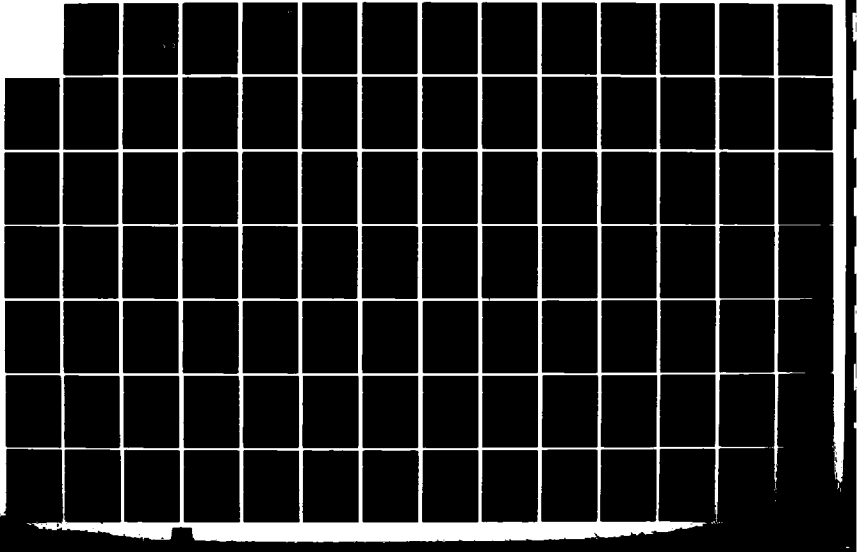
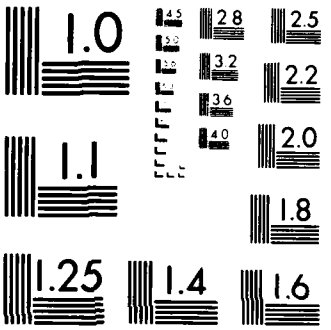
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ENVIRONMENTAL CHARACTERISTICS OF ALTERNATIVE DESIGNATED DEPLOYMENT AREAS: NATIVE AMERICANS--NEVADA/UTAH

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Prepared for

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

By

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Federal, State and Local Agencies

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

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

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

Sincerely,

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

1 Attachment
Preliminary FEIS

TABLE OF CONTENTS

		Page
1.0 Introduction		1
1.1 Legal Background		1
1.1.1 Trust Status		1
1.1.2 EIS Legislation		4
1.1.2.1	Reservation Land	4
1.1.2.2	Indian Water Rights	5
1.1.2.3	National Historic Preservation Law and Implementing Guidelines	6
1.1.2.4	Protection and Preservation of American Indian Religious Freedom	6
1.1.2.5	Employment and Community Well-Being	6
1.1.3 Te-Moak Shoshone Land Claim		8
1.1.4 Paiute Indian Tribe of Utah, Termination and Reinstatement		10
1.2 Scope of Study		11
1.2.1 Cultural Resources		14
1.2.2 Land and Water Use		14
1.2.3 Socioeconomic Characteristics		14
1.3 Perspective and Context of the Study		16
1.3.1 Cultural Persistence Theory		17
1.3.1.1	Political Incorporation	18
1.3.1.2	Demographic Incorporation	18
1.3.1.3	Ecclesiastical Incorporation	19
1.3.1.4	Economic Incorporation	19
1.3.2 Discussion		20
1.4 Ethnographic Overview		21
1.4.1 Past Tribal Distributions in the Great Basin		21
1.4.1.1	Early Tribal Distributions	21
1.4.1.2	Historic Modern Tribal Distributions	25
1.4.2 Traditional Floral and Faunal Resources		27
1.4.2.1	Traditional Subsistence Patterns	27
1.4.2.2	Religious Significance of Native Flora and Fauna	44

			Page
		1.4.2.3 Contemporary Significance of Native Flora and Fauna	59
	1.4.3	Great Basin Sacred Areas	69
		1.4.3.1 Problems in the Identification of Sacred Areas	71
		1.4.3.2 Sacred Sites and Areas	73
		1.4.3.3 Discussion	85
	1.4.4	Historic and Modern Occupation Areas	86
		1.4.4.1 Washo Reservation	87
		1.4.4.2 Northern Paiute	88
		1.4.4.3 Ute	91
		1.4.4.4 Southern Paiute	95
		1.4.4.5 Western Shoshone	106
2.0	Cultural Resources		117
	2.1	Existing Cultural Resource Data	117
	2.2	Western Shoshone	119
	2.2.1	Introduction	119
	2.2.2	Religion and World View	123
	2.2.3	Kinship	124
	2.2.4	Cultural Persistence	124
	2.2.5	Project Impacts	125
		2.2.5.1 Duckwater Reservation	125
		2.2.5.2 Ely Colony	127
		2.2.5.3 Goshute Reservation	128
		2.2.5.4 South Fork Reservations	129
		2.2.5.5 Yomba Reservation	130
	2.3	Nevada Southern Paiutes	132
	2.3.1	Introduction	132
	2.3.2	Religion and World View	133
	2.3.3	Kinship Networks	134
	2.3.4	Cultural Persistence	134
	2.3.5	Project Impacts	135
		2.3.5.1 Moapa Reservation	137
		2.3.5.2 Las Vegas Colony	138
	2.4	Paiute Indian Tribe of Utah	140

			Page
2.4.1	Introduction		140
2.4.2	Religion and World View		141
2.4.3	Kinship		141
2.4.4	Cultural Persistence		142
2.4.5	Project Impacts		142
	2.4.5.1	Impacts on Hunting and Gathering	144
	2.4.5.2	Impacts on Sacred and Ancestral Sites	144
2.5	Mitigation Measures		145
3.0	Land and Water Use		151
3.1	Land Use and Impacts to Land Use		151
3.1.1	Introduction		151
3.1.2	Yomba Reservation		155
	3.1.2.1	Land Holdings	155
	3.1.2.2	Land Use	155
	3.1.2.3	Siting Information	158
	3.1.2.4	Impacts on Land Use	159
	3.1.2.5	Comparison of Alternatives	160
3.1.3	Goshute Reservation		160
	3.1.3.1	Land Holdings	160
	3.1.3.2	Land Use	160
	3.1.3.3	Siting Information	162
	3.1.3.4	Impacts on Land Use	162
	3.1.3.5	Comparison of Alternatives	163
3.1.4	South Fork Reservation		163
	3.1.4.1	Land Holdings	163
	3.1.4.2	Land Use	163
	3.1.4.3	Siting Information	166
	3.1.4.4	Impacts on Land Use	166
	3.1.4.5	Comparison of Alternatives	167
3.1.5	Duckwater Reservation		167
	3.1.5.1	Land Holdings	167
	3.1.5.2	Land Use	168
	3.1.5.3	Siting Information	170
	3.1.5.4	Impacts on Land Use	171
	3.1.5.5	Comparison of Alternatives	172
3.1.6	Ely Colony		172

		Page
3.1.6.1	Land Holdings	172
3.1.6.2	Land Use	172
3.1.6.3	Siting Information	172
3.1.6.4	Impacts on Land Use	174
3.1.6.5	Comparison of Alternatives	174
3.1.7	Moapa Reservation	174
3.1.7.1	Land Holdings	174
3.1.7.2	Land Use	174
3.1.7.3	Siting Information	177
3.1.7.4	Impacts on Land Use	177
3.1.7.5	Comparison of Alternatives	178
3.1.8	Paiute Indian Tribe of Utah	178
3.1.8.1	Siting Information	178
3.1.8.2	Impacts	179
3.2	Water Resources and Impacts	179
3.2.1	Introduction	179
3.2.2	Duckwater Reservation	181
3.2.2.1	Water Resources	181
3.2.2.2	Water Use	181
3.2.2.3	Siting Information	182
3.2.2.4	Impacts	182
3.2.3	Moapa Reservation	183
3.2.3.1	Water Resources	183
3.2.3.2	Water Use	183
3.2.3.3	Siting Information	185
3.2.3.4	Impacts	185
3.3	Mitigation Measures	187
4.0	Socioeconomic Characteristics	189
4.1	Demography	190
4.1.1	Introduction	190
4.1.2	Baseline Demographic Structure	191
4.1.2.1	Population	191
4.1.2.2	Age Structure	195
4.1.2.3	Household Size	195
4.1.2.4	In-Migration of Native Americans	195

			Page
	4.1.2.5	Out-Migration of Native Americans	198
	4.1.2.6	Mobility of Native Americans	198
4.1.3	Demographic Impacts		198
	4.1.3.1	Population	198
	4.1.3.2	Age Structure	205
	4.1.3.3	Household Size	207
	4.1.3.4	In-Migration	209
	4.1.3.5	Out-Migration	210
	4.1.3.6	Mobility	212
4.2	Economics		213
4.2.1	Introduction		213
4.2.2	Baseline Economics		213
	4.2.2.1	Income	213
	4.2.2.2	Labor Force	215
	4.2.2.3	Public Finance	221
	4.2.2.4	Inflation	229
	4.2.2.5	Subsistence Activities	229
4.2.3	Impacts		230
	4.2.3.1	Income	230
	4.2.3.2	Labor Force	237
	4.2.3.3	Public Finance	240
	4.2.3.4	Inflation	241
	4.2.3.5	Subsistence Activities	243
4.3	Community Infrastructure		245
4.3.1	Introduction		245
4.3.2	Baseline Community Infrastructure		245
	4.3.2.1	Schools	245
	4.3.2.2	Health	245
	4.3.2.3	Housing	247
	4.3.2.4	Public Services	248
	4.3.2.5	Transportation	256
	4.3.2.6	Communications	258
	4.3.2.7	Tribal Jurisdiction	260
4.3.3	Impacts		262
	4.3.3.1	Schools	263
	4.3.3.2	Health	267
	4.3.3.3	Housing	268
	4.3.3.4	Public Services	272

Page

4.3.3.5 Transportation 275
4.3.3.6 Communications 276
4.3.3.7 Tribal Jurisdiction 277

4.4 Mitigation Measures 279

5.0 Impact Assessment 281

5.1 Impact Methodologies 281

5.1.1 Cultural Resources 281
5.1.2 Land and Water 285
5.1.3 Socioeconomic Characteristics 285

5.1.3.1 Demographic Methodologies 285
5.1.3.2 Economic Methodologies 301
5.1.3.3 Community Infrastructure Methodologies 351

5.2 Impact Significance Levels 382

5.2.1 Cultural Resources 382
5.2.2 Land and Water 391
5.2.3 Socioeconomic Characteristics 391

5.2.3.1 Population Growth and Decline 391
5.2.3.2 Age Structure 394
5.2.3.3 Persons Per Dwelling Unit 394
5.2.3.4 Mobility Patterns 394
5.2.3.5 Total Personal Income and Per Capita Income 395
5.2.3.6 Labor Force 395
5.2.3.7 Public Finance Stress 395
5.2.3.8 Regional Inflation 395
5.2.3.9 Subsistence Activities 396
5.2.3.10 Schools 396
5.2.3.11 Housing 396
5.2.3.12 Public Services 396
5.2.3.13 Tribal Services and Governments 396
5.2.3.14 Transportation and Communications 396
5.2.3.15 Tribal Jurisdiction 397

6.0 Projected Baseline Without M-X 399

7.0 Appendices 401

Appendix A. Land Uses and Land Descriptions 403

A.1 Ruby Valley Treaty 403
A.2 Paiute Indian Tribe of Utah Termination and Reinstatement 405
A.3 Descriptions of Reservation Lands in or Peripheral to the DDA 411

			Page
	A.3.1	South Fork, Odger's Ranch, and Ruby Valley Reservations (Te Moak)	411
	A.3.2	Yomba Reservation	411
	A.3.3	Duckwater Reservation	421
	A.3.4	Goshute Reservation	425
	A.3.5	Moapa Reservation	425
Appendix B. Water Issues on Reservations in or Peripheral to the DDA			433
	B.1	South Fork, Odger's Ranch, and Ruby Valley Reservations (Te-Moak)	435
	B.2	Yomba Reservation	436
	B.3	Duckwater Reservation	441
	B.4	Goshute Reservation	446
	B.5	Moapa Reservation	446
8.0 Bibliography			449

LIST OF FIGURES

No.		Page
1.2-1	Designated Deployment Area of Nevada/Utah	13
1.2.3-1	Region of Influence and Areas of Analysis for Nevada/Utah Native Americans	15
1.4.1-1	The Uto-Aztecan Family of Languages	22
1.4.1-2	The Numic Branch of Uto-Aztecan in the Great Basin area	23
1.4.1-3	Traditional linguistic boundaries of Great Basin Indians	26
1.4.1-4	Native American reservations and colonies and Proposed Action conceptual project layout in Nevada/Utah	28
1.4.2-1	Former distribution of bison in Nevada, Utah and Idaho	36
1.4.2-2	Distribution of Pinyon-Juniper Woodlands in the Study Area	68
1.4.4-1	Historical distribution of Northern Paiutes	89
1.4.4.2	Occupational areas of the Western Ute	93
1.4.4-3	Historical distribution of the Southern Paiute bands	98
1.4.4-4	Major historical trails in the Great Basin	100
1.4.4-5	Southern Paiute reservations and colonies	102
1.4.4-6	Historic occupational areas of the Western Shoshone and the Proposed Action conceptual layout	115
2.1-1	Native American cultural resources known and predicted sensitive areas	121
2.2.1-1	Major river systems of concern to Native Americans in Nevada and Western Utah	122
3.1.1-1	Native American reservations and colonies and M-X project activity in Nevada/Utah, full deployment	153
3.1.1-2	Native American reservations and colonies and M-X project activity in Nevada/Utah, split deployment	154
3.1.2-1	Yomba reservation and ranches	156

No.		Page
3.1.2-2	Yomba grazing lands	157
3.1.3-1	Goshute reservation	161
3.1.4-1	South Fork reservations	164
3.1.4-2	Odger's ranch and grazing allotment	165
3.1.5-1	Duckwater reservation and grazing lands	169
3.1.6-1	Ely colony	173
3.1.7-1	Moapa reservation	175
3.2.3-1	Muddy River drainage basin	184
5.1.1-1	Native American sensitive sites and areas in the vicinity of Delamar Valley	283
5.1.1-2	Native American sensitive sites and areas in the vicinity of Cactus Flat Valley	284

LIST OF TABLES

No.		Page
1.4.2-1	Major edible plants used by Great Basin Indians	32
1.4.2-2	General seasonal subsistence and settlement cycles of Great Basin Indians	39
1.4.2-3	Major plants used in manufacturing in the Great Basin and the traditional usage	42
1.4.2-4	Medicinal plants Used by Great Basin Indians	45
1.4.2-5	Common fauna used by Great Basin Indians	63
1.4.2-6	Major health problems reported at thirteen Nevada Indian reservations and colonies	65
1.4.2-7	Commonly used minerals of the Great Basin Indians	70
1.4.4-1	Probable location of Western Ute archeological site concentrations in the Utah study area	96
1.4.4-2	Probable location of Southern Paiute site concentrations in Nevada/Utah study area	105
2.3.5-1	Potential impacts to significant Native American cultural sites in the vicinity of Coyote Spring for the Proposed Action and for Alternatives 1, 2, 4, and 6	136
4.1.2-1	Native American resident population, 1973 and 1980	192
4.1.2-2	Native American baseline population projections by areas of analysis	193
4.1.2-3	Nevada/Utah Native American populations, tribal affiliations, areas of analysis	194
4.1.2-4	Percentage age distribution by residents, area of analysis	196
4.1.2-5	Average family size by area of analysis	197
4.1.3-1	Peak year (1987) M-X-related population influx and percent increase over baseline for AOAs, Proposed Action, and alternatives	199
4.1.3-2	Long-term (1992), M-X-related population influx and percent increase by AOA and alternatives	201

No.		Page
4.2.2-1	Per capita incomes and total personal incomes for the Nevada/Utah Native American AOAs (1980 dollars)	214
4.2.2-2	Projected baseline personal income levels for the Nevada/Utah AOAs	216
4.2.2-3	Labor force size and labor force participation rates by area of analysis, 1980	217
4.2.2-4	Native American labor force participation rates, by area of analysis, 1980, 1987, and 1992	218
4.2.2-5	Projected Native American baseline labor force sizes by year, 1980-1992	219
4.2.2-6	Native American labor force, employment, unemployment, and unemployment rates, by area of analysis, 1980	220
4.2.2-7	Occupational classification of employed workers, by area of analysis	222
4.2.2-8	Recent grants and loans to the Duckwater tribe	223
4.2.2-9	Recent grants and loans to the Yomba tribe	225
4.2.2-10	Recent grants and loans to the Moapa tribe	226
4.2.3-1	Peak-year (1987) M-X-related total personal income and percent increase over baseline by AOA and alternative	231
4.2.3-2	Long-term (1992) M-X-related total personal income and changes, by area of analysis, Proposed Action, and alternatives	233
4.2.3-3	Unemployment rates, baseline, peak-year 1987, and long-term (1992), by AOA and alternative	238
4.3.2-1	Native American school age children baseline projections, by AOA, 1980-1992	246
4.3.2-2	Number of persons per household at Native American AOAs, 1980	249
4.3.2-3	Native American housing units baseline projection, by AOA, 1980-1992	250
4.3.3-1	Absolute changes in school age population, peak-year and long-term, by AOA and alternative	264

No.		Page
4.3.3-2	Absolute changes in housing demand, peak-year (1987) and long-term (1992), by AOA and alternative	270
5.1.3.1-1	Estimate of average annual population growth rates, by area of analysis	287
5.1.3.1-2	Baseline population projections, by area of analysis, 1987 and 1992	288
5.1.3.1-3	Estimated age distribution, by area of analysis	289
5.1.3.1-4	Age distributions, by area of analysis, peak year and long term	290
5.1.3.1-5	Estimated 1980 persons per household, by area of analysis	291
5.1.3.1-6	Areas of analysis with 30 mi of operating bases, by alternative	294
5.1.3.1-7	Allocation of construction worker in-migrants, by area of analysis	295
5.1.3.1-8	Estimated in-migration of construction workers and their households, by area of analysis, peak year (1987)	296
5.1.3.1-9	Allocation of operation in-migrants (workers) to areas of analysis, by alternative	298
5.1.3.1-10	Total in-migration of operation workers and their families by area of analysis and by alternative	299
5.1.3.1-11	Total in-migration by area of analysis and by alternative	300
5.1.3.2-1	Estimates of total personal income and per capita personal income, 1980, by area of analysis	302
5.1.3.2-2	Projected baseline total personal income, by area of analysis, peak year and long term	303
5.1.3.2-3	Change in total personal income, peak year (1987), by area of analysis, Proposed Action	304
5.1.3.2-4	Change in total personal income, peak year (1987), by area of analysis, Alternative 1	305
5.1.3.2-5	Change in total personal income, peak year (1987), by area of analysis, Alternative 2	306

No.		Page
5.1.3.2-6	Change in total personal income, peak year (1987), by area of analysis, Alternative 3	307
5.1.3.2-7	Change in total personal income, peak year (1987), by area of analysis, Alternative 4	308
5.1.3.2-8	Change in total personal income, peak year (1987), by area of analysis, Alternative 5	309
5.1.3.2-9	Changes in total personal income, peak year (1987), by area of analysis, Alternative 6	310
5.1.3.2-10	Change in total personal income, peak year (1987), by area of analysis, Alternative 8	311
5.1.3.2-11	Change in total personal income, long-term (1992), by area of analysis, Proposed Action, and all alternatives	312
5.1.3.2-12	Percentage change in total personal income, by area of analysis, Proposed Action	313
5.1.3.2-13	Percentage change in total personal income, by area of analysis, Alternative 1	314
5.1.3.2-14	Percentage change in total personal income, by area of analysis, Alternative 2	315
5.1.3.2-15	Percentage change in total personal income, by area of analysis, Alternative 3	316
5.1.3.2-16	Percentage change in total personal income, by area of analysis, Alternative 4	317
5.1.3.2-17	Percentage change in total personal income, by area of analysis, Alternative 5	318
5.1.3.2-18	Percentage change in total personal income, by area of analysis, Alternative 6	319
5.1.3.2-19	Percentage change in total personal income, by area of analysis, Alternative 8	320
5.1.3.2-20	Labor force participation rates, by area of analysis	321
5.1.3.2-21	Projected labor force participation rates, by area of analysis, peak year and long-term	323
5.1.3.2-22	Projections of baseline labor force, by peak year and long-term, by area of analysis	324

No.		Page
5.1.3.2-23	Projected changes in the size of the labor force, by peak year and long-term, by area of analysis, Proposed Action	325
5.1.3.2-24	Projected changes in the size of the labor force, by peak year and long-term, Alternative 1	326
5.1.3.2-25	Projected changes in the size of the labor force, by peak year and long-term, Alternative 2	327
5.1.3.2-26	Projected changes in the size of the labor force, by peak year and long-term, Alternative 3	328
5.1.3.2-27	Projected changes in the size of the labor force, by peak year and long-term, Alternative 4	329
5.1.3.2-28	Projected changes in the size of the labor force, by peak year and long-term, Alternative 5	330
5.1.3.2-29	Projected changes in the size of the labor force, by peak year and long-term, Alternative 6	331
5.1.3.2-30	Projected changes in the size of the labor force, peak year and long-term, Alternative 8	332
5.1.3.2-31	Projected labor force, peak year (1987), by area of analysis, Proposed Action	333
5.1.3.2-32	Projected labor force, peak year (1987), by area of analysis, Alternative 1	334
5.1.3.2-33	Projected labor force, peak year (1987), by area of analysis, Alternative 2	335
5.1.3.2-34	Projected labor force, peak year (1987), by area of analysis, Alternative 3	336
5.1.3.2-35	Projected labor force, peak year (1987), by area of analysis, Alternative 4	337
5.1.3.2-36	Projected labor force, peak year (1987), by area of analysis, Alternative 5	338
5.1.3.2-37	Projected labor force, peak year (1987), by area of analysis, Alternative 6	339
5.1.3.2-38	Projected labor force, peak year (1987), by area of analysis, Alternative 8	340
5.1.3.2-39	Projected unemployment rates, peak year (1987), by area of analysis, Proposed Action	341

No.		Page
5.1.3.2-40	Projected unemployment rates, peak year (1987), by area of analysis, Alternative 1	342
5.1.3.2-41	Projected unemployment rates, peak year (1987), by area of analysis, Alternative 2	343
5.1.3.2-42	Projected unemployment rates, peak year (1987), by area of analysis, Alternative 3	344
5.1.3.2-43	Projected unemployment rates, peak year (1987), by area of analysis, Alternative 4	345
5.1.3.2-44	Projected unemployment rates, peak year (1987), by area of analysis, Alternative 5	346
5.1.3.2-45	Projected unemployment rates, peak year (1987), by area of analysis, Alternative 6	347
5.1.3.2-46	Projected unemployment rates, peak year (1987), by area of analysis, Alternative 8	348
5.1.3.2-47	Projected unemployment rates, long-term (1992), by AOA, by alternative	349
5.1.3.2-48	Unemployment rates, baseline year, peak year (1987), and long-term (1992), by AOA and alternative	350
5.1.3.3-1	Projected baseline school-age population (6-17)	352
5.1.3.3-2	Projected change in school-age population (6-17), by area of analysis, peak year and long-term, Proposed Action	353
5.1.3.3-3	Projected change in school-age population (6-17), by area of analysis, peak year and long-term, Alternative 1	354
5.1.3.3-4	Projected change in school-age population (6-17), by area of analysis, peak year and long-term, Alternative 2	355
5.1.3.3-5	Projected change in school-age population (6-17), by area of analysis, peak year and long-term, Alternative 3	356
5.1.3.3-6	Projected change in school-age population (6-17), by area of analysis, peak year and long-term, Alternative 4	357
5.1.3.3-7	Projected change in school-age population (6-17), by area of analysis, peak year and long-term, Alternative 5	358
5.1.3.3-8	Projected change in school-age population (6-17), by area of analysis, peak year and long-term, Alternative 6	359

No.		Page
5.1.3.3-9	Projected change in school-age population (6-17), by area of analysis, peak year and long-term, Alternative 8	360
5.1.3.3-10	Percentage change in school-age population, by area of analysis, peak year and long-term, Proposed Action	361
5.1.3.3-11	Percentage change in school-age population, by area of analysis, peak year and long-term, Alternative 1	362
5.1.3.3-12	Percentage change in school-age population, by area of analysis, peak year and long-term, Alternative 2	363
5.1.3.3-13	Percentage change in school-age population, by area of analysis, peak year and long-term, Alternative 3	364
5.1.3.3-14	Percentage change in school-age population, by area of analysis, peak year and long-term, Alternative 4	365
5.1.3.3-15	Percentage change in school-age population, by area of analysis, peak year and long-term, Alternative 5	366
5.1.3.3-16	Percentage change in school-age population, by area of analysis, peak year and long-term, Alternative 6	367
5.1.3.3-17	Percentage change in school-age population, by area of analysis, peak year and long-term, Alternative 8	368
5.1.3.3-18	Percentage change in school-age population, peak year, by area of analysis and alternatives	369
5.1.3.3-19	Percentage decrease in school-age population, long-term, by area of analysis and alternative	370
5.1.3.3-20	Changes in housing demand, by area of analysis, peak year and long-term, Proposed Action	372
5.1.3.3-21	Changes in housing demand, by area of analysis, peak year and long-term, Alternative 1	373
5.1.3.3-22	Changes in housing demand, by area of analysis, peak year and long-term, Alternative 2	374
5.1.3.3-23	Changes in housing demand, by area of analysis, peak year and long-ter , Alternative 3	375
5.1.3.3-24	Changes in housing demand, by area of analysis, peak year and long-term, Alternative 4	376
5.1.3.3-25	Changes in housing demand, by area of analysis, peak year and long-term, Alternative 5	377

No.		Page
5.1.3.3-26	Changes in housing demand, by area of analysis, peak year and long-term, Alternative 6	378
5.1.3.3-27	Changes in housing demand, by area of analysis, peak year and long-term, Alternative 8	379
5.1.3.3-28	Changes in housing demand, by area of analysis, by alternative, peak year (1987)	380
5.1.3.3-29	Changes in housing demand, by area of analysis, by alternative, long-term (1992)	381
5.2.1-1	Potential impacts to significant Native American cultural sites in the vicinity of Coyote Spring for the Proposed Action and for Alternatives 1-6	383
5.2.1-2	Potential impacts to significant Native American cultural sites in the vicinity of Coyote Spring for the Proposed Action and for Alternatives 1, 2, 4, and 6	384
5.2.1-3	Potential impacts to significant Native American cultural sites in the vicinity of Milford for the Proposed Action and for Alternatives 5 and 6	385
5.2.1-4	Potential impacts to significant Native American cultural sites in the vicinity of Beryl for Alternatives 1, 3, and 4	386
5.2.1-5	Potential impacts to significant Native American cultural sites in the vicinity of Delta for Alternative 2	387
5.2.1-6	Potential impacts to significant Native American cultural sites in the vicinity of Ely for Alternatives 3 and 5	388
5.2.1-7	Potential impacts to significant Native American cultural sites in Nevada/Utah split-basing DDA, Alternative 8	389
5.2.2-1	Potential impact to Native American water accessibility and land use in the Nevada/Utah DDA for the Proposed Action and Alternatives 1-6	392
5.2.2-2	Potential impact to Native American water accessibility and land use in Coyote Spring operating base suitability zone for the Proposed Action and Alternatives 1, 2, 4, 6, and 8	393

1.0 INTRODUCTION

1.1 LEGAL BACKGROUND

In order to properly understand the impact of M-X deployment in Nevada/Utah on Native Americans, it is important to briefly explain the relationships which exist between the federal government and American Indians. More detailed discussions of the relationships are available, and several eloquent summaries were presented as public response to the draft EIS. The following is simply a summary of the relationship from a historical and present-day perspective.

TRUST STATUS (1.1.1)

The relationship between the federal government and American Indians has evolved continuously over the past two hundred years. However, in order to understand the current status of that relationship, it is important to understand the historical origins of the federal policy toward American Indians.

From the beginning, Congress held total responsibility over the interaction between the newly created states and the Native Americans. Article III of the Northwest Ordinance of 1787, which was ratified by the first Congress assembled under the new Constitution in 1789, 1 Stat. 50, 52, declared:

> The utmost good faith shall always be observed toward the Indians; their lands and property shall never be taken from them without their consent; and in their property, rights, and liberty they shall never be invaded or disturbed, unless in just and lawful wars authorized by Congress; but laws founded in justice and humanity shall, from time to time, be made, for preventing wrongs being done to them, and for preserving peace and friendship with them.

Similarly, Article 1, Section 8 of the United States Constitution provides that Congress shall have the power "(t)o regulate commerce with foreign nations, and among the several states, and with Indian Tribes." Based on this authority Congress established the framework of the federal-Indian relationship by entering into treaties with Indian tribes in the 1800s. Treaties were in essence agreements with the Indian groups wherein the Indians agreed to give up certain sovereign powers in exchange for the retention of their recognized land areas and for protection by the federal government. As stated by the Supreme Court in Board of County Commissioners v. Seber, 318 U.S. 705, 715 (1943):

> In the exercise of the war and treaty powers, the United States overcame the Indians and took possession of their lands, sometimes by force, leaving them an uneducated, helpless and dependent people, needing protection against the selfishness of others and their own improvidence. Of necessity, the United States assumed the duty of furnishing that protection, and with it the authority to do all that was required to perform that obligation and to prepare the Indians to take their place as independent, qualified members of the modern body politic.

Although the framework of the federal-Indian relationship has been established by treaties, statutes, and executive orders, the Supreme Court has

played a vital role in defining the characteristics and legal parameters of this unique relationship. In the case entitled Cherokee Nation v. Georgia 5 Pet. 1 (1831), Chief Justice John Marshall described the Indian's relationship to the United States as resembling "that of a ward to his guardian." From that description courts have subsequently implied that the federal government has a "trust obligation" to the Indians and, therefore, acts as a trustee when it deals with the Indians.

The true nature of the federal government's trust obligation to American Indians is not, however, easily explained and is certainly not subject to precise legal definition. On the one hand, the Supreme Court has implied that the government has a responsibility toward the Indians that is similar to the fiduciary obligations imposed on an ordinary trustee (see Seminole Nation v. United States, 316 U.S. 286 (1942)). On the other hand, the Supreme Court has recently held that some Acts of Congress impose only "limited" trust responsibilities, and that in order to determine the government's obligations to the Indians a careful analysis of applicable treaties and statutes must be made in each case (see United States v. Mitchell, 63 L.Ed.2d 607 (1980)).

Even though the scope of the federal government's obligation to the Indians is rather imprecise, some aspects of Indian law are well settled and significant in regard to this project. Since it is clear that the 19th century treaties involved grants of power from the Indians to the United States, instead of grants of power from the United States to the Indians, the principle that the tribes are sovereign political entities is firmly established. In various attempts to articulate the powers generally retained by Indian tribes in America today, the Supreme Court has basically held that Indian tribes have sovereign authority over their tribal members and their respective reservations. By submitting to the overriding sovereignty of the United States, Indian tribes have relinquished such powers as their authority to deal directly with foreign nations and to exercise criminal jurisdiction over non-Indians. Furthermore, although the Supreme Court held in 1832 (Worcester v. Georgia 6 Pet. 515 (1832)) that the states had no jurisdiction whatsoever over Indian reservations, that legal principal has been modified by subsequent Supreme Court decisions. Today the states may generally exercise limited jurisdiction over the activities of non-Indians on Indian reservations, except where such jurisdictional intrusions interfere with tribal self-government or are preempted by federal law (McClanahan v. Arizona State Tax Commission 411 U.S. 164 (1973)).

It is clear then, that Indian tribes retain considerable sovereign powers within their respective reservations. Moreover, recent federal Indian policy reflects an intention to preserve and strengthen the tribal political structure. In this direction, Congress has recently passed legislation which allows Indian tribes to assume more authority over the management of programs administered for their benefit by the Bureau of Indian Affairs, and Indian Health Service (see Indian Self-Determination and Education Assistance Act, 25 USC 450 et seq.).

Given this general background, it is important to articulate the federal government's responsibility to American Indians when the government undertakes to construct a project which may, directly or indirectly, impact the Indians and their reservations. Initially, it is clear that Congress may unilaterally abrogate or modify Indian treaties, and that Congress may condemn Indian lands (subject to the possible application of the 5th Amendment provision of just compensation for the taking of property). However, in the absence of such extreme measures, the focus is more properly on the actions of the Executive Branch in carrying out its congressionally assigned tasks.

Although it is again difficult to draw clear legal conclusions in this area of federal-Indian relations, it is safe to say that the federal government's most obvious and clear responsibility to the Indians involves the protection of their natural resources. Although the United States holds legal title to all Indian trust lands, the Supreme Court has made clear that the Indians hold significant rights of ownership in their lands and are ultimately responsible and in control of how their lands are managed and utilized, unless otherwise directed by Congress (see Federal Indian Law (1958) pg. 440-444).

Furthermore, since water rights have been held to be equal to rights in real property, whatever duties extend to protection of Indian lands probably also extend to Indian water rights as well.

The impact of these duties constrains the Executive Branch with respect to Indian property rights when it undertakes non-Indian projects. Unless Congress authorizes a taking of Indian lands or some other intrusion, the Executive Branch must be careful to avoid impacts which would injure or destroy Indian rights in real property and other natural resources. Moreover, this obligation is made much more significant because of the trust status of Indian lands. In other words, the care required to be exercised by the federal government may be of a higher degree in regard to Indian lands than in regard to ordinary private lands.

Beyond the area of real property related interests, the duties of the Executive Branch become much more difficult to articulate. Some people assert that the government has fiduciary obligations to the Indian in relation to such matters as social services, education, and preservation of cultural integrity. However, others assert that such broad "trust responsibilities" do not exist, and that the Executive Branch only has those responsibilities clearly set forth by Congress in treaties or federal statutes. Regardless of the merits of each approach, it is clear that Congress has set forth specific guidelines to the Executive Branch which must be followed in relation to actions which affect Indians. Probably the best, and most relevant, example is the American Indian Religious Freedom Act (42 USC 1996), which seeks to safeguard Indian cultural values through the protection of religious practices which are important to American Indians.

PUBLIC COMMENTS ON THE DRAFT EIS:

"Perhaps the most glaring deficiency in the draft Environmental Impact Statement is its failure to understand this fundamental concept of the nature and power of Indian tribes. Thus, it appears that the drafters of the Impact Statement failed to recognize that Indian tribes should be treated as governmental entities and not like clubs or incorporated private associations. Since the Air Force does not recognize Indian tribes as units of local government, it has similarly failed to analyze the potential effect and impact of the M-X Missile System on plans and goals of the tribe." (A1030-5-004)

"The Draft EIS indicates that the Air Force is not aware of the governmental status of the tribes. This is a serious inadequacy of the EIS. Furthermore, the failure of the Air Force to consult with the tribes in accordance with their status during the preparation of this EIS has

contributed to other serious inadequacies. We believe that the actions of the Air Force have not been consistent with the Federal trust responsibility to the tribes." (A1160-0-098).

"We believe that the construction of the M-X in Nevada and Utah would be contrary to the Federal Government's trust responsibility to the Indians of the Great Basin. As stated in the Bureau of Indian Affairs Manual (30BIAM 1.3D):

"The trust responsibility is based on numerous treaties and agreements between the Federal Government and the tribes, acts of Congress, and decisions of Federal courts. The underlying purposes of the trust relationship is to make it possible for the tribes to survive as distinct political and cultural entities."

"While the doctrine of the trust responsibility has evolved primarily in the context of land which is held in trust for Indians, we believe that it is a responsibility that extends to all the agencies of the Federal Government when their actions have impacts on the tribes. Since the proposal to build the M-X in Nevada and Utah threatens the very survival of the tribal cultures of that region, we believe that it would be contrary to the Federal trust relationship." (A1160-0-002)

"The utmost good faith shall always be observed towards the Indians, their lands and property shall never be taken from them without their consent and their property rights and liberty never shall be invaded or disturbed unless in just and lawful wars authorized by Congress"... (Thomas Jefferson, 1787). (A0628-7-001)

EIS LEGISLATION (1.1.2)

Like non-Indian interests, Congress has also sought to protect Indian environmental concerns through the application of the National Environmental Policy Act (NEPA). As set forth in 42 USC 4331(4), it is the responsibility of the federal government "to use all practical means, consistent with other considerations of national policy" ... so that the nation may ..."preserve important historic, cultural and natural heritage, and maintain whenever possible an environment which supports diversity and variety of individual choice." Native Americans have a special implementing regulation that requires agencies to give "notice to federally recognized Indian tribes when effects may occur on reservations." This notice to the Indian tribes (40 CFR 1506.6) is part of the decisionmaking process in which an affected Indian tribe is invited to participate (40 CFR 1507.7(a)(1)). The effects or impacts on an Indian tribe include both benefits and detriments (40 CFR 1508.8(b)). In integrating Indian interests into the NEPA process, there are five areas of concern which will probably receive the most attention. These areas are set forth in more detail below.

Reservation Land (1.1.2.1)

In exercising its exclusive authority over Indian lands, Congress has for many years required Congressional consent before Indian lands may be sold or alienated in

any other manner (25 USC 177). Through statutes, Congress has allowed for the leasing of Indian lands and for the granting of rights-of-way over Indian lands. Both procedures are heavily regulated through authority vested in the Secretary of the Interior by Congress.

Leasing of Indian lands is governed by 25 USC 415 et seq. and other statutes. Regulations governing leases on Indian lands are contained in 25 CFR Part 131. In allowing for leases on Indian lands, Congress has chosen to make the Indians (either the tribe or individuals) the grantors or lessors, and the Secretary of the Interior is given the authority of approving all leases executed. The Secretary's approval authority is subject to NEPA, and therefore, an EIS is required where significant environmental impacts might occur.

Unlike the arrangement for leases, Congress has made the Secretary the grantor of right-of-way over Indian lands, although it is necessary to obtain Indian approval of the right-of-way before it is granted. The granting of rights-of-way over Indian lands is governed by 25 USC 311 et seq., and the regulations covering rights-of-way are contained in 25 CFR Part 161.

Indian Water Rights (1.1.2.2)

Although this is an evolving area of the law, it is safe to say that the most important Indian water rights are the federal reserved water rights or "Winters Doctrine". Federal reserved water rights were first recognized by the Supreme Court in the case of Winters v. United States, 207 U.S. 564 (1908). Winters holds that when federal land is reserved for a specific use, such as for a military or Indian reservation, sufficient appurtenant water is reserved to fulfill the purposes of the reservation. The federal reserved right operates only on unappropriated water, that is, water which has not been claimed and used by anyone else prior to the creation of the reservation. Once the reserved water rights have been created, subsequent attempts by individuals to obtain state water rights to the same water are void and of no effect. The priority date for reserved water rights is the date of the creation of the reservation. Finally, reserved water rights are unlike state water rights in that they cannot be lost through nonuse. Once they have been established, the quantity reserved is available for use on the reservation whenever needed.

Although one standard for quantifying Indian reserved rights is that amount of water needed to irrigate reservation lands (Arizona v. California, 373 U.S. 546 (1963)), other courts have recognized that water may be reserved to fulfill other purposes, such as the maintenance of fisheries and for industrial uses. Indian reserved water rights may be satisfied through the use of groundwater (Cappaert v. United States, 426 U.S. 128 (1976)), or through the use of replacement supplies if the original source has been diverted (Colville Confederated Tribes v. Walton, 9th Cir., 1981).

Indian reserved water rights are not subject to state law in any manner, except in the judicial quantification of water rights. Although Indian reserved water rights are wholly a result of federal law, Congress has allowed, through 43 USC 666, for state courts to exercise jurisdiction over federal reserved rights, including Indian rights, in appropriate state court water adjudications. Appropriate adjudications are those encompassing all users in a watershed which will result in a comprehensive determination of all rights and claims.

National Historic Preservation Law and Implementing Guidelines (1.1.2.3)

When dealing with antiquities, the Native American's power to influence the decisionmakers is particularly potent.

Under 36 CFR sec. 800.15, federally recognized tribes are encouraged to participate in the review process "in evaluating National Register and eligible properties determining effect and developing alternatives to avoid or mitigate an adverse effect." Executive Order 11593 directs all land-holding agencies in the federal government to identify and nominate historic properties for the National Register. The order places an affirmative duty of care on all federal agencies managing properties that might be eligible for the National Register. Sections 3(a) and 7(a) of the Archaeological and Historic Preservation Act of 1974 establish two options for an agency to use or preserve these properties: (1) the agency may perform the required work or (2) the agency may request the Secretary of the Interior to perform the work using a fund transfer of up to one percent of the total cost of the project (16 USCA 469 (c)). The National Park Service will ordinarily not use funds for preservation of resources until the agency informs NPS that it has complied with NEPA, the National Historic Preservation Act, and Executive Order 11593 (Fed. Regis. Vol. 44 No. 59, 26 Mar 1979).

It should be noted, for purposes of analysis, that if an historic or ancient site meets the standards for inclusion in the National Register, any change in the site must be considered by using the "adverse effect" criteria of 36 CFR 800.3. An undertaking concerning the site is considered to have an "effect" when it may cause any change, either beneficial or adverse, in the quality that causes the property to meet the criteria for inclusion in the National Register (36 CFR 800.3). (See requirements for a Programmatic Memorandum of Agreement which should be included in the final environmental impact statement.)

Protection and Preservation of American Indian Religious Freedom (1.1.2.4)

Under 42 USCA sec. 1996, it is the policy of the United States to protect and preserve for American Indians their religious freedom. Freedom of worship includes, but is not limited to, access to sites and possession of sacred objects. Several agencies have revised their guidelines to comply with the intent of the law.

It is clear that the Religious Freedom Act would protect a Native American's use of peyote in a bonafide pursuit of a religious faith (People v. Woody, 61 Cal. 2d 716 (1964) and Golden Eagle v. Johnson, 493 F.2d 1179 (1974)).

The personal freedom to express one's native religion, however, is outweighed by a contravening policy to assure survival of an endangered species. A Native American's desire to use eagle feathers in a religious ceremony must yield to Congressional policy expressed in the Eagle Protection Act (United States v. Fryberg, 622 F.2d 1010 (1980)).

Employment and Community Well-Being (1.1.2.5)

Employment and general community well being are part of the social and economic factors that make up part of the Native American's "human environment." When an environmental impact statement is prepared and economic or social and

natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all these effects on the human environment" (40 CFR 1508.14). Under NEPA, we may perceive a continual broadening of the sphere of recognized and secured interests. The law is an attempt to reconcile, to harmonize, and to compromise conflicting interests.

Early cases under NEPA dismissed social problems as inapplicable to the human environment (Image of Greater San Antonio v. Brown, 11 ERC 1529 (Calif. 5th 1978); Breckenridge v. Rumsfeld, 11 ERC 1529 (Calif. 6th, 1976); Contra McDowell v. Schlesinger, 404 F. Supp. 221 (W.D. Mo. 1975)).

More recent cases have held that allegations of economic injury with an ecological injury were sufficient grounds to sue in a federal court (Shiffler v. Schlesinger, 548 F.2d 96 (3d Cir. 1979) and Lake Erie Alliance v. Corps of Engineers 14 ERC 1405, 1407 (1980)).

As any line of adjustment between conflicting rights must be drawn on practical grounds, there is no doubt that these rights may vary under different circumstances. For example, it has been established under an Alaska State Statute that it is unlawful for anyone to hunt walrus. Nevertheless, federal authorities have an obligation toward Indians, "including the duties so as to protect the subsistence resources of Indian communities (cases cited) and to preserve such communities as distinct cultural entities against interference by the states" (People v. Togiak, 470 F. Supp. 423 (1979)). In the Togiak case, an Alaskan native's right to hunt walrus was upheld against the Alaskan statute prohibiting such hunting.

Logic, history, custom, utility, and community standards of right conduct shape the progress of the law (Cardozo, 1921). The coordination of competing interests is tempered in the crucible of the law. This situation may result in recognizing the special position of Native Americans in some areas of concern. For example, it is permissible to grant a monopoly to a Native American under some circumstances. "The education of the public in the history and tradition of the area as well as the promotion of Indian arts and crafts are sufficient grounds to support the policy of the state of New Mexico, and the city of Santa Fe in permitting Indians to sell handcrafted jewelry, arts, and crafts, and prohibiting non-Indians from selling such items in certain areas" (Livingston v. Ewing, 601 F.2d 1110 (1979)).

It is also desirable that Native Americans be given certain employment preferences. Preferential hiring of Indians within the Bureau of Indian Affairs (25 CFR 259.1 to 259.3) does not violate the Equal Opportunity Act (42 USCA 2000e - 16(a)) (Morton v. Mancari, 417 U.S. 535 (1974)).

The social interests served by protecting Native American autonomy, however, must also be balanced against the social interests served by equity, fairness, and other elements of social welfare such as the needs of national defense. The needs of national defense, however, must be established early in the case (McDowell v. Schlesinger, 40 Fed. Supp. 221 (1975); Concerned About Trident v. Schlesinger, 8 ERC 1129, (1975); Trident v. Rumsfeld, 9 ERC 1370 (1976)).

NEPA does not require that an agency abdicate its primary responsibility to defend the nation; it does demand that the Native Americans, as an environmental factor, be accorded consideration in agency decisions (Concerned about Trident v. Schlesinger, 8 ERC 1129, 1149).

TE-MOAK SHOSHONE LAND CLAIM (1.1.3)

On October 1, 1863, the "Western Bands of the Shoshone Nation of Indians" and the United States of America entered into an agreement known as the Treaty of Ruby Valley. The Western Shoshone agreed to the safe passage of emigrants and travelers, to the establishement of military posts, telegraphs, overland stage, and railway lines, and to the opening of their lands to prospecting, mining, farming, and ranching. The Western Shoshone further agreed to allow the Government and its citizens to do so "without molestation and injury to them" (see Appendix A for treaty text).

The boundaries described in the treaty outlining the Shoshone territory were ratified by Congress. The land was described as bounded on the north by the Wong-goga-da Mountains and Shoshone River valley; on the west by Smith Creek Mountains; on the south by Wi-co-beh and Colorado Desert; and, on the east, by Steptoe Valley and the Great Salt Lake Valley.

These lands, however, have been claimed by the United States and have been managed by the Bureau of Land Management for many years. In 1951 the Te-Moak Bands of the Western Shoshones, as representatives of the Western Shoshone Indians, filed a claim with the Indian Claims Commission. This claim alleged that the United States Government had violated the Treaty of Ruby Valley and had taken part of their lands without just compensation. In 1962 the Indian Claims Commission ruled that the government had taken their lands without compensation, and in 1972 the Indian Claims Commission set the value of the taking at approximately $26 million.

In 1974, however, a second group of Western Shoshone Indians tried to intervene in the law suit. They alleged that part of the land had never been taken by the Govenment and was still owned by the Western Shoshone Indians. The petition to intervene was denied by the Indian Claims Commission, and the denial was affirmed by the Court of Claims (Western Shoshone Legal Defense and Education Association v. United States, 531 F.2d 495 (Ct. Cl. 1976), cert. denied, 429 U.S. 885 (1976)).

In 1976 the Te-Moak Band also switched tactics, adopted the position of the unsuccessful intervenors, and sought recognition of ownership rather than monetary damages. The Indian Claims Commission, however, declined to let the case proceed on that basis, and in 1977 issued a final award reaffirming its earlier rulings. The Indians appealed the decision and lost (Te-Moak Band of Western Shoshone Indians, Nevada v. United States, 593 F.2d 994 (Ct. Cl. 1979), cert. denied 100S.Ct. 133 (1980)). The money has since been paid into a fund for the Indians. Under 25 USC 70u, payment of the claim fully discharges the United States and bars any further claim arising out of the controversy.

While the Te-Moak Band case was pending, the United States undertook a lawsuit against two Indians charged with grazing livestock on public domain land without a permit. The Indians' defense was that the land belonged to the Western Shoshone Indians, rather than the U.S. Government. The District Court found against the Indians, since the Indian Claims Commission had ruled in 1962 that the land belonged to the Government and that the title of the Western Shoshone Indians had been extinguished. The Ninth Circuit Court of Appeals reversed this decision (United States v. Dann, 572 F.2d 227 (9th Cir. 1978). The appeals court held that

the title question was still open since the Te-Moak Band case, supra, was still pending and the Indian Claims Commission had not yet completed all of its proceedings. The case was remanded to the District Court in Nevada for further proceedings. In 1980 the District Court again ruled in favor of the Government, holding that title to the land was vested with the United States. Both sides, however, have again appealed, because the court held that title had not been extinguished until 1979.

The following excerpt from a letter received from the office of Governor List in Nevada, written by the attorney for the Western Shoshone Sacred Lands Association, describes their version of what has occurred.

> "In 1946, Congress passed the Indian Claims Commission Act, ostensibly to create a forum for the presentation and resolution of hundreds of outstanding claims by Indian tribes against the United States. In 1951 certain attorneys from Washington, D.C., and Elko, Nevada, filed a claim in the Indian Claims Commission on behalf of the Western Shoshone Indians which contended that the Western Shoshones are entitled to compensation for the taking by the United States of the entire area of their aboriginal lands. This claim came to be known as Western Shoshone Identifiable Group, Represented by the Te-Moak Bands of Western Shoshone Indians, Nevada v. United States, Docket 326-K. There are serious questions about whether these attorneys were ever authorized to file such a law suit, and whether they actually represented more than a handful of Western Shoshones. These questions are currently being dealt with in the United States Court of Claims. The attorneys apparently believed at the time that the Western Shoshone land titles had in fact somehow been extinguished by the United States, although they stipulated a so-called "taking date" (1872) and have never been able to identify any act of the federal government which would have constituted an extinguishment of title. Despite the vigorous protestation of large numbers of Western Shoshones, a judgment for $26 million for the taking of the Western Shoshone lands became final in the United States Court of Claims on December 19, 1979.
>
> On April 25, 1980, Judge Bruce Thompson in the Federal District Court in Reno, Nevada decided the case of United States v. Dann. The United States sued Mary and Carrie Dann of Beowawe, Nevada for trespass for grazing livestock on the so-called public domain without a federal grazing permit. Judge Thompson found that the Western Shoshone Indians retained unextinguished title to their aboriginal lands until December of 1979 when the Court of Claims judgment became final. This was a dramatic confirmation to hundreds of Western Shoshones who believed that their title had never actually been extinguished by the United States as well as a source of concern that extinguishment might have occurred solely as a result of the claim brought by the previously mentioned attorneys."

Thus, the Shoshone continue to assert ownership over an expansive tract of land in central Nevada, approximately 18 million acres, which includes a large portion of the area selected by the United States Air Force for the basing of the M-X system. The Sacred Lands Association, the Duckwater Shoshone Tribe and the Battle Mountain Community of Western Shoshone Indians intend to pursue all legal avenues to assert their claims to this land.

It has been the consistent position of the United States, however, that title to these lands is vested in the United States. The Air Force is not free to question this position, which has been sustained in every court challenge to date. If the courts should ultimately rule that the land does not belong to the United States, the Air Force would abide by that decision. Until then, however, the Air Force will continue to plan that the public lands claimed by the Western Shoshone would be available for M-X purposes should the President decide to build M-X in Nevada and were Congress to withdraw those lands for M-X uses.

PAIUTE INDIAN TRIBE OF UTAH, TERMINATION AND REINSTATEMENT (1.1.4)

At the time of European contact, the Southern Paiutes lived in an area encompassing what is now southern Utah, northern Arizona, southern Nevada, and southeastern California. The western migration of non-Indians, encroachment on Indian land, and depletion of natural resources upon which the Southern Paiutes had depended culminated in the establishment of five reservations: Kanosh, Koosharem, Indian Peaks, Shivwits, and Cedar City.* Dates of establishment and acreages are listed below.

Reservation	Established	Acreage**
Kanosh	1929	4,280
Koosharem	1928	830
Shivwits	1916	28,160
Indian Peaks	1915	9,000
Cedar City*	1899	-----

In 1954, four bands of Southern Paiutes were terminated from federal trust status. A fifth band, the Cedar City Band, was overlooked in the termination bill but was assumed by all concerned to have also been terminated. Following termination, the Kanosh, Koosharem, and Indian Peaks Bands lost their tribally owned lands through sales and for failure to pay property taxes. Tribal members report that they had been assured that no taxes would be levied. The current Kanosh Colony consists of 80 acres; the Koosharem band relocated, for the most part, to the town of Richfield; most of the Indian Peaks members live in Cedar City; the Cedar City Band remains landless, still living on church land. Only the Shivwits managed to keep their land, by leasing it to non-Indians in order to pay the property taxes. Most of the Shivwits band members live in St. George and Cedar City.

The Kanosh, Cedar City, Shivwits, Indian Peaks, and Koosharem/Richfield Bands of the Paiute Indian Tribe of Utah have recently been reinstated to federal trusteeship.

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*Money was appropriated by Congress to establish a reservation in 1899. The land was never purchased, however, and the Cedar City Band remained on land owned by the Mormon Church.

**Total acres includes acreage added following the original establishment date.

As of April 3, 1980, "The Federal trust relationship has been restored to the Shivwits, Kanosh, Koosharem, and Indian Peaks Bands of Paiute Indians of Utah and restored or confirmed with respect to the Cedar City Band of Paiute Indians of Utah" (Public Law 96-227:317). The law provides that reservation lands be restored to the extent possible and expanded. Since the Interim Tribal Council of the Southern Paiute Tribe of Utah has two years to develop its plan for the restoration and enlargement of these reservations, it is only possible to indicate (a) where the reservation lands were, and (b) the Utah counties from which lands may be withdrawn for reservation restoration.

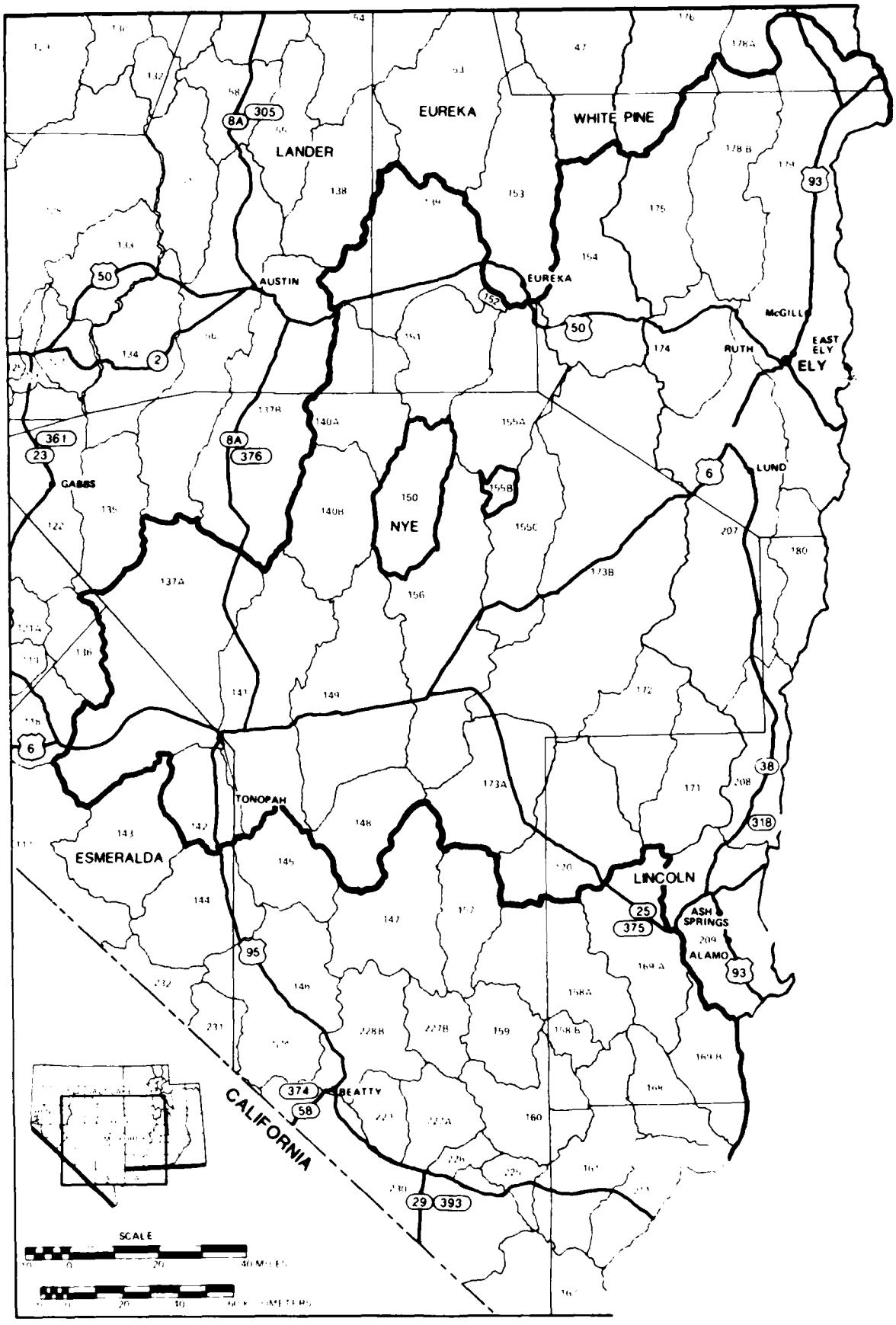
(a) The Shivwits Reservation lies outside of the study area in southwestern Utah; Indian Peaks is in Beaver County on the border of the Pine and Hamblin hydrologic subunits (6 and 196, respectively). Koosharem Reservation straddles the county line of northeast Piute County and southeast Sevier County. Kanosh is in Millard County which is within the study area. The Cedar City band occupies lands owned by the Mormon Church in Cedar City.

(b) The Shivwits Reservation has remained largely intact but the lands of the other bands have been partially or wholly acquired by non-Indians. To provide these groups with reservation lands when the original lands cannot be recovered, and to provide lands for the Cedar City band, the "plan shall include acquisition of not to exceed a total of 15,000 acres of land to be selected from available public, state or private lands within Beaver, Iron, Millard, Sevier, or Washington counties, Utah" (Public Law 96-227:320).

1.2 SCOPE OF STUDY

The potential impacts from M-X deployment on Native Americans in Nevada/Utah will extend beyond the immediate vicinity of construction and operation to those who are concerned with this particular region, in terms of culture, society, and economy. This study, therefore, is not restricted to Native Americans immediately adjacent to proposed M-X sites. Instead, it extends to all Nevada/Utah Native Americans with historic and contemporary concerns in the region.

To understand the concerns of Nevada/Utah Native Americans regarding M-X deployment, it is necessary to investigate their range, economy, religion, culture, and society, both contemporary and historic. This introduction highlights some contemporary issues and familiarizes the reader with the history of Nevada/Utah Native Americans. An extensive ethnographic overview, in Section 1.4, fully discusses Native American history in the study area. Three geographical areas, or ranges, are encompassed in this study: (1) the Great Basin of Nevada/Utah, (2) that portion of the Great Basin which contains hydrologic subunits that have been designated as geotechnically suitable for M-X deployment, and (3) the Designated Deployment Area (DDA), namely the hydrologic subunits that are presently proposed for project construction (Figure 1.2-1). The largest area under consideration, the Great Basin, is a region of arid, elevated, enclosed drainages, which in aboriginal times was occupied by peoples of closely related languages and cultures. Bands of Washo, Northern Paiute, Shoshone, Southern Paiute, and Ute Indians roamed widely in various portions of this region to utilize seasonal and dispersed resources. Today these peoples are still connected to the Great Basin area through history, a web of kin relations, and traditional subsistence activity and religion.


EUREKA
WHITE PINE
LANDER
AUSTIN
EUREKA
McGILL
EAST ELY
ELY
RUTH
LUND
GABBS
NYE
TONOPAH
ESMERALDA
LINCOLN
ASH SPRINGS
ALAMO
BEATTY
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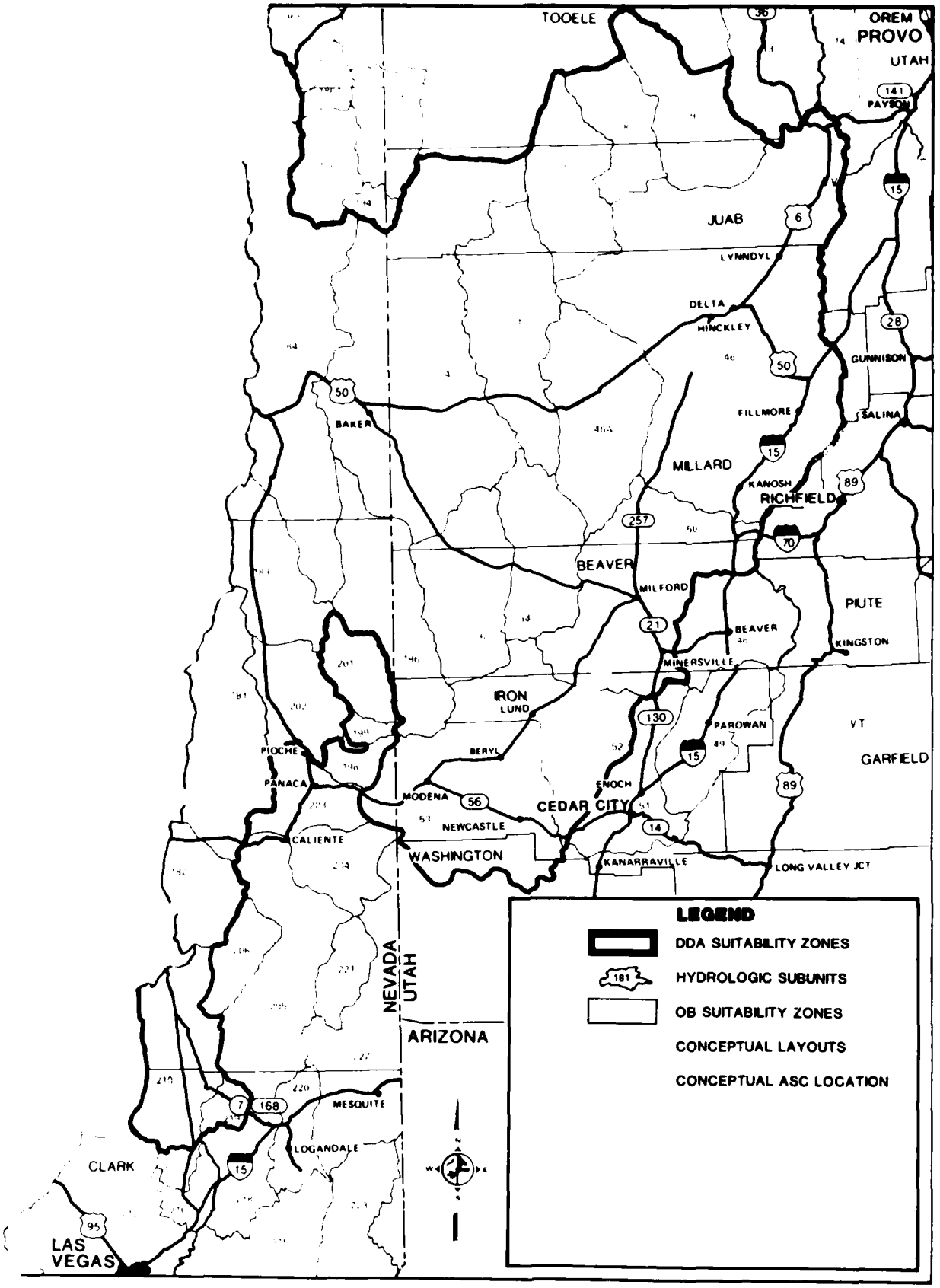


Figure 1.2-1. Designated deployment area of Nevada/Utah.

CULTURAL RESOURCES (1.2.1)

Within the Great Basin geographical unit is a smaller region composed of hydrologic subunits which have been designated as geotechnically suitable for M-X deployment. This region is referred to in this report as the deployment suitability area. A number of these subunits, termed the Designated Deployment Area (DDA), are presently proposed for construction activities. Section 2.0 presents information on those Southern Paiute and Western Shoshone colonies and reservations whose cultural resources are likely to be affected by project activities. Data on ancestral and sacred sites and hunting and gathering areas are presented, together with discussions on religion and world view, kinship, and cultural persistence. This material is drawn primarily from field work conducted among 18 Great Basin Native American groups during the summer of 1980. From this baseline material, the potential impacts of M-X deployment are analyzed. Based upon the potential impacts, mitigative measures that could be employed are discussed.

LAND AND WATER USE (1.2.2)

For Native Americans in the Great Basin, access to water and productive land is the key to economic survival and persistance as a distinct people. Many of the reservations and colonies within the Nevada/Utah area are outside the region of influence of the DDA and OB sites. Only those reservations and colonies adjacent to project activity, whose lands or water resources are expected to be affected by M-X construction or operations, are considered in discussions of land and water use. These are: Yomba, Goshute, South Fork, Duckwater, Ely, Moapa and the current and projected lands of the Paiute Indian Tribe of Utah.

Discussions of land use are divided into three major categories: 1) farming and ranching on reservation lands and public lands (BLM and Forest Service), including projected agricultural operations; 2) other actual and projected land based economic activities (e.g., mining and recreational enterprises); and 3) subsistence activities (hunting, gathering, and fishing) on reservation and nonreservation lands.

SOCIOECONOMIC CHARACTERISTICS (1.2.3)

This section identifies the scope of the geographic and subject matter included in the socioeconomic analysis of Native Americans. Direct socioeconomic impacts are geographically analyzed for specific areas referred to as Native American Areas of Analysis (AOAs) as discussed below. Indirect Native American socioeconomic impacts would occur at reservations and colonies outside the study area, but quantification of such impacts is not possible. Qualitative indirect impacts are assessed in a generic approach.

The Region of Influence (ROI) is a geographic area defined for analytic purposes in order to assess socioeconomic impacts resulting from construction and operation of the M-X system. Within this ETR, the socioeconomic ROI is defined as the geographic area in which approximately 90 percent of all local income and employment impacts would occur as a result of the M-X construction and operation activities. The ROI for Native American socioeconomic impacts is identical to the ROI for all other socioeconomic attributes analyzed in this Environmental Impact Statement. The geographic designation of the Nevada/Utah ROI is presented in Figure 1.2.3-1. The ROI is the same for the Proposed Action and for all alternatives

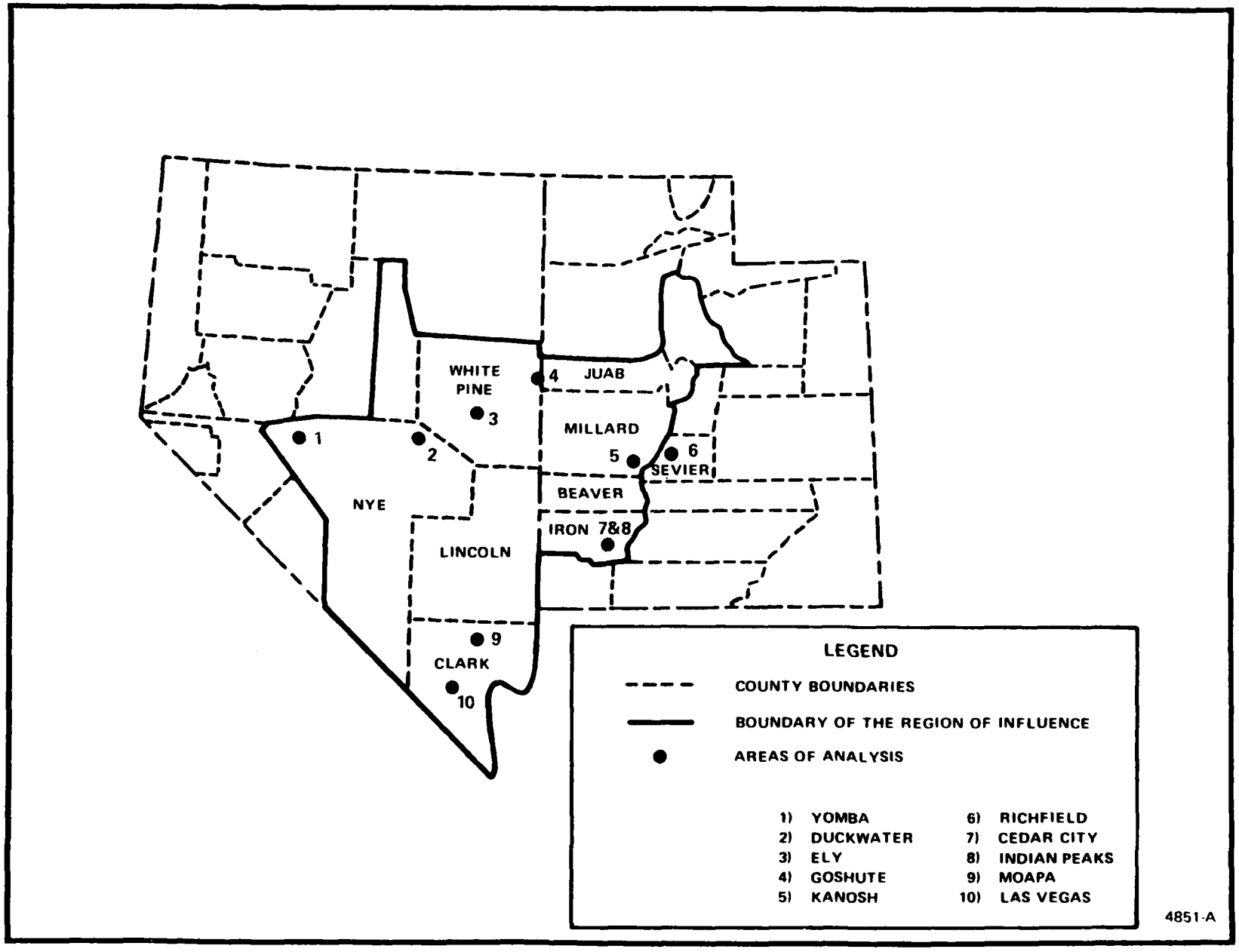


Figure 1.2.3-1. Region of influence and areas of analysis for Nevada/Utah Native Americans.

in Nevada/Utah. No Native American reservations or colonies are currently located in the Texas/New Mexico DDA.

Within and in close proximity to the Nevada/Utah ROI are ten (10) Native American reservations, colonies, and bands which have been designated as Areas of Analysis (AOAs). AOAs are existing Native American reservations, colonies, or bands that may be subjected to in- and out-migration of Native Americans seeking work on the M-X project. These AOAs are also referred to as host communities. The AOAs identified are: Moapa, Yomba, Duckwater, and Goshute reservations; Las Vegas, Cedar City, Kanosh, and Ely colonies; and Indian Peaks and Koosharem bands.

The Koosharem band is located near Richfield, Utah, just outside the ROI (Figure 1.2.3-1). The Koosharem band was included as an AOA because the Paiute Indian Tribe of Utah Restoration Act (PL96-227) creates the probability that the band could move within the ROI during M-X construction. The purpose of PL96-227 is to restore the Federal trust responsibility to the Koosharem band and four other related bands of the Paiute Indian Tribe of Utah. Another element of this Act provides for the acquisition of up to 15,000 acres of land that could be selected from available federal, state, or private lands located within Beaver, Iron, Millard, Sevier, or Washington counties. A land withdrawal request from the four bands is expected in 1982.

The extent to which the identified reservations, colonies, and bands would serve as "host" communities would depend upon the constitutions, regulations, and policies established by each tribal government. It is assumed that members of tribes whose reservations are close to project activity would establish tribal guidelines regarding population growth. These policies would, in turn, affect the degree to which tribal services and community infrastructure would be impacted by the M-X project. It is assumed that tribal councils would not abandon their authority in regulating access to reservation lands. *Tribal leaders have indicated that only close* family members of reservation or colony residents would be allowed to reside in their tribal communities during the project construction period.

1.3 PERSPECTIVE AND CONTEXT OF THE STUDY

The deployment suitability area includes portions of the ancestral territories of the Northern Paiute, Shoshone, Southern Paiute, and Ute peoples. Linguistic evidence indicates that these closely related groups have occupied these lands since at least 1000 A.D., and perhaps for millennia. Despite governmental efforts to segregate Nevada/Utah Indians on a small number of geographically isolated reserves in the 19th century, a significant proportion refused to leave their natal territories. These Native Americans eventually became landless through settler and government appropriations. Several additional reservations and colonies were subsequently created for these groups by the government in their native areas during the 20th century.

Of central importance, and in sharp contrast to the Texas/New Mexico study area, is the fact that the majority of Nevada/Utah Indians presently occupy lands held by their immediate and distant ancestors. This temporal and spatial continuity has accentuated the cultural and emotional ties of modern Native Americans to their ancestral territories and to the traditional resources they contain. Despite

external appearances of assimilation to the American mainstream society, Nevada/ Utah reservation Indians maintain a strong identification with their traditional cultures. Native languages have been universally maintained, as have important elements of traditional customs, religions, lifeways, and worldviews.

The deployment suitability area contains several populations, such as Native Americans, Mormons, and Basques, which are culturally distinct. An assessment of potential project impacts on the resources and lifeways of these peoples requires a distinct theoretical model and approach. The model must account for the phenomenon of persistence, and additionally provide a framework with which to understand the relative significance of resources to the population, their unique vulnerability to project effects, and the factors that both promote and discourage receptivity to change. The approach for the study of distinct or persistent peoples requires that the population be viewed as the focus rather than a by-product of the larger historical process of intergroup relations and events. That is, the social process in which they emerged and remained as minority groups must be reconstructed from the perspective of persistent peoples themselves. Since histories are typically written from the viewpoint of the majority, the study of persistent peoples often requires consideration of alternate interpretations of chronological events. The purpose of this line of inquiry is not to assume a position of advocacy for one historical reconstruction over another, but to highlight the way in which the persistent minority population views itself in relation to others. This approach provides the necessary perspective or cultural context with which to understand minority issues and concerns regarding change imposed from the outside.

CULTURAL PERSISTENCE THEORY (1.3.1)

Simple assimilationist models have viewed colonized peoples as occupying points on a unidimensional gradient between traditional and modern cultures. Several scholars have recognized the inadequacy of this theory in their studies of certain non-Western populations. Barth (1969), for example, noted that some ethnic groups seek to maintain their distinctiveness by creating behavioral, social, and artificial boundaries between themselves and others. Similarily, Mayer (1971), in his analysis of Black Africans in modern South Africa, underscored the ability of these peoples to participate in the modern industrial economy without any appreciable loss of traditional culture identity. The process by which rural Africans were able to float between two contrastive cultures was termed "encapsulation" by Mayer. That is, Africans adapted to an oppressive contract labor system by encapsulating or insulating themselves from foreign ideologies while in the urban setting, and reassuming their traditional roles, statuses, and identities upon return to rural reserves. This strategy of cultural persistence is successful despite the addition of foreign language proficiency and the adoption of modern technological skills and innovations.

Spicer (1971) was the first to propose a general theoretical model to explain the phenomenon of organized resistence to cultural incorporation. He noted that certain populations, such as the Basques, Jews, Welsh, Catalans, and several Native American tribal groups, have demonstrated the ability to maintain their distinct identity systems in a variety of contrastive cultural environments. These "persistent peoples," he argues, share a number of common historical experiences with, and strategies of opposition toward, the controlling apparatus of dominant political states.

According to Spicer, a persistent cultural system is characterized by a unique set of symbols which are embodied in linguistic exclusivity, moral or ideal behaviors, music and rituals, and historical identification with a territory. All persistent peoples have been engaged in continual conflict with external agents over issues of political, demographic, ecclesiastical, and economic incorporation. The oppositional process itself typically intensifies collective consciousness and internal solidarity. This model provides a useful perspective in which to view Native American enclaves in the study area.

Political Incorporation (1.3.1.1)

The political incorporation process pursued by the United States government toward Great Basin Indians began in the mid-19th century with military campaigns accompanied by the usurpation of traditional lands and water resources by settlers, and by the imposed homelessness or segregation of Indians in less desirable land areas. Political incorporation was extended by the official granting of citizenship to Native Americans in 1924, and by the granting of direct control to the Bureau of Indian Affairs over the political, social, and economic internal affairs of reservation communities.

In a series of policy actions aimed at the detribalization of Indian peoples, the government encouraged the dependency of reservations on the dominant culture for economic and technical aid, and sought to usurp the role of parents and tribal elders in the enculturation process. Children were removed from their homes and sent to agency boarding schools where the speaking of their native tongues was forbidden. Educational materials emphasized the inferiority of traditional Indian cultures and teachings, and imparted a distorted, negative view of tribal histories and the events surrounding Euroamerican colonization. Despite these efforts, native lore and tradition was successfully transferred to succeeding generations, and bilingualism, rather than linguistic assimilation, prevailed.

In 1934, the government redirected its policy toward Native Americans from detribalization to one of cultural and ethnic pluralism. The Indian Reorganization Act provided for the drafting of constitutions and the formation of reservation governments on the Euroamerican plan. This move was designed to instruct Native Americans in self-government, and to incorporate their communities into the political process of the dominant society. As noted by Spicer (1971:799), increased participation by persistent peoples in the political institutions of the larger nation-state is typically misinterpreted by members of the dominant culture as a sign of assimilation. More often, this new knowledge and sphere of operations is incorporated into the oppositional process. Indian reservations in the study area have become sophisticated in their interactions with federal agencies and private corporations, and have made use of state and national legal institutions to pursue actions which protect or expand their ethnic boundaries.

Demographic Incorporation (1.3.1.2)

The invasion of the American continent by Europeans resulted in the territorial displacement of Indian populations, the disruption of traditional demographic units, and the artificial reconstitution of these units on reservations and colonies, often with members of formerly unrelated families or tribal groups. The most devastating demographic effect of colonization, however, was the

introduction of European pathogens, for which Native Americans had no natural immunities. Dobyns (1966) estimates that the aboriginal North American Indian population was reduced by 90 percent from the Discoveries Period to the 20th century.

In the 19th century, demographic incorporation in the Great Basin was encouraged by the failure of the government to honor treaty obligations. Inadequate reservation support forced Native Americans into white settlements. Southern Paiutes in Nevada/Utah suffered tremendous population depletion and sex ratio imbalances as a result of Mexican slaving operations. Moreover, the Mormon institution of "adoption" of Indian children created a class of assimilated Southern Paiutes who found difficulty in acquiring mates in either cultural group.

During the 20th century, however, the successful enclavement of Native American communities, improved nutrition, and the persistence of cultural values regarding reproduction and family structure have led to a numerical replenishment of the Indian population. The current high birth rate of Native Americans has reversed the demographic incorporation which, a century ago, seemed inevitable.

Ecclesiastical Incorporation (1.3.1.3)

Governmental agencies typically welcomed various Christian sects to establish missionary inroads on the reservations under their jurisdiction. Churches were encouraged to serve as assimilating agents, converting the Native American population to "accepted" religions. On most Nevada/Utah reservations, Indian traditional religious rituals were discouraged by general policy. It was not until 1978, with the passage of the American Indian Religious Freedom resolution, that this policy was officially abolished. Christian sects often competed with one another for converts on the same reservations, contributing to the development of political and social factions within Indian communities.

Possible reasons for the limited success of Christianity among Native Americans will be explored more extensively below in the discussion of traditional sacred areas. An important factor in the opposition of persistent peoples to ecclesiastical incorporation is their historical and symbolic relationship to ancestral territories. Native Americans in the Great Basin continue to live in their traditional sacred lands where the visual evidences of tribal culture are a daily experience. For them, the land and the features it contains have served as constant reminders of their spiritual identity as Indians. The religious intolerance experienced during the reservation period intensified the internal solidarity of Native American enclaves by forcing the secret performance of traditional rituals. Participation in these native rites thus assumed an important role in the strategy of opposition to the Anglo-American culture.

As in ancestral times, the locus of political power in many Indian communities still lies largely in the hands of traditional religious and spiritual leaders. This pivotal decisionmaking structure has remained hidden from public view since the period of Euroamerican conquest.

Economic Incorporation (1.3.1.4)

Intensive population pressure associated with Euroamerican invasion of the Great Basin disrupted the ecological niches of indigenous populations. Natural

resources such as native flora and fauna were consumed and valuable land and water resources were taken for settlement.

As traditional economic adaptations became increasingly unfeasible, native peoples were gradually drawn into a new dependence on nonnative economies for subsistence. In all areas of the Great Basin, wagon train and settler livestock were exploited for resources. Some groups, such as the western Ute, expanded their traditional international trade networks to Mexican markets, where both horses and Indian slaves were major commodities. Political conquest and incorporation, however, moved Great Basin Indians into permanent economic relationships with nonnative populations. Implementation of the reservation policy was accompanied by the adoption of livestock herding and the cultivation of new crops. The wide variety of desired commodities and material goods made available by the colonist population eventually drew all Native Americans into the national market economy.

Modern reservation communities reflect the adaptability of Native American populations. The technological and marketing skills of the dominant culture have been incorporated as survival strategies, but the assimilationist goal of economic individuation has not been realized. Although in many areas, wage labor by heads of household comprises the primary income, extended family networks continue the aboriginal pattern of mutual aid and the sharing of resources. Moreover, both reservations and colonies in the study area have developed communal enterprises, such as agricultural and livestock cooperatives and industrial parks. Aggressive programs are also currently underway to both protect and expand tribal resources, such as water and land. These actions represent new cultural strategies of adaptation to economic pressures.

Because communally held natural resources necessary for economic viability form the basis of demographic and political boundary maintenance, perceived threats to tribal water, land, and productivity are viewed as jeopardizing cultural survival.

DISCUSSION (1.3.2)

Spicer's (1971) model of persistent peoples permits a clearer understanding of contemporary Native American concerns regarding the M-X program or any program by the dominant society. As populations which have maintained a distinct identity system through decades of assimilative pressure and adversity, contemporary Indian communities continue to face an uncertain future. Modern reservations and colonies experience a constant barrage of real or proposed external policy actions which are viewed as a threat to their persistence as distinct peoples. Among these are the potential loss or reduction of federal trust status, potential erosion of water resources and rights, grazing allotments, federal aid for economic development, and the desecration of sacred sites and areas.

The M-X program is interpreted by the majority of Native Americans as another step toward economic incorporation. Despite their adoption of modern technologies, contemporary Indians have not adopted a secular utilitarian attitude toward their ancestral lands. The persistence of a traditional cosmological perspective produces a sacred emotional perspective regarding native plants and animals, physiographic features created by supernaturals, and the many places where spirits reside. Since, in Indian belief, relationships in the universe are based

on reciprocity, it is feared that continued human interference with nature will generate forms of supernatural retribution. So central are traditional religious elements to the persistent identity system of Native Americans, that an assault on their sacred lands is often viewed as a threat to their entire culture.

1.4 ETHNOGRAPHIC OVERVIEW

PAST TRIBAL DISTRIBUTIONS IN THE GREAT BASIN (1.4.1)

The cultural remains of Native American populations indicate that, with the exception of the Utah Colorado Plateau and southeastern Nevada areas, human occupation of the arid Nevada and Utah basin has been based on a hunting, fishing, and gathering economy for at least the past 10,000 years. There is little agreement among archaeologists, linguists, and ethnologists, however, concerning the chronological relationship of Indians encountered in this region in the 19th century with those who employed similar tool inventories in ancient times. What is certain, however, is that the several linguistically related Native American tribes of Nevada and Utah were well established in the area by historic times. Descendants of these peoples now reside on reservations in and adjacent to their former homelands, with which they maintain important cultural and affective ties.

Early Tribal Distributions (1.4.1.1)

Native American tribal groups with historic ties to Nevada/Utah lands are the Washo, Northern Paiute, Shoshone, Ute, and Southern Paiute. With the exception of the Washo, who inhabited an area on the California-Nevada border, all Great Basin peoples in the historic period spoke a group of closely related languages of the Uto-Aztecan (Utaztekan) stock. This consists of several language families that extend from the northern Great Basin to Central America. The distribution of Uto-Aztecan languages in North America appears in Figure 1.4.1-1.

The languages of Northern Paiute, Shoshone, Southern Paiute, and Ute peoples belong to the single Uto-Aztecan language family designated Shoshonean (Kroeber, 1907) or, more recently, Numic (Lamb, 1958; Miller, 1966; Goss, 1968). The Numic family is typically divided into subfamilies which connote degrees of genetic relationship. The traditional distribution of these subfamilies and the Native American tribal groups with which they are associated appears in Figure 1.4.1-2.

Several attempts have been made by both linguists and archaeologists to establish the relative antiquity of Numic peoples in the Great Basin area. Some archaeologists have taken note of the basic similarity between the material culture and ecological adaptation of the historic Shoshone described by Steward (1938), and the cultural remains of the Desert Archaic peoples. Jennings (1957:3), for example, postulates cultural continuity in Great Basin cultures for the past 10,000 years. A contrasting group of theories on the origins of Numic-speaking peoples has been proposed by linguists who employ a dating technique called glottochronology to assess genetic relationships among languages and the span of time involved in their divergence from a common stock. Romney (1957), for example, dates the divergence of Numic and other related families from a common Uto-Aztecan ancestral stock at 1000 A.D., and further postulates a regional origin in Arizona. According to Romney, Numic peoples expanded into the Great Basin from the south in comparatively recent times. In contrast, Lamb (1958) dates the divergence of

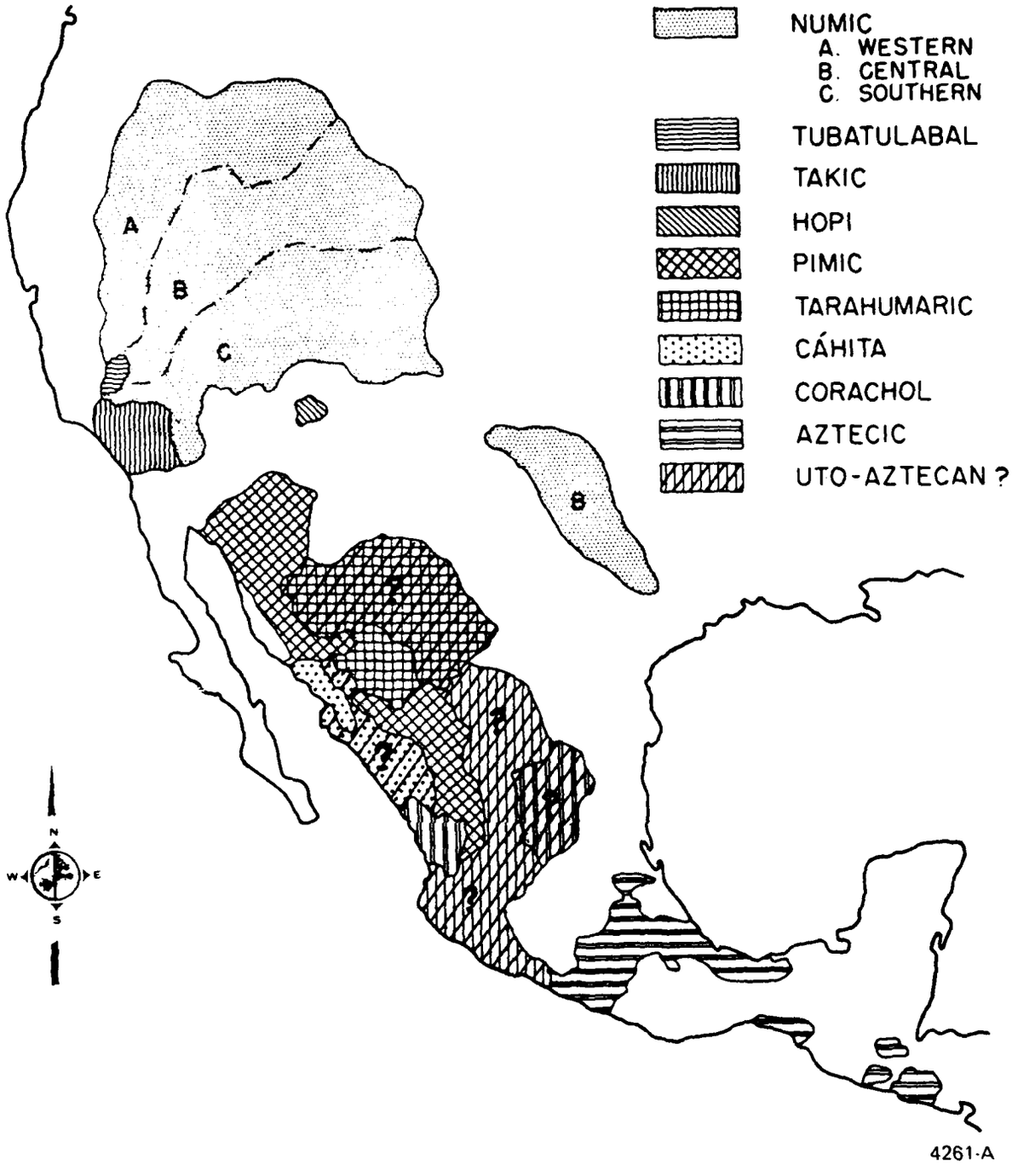


Figure 1.4.1.-1. The Uto-Aztecan family of languages (adapted from Stewart, 1966).

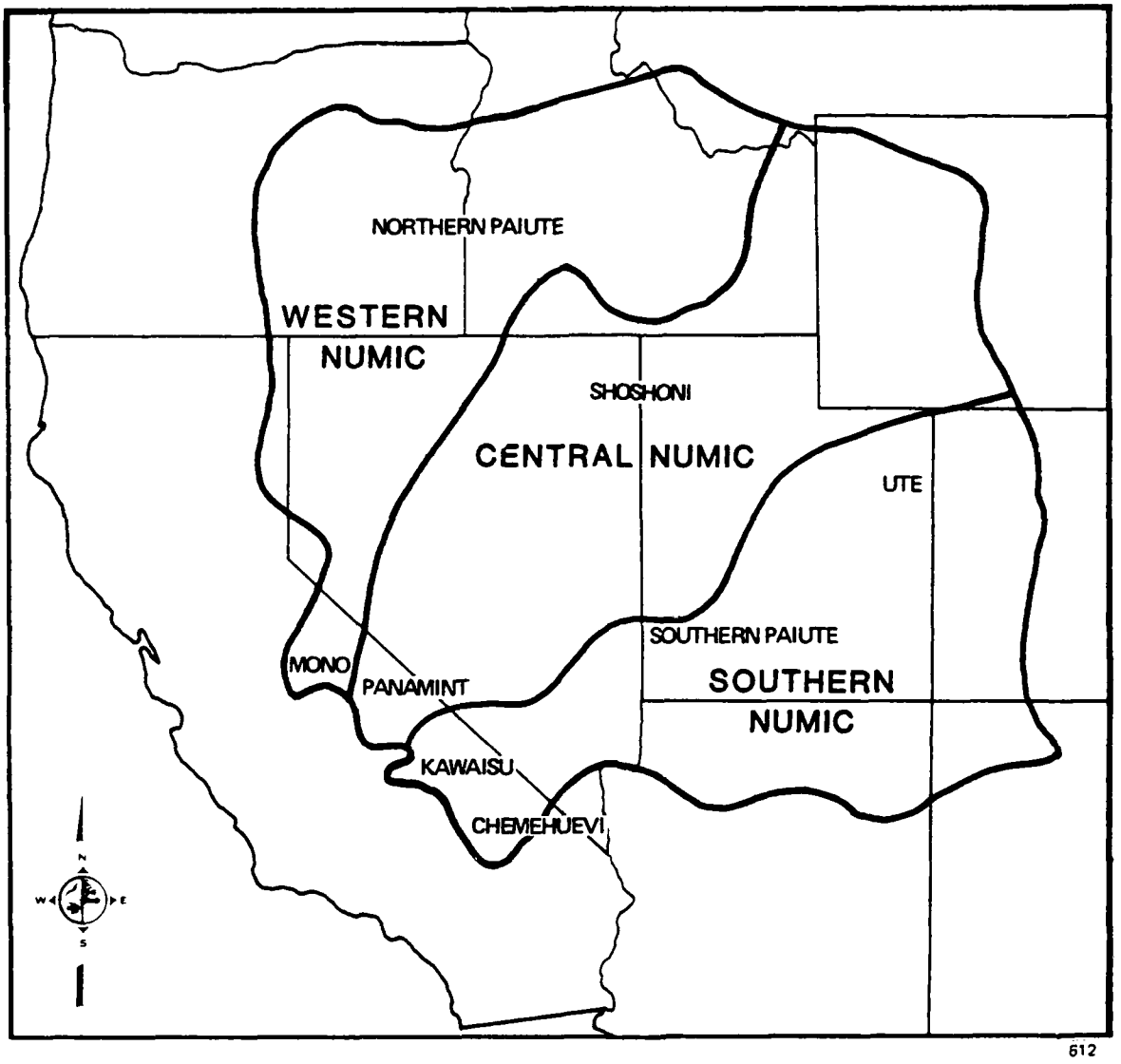


Figure 1.4.1-2. The Numic branch of Uto-Aztecan in the Great Basin area (adapted from Stewart, 1966).

Uto-Aztecan language families at 3000 B.C. near the Arizona-Sonora border. He argues on the basis of allegedly close relationships between the Numic family and the Tubatulabalic family of Uto-Aztecan (spoken only by the Tubatulabal Indians of southeastern California) that Numic peoples expanded into the Great Basin from the area of Death Valley around 1000 A.D.

The picture of Numic antiquity in the Great Basin area becomes even more confused when scholars attempt to combine data from linguistics and archaeology. Taylor (1961), Hopkins (1965), and others have utilized both glottochronological dating methods and references to archaeological cultural remains from various geological periods and areas to construct rather grand schemes of Uto-Aztecan linguistic diversification and migration in the western United States. Others, such as Madsen (1975), have attempted to correlate Lamb's (1958) theory on Numic expansion with the spread of Paiute-Shoshone pottery after 1000 A.D.

In a recent discussion of the problems involved in the linguistic prehistory of the Great Basin, Goss (1977) argues that the Lamb hypothesis (which posits Numic expansion into the Great Basin from the Death Valley area after 1000 A.D.) has become dogma. The uncritical acceptance of this theory, he notes, has resulted in several attempts to skew data to fit the model (Gunnerson, 1962; Hopkins, 1965; Miller, 1966; Goss, 1968; Fowler, 1972; Fowler, Madsen, and Hattori, 1973; and Madsen, 1975). As Goss (1977) points out, the Lamb hypothesis is based upon two assumptions, neither of which is scientifically substantiated: (1) that the Numic family is genetically derived from Tubatulabalic, and (2) that the greater linguistic distinctiveness of Numic languages in the southwestern area of the Great Basin is indicative of greater antiquity (and hence the center of Numic origins).

Goss (1977) and Jett (1977) conclude that there is no linguistic evidence at present to discredit the view that the Numic language family diverged from an ancestral Uto-Aztecan stock in situ. In other words, the ancestral line of contemporary Paiute, Ute, and Shoshone peoples in Nevada/Utah may extend back to very ancient times. A recent archaeological study by Thomas (1973) supports the view that peoples with a Shoshonean cultural tradition have continuously occupied the Reese River Valley of Nevada from at least 2500 B.C. to the historic period. Debate over the relative antiquity of Numic peoples in the Great Basin may be expected to continue for some time. What is certain is that the ancestors of contemporary Indians of Nevada and Utah were well established in this territory centuries prior to Anglo-American contact.

There are many references to one or more of these Great Basin tribes in the diaries of explorers, missionaries, trappers, and settlers beginning as early as the 16th century. The establishment of original tribal boundaries on the basis of these accounts, however, is complicated by incomplete or inaccurate observations, and by the fact that rapid depopulation and territorial displacement often preceded the recording of spatial distributions. Ethnographic field work and linguistic reconstructions begun in the early 20th century provided the basis for the first joint attempts by Great Basin Indian specialists to establish the aboriginal territories of contiguous peoples. Such efforts, however, typically fell short of the goal to establish boundaries which were mutually agreed upon by Indian informants or the anthropologists themselves (cf. Park et al., 1938).

The most important catalyst for intensive and thoroughgoing research on aboriginal tribal distributions was passage of the 1946 Indian Claims Commission

Act. The expert testimony required to both support and oppose Indian land claims initiated a long period of concentrated linguistic, ethnohistorical, and ethnographic study of the majority of Native American groups. Although the conclusions of expert witnesses, Indians, and the Justice Department were not always in agreement, the studies submitted are of sufficient magnitude and quality to establish former tribal distributions with a high degree of accuracy.

Ethnohistorical data on Great Basin Indians presented by witnesses before the Claims Commission are reviewed and evaluated by Stewart (1966) in an effort to establish the linguistic boundaries of tribal groups immediately prior to Anglo-American contact. The conclusions of this study are mapped in Figure 1.4.1-3.

As seen in Figure 1.4.1-3, ethnic divisions in the Great Basin correspond to linguistic divisions within the Numic family, with the further cultural distinction of Ute from Southern Paiute peoples. The Washo of California and Nevada, although culturally similar to the Numic peoples, speak a language of the unrelated Hokan stock. The traditional territorial boundaries of the Washo and Northern Paiute tribes lie to the west of the DDA. However, portions of the DDA fall within traditional lands of the Shoshones, Southern Paiute, and Ute peoples.

Historic Modern Tribal Distributions (1.4.1.2)

According to Steward (1938:5-10), the events which marked the transition from early to modern tribal distributions in the Great Basin may be divided into four historical periods: (1) penetration of the area by explorers and trappers from 1776-1840, (2) the establishment of wagon train routes and of Anglo-American settlement in Utah and the Humboldt Valley of Nevada between 1840 and 1860, (3) intensive settlement by miners and farmers, and the climax of Indian hostilities between 1860 and 1870, and (4) the removal of Indians to reservations.

The initial contacts of Indians with Anglo-American explorers and trappers resulted in some sporadic skirmishes, but had few cultural or economic effects. Commencing in the 1840s, however, in-migrants destined for the West Coast began to traverse Utah and Nevada in considerable numbers. The ecological impact of European settlement in Utah and along the Humboldt River was immediate and severe. Indians in these areas were displaced from well-watered regions, and the grasses on which a significant portion of their subsistence depended were rapidly decimated by large herds of domesticated animals. The situation worsened for Indians with the discovery of the great Comstock lode at Virginia City in 1857. Within a decade, prospectors had penetrated the most remote areas of the territory, and in-migrant boom towns had sprung up at desert oases. Wherever such settlements occurred, native food plants were consumed by livestock, and nut-bearing pinyon groves were cut down for firewood.

The most serious resistence to settlement was launched by Utes, Shoshone peoples of northern Utah and Nevada, and by Northern Paiute bands, all of whom were equestrian and in possession of firearms. Serious clashes between the Northern Paiute and settlers began in 1860, whereupon the Shoshone of Battle Mountain and Austin also became involved. The Goshute Shoshone and the Pahvant band of Utes began a long series of attacks on in-migrants, and systematically raided stages and the pony express in western Utah and eastern California. Utes of the Utah Lake region were united under Chief Walker, the "Napoleon of the Desert," as early as the 1840s, and conducted raids into southern California for cattle and horses. Several

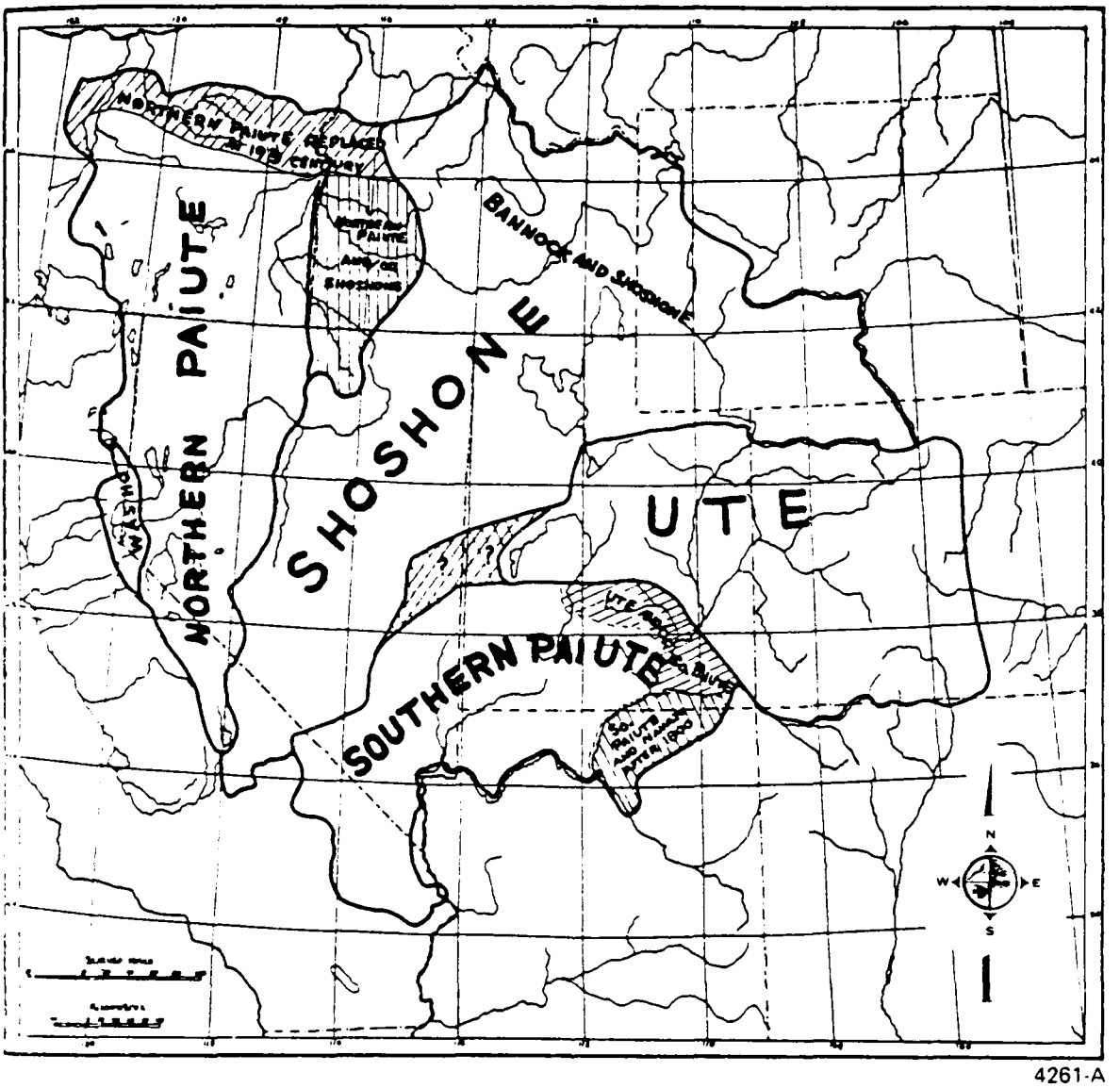


Figure 1.4.1-3. Traditional linguistic boundaries of Great Basin Indians (after Stewart, 1966: 207).

Ute chiefs gained prominence following Walker's death in 1855. Hostilities in Utah reached their climax around 1865 with the Black Hawk War. In southern Nevada and Utah, the Southern Paiute were subjected to settlement and missionizing attempts by Mormon settlers as early as 1850. By 1856, Paiutes began to launch attacks on wagon trains and settlers, the object often being procurement of horses and cattle for food.

Retaliation by the United States Army resulted in the rapid annihilation of Indian forces. The Steptoe Valley Massacre of Shoshones in 1862 led to treaties with Shoshone bands in 1863. Although sporadic skirmishes continued, and Northern Paiute bands failed to sign a treaty with American forces, Indian strife in the northern half of Nevada was virtually over by 1865. Shoshone bands of central Nevada fled to remote areas during the period of conflict, and were not involved in the hostilities. The Washo of western Nevada were themselves preyed upon by the Northern Paiute and were decimated in their efforts to join Anglos against the common enemy. In Utah, several major skirmishes led to treaties in 1863 and the establishment of the Uintah Ute Reservation in 1865. Due to their lack of horses, Southern Paiute resistance never reached the scale attained by the Utes. Most Southern Paiutes were, by the 1870s, either on reservations or attached to Anglo settlements.

Indian reservations and colonies in Nevada and in Utah appear in Figure 1.4.1-4. In the 19th century, seven reservations were established in Nevada and Utah for Indian concentration. The Uintah Reservation was set aside in 1865 to accommodate Utes from the entire state of Utah. The Northern Paiutes were assigned land areas at Walker River in 1871 and Pyramid Lake in 1874. The Duck Valley Reservation was established for all Nevada Shoshones in 1877. In addition, land allotments for Shoshones were made in Ruby Valley in 1887, and the Fort McDermitt reserve was set aside for Shoshones and Northern Paiutes in 1892. Southern Paiutes were established at Moapa River Reservation in 1875.

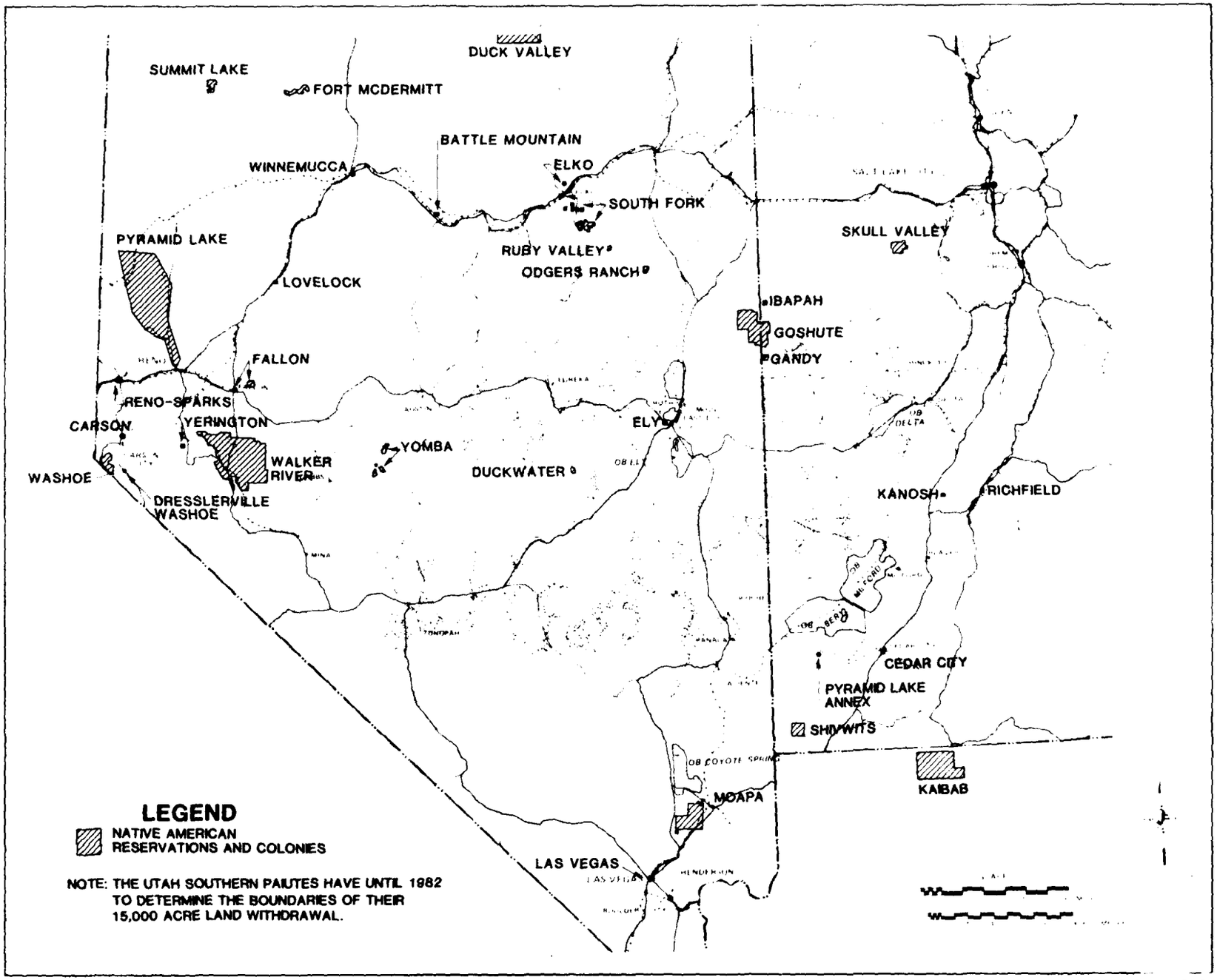
Government efforts to segregate Indians on these reserves before the turn of the century were not totally successful. Douglas (1870:95) reports that around 1870 nearly 90 percent of the Shoshone and Northern Paiute were still living in remote areas. Over the next few decades the paucity of native foods encouraged many Native Americans to attempt farming and cattle-raising on the assigned reserves. Some bands of Nevada and Utah Indians, however, refused to leave the areas of their heritage. These peoples, when unable to support themselves by living off the land, moved into populated areas and attached themselves in colonies to Anglo-American ranches and farms. The biological and cultural persistence of these Indian enclaves encouraged scores of additional land purchases by the government in Nevada/Utah between the turn of the century and 1972.

TRADITIONAL FLORAL AND FAUNAL RESOURCES (1.4.2)

The traditional pattern of plant and animal utilization and the religious significance of these species for Nevada/Utah Indians will be examined below. Contemporary use patterns by Native Americans and the relative importance of flora and fauna for cultural persistence will then be explored.

Traditional Subsistence Patterns (1.4.2.1)

With few exceptions, Native Americans in the Nevada/Utah area were wholly dependent upon the utilization of wild plants and animals in ancestral times. All



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Figure 1.4.1-4. Native American reservations and colonies and the Proposed Action conceptual layout in Nevada/Utah

adults were cognizant of native botany and zoology. Native Americans believed themselves to be one of the thousands of species in a common system. Flora and fauna were not viewed with scientific detachment, but were incorporated into universal cosmological systems. Human interaction with native animals and plants, including killing and eating, was rationalized and underscored on the sacred plane. Faunal species play significant roles in the creation myths of Native American peoples, which typically refer to mystic times when animals were people. Fauna are thus assigned human-like qualities and are often regarded as potential bearers of messages from the spiritworld. Similarly, important plants were created in mystic times for human survival, several of which hold special powers that may be manipulated by religious specialists to heal or to promote evil.

Traditional religious systems provided the entire fabric of Native American cultures. Despite repeated efforts for the ecclesiastical incorporation of contemporary Indians, traditional beliefs have displayed tremendous resiliency and persistence. The continued use of native flora and fauna in the traditional manner is an essential component in the maintenance of cultural identity. Access to traditional gathering and hunting areas has been of concern to Native Americans since Anglo-American contact. Historic and modern developments have resulted in radical alteration of the environment and the elimination of some native resources. Remaining underdeveloped areas where native species persist are often restricted to public use or are themselves threatened with development. Native Americans are currently supporting efforts to preserve native flora and fauna, and to guarantee their right to utilize these protected and renewable resources in a manner consistent with traditional cultural usage. This pattern of preservation and selected group utilization was behind nearly all historic modern environmental movements, from forestry and timber management in the southeast to hunting and fishing preserves in the northeast and range management in the west.

Traditional Use Patterns (1.4.2.1.1)

With the exception of some Southern Paiute groups who adopted limited cultivation from neighboring tribes, Nevada/Utah Indians in ancestral times derived their subsistence primarily from the gathering of wild plant foods, supplemented by hunting and fishing. The extreme aridity which characterizes the major portion of the two-state area severely limited the development of localized, abundant, and perennial food supplies. Plant, animal, and water resources were widely scattered over large areas and were in short supply for the major portion of the year. Plants were available for use for only short periods in the annual cycle, and this period varied from species to species and place to place. Moreover, annual fluctuations in rainfall affected not only the productivity of wild plants, but their distributions as well. All of these factors contributed to the low population densities and high spatial mobility of Native American groups. Washo, Northern Paiute, Shoshone, Ute, and Southern Paiute peoples developed solutions to natural limitations based upon botanical and zoological expertise and an orchestration of activity and movement.

Major Resource Zones (1.4.2.1.2)

According to Steward (1938:14-44), Native American subsistence in the Great Basin was most significantly affected by floral distributions. The distribution of plants not only influenced human population density and movement, but determined

the distribution of game animals which provided dietary supplements. Five floristic zones were important as resource areas to Nevada/Utah Indians in ancestral times.

Alpine Belt

This zone lies above the timberline over 11,000 ft in elevation. The vegetation was of only secondary importance to Native Americans in that it supported large game animals.

Aspen and Spruce Belt

In Nevada, this zone is limited to ranges in the central part of the state where elevations of 9,000-11,000 ft occur. Trees such as fir, Engleman spruce, and whitebark pine were available for firewood, while willows were utilized for basketry materials. Several herbaceous food plants also occurred. Among them were fruits and several seed grasses, notably Agropyron, Agrostis, Poa, Stipa, and Trisetum. In Utah, the zone had a wider distribution in the Wasatch, Uintah, and other ranges which extend from 7,500-9,000 ft (2,250-2,700 m) in the central and southern parts of the state. It offered Douglas fir, aspen, pine, and the seed grasses noted above, as well as several species of berries.

Pinyon-Juniper-Mahogany (Nevada) Belt

This floristic zone, occurring roughly from 5,000-7,000 ft, is widely distributed in Nevada and Utah and contained vegetation which was critical to the survival of Great Basin Indians in ancestral times. Of primary importance is the pinyon tree (Pinus monophylla and Pinus edulis), whose annual fall yields of pine nuts provided the majority of life-sustaining food stores during the barren winter months. Other important food plants were species of Agropyron, Poa, Stipa, Amelanchier, and Rosa. The lower reaches of this belt were favored by some Great Basin peoples as winter village sites.

Artemisia Belt

This floristic zone typifies the bulk of lands in Nevada and Utah north of the 37th parallel and is the main area that would be directly impacted by the M-X system. Traditional utilization of this widely distributed zone was obviated by the scarcity of food plants which it contained. Due to conditions of high aridity, flora is xerophytic and generally limited to inedible desert shrubs and (in alkaline areas) salt desert shrubs. Herbaceous food plants and grasses are found only in rare moist areas, such as along streams and natural springs. Steward (1938:17) notes, however, that rabbitbrush, according to local Indians, replaced native seed grasses in many areas after the introduction of livestock. Despite the relative sterility of this zone for food plants, several species were used for medicinal and manufacturing purposes. The Artemisia belt also supported important small game, such as the jackrabbit, and in limited regions was coursed by perennial rivers that provided fish on annual spawning runs. Winter villages were often located on these rivers, or on the upper fringes of this zone, where springs or streams provided an adequate water supply.

Covillea Belt

This zone is the desert shrub counterpart of the Artemisia belt below the 37th parallel in the southwestern tip of Utah and southeastern portion of Nevada. It

consists of arid, low valleys which contain occasional cacti and yucca. Southern Paiutes in these areas exploited the yucca, Joshua tree, cacti, and, in moist areas, mesquite and screw beans. As in northern latitudes, this lowest elevation zone was also important for small game.

Floral Foods (1.4.2.1.3)

The major dependence of Great Basin Indians on plant foods was based not only on the relative scarcity of game, but on the storable nature of such foods for consumption during the long winter season (Table 1.4.2-1). Seeds from grasses and various shrubs, and pine nuts were the two most important storable plant foods. In addition, a large number of plant products, such as greens, roots, flowers, fruits, and berries were exploited for more immediate consumption. Although there is much ecological variation in plant populations throughout the Great Basin, the following species were widely distributed and of general importance to all aboriginal Indian groups. More complete plant lists are available in Steward (1938:21-30) and Chamberlin (1909, 1911).

Seed Grasses

Agrostis (redtop), Agropyron (bluejoint or wheat), Elymus (wild rye), Lepidium (peppergrass), Oryzopsis hymenoides (Indian ricegrass), Poa (bluegrass), Triglochin (arrowgrass).

Other Seed Plants

Artemisia (sagebrush), Atriplex (saltbrush), Balsamorhiza (arrowroot), Chenopodium, Helianthus (sunflower), Juncus, Lappula (stickseed), Mentzelia, Pinus (pine), Rosa (wild rose), Salvia columbariae, (chia), Sitanion hystrix, Sophia (tansymustard), Typha (cattail). Some Shoshone groups in east-central Nevada are known to have broadcast seeds, notably Chenopodium and Mentzelia, to increase the density of these wild seed bearing plants at specific locations.

Greens

Allium (wild onion), Balsamorhiza (arrowroot), Cymopteris, Nasturtium (watercress), Ranunculus (buttercup), Stanleya (squaw cabbage), Taraxacum (dandelion). Greens were typically gathered in the early spring and eaten raw or boiled.

Roots, Bulbs, and Tubers

Calochortus, Cirsium (thistle), Claytonia, Fritillaria, Orobanche, Scirpus (bulrush or tule), Typha (cattail), Valeriana edulis, (bitterroot). The roots of various cacti were also exploited.

Tree or Cactus Crops

Opuntia (prickly pear), Pinus monophylla and P. edulis (pinyon nuts), Prosopis glandulosa (mesquite beans; in Covillea belt), Quercus (oak acorns), Strombocarpa odorata (screwbean; in Covillea belt).

Table 1.4.2-1. Major edible plants used by Great Basin Indians (Page 1 of 3).

Genus	Specific Epithet or Common Name
Agropyron	bluejoint
Agrostis	red top
Allium	wild onion
Amaranthus	pigweed
Amelanchier	serviceberry, juneberry
Amsinckia	tessellata
Aphyllon	cancer root
Artemisia	biennis
	discolor
	dracunculoides
	tridentata (sagebrush)
Asparagus	wild asparagus
Atriplex	saltbush
Balsamorhiza	hookeri
	sagittata (arrowroot)
Berberis	Oregon grape
Bigelowia	rabbitbrush
Bromus	brome grass
Calochortus	sego
Camassia	esculenta
Carex	utriculata
Carum	gairdneri
Chenopodium	capitatum
	leptophyllum
	rubrum
Cirsium	thistle
Cinna	rood reed grass
Citrullus	vulgaris
Claytonia	caroliniana
Clistoyucca	Joshua tree
Cnicus	plumed thistle
Cymopterus	longipes
	montanus
Deschampsia	caespitosa

T5147/10-2-81a

Table 1.4.2-1. Major edible plants used by Great Basin Indians (Page 2 of 3).

Genus	Specific Epithet or Common Name
Dracocephalum	parviflorum
Ephedra	Brigham tea
Ferula	multifida
Festuca	ovina
	tenella
Fragaria	strawberry
Glyceria	distans
	nevata
Grossularia	gooseberry
Gymnolomia	multiflora
Helianthus	sunflower
Juniperus	cedar
Koeleria	cristata
Lathyrus	ornatus
Lepidium	peppergrass
Lithospermum	stickseed
Lomatium	wild carrot
Lophanthus	urticifolius
Mammillaria	cactus
Mentzelia	stickleaf
Nasturtium	watercress
Oenothera	evening primrose
Opuntia	prickly pear
Orobanche	broom rape
Orogenia	Indian potato
Oryzopsis	hymenoides (rice)
	cuspidata
Phragmites	communis
Pinus	edulis
	monophylla
Prosopsis	mesquite beans
Prunus	demissa

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Table 1.4.2-1. Major edible plants used by Great Basin Indians (Page 3 of 3).

Genus	Specific Epithet or Common Name
Ranunculus	buttercup
Rhus	squaw bush, sumac
Ribes	black currant
	californica
Rosa	fendleri
Rubus	raspberry
Rumex	wild rhubarb
Salvia	columbine
Salicornia	herbace
Sambucus	elder
Scirpus	bulrush
Scutellaria	skullcap
Senecio	chewing gum
Sisymbrium	canescens
Sitanion	hystrix
Solanum	wild potato
Descurainia	tansymustard
Stanleya	squaw cabbage
Stachys	woundwort
Strombocarpa	screwbean
Suaeda	depressa
Taraxacum	dandelion
Triglochin	maritimum
Trisetum	subspicatum
Troximon	aurantiacatum
Typha	cattail
Vaccinium	blueberry
Valeriana	edulis

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Sources: Chamberlin 1909,1911; Evler, 1966; Facilitators 1980; Intertribal Council of Nevada, 1976; Kirk,1975; Moore,1978; Steward, 1938.

Berries

Amelanchier (serviceberry), Grossularia (gooseberry), Lycium (red berry), Prunus (chokecherry), Rhus (sumac or squawberry), Ribes (currant), Rubus (raspberry), Sambucus (elderberry), Shepherdia (buffalo berry or buckberry), Smilacina (coyote berry), Vaccinium (blueberry).

Faunal Foods (1.4.2.1.4)

For most Great Basin Indians, animals played only a secondary role in subsistence. The aridity of most land areas in Nevada/Utah largely precluded sizeable herd animals that thrive in open grasslands. Small animals, rodents, insects, and smaller mammals, however, were abundant and generally supplied a year-round supplement to vegetable foods. The two-state area supported only a few perennial rivers, but where those occurred annual spawning runs of several fish species provided a storable protein food source for local groups.

Bison

Available evidence indicates that this large herd animal was distributed in the northern third of Nevada and throughout most of Utah around 1500 A.D. Bison had disappeared from Nevada and Utah by 1832, and from adjacent Idaho by 1840. Former distributions are illustrated in Figure 1.4.2-1. Extirpation of the bison in these areas is typically related to overhunting by equestrian Indians and early Anglo trappers. Prehistoric petroglyphs indicate that the bison was hunted by peoples immediately ancestral to the historic Northern Paiute, Shoshone, and Ute. Where bison hunting occurred, it undoubtedly allowed greater population concentrations (at least on a seasonal basis) than was possible in the historic period.

Mountain Sheep

Mountain sheep, averaging 300 lb in weight, were abundant in prehistoric times. They were formerly distributed throughout the Great Basin in grassy foothill areas, but more recently have retreated to more inaccessible mountain regions. Due to their sure-footedness on rocky promontories, they were difficult to hunt. Indians in historic times utilized dogs to isolate individual animals, or attracted them during their December mating season with the use of logs thumped to imitate the sounds of combating animals. The mountain sheep may have been of considerable importance in prehistoric times when larger herds inhabited open grassland areas.

Elk and Deer

Elk seem to have been limited to the extreme northeastern part of Utah and were, therefore, unimportant to most Great Basin Indians. Deer, however, namely the mule and black-tailed and the Virginia or white-tailed varieties, were widely distributed and universally hunted. Deer congregated in small bands and generally inhabited partially wooded foothill areas. They were taken by individual stalking, or by small groups of hunters who drove them into ambush. Communal hunts commonly occurred in the spring and fall when deer migrated along established trails between high and low ground.

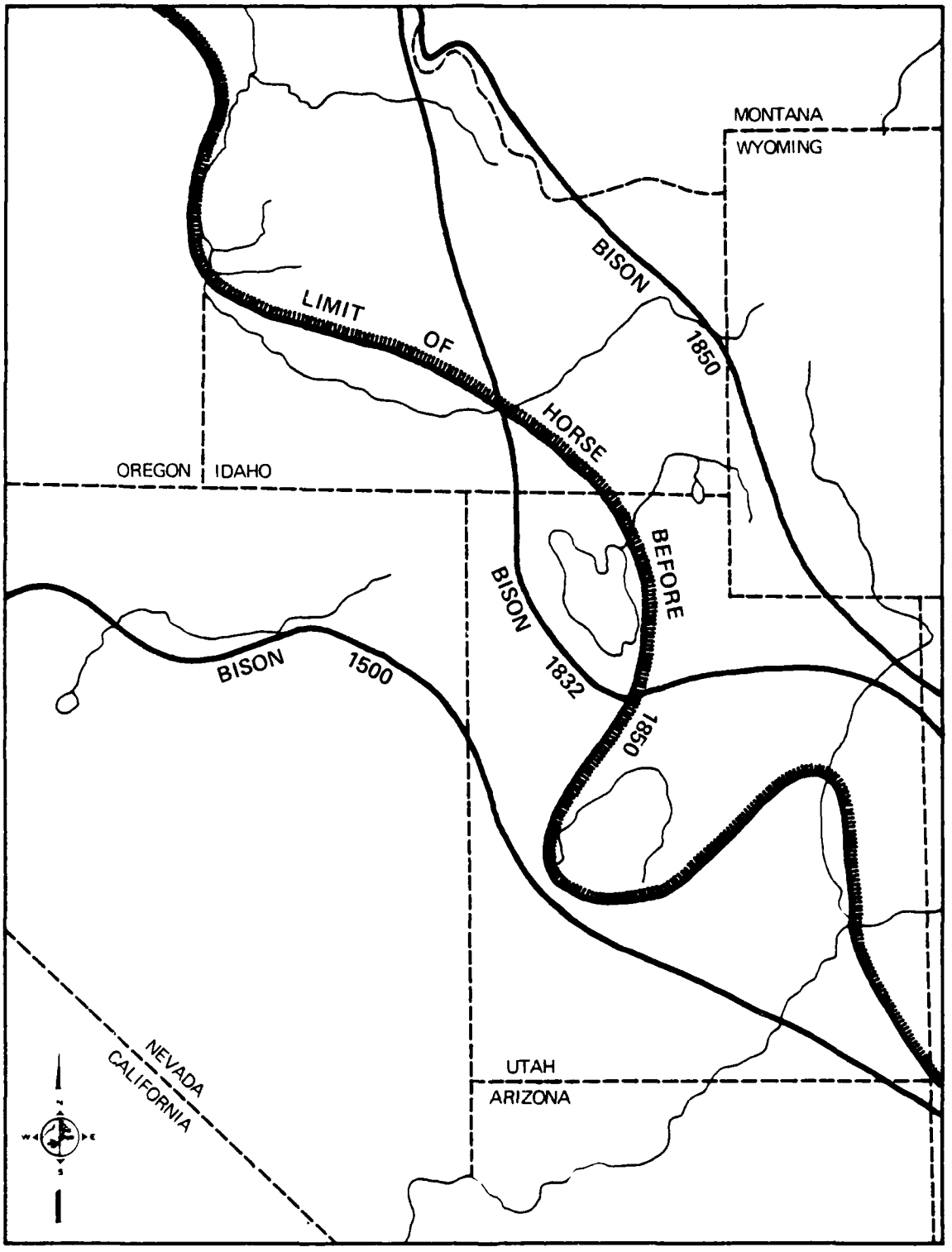


Figure 1.4.2-1. Former distribution of bison in Nevada, Utah, and Idaho (after Steward, 1938).

Pronghorn

The pronghorn was distributed throughout the Great Basin, except for the Covillea belt of southern Nevada. Unlike the deer, pronghorn gathered into large herds in open areas of hills and valleys. Although individual animals were sometimes stalked, entire herds were typically driven into ambush by Indians. Large numbers of animals could be successfully taken by this method in ancestral times, but one such hunt depleted the local pronghorn population for several years.

Rabbits

A major source of meat for Great Basin Indians in early times was the jackrabbit. These animals, averaging over 5 lb in weight, were distributed in very large herds throughout Nevada and Utah in the Artemisia and Covillea belts. Their gregarious nature and open habitat made them especially vulnerable to large-scale communal hunts. Large numbers of Indians, serving as a corps of beaters, drove the animals into a horizontally stretched band of nets where they were easily slaughtered. Meat was dried for storage, and skins were utilized for blankets. The high fecundity rate of jackrabbits, unlike the pronghorn, guaranteed rapid natural replenishment of the herds. Smaller cottontail rabbits, inhabiting brushy foothill areas, were also taken with snares or bow and arrow.

Birds

Several species of waterfowl were used by Great Basin Indians located near marshy areas, playas, lakes, or streams. Prominent in this respect were mudhens, ducks, geese, and swans, as well as their respective eggs. Waterfowl were sometimes driven into nets, or taken onshore when molting or immature. Sagehens, wild turkeys, and a variety of small birds were also taken with dead-falls or bow and arrow.

Other Small Animals

Many varieties of smaller mammals and reptiles were taken throughout the year to supplement vegetable foods. Among these are the rockchuck, woodchuck, badger, porcupine, fox, beaver, marmot, mink, rats, prairie dogs, gophers, squirrels, lizards, desert tortoise, and snakes. Insects such as locusts, grasshoppers, caterpillars, and ants were also used.

Fish

Fish were taken by all Great Basin Indians from springs and from temporary streams, marshes, and lakes created by the first melting of mountain snows. Only a few rivers and permanent bodies of water, however, provided large supplies of fish. In Nevada, the Truckee, Walker, Carson, and Humboldt rivers and their tributaries supported annual spring spawning runs of trout, suckers, and mullet. Salmon runs were limited to the Snake River in adjacent Idaho. In Utah, fish were important to Indians inhabiting tributaries of the Great Salt Lake and Utah Lake, the Sevier River, and tributaries of the Colorado-Green drainage system. In these areas, fish were taken in huge quantities during spawning runs and dried for storage. They were also used on a more limited basis throughout the winter months. The Washo of western Nevada migrated annually to the Lake Tahoe area in the California Sierras

for intensive fishing at the lake and surrounding mountain streams. Several methods were employed, including hook and line, hand collection in baskets, weirs and diversion dams, and nets.

Horticulture and Seed Broadcasting (1.4.2.1.5)

Hoe farming occurred only among a minority of Southern Paiute groups in ancestral times. Domesticated plants such as maize, beans, squash, watermelon, cantaloupe, and sunflowers were acquired from the Hopi. Nowhere did the yields of such crops provide more than a supplement to the dietary staples of seeds and pine nuts. Crops were typically planted with a digging stick on small plots which had been irrigated by the construction of a water diversion ditch from perennial springs. Plots thus planted in the early spring were left unattended until fall harvesting time, when Southern Paiute groups returned from their seasonal hunting and gathering rounds. In early postcontact times, cultivation was adopted by the Death Valley, Lida, Spring Valley, and Ely groups of Shoshone.

Some Shoshone groups in east-central Nevada and west-central Utah engaged in the deliberate sowing of wild plant seeds. This activity is known to have been associated with Shoshone of Small Creek, Reese River, Spring Valley and the Morey, Ely (Steptoe Valley), and Egan areas; and with the Goshute Shoshone of Deep Creek. Members of local groups in these areas employed communal labor for the irrigation of a large plot, and for seed broadcasting. Harvesting was undertaken by individual families. Chenopodium and Mentzelia appear to have been the predominant seed plants.

Seasonal Subsistence Cycles (1.4.2.1.6)

Due to the generally sparse, scattered, and unpredictable nature of food resources, Great Basin Indians in ancestral times ranged over considerable distances during the annual cycle. This wandering was not, however, without direction or consistency. All groups had at least one local home-base from which they radiated and to which they returned on a seasonal basis--a settlement pattern called transhumancy. Typically the winter village, where family-groups of larger local collectives congregated to live off stored food during the cold season, served as the locus of cultural identity and economic activity. The relative abundance of food resources within a given area determined whether family units lived individually or gathered together in bands. Although ecological variation was considerable both between and within Nevada/Utah tribal groups, general patterns in seasonal subsistence activities and settlement may be discerned. These patterns are outlined for Washo, Northern Paiute, Shoshone, Southern Paiute, and Ute Indians in Table 1.4.2-2.

Winter for all Great Basin tribal groups was a time to congregate with kinsmen and allied families which may have been separated during a major portion of the year. Such settlements among the Washo and some Northern Paiute bands were limited in size and local density by the availability of springs or perennial streams. Winter collectives among the Shoshone, Ute, and Southern Paiute more closely approximated true villages, composed of family-groups which utilized the same territory throughout the year. Subsistence during winter was derived primarily from stored seeds and pine nuts, dried animal flesh (especially deer and rabbit), and dried fish. Hunting and, in some locations, fishing activities continued throughout the

Table 1.4.2-2. General seasonal subsistence and settlement cycles of Great Basin Indians.

WASHO	NORTHERN PAIUTE[1]	SHOSHONE	SOUTHERN PAIUTE	WESTERN UTE[2]
WINTER				
Settlement in small camps along eastern Sierra foothills in areas with adequate water and firewood supplies. Primary subsistence derived from cached foods acquired earlier in the year. Time of basket- and tool-making. Late winter the famine season.	Settlement in small camps along valley lakes and streams. Primary subsistence derived from stored foods. Hunting of small animals and ice-fishing throughout the winter supplemented diet. Willow-gathering and basketmaking are important winter activities. Late winter the famine season.	Settlement in winter villages (ideally served as home bases for several family groups which exploited the same territory on an annual basis) located in well-watered foothill areas. Primary subsistence derived from cached foods acquired during the year. Late winter the famine season.	Winter villages located at springs, perennial streams, or lakeshore served as communal home base for allied family units or bands. Primary subsistence derived from stored food, with supplementary hunting, winter rabbit drives and ice-fishing in some areas. Late winter the famine season. In some areas, Southern Paiutes left winter villages to collect mescal, cacti, and juniper berries (known as "starvation foods") in canyons.	Members of communal band territories nucleated into winter villages, generally in valley areas along perennial streams or lakes. Primary subsistence from stored pinenuts, vegetable foods, dried meat and fish. Large and small game hunting continue throughout the winter, with some ice-fishing. Late winter the leanest season, but no reports of widespread famine.
SPRING				
Gathering of greens, roots, and tule in valleys with first melting of snows. Trek of young men and women to Lake Tahoe to establish early fishing villages. Gathering and hunting. Gradual trek of remaining Washo (elderly and very young) from winter camps to Lake Tahoe villages.	Gathering of cattails and desert greens, hunting of waterfowl. Late spring nucleation of camps into fishing villages on rivers for spawning runs. Harvested fish dried for storage.	Limited gathering expeditions from winter villages with first melting of snow. Communal deer hunting along deer migration trails. Gathering and fishing in low hills, lakes, and streams. Winter village remains home base.	Crops planted at winter village in spring by some Southern Paiute groups. Gathering expeditions undertaken by family groups or communally by entire band to lower elevation areas. Hunting of small game supplemented diet. For Southern Paiute in lake and perennial stream regions, spring was the primary fishing season.	Large communal fishing villages, for intensive collection of trout, suckers, and mullet on annual riverine spawning runs. Time of feasting and performance of Bear Dance, for which several Ute bands may nucleate. Reported that Utah Lake was the annual spring gathering place for all Ute bands within a 200 mi radius by the 1840s. This nucleation was aided by acquisition of horses.
SUMMER				
All Washo assembled in Lake Tahoe villages by early summer. Intensive fishing during annual spawning runs of trout and sucker. Harvested fish dried. Dispersal of Washo families to higher elevations for fishing, hunting, and gathering by mid-summer. Return of Washo to camps in valley floor regions in the late summer for intensive gathering and hunting.	Dispersal into small mobile camps for harvesting of desert seeds; hunting of small game. Hunting of waterfowl, and harvesting of Indian rice grass by mid-summer. Berry harvesting and the hunting of small game. Scouts deployed in August to find pinyon groves with promising crop. Prayer rituals at grove and summer camp for successful harvest.	Dispersal of family groups from winter village for extended seed gathering expeditions in moist hills and desert valleys. Seeds cached in hills. Movement back to hills as seeds ripened near winter village. Harvesting of rice grass by mid-summer, and communal antelope drives in lower sagebrush belt. Return to hills in late summer to gather roots, berries, and tule. Communal rabbit drives in lower sagebrush belt.	Some Paiute groups returned in summer to home base winter villages to gather seeds in valleys and higher elevations. Others in lake areas dispersed in small groups in early summer to the plateaus for foot gathering and hunting. In late summer, Paiute groups in arid regions moved to plateaus for gathering and the hunting of large animals. In lake areas, late summer was associated with the nucleation of band members in valley areas for gathering and communal rabbit drives.	Dispersal of family groups within band territories for gathering and hunting. Band chief sends messengers to family camps when prime seed-gathering areas are encountered. All band members converge on such areas intermittently throughout the season for intensive gathering.
FALL				
Gathering, fishing on lower streams continues. Intensive hunting of large and small game. Washo camps gather in lower mountain areas by late fall for pinyon harvest. Pinenuts cached in caves. Time of plenty and festivals. After nut harvest, winter camps established in foothills, firewood gathered. Large communal rabbit drives conducted in valleys. Intensive hunting and gathering for accumulation of winter food stores until first snows.	Northern Paiute camps gather in pinyon groves for pinenut harvesting; crop cached in pits; hunting of small game. After primary nut harvest, all but young and infirm summoned by rabbit-chief to large desert camp for communal rabbit drive. Time of feasting. Meat dried for storage. After rabbit drive, camps disperse back to hills to hunt, and to gather remaining fallen pinenuts. In late fall, winter camps re-established along valley lakes and streams. Intensive hunting and gathering to build up winter stores.	Convergence of family groups in area of good pinenut crop and establishment of winter villages. Harvesting and storage of pinenuts. Time of plenty and festivals. Large-scale communal rabbit drives organized in valleys. Return to winter villages for intensive hunting and gathering until first snows. Communal hunting of deer along deer migration trails.	Fall was the season of plenty and festivals. Most Paiute groups gathered pinenuts, roots and seeds on adjacent plateaus and conducted communal hunts of large game. Following the pinenut harvest, winter villages were reoccupied, and any planted crops were harvested. Communal rabbit drives occurred in most areas. Intensive hunting and gathering to increase winter stores.	Trek to adjacent mountain areas for pinenut harvesting and deer hunting. Return to winter villages for rabbit drives and other intensive hunting, fishing, and gathering activities prior to the onset of snows.

069

[1]Based largely upon data for Northern Paiute of the Truckee and Carson river drainages.

[2]Information on the pre-horse Ute subsistence found is scant. It is assumed that prior to horse acquisition, Ute subsistence and settlement patterns were similar to those of the Shoshoni and Southern Paiute, but with a heavier dependance on fishing. The horse allowed greater band cohesion and mobility than was possible in early times.

Sources: Downs (1966); Kelly (1964); Malouf (1974); Steward (1938); Thomas (1971); and Wheat (1967).

winter to supplement the eroding caches of food. The cold season provided the opportunity for heightened indoor activities, such as basketmaking and the crafting of stone tools. It was also the time of extended storytelling, when elders conveyed the knowledge and lore of the tribal culture to others. Food stores often became exhausted by late winter or early spring. This annual famine period was often a time of illness and death for the elderly and very young. Food shortages motivated Southern Paiute bands to disperse prematurely from winter villages to the lower canyon areas for the collection of mescal, cacti, and juniper berries--foods which were used only under the threat of starvation.

With the first melting of desert snows in early spring, all Great Basin Indians undertook gathering expeditions from winter villages to the low hills and valleys. There they gathered leafy plants or "greens" and roots in areas which would in a few weeks become parched by the desert sun. Plant foods were eaten fresh or boiled, and no surplus storage was possible. Early spring was also a time of heightened hunting activity. In marshy areas, peoples such as the Northern Paiute and Ute undertook communal hunts of waterfowl which had returned from their seasonal migrations. Early spring was also an important deer hunting season. Ambushes and pitfalls along established trails were utilized by groups of hunters to capture deer which migrated annually to high ground with the melting of snows.

Fishing was undertaken by all Great Basin Indians in watercourses created by spring mountain streams. For some groups, however, notably those occupying areas with perennial rivers and lakes, spring fishing activities provided a major source of storable food. In late spring some Northern Paiute bands gathered into communal fishing villages for the annual spawning runs of fish on the Truckee and Walker rivers. Great numbers were taken and stored for future use. A similar pattern held for Shoshone bands in the Humboldt River drainage, Southern Paiute bands in lake and perennial stream areas, and for Western Ute bands of the Great Salt Lake drainage and Bonneville Basin. Fishing provided such a reliable food source for Utes of the Utah Lake, Sevier River, and Fish Lake areas that family-groups that composed larger band units were able to remain together throughout most of the year.

Early summer for the majority of Great Basin Indians marked the beginning of intensive seed-gathering. Family-groups dispersed throughout the lower hills and valleys to harvest the grasses which had sprung up from the winter moisture. Great distances were covered on these expeditions, with gradual movement of groups to higher elevations as the warm season progressed. Harvested seeds and roots were usually cached in the foothills near winter villages sites, to which the family group hoped to return in a few months. In some tribal groups, such as the Western Ute, the activities of family-groups that made up a common territorial band were coordinated by a chief who sent messengers to inform members of primary seed-gathering areas.

As the summer drew to a close, Great Basin Indians began to anticipate the most important phase of the annual gathering round, namely the fall pinyon harvest. Shoshone and Southern Paiute groups migrated from arid regions to plateau and foothill areas to hunt large game and to await the ripening of pine nuts. Northern Paiute bands sent scouts to the neighboring hills to locate promising pinyon groves, and conducted ceremonials to ensure plentiful crops. Western Ute bands made preparations for the long trek to mountain areas for the pine nut harvest.

Fall was a time of plenty and festivities for all Great Basin Indians. Family groups and local bands nucleated in foothill pinyon groves for the intensive gathering and storage of pine nuts. The harvest, which lasted for two to four weeks, was followed by large communal rabbit drives in the surrounding valleys. All subsistence activities were heightened in anticipation of the long winter season when stored foods would provide the measure against starvation. By late fall, winter villages were well-established and huge supplies of firewood had been accumulated. The communal hunting of deer and of other mammals now fattened for winter hibernation provided the last major source of storable food before the onset of winter snows.

Manufacturing and Pharmaceutical Uses of Flora and Fauna (1.4.2.1.7)

For Indians of the Great Basin, survival depended not only upon the successful utilization of flora and fauna for food, but on the additional knowledge and use of selected species for manufacturing and pharmaceutical purposes. The persistence of traditional crafts among contemporary Native Americans for commercial purposes and for the education of their children is marked. Similarly, modern Indians often express a preference for traditional medicinal remedies over commercial products in the treatment of minor ailments. These patterns warrant closer examination of the floral and faunal usages in early times.

Organic Manufacturing Materials

Game animals were utilized in early times for a variety of products. The fur hides of rabbits and occasionally bears were made into warm winter blankets. Deer hides were tanned for clothing and containers. Horn and bone material from butchered antelope, deer, and other game animals was utilized for scrapers, flaking tools, ornaments, and a variety of household utensils. Among some Great Basin Indians, eagles were captured from aeries when immature and raised at encampments to ensure a source of feathers for arrows. Some of the major plants utilized in traditional manufactures are listed in Table 1.4.2-3. Of all the traditional crafts practiced by Great Basin Indians, basketry is perhaps the most famous and most persistent. All tribal groups possessed the skills of intricate weaving and basket-making for containers required in gathering, food processing, and food storage. Some vessels were so finely woven that they were watertight, and could be used for water transport on long treks into the desert. These handsome basketry pieces continue to be made by skilled Native American women, and claim high prices in the commercial market. Raw materials for this craft are regarded as important cultural resources.

Medicinal Plants

All Great Basin Indian tribal groups were knowledgeable in pharmaceutical applications of native flora for common ailments. Wounds, bruises, sores, and rheumatism were typically treated with ground leaves or roots prepared into ointments or poultices. A wide variety of minor internal ailments, such as colds, fever, and digestive problems were countered with oral medicines. Roots, leaves, flowers, or entire plants were made into teas, or boiled, and the resultant liquid drunk. Knowledge of successful techniques for the setting of broken bones was commonplace among adults. The medicinal inventory of the Ute Indians also included veterinary preparations for horses. A list of common medicinal plants and

Table 1.4.2-3. Major plants used in manufacturing in the Great Basin and the traditional usage (Page 1 of 2).

Genus	Common Name	Traditional Usage
Abies	balsam	Gum, pitch, etc., basketry
Amalchoer	june berry	Basketry materials
Amelanchier	service berry	Basketry materials; bows
Apocynum	dogbane	String (from dried bark), fiber
Artemisia	sagebrush	Fire drills; tinder; twined bags and garments; rabbit nets; houses and windbreaks; hunting enclosures; bark shoes
Cercocarpus	mountain mahogany	Basketry designs (dye); arrows; bows; digging sticks
Cowania	cliffrose	Clothing
Clistoyucca	Joshua tree	Basketry materials; firedrills; sandals
Echinocactus	devil's pincushion	Awls
Epicampes	grass	Coild basketry foundation
Equisetum	scouring-rush	Whistles
Juncus		Basketry materials (yellow designs)
Juniperus	juniper	Bows; house frames; kindling
Malvastrum	false mallow	Gummy paste used on insides of dishes
Martynia	devil's claw	Basketry materials (black designs)
Phragmites	reed or cane	Arrow shafts
Picea	Englemann spruce	Kindling
Pinus	Pinyon	House frames and coverings
Populus	cottonwood	Basketry materials
Pseudotsuga	spruce	Kindling
Rhus	sumac, squawbrush	Basketry materials (white designs); cradle-boards
Ribes	currant	Arrow shafts
Salix	willow	Basketry materials

T5933/10-2-81

Table 1.4.2-3. Major plants used in manufacturing in the Great Basin and the traditional usage (Page 2 of 2).

Genus	Common Name	Traditional Usage
Sambucus	elder	Flutes
Sarcobatus	greasewood	Arrows; digging sticks
Scirpus	tlule	Sleeping mats, boats
Shepherdia	buffalo berry	Basketry designs (dye)
Sphaeralcea	desert mallow	Pottery materials (syrup, mixed with clay)
Symphoricarpos	snow berry	String (from bark); cradleboards
Yucca		Basketry materials; firedrills; sandals

T5933/10-2-81

Sources: Chamberlin, 1909, 1911; Facilitators, 1980; Kelly, 1964; Malouf, 1974; Moore, 1979; Steward, 1938; Wheat, 1967.

their traditional applications appears in Table 1.4.2-4. The precise nature of more serious life-threatening or fatal illnesses among Native Americans in ancestral times is less well known. In Table 1.4.2-4, it is notable that introduced contagions, such as smallpox and venereal diseases, were initially treated (no doubt unsuccessfully) with native pharmaceuticals. In the traditional cultures, the treatment of serious illnesses was typically monopolized by religious specialists, or shamans. Only persons with special supernatural powers were felt to be capable of curing the gravely ill. Shamans often specialized in particular medical problems, such as snakebites, or had a more generalized practice. The charging of fees for services, which involved songs, expurgations, and at times trances, was common.

Religious Significance of Native Flora and Fauna (1.4.2.2)

There is no strict dichotomy in traditional Native American cosmologies between human and non-human organic forms. All are infused with a similar spiritual energy which relates back to the time of creation. It is this spiritual essense which is the substantive property of all life, whereas species demarcation, as we would phrase it, is merely a secondary or formal property. This concept is basic to an understanding of Native American views of the universe. It accounts for the interchangeability of human and animal forms in mystic times, and their continuing ability to interact with and influence one another in daily life.

When Animals Were People (1.4.2.2.1)

Animals play a central role in Native American religious accounts of the creation of the universe, earth, the natural environment, and humans. The creation myths of American Indians refer to the time When Animals Were People. They typically begin with a supreme being such as the Southern Paiute "Ocean Woman" (Laird, 1976:148-149), the Washo "Creation Woman" (Downs, 1966:60), or the Ute "He-She" Great Spirit (Jefferson, Delany, and Thompson, 1972:64). These supreme beings provide the raw materials for the formation of the planet, but generally leave the primary roles of creation to animals, which are often portrayed as their agents or offspring. Unlike the more universal religions, supreme gods remain comparatively remote from the daily lives of individuals, and are seldom the objects of direct communication or prayer. Animals, in contrast, are the guardians of the spirit-world and the primary intermediaries between humans and the unknown.

Animals in mystic times had their own languages, societies, and supernatural powers, and were the immediate precursors of Indians. Each Native American culture in the Great Basin has hundreds of myths which recount the formation of the natural environment, the afterworld, and humans by animals. The most prominent figures in this respect are Wolf and Coyote. Among the Kaibab Southern Paiute, for example, Wolf is referred to as "people's father" for his role in creating land and animals (Kelly, 1964: 133). Coyote, often portrayed as his brother, is credited with the introduction of sexual intercourse by the Northern Paiute (Kelly, 1938:371), and with fathering the human race (by copulating with Louse, daughter of Ocean Woman) by the Chemehuevi branch of Southern Paiutes (Laird, 1976:149-152). Although their roles vary from tribe to tribe, Wolf and Coyote are universally recognized as supreme supernatural creatures among Numic-speaking peoples. Wolf typically assumes a powerful, business-like, and asexual posture, creating earth, its creatures, and the afterworld (Jorgensen, 1913). Coyote, although equally powerful and often fearsome, is more subject to "human" passions, and at times is cast in the role of trickster.

Table 1.4.2-4. Medicinal plants used by Great Basin Indians (Page 1 of 8).

Genus	Species or Common Name	Usage
Abies	white fir	tuberculosis, sores, boils, swelling, and burns
Abronia	verbena sand puff	stomach and bowel ailments, rheumatism, stomach ache, rashes
Achillea	yarrow	anaesthetic, toothache, sores, bruises
Agastache	mint	stomach ache, sore eyes, colds
Amelanchier	service berry	sore eyes
Ambrosia	rag weed	sore eyes
Anemopsis	yerba mansa	stomach ache, gonorrhea, muscular pains, sore feet, antiseptic
Angelica	breweri	colds, chest ailments
Aplopappus	goldenweed	stomach aches, cramps, colds, fever, and sore eyes
Aquilegia	columbine	head lice, venereal disease, diarrhea, rheumatism
Arabis	rock cress	liniment
Arctostaphylos	green manzanita	venereal disease
Arenaria	aculeata, congesta, obtusa triflora	eyewash, bowel ailments
Argemone	prickly poppy	toothache, burns, boils
Artemisia	sagebrush	stomach ailments, venereal disease, headache, liniment, coughs, colds
Asclepias	milkweed	measles, cough, tuberculosis, headache, ringworm, cuts, corns, swelling
Aster	frondosus, scopulorum	rheumatism, swollen jaw and neck glands, eye wash
Astragalus	rattleweed, locoweed	horse medicine, venereal disease

T5197/10-2-81

Table 1.4.2-4. Medicinal plants used by Great Basin Indians (Page 2 of 8).

Genus	Species or Common Name	Usage
Balsamorrhiza	arrowroot	stomach, bladder and wounds
Battarrea	puffball	sores, swelling
Berberis	barberry	venereal disease, blood tonic or purifier, bladder and stomach disorders
Brassica	wild mustard	burns
Brickellia	oblongifolia	stomach
Byrum	moss	burns
Castilleja	paintbrush	venereal disease
Catabrosa	aquatica	blood tonic
Caulanthus	crassicaulis	blood tonic
Cematis	legusticifolia	unspecified ailments
Cercocarpus	mountain mahogany	tuberculosis, coughs, sores
Chaenactis	nevadensis	diarrhea
Chamaebatiaria	millefolium	gonorrhea
Chrysothamnus	rabbitbrush	sore muscles, colds, measles, small pox, swelling
Cicuta	poison parsnip	rattlesnake bites, swelling
Claytonia	miner's lettuce	burns, rheumatism
Clematis	virgin's bower	bruises, sores
Cleome	integrifolia	sore eyes
Cnicus	eatoni	cuts and sores
Collinsea	parviflora	sore ointment
Commandra	bastard toad flax	headaches

T5197/10-2-81

Table 1.4.2-4. Medicinal plants used by Great Basin Indians (Page 3 of 8).

Genus	Species or Common Name	Usage
Corallorrhiza	coralroot	pneumonia
Cordylanthus	ramosus	venereal disease
Cornus	dogwood	unspecified ailments
Cowania	cliffrose	smallpox, laxative, measles, sore eyes
Crepis	hawksbeard	sore eyes, post childbirth breast soreness
Cucurbita	desert gourd	venereal disease
Cuscuta	dodder	female sterility
Cymopterus	globosus	insecticide
Dalea	freemontii	internal hemorrhage, stomach trouble
	smokebush	colds and coughs, pheumonia, tuberculosis, stomach aches, venereal disease, kidney trouble, muscular pains
Datura	jimson weed	narcotic uses
Desmanthus	illinoensis	sore eyes
Dyssodia	thurberi	psychic tea
Elymus	rye grass	sore eyes
Enceliopsis	red brush	stomach disorders
Ephedra	nevadensis	kidney disorders
	veridis	rheumatism, sores, venereal disease, colds, stomach disorders
Equisetum	horsetail rush	kidney disorders
Erigeron	fleabane	eyewash, arrow poison, diarrhea
Erigeron	brass buttons	stomach aches and cramps, constipation, sore eyes

T5197/10-2-81

Table 1.4.2-4. Medicinal plants used by Great Basin Indians (Page 4 of 8).

Genus	Species or Common Name	Usage
Eriodictyon	mountain balm, yerba santa	colds, coughs, stomach ailments
Eriogonum	silver plant	stomach disorders, venereal disease
	wild buckwheat, butterballs, sulphur flower	tuberculosis, colds
Eryngium	button snakewood	diarrhea
Euphorbia	spurge	snakebites, eyewash, swelling
Eurotia	whitesage, winterfat	hair treatment, fevers
Ferula	multifida	wounds, bruises, horse distemper
Forsellesia	nevadensis	tuberculosis
Frasera	albomorginata	eyewash
Fritillaria	tiger or brown lily	unspecified ailment
Geranium	fremontii	astrigent, diarrhea
Gilia	gracilis	bruised or sore legs
Grindelia	gumweed	smallpox, measles, venereal disease, coughs, bladder ailments, swelling
Gutierrezia	snakeweed	rheumatism, colds, measles, nose bleeds
Hedeoma	pennyroyal	indigestion
Hedysarum	mackenzii	unspecified ailment
Helianthellia	little sunflower	rheumatism, headache
Helianthus	common sunflowers	rheumatism
Heliotropium	heliotrope	measles, venereal disease
Heracleum	cow parsnip	toothache, sore throat, colds, diarrhea, tuberculosis wounds

T5197/10-2-81

Table 1.4.2-4. Medicinal plants used by Great Basin Indians (Page 5 of 8).

Genus	Species or Common Name	Usage
Hermidium	four-o'clock	headaches, wounds, fainting, dizziness
Heuchera	alumroot	fevers, venereal disease, heart trouble
Holodiscus	rock spirea	colds, stomach aches
Hypericum	St. John's wort	sores, swelling, toothache
Iris	wild iris	toothache, venereal disease, burns, earache, bladder ailments
Iva	poverty weed	stomach ache, cramps, skin irritations
Juniperus	cedar, juniper	blood tonic, venereal desease, cough, colds
Krameria	grayi	sores, swelling
Krynitzkia	sericea	stomach ailments
Larrea	creosote bush	venereal disease, colds, cramps, chicken pox
Leptotaenia	cough root, Indian balsam	coughs, colds, hayfever, breathing difficulties
Linum	wild flax	bruises, swelling, rheumatism, sore eyes, gall trouble
Lithospermum	gromwell, stoneseed	diuretic, kidney trouble, contraceptive
Lophophera	peyote	narcotic uses
Lupinus	lupine	urinary problems
Lygodesmia	skeleton weed	toothaches, swelling, diarrhea, eyewash
Marrubium	horehound	blood circulation
Matricaria	may apple	unspecified ailments
Mentha	wild common mint	headache, stomach ache
Mentzelia	laevicaulis	bruises, swelling, rheumatism
Mimulus	monkey flower	wounds, rope burns

T5197/10-2-81

Table 1.4.2-4. Medicinal plants used by Great Basin Indians (Page 6 of 8).

Genus	Species or Common Name	Usage
Mitella	trifida	purgative
Monardella	western balm	colds, digestive ailments
Nicotiana	wild tobacco	swelling, toothache, cuts
Oenothera	evening primrose	unspecified ailments
Opuntia	beavertail cactus	cuts, wounds
Orbanche	broomrape	colds, peumonia
Osmorhiza	sweetroot	colds, peumonia
Paeonia	wild peony	tuberculosis, venereal disease, headaches, sore throat
		sore eyes, wounds, burns
Parnassia	fimbriata	venereal disease
Parrya	daggerpod	tonic for after childbirth
Pedicularis	elephant head	stomach aches, cuts, sores
Penstemon	red penstemon	burn ointment
Peucedanum	graveolens	sore throat
Phragmites	reed	cuts
Physaria	twinpod	eyewash, cuts, sores
Pinus	aristata monophylla	dressing for sores,
	monophylla	intestinal parasites, colds, venereal disease, diarrhea, kidney problems
Plantago	common plantain	swelling rheumatism
Pluchea	arrowweed	diarrhea
Populus	quaking aspen, black cottonwood	venereal disease

T5197/10-2-81

Table 1.4.2-4. Medicinal plants used by Great Basin Indians (Page 7 of 8).

Genus	Species or Common Name	Usage
Porophyllum	leucospermum	delayed menstruation
Prosopis	screwbean	eyewash
Prunus	andersonii	influenza, diarrhea
Prunus	demissa	bowel ailments
Psathyrotes	turtleback	digestive ailments, tuberculosis, toothache, venereal disease, eyewash
Purshia	antelope brush	venereal disease, smallpox, chickenpox, measles
Pyrola	shinleaf	liver ailments
Rhus	squawberry	astringent
Ribes	currant	sores, swelling
Rosa	wild rose	colds, urinary problems
Rubus	raspberry	cuts and wounds
Rumex	Indian rhubarb	rheumatism, cuts, bruises, swelling
	sanddock	burns
Salix	willow	eye ailments, venereal disease
Salvia	purple sage	colds, stomach disorders
Sambucus	elderberry	diarrhea
Sarcobatus	greasewood	diarrhea
Saracodes	snow plant	pneumonia
Silene	multicaulis	unspecified ailments
Sisymbrium	hedge mustard	unspecified ailments
Smilacina	false solomonseal	carache, wounds
Solanum	nightshade	diarrhea
Sphaeralcea	mallow	venereal diseases, stomach ailments, swelling

T5197/10-2-81

Table 1.4.2-4. Medicinal plants used by Great Basin Indians (Page 8 of 8).

Genus	Species or Common Name	Usage
Sphenosciadium	yellow prince's plume	toothache, earache, throat congestion
Spiroea	millefolium,	venereal disease,
	coespitosa	burns
Suaeda	seepweed	bladder, kidney ailments
Symphoricarpos	snowberry	eye ailments
Tanacetum	tansy	diarrhea
Tetradymia	canescens, comosa	venereal disease, stomach aches, colds and coughs
Thalictrum	meadow rue	gonorrhea, colds
Thamnosma	desert rue	colds
Typha	cattail	diarrhea
Urtica	nettle	rheumatism, colds
Vaccinium	blueberry	astrigent
Valeriana	edulis	bruises, swelling, rheumatism
Veratrum	false hellebore	venereal disease, sore throat
Viola	wild pansy	horse ailments
Welwitschia	diffusa	emetic
Wyethia	amplexicaulis, mollis	bruises, swelling rheumatism,
	mollis	emetic
Zigadenus	foothill death camas	bowel ailments, rheumatism, sprains, toothache, swelling

T5197/10-2-81

Sources: Chamberlin, 1909, 1911; Facilitators, 1980; Intertribal Council of Nevada, 1976; Kirk, 1975; Moore, 1978; Steward, 1938; Train, Heinrichs, and Archer, 1974.

Several other animal species play important roles in the creation of specific environmental features or in instructing humans how to survive and behave morally. Prominent in this respect are Bear, Mountain Sheep, Deer, Rabbit, Beaver, Fox, Eagle, Skunk, Porcupine, Sagehen, Hawk, Antelope, Bat, Dove, Tortoise, Rat, Weasel, Mountain Lion, Dove, Frog, Gila Monster, and Rattlesnake (see also Downs, 1961; Kelly, 1938; Kroeber, 1901; Lowie, 1909, 1924; Malouf and Smith, 1947; Mason, 1910; Palmer, 1946; Reagan, 1935; Steward, 1943). Literally all animal forms which appeared in the original environments of Nevada/Utah Indians are portrayed in myth and folklore.

A central element in Native American cosmologies is the facility with which the formal properties of human and nonhuman or species statuses are regularly crossed. The central character of a particular tale may assume several different forms in a single adventure. In the Southern Paiute "Sky Brothers" myth, for example, protagonists alternate between human, bat, and deer forms (Laird, 1976:210-211). Similarly, in a creation myth of the Northern Paiute, a woman encounters a Beaver who is an Indian, the Beaver's sister Gopher, and finally Rat, who is simultaneously a brother to Beaver and Gopher and the woman's own uncle (Kelly, 1938:365-368). Such mutations of form, while somewhat bewildering to non-Indians, are central to an understanding of past and present relationships between Native Americans and native fauna.

Animal-Spirits and Anthropomorphic Creatures (1.4.2.2.2)

Although the creative acts and exploits of native fauna in mystic times are recognized to have occurred in the distant past, the contemporary descendants of these creatures are still embued with spiritual energy and supernatural power. Animals continue to serve as the primary intermediaries between humans and the unknown. They are the ultimate source of supernatural power in traditional Great Basin Indian religions. This power may be directed against humans for the redress of wrongs, or may be transferred by animals to selected persons for the benefit of mankind. In the first instance, animal or anthropomorphic creatures are viewed as spiritual beings which must be placated or avoided. In the second instance, power and curing knowledge provided by animal-spirits to shamans and selected individuals allows human manipulation of an otherwise harsh and unpredictable environment.

All animals portrayed in the myths of Great Basin Indians were felt to be sources of supernatural power with the ability to avenge themselves on humans for mistreatment. Disposing of game animal remains, especially the bones, without proper respect could cause illness or other dire consequences (Downs, 1966:29). The Northern Paiute, for example, among whom Porcupine was regarded as the architect of snowstorms, took care when burying the entrails not to offend this animal (Wheat, 1967). Anthropomorphic creatures are also a potential source of harm. One of these, the Water Baby, appears in varying forms in all Nevada/Utah Indian groups (Downs, 1966:62; Park, 1934:100; Kelly, 1964:138; Jefferson, Delaney, and Thomp son, 1972:74-75). This nymph- or fish-like creature is usually described as 2-3 ft tall with long hair, mustache, and clammy reptilian skin. It occupies all water bodies (including modern irrigation ditches), and attempts to woo unsuspecting humans, particularly children, to the water's edge for drowning. A seemingly dry-land variant of this creature, Mountain Man, is noted for the Goshute (Malouf, 1974:54). The Ute additionally recognize a terrestrial variant with fish-scales and protruding red eyes which captures and eats children. Anthropomorphic creatures

which can frustrate or thwart humans are commonplace. Among the Southern Paiute, for example, a creature appearing alternately as a man, dog, or two large deer was felt to own the Kaibab plateau, and to ruin the luck of individual deer-hunters if offended (Kelly, 1964:139). Other animals, such as the Owl (Kelly, 1964:139) or Meadowlark and Coyote (Malouf, 1974:57) are felt to bear messages of death with their cries.

Shamanism and Power Acquisition (1.4.2.2.3)

Perhaps the most important area of supernatural interaction between animals and humans occurs in the transfer of curing and other powers to shamans. It is here that the interchangeability and intimacy of human and animal forms had greatest impact in daily life. Shamans are religious specialists of either sex who have acquired supernatural powers from an animal-spirit. The pattern of power acquisition is consistent among Great Basin Indians (Downs, 1966:56-57; Park, 1934; Malouf, 1974:81-82; Kelly, 1939; Laird, 1976:32-38). Adult men and women who are to become shamans receive a number of visitations from a particular animal-spirit in dreams or visions. This animal-spirit or "familiar" instructs the chosen person to acquire items of curing paraphernalia, and teaches the novice through songs the arts of healing. The status of the shaman is thus involuntary. Those who resist a calling may suffer a series of illnesses, or even death.

Sponsor animal-spirits or familiars continue to visit shamans in dreams throughout life, and are regularly called upon during curing rituals for supernatural power. This process is often mediated by trance. So intimate is the relationship between shamans and their familiars that religious specialists are often felt to acquire the personality characteristics of their animal sponsors. A shaman who has the powerful Bear for a familiar, for example, may at times exhibit superhuman strength (Downs, 1966:58; Laird, 1976:37-38). This interchangeability in some cases is believed to reach the extreme of actual physical change. Underhill (1965:91) records a Native American report of a Northern Paiute shaman turning himself into a bear. The nature of a shaman's familiar often predisposed the curer toward treatment of specific types of illnesses. Those with Rattlesnake as a familiar, for example, were thought to be immune to snake venom and uniquely qualified for successful treatment of bites (Downs 1966:58; Park 1934:101, 107).

The products of certain animals were regularly utilized to make curing instruments. Prominent in this respect are eagle feathers or entire eagle skins, which were universally used in the Great Basin to embellish the curing sticks or wands used by shamans during the medicinal ritual (Downs, 1966:57; Malouf, 1974:52; Laird, 1976:115; Park, 1934:99). The important role played by Eagle in the manufacture of religious paraphernalia led to the general recognition of this bird as a sacred animal among Nevada/Utah Indians. Also regularly utilized were deer ears, claws, and hooves for curing rattles (Wheat, 1967:20; Park, 1934:99).

Certain animal-spirits or familiars were regarded as more powerful or were viewed with more favor than others. While Coyote and Wolf were extremely powerful familiars, there was always an underlying fear that the shamans which they sponsored could assume the carnivorous nature of these animals and present a danger to society. In contrast, Antelope and Deer, themselves often portrayed as shamans in myth, were simultaneously powerful and friendly to humans. There is evidence to suggest that anthropomorphic creatures could also serve as shaman's

familiars among some Great Basin groups. Park (1934:101) notes that this supernatural power may be derived from Water Babies among the Northern Paiute, while Malouf (1974:82) records a similar role for the diminutive Mountain Man among the Goshute.

Supernatural Aspects of the Hunt (1.4.2.2.4)

These cultures which accord animals such a central place in their cosmological systems could regularly utilize them for subsistence through the general Great Basin Indian belief that game animals voluntarily donate their lives for the benefit of mankind. The only payment demanded by animals in return is proper treatment, respect, and appreciation for this sacrifice (Downs, 1966:30). It is perhaps more understandable, then, that in times past the hunting of large game animals was surrounded by an aura of ritual sacredness.

This pattern was particularly marked in the traditional communal drives of the pronghorn antelope, which were directed by a special antelope shaman (Steward, 1938:34-35; Steward and Wheeler-Voeglin, 1974:51; Park, 1934:108-109; Underhill, 1961; Downs, 1966:31). The antelope shaman received special supernatural powers in dreams or visions which enabled him to locate suitable herds and to charm them into docility. One to several days of ritual prior to a hunt were required to capture the souls of the herd. So powerful was this activity that the death of a hunter during the campaign was often expected. Communal deer hunts along migration trails during the spring and fall involved similar ritual charming by deer shamans in some areas of the Great Basin (Steward, 1938:36). The hunting of elk was also marked by supernatural ritual among the Goshute (Malouf, 1974:79).

Supernatural means for increasing hunting success were also available to the average person on an individual basis. Favors could be requested directly from the spirit-world at special sites, such as caves and rock outcroppings, where supernatural power was known to reside (Malouf, 1974:81-82; Park, 1934:103). These sites were extremely sacred and dangerous, however, and only the brave could withstand the trial of spending the night there.

Witchcraft (1.4.2.2.5)

Just as shamans possessed supernatural powers to cure the sick, so could they direct this energy for selfish and evil purposes. Witchcraft by shamans was regarded as a primary cause of illness (Park, 1934:110-111; Downs, 1966:57; Whiting, 1950). The malevolent goals of an evil shaman were accomplished primarily through psychic activity (i.e., by willing that a person fall ill). In some cases, however, a poisonous snake or lizard may be willed by the shaman to attack the chosen victim. The only cure available to a bewitched person is the counter-magic of a powerful shaman. Persons suspected of witchcraft were typically executed.

Persistence of Native American Religious Beliefs (1.4.2.2.6)

There are several reasons why Christianity has been unsuccessful in obliterating traditional Native American religious beliefs. First, it is based upon a single omnipotent creator deity, with only a limited number of lesser deities (the Trinity). The supreme Christian deity is more comparable to Ocean Woman, the Great Spirit, or the Sun in Great Basin Indian religions than it is to powerful animal-spirits. The

Holy Ghost and Messiah, as the spirit and messenger of the supreme being, are more parallel to Wolf or Coyote as purveyors of wisdom and foci of human communication with the cosmos. Still, the fit is imperfect, and simple replacement of Native American gods and demi-gods with Christian ones is impossible. A common method of religious integration, therefore, was to simply add Christian dieties to the existing traditional pantheon. The basic Christian demand for exclusiveness with respect to recognition of the supreme being holds little appeal or logic for followers of polytheistic religions.

A second feature which favors the persistence of Native American religious beliefs is the differential reckoning of sacred space and sacred time. Christian teachings are based upon a chronological sequence of events, the most significant of which occurred long ago among unlike people in a very distant holy land. The sacred lands which surround the Native American have little relevance or definition in the new Faith. More importantly, the vertical reckoning of sacred time in Christianity generally limits human contact with the deity to one-way communications (i.e., prayer). More substantive contact with the deity in another world also carries a chronological prerequisite, namely death, and is not guaranteed. Visions, a central communication element in Native American religions, are prominent in Christian legends of past events, but play little role or are accorded less credibility by major Christian sects in the present. The horizontal reckoning of sacred time, an essential Native American vehicle for dealing with the exigencies of everyday life, is entirely lacking. Whereas traditional animal-spirits offer power for immediate problems, Christianity offers salvation--a reward automatically guaranteed to all but witches in Great Basin Indian religions.

Third, Christianity reinforces, rather than discourages, traditional beliefs regarding ghosts or the spirits of the dead. Scriptures and communiques of the Church are replete with references to evil spirits, demons, witchcraft, and exorcism. Moreover, there is presently a renewed interest in and implied credibility for such supernatural phenomena in the larger American society. These notions are part of the persistent traditional belief systems of both Western European and Native American cultures.

A fourth reason for the limited success of Christianity as an acculturating agent is the rise and subsequent popularity of the Native American Church, or Peyote Cult. The Native American Church incorporates a number of Christian features, such as its congregational nature, and selected song and prayer elements. While sometimes regarded as a syncretistic movement, the Church is firmly based in Indian traditional religion. The element so overtly lacking in Christianity, namely horizontal reckoning of sacred time, is restored by the Peyote Cult. In prayer meetings, the journey to the spirit-world is achieved by members through visions facilitated by the hallucinogenic properties of peyote. As in ancestral times, Native Americans may consult the spirits directly for the achievement of everyday health and well-being.

The Bear Dance (1.4.2.2.7)

A spring festival dance honoring the animal-spirit Bear was an important ritual event in ancestral times for the Ute Indians (Reagan, 1930; Reed, 1896; Steward, 1932, 1938:228). A form of the Bear Dance continues to be held on Ute reservations to the present day.

Several reports on the ceremony and its ritual significance have been made, but few traditional performances were observed and described in early historic times. The eye-witness account of Reed in 1893 is a notable exception (Reed, 1896). His observations occurred sufficiently early in the reservation period to capture the full cultural import of the ritual. According to Reed, a participant in the event, the Bear Dance is a sacred rite which underscores and renews the relationship of bears and humans established at the time When Animals Were People:

> o The Utes believe that their primal ancestors were bears; after these came a race of Indians, who, on dying, were changed to bears, and as bears they roamed in the forests and mountains until they died, when they went to the future land and lived with the shades, preserving the forms of bears, but having human wisdom and participating with the Indians in the pleasures of immortality. It is believed that this transmigration ceased long ago, but the bears of the present are believed to be descendants of the Ute bears of old, and are therefore related to the Indians...They believe that bears possess wonderful magic power... They believe that the bears are aware of the relationship existing between themselves and the Utes, and their ceremony of the Bear dance, being a form of animal worship, assists in strengthening this friendship ...one of the purposes of the dance is to assist the bears to recover from hibernation, to find food, to choose mates, and to cast the film of blindness from their eyes. Some of the other motives of the ceremonies are to charm the dancers from danger of death from bears, to enable the Indians to send messages to their dead friends who dwell in the land of immortality, and one or two minor ceremonies are performed usually for the purpose of healing certain forms of sickness (1896:238).

The entire ceremony thus symbolizes the sacred association of humans and bears. It is held in March, the time when bears emerge from hibernation, and formerly lasted four days and one night, a time period equated with that required for bears to fully recover from the winter's inactivity. The dance was held in a specially-constructed circular, walled enclosure, 100-150 ft in diameter, which symbolized a bear cave. The ceremonial structure was considered sacred ground for the duration of the rites. It was believed that bear and Indian members of the afterworld simultaneously prepared for their own Bear-spirit dance, and sent messengers to mortal hibernating bears to advise them of their imminent awakening. The dancing itself, held daily for the duration of the ceremony, was performed to the accompaniment of a select group of musicians and singers. Women and men occupied opposite sides of the ceremonial cave and danced in unison facing one another in parallel rows. Dance partners were selected by women, after the manner in which female bears select their mates. Accordingly, much courting occurred in the context of the ritual. The festive nature of the dance was regularly interrupted by periods of silence and devotion, wherein the dance chief (typically a shaman) and singers participated in incantations to the afterworld. The Bear Dance performance served to secure the supernatural power of spirit-bears, to send messages to the dead, and to protect dance participants from predation by bears on earth.

It is interesting to compare the 1893 observations of Reed (1896) with the eye-witness account of Steward (1932) made at the Uintah Reservation in 1931. The Bear Dance had, by that time, attracted non-Indian tourists, and lacked the religious incantations of earlier times. Steward, who was apparently unfamiliar with Reed's

(1896) earlier paper, described the festivities as largely a social affair or "mating dance" which had lost all traditional religious content. Steward interpreted the aggressive role played by women in selecting dance partners as curious, and a possible argument against the "universal law" of male dominance (1932:272). This stylized behavior is a ritual representation of bear mating patterns.

Steward's (1932) description also underscores the importance of outside restrictions on Native American religious activities. The number of Bear Dances regularly held and attended by all Utes at various reservations, for example, was actively limited by governmental agents, who viewed such time expenditures by Indians as "unproductive." Similarly, all-night dancing (a central feature on the final night of the ritual) was prohibited by government regulation on the ground that liquor importation could not be controlled (Steward, 1932:272). It is difficult to imagine that Utes in 1931, many of whom participated as children or young adults in Bear Dances such as that observed by Reed (1896) some forty years before, had forgotten the religious and symbolic content of the ceremony. It is more likely that traditional rituals were performed privately, at times when the general religious intolerance and mockery of ancestral beliefs by outsiders could not serve as inhibiting factors. Interestingly, Steward notes that the 1931 Bear Dance, scheduled to end on a Sunday, was extended one day "because they preferred to postpone their feast until after Sunday when the white people had left" (1932:271).

Ritual Aspects of Native Flora (1.4.2.2.8)

Native plants, when compared to animals, are clearly secondary in supernatural importance or connotation in Great Basin Indian religions. Several important features, however, must be noted.

In mythology, plants are seldom personified, although there are some instances in which bushes and shrubs respond verbally to questions (Laird, 1976:104). Washo tradition holds that Creation Woman formed this and neighboring tribes from cattail (Typha) seeds (Downs, 1966:60). More typically, however, mythological references to flora refer to the sacred origin of important subsistence foods. Among the Northern Paiute, for example, Coyote is credited with the introduction of pine-nuts (Wheat, 1967:31).

Due to its importance for the economic survival of Great Basin Indians, the fall pine nut harvest was associated with supernatural power and ritual. Among the Northern Paiute an annual prayer dance was held several weeks before the ripening of pine-nuts to ensure a good crop (Wheat, 1967:12-13). This sacred rite involved the dispatching in August of a scout and a specially-appointed group of religious pilgrims (including a shaman) to a promising pinyon grove for prayer and the collection of immature pinecones. Nuts from these cones were gathered and carried back to camp for ritual consumption. The ceremony lasted for four or five days, and consisted of prayers for rain in the form of songs and dances. A sagebrush (Artemisia) branch, itself regarded as containing the supernatural power to cause rain, was employed by a shaman during the ritual. The pinyon harvest among the Washo was marked by ceremonies during the first four days of gathering, again to ensure a good crop (Downs, 1966:23). The religious observances included ritual bathing, fasting, and evening songs and round dances. Plants, like animals, had the supernatural power to avenge themselves on humans if offended. Violation of the taboo against mistreating pine-nuts or pinyon trees resulted in illness and misfortune (Downs, 1966:56).

Other plants were regarded by some Great Basin Indians as containing supernatural power which could be utilized by humans to achieve personal goals. The Jimson weed, an hallucinogen, was approached for its power to locate misplaced articles or to identify a person causing misfortune (Laird, 1976:39). The ritual required an individual to verbally address the plant, apologize for disturbing it, remove the eastern root, and either chew the root or make it into a drink. The resultant visions experienced by the recipient supplied the desired information. In addition, the leaves of certain plants, when rubbed on the body, were felt to contain the supernatural power to ensure hunting luck (Downs, 1966:35).

One of the most important native plants in terms of ritual or religious significance is wild tobacco (Nicotiana attenuata). It was almost universally used by Native American shamans in curing and other prayer rituals, and its smoking was regarded as a sacred or semi-sacred act (Downs, 1966:56; Park, 1934:105; Steward, 1933:319-320; Chamberlin, 1911:3435; Reed, 1896:243). Wild tobacco is an essential ingredient in the shaman's religious paraphernalia which is gathered under the instructions of an animal-spirit or familiar. It is utilized in all curing rituals by these religious specialists. Wild tobacco is also employed in important ceremonials such as the Bear Dance, where "sacred smoke" is utilized to contact the dead and bear-spirits in the afterworld.

A second hallucinogen, peyote (Lophophera williamsii), is associated with a historic and contemporary religious movement called the Peyote Cult or Native American Church (Stewart, 1944; Hayes, 1940; Malouf, 1942; Jefferson, Delaney, and Thompson, 1971:65; La Barre, 1938). The movement began among Plains Indians, and diffused to Nevada and Utah in the 1920s and 1930s. Membership in this congregational church is widespread, and is associated with the maintenance of Indian identity and culture. While certain elements of Christianity have been incorporated, the basic doctrines and rituals are distinctly Native American in origin. The primary purpose of religious meetings is the physical and spiritual purification of members through the power of Peyote (a plant-spirit) and prayer.

Contemporary Significance of Native Flora and Fauna (1.4.2.3)

A complete assessment of contemporary Native American uses of and concerns for native flora and fauna in Nevada/Utah can be gained only through the gathering of data from the Indians themselves. Although some information was collected during 1980 field studies, and is included in Chapters 2, 3, and 4, the data are incomplete. The general discussion which follows is based largely upon ethnographic studies undertaken for environmental statements in other areas and logical conclusions which may be drawn from the existing literature.

The Question of Cultural Persistence (1.4.2.3.1)

The first question which must be addressed is whether Native American environmental concerns simply mirror those of the broader citizenry, or whether their traditional heritage continues to foster a culturally distinct way of perceiving flora and fauna. A view expressed by anthropologists early in this century was that American Indians were totally acculturated to the dominant society, and that only a few vestiges of the old ways remained. Such views have been expressed today by missionaries or governmental agencies who perceive themselves as guardians of the Indian community or agents of change. Assertions such as the following are

commonplace: "About the only remaining facets of Indian culture are the small amount of beadwork being done by a few and the native tongue spoken by the majority of residents" (USDC, 1974:322).

The well-established fact that language and cultural perception go hand in hand should in itself draw into question the total Indian assimilation. The persistence of native languages is all the more remarkable when one considers their lengthy prohibition in compulsory government schools. Until recently, American Indian communities themselves were promulgators of the myth of acculturation. In the face of severe governmental restrictions on the speaking of native languages and on the expression of traditional religious beliefs, a veneer of Anglo-Americanism was adopted. The core of distinctively Native American cultural elements remains today where it has been since pacification--in the private homes and ceremonies of reservation communities. While agents of change have unquestionably modified specific customs, beliefs, and traditional knowledge, the reservation Indian's perception of the universe is in many ways distinct from that of other Americans. New laws which guarantee religious freedom and the protection of cultural resources are encouraging the open expression of these traditional Native American concerns.

Contemporary Significance of Native Flora (1.4.2.3.2)

The traditional lands of Nevada/Utah Indians have undergone considerable ecological change since first Anglo-American contact. Native grasses in many areas were destroyed by livestock and replaced with hardier species such as sagebrush. The diversion of surface and groundwater for private wells and irrigation increased the aridity of these regions, effectively eliminating species formerly used for manufacturing, food, and medicines, and laying vast surface areas open to erosion. These processes, along with the legal alienation of Native Americans from tribal lands, contributed to the gradual alteration of ancestral patterns of interaction with native flora. Nevada/Utah Indians became dependent upon new food resources, such as those derived from agriculture and cattle-herding, and those available commercially through the vehicle of wage labor. Adoption of Anglo-American subsistence technology, firearms, clothing, cooking utensils, and containers discouraged the generational dissemination of knowledge in traditional crafts. Moreover, the introduction of modern medical facilities and commercial drugs greatly reduced the extent to which native flora were utilized for curing. Despite these obvious changes, traditional knowledge and traditional patterns of floral utilization persist in contemporary Indian communities. These skills, typically in the hands and minds of tribal elders, are currently being revitalized as part of the growing national movement of Indian cultural pride. The survival of and access to native plants on which these activities depend has thus become an important Native American issue.

Basketry Plants

Of all the traditional crafts, basketmaking is undoubtedly the most difficult and most highly valued. Old baskets are typically found in all Indian homes, and have become family heirlooms over the generations (Downs, 1966:109). The bulk of these valuable pieces are currently in the hands of non-Indians in museums, universities, private collections, and commercial outlets. Native American access to these artifacts for their own proposed or newly-formed tribal museums is a current source of debate. In most Great Basin Indian communities there are women elders who retain the traditional skills for producing a wide variety of traditional

baskets, cradleboards, and other containers. In an effort to preserve these crafts, many reservations are promoting basketmaking classes for younger members of the tribes. This renewed interest not only preserves an area of traditional knowledge, but provides a source of commercial income for skilled artisans. The native plants which provide the raw materials for these products, however, often grow in areas where access is restricted, or are increasingly threatened by modern development. Many of these plants, such as the buffalo berry (Shepherdia), june berry (Amalchoer), service berry (Amelanchier), grasses (Epicampas), and mahogany tree (Cercocarpus), occur in foothill and higher elevations, and are not always generally available to Native Americans congregated in arid valley reserves. Perhaps the most important basketry plant in the Great Basin, the willow (Salix), is limited to well-watered areas which are themselves a vanishing resource. Other riparian flora utilized in basketmaking, such as Juncus, devil's claw (Martynia), and cottonwoods (Populus), are similarly threatened by increasing aridity and by the primary and secondary impacts of off-road vehicle use. In a recent ethnographic study, women of the Chemehuevi branch of Southern Paiutes complained of the difficulty in locating suitable basketry materials. One female elder remarked of devil's claw: "The plant likes sandy washes, and that is the place that the dune buggy people drive. You cannot have both in the same area" (Bean et al., 1978:6-38).

Medicinal Plants

The introduction of medicine based upon Western science has had a tremendous impact on traditional methods for the treatment of illnesses (see discussion of shamanism and peyote below). Modern doctors and medical facilities, however, are utilized by contemporary Indians primarily for traumatic injuries or serious ailments, when other remedies fail or are unavailable. The traditional pharmaceutical inventory of Great Basin Indians, outlined in Table 1.4.2-4, focused largely on the relief of common illnesses such as colds, sores, and digestive problems. Modern commercial preparations, while generally available, are often foregone by Native Americans in favor of teas and other medicines made from native plants which have been proven over the generations to produce desired results. All Great Basin groups continue to utilize medicinal plants, however, decreasing availability is a growing concern (Facilitators, 1980).

Food Plants

Pinyon-juniper groves appear throughout the two-state area at elevations between 5,000 and 7,000 ft. The pine nut was the most important food resource of early Great Basin populations, and continues to be harvested annually by contemporary Nevada/Utah Indians (Downs, 1966:86, 109; Freed and Freed, 1963:36; Clemmer, 1978; Wheat, 1958, 1967: 29-39; Facilitators, 1980). No longer critically important for physical survival, today this resource provides a significant symbolic link with the past. Pine nut festivals are considered to be the single most traditional custom practiced among Paiute and Shoshone people. For this economic, religious, and social event, extended families meet in the fall and camp for up to two weeks in the high pinyon ranges. Recreational and commercial harvesting of pine-nuts is practiced by non-Indians as well. (Table 1.4.2-1)

According to field work conducted during the summer of 1980, tribes within the deployment suitability area were fearful that this competitive activity would increase. In a recent survey by the U.S. Forest Service, Nevada Shoshones indicated

a concern for the preservation of these groves, and for the maintenance of free access (USFS, 1978a: 13, 19). A wide variety of herbs and other food plants continues to be utilized by all Great Basin groups (Facilitators, 1980).

Contemporary Significance of Native Fauna (1.4.2.3.3)

Interview data for Native Americans in Nevada and Utah indicate a deep concern for the preservation and well-being of all native animal forms (see Table 1.4.2-5), from the largest mammals to the smallest reptiles and insects (Facilitators, 1980). It is notable that the Utes of the Uintah and Ouray Reservation have established a tribal Fish and Game Department for the monitoring and protection of native fauna, and that mitigation for deferred Ute water rights to the Central Utah Project included the establishment of reservoirs for the propagation of waterfowl. The extent to which these concerns reflect the persistence of traditional notions about the sacred relationship between Indians and animals is difficult to assess. After years of religious intolerance, persecution, and often mockery by outsiders, Native Americans have tended to maintain an aura of secrecy regarding traditional ideas and activity. Evidence for both persistence and change in Native American cosmologies is available.

Shamanism, Modern Medicine, and Peyote (1.4.2.3.4)

In ancestral times, the role of shaman commanded the greatest power and respect in Great Basin Indian cultures. The brief period of Indian-Anglo wars saw the rise to prominence of several military chiefs who consolidated local bands into political units much larger than those which prevailed in the precontact period. Following pacification and the establishment of reservations, however, Indian war leaders were stripped of their power, leaving shamans once again in a dominant position. While shamans generally experienced an exaggeration of power in the early reservation period, several factors over the next century conspired to demote their status and, in some areas, to eliminate them altogether. Three factors will be briefly discussed here: (1) the inability of shamans to effectively control and eliminate new causes of misfortune in Indian communites, (2) the introduction of western medicine, and (3) the introduction of the Peyote Cult.

The period following the Anglo-Indian conflicts was one of cultural anomie for Native Americans. Extreme poverty, coupled with malnutrition and the introduction of new diseases, placed an overwhelming burden on shamans to alleviate the suffering. Their inability to deal effectively with new diseases, such as smallpox and venereal diseases, cast doubt on their profession. Interestingly, it was not the ability of shamans to cure illness which was questioned, but rather their intentions. Witchcraft accusations against shamans became commonplace, and murders of such individuals were reported through the 1930s (Downs, 1966:99-101; Park, 1934:98). Shamans have continued to practice until modern times, but their ranks have not been replenished and have often disappeared with the death of remaining elderly curers (Freed and Freed, 1963:33-34).

The decline of shamanism is partially attributable to the usurpation of curing roles by modern medical doctors. These specialists had a greater familiarity with and greater skills for the healing of diseases which were often introduced by their own culture. The dietary changes and psychosocial stresses imposed upon Native American populations have led to a syndrome of chronic health problems distinct

Table 1.4.2-5. Common fauna used by Great Basin Indians.

Mammals

Badger	Coyote	Porcupine
Bear	Dog	Pronghorn
Beaver	Elk	Rabbit
Bighorn Sheep	Fox	Rat
Bison	Gopher	Weasel
Bobcat	Ground squirrel	Whitetail deer
Chipmunk	Marmot	
	Mink	
	Mountain lion	
	Mule deer	

Reptiles

Lizard	Snake	Tortoise

Birds

Blackbird	Eagle	Quail
Chukar partridge	Goose	Sage grouse
Dove	Magpie	Swan
Duck	Mud hen	

Fish

Bass	Suckers	Trout
Carp	flannel mouth	Bonneville
Chub	humpback	brook
Mullet	mountain	German brown
Salmon	razorback	yellow fin
	white	

Insects

Ants	Caterpillar	Fly larva
Black cricket	Cicada	Grasshopper
Carpenter bee		

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Sources: Chamberlin, 1911; Euler, 1966; Facilitators, 1980; Intertribal Council of Nevada, 1976; Steward, 1938.

from those of the earlier period when shamans held sway. Medical information on major health problems for approximately half of the Nevada reservations and colonies is available. These data are summarized in Table 1.4.2-6.

It is interesting to compare Table 1.4.2-6 with data for common ailments contained in Table 1.4.2-4. Of the health problems affecting contemporary reservation Indians, only colds, arthritis, and digestive problems are consistently reported ailments from the precontact to modern period. Although little information is available on the types of serious or life-threatening conditions treated by shamans in prehistoric times, there is ample evidence to suggest that chronic health problems which affect Native Americans today are related to conditions of poverty and psychological stress. Otitis media and respiratory infections, such as the common cold, pneumonia, strep throat, pharyngitis, and bronchitis, were undoubtedly commonplace during the prehistoric period when cold winters combined with frequent food shortages. Their persistence today as a major health problem points to poor housing and poor nutrition. Dietary changes from nutritious seeds, pinenuts, greens, and fresh meat and fish to inexpensive commercial foods high in fats and carbohydrates undoubtedly contribute to the current incidence of hypertension, heart disease, diabetes, and obesity (Scotch and Scotch, 1963). Alcoholism and an extremely high incidence of lacerations, contusions, and fractures point to the innerdirected depression and hostility characteristic of modern ethnic enclaves. It was this same process of community internalization of aggression for misfortunes which led to witchcraft accusations against shamans (Leis, 1963).

The decline of shamanism is also importantly related to the usurpation of curing roles by the Peyote Cult movement. The Peyote Cult arrived in Nevada/Utah in the 1920s and 1930s at a time when shamans were falling into disfavor. These traditional religious specialists, as well as younger persons who would have themselves become shamans in the past, immediately sought leadership roles in the new cult. The traditional notion of curing through supernatural power derived from spirit-animals was transferred to a spirit-plant, peyote. This nativistic church claims a broad membership among Nevada/Utah Indians. It is based upon abstinence from alcohol, and ritual purification through the induced visions and power of peyote. It is typically regarded as a primary mechanism for combatting disease in Indian communities today (Jefferson, Delaney, and Thompson, 1972:65). Peyote in many respects provides a binding-pin between the old and the new ways:

> To the Washo the changeover from the aboriginal religion to peyote is viewed as simply the addition of a new element of supernatural power provided to assist the Indian. The old patterns were not effective or needed in the new world. As one informant put it: "Them old doctors had to have a lot of power because the Indians didn't have (know) too much. But nowadays the white doctors have a lot of power and the Indian doesn't need his power anymore. But the peyote helps the white doctor take care of the Indians." It must be disheartening for the doctor in a modern hospital to realize that in the eyes of his Washo patients he is nothing more than a new and more powerful shaman assisted by peyote (Downs, 1966: 104).

Anthropomorphic Creatures and Animal-Spirits (1.4.2.3.5)

The partial acceptance of Christianity and/or the new transfer of power in the universe to peyote has not eliminated traditional beliefs in the supernatural power

Table 1.4.2-6. Major health problems reported at thirteen Nevada Indian reservations and colonies.

MAJOR HEALTH PROBLEMS	NUMBER OF RESERVATIONS
Respiratory Infections	13
Alcoholism and Mental Health	13
Otitis Media	9
Traumatic Injuries	9
Diabetes	6
Skin Diseases	5
Hypertension and Heart Disease	5
Rheumatoid Arthritis	2
Digestive Ailments	2
Non-endocrine Obesity	1
Hepatitis	1
Prenatal Disease	1
Bacillary Dysentery	1

072-1

Source: Bureau of Indian Affairs, Information Profiles of Indian Reservations in Arizona, Nevada, and Utah - 1978.

of animals and other creatures. Modern references to the existence of Water Babies, for example, are commonplace (Downs, 1966:62; Park, 1934:100). The creature has adapted to contemporary conditions by occupying irrigation ditches, in addition to natural streams, ponds, and lakes. Their high mewing calls are said to be still heard at night, and the footprints of modern female Water Babies often show evidence of high-heels. The Washo fear that whites, ignorant of the powers of the Water Babies, may inadvertantly catch one while fishing. Illness may result from thus insulting the creatures, or even from mocking them and speaking skeptically about their existence. The supernatural power of many other anthropomorphic figures portrayed in traditional mythologies persists today.

The supernatural power of animal-spirits, like shamanism, has been somewhat overshadowed by the power of the plant-spirit, Peyote. The persistence of witchcraft beliefs, however, is widespread in Native American communities. It is as if supernatural curing powers which benefit mankind have been transferred to peyote, whereas supernatural powers acquired from more traditional sources are associated with evil acts. The notion that some persons can turn themselves into coyotes and harm others still finds adherents among the Washo (Downs, 1966:61). Ute Indians today continue to fear witchcraft by Navajos, and the spouses of Ute women who have intermarried with this tribe are often accused of casting evil spells (Jefferson, Delaney, and Thompson, 1972:74).

The Bear Dance, another symbolic remnant of the ancient supernatural relationship between animals and humans, is still celebrated annually at the Ute Uintah and Ouray Reservation (USDC, 1974:523).

Hunting and Fishing (1.4.2.3.6)

Fish and game continue to make an important contribution to Native American subsistence. The Northern Paiute, for example, still gather for the annual spawning runs of the cui-ui sucker on the Truckee River (Wheat, 1967:60-64), and hunting is universally important among all Nevada/Utah Indians. In ancestral times, the taking of game animals was a rite of passage from boyhood to manhood, and a central ingredient in masculine identity. Downs (1966:36) notes the persistence of this pattern: "Hunting virtually dominated the Washo man's image of himself. Even today to suggest that a man had no taste for hunting and preferred to remain in camp with the women is an oblique way of attacking his entire character."

Fish and game laws are regarded with disdain by modern Indians, who view the respectful taking of such animals as their natural right. The general sentiment of Nevada/Utah Native Americans is summarized nicely in this statement of Washo concerns:

> Indian lands, in their minds, encompass all that once was Washo hunting territory. Federal and state authorities do not agree with this interpretation. Every fall, Washo men are arrested for violation of the game laws relating to deer hunting. Deer meat often is the margin between eating and starvation even today, and the Washo feel they are unfairly treated. There are no exact figures on how much deer hunting still contributes to Washo subsistence, but in many families the lack of deer meat would be a serious hardship. More importantly, surrendering to white law would be a final denial of Washo heritage and subjugation to

white society which has already taken so much from them (Downs, 1966:82).

Indian concerns for the welfare of native fauna and their natural right to exploit these food resources has recently become the subject of political action. The Northern Paiute of Pyramid Lake successfully concluded litigation with the State of Nevada over Truckee River water diversions to maintain tribal fisheries. Similarly, the Utes of the Uintah and Ouray Reservation withdrew from water agreements with the Central Utah Project over a dispute with the State Legislature concerning the extension of Indian hunting and fishing rights.

Conclusion (1.4.2.3.6)

The intimate relationship of Nevada/Utah Indians with native flora and fauna is an ancient and persistent pattern. Despite the substantial modifications which have occurred in Native American cosmologies, spiritual and supernatural elements continue to color modern Indian perceptions of the universe and natural environment. There is a general belief that the white man has wantonly and indiscriminately taken more from the environment than he has replaced. The biological concept of endangered species is regarded as both tardy, and invalid. All life forms are seen as integral parts of a single living system, such that the endangerment of one threatens the well-being of all. Whereas in the past Native Americans have responded with sadness and apathy, modern and future trends point to aggressive resistance and protest where loss of perceived hunting or fishing rights or loss of natural environment is involved.

Native Americans residing in the area continue to utilize flora and fauna species and a variety of inorganic materials in the traditional manner. For many reservation Indians, hunting and gathering provide an important dietary supplement as well as an affirmation of cultural identity. Native flora are also collected for the production of traditional pharmaceuticals, and for craft materials. Both organic and inorganic substances are additionally utilized for religious purposes.

Culturally, Great Basin Indians have an intimate knowledge of the ecological adaptations of native species. Native flora and fauna are regularly exploited as a food source. Access to hunting and fishing areas is an especially sensitive issue among contemporary Native Americans (Downs, 1966; Wheat, 1967). In traditional religious belief, faunal species voluntarily donate their lives to Indians for food. They are additionally a source of materials, such as feathers, skins, and animal hooves for the production of sacred objects (Wheat, 1967; Park, 1934). As in ancestral times, pinenuts are the most important flora resource. The annual harvests in mountain areas throughout Nevada/Utah provide an important cultural and symbolic link with the past (Downs, 1966; Freed and Freed, 1963; Wheat, 1958, 1967, Facilitators, 1980), as well as food and a commercial product. The distribution of pinyon groves in the two-state area is illustrated in Figure 1.4.2-2 Pinyon groves are generally found in areas above 5,000 ft in altitude in northern latitudes, and above 6,000 ft in southern latitudes of the deployment area (Steward, 1938; Tueller et al., 1979). Pinyon groves are also important environments for game animals.

Native flora are also exploited for medicinal purposes. Traditionally, over 500 flora species were utilized for the treatment of common illnesses (Train, Henrichs,

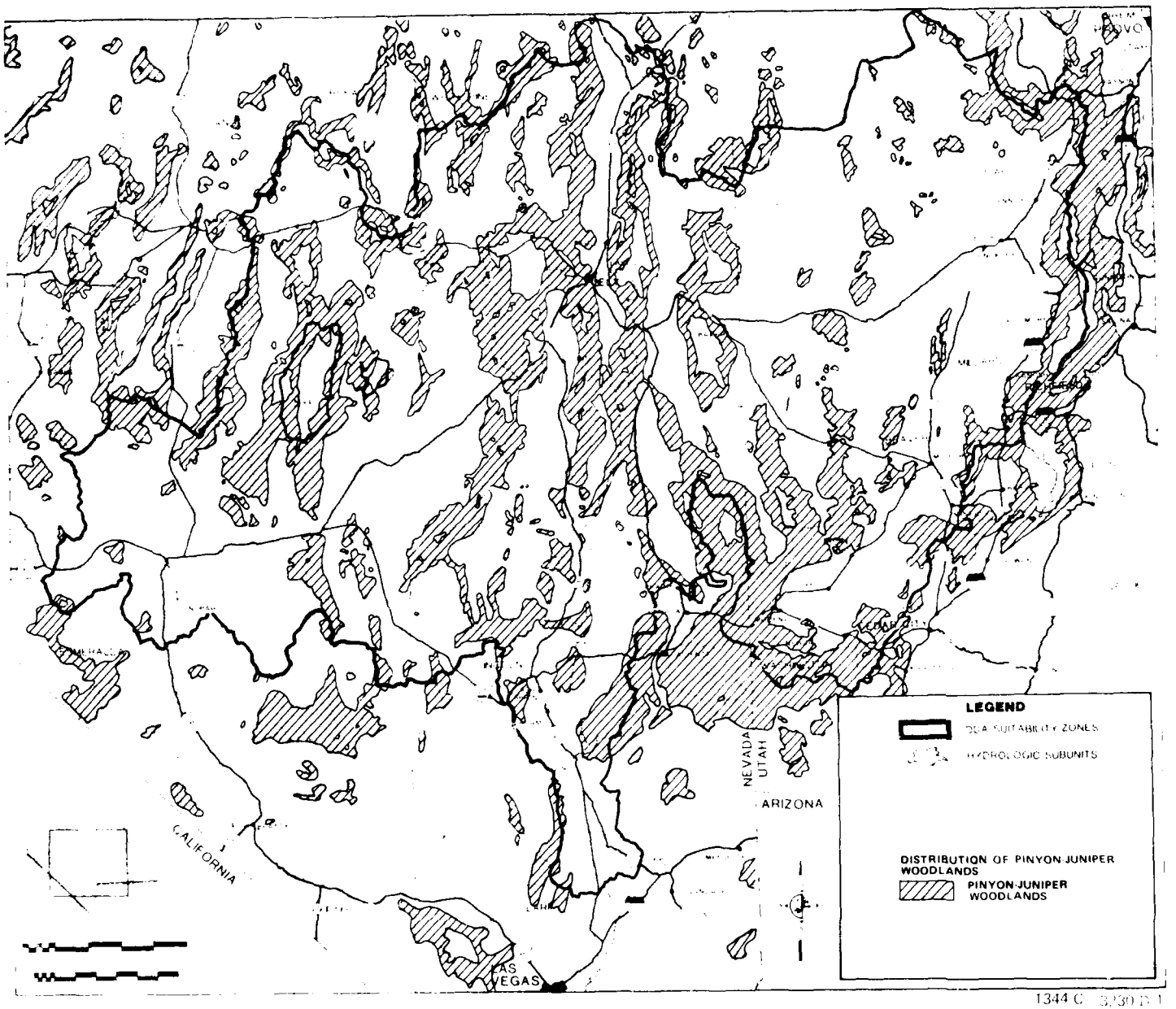


Figure 1.4.2-2. Distribution of pinyon-juniper woodlands in the study area.

and Archer, 1941). Some of these plants continue to be gathered today, and are often regarded as superior to modern pharmaceuticals (Smith, 1972). Willow, Juncus, devil's claw, and other riparian species are also collected by Native American artisans for basketmaking (Kelly, 1964; Bean et al., 1978). These traditional crafts not only provide an important link with the past, but support a number of skilled craftpersons with supplementary incomes (Downs, 1966; Wheat, 1967).

Certain types of mineral deposits were regularly utilized for the production of stone tools, pottery vessels, and substances which were imbued with supernatural power (see Table 1.4.2-7). Since these deposits have little or no monetary value in the modern marketplace, their significance in traditional Native American cultures is often overlooked.

Pottery made in the traditional manner by contemporary Indian craftpersons requires the use of special clays for vessels and decorative paint and glazes, and of special tempering materials such as mica or quartzite. These deposits typically have a very limited distribution within the radius of existing communities (Bean et al., 1978). Their preservation is importantly linked to the cultural maintenance of traditional crafts.

Special red clays, still mined today, have, in traditional Great Basin Indian belief, special properties which provide individuals with protection from injury and from evil spirits (Freed and Freed, 1963; Kelly, 1964; Downs, 1966; Wheat, 1967). White clays play an important role in traditional curing ceremonies, and continue to be utilized for medicinal purposes (Park, 1934; Smith, 1972).

Other materials, such as quartz crystals and speculorite, have sacred connotations due to their perceived value in warding off evil spirits (Steward, 1941).

The extant ethnographic literature contains much information on the types of hunting and gathering activities which continue to play an important role in cultural persistence. A number of hunting and gathering areas which are exploited and valued by contemporary Native Americans have been recorded in field investigations at Indian reservations and colonies (Facilitators, 1980). These data are presented in Section 2.0.

GREAT BASIN SACRED AREAS (1.4.3)

In Great Basin Indian religions, the concept of sacredness is associated with supernatural power derived from the spirit-world. All such supernatural power originates from the events and personages linked with Creation.

Native American and Western religions differ fundamentally in their basic perceptions of the universe. Sacredness in all cosmologies has both temporal and spatial attributes. In the Judeo-Christian traditions, sacred time is reckoned chronologically. Supernatural beings are accorded significance for their seniority in a series of sacred events which are not only recorded, but reenacted or celebrated, by the living, in annual calendars. Sacred space in these universal religions is associated with specific sites where sacred events occurred in the past, with icons which symbolize these events in rituals, and with structures where such rituals are held.

Table 1.4.2-7. Commonly used minerals of the Great Basin Indians.

Minerals		
Bottle glass	Nitrate salts	Rock salt
Dolomite	Obsidian	Speculorite
Flint	Quartz crystals	Turquoise
Iron	Red clay	White clay
Mica		

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Sources: Chamberlin, 1911; Euler, 1966; Facilitators, 1980; Intertribal Council of Nevada, 1976; Steward, 1938.

In Great Basin Indian religions, sacred time is associated with the period When Animals Were People. In sharp contrast to Western thought, sacred time is reckoned horizontally rather than vertically. That is, the pathway from current to primordial times is regularly traversed in dreams and visions, such that distinctions between past and present are irrelevant or nonexistent. The ancient spirit-world is alive and ubiquitous.

For Native Americans, sacred space is wherever spiritual energy resides. In the broadest sense, the entire ancestral territory of each tribal group is sacred, since the physiographic features of the environment were created during mystic times and contain the spirits of creator figures and their descendants. One often hears the phrase: "The whole area is sacred; the whole land is our church." Some spirits range freely within this territory, and cannot be identified with particular sites. Others make their homes at specific locations, such as mountain peaks, caves, rock outcroppings, or springs. These areas, when revealed by Native Americans, can be mapped as permanent sacred sites. Space may also be deemed sacred on a temporary basis. For example, sites utilized for rituals in which communication with the spirit-world takes place, such as the Bear Dance or modern Peyote Cult meetings, are considered sacred only for the duration of the ceremony. Sacredness may also attach itself to the vehicles of communication with the spirit-world. Plants such as native tobacco, peyote, or Jimson weed may be so regarded. Similarly, curing wands and the entire inventory of shamanistic paraphernalia are sacred objects imbued with supernatural power due to their use in soliciting the aid of animal-spirits. The fact that eagle feathers were a necessary embellishment of shamanistic curing wands diffused sacred status to the bird itself.

In summary, Great Basin Indian notions of sacred time refer to a consistent spirit-world and living universe where past, present, and future are one. Sacred space may be defined as all that is circumscribed by aboriginal boundaries, or it may be further delimited to general areas or specific sites. This sacred quality may be timeless or merely temporary. And finally, sacred status may be attached to special phenomena, artifacts, and species. In all of these cases, the essential association of sacredness with the supernatural power of the spirit-world is expressed.

Problems in the Identification of Sacred Areas (1.4.3.1)

In Native American cultures, knowledge of sacred areas is passed from generation to generation through the performance of important rituals and the retelling of myths, legends, revelations, and personal experiences. Religious traditions are strictly oral. Only certain forms of rock art may be regarded as scriptures, but the meanings of these symbolic representations are themselves a component of traditional lore. This privileged information was in the past a birthright of all tribal members, but was disseminated on a more selective basis, or not at all, to outsiders. The policy of exclusiveness in traditional knowledge became a cornerstone of Indian relations with Anglo-Americans from the period of pacification to the present day.

Native American Reticence (1.4.3.1.1)

The political subordination of Indians in the 19th Century by whites, the loss of sovereignty over sacred traditional lands, and the religious intolerance expressed by outsiders all contributed to a general Native American moratorium on public ritual

and oratory. A strategy for cultural survival based upon reticence and the clandestine persistence of traditional knowledge and ritual was rapidly developed. Laws were passed by the federal government which were deliberately designed to restrict the practice of traditional rites, and thereby to bring Indians into firmer political and cultural control. Colorful ceremonies which formerly contained sacred rituals quickly attracted non-Indian tourists in search of the "romantic" and "quaint." Native Americans adapted by charging admissions to these entertainment-seekers, and by removing sacred aspects of the ceremonies from public view. In addition to mockery by outsiders and the fear of government reprisals, a third incentive for publically downplaying the importance of traditional religious beliefs was provided by missionaries. Indians on the brink of starvation were quick to learn that public participation in Christian rituals brought immediate tangible rewards in the form of food, clothing, and technical and medical aid.

Anthropologists who worked with Great Basin Indians earlier in the century tried to unravel the mystery of traditional religious systems. These scholars often won the confidence of Native Americans, and began to record the mythology of traditional cultures and the spiritual basis of native shamanism. As outsiders, however, they were seldom entrusted with definitive information on the most sacred aspects of Indian religions. An anthropologist may be told, for example, the reason why a particular type of area or site, such as a cave, was sacred, but its actual location was not revealed. When such information was provided scholars, they often would not, out of respect for their Indian informants, make these data part of the published literature. Thus, for example, we read in Park's (1934:102) article on shamanism that the Northern Paiute or Paviotso have eight sacred caves in their territory at which visions may be acquired, but these sites are not identified. Scholars commonly joined the conspiracy of silence.

The reluctance of Native Americans to reveal the location of sacred sites is also motivated by fears that such areas will be desecreted or destroyed. These fears are certainly justified by past history. Countless graveyards, petroglyphs, and archaeological sites, for example, when their locations have become public knowledge, have been pilfered and obliterated by vandals and treasure-seekers. The senseless loss of such sites arouses not only sadness and anger in Native American communities, but apprehension and fear as well, lest the spirits residing in these places become offended and cause harm to the living. The policy of silence in sacred matters is thereby reinforced.

Loss of Cultural Information (1.4.3.1.2)

The very nature of oral tradition makes it susceptible to information loss over a number of generations. This is all the more true where, as in the case of Native Americans, public participation in traditional religious ritual and oratory was severely restricted, and new cosmologies openly competed with the old. Among contemporary Indians, knowledge of traditional tribal lore and religion is generally commensurate with advanced age. The death of tribal elders has been accompanied by an attrition of traditional knowledge. Information on the precise location of sacred sites has thus often been lost. Native Americans commonly respond: "I know there are such sites, but only the shamans know where they were," or "I only wish I had listened to my grandfather more closely; I had no idea when I was young how important that information would be today." Where such cultural information loss has occurred, contemporary Native American concerns for these sites and areas are

sometimes exaggerated rather than diminished. That is, if an important burial ground or ritual cave is known to exist somewhere within a large area such as a mountain range, the fear that this sacred site may be discovered by outsiders and inadvertantly or deliberately destroyed is thereby increased.

Contemporary Native American Input (1.4.3.1.3)

In recent times, the old policy of silence on sacred matters has been somewhat relaxed. Two factors seem to have encouraged this trend: (1) new federal and state legislation regarding religious freedom and the protection of cultural resources, and (2) the national movement for Indian pride and cultural awareness. Recent legislation guarantees Native Americans the freedom to express their traditional religious beliefs publicly without fear of legal reprisals. This has encouraged a cultural renaissance on all Indian reservations. The further requirement that cultural resources such as sacred areas are entitled to protection and preservation under the law has provided a unique opportunity for open discussion of traditional religious concerns in ethnographic interviews and at public hearings.

The voicing of concerns by Native Americans for sacred or culturally significant sites has taken many persons by surprise. Religious beliefs which were held in confidence for generations were often assumed by outsiders to have disappeared long ago. The legitimacy of Indian religious arguments has been sometimes questioned on this basis, and on the ground that (for reasons noted above) little corroborating evidence for the existence of such sites may be found in the extant literature. Schedule interruptions and project delays resulting from differences of opinion on the sacred or cultural resources has in some instances led to ill feelings between the Indian and non-Indian communities.

Under present environmental laws, Native American concerns are viewed as valid and legitimate claims based upon persistent cultural values and beliefs. In many cases, these claims represent new data to the anthropologist as well as to the general public. The extant literature on Great Basin Indian sacred beliefs is, in and of itself, inadequate to identify and locate specific sacred sites and areas which are of concern to contemporary Native American peoples. Such information can only be acquired with the personal cooperation of Nevada/Utah Indians or their tribal representatives.

Sacred Sites and Areas (1.4.3.2)

Ethnographic data collected over the past century provide information on the types of sites and areas which are significant in traditional Great Basin Indian religious systems.

Mountain Peaks and Ranges (1.4.3.2.1)

Ancestral Great Basin Indians had an intimate knowledge of their natal territories. Prominent surface features not only served as guides for travel in the annual subsistence round, but were linked to creation legends and mystic times. The natural environment was formed When Animals Were People, and hence the entire traditional territory or selected features therein are regarded as sacred.

Wolf is noted as the creator of mountains, valleys, and canyons among the Ute (Fowler and Fowler, 1971:77) and Southern Paiutes (Kelly, 1964:133). Goshute

legends recount the formation of the Deep Creek Mountains and Snake Range by Hawk (Malouf, Dibble, and Smith, 1950:45). Ancient giants play a prominent role in Northern Paiute lore. One legend recounts how Coyote slew the cannibalistic giant Numuzoho with a large stone. The mountains in Northern Paiute country are the result of the giant's kicking and thrashing before death (Kelly, 1938:372).

Certain mountain peaks are regarded as the homes of spirit-animals, and are therefore very powerful and sacred places. Charleston Peak in the Spring Mountains of southern Nevada is noted as the home of Wolf and Coyote and of all shaman's familiars by the western bands of Southern Paiutes (Kroeber, 1925:596; Laird, 1976:32). The Chemehuevi band also regards the entire Panamint Range in California as holy ground (Laird, 1976:122). In Northern Paiute territory, Job's Peak in the Stillwater Range is identified as the place where Ocean Woman created Indians (Lowie 1924a:200), and the mountain where Wolf (Numa na ah, "Father of the People") resides (Fowler and Fowler, 1971:246; Johnson, 1975:15). Mount Grant, or Duranga, is also regarded as sacred by the Walker River Paiutes (Johnson, 1975:15).

Sacred mountain areas, as the abodes of spirit-animals, are places which may be approached by Great Basin Indians for the acquisition of supernatural power. Steward (1940:492) notes that Shoshone peoples often deliberately sought dreams and visions in mountain areas, although specific peaks or ranges are not identified. According to Lowie (1924b:296), Shoshone vision quests were associated with encounters with the dwarf Mountain Man. An identical pattern is noted for the Goshute of Northern Utah (Steward, 1943:282-283), who reportedly traveled to the mountains south of Lucin and in the vicinity of Washakie for the procurement of visions associated with this creature. Chemehuevi Southern Paiute shamans journeyed to Charleston Peak for visionary powers (Laird, 1976:32, 122). A Northern Paiute informant of Lowie (1924b:294) indicated that a mountain in the Walker River district was regularly approached by persons in quest of a vision. This reference may be to the sacred Mount Grant, noted above.

In addition to providing abodes to animal-spirits and dwarf familiars, mountain ranges may contain other creatures or evil spirits. Mountain Man himself is a potential danger, since in addition to aiding selected mortals through visions, he also has powers to slay humans with miniature arrows (Lowie, 1924b:296). In 1880, John Wesley Powell recorded the Northern Paiute belief in three separate mountain creatures: (1) a naked and very cruel giant, I-ho-pi-wo-ya, who lives with his wife in the mountains at Austin, (2) a great serpent, Pa-va-wo-gwok, residing at Spice Valley Mountain, and (3) a giant eagle, Pa-va-kwi-na, who lives in a mountain near Humboldt sink (cf. Fowler and Fowler, 1971:241).

It is likely that all mountain ranges and peaks had significance in ancestral times. Only a small number of these places of supernatural power have been recorded in the anthropological literature. Knowledge of some of these sites and areas has been preserved among elder or traditionalist Native Americans, some of whom may continue the ancient pattern of religious retreats for visionary power. In a mid-1960s position statement on Indian-white relations, Stanley Smart, a prominent Nevada Indian from Fort McDermitt, asserted:

> There are still some mountains that await Indians who really believe in the Great Spirit's ways to get power in case of emergency, like Indian doctoring to save one from sickness and death (Forbes, 1967:263).

Caves and Rocks (1.4.3.2.2)

Caves and unusual rocks, or rock outcroppings, are noted in myth and legend in a manner similar to that of mountains. In some instances, mountains gain their sacred connotation from the nature of the caves which they contain. In Northern Paiute country, for example, Star Peak in the Humboldt Range has religious significance because its many caves are said to have been utilized by Wolf to keep animals in mystic times (Fowler and Fowler, 1971:225-226, 241-242, 246).

Other caves and rocks have mythological importance in their own right. A cave in the northern end of Cave Valley is noted in Shoshone legend as containing an entrance to another world (Steward, 1938:131; Wheeler, 1875: 60).

Special caves are also universally regarded in Great Basin Indian religions as the residences of spirit-animals or anthropomorphic creatures. These places are seen as extremely powerful and dangerous. Individuals brave enough to sleep at such caves may do so for the acquisition of a familiar for shamanistic purposes or for a guardian spirit or luck in a particular venture. This practice is documented for the Nevada Shoshone and the Goshute, who often secured the vision and aid of the dwarf Mountain Man (Malouf, 1974:81; Steward, 1943:282; Steward, 1940:492). The Ute and Southern Paiute are also known to have sought nonshamanistic guardian spirits in caves (Stewart, 1942:333). The Chemehuevi band of Southern Paiutes utilized caves for the acquisition of spirit-animals or familiars both at Charleston Peak and at the distant Lehman's Cave on Wheeler Peak in east central Nevada (Kelly, 1936:129; Laird, 1976:39, 245). Similar practices are noted for the Northern Paiute. Park's (1934:99, 102-103) 1933 interviews of Paiutes at Pyramid Lake, Walker Lake, Reno, Fallon, and Yerington revealed the existence of eight local sacred caves where visions could be acquired. A shaman located one such cave as being a mountain just below Dayton, Nevada.

Caves, like mountains, may also be occupied by harmful or evil creatures. The Ute believed certain caves to be the homes of dwarfs who caused pneumonia by shooting people with miniature arrows (Stewart, 1942:318). These creatures seem identical to the Shoshone and Goshute Mountain Man. An early report by Egan (Egan and Egan, 1917:275) refers to a large cave on the side of a knoll at the very south end of the Shell Creek Range which was said by local Shoshones to be inhabited by an evil spirit.

The frequent association of caves and rock outcroppings with both sacredness and danger is reinforced by the ancient Great Basin Indian custom of placing their dead in these areas. A discussion of this important aspect of Native American religious ideology appears below.

Special rocks in Northern Paiute territory have been noted by travelers and scholars as sources of curative power for local Native Americans. One such rock was located at the floor of Simpson Pass, which divides the Desert Mountains and Terrill Mountains in Lyon County (this rock was bulldozed during highway construction for U.S. 95). Known alternatively as Doctor Rock or Medicine Rock, it was approached by Paiutes with prayers for good health and general well-being, after which offerings of beads (and later, buttons and coins) were left in the small holes which covered its surface (Simpson, 1876:87; Wheat, 1967:115; Heizer and Baumhoff, 1962:48). Similar medicine rocks are found today on the Walker River Indian

Reservation. According to Johnson (1975:94): "The People (Paiutes), when entering the reservation, leave offerings at the rock and pray for good health." In addition, Heizer and Baumhoff (1962:60) refer to a Medicine Rock in the Humboldt Range, Pershing County. Northern Paiutes formerly visited this cliff to lick nitrate salts from its face. All of these curing rocks, and many of the sacred caves and rock shelters throughout the Great Basin are associated with Indian petroglyphs and pictographs.

Rock Art (1.4.3.2.3)

Great Basin petroglyphs and pictographs were first recorded systematically by Mallery (1886:24-25; 1893:92-96, 117). Attempts to consolidate and expand site data for the area have been subsequently made by Steward (1929) and Heizer and Baumhoff (1962). Since vast areas of both states have not been surveyed, it is likely that many more sites exist which are not yet recorded.

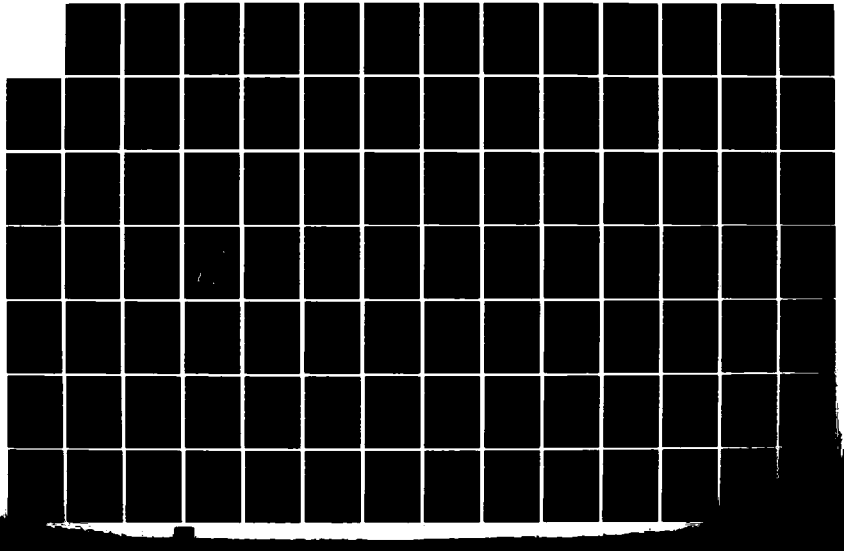
Rock art appears to be a very ancient tradition in the Great Basin, and may be associated with several different populations which variously inhabited the area. Present methods for dating rock art sites are based upon the superposition of art elements, the degree of deposits or sedimentation, differential patination, and association with archaeological remains. Results at this point are at best tentative. Heizer and Baumhoff (1962) have distinguished a number of distinct styles in the rock art of Nevada and eastern California, and have assigned them to separate traditions or chronological periods. The oldest petroglyphs are dated at 5000-3000 B.C., and the most recent forms from 1000 B.C. to 1500 A.D.

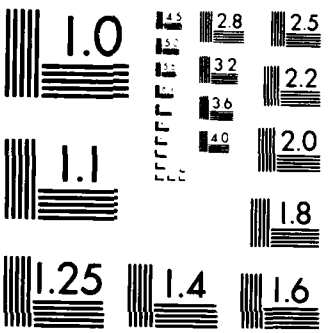
The question of the relationship of historic Great Basin Indian populations with local rock art is complicated by several factors. First, there are conflicting theories on the relative antiquity of Numic-speakers, or Shoshoneans, in the Great Basin. Lamb (1958) and several others after him have argued that Numic expansion into this area was relatively recent. Still other scholars note the possibility of an in situ linear sequence from the ancient Desert Culture to historic ones (cf. Schaafsma, 1971:136-145). A second complicating factor is the testimony of contemporary Native Americans. Goshute Indians of Deep Creek attribute pictographs in local caves to ancient giants (Reagan, 1929:115-116; Malouf, Dibble, and Smith, 1950:46). Northern Paiutes typically credit the origin of petroglyphs in their territory to Coyote (Stewart, 1941:418; Wheat 1976:115). Similarly, both Utes and Southern Paiutes attribute petroglyphs and pictographs to animal-spirits or ancient populations (Stewart, 1942:321). Heizer and Baumhoff (1959:905) assert that all historic Great Basin Indians deny responsibility for local rock art.

Indian testimony would seem to support the view that the ancestors of modern Numic-speakers entered the Great Basin at some point after petroglyphs and pictographs were made. The problem, however, is not so easily resolved. Heizer and Baumhoff (1962:232-234) have noted that some styles of rock art, such as scratched petroglyphs and Great Basin painted pictographs, are recent (1000 B.C.-A.D. 1500) in origin, and attributable to the immediate ancestors of contemporary Native Americans. The Whiskey Flat petroglyphs in central Mineral County, Nevada, for example, are associated with Northern Paiute cultural deposits from the late prehistoric period. At least some of the petroglyphs at this site appear to be attributable to these peoples. Other scholars (Huscher and Huscher, 1943:

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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

Henderson, 1946) have pointed to possible relationships of the Ute with petroglyphs in southeastern Utah. The most convincing evidence of the continuation of this art form into the historic period, however, is found at Kane Springs in northcentral Clark County, Nevada. Here, some of the petroglyphs depict men on horseback with sombreros and wheeled carts. Heizer and Baumhoff (1962:230) note that these glyphs probably were made sometime after 1830 when the first wheeled carts appeared along the Old Spanish Trail in this area.

How, then, are these data to be interpreted in light of the testimony of 20th century Great Basin Indians? One explanation is that Native Americans deny to outsiders any relationship with rock art due to their general reluctance to speak of sacred matters. Concern for their preservation is an additional factor. Stewart's (1941:418) Northern Paiute informants, for example, not only attributed local petroglyphs to Coyote or the devil, but claimed ignorance regarding the location of these sites. Heizer and Baumhoff (1962:227) comment:

> Stewart also asked whether petroglyphs occurred within band areas and several informants said they did not, even in cases where this was palpably false. It is especially odd that the Stillwater band denied the presence of petroglyphs when there are about a dozen sites recorded in their territory, including the large one at Grimes (site Ch-3).

Native American reticence regarding these sites may play a role in their public dissociation from what are in essence sacred areas. A second important factor is the apparent decline in rock art production after A.D. 1500, and a fundamental shift in the function and meaning of these sites to Great Basin Indians. In order to explore this issue more fully, the question of why petroglyphs may have been made in prehistoric times must be addressed.

A widely accepted hypothesis on the origin and meaning of Nevada petroglyphic sites was advanced by Heizer and Baumhoff (1959) some twenty years ago, and expanded in subsequent publications (Heizer and Baumhoff, 1962; Heizer and Hester, 1978). In their extensive study of rock art in western and central Nevada, the authors began to note a characteristic association of petroglyphic sites with prehistoric game migration trails, particularly where such trails approached water tanks and springs or canyon narrows, draws, and natural bottlenecks. The occurrence of a majority of petroglyphic sites at these locations, unusually well-suited for the ambush of game herds, led to the hypothesis that rock art is primarily associated with hunting, and more particularly with hunting magic. Ritual or sacred aspects of the hunt have been well documented for historic Great Basin Indians (Steward, 1938:34-35; Steward and Wheeler-Voeglin, 1974:51; Park, 1934:108-109; Underhill, 1961; Downs, 1966:31). Game animals and hunting scenes are familiar motifs in rock art panels, as are anthropomorphic and decorated human figures associated by scholars with ceremonial or ritual content.

Further studies by Heizer and Baumhoff (1962) in Nevada provided more evidence in support of the thesis that petroglyphs were made, perhaps by shamans, in connection with hunting magic. Two characteristic patterns were delineated for regional areas of the state. In southern Nevada, rock art sites typically occur in narrow draws which lead to a source of water frequented by game. The primary animal hunted in this arid lowland region in prehistoric times was probably the

mountain sheep. In northern Nevada, rock art sites are consistently associated with draws along established migratory game trails of antelope and deer. Archaeological remnants of blinds, diversionary fences, and corrals at several large sites support the notion that animals were driven, trapped, and slaughtered in these natural ambush arenas. Schaafsma (1971:147-149) feels that the Heizer-Baumhoff theory is generally consistent with patterns observed in the rock art sites of western Utah.

If, as it seems possible, petroglyphs were made by shamans at established ambush sites as part of the ritual to lure and "steal the souls" of game animals, why was this practice largely discontinued by A.D. 1500? Some scholars have theorized that the rapid decline in game associated with late prehistoric and early historic times may have undermined the ritual belief system with which the production of petroglyphs was associated (Von Werlhof, 1965; Grant, Baird, and Pringle, 1968). An alternate theory proposed here is that the ambush sites themselves may have been gradually abandoned, along with the pattern of large communal hunts, as game became depleted. The problem may have been more one of the diminishing rewards of large communal activity rather than a diminshed belief in the efficacy of shamanistic rituals which persisted in basic content to the modern period. If petroglyph-making was the province only of shamans, the decline in their production may relate more to the general local availability of these specialists as Indian population segments dispersed to more efficiently exploit the dwindling numbers of mountain sheep, antelope, and deer. While the belief in hunting magic remained strong well into the historic period, the degree of elaboration and the number of elements associated with accompanying shamanistic rituals undoubtedly declined over the centuries as these ceremonies became more and more infrequent. The disappearance of a ritual art form, when in the hands of a small number of specialists and practiced with decreasing frequency, is a not uncommon cultural phenomenon.

Despite the apparent abandonment of petroglyph and pictograph production centuries ago, there is considerable evidence to suggest that the sacred nature of these rock art sites has been maintained in Great Basin Indian cultures. Antelope shamans in historic times appear not to have visited these areas for the performance of hunting-magic rituals. Caves and rock outcroppings with petroglyphs and pictographs were, however, regularly approached by incumbent shamans for the acquisition of animal-spirit familiars, and by ordinary persons to secure guardian spirits or special favors:

> Long ago the Shoshone would go to the hills or rocks in the mountains where there was "a kind of writing." There they would sleep for from one to three nights in the quest of a dream, but without fasting; in the morning they went back home. Some animal or person might appear to the would-be visionary and tell him he was to be a physician (Lowie, 1924a:296).

A similar pattern is noted for the Goshute:

> Certain caves, or rock outcroppings were believed to be the abode of the spirits with whom they wish to communicate. Often they were areas where there were numerous pictographs painted on the cave walls, or on rocks. Such an area was known as pohaghani, and suppliants were pohaghants. When in this pohaghani he would ask for favors from the

> spirits. If they were favorably impressed they would reveal much information. Elk might give him doctoring powers, while Water Baby would make him hardy in war. Most likely he saw Mountain Man, Toyanumbi, who taught him how to use herbs as medicine, or gave him hunting powers. Mountain Man was considered as a sort of partner to the shaman (Malouf, 1974:81-82).

The acquisition of nonshamanistic guardian spirits by sleeping near pictograph sites is recorded for both the Ute and Southern Paiute (Stewart, 1942:333). In addition, it is notable that Northern Paiute curing rocks, to which prayers and offerings are made, are covered with petroglyphs.

Trails (1.4.3.2.4)

The ecological adaptation of Great Basin Indians in prehistoric and early historic times required a high degree of mobility for a significant portion of the annual cycle. Transhuman movements for subsistence and ritual activities typically occurred along established routes which were widely known and utilized from one generation to the next. Major trails were regarded by Native Americans not only as highways for travel, but as sacred pathways that symbolized the cultural continuity of ancient and modern peoples. Powell made the following observations of Ute behavior in the 19th Century:

> It is curious to notice with what tenacity an Indian clings to a trail; a path which has been followed by his forefathers is sacred to him, and though in the onstant and rapid erosion of the gulches and sides of the hills and mountains these trails have become very difficult yet he never abandons them when they can by any possibility be followed, even though a shorter and better road is very perceptible (in Fowler and Fowler, 1971:39).

Trails to sites where communications with the spirit-world were undertaken were undoubtedly also regarded as sacred. Some areas of the Great Basin contain a complex network of trails that link special mountains, caves, petroglyphs, and springs (Heizer and Baumhoff, 1962:21-25). As noted above, sacred sites are often associated with petroglyphs and pictographs, and these in turn frequently occur along established animal migration trails. Deer and antelope trails may have themselves been regarded as sacred in the past due to the religious activity that surrounded the hunt. Although the production of petroglyphs apparently did not extend with any frequency into the historic period, the performance of sacred rituals by shamans at hunting sites along these trails was a persistent feature among the immediate ancestors of contemporary Great Basin Indians (Steward, 1938:36).

Lakes and Springs (1.4.3.2.5)

Native American religions attach special significance to water bodies and water sources. For Great Basin Indians, all lakes, streams, and springs contained spirit-animals or anthropomorphic creatures, and were thereby linked to the sacred domain.

Like other prominent physiographic features, lakes were regarded as the outcome of dramatic events that took place in mystic times. According to Northern

Paiute tradition, for example, Walker Lake is a remnant of a great flood during which Sagehen sat atop the adjacent sacred Mount Grant and saved fire for future generations (Johnson, 1975:15).

Major lakes in Northern Paiute territory are noted in legends to contain serpents resembling huge dinosaurs or amphibian reptiles. Sitings of such a monster in the vicinity of Walker Lake by non-Indians have been reported from 1868 through 1956 (Johnson, 1975:182-186). The Walker Lake serpent has thus taken on an aura much like that of the famous Loch Ness monster in Scotland. Northern Paiute legends hold that a similar creature exists in Pyramid Lake. Here a demon-deity serpent is held responsible for the frequent whirlpools surrounding the nine lake islands, and is said to devour the unwary (Bancroft, 1886:135-136). Winnemucca Lake is also said to contain a dangerous giant green snake, and a particularly cruel water baby which may cause death to anyone who sees it (Stewart, 1941:444). Among the Ute, great serpents were believed to inhabit both Utah and Fish lakes. As at Walker Lake, several alleged sitings of the Utah Lake monster by early Anglo settlers promulgated local Indian legends (Jorgensen, 1913:811).

The most important link between water and the supernatural concerns the spirit-animals or spirit-creatures which, in Great Basin Indian cosmologies, inhabit all lakes, streams, and springs. Prominent in this respect is the Water Baby, a source of supernatural power which can be deliberately solicited by humans. According to Steward (1940:492), the Shoshone formerly approached springs in order to acquire a vision or familiar. Water babies also served as shaman's familiars among the Goshute (Malouf 1974:82), Northern Paiute (Park, 1934:100; Steward, 1941:258), and Ute and Southern Paiute (Stewart, 1942:318). As at special mountains and caves, the acquisition of a vision required the prospective shaman to spend a night at the spring. Bodies of water and the water babies they contained could also be approached by ordinary persons for the granting of special favors. Among the Washo, for example, an individual seeking assistance may deposit an especially fine basket in the spring or pond as an offering to the spirit (Downs, 1966:62).

Two cold water springs are specifically noted in the literature as spiritually active (although all springs contain this potential): Deep Spring in Skull Valley, Goshute territory, reputed to contain water babies (Chamberlin 1913:8); and a spring called Pai dopi (clay rock) near the west shore of Walker Lake, three miles south of Schurz, in Northern Paiute territory. At Pai dopi, a hunter could acquire luck with deer by sleeping near the spring and obtaining a dream-vision of the circumstances of the hunt.

Although data are incomplete, there is some indication in Indian traditions that all water resources were felt to share a common subterranean connection. In 1880, for example, Powell noted the Northern Paiute concept, Tu-vi-twi-u-su-gu-va. This referred to a single reservoir of "deep water" which connects all lakes, and from which all springs ultimately emanate (in Fowler and Fowler, 1971:246). A similar underground connection of springs is recognized by California Shoshoneans. In Cahuilla traditional belief, for example, both spirits and shamans utilized these underground pathways to travel magically from one place to another (Bean, 1972). Interestingly, a significant number of springs in the Great Basin are associated with petroglyphs and pictographs, the reputed creations of shaman artists (Heizer and Baumhoff, 1962).

Water as a link to the spirit world and mystic times is also underscored in beliefs surrounding mineral hot springs. In Ute traditional belief, hot springs are extremely sacred places owned by spirits, to which prayers and offerings are made (Stewart, 1942:301). Northern Paiute tradition holds that hot springs are created by the deep, subterranean cooking fires of water babies (Fowler and Fowler, 1971:241). In prehistoric and historic times, hot springs were utilized by Paiutes for curative mineral baths. At these sites, individuals could avail themselves of the opportunity for direct supernatural assistance from the spirit-world. Hot springs were "paid" by bathers with offerings of bone beads and other valuables (Stewart, 1941:430, 440). Mineral hot springs are rare, and access to these important sacred areas has become restricted or prohibited to Indians through public and private land appropriations. The current dispute of Northern Paiutes with the U.S. Navy over access to sacred Coso Hot Springs for the performance of traditional rituals is indicative of the persistence of Native American religious beliefs.

The use of hot springs for ritual purification and curing has an interesting parallel among Native Americans in the traditional sweat bath. In most areas of the Great Basin, sweatlodges consisted of small enclosures with a central or corner hearth of heated stones over which water was poured to create steam. Sweatlodges are reported for the Goshute (Steward, 1943:308), and are specifically related to special shamans and curing rituals among the Nevada Shoshone (Steward, 1941:261) and Ute (Stewart, 1942:260). They also appear among the Southern Paiute (Lowie, 1924a: 307-309) and Northern Paiute (Park, 1938:57), but in both instances are recent acquisitions. It is notable that the Northern Paiute sweatlodges were adopted in the 1880s, after these peoples were restricted to reservations and less able to visit sacred hot springs on a regular basis (Stewart, 1941:430). The curing aspect of sweatbaths, however, was not accepted by the Northern Paiute. They were utilized for hygienic purposes only.

Minerals (1.4.3.2.6)

Certain materials in the natural environment are regarded in traditional Great Basin Indian beliefs to have special supernatural power for curing and the prevention of misfortune. Speculorite, for example, was gathered by the Northern Paiute for its special magical properties, which are believed to repel whirlwinds (ghosts) when sprinkled around a dwelling (Stewart, 1941:445).

Clays were exploited by Nevada/Utah peoples not only for pottery, but for the production of paints. Red clays are especially valued for their protective value. Among the Northern Paiute, brick-colored clay is gathered from a deposit and shaped into balls to facilitate transport. A red paint is then produced which, when applied to the feet, is believed to offer protection against rattlesnake bites. It is applied to other areas of the body as a medicine, and is also utilized for body decoration. Red clay is still in demand by Northern Paiutes for use in the traditional manner (Wheat, 1967:27). The use of red clay for protective functions is also reported for the Southern Paiute, who believe it effective in repelling water babies, ghosts, and evil spirits (Kelly, 1964:138, 141). The Washo use red clay paints in the traditional girl's puberty rite (Freed and Freed, 1963:29: Downs, 1966:24).

White clay appears to have a special relationship with the sacred domain in Great Basin Indian cultures. Among the Northern Paiute, there are definite connections between the use of white paint and animal-spirit world. Shamans often

apply white paint to their bodies during vision quests to acquire familiars, and regularly apply white paint to the bodies of their patients as a prerequisite to sacred curing rituals (Park, 1934:103, 106-107). A similar relationship with curing persists among the modern Duckwater Shoshone. Smith (1972:74) notes that white clay (appah) is added to teas made from native medicinal plants "to make it work." White clay thus seems to serve as a catalyst or medium for communication or power transmission from the spirit-world.

Burials and Cremations (1.4.3.2.7)

The remains of both the immediate and distant ancestors of contemporary Great Basin Indians are distributed throughout the upland regions of Nevada and Utah. All burial and cremation sites are regarded as extremely sacred and dangerous.

In Great Basin Indian traditional beliefs, the soul of a dead person travelled to another place, which was typically envisioned as bountiful and happy. The Northern Paiute felt that the souls of the dead travelled south on the Milky Way (Lowie, 1924b:295; Kelly, 1938:372; Stewart, 1941:444). The Shoshone, Ute, and Southern Paiute believed that the afterworld was somewhere in the sky where the creator, Wolf, lives (Jorgensen, 1913:809; Steward, 1941:265; Stewart, 1942:319). In Chemehuevi Southern Paiute tradition (Laird, 1976:40), souls of the dead travel to Spirit Land far to the north (perhaps to sacred Charleston Peak, home of Wolf and other animal-spirits). A variation was recorded for the Ute by Powell in the 1880s. He noted that the Ute land of the dead was entered by an underground passageway, across a bridge spanning a deep chasm, and finally across a mountain to reach a beautiful valley of eternal feasting and dancing (in Fowler and Fowler, 1971:66-67).

The traditional funeral rites of Great Basin Indians shared a common feature that often came as a surprise to foreign observors--the dead were publicly admonished to go away. The following Northern Paiute speeches delivered to a corpse are typical: "Do not think of coming back, for you are going for good. Goodbye, you are going to a good place. Be good while you are there" (Lowie 1924a:281); "Do not think of coming back, stay away, we don't want you" (Stewart, 1941:444). Such exhortations relate to a fear of the dead, whose jealous and vengeful spirits return to harm the living.

The property of the deceased was often viewed as the road by which the dead return, and was therefore burned or redistributed to others. Similarly, houses occupied by the deceased were either destroyed, or the settlement abandoned. A taboo on mentioning the name of a dead person was universal. Ghosts were thought to appear in the form of whirlwinds. Among the Southern Paiute, whirlwinds could be repelled by opening and closing a bag made of sewn flicker wings. Protection against ghosts was also afforded by red paint and ashes, or by singing at night camps when traveling to drive away the evil spirits of those who may have met their death in the area. Ghosts could be heard whistling and yelling at night. The spirits of the dead may use toenail clippings of living persons to choke them, or may kill simply by "shooting their power" into an individual (see Steward, 1941:257; Stewart, 1942:314, 319; Freed and Freed, 1963:32-33; Kelly, 1964:102, 140-142, 166; Downs, 1966:59-60).

Ancestral methods of disposing of the dead were undoubtedly influenced by the limited tool inventory of traditional cultures and the hard desert soil. Corpses were

typically placed above rather than below the ground, in natural enclosed or sheltered areas. Of all the Nevada/Utah tribal groups, only the Washo cremated their dead in prehistoric times, a trait shared with their Hokan linguistic relatives south of the Great Basin. Typically, the corpse was cremated by burning the house of the deceased, after which survivors moved to a new settlement. Historic Washo abandoned this custom after government laws forced them to bury their dead in cemeteries (Curtis, 1926:97; Downs, 1966:108-109).

The Northern Paiute in former times followed the general Shoshonean pattern of carrying the deceased into the hills or mountains and placing the corpse in a rock cairn or cave (Yarrow, 1881:143; Lowie, 1924b:281). In historic times, burials often included animal and even human sacrifice (Hopkins, 1883). Powell noted in the 1880s that the body of a man was sewn inside the skin of his slain horse before interment in a rock cairn (in Fowler and Fowler, 1971:215). A variation of the Washo pattern of cremation was also apparently practiced by the Northern Paiute. In this case, the corpse was carried into the mountains and placed on a pyre over a hole or natural depression. After exhumation, the ashes were covered with rocks (Stewart, 1941:443).

Among the Shoshone, the corpse was dressed in finest clothing and taken to the mountains. Preferred interment areas were caves, the entrance to which was blocked by stones. Rock cairns were also utilized, ideally in the area of rock slides, talus slopes, or soft dirt (Lowie, 1924b:282; Steward, 1941:257). In historic times, some equestrian northern Shoshone adopted the Plains Indian method of placing the corpse in a special burial lodge, which was then abandoned by survivors (Yarrow, 1881:153-154).

Goshute methods of disposing of the dead followed the typical pattern of removal of the corpse to the mountains and interment in either caves or rock cairns (Chamberlin, 1913:6; Steward, 1943:343; Taylor, 1954:13). Identical patterns are reported for the Ute, who placed the deceased in mountain caves or rock cairns (Yarrow, 1881:127-128; Stewart, 1942:312-313), or alternatively in soft ground or natural depressions and covered with rocks (Lowie, 1924b:279-280). Notably, both the Goshute and Ute are reported to have also deposited their dead in springs (Yarrow, 1888:181; Steward, 1943:343; Stewart, 1942:333). Spring burials are perplexing, given the limited fresh water sources available to local Indians in western Utah. This option may well have been reserved for shamans or other important persons.

Southern Paiute mortuary practices follow two distinct chronological patterns. Until recent times, corpses were placed, often in rabbit-skin blankets, in caves, rock clefts and shelters, or at the base of hills or washes, and covered with stones. By the early historic period, cremation had been generally adopted from Hokan-Yuman peoples to the south. This method involved inhumation of the corpse and the personal property of the deceased on a funeral pyre (Kelly, 1964:101-102; Lowie, 1924b:279; Stewart, 1942:312-313). The diffusion of cremation also led to adoption of the associated annual mourning or cry ceremony, which was performed from 6 to 12 months after the death. In this ceremony, any remaining possessions of the deceased are burned or redistributed in a sacred ritual, accompanied by prayers, song, and dance (Laird, 1976:41-43).

Although certain general areas for disposal of the dead were undoubtedly favored by local Native American groups, it may be assumed that the skeletal

remains of scores of generations are widely distributed at sites beyond the memory of living poeples. Burials have been uncovered at Dynamite Cave and at Medicine Rock in Northern Paiute territory. Both of these sites are additionally associated with pictographs (see Figure 1.4.3-1). Kelly (1964:188) reports that corpses were regularly deposited among lava boulders just south of Panguitch Lake by the Southern Paiute. In Goshute-Shoshone territory, five aboriginal burial sites are noted in the literature. Spring burials were specifically undertaken in Skull Valley (Yarrow, 1881:181). Cave interments are known or suspected at four locations. Taylor notes the following:

> Three miles southwest of Garrison there is a large subterranean cave on a spur of the Snake Range (Snake Creek Cave). The entrance is through a narrow crevice under an overhanging rock and there is a vertical drop of 40 ft to the floor of the cavern. . .It was the custom of the Gosiutes at the time of first white contact to dispose of their dead by dropping them through the entrance to the cave. A similar practice was noted at Lehman's Cave, where two skeletons were discovered at the bottom of an old natural entrance (1954:13).

Lehman's Cave, in Nevada, was subsequently excavated by Rozaire (1964) and evaluated by Fowler (1977). The skeletal remains of approximately 26 individuals have been recovered, although only 30 percent of the cave floor was excavated. Rozaire (1964:15) notes that nearby Snake Creek Cave, Nevada has a far greater abundance of human bone material.

A fourth area associated with cave burials is suggested by early 20th century interview data collected by Chamberlin (1913). His Goshute informants referred to an area called A'pa-ya-wi-up, or alternatively I'dju-pa-ya-wi-up, place-names for the extreme southern tip or west slope of the Oquirrh Mountains, Utah:

> The name is given to this section as the scene of a very disastrous and long drawn out conflict between the Gosiute and another Indian tribe, which one the author is unable to make wholly certain. The name means in effect "Place of the weeping or wailing of ancestors," the caves in the neighborhood being supposed to be haunted by the shades of those who met death there. Cf. I'dju-pa-ya-wi-up, the same place but not the usual designation or the more correct, as I'djup properly refers to the very first members of the human race when used in this sense, while a'pa refers more generally to less remote ancestors (Chamberlin, 1913:6).

From what is known of Goshute mortuary practices, it may be assumed from Chamberlin's statement that the Oquirrh Mountain caves in question contain the skeletons as well as the ghosts of the ancestors. The two Goshute names for this area, distinguished only by prefix, are intriguing in light of the horizontal nature of sacred time which characterizes Great Basin Indian religions. The alternate place-name refers to Creation or mystic times, and may indicate that these sacred caves contain animal-spirits. It is also possible that the alleged battle itself occurred in mystic rather than modern times, when animal-spirits preyed upon the giants once believed to inhabit the area (Malouf, Dibble, and Smith, 1950:46).

As in western European cultures, traditional notions about the dead and their spirits or ghosts are tremendously persistent among contemporary Native Ameri-

cans. Ancestral spirits are believed to reside in the countless interment areas throughout the Great Basin hills and mountains. Any disturbance of the graves of the dead may anger these ghosts, and motivate them to seek vengeance on contemporary Indians. Taylor, for instance, decided to suspend plans for archaeological investigations at Snake Creek Cave due to the expression of such fears:

> Our plans to excavate the cave were dropped because of opposition from local Gosiutes, who thought that we would disturb their ancestors (1954:13).

Similar anxieties were recently expressed by Utah Southern Paiute-Pahvant Ute peoples over potential development of selected roadless areas by the U.S. Forest Service:

> Residents of the Kanosh Indian Reservation talk of important burial grounds that are located on two roadless areas in the Pavant Range. They would not welcome any decision about these roadless areas that would attract visitors to them (USFS, 1978b:29).

Traditionally, burials are located in upland areas. However, in historic times, many displaced Native Americans settled near non-Indian ranches and often buried their dead on valley floors. Such burials are difficult to identify by non-Indians, yet are highly susceptible to unintentional destruction.

Discussion (1.4.3.3)

All Great Basin sites and areas that are regarded as sacred in traditional Native American belief have a necessary connection with the spiritworld. Prominent physiographic features, such as mountains and lakes, are the end-products of dramatic events that occurred during mystic times. They are often the homes of creator figures and other animal-spirits, which are the primary source of supernatural power in the universe. At these sites and at special caves and springs, individuals may communicate with the spirit-world through visions and dreams. The wisdom so gained by shamans benefits all mankind. That gained by ordinary persons promotes success in daily life.

The horizontal nature of sacred time in Great Basin Indian religions allows immediate access to mystic power via the pathway of visions. At ancient rock art sites, shamans summoned this power for charming animals of the hunt. It is possible that petroglyphs and pictographs were believed to be sculpted and painted by the animal-spirits themselves, with shamans acting as both the summoning agents and mediums for the physical production of artistic symbols. The characteristic response by historic Indians that petroglyphs were made by Coyote or other animal-spirits ("the ancients") is typically interpreted by scholars to mean that contemporary peoples or their ancestors were not involved in the production of rock art. Such responses, however, may represent traditional religious truths rather than statements of dissociation. This interpretation would help explain the continued use of rock art sites by historic Indians, perhaps centuries after their original production, for the acquisition of familiars and animal-spirit guides. Such sites may represent permanent shrines where animal-spirits have visually communicated with The People, and at which they may be contacted again. Most, if not all, of the sacred mountains, caves, rock shelters, and curing rocks utilized by historic Great Basin Indians for visions and prayer are associated with petroglyphs and pictographs.

As in Judeo-Christian traditions, the spirit-world is balanced by evil elements. The graves or bones of the dead derive their sacred connotation from the evil spirits of the ancestors which lurk at burial sites and which may pursue the living with acts of vengeance. This sacred status diffuses to the caves, rock cairns, springs, and broader traditional areas, notably mountains, where interments are concentrated.

Beliefs regarding the traditional spirit-world are persistent among contemporary Native Americans despite the apparent in-roads made by Christianity over the past century. Whereas missionaries regarded traditional Indian religions as incompatible with the new Faith, this view was not generally shared by their nominal converts. Christianity, for the most part, was merely integrated with or tacked onto aboriginal cosmologies.

HISTORIC AND MODERN OCCUPATION AREAS (1.4.4)

When, in the 19th century, a number of reservations were established in Nevada/Utah, only a small percentage of Indians voluntarily relocated to these areas. Despite the destruction of native food resources, the usurpation of favored settlement areas, and other economic and social hardships precipitated by white in-migration, the majority of Native Americans refused to leave ancestral lands. In some areas families remained in the countryside, foraging in the traditional manner until waning resources made life by the old ways impossible. Others congregated into impoverished shantytowns near white settlements where, several decades later, certain colony and reservation lands were finally set aside for them by the government.

Most Native Americans in the study area have thus experienced spatial, temporal, and cultural continuity with native lands and the features they contain. Village sites occupied by their ancestors just three or four generations past are remembered by living peoples, as are important Indian historic landmarks such as battle sites, war refugee camps, homes of famous chiefs, native festival sites, and former shantytown sites.

A consideration of such historic sites is important for two reasons. First, villages and campsites occupied by past generations can be defined as cultural resources, and are therefore subject to protective measures under existing environmental legislation. The ethnohistorical and ethnographic literature provide an additional data source for the identification and location of such sites. An investigation of historic settlement patterns in native areas lends clues to prehistoric ones as well. A second reason for considering historic sites is their cultural importance to contemporary Native Americans. These sensitive sites and areas are part of the long, unwritten history of native peoples, and there is deep concern in modern Indian communities over their preservation for future generations.

The ancestral lands of Nevada/Utah tribal groups will be unevenly impacted if M-X withdrawal and deployment occurs. Since the traditional territories of the Washo and Northern Paiute lie considerably to the west of geotechnically suitable areas, no direct impacts to the cultural or economic resources of these peoples are foreseen. Therefore, they will be considered only briefly in the following discussion. The DDA does fall within the ancestral lands of the remaining three tribal groups.

This chapter will review available ethnohistorical and ethnographic data for the Ute, Southern Paiute, and Shoshone, to identify traditional areas of population

concentration and to compare the distribution of known occupation and other historic sites with areas under consideration for potential deployment.

As noted in Section 1.3 above, an effort is made in the historical reconstruction of Indian/non-Indian relationships to emphasize the Native American perspective. Whereas traditional histories often portray Indians as temporary obstacles to manifest destiny, Indians recount the same events as a catastrophic process of genocide and the loss of original sovereignty. Since history is by definition an interpretive undertaking, bias in both the selection of events and the manner in which they are rationalized and explained varies between Indian and non-Indian chroniclers. By viewing the history of Nevada/Utah tribal groups from the perspective of the original inhabitants rather than the intruders, Native American concerns and attitudes regarding past and present externally-imposed change are highlighted.

Reservation profiles are given in this technical report, not only because current reservations are congruent with traditional ranges but to document existing conditions. While this section deals with the Great Basin as a general sensitivity area, other sections concentrate on those reservations and resources more closely tied to the system suitability zone.

Washo Reservation (1.4.4.1)

The Washo people lost their ancestral lands on the border of California and Nevada in the 1860s as a result of wars involving Anglo settlers, Northern Paiute bands, and themselves. While 580 acres of allotted lands, known as Woodsfords Colony, were made available in 1887 to Washo in California, the majority of Nevada Washo settled in colonies of their own making in the vicinity of Reno. Lands were subsequently set aside in this area beginning in 1917. The 40-acre Dresslerville Colony was established with the purchase of the Dressler Ranch by the government to provide farmland for the Washo. Carson Colony added an additional 160 acres for settlement. Tribal lands now include a 795-acre area known as Washo Ranches, 388 additional acres in Woodsfords Colony, and the 80-acre Alpine Colony in California set aside for Washo by the Department of Interior in 1970.

The Washo population numbered 500 persons in 1978 (BIA, 1978a:143). The Woodsfords, Dresslerville, Reno-Sparks, and Carson colonies are governed jointly by a 10-member Washo Tribal Council and, individually, by community councils which serve as sub-councils. The Washo Ranches, owned and operated by the tribe as a farming enterprise, are leased for alfalfa and hay farming, and for grazing. Individual Washo colonies are today totally residential. According to the U.S. Department of Commerce (1974:300-301), elders in the Washo colonies still speak their native language. Indian heritage in the form of traditional arts and crafts is reportedly retained at Carson City Colony, but virtually absent at Dresslerville. When considered alone, the presence or absence of traditional crafts in contemporary Indian communities is an unreliable index of cultural persistence.

The Reno-Sparks Colony was established by land purchases made in 1917 and 1924 for displaced Indians of both the Washo and Northern Paiute tribes. This 28-acre reserve lies in the heart of Reno, and is almost entirely surrounded by industry. No water rights are attached to this tribally owned land. The colony is purely residential, and has a population of 507 (BIA, 1978a:130), and is governed by the six-member Reno-Sparks Indian Council.

Northern Paiute (1.4.4.2)

The Northern Paiute, or Numa, of Nevada occupied much of the remainder of the state west of Shoshone territory (see Figure 1.4.4-1). Although there appears to have been much overlap with Shoshones on their eastern border, the division between these two groups along the Humboldt River is generally recognized as a point midway between the present towns of Battle Mountain and Winnemucca. Only a small portion of former Northern Paiute lands contain valleys currently under consideration for M-X deployment. These valleys are concentrated in Pershing County northwest and east of the Humboldt River.

Northern Paiutes in the vicinity of the Humboldt were nearly identical to Shoshones upriver in terms of general subsistence strategies and sociopolitical organization. Paiute subgroups or bands were named after the area in which they lived, which was often associated with a particular type of resource. The Koop Ticutta, for example, who occupied the Lovelock area, are Ground Squirrel Eaters, and the Toi Ticutta to the south, Tule Eaters. Northern Paiutes in the study area had a heavy dependence on aquatic resources such as fish, which spawned annually in the spring, and on waterfowl, which were taken by communal drives in the fall.

Indians in this area of the Humboldt Trail experienced the same environmental destruction, territorial displacement, and predation at the hands of trappers, emigrants, settlers, and the military as did the Shoshone. Forced to leave their ancestral lands, the Koop Ticutta joined other Paiute bands in the 1860 Pyramid Lake War against the intruders. Following the bitter five-year war, over which a peace treaty was never signed, the Koop Ticutta returned to the Lovelock area. Landless, and their natural foods destroyed, these Paiutes eked out a living through manual and domestic labor for whites. Two acres (0.8 ha) were set aside for residential use in 1907 by the government. Eighteen more acres (7 ha) were finally added to the colony in 1910. Due to this inadequate land allotment, Lovelock Paiutes continue to depend on outside labor for subsistence.

Northern Paiute bands north and west of the Humboldt were rounded up by U.S. military troops following the outbreak of the 1868 Bannock and Paiute War, and forced to march to the Yakima Indian Agency in southern Washington. Although some eluded capture and others made successful escapes, the majority of Paiutes, such as the Yamosopu Tuviwa ga yu, were detained far from their homelands until 1883. Upon their return, some joined the Fort McDermitt and Duck Valley Reservations, where their descendents live today.

The Fallon Reservation combines the two cultural groups into one settlement, although differences in opinion and allegiance are still identified between the Paiutes and Shoshones on the reservation. The Winnemucca Colony was established in 1917 for homeless Shoshone, but the majority of the inhabitants now are Northern Paiute originating from the Fort McDermitt Reservation. The Walker River Reservation. The Walker River Reservation residents are Paiutes, with blood ties north and south as far as Death Valley and east into Shoshone land. At Lovelock Colony, remnants of the Northern Paiute bands have intermarried with Shoshone people to the north since the early 1900s.

Other Northern Paiute and Northern Paiute-Shoshone reservations outside the study area include: Pyramid Lake, Summit Lake, Yerington, and Fort McDermitt.

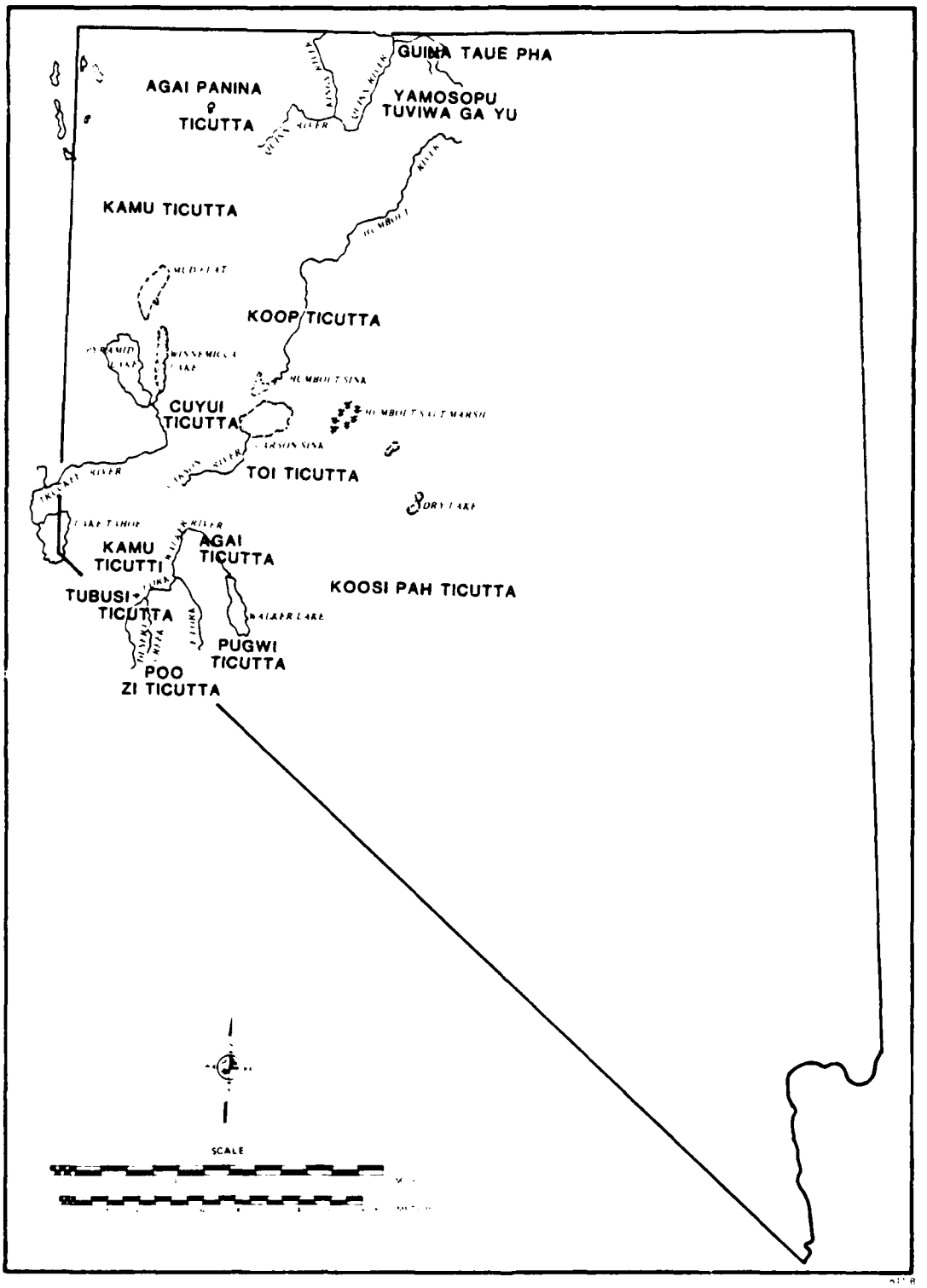


Figure 1.4.4-1. Historical distribution of Northern Paiute (after Inter-Tribal Council of Nevada, 1976c).

Walker River Reservation (1.4.4.2.1)

Walker River Reservation, established in 1874, is located in west central Nevada, 100 mi southeast of Reno. It consists of 323,386 acres including 313,670 acres tribally owned, 8,752 acres individually allotted, and 964 acres owned by the federal government; approximately 2,700 acres are under irrigation. There are an estimated 2,000 members of the Walker River Paiute Tribe; 930 members live on the reservation in the town of Schurz. Approximately 58 non-Indians live in Schurz. The town is located along both U.S. Highway 95, the main route to Las Vegas, and the Walker River. The river flows from north to southeast through the reservation and onto Walker Lake. The reservation is governed by the seven-member Walker River Paiute Council, aided by several advisory committees. Tribal income is generated from smokeshop revenues and mineral leases. Ranching and farming are primary occupational activities (Facilitators, 1980).

Fallon Reservation and Fallon Colony (1.4.4.2.2)

The Fallon Reservation and Fallon Colony occupy 8,180 acres of land 75 mi east of Reno, Nevada. The colony consists of 60 acres developed as a subdivision with 31 homes and an industrial park on road frontage 2 mi northwest of the town of Fallon. The reservation is further east of the colony, 12 mi northeast of Fallon. It encompasses 8,120 acres, with water rights for 4,877 acres. Some 4,640 acres are held in individual allotments which have, over the years, developed large numbers of heirs and the attendant problems of multiple ownership. The membership of the Fallon Paiute-Shoshone Tribes is about 669: 489 people live on the reservation, and 117 in the colony. The two Fallon reserves are governed jointly by the seven-member Fallon Business Council; economic development is planned for both the colony and reservation. A smokeshop, located in the colony, is the only tribal enterprise operating at this time (Facilitators, 1980).

Lovelock Colony (1.4.4.2.3)

Lovelock Colony consists of a 20 acre residential area adjacent to the southern city limits of Lovelock. The town is located 90 mi east of Reno on Interstate 80. The land was acquired in 1910 to be used as homesites for nonreservation Indians. The Lovelock Paiute Tribe has a membership enrollment of 346, with a colony resident population of 149, and 20 members living within Lovelock town (Facilitators 1980:2.25). The existing land base has been put to full use as a residential area, thus precluding the return of additional tribal members, a phenomenon taking place at other Indian communities. Negotiations are currently underway for purchase of a 107 acre ranch 17 mi west of Lovelock in Oreana.

Winnemucca Colony (1.4.4.2.4)

Winnemucca Indian Colony is a 340 acre reserve situated in the southeastern quadrant of the City of Winnemucca in northcentral Nevada. The colony was established in 1917 for homeless Shoshone, but the majority of the inhabitants now are Northern Paiute originating from the Fort McDermitt Reservation (U.S. Dept. of Commerce 1974:333). The population of the colony is 25, with about 200 Indians living off the colony (Facilitators 1980:2.150). There is an informally organized four-member tribal council. No natural or economic resources are indigenous to the colony, and there are no tribal enterprises.

Northern Paiute Occupation and the Designated Deployment Area (1.4.4.2.5)

Sacred and burial sites and hunting and gathering areas are scattered throughout the Northern Paiute territory. The area currently under consideration for M-X deployment does not directly include Northern Paiute lands. However, culturally important sites may be affected by the proximity of the project and increased land use by non-Indians.

Among the sites identified as significant to the Fallon Reservation people are: Grimes Point, a petroglyph site with archeological and historic significance; Sand Mountain, a Northern Paiute power point embellished in oral history and legends; Job's Peak, considered the place of Northern Paiute origin and important as a hunting and gathering area; and various hot springs, important for ceremonial and medicinal purposes and the availability of plant and animal resources.

Among religious and healing sites important to the Walker River Indians are Medicine Rock, Dead Horse Wells, and Sacred Caves. The legends associated with Pilot Cones, also known as Two Sisters, and Scratched Rock carry significant emotional value. Pilot Peaks was a prominent hunting and gathering area, particularly noted for mustang round-ups.

Sites identified as important to the Lovelock Colony are primarily associated with hunting and gathering. Table Mountain, Star Peak area, Seven Troughs, Happy Jack Canyon, and Lousy Water Canyon are all hunting areas. Pine nut gathering is done at Table Mountain, Fence Maker Canyon, and Lousy Water Canyon. Medicinal plants are gathered in Happy Jack Canyon. Kyle Hotsprings, Limerick Canyon Springs, and Waboga Hobbe, or Lone Mountain, are significant for their healing and spiritual values.

Paradise Valley is the ancestral home of the Winnemucca and continues to be a culturally important region containing unidentified migration paths, burial sites, and hunting and gathering areas.

Ute (1.4.4.3)

The Ute Indians formerly inhabited a large territory extending from the Rocky Mountains in Colorado west, through the state of Utah, to the great deserts near the Nevada border. Traditionally, Ute throughout this area appear to have been organized into politically autonomous local groups that subsisted on native plant foods, game, and fish. At least four regions in Utah, namely the Uintah Basin, Wasatch piedmont, lower Sevier River, and San Pete Valley, were sufficiently abundant in natural resources to support permanent villages, some of which were allied by an established network of chiefs and subchiefs.

Although white settlement of Utah did not commence until the mid-19th century, significant changes in Ute culture occurred decades earlier with the diffusion of horses from the American Southwest. The equestrian adaptation greatly increased the geographical mobility of local groups in food-getting activities, enabling large communities to range great distances throughout the annual subsistence cycle in pursuit of large game, fish, and wild plant foods. The horse not only contributed to increased nomadism, but allowed larger numbers of Ute to congregate on a seasonal or permanent basis. Attachments to local territories became

weakened with increased mobility and, accordingly, the locus of political identity and attachment began to shift from specific localities to charismatic leaders. On the basis of historic accounts, it is estimated that equestrianism diffused to Colorado Utes in the mid-18th century, to the Uintah Basin in the 1820s, the Utah Lake region by the 1840s, and to the lower Sevier River area by 1850 (Steward, 1974:42).

The most dramatic changes in Ute traditional culture and settlement occurred after the ingress of Mormon settlers in 1847. Lured by areas of natural resource abundance, settlers with large herds of cattle and sheep pressed into the same western Utah valleys selected and occupied by Ute villagers. The effects of this invasion on Indian populations was immediate and devastating. The destruction of natural seed grasses by livestock forced the dislocation of Ute villages and the formation of large, nomadic equestrian bands with fluid membership. Many such groups migrated to the Uintah Basin, an area as yet untouched by white settlement. Utes remaining in ancestral areas of western Utah were reportedly starving by 1862 (Hamblin, 1881:87-89), and preying upon Mormon cattle for subsistence. Raids and eventually full-scale warfare developed between settlers and the followers of famous Ute war chiefs, culminating in the Black Hawk War of 1865-1870. These hostilities and subsequent defeats contributed to the mass exodus of Utes to the Uintah Basin and the newly formed Uintah Reservation where their descendants remain today.

M-X suitable areas in westcentral Utah fall within portions of the ancestral territories of two known western Ute groups, the Timpanogots Ute of the Wasatch piedmont and Utah Lake region, and the Pahvant Ute of the lower Sevier River area. Although data for both groups are scant, areas of population concentration and early historic village sites have been documented by Steward (1938, 1974).

Timpanogots Ute (1.4.4.3.1)

The Timpanogots Ute, also known as the Tim-Pa-Noys or Timpanoags, occupied several permanent villages along a belt of the Wasatch piedmont extending adjacent to and north and south of Utah Lake, and around the lake itself. Two major Timpanogots village groups are also recorded to the west of Utah Lake in Cedar Valley and one in Tintic Valley (see Figure 1.4.4-2). The Oquirrh and Tintic mountains appear to mark the informal boundary between the Timpanogots Ute and Goshute Shoshone to the west.

The first historic account of the Timpanogots is that of the Escalante expedition which penetrated the Utah Lake region in 1776 (Bolton, 1950). At the time of Escalante's visit, the Timpanogots were non-equestrian and living in villages of cane huts or lodges. Subsistence was based largely upon fish, supplemented by seeds, rabbits, waterfowl, and large game. The permanency of these Ute villages allowed the development of stable political integration and an established hierarchy of officials. Escalante noted that the Timpanogots group of villages at what is now American Fork recognized a war chief, two assistant war chiefs, and a civil chief. A second village group visited on the southern shore of Utah Lake was headed by a principal chief and a chief's spokesman.

Few substantive data are available on the Timpanogots Ute from 1776 until the 1840s. Slaving expeditions originating in New Mexico, such as that of Arze and

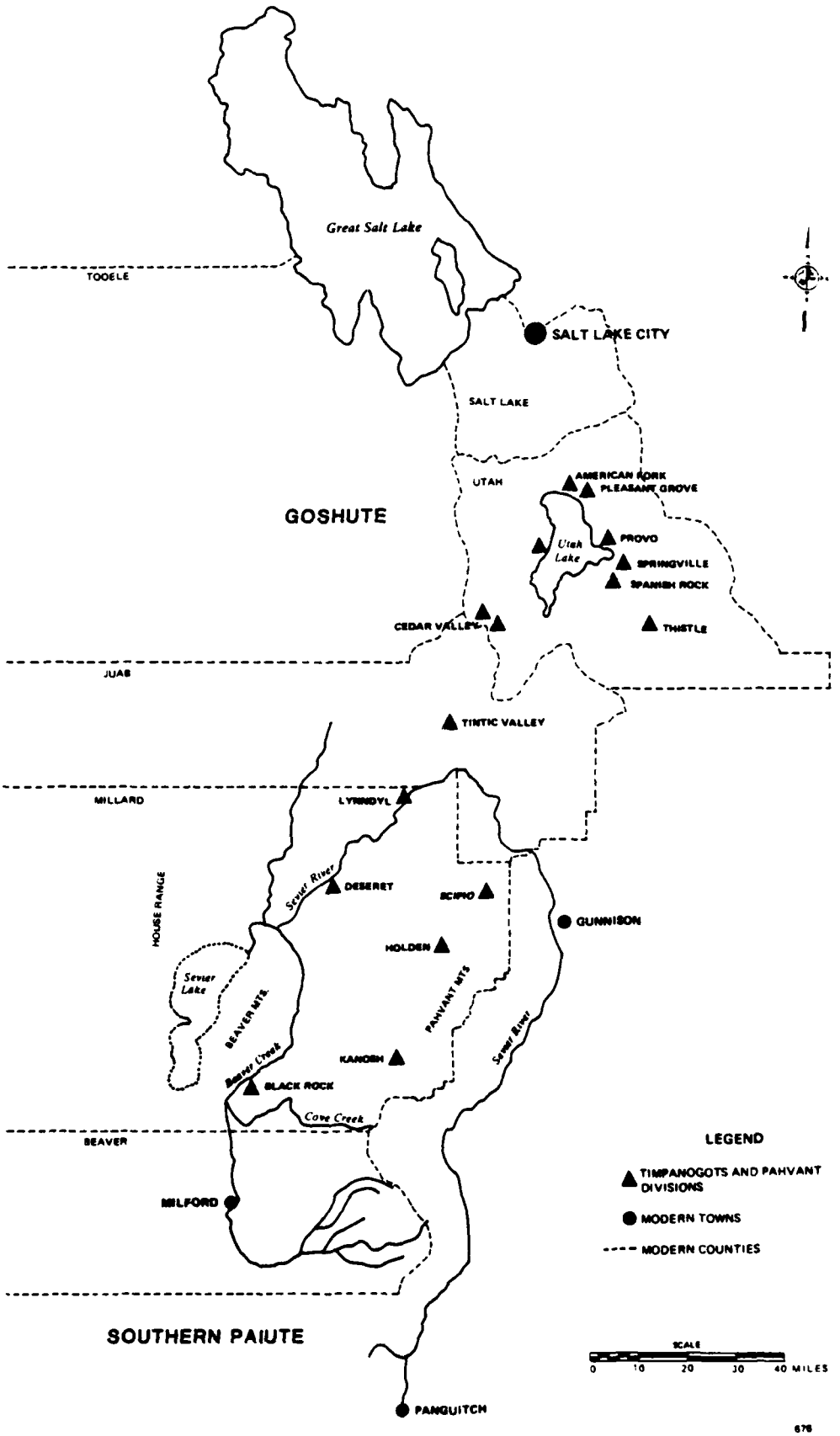


Figure 1.4.4-2. Occupational areas of the Western Ute (adapted from Steward, 1974).

Lagos in 1813, are known to have penetrated the Utah Lake area, and to have established trading relationships for war captives which were to later become expanded with the development of the Old Spanish Trail. It was perhaps through this market and through contacts with Utes in the Uintah Basin that the Timpanogots began to acquire sufficient horses for the equestrian transition.

By 1840 the Timpanogots were mounted, and well-organized bands began to crystallize around charismatic chiefs. Wakara, also known as Walker, rose to prominence during this period, and is said to have led raiding parties as far as California for the acquisition of horses, cattle, and of Indian captives which were traded to New Mexicans as slaves. Wakara and his men were met near Fillmore in the 1840s by John Fremont, who described them as well-mounted and in possession of rifles. Wakara and another prominent Ute chief, Soweit, journeyed with several hundred followers from Spanish Fork to Salt Lake City in 1848 to visit Mormons who had settled in Salt Lake City.

Timpanogots equestrianism appears to have reached its climax by the late 1840s. The area near modern Provo had, by 1849, become the spring gathering-place of all Utes within a 200 mi radius. Here Chief Wakara, subordinate local chiefs, and their hundreds of followers feasted on fish from the annual spawning run, gambled and held horse races, and engaged in important religious events such as the Bear Dance. By 1850 Wakara had achieved the title of "Napoleon of the Desert." His contemporary, Soweit, the Uintah chief, was sometimes alternately proclaimed by Mormons as "King of the whole Ute nation."

As noted earlier, however, Mormon penetration of Timpanogots territory in the 1850s soon destroyed the Ute ecological niche. Chief Wakara died in 1855 and, although succeeded by his brothers, local chiefs began to reassert their sovereignty both in warfare against the settlers and in emigration to the Uintah Basin. Utes who remained in Western Utah until 1865 joined under the Timpanogots Chief Black Hawk for the final unsuccessful struggle to repel the Mormon invasion.

Pahvant Ute (1.4.4.3.2)

The Pahvant or Pavanduts (water people) inhabited permanent villages on the Sevier River, Beaver River, and on the adjacent western flank of the Pahvant Mountains. Winter villages corresponding to major Pahvant divisions were located at Lynndyl, Deseret, Black Rock, Kanosh, Holden, and Scipio (see Figure 1.4.4-2). The Pahvant ranged westward into the deserts surrounding Sevier Lake during portions of the annual subsistence round, where they frequently overlapped with Goshute Shoshone. Their boundary with the Southern Paiute appears to have fluctuated through time, being initially defined as the Cove Creek area of Beaver River, and later as the Sevier Lake-Sevier Desert area.

Escalante's 1776 expedition encountered a Pahvant encampment of 20 persons some four days travel south of Utah Lake. The Pahvant are described as being bearded, dressed in rabbit-skin robes, and as wearing bone nose-pins. Little other historical data, however, are available for the period before Mormon settlement. Since rapid changes resulted from the almost simultaneous arrival of the horse and the Mormons, much of what is known about ancestral and early historic Pahvant Ute occupation was gathered from Indian informants in the previous century.

The total ancestral population of the Pahvant is estimated between 1,000 and 1,500. Each major winter village division, comprised of approximately 200 persons, was led by a civil chief who monitored the location of food resources and dispatched messengers in order to assemble all members in favorable gathering areas. Special chiefs were recognized for rabbit-drives, antelope-drives, fishing, dances, and warfare. All Pahvant divisions appear to have gathered together at the Sevier River for the annual spawning runs of mountain trout and suckers, during which the 10-day Bear Dance Festival was held. The Pahvant seem to have recognized a pan-village or paramount chief, but the degree of authority exercised by this official in prehistoric times is not known.

The Pahvant were displaced from most of the six village division sites by Mormons in the 1850s. With the aid of horses, they began to gather in large nomadic bands to facilitate survival. Kanosh, a contemporary of the Timpanogots Chief Wakara, arose as paramount chief of the Pahvant. His war chief, Moshoquop, and 50 Pahvant warriors were responsible for the massacre at Gunnison in 1853. By 1860, the Pahvant occupied the Sevier Lake area to the west, and the Corn Creek area to the east, of their original winter village sites (now occupied by Mormon settlers). Kanosh, after whom the modern town is named, was recognized as the Pahvant chief through the 1870s. His following, however, had been diminished by the exodus of Pahvants to the Uintah Basin and to the ranks of Black Hawk during the 1865-1870 war against the settlers.

Ute Occupation and the Designated Deployment Area (1.4.4.3.3)

It appears that by 1870, the majority of Timpanogots and Pahvant Utes who had escaped death from starvation or warfare had emigrated to the Uintah Basin. There they amalgamated with Utes from other areas of the state and became collectively known as Uintahs. According to Steward (1938:222), some Pahvant families still resided at Kanosh in the mid-1930s, but had intermarried extensively with Southern Paiutes and were too young to recall much of the older culture. Southern Paiutes are now dominant in this area of the state, and it is doubtful that Utes who identify themselves as either Timpanogots or Pahvant now reside in any numbers near the proposed M-X deployment area. The bulk of their descendants live today on the Uintah and Ouray Reservation.

The historical data indicate that extensive western Ute archaeological sites are likely to exist in the DDA. These areas are summarized in Table 1.4.4-1.

Southern Paiute (1.4.4.4)

The Southern Paiute people, or Nuwuvi, occupied an extensive territory that included portions of southeastern Nevada, southern Utah, northern Arizona, and southeastern California. In ancestral times, several distinct political groups, or bands, were identified with particular regions within this area. Each band consisted of family groups that individually or jointly occupied permanent winter settlements at specific streams or springs. Family groups in each band were welded by common territory, communal subsistence pursuits, frequent visitation, and joint celebration of traditional ceremonies and dances. Traditional political institutions reflect the Southern Paiute emphasis on individual freedom and autonomy. Bands were informally structured by a council of elders that convened to decide matters and organize activities involving their entire memberships. Leaders of band communal

Table 1.4.4-1. Probable location of Western Ute archaeological site concentrations in the Utah study area.

LOCATION	UTE GROUP	PROBABLE SITES	ASSOCIATION
Tintic Valley	Timpanogots	Villages	Territory of a major division of Timpanogots
Sevier River (Deseret to Sevier Lake)	Pahvant	Villages	Territory of a major division of Pahvants; major area for communal fishing and hunting of waterfowl.
Sevier Lake (dry)	Pahvant	Campsites, Prehistoric Settlements	Prehistoric gathering area of Pahvants; refugee occupation area for equestrian Pahvant bands in 1860; prehistoric fishing camps or villages expected on old lake shoreline.
Beaver River	Pahvant	Villages	Territory of major division of Pahvants; historic village in Black Rock area; prehistoric villages expected along entire drainage.
House Mountains	Pahvant	Campsites	Pine-nut gathering area; excursions made for favored nut of *Pinus monophylla* unavailable elsewhere in Pahvant territory.

074

ventures, such as rabbit-hunt or festival chiefs, were chosen for their special abilities or spiritual powers but had only limited and temporary authority. Leaders of individual family or local groups, who directed seasonal movements and subsistence endeavors, were typically selected by the larger band council and had similarly limited power. The Southern Paiute recognized no common authority above the band level, but shared a common cultural identity and relationship to traditional lands.

The Southern Paiute differ from neighboring Ute bands in two important respects. First, all local groups were dependent to a greater or lesser extent on horticulture from prehistoric times. Crops such as corn, beans, squash, pumpkins, and sunflowers were cultivated in irrigated plots near streams or springs on a seasonal basis. This subsistence base supported fairly dense population concentrations along the Virgin, Santa Clara, and Muddy rivers, and other perennial streams. Second, due to the inadequacy of forage in these more southern latitudes, the development of equestrianism was very limited in historic times. The pedestrian nature of Southern Paiute bands and the permanency of winter settlements and associated farming plots made them susceptible to attack, enslavement, and territorial displacement by non-Indian and Indian predators.

Early Distributions (1.4.4.4.1)

The Southern Paiute recognize 19 major band divisions that were associated with distinct regional provinces in Nevada/Utah and adjacent portions of California and Arizona. These bands appear in Figure 1.4.4-3.

The northern boundary in Utah claimed by Southern Paiutes overlaps with southern historic boundaries documented for the western Ute. The northern movement of the Kwiumpits and Koosharem Paiutes began after 1850 when the majority of Utes emigrated to the Uintah Basin. The 1776 Escalante expedition, penetrating Southern Paiute territory from the north, recorded its first encounter with Kwiumpits bands at a point 12 mi south of Minersville, Utah. This northern extent corresponds to ancestral Southern Paiute distributions outlined by Kelly (1934).

Escalante met Utah Southern Paiutes at Coal Creek, Ash Creek, and in the vicinity of modern Hurricane. Cultivated fields, well-constructed irrigation systems, and large quantities of crops were reported during this earliest encounter, particularly in the Ash Creek area. Following the Escalante expedition, large numbers of Spanish fur trappers and traders entered the Salt Lake, Utah Lake, and Uintah Basin areas. The Indian slave trade, which was to have devastating effects on the Southern Paiute population, appears to have begun at this early date. The first recorded instance of slaving was the 1813 expedition of Arze and Garcia. The Ute were actively involved by this period, raiding Goshute and Southern Paiute settlements for captives and selling them to New Mexican traders.

By the mid-1820s, Anglo trappers and traders began to penetrate Southern Paiute territory in an effort to establish a route between New Mexico and the Pacific. The 1826 expedition of Jedediah Smith passed along the Santa Clara River. The area was referred to as Corn Creek, after the extensive farming villages on its banks. Smith successfully linked segments of the Escalante route with a 1776 road across the Mojave Desert to California established by Garces. The east-west route

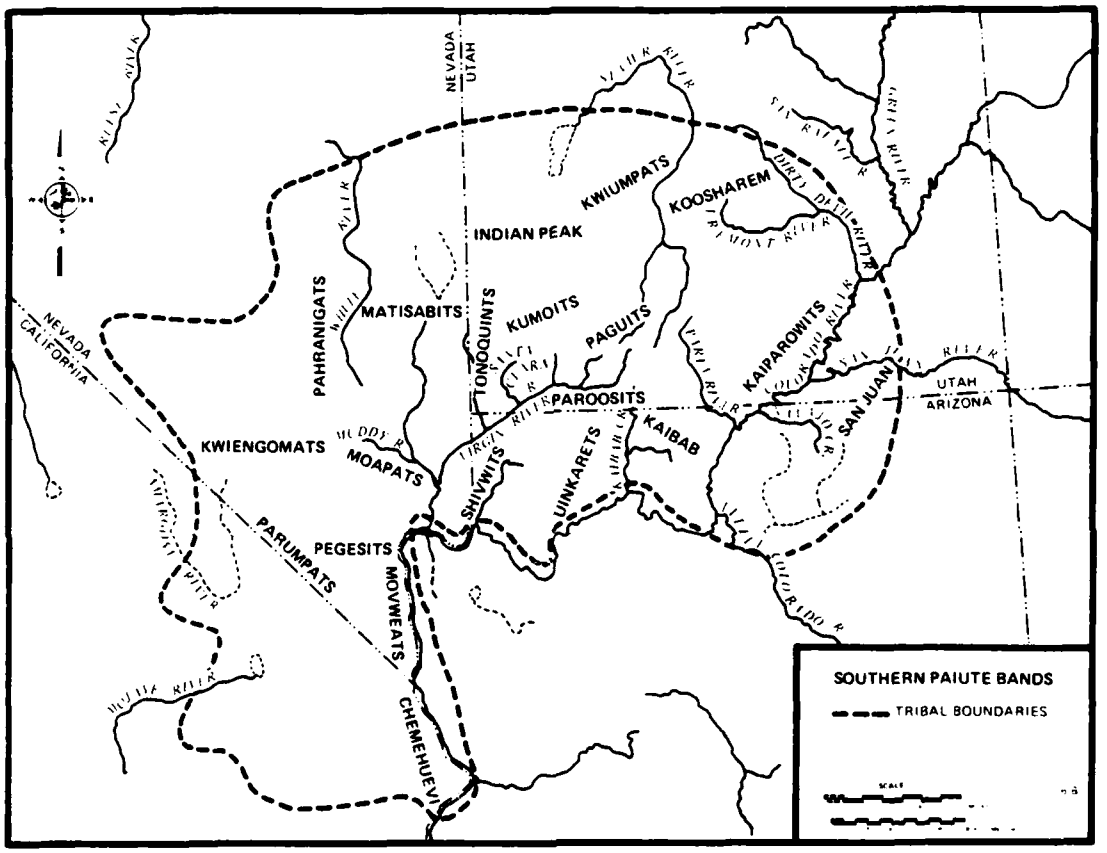


Figure 1.4.4-3. Historical distribution of the Southern Paiute bands (after Kelly, 1934).

known as the Old Spanish Trail was thereby formed, and came into general use by 1830.

Heavy traffic along the Old Spanish Trail (see Figure 1.4.4-4) dealt the first major destructive blow to the Southern Paiute environment, settlement pattern, and subsistence. Large caravans were an annual occurrence between 1830 and 1848. The route was utilized by three major categories of travelers: (1) Mexican slaving expeditions, (2) Ute horse- and slave-raiding expeditions, and (3) Anglo-American traders, adventurers, and military parties. Caravans often averaged 200 men and 2,000-4,000 head of livestock (horses and mules) each in size. Foliage along the entire length of the Old Spanish Trail was decimated by both animal traffic and overgrazing. Such grasses were a major source of Southern Paiute subsistence. Moreover, perennial streams and springs, as favored camping areas, were totally monopolized by successive expeditions from late spring to early fall. These well-watered areas were utilized for farming during the same season by Southern Paiutes. Incidences of trespass and of expedition camping in Paiute cornfields became commonplace. The outnumbered, under-equipped, and basically non-militaristic Paiutes could offer little organized resistance to the destruction of their basic food supplies.

In addition to the effects of expeditions flowing along the trail, Southern Paiutes were also plagued by annual slave raids by both Ute war parties and Mexican slaving caravans. It is estimated that the Paiute lost approximately one-half of their children and young adults to slavers in the historic period preceding 1848. Since females brought higher prices than did males, and were taken in greater numbers, a severe sexual imbalance developed.

The period between 1830 and 1848 thus saw the total disruption of Southern Paiute population centers and subsistence patterns. Due to their displacement from favored farming areas by caravan encampments and to the fear of slaving parties, band members dispersed into the countryside in small groups. Food shortages became acute. Whereas Mexican caravans tended to be totally avoided by Paiutes due to their large size and slaving propensities, smaller Anglo-American wagon trains were often followed or confronted with a show of numbers. Starvation forced some Southern Paiutes to adopt horse-raiding or the ambushing of other wagon train livestock for food. Anglo-Americans generally responded with indiscriminate acts of retribution, and in some instances with the hunting of Indians for sport.

By 1848, the presence of U.S. military patrols along the Old Spanish Trail had effectively ended the era of large Mexican slaving caravans. As the constant threat of attack and abduction diminished, Southern Paiutes began to reoccupy perennial streams, such as the Santa Clara River, Muddy River, Virgin River, and Beaver Dam Wash area, for irrigation farming. Sporadic slave raids by Ute bands, however, continued for the next decade. Southern Paiute attempts to return to their aboriginal population centers and subsistence activities were further complicated by the discovery of gold in California in 1849. A new wave of Anglo-American wagon trains flooded the Old Spanish Trail, inflicting further damage on the Southern Paiute countryside. Incidences of trespass and the utilization of Indian cornfields for encampments and livestock forage led to hostilities and renewed displacement of Southern Paiutes from well-watered areas.

In the same year, 1849, the Mormon Church sent an exploratory expedition to Southern Paiute territory to select an area for settlement.

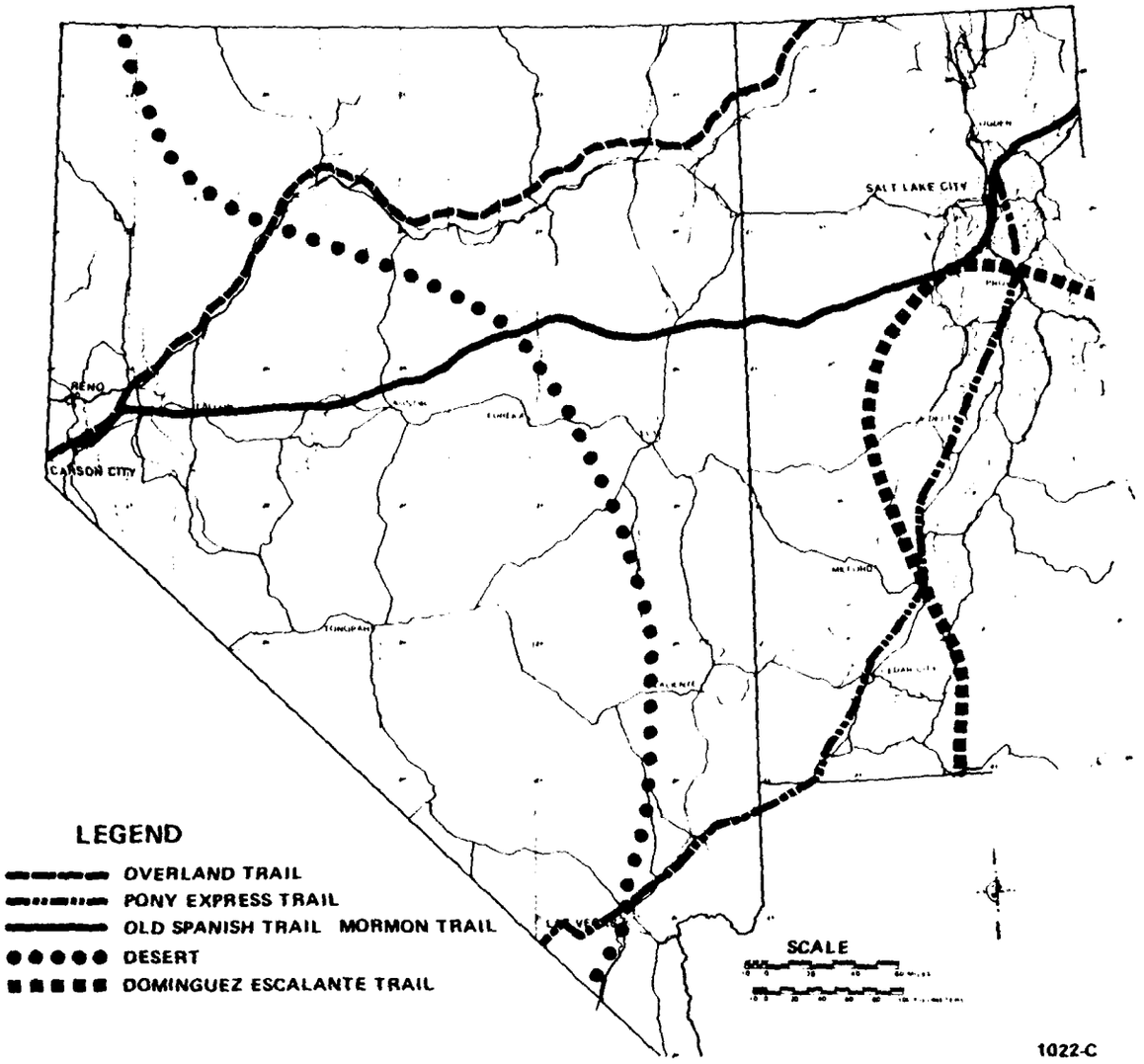


Figure 1.4.4-4. Major historic trails in theGreat Basin.

Mormon Settlement and Territorial Usurpation (1.4.4.4.2)

As in former Ute lands, Mormons were attracted to the same environmental areas which had been selected by indigenous Indians for settlement. The church referred to Indians as "Lamanites," and embodied the philosophy that they had once been Christians, and that they must be returned to the Faith. Taking over choice Southern Paiute farmlands, Mormon pilgrims established their first settlement at Parowan in 1850. Subsequent missions were built at Fort Harmony in 1854, Las Vegas and Santa Clara in 1855, St. George in 1861, and Meadow Valley and Callville in 1864. The Mormon Church maintained a paternalistic attitude toward Southern Paiutes, defining themselves as civilizing and enlightening agents, and guardians of Indian welfare. Once again displaced from their original farmlands, and their countryside denuded of food grasses by settler livestock, starving Southern Paiutes in Utah began to radiate to Mormon farms and ranches to serve as laborers and sharecroppers. Others moved westward, where resistance to Mormon settlement and conversion were greater, to join other Southern Paiute bands.

The Mormon Church played a major role in terminating the Indian slave trade by Mexicans and Utes. Contemporary Southern Paiute historical interpretations, however, suggest that the underlying motivation of this effort was self-serving (Inter-Tribal Council of Nevada, 1976a:56-89). According to this source, Mormon efforts to end the trade were designed to eliminate the very real political threat of a Ute-Mexican military alliance against the church, and simultaneously to monopolize the Indian labor market for themselves. Indeed, the 1852 Act for Relief of Indian Slaves and Prisoners established a legal institution of indentured servitude, wherein Mormons were permitted to "adopt" Indian children for up to twenty years. Many Southern Paiute children were thus channeled into domestic and farm labor, and were subject to purchase and resale as chattels.

By the late 1850s, as conflict escalated between the Mormons and U.S. government, the church allegedly made numerous attempts to win the alliance of Southern Paiutes against gentile miners and wagon trains. Numerous acts of aggression and retaliation between Indians and the expanding population of Anglo-American intruders were reported over the next several years.

Peace was established by the U.S. government in 1865, but no lands were set aside at that time for the strife-torn and homeless Southern Paiutes. Paiute farmlands along perennial streams in Utah had been completely usurped by settlers. Although areas along the Muddy River, Colorado River, and at various springs in Nevada continued to be cultivated on a limited scale, the vast majority of Southern Paiutes had, by 1869, been reduced to indigence and vagrancy.

The Moapa Reservation was officially established in 1872 and expanded in 1874 to include approximately 4,000 sq mi in southeastern Nevada. This large reserve, which was intended for resettlement of several Southern Paiute bands, was drastically reduced to only 1,000 acres in 1875 (see Figure 1.4.4-5).

Due to repeated mismanagement and the illegal use of both funds and land by reservation officials, Southern Paiute occupancy of Moapa was delayed for over a quarter of a century. In the interim, Nevada bands clustered on the fringes of white settlements in the upper Meadow Valley, lower Muddy River Valley, and Las Vegas. A 10-acre parcel was purchased for the Las Vegas Colony in 1911.

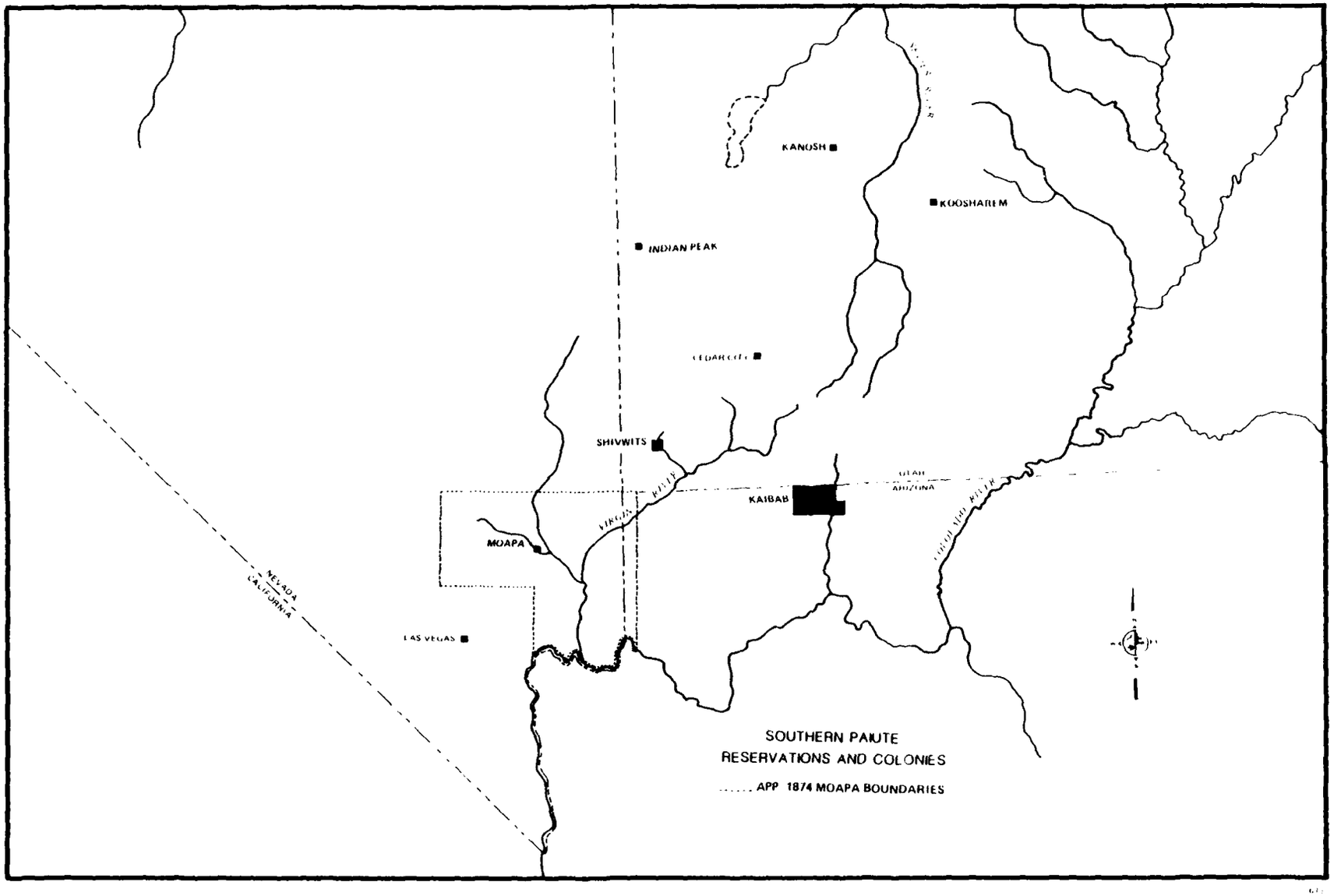


Figure 1.4.4-5. Southern Paiute reservations and colonies (after Inter-Tribal Council of Nevada, 1976a).

Utah Southern Paiutes, totally dispossessed of farmland, were forced to migrate to white settlements for wage labor. Santa Clara and Virgin River Paiutes resettled at both Muddy River and Cedar City until the Shivwits Reservation was established in 1903. Lands for the Indian Peak Paiutes were set aside in 1915. Cedar City Southern Paiutes in 1917 established a colony on land owned by the Mormon Church. The northernmost Utah bands joined remaining Ute families at Koosharem and Kanosh, which were converted to reservations in 1928 and 1929, respectively.

Southern Paiute Reservations (1.4.4.4.3)

In Nevada, descendants of the Pahranagits, Matisabits, and Moapits bands now reside at the Moapa Reservation and Las Vegas Colony. All Southern Paiute reservations in Utah were terminated from federal trust status in 1954. Members of the Indian Peaks band were forced to sell their former reservation lands in order to settle accumulated real estate taxes levied on the property since termination. The Shivwits Reservation land was leased to non-Indian ranchers, and most tribal members relocated. The majority of Indian Peaks peoples now reside in Cedar City Colony. Descendants of the Kwiumpits band blended with remaining Pahvant Ute families, and live at Kanosh and nearby Richfield. All of these Utah Southern Paiute bands have recently been reinstated to federal trusteeship, and the withdrawal of 15,000 acres is planned to replace lands lost due to termination.

Moapa Indian Reservation (1.4.4.4.4)

The Moapa Indian Reservation, established in 1875 for Southern Paiute Indians, is located in southern Nevada, 55 mi northeast of Las Vegas. In December 1980, legislation was passed adding 70,565 acres of BLM land to the existing 1,466 acre reservation. Currently, 750 acres are under irrigtaion, with plans to increase that acreage with the new land acquisition. Presently, 208 members live on the reservation but a proposal for the construction of 40 additional dwelling units has increased the projected number to 396 individuals. The six-member Moapa Business Council acts as the governing body (Facilitators, 1980).

The Moapa reservation has experienced considerable economic growth with the development of an auto repair shop, a construction company, a leather shop, a grocery store, and a greenhouse horticulture enterprise. The infrastructures of its ranching and farming enterprises have been improved. Development plans include a restaurant, gas station, and museum to benefit from tourism at Valley of Fire State Park. The reservation is largely dependent on the Muddy River for domestic, agricultural, and industrial water uses.

Las Vegas Colony (1.4.4.4.5)

The Las Vegas Colony was founded on 10 acres of suburban land midway between the cities of Las Vegas and North Las Vegas. This parcel was deeded to "homeless" Indians in 1911. In 1978, an additional 2.5 acres was purchased for commercial development. Approximately 100 persons live on the colony. Of this number, 4 are non-Indians, and an estimated 7 to 10 individuals are Chemehuevi; the remainder are members of the Las Vegas Tribe of Paiute Indians. Local affairs are coordinated by the seven-member Las Vegas Tribal Council. Two tribally owned smokeshops do a thriving business. There is high economic potential for the recently acquired 2.5-acre tract (Facilitators, 1980).

Paiute Indian Tribe of Utah (1.4.4.4.6)

The Cedar City Colony is located on 36.9 acres of land owned by the Church of Jesus Christ of Latter-Day Saints and adjacent to the northeast part of Cedar City, Utah. The Cedar City Band has never owned this land, but is attempting to purchase the church-owned property. The Cedar City Band of Southern Paiutes has 138 members; of this number 84 individuals live on the colony. The colony is also presently the center of the Indian Peaks Band with a representation of 14 people. Since the colony houses two bands, there are two tribal chairmen responsible for local decisionmaking (Facilitators, 1980).

The Kanosh Indian Reservation is located on an 80-acre tract approximately 1 1/2 mi northeast of Kanosh, Utah. Most of the 4,280 acres that the reservation owned before termination were sold to pay property taxes. The Kanosh Band has 80 members, 44 of whom live on the reservation. The band leases water rights to nearby cattle ranchers. That income is supplemented by the rental of a reservation building to non-Indians by the Utah Paiute Tribal Council (Facilitators, 1980).

The Koosharem Band of Paiutes now lives on a 1.5 acre leased parcel in the City of Richfield in south central Utah. They formally owned reservation lands 35 mi to the south, but currently have no land base of their own. The Koosharem Band is composed of 85 members, 40 of whom live in the Richfield Colony. Presently the band has no source of income (Facilitators, 1980).

The Shivwits Indian Reservation consists of 28,160 acres, 15 mi northwest of St. George, Utah, in the southwest corner of the state. The band has approximately 189 members, 65 of whom live on the reservation. The tribal chairwoman represents Shivwits in the Interim Utah Paiute Tribal Council. The reservation is primarily residential with grazing, mineral, and lumber rights leased to private concerns (Facilitators, 1980).

The Indian Peaks Reservation was purchased by the state of Utah after the Paiutes were terminated from federal government supervision in 1954. The 9,000 acre tract, 75 mi from Cedar City, is now a game management area. The Indian Peaks population is dispersed among the other colonies, primarily Cedar City (Facilitators, 1980).

Southern Paiute Occupation and the Designated Deployment Area (1.4.4.4.7)

The DDA is proposed for construction in the ancestral territories of five historic Southern Paiute bands. These are: in Nevada, the Pahranagits, Matisabits, and Moapits; and in Utah, the Kwiumpits and Indian Peaks bands (see Figure 1.4.4-5).

The members of all Southern Paiute bands ranged over considerable distances during the annual subsistence cycle. Campsite remains may therefore be expected to have a wide distribution. The major population centers of each band, however, consist of permanent winter settlements. These latter archaeological remains are in some areas extensive, and have a higher potential for sensitivity among contemporary Indians. These areas are summarized in Table 1.4.4-2.

Those sites and areas identified as signficant by contemporary Southern Paiute people are discussed in Section 2.0.

Table 1.4.4-2. Probable location of Southern Paiute site concentrations in the Nevada/Utah study area.

LOCATION	BAND	PROBABLE SITES	ASSOCIATION
Pahranagat Valley	Pahranagits	Winter Settlements, Historic Sites	Center of Pahranagits permanent occupation sites. Potential battle or massacre sites from the 1855-1865 period.
Meadow Valley Wash	Matisabits	Winter Settlements, Historic Sites	Population center of Matisabits band, particularly in the northern end of the Valley near Panaca and Pioche. Potential battle sites from the 1855-1865 period.
Muddy River Valley	Moapits	Winter Settlements	Center of Moapits band and one of the most densely settled areas in Southern Paiute territory; occupation sites extend along entire length of river and southern end of Meadow Valley Wash.
Indian Peak	Indian Peak	Winter Settlements	Concentration of permanent settlements located at foot of Indian Peak; additional sensitive areas probable in adjacent Needle Range.
Beaver River Valley	Kwiumpits	Winter Settlements	Central territory of Kwiumpits band; sites expected along length of river valley from the Cove Creek area to Beaver City area; known historic population concentration at foot of Tushar Mountains.

075

Western Shoshone (1.4.4.5)

The Shoshone, or Newe, originally occupied a large area covering major portions of central and northeastern Nevada, northwestern Utah, and adjacent areas of southern California, Idaho, and Wyoming. The Western Shoshone division typically refers to the Nevada, Utah, and California peoples. Indians who occupied the Great Salt Lake Desert area and Great Salt Lake drainage have been referred to in the literature as Goshute, Gosiute, or Deep Creek Shoshone. Once thought to represent a distinct tribe, the Goshute are now recognized as Shoshone, both linguistically and culturally. The traditional territory of the Western Shoshone includes approximately 24 million acres, a significant portion of which is within the DDA. Therefore, the Western Shoshone may experience substantial impacts to cultural and natural resources.

In ancestral times, all areas of this vast territory were utilized for food on a seasonal basis. Local sociopolitical organization, while structured on consistent cultural principles, seems to have varied in relative size and complexity according to local ecological conditions. In general terms, specific land areas or subsistence ranges were recognized throughout Shoshone territory, and were often named after prominent resources in the district. Since families in the same district tended to use the same areas for food, and to join together seasonally for communal gathering, hunting, and ceremonial activities, district names were also applied to persons residing there. Thus, for example, the Ruby Valley Shoshone were referred to as Wadaduka ("rye grass seed-eaters"), and the Duckwater Shoshone as Tsaiduka ("tule-eaters"). Seasonal occupation sites returned to annually included summer camps near mountain springs, utilized during gathering and fishing; and winter villages in foothill or pine-nut areas.

Due to the considerable environmental and political disruption of the early historic period, it is difficult to determine whether these Shoshone regional divisions were, in ancestral times, autonomous units or bands with consistent cross-generational memberships. Later ethnographic descriptions indicate considerable fluidity in family-regional affiliations based upon the fluctuating seasonal and annual availability of native foods in given areas. It is likely that sociopolitical groups approximating true bands were found in areas with stable and abundant seasonal resources, whereas less favorable regions with less predictable food sources encouraged greater horizontal mobility of component family units and periodic fluctuations in group membership. The mass destruction of native foods by intruders in the early historic period may account for the apparent dominance of family mobility and autonomy as opposed to older, more stable organizational structures.

As among the Ute and Southern Paiute, Shoshone leadership was consensual and nonhierarchical. Civil chiefs of villages, or at times groups of villages, generally coordinated the flow of essential seasonal subsistence activities. Several other chiefs, chosen for their wisdom and special abilities, led antelope hunts, rabbit hunts, festivals, and dances. Charismatic, militaristic chiefs who rose to prominence during the early historic period deviated from the aboriginal pattern, and represent an adaptive response to armed invasion.

Since some of the best ecological niches and areas of population density were destroyed during the earliest period of intrusion by outsiders, an accurate picture of aboriginal occupancy and lifestyle is perhaps best viewed through the historical

process as documented by the Shoshone themselves (Inter-Tribal Council of Nevada, 1976b). These data will then be compared with 1930s information gathered from Shoshone elders by Steward (1938), which documents the location of rural village, camp, and festival sites circa the 1880 period.

Historic Overview (1.4.4.5.1)

The Humboldt River area of Shoshone territory, once rich with tall grasses, abundant game, and waterfowl, provided a natural east-west passageway across northcentral Nevada. The very features which made this region a major population center for Shoshones were also a natural attraction for traders, emigrant trains, and eventually foreign settlers. The Humboldt River corridor was to become a major link in a northern overland route from Salt Lake City to California (see Figure 1.4.4-4). The deleterious environmental and human effects experienced by the Shoshone were in many ways parallel to those documented for Southern Paiutes along the Old Spanish Trail.

Fur trappers were the first to invade Shoshone lands, beginning in 1827 with the expedition of Jedediah Smith. Peter Odgen, accompanied by an entourage of trappers and a large number of horses, traversed the Humboldt from west to east in the fall of 1828, and from east to west in the spring of 1829 (Ogden, 1911). On these two brief expeditions, Odgen's party extinguished the riverine beaver population, on which the Shoshone depended for food and clothing. Moreover, trapper horse herds denuded the land of valuable seed grasses along the river, and seriously depleted game animals in the area. Shoshones, described as friendly and inhabiting villages along the Humboldt in 1826, had by the following spring adopted a policy of avoidance. As this and successive trapping parties passed through their territory, Shoshones became increasingly alarmed and angered at the destruction of native flora and fauna, on which their survival depended.

The 1840s saw the development of the Humboldt River as a major wagon train route westward. A road passing from Salt Lake to Steptoe Valley, Ruby Valley, Wells, South Fork, Elko, and along the entire length of the Humboldt was established by 1841. Wagon trains after 1844 reported the disappearance of forage along the river, and the general paucity of game. More significantly, Shoshones, who were described earlier as robust and living in dense settlements, were now characterized as impoverished, wretched, and predatory on wagon train cattle. By the end of the decade, new external events, such as United States acquisition of the West from Mexico, the Mormon arrival in Utah, and the discovery of gold in California, set the stage for foreign usurpation of Shoshone lands.

An estimated 100,000 people rushed to California in search of gold between 1848 and 1850, half this number utilizing the established trail through Shoshone territory. Deleterious environmental effects caused by the almost unbroken line of wagon trains were thereby magnified on a new scale. Their food and water supplies decimated, and some of their people murdered by unprovoked emigrant attacks, the Shoshone of the Humboldt River area organized for military retaliation. Unlike Southern Paiute territory, forage in northern Nevada and Utah allowed the limited keeping of horses and the development of mobile defensive forces. Rotating acts of violence became endemic.

After travelling extensively through the Humboldt River area from 1852-1853 and investigating Shoshone-white hostilities, U.S. Indian Agent Jacob Holeman

concluded that Indian attacks were the direct result of imposed food shortages and deliberate provocations by lawless emigrants (Holeman, 1852). Mormon settlers and their livestock herds had also penetrated Shoshone territory, usurping the best lands for farming and husbandry. Although Agent Holeman recommended establishment of an agency along the Humboldt, and in good faith promised aid to the Shoshone, no such actions were taken, and Holeman was removed from office.

The new Indian Agent, Garland Hurt, successfully completed a peace agreement with Shoshones along the Humboldt in 1855, but this intended treaty was never ratified by the United States. Frustrated by this failure, a summer drought, and an unusually harsh winter, relations again deteriorated between Shoshones and the continuing waves of emigrants and settlers. One year after his appointment in 1858, a third agent, Superintendent Jacob Forney, attempted to establish an Indian reserve in verdant Ruby Valley, a favored winter gathering place for an estimated 1,500 Shoshone. Forney instructed the Ruby Valley leaders to summon other Humboldt River groups to the valley for settlement, and made promises of livestock and dry goods. These groups arrived to find that, after their traveling hundreds of miles, the promised gifts were nonexistent. Shoshones abandoned the Ruby Valley Reserve when, in 1859, it became the site for a mail station and military troop depot, Fort Ruby. Indian depredations against travelers and settlers continued as a subsistence strategy. During this same period, Shoshones in interior Nevada south of the Humboldt remained comparatively isolated from Indian-white hostilities, and their environments relatively intact. Simpson's 1859 expedition, for example, which passed through the Diamond, Kobeh, and Reese River valleys en route to Genoa, recorded abundant game animals, plant foods, and numerous, friendly Indians (Simpson, 1876).

But this situation was to be short-lived. The decade of 1860-1870 saw the invasion and usurpation of Shoshone lands by thousands of emigrants, and marked one of the most brutal and devastating periods in Shoshone history. In 1861, foreign communication and transportation networks were firmly established with the completion of a telegraph line between Omaha and Sacramento, and the initiation of service by the Overland Mail and Stage Line. Shoshone lands were taken at will and without compensation by miners and homesteaders, and areas surrounding these settlements stripped of vital food sources such as pinyon trees and seed grasses. Ruby Valley, for example, was hunted- and fished-out by military personnel by 1861, and choice farming areas had been already claimed by settlers. Similarly, Reese River Valley had by 1863 drawn 3,000 miners, and livestock grazing by the Overland Stage had denuded the surrounding countryside. Displaced and without viable means of subsistence, Shoshones mounted attacks on mail stations and wagon trains. U.S. military troops, in a series of calculated acts of terrorism, retaliated with indiscriminate massacres of entire villages and of family groups encountered throughout the Shoshone countryside.

On October 1, 1863, representatives from the Western Shoshone agreed to a peace treaty which guaranteed, among other things, monetary payments and aid, and the establishment of land reserves for the Shoshone within their native territory. Fulfillment of the terms of this treaty remains a salient issue to the present day. Although peace prevailed following the agreement, neither governmental aid nor land allotments was forthcoming. Instead, settlers, industrialists, and businessmen laid claim to the choice parcels of Indian land, bringing with them diseases for which Shoshones had no natural immunities. Completion of the transcontinental railroad in

1869, a segment of which followed the Humboldt River, opened Shoshone lands to even greater numbers of outsiders.

Indian Agent Levi Gheen, exceptional for his compassion and knowledge of Shoshone language and culture, became an activist for Indian rights as outlined in the 1863 treaty. Gheen used his own funds to assist Indians at Duckwater and Elko in developing farms, and complained repeatedly to his superiors about the impoverished condition of Shoshones and their need for land reserves and equipment. Despite his political removal from office, Gheen continued to work and live among the Shoshone, and to utilize his influence with the white bureaucracy. Parcels on which Shoshones farmed throughout their territory were unsurveyed, and hence subject to possession by settlers. After attempts to remove the Shoshone to Idaho, and repeated requests for the establishment of Nevada reserves by Indian leaders, Gheen, and Paiute Agent C. E. Bateman, the Duck Valley and Carlin Farms reservations were finally established in 1877.

After fourteen years of waiting since the 1863 treaty, more hardships beset the Shoshone. Reservation lands at Carlin Farms were turned over to whites in 1879, and the Indians removed. Duck Valley Reservation was neglected and mismanaged, and insufficiently developed to accommodate large numbers of Shoshones. Continued governmental attempts to remove all Shoshones to Idaho were successfully resisted, the majority choosing to remain in the areas originally occupied by their ancestors. There they managed to exist, largely by laboring for white ranches and businesses, until lands were finally set aside for them by the government. These included the Goshute Reservation (1914), Battle Mountain Colony (1917), Elko Colony (1918), Ely Colony (1931), Yomba Reservation (1937), Duckwater Reservation (1940), and South Fork Reservation (1941).

Western Shoshone Reservations (1.4.4.5.2)

Nevada reservations and colonies whose members identify exclusively with Shoshone cultural heritage are, for the most part, composed of the descendants of Shoshone bands who refused to relocate to the Duck Valley Reservation created for them in 1877. Their persistence in native areas and their eventual homelessness due to Anglo land appropriations led to a long series of reserve area purchases by the government.

Te-Moak Western Shoshone

Members of several reservations and colonies in north central Nevada claim direct descent from the Shoshone bands allied under Te-Moak, the Shoshone chief who signed a peace treaty with the United States in 1863. This tribal identity is underscored by the Te-Moak Western Shoshone Council, a governing body of six persons that has total jurisdiction over all matters concerning lands of member reservations and colonies. Within the study area, the following reservations and colonies are represented in the council.

Battle Mountain Western Shoshone Colony

Battle Mountain Colony occupies two parcels of land, totaling 680 acres, on the outskirts of the city of Battle Mountain in the Reese River Valley of north-central Nevada. Interstate 80 and the Southern Pacific railroad intersect both

sections of the colony. There is a total enrollment of 175 members, with 117 individuals residing in the colony and 55 living in town. Although the colony holds all water rights within the 680 acres, the soil is of poor quality and there is no potential for irrigation. Local affairs are governed by a six-member tribal council, with colony representation on the parent council of the Te-Moak Bands of the Western Shoshone Indians of Nevada. The colony operates a smokeshop. Plans are being developed to construct a mobile unit hook-up system and campgrounds for the use of tribal members and tourists (Facilitators, 1980).

Elko Colony

The Elko Colony consists of 193 tribally owned acres located on the northern boundary of the city of Elko in northeastern Nevada. The colony was established by Executive Order in 1918 for Western Shoshone who had migrated to Elko from Indian settlements throughout northern and central Nevada. Estimates of the total Indian population of Elko range from 395 to 440. Approximately 209 individuals reside in the colony. The Elko Indian Colony Tribal Council administers colony business. The council has representatives within the Te-Moak Tribal Council, which governs all tribal lands on the several reserves. Tribal income is generated by a smokeshop and form the rentals of tribally owned facilities and equipment. A commercial/ industrial park on colony land adjacent to Interstate 80 is under construction (Facilitators, 1980).

South Fork

The reservations of South Fork, Odger's Ranch, and Ruby Valley share a common territory, the Ruby Mountain area, and common governing bodies: the South Fork Community Council at the local level, and the Te-Moak Council regionally.

South Fork Reservation

Located 30 mi south of Elko, South Fork Reservation consists of 13,050 tribally owned acres. It was created specifically for the use of Te-Moak bands of Western Shoshone by the purchase of 9,000 acres in 1938-1939, and subsequent additions through 1941. There are 98 resident members. The reservation is active in the Te-Moak Council and participated in its creation. Local affairs other than land matters are coordinated by the South Fork Community Committee. Since 1970, all of the tribe's economic development efforts have been expended to increase the productive capacity of the land. Pasture hay is grown on 4,100 cultivated acres, and about 250 head of cattle are marketed annually (Facilitators, 1980).

Ruby Valley Reservation

The Ruby Valley reserve is located southeast of Elko, nearly midway between South Fork Reservation and Odger's Ranch. It consists of 120 acres, which were allotted to individual Shoshones under the Allotment Act of 1887. The allotment was conveyed to the allottee in 1970 by a trust patent. During the summer months, 13 people from 3 families live at Ruby Valley; this figure is smaller in the winter, because children attend school in Elko and live with relatives there (Facilitators, 1980:3.133).

Odger's Ranch

Odger's Ranch is a parcel of 1,987 tribally owned acres located 150 mi southeast of Elko. This reserve has seven permanent residents, all members of one extended family (Facilitators, 1980:3.133). The development of irrigable land, estimated at 317 acres, and the improvement of rangelands are major priorities. Odger's Ranch includes an additional 40,000 acres in BLM permits.

In addition to the Te-Moak Shoshone reserves, two other Shoshone federal reserve areas are found in central Nevada:

Ely Colony

Ely Colony, located in the City of Ely, was established in 1931 for local Shoshone Indians who had no tribal rights on any other reservation. The colony is composed of three separate land areas: the original allocation of 9.95 acres on the southwest side of Ely; a 10.1 acre parcel on the southeast side of the city leased from White Pine County since 1973; and 90 acres of undeveloped land on the south side granted to Ely Colony Shoshone in 1977 by the U.S. Forest Service and the Bureau of Land Management. The population of the colony if variously reported as between 165 and 187 individuals (Facilitators, 1980:3.92). The Ely Western Shoshone Tribe is governed by the five-member Ely Tribal Council. The colony is strictly residential, and has no potential for irrigation; however, plans exist for the development of a full service truck stop on the 90 acre tract.

Yomba Reservation

The Yomba Shoshone Indian Reservation is located in a very remote area of central Nevada, approximately 180 mi east of Carson City. Yomba was created for the descendants of the Shoshone Indians living at the headwaters of the Reese River who refused to relocate after the Anglo-Indian peace treaty of 1863. The river begins a few miles south of Yomba and flows northward through the center of the reservation into the Humboldt River. The 4,718 tribally owned acres are composed of three separate units purchased between 1937 and 1941; more than 2,000 of these are bottom lands considered arable. Estimated total tribal membership is 350. The population of the reservation is presently about 95, with some 52 Indians living adjacent to the reservation (Facilitators, 1980:3.162). Twenty-two housing units are currently under construction; half of these will be occupied by families now living off the reservation. The seven-member Yomba Tribal Council works in conjunction with several organizations and committees to coordinate local affairs. Ranching is the primary occupation; in addition to reservation lands, the Yomba Reservation Indians hold 268,397 acres in BLM grazing permits. Stable tribal revenue does not exist.

Duckwater Reservation

Duckwater Reservation is located in central Nevada, 75 mi southwest of Ely. The Duckwater area was settled by Anglo-Americans in 1868. Most Shoshones native to this region moved to the Duck Valley Reservation in northern Nevada after its establishment in 1877. The descendants of those who refused to relocate were ultimately granted a 3,785 acre tribally owned reserve in the Duckwater area. The tribe has 268 members, with 148 individuals living on the reservation, and is

governed by the five-member Duckwater Tribal Council (Facilitators, 1980:3.212). The reservation contains 1,166 irrigable acres, and numerous hot and warm springs, both surface and underground. In addition to reservation lands, the Duckwater Indians claim to hold up to 800,000 acres in BLM permits (BLM estimates 352,000 acres) and have applied for withdrawal of these areas. Steady employment is a high priority concern of tribal members. Plans to increase tribal economic potential are based on utilizing the warm springs and expanding the amount of arable and grazing lands at reservation disposal. The main source of tribal income is generated from the sale of cattle.

Goshute Shoshone Reservations

Indians who occupied the Great Salt Lake Desert area and Great Salt Lake drainage in ancestral times have been referred to in the literature as Goshute, Gosiute, or Deep Creek Shoshone. Once thought to represent a distinct tribe, the Goshute are now recognized as Shoshone, both linguistically and culturally. When the Uintah Reservation in northeastern Utah was established in 1865 for Utah Ute Indians, no lasting provisions were made for the Goshute Shoshone. It is only in recent times that two reserves were set aside for them by the government in their native areas.

Goshute Reservation

The Goshute Reservation occupies 108,779 isolated acres astride the Nevada/Utah border, 95 mi northeast of Ely, Nevada, and 70 mi south of Wendover, Utah. With the exception of an 80 acre trust allotment, the land is tribally owned; 70,569 acres are in Nevada and 38,210 acres in Utah (Facilitators, 1980:3.277). Deep Creek is the principal water source, running from the reservation's southern border north to the Great Salt Lake Desert. Historically, Deep Creek Valley was a major area of population concentration for the Goshutes. Population figures for tribal membership vary widely according to source, with estimates ranging from 270 to 602 individuals. Approximately 170 members live on the reservation. The Confederated Tribes of the Goshute Reservation are governed by the Tribal Business Council assisted by various committees, including the Overall Economic Development and Planning Committee. A tribally owned steel fabricating plant, Goshute Enterprises, produces cattle guards. The reservation currently has a potential for 2,500 irrigable acres. Tribal goals call for water and land improvement projects to benefit their livestock industry and to develop recreational facilities.

Skull Valley Goshute Indians Reservation

Skull Valley Reservation is located in an isolated area of northwestern Utah, approximately 35 mi south of the Great Salt Lake. The reservation consists of 17,444 tribally owned acres, 160 of which are leased to the federal government for the Hercules Missile Testing Site. Indian Hickman Creek, the reservation's main source of water, flows from a spring located in the mountains to the east. Of an enrollment of approximately 75 members, it is estimated that from 10 to 15 individuals live on the reservation (Facilitators, 1980: 3.282). The tribe does not oeprate under a constitution or by-law; rather, a large proportion of the adult members, headed by a tribal chairman, take direct part in decisionmaking processes. Some members raise cattle and horses.

Shoshone Occupation and the Designated Deployment Area (1.4.4.5.3)

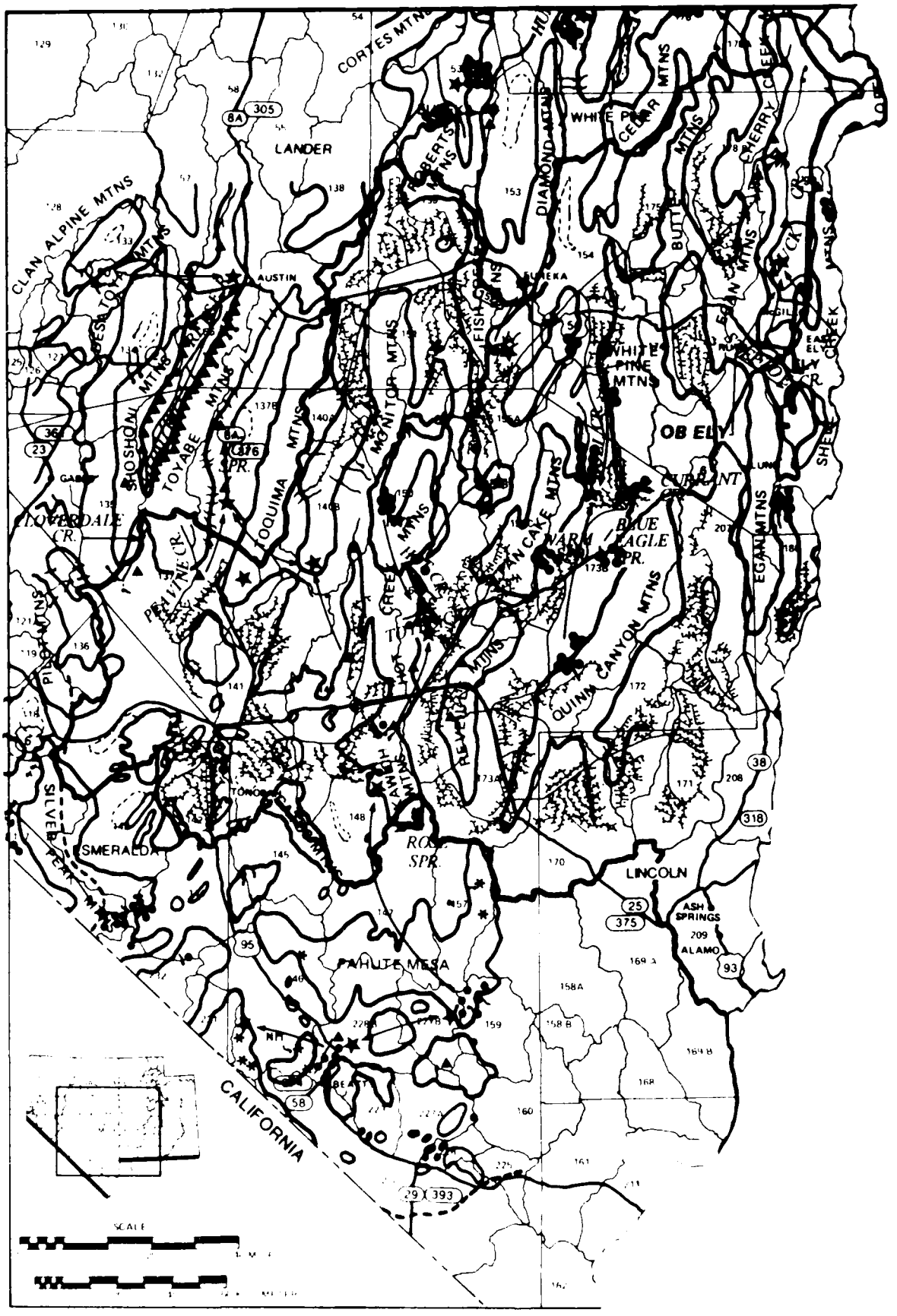
Many of the valleys regarded as geotechnically suitable for M-X deployment are part of Shoshone traditional lands. It is a reasonable assumption that all of these valleys, save those areas totally devoid of surface water, were occupied by the ancestors of contemporary Indians on at least a temporary basis. The best data available in the anthropological literature on specific occupation site locations were collected from Shoshone elders in the early 1930s by Julian Steward (1938). This information consists of rural Shoshone settlements recalled by informants from the 1870-1880 time period. Steward's findings are summarized in Figure 1.4.4-6.

Although, as noted earlier, considerable disruption of Shoshone settlement patterns occurred after 1830, a profile of major population concentration areas may still be drawn from Steward's data. Greatest density in aboriginal times occurred along the Humboldt River and its tributaries. Extensive settlements are known for the following areas: Battle Mountain; Pine Creek and Diamond Valley; Independence Valley; the Palisade, Carlin, and Elko areas; Dixie Valley; Huntington Valley; and the North Fork, Halleck, Deeth, and Wells areas. A second area of known high density occurs to the southeast. Significant site concentrations are located in all stream and spring areas of the following regional cluster: Ruby Valley, Clover Valley, Spruce Mountains, Butte Valley, Long Valley, Pequop Mountains, Egan Canyon, Jakes Valley, and White Sage Valley. A third major Shoshone population center was found in the southern Reese River Valley. Over 40 distinct winter village sites in the foothills of the adjacent Shoshone and Toiyabe ranges were recalled by Steward's informant.

Areas of Shoshone territory south and east of these major population centers had fewer perennial streams and more scattered water sources. Population clusters were thus smaller and more unevenly distributed. Significant occupation is noted in northern and central Steptoe Valley, Railroad Valley between the towns of Hamilton and Nyala, and southern Snake Valley in the vicinity of modern Baker and Garrison. While the central Nevada region is less well documented, Shoshone occupation sites are expected in the vicinity of all springs and streams, particularly in the foothill areas.

While these known occupation sites represent only a small fraction of Shoshone ancestral places, the fact that they are within the living memory of informants accords them high sensitivity.

Those sites and areas identified as significant by contemporary Shoshone people are discussed in Section 2.0.


CORTES MTNS
LANDER
CLAN ALPINE MTNS
AUSTIN
EUREKA
DIAMOND MTNS
WHITE PINE MTNS
CHERRY CREEK MTNS
EGAN MTNS
OB ELY
CURRANT
TOYABE MTNS
TOQUIMA MTNS
MONITOR MTNS
ROBERTS MTNS
FISH CREEK MTNS
PINE CR.
LOVERDALE CR.
BLUE EAGLE SPR.
QUINN CANYON MTNS
EGAN MTNS
PIOCHE MTNS
SILVER PEAK
TONOPAH
SMERALDA
ROSE SPR.
LINCOLN
ASH SPRINGS
ALAMO
PAHUTE MESA
CALIFORNIA
SCALE

3230-D-1

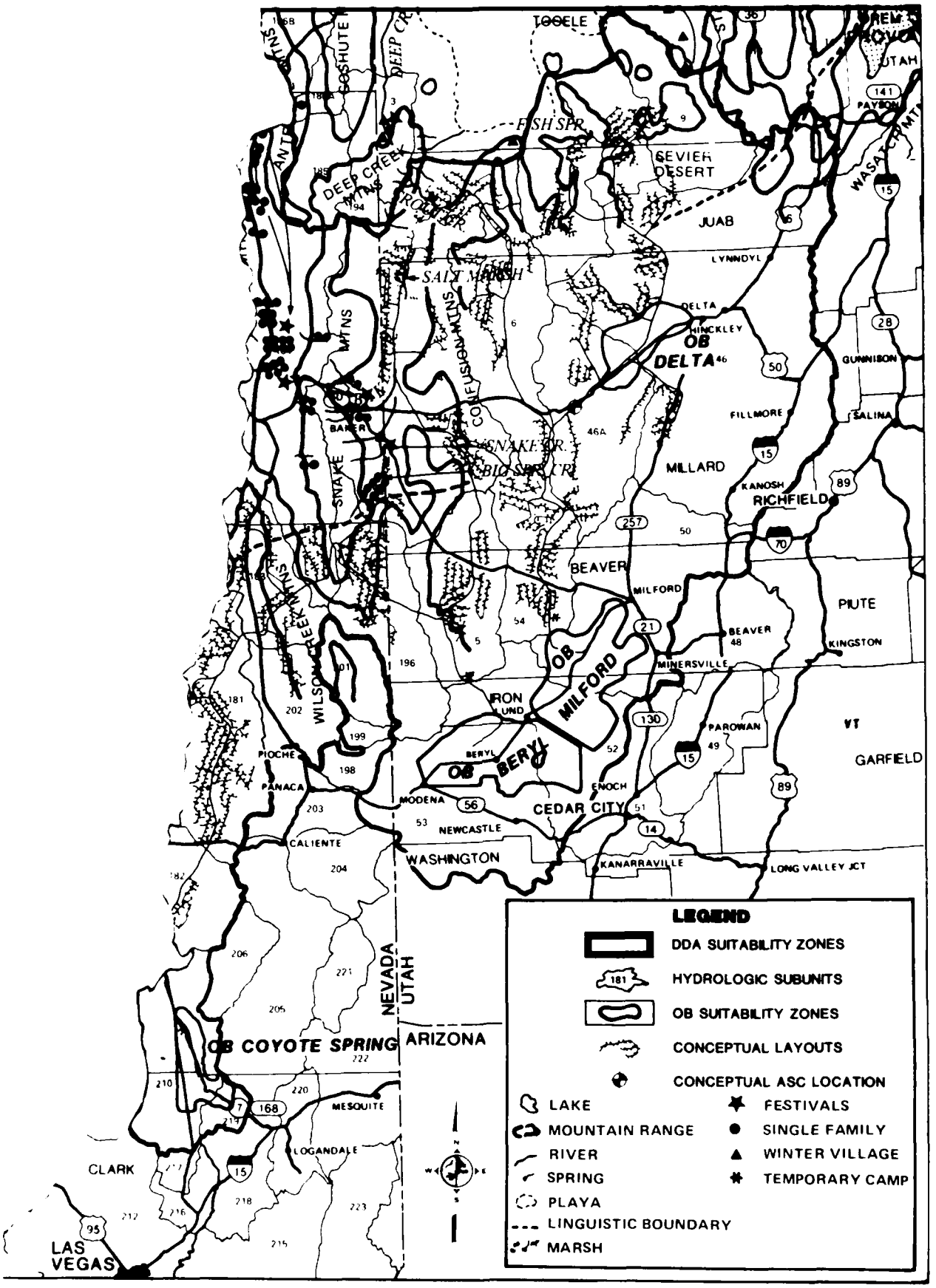


Figure 1.4.4-6. Historic occupational areas of the Western Shoshone and the Proposed Action conceptual layout (adapted from Steward, 1938). 3230-D-1

2.0 CULTURAL RESOURCES

2.1 EXISTING CULTURAL RESOURCE DATA

Linguistic and ethnohistorical publications in existing anthropological literature have provided information on the identity of prehistoric Indians in the study area, their former distributions, and the relative antiquity of these tribal groups in Nevada/Utah. Northern Paiute, Shoshone, Southern Paiute, and Ute Indians have occupied the study area for centuries. A review of the ethnographic literature on Great Basin Indians has provided data on ancestral land use patterns, areas of population density, and traditional lifeways and cosmologies. Extensive ties with ancestral lands and cultural resources have been maintained by contemporary Native American peoples.

Environmental features which continue to play an important role in Great Basin Indian traditional cultures are:

1. Native flora and fauna are utilized in the traditional manner for food, medicines, craft materials, and ceremonial objects, and play a central role in traditional religious thought.

2. Sacred sites and areas, such as physiographic features associated with mystic times, burial and cremation sites, rock art sites, springs, and the dwelling-places of spiritual beings.

3. Traditional mineral resources, such as clay deposits are used for pottery materials and the production of sacred paints; stone deposits are used for religious purposes.

4. Historic and archaeological sites, and ancestral artifacts.

While the existing literature has provided good documentation for the types of sites, features, and areas which are sacred or otherwise culturally sensitive to traditionalist Native Americans, locational data for these resources are poor. Due to the relatively small amount of archaeological field survey conducted in the Great Basin, recorded sites are known to represent only a small portion of the total resource base.

Many of the public comments addressed to the Native American portions of the DEIS and the original ETR expressed concern for the insufficiency of available data.

During the summer of 1980, fieldwork was conducted on 18 reservations and colonies within the Great Basin. Those reservations whose cultural and socio-economic resources were thought to be within the broadest area of influence of project-related activities were included in the study. A primary goal of the undertaking was to identify and locate cultural resources considered significant to contemporary Native Americans living in the study area.

During the course of the study, 130 culturally significant sites were documented. These include both sacred and ancestral sites and currently utilized

hunting and gathering areas. Because contemporary Native Americans tend to return to locations favored by their ancestors for the acquisition of plants and animals, many of today's hunting and gathering areas are simultaneously considered to be sacred/ancestral sites as well.

Although the documentation of these 130 sites adds substantially to the available ethnographic information, the data base is still incomplete. Limitations on the 1980 field study are twofold. First, during this period, people often travel from their home reservations and, consequently, many knowledgeable persons were not available for consultation. Further, amongst traditional Native Americans a prohibition exists against relating sacred matters outside of the winter season. Information was gathered during the summer months exclusively. The second limiting factor is the ambivalent attitude toward disclosure of information concerning cultural resources. Many informants were reluctant to provide information on precise site locations for fear that public disclosure would lead to non-Indian disturbance of the resource. All too often in the past, this has been an unfortunate consequence when Indians have agreed to cooperate with academicians or government agencies. For the most part, Native Americans were informative to a limited degree.

To protect the confidentiality of the information gathered during the field study, those precise locations which were disclosed by Native American consultants will not be provided in the following description of reservation-specific cultural resources. Rather, discussions will be framed in the context of general areas. However, all available information will be used in siting decisions and for mitigation purposes.

Tier II field studies currently being conducted on reservations and colonies in the vicinity of the proposed OBs are expected to add substantially to the data base.

Cultural resources of Shoshone, Ute, and Southern Paiute peoples are distributed throughout the Nevada/Utah DDA. Known Native American sensitive areas appear in Figure 2.1-1 (the precise location of sites have been obscured to ensure their protection).

National Register sites and eligible properties which are likely to be sensitive to Native Americans include ancestral winter village sites, historic occupation sites, and historic event sites such as birth and death places of important tribal personages, and battle or massacre sites. Important archaeological remains are expected with greatest frequency in foothill areas and along present or former water sources such as perennial streams, lakeshores, and springs. Some locational data on Native American historic event sites and settlements, generally unavailable in the extant literature, was gathered during the 1980 field study.

Sacred sites include burial grounds, cremation areas, rock art, cermonial and ritual sites, special caves and springs, and selected physiographic features which are accorded significance in traditional cosmologies. Burial areas, caves, and prominent physiographic features generally occur in foothill and mountain areas, and are therefore more subject to direct impacts by transportation and utility corridors than by OB and DDA facilities. Historic burials, however, are common in valley floor regions near former settlements associated with non-Indians. Rock art in the Nevada/Utah area is typically associated with natural draws and canyons, springs,

water tanks, and caves. These sites, which are also eligible for National Register status, do occur in some valley areas currently under consideration for deployment.

Sacred resources sensitive to Native Americans include a wide variety of fauna which have symbolic religious content in traditional cosmologies. Virtually all native species are so regarded, and special supernatural significance is accorded all varieties of eagles. Faunal materials such as feathers, hides, ears, hooves, and other bone matter are utilized for the production of sacred ritual objects. Critical animal habitats in the study area are therefore an area of overlap between biological and Native American cultural impacts.

A second such area of overlap concerns sensitive Native American gathering areas. Most prominent in this category are pinyon groves which are generally distributed in areas above 5,000 ft (1,500 m) in altitude in northern latitudes, and above 6,000 ft (1,800 m) in southern latitudes of the study area. Valley and foothill areas continue to be utilized for a wide variety of native flora used for medicinal preparations. The deployment area also contains traditional basketry materials such as willows, tule, and devil's claw. These lowland riparian species are subject to direct impacts from construction activities and water depletion.

Inorganic cultural resources gathered in the study area include clays for pottery and paints, and a variety of stone materials for pottery temper, medicine bags, and other sacred uses. Clay and stone deposits which continue to be utilized by Native Americans in the study area have not been specifically identified in the literature.

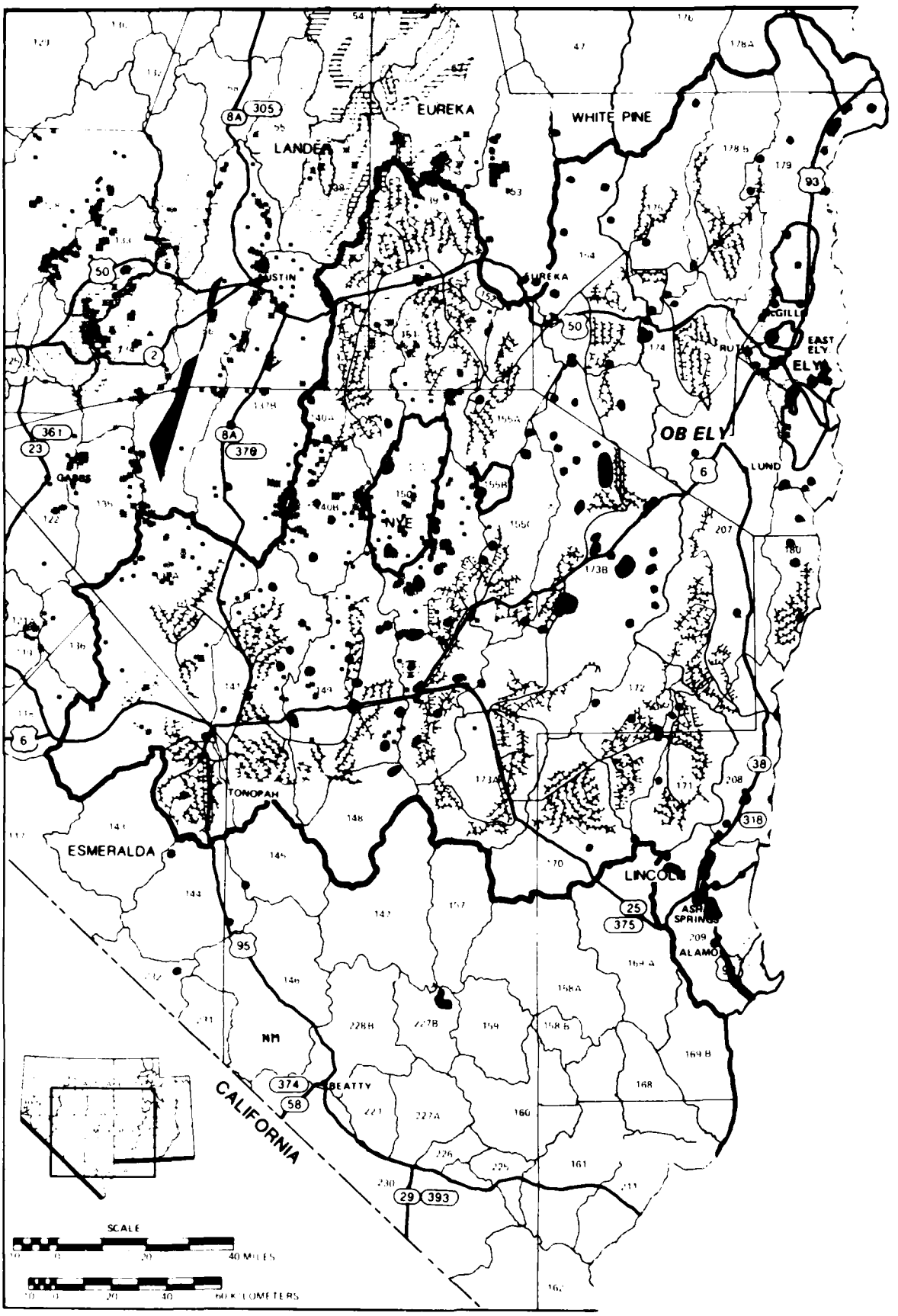
The data on Native American ancestral and sacred sites and hunting and gathering areas presented in the following three sections incorporates the results of the 1980 field study into the existing body of ethnographic and archeological literature. Discussions on religion and world view, kinship, and cultural persistence are drawn from interviews between tribal members and field workers; often the latter were also Native Americans. Only those Southern Paiute and Western Shoshone colonies and reservations whose cultural resources are likely to be directly affected by project activities are included.

2.2 WESTERN SHOSHONE

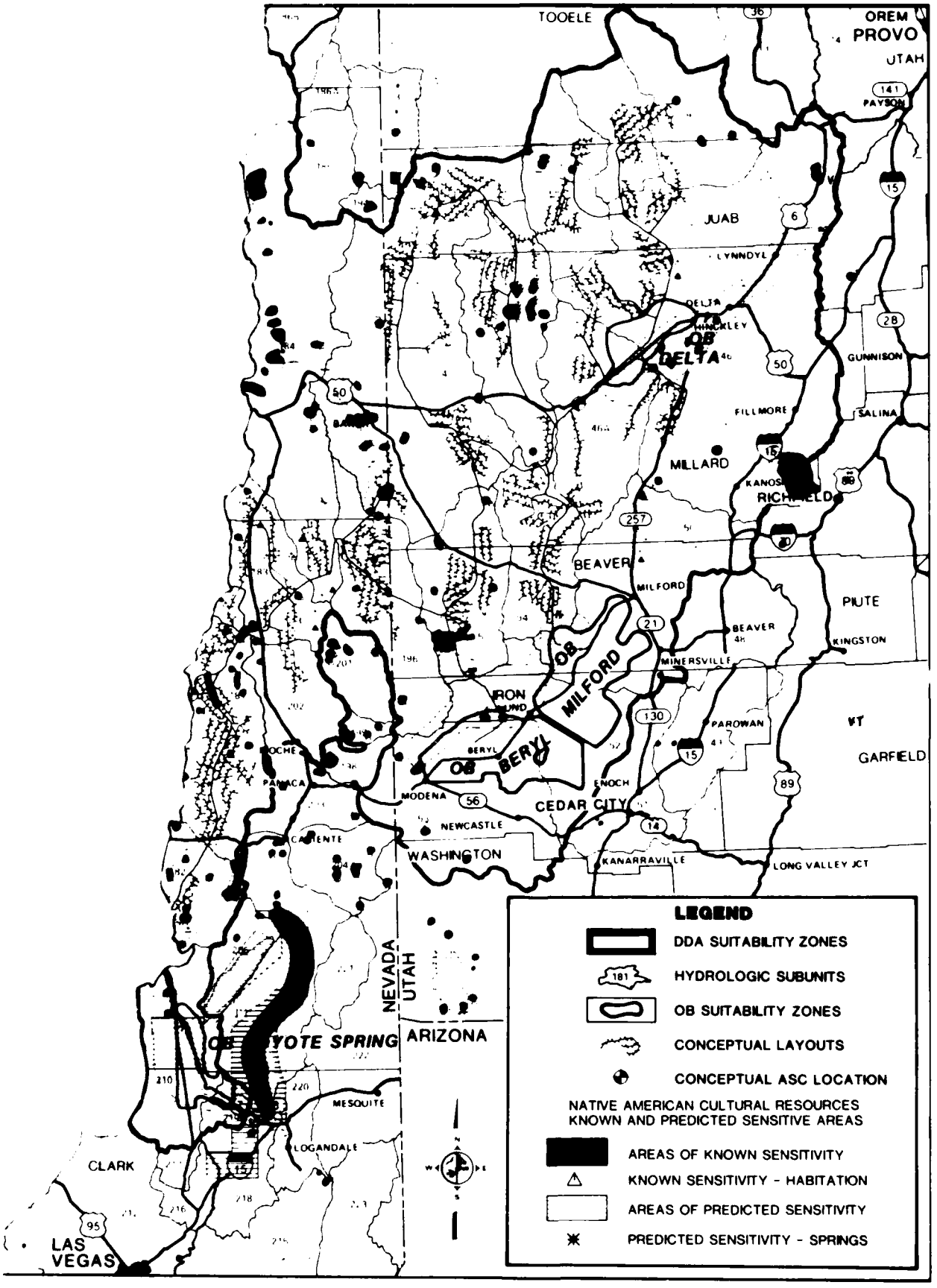
INTRODUCTION (2.2.1)

The ancestral territory of the Western Shoshone or Newe covered parts of Nevada, Utah, Idaho, and Southern California. In this land of interior drainage, streams disappear into lakes and marshes or beneath the ground, rather than flowing to the sea (see Figure 2.2.1-1). Along the perimeters of the high desert valleys, mountain canyons contain springs or small streams. Many of the streams flow only short distances beyond their canyon mouths before sinking from sight. The cultural identity of Great Basin Shoshone is based on ancestral migratory land use practices centered on specific territories. These include the Reese River, Ruby Valley, Beowawe, Duckwater, Ely, Goshute, and others.

Nevada Western Shoshone consider the lands described under the Treaty of Ruby Valley as rightfully and legally their own. Individual settlements within this area, now designated as Indian reservations and colonies, are viewed as camps rather

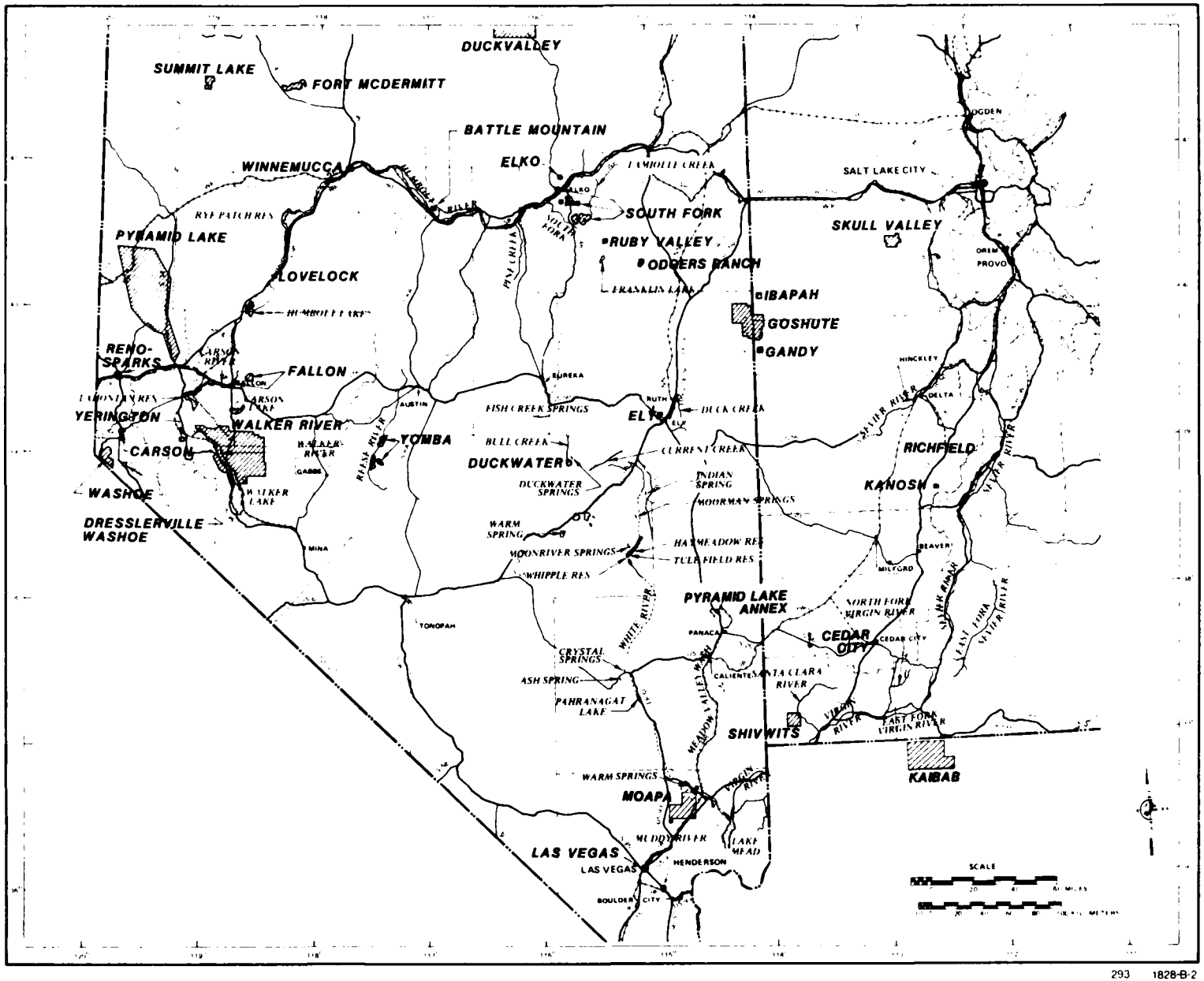

EUREKA
WHITE PINE
LANDER
8A
305
50
AUSTIN
EUREKA
93
GILLE
EAST ELY
ELY
OB ELY
361
23
8A
370
LUND
6
NYE
TONOPAH
ESMERALDA
38
318
LINCOLN
25
375
ASH SPRINGS
ALAMO
95
NM
374
58
BEATTY
CALIFORNIA
29
393
SCALE
40 MILES
60 KILOMETERS

3230-D-1



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Figure 2.1-1. Native American cultural resources known and predicted sensitive areas.


DUCKVALLEY
SUMMIT LAKE
FORT MCDERMITT
BATTLE MOUNTAIN
WINNEMUCCA
ELKO
SALT LAKE CITY
OGDEN
SOUTH FORK
RUBY VALLEY
ODDERS RANCH
SKULL VALLEY
PYRAMID LAKE
LOVELOCK
IBAPAH
GOSHUTE
GANDY
RENO-SPARKS
FALLON
YERINGTON
WALKER RIVER
YOMBA
CARSON
DUCKWATER
ELY
RICHFIELD
KANOSH
WASHOE
DRESSLERVILLE
WASHOE
PYRAMID LAKE ANNEX
CEDAR CITY
SHIVWITS
KAIBAB
MOAPA
LAS VEGAS
LAKE MEAD
SCALE

293 1828-B-2

than the sum of the lands to which they hold title. These include Battle Mountain, Winnemucca, Wells, Elko, Yomba, Duckwater, Duck Valley, Ely, South Fork, Odgers Ranch, and Ruby Valley. The Shoshone of Goshute and Skull Valley, which are outside the treaty-specified area, belong to the kinship network of the Nevada Shoshone and share their cultural identification. Western Shoshone cultural traits and practices cannot be separated from land use and the issue of title to treaty lands. Details of the land claim are given in Section 1.1.3.

The importance of the land to these people cannot be overstated. To disturb the land as little as possible is a valued goal. The Indians believe it is a great virtue that their ancestors lived on this continent for thousands of years and left the environment so perfectly intact. They share with other Great Basin Indians the concept of "Mother Earth" and the sacredness of all nature.

RELIGION AND WORLD VIEW (2.2.2)

For Western Shoshone people, religious practices and beliefs permeate every aspect of daily life. Religion determines world view and prescribes relationships with the natural world and among the people themselves. Assurance of a harmonious association between natural and social spheres is of fundamental concern to Indian people.

Prayer and religious ritual are integral to traditional Shoshone culture. Each morning, people began their days with a prayer asking the sun to carry away their illnesses. Prayers of petition and thanks were offered on every important occasion. After a successful hunt or harvest, for example, the tribe would gather to pray in gratitude for such bounty. Offerings of food were made to the earth to thank the Great Mother for her generosity. The harmonious balance between natural and man-made systems is still the highest religious value to Indian people: "Where the land is sick, the people are sick" (ITC in Facilitators, 1980:2.5).

The Great Basin Shoshone are traditionally a nomadic group. Migration patterns followed patterns of natural resource utilization. Because of this wandering lifestyle, sites designated for religious practice were rarely man-made structures. The concept of a "house of worship" does not apply to a people who traditionally changed their place of worship with the seasons. The lack of structures and accumulated objects, and the seemingly unceremonious observance persists in certain Indian practices today. Worship is individual, "every man is his own priest" (Scott in Facilitators 1980: 2.5).

Rituals generally take place in areas demarcated by natural formations. Valleys, hotsprings, streams, sacred mountains, or even plants are believed to embody certain spirits. Natural objects are often used in religious practice, and the places in which these objects are collected are considered sacred as well.

Most Shoshone settlements now have established cemeteries. The traditional pattern of isolated individual burials was abandoned after plundering by non-Indians became common. Only the secrecy of burial places guarantees their protection, and this secrecy is lost in the face of decreasing physical isolation.

The Western Shoshone world view is characterized by a reverence for all the land, as well as a belief in the eventual retribution of the land against those who

abuse her. "Take care of your Mother and she'll take care of you. Rape her, and 'Buddy, you better watch out!'" (Facilitators 1980:2.5). The predation of sacred areas by curiosity-seekers, collectors and academicians has reinforced the privatism of the contemporary Shoshone. Following site desecration by non-Indians, the people adopted a policy of silence and invisibility as a protective mechanism used to insure the sanctity of their sacred places and ritual observances.

KINSHIP (2.2.3)

Kinship ties are the strongest bonds among Indian peoples. Evidence of the strength of these ties is the far-reaching patterns of visitation between relatives, often extending beyond the Great Basin to other western states. Urban Shoshone are culturally nurtured by contact with land-based kin; reservation dwellers rely on city-based colony contacts for access to urban goods and services.

The continuity of life is a central cultural theme. As such, each stage of life brings with it certain responsibilities that tribal members are expected to assume. The continuity of the culture, however, supersedes the importance of individual life. Therefore, childhood and old age, those stages most critical to cultural persistence, are held in highest value. Having children is viewed as an essential activity. Due to the tight kinship network, child-rearing responsibilities are usually shared by members of the child's extended family, thus easing the burden of the biological parents.

Elders continue to hold a highly respected position in the community. Bonds between grandparents and grandchildren are close. Knowledge conveyed by tribal elders is central to cultural persistence, and they are considered the artful teachers of the people.

To the extent that the Western Shoshone settlements provide adequate space, housing and employment for tribal members, extended family practices flourish. Where there is no room, (and Indian people will share close quarters if necessary) and no work, the capable wage earners leave and the close ties between the elders and the young are disrupted. Field studies show a repeated pattern: adequate housing and the possibility of employment bring family members back to the home base (Facilitators 1980:3.28).

CULTURAL PERSISTENCE (2.2.4)

Several enclaves of traditional extended families are located on Shoshone reservations. These families become valuable vehicles of cultural persistence. Their knowledge of the traditional skills and crafts, language and history makes them important cultural assets.

Cultural persistence is aided by the relative isolation of most Shoshone reservations. This isolation is considered beneficial by tribal members. Tribal leaders are charged with the responsibility of expanding reservation land-bases, both as an economic imperative and to guarantee the desired physical and social isolation. This seclusion strengthens family ties and preserves the psychological qualities that are "Shoshone." Lacking electricity and phones, the people rely more heavily on traditional pastimes and social activities.

It may be assumed that on those reservations seeking to maintain isolation, the Shoshone language is being taught to the children. Among Shoshone adults there is evidence of substantial use of the native language and a corresponding difficulty with English (Davis and Sanchez in Facilitators, 1980:3.30).

The Duckwater Reservation, in an attempt to foster tribal integrity and autonomy, operates their own elementary school. They are the only Great Basin tribe to do so.

The medicine man or woman is still highly respected among the Western Shoshone. Those who are sick frequently consult both a non-Indian physician and the native practitioner (Facilitators, 1980:3.32).

Residents on urban colonies, as well as reservations, continue to practice traditional hunting and gathering activities. Pine-nut festivals in the fall of the year are the single most important traditional event carried on by contemporary Shoshones. The social and religious importance of these activities far outweighs the economic benefits derived from them, and are notable aspects of cultural persistence.

PROJECT IMPACTS (2.2.5)

The DDA contains 500 known ancestral and sacred sites, 113 of which are within 1 mi of the representative protective shelters, cluster roads, and DTN used in this analysis. In addition to specific sites, there are general areas within the DDA valleys known to be associated with late prehistoric and historic Indian settlements. Many of these sites and areas are perceived as culturally important to contemporary Shoshone peoples.

The cultural resources of many of the reservations and colonies within the original study area are outside the region of influence for the DDA. Therefore direct project impacts to cultural resources will not be experienced and degree of impact will vary. The reservations and colonies whose cultural resources are peripheral to the region of influence are discussed in other sections of the EIS and ETR. Only those Shoshone reservations and colonies with cultural resources in and adjacent to DDA are discussed in this section. These include Duckwater, Ely, Goshute, South Fork, and Yomba.

Duckwater Reservation (2.2.5.1)

Under the Proposed Action, clusters and the DTN surround the Duckwater Reservation. Clusters are planned for Monitor-North, Antelope, Little Smoky, Hot Creek, and Railroad valleys; the latter within 10 mi of the reservation. Under full basing, there are six construction camps located near the reservation or other lands utilized by the Duckwater. The DTN runs through Railroad Valley, less than 5 mi from the reservation. Under split basing, there is no project activity in Little Smoky and Railroad valleys.

Impacts on Hunting and Gathering (2.2.5.1.1)

The Duckwater Indians hunt and gather in areas surrounding the reservation including Monitor, Little Smoky, Hot Creek, and Railroad valleys. Hunting and

gathering are important forms of cultural persistence as well as economic activities. Plant, animal, and mineral resources are used in the preparation of food and medicine, and in craft production and religious ritual.

Two of the most traditional Shoshone food sources are sage grouse and antelope. Sage grouse are currently taken in Little Smoky Valley; antelope and deer are hunted in Railroad Valley. Project-related noise, construction, and presence of people will have a major negative effect on these resources.

Many edible and medicinal plants are gathered in Hot Creek Valley. Although precise locations and species have not been identified, project activity will undoubtedly have both direct and indirect impacts on some of these.

Project construction, increased numbers of recreationists, and the accessibility afforded by the DTN will all effect the range and variability of the plant and animal resources now harvested both on and off the reservation by the Duckwater people.

Impacts on Sacred and Ancestral Sites (2.2.5.1.2)

Burials and ancestral camp sites are located in Monitor-South, Antelope, Railroad, Big Smoky, and Hot Creek. Planned construction in Antelope, Railroad, and Hot Creek valleys will not directly impact burials identified there. However, indirect impact due to increased site accessibility and numbers of recreationists may be anticipated there and in Monitor-South and Big Smoky.

The Duckwater Reservation is one of the most isolated of all Great Basin reservations. After non-Indians settled on the best lands, many of the Duckwater Newe left the home valley and moved east to Elko, South Fork, Duck Valley, and Battle Mountain reservations. In 1938 they were allowed to return to a part of Duckwater Valley. Their ancestors roamed and farmed an area of land west and east of the Nevada/Utah border, north of the lower Steptoe Valley in Nevada and from Simpson Spring in Utah to the Great Salt Lake.

For a worst-case analysis, all lands currently occupied, utilized, or perceived as sacred by Native Americans are assumed to form an integral part of their culture and heritage. Because of a cultural identity inseparably tied to the environment, the Duckwater people consider all ancestral land as sacred. The adverse impacts associated with worst-case include varying degrees of irreversible damage to the traditional cultures of those groups whose culturally significant lands are used or affected by the Proposed Action. A substantial part of Duckwater ancestral lands is included within the DDA, and a larger area would be affected by project-related activities. It is probable that M-X deployment in Nevada/Utah would hasten the destruction of a traditional culture based on a harmonious balance between humans and their environment. Persistence of traditional culture has been maintained largely as a function of physical isolation. This isolation will be altered by M-X deployment in Nevada/Utah.

PUBLIC COMMENTS ON THE DRAFT EIS:

"In discussing the quality of life the document fails to adequately address, analyze, and assess the impacts the M-X will have on my rural

and Indian lifestyle. I live alone with my children who range in age from two to 14. I do not lock my house and yet I feel secure. I do not remove the keys from my car and yet I feel secure. My children, when they are not in school or preschool, are free to roam and I feel comfortable about their security. Drugs, crimes, suicides and the other problems associated with boom type societies are virtually nonexistent. I do not fear that my 14 year old will be turning to drugs if he becomes bored. I want my children and their children to grow up in a setting where they are free of worry, have a chance to develop at an unhurried pace, and are supported by people who understand our way of life. I want to preserve this for the future generations of the Duckwater tribe." (B0301-1-001)

"Passed from generation to generation in the spoken history of the Duckwater Shoshone Indians are other examples of broken promises by the white man. This is but another example to add to our history. We and other Shoshone, were promised undisturbed grazing and water. The M-X proposal shows us that promise will not be adhered to by the white man. Our land, our water and out livelihood are all being taken by this proposal. Our culture is being decimated and our traditional and sacred sites desiccated." (A1160-0-001)

Ely Colony (2.2.5.2)

Under the Proposed Action there are four clusters planned for Jakes Valley, approximately 30 mi west of Ely. With the split-basing option, the Ely Colony is outside the region of influence of the DDA.

Impacts on Hunting and Gathering (2.2.5.2.1)

No site-specific information is available on Ely Colony hunting and gathering activities. However, the upper and lower bajadas of the Egan and Schell ranges contain springs and traditional foods and raw materials. Recreational use of this area will be significant.

Impacts on Sacred and Ancestral Sites (2.2.5.2.2)

A sacred ancestral village site, important to the Shoshone heritage, is located in Spring Valley. Clusters planned for the lower end of the valley are over 40 mi away. A similar settlement site is located in Steptoe Valley. This hydrological unit also contains a ritual hot springs and a Sun Dance Ceremony site. The Sun Dance is still practiced annually in certain Shoshone areas. None of these sites will suffer direct impact from M-X activity. However, they are all found in association with springs or other water sources. Therefore, indirect impacts connected with increased numbers of recreationists is anticipated.

The Ely Colony Shoshones are descendants of the larger group of Newe who inhabited the Steptoe Valley before white settlement. Ely was then the largest village in the area. Non-Indian settlement and mining activities caused the displacement of the Newe, who became dependent on miners and ranchers for subsistence. In 1931, the colony was established within the city of Ely. Despite their urban location, the Ely Colony residents retain strong feelings about the sacredness of the land, and the preservation of their ancestry.

For a worst-case analysis, all lands currently occupied, utilized, or perceived as sacred by Native Americans are assumed to form an integral part of their culture and heritage. Because of a cultural identity inseparably tied to the environment, the Ely Colony Shoshone consider all ancestral land as sacred. The adverse impacts associated with the worst-case include varying degrees of irreversible damage to the traditional cultures of those groups whose culturally significant lands are used or affected by M-X. Ely Colony sacred lands would be affected by project-related activities and personnel. Adequate protection of sacred sites will lessen the probability that M-X construction will contribute to the destruction of traditional Ely Shoshone culture.

Goshute Reservation (2.2.5.3)

There are clusters throughout much of Snake Valley under full basing, with several in the north end of that hydrological unit only 7 mi from the eastern edge of the Reservation. Several clusters are located in the south end of Spring Valley. A construction camp is proposed on the east side of Fish Spring, about 40 mi from Goshute Reservation. Under split basing, the nearest construction camp is 70 mi from the eastern edge of the Reservation, with the nearest shelter located 50 mi southeast in the Sevier Desert.

Impacts on Hunting and Gathering (2.2.5.3.1)

The Goshute hunt deer in the Deep Creek Range. Because this territory was also utilized by ancestral Goshute, hunting there is an expression of cultural continuity as well as an economic necessity. Since there are several clusters planned for the Snake Valley within a few miles of this range, it is anticipated that project construction and activity will affect the number of animals available. DTN and cluster roads will increase accessibility to the range and allow non-Indians to compete with Indians for this limited resource.

Pinyon groves are located in the 5,000 to 7,000 ft elevations of the reservation area. Pine nut gathering festivals still held annually in the Deep Creek Range are an important social and religious event for Shoshone people. Goshute residents expressed anxiety that this resource would be exhausted by non-Indians. While not directly endangered by project activities, the groves would be easily accessible to increased numbers of recreationists once DTN and cluster roads, particularly those in the Snake hydrologic unit, opened up the area. Additional plant resource areas in the Deep Creek and neighboring ranges could be similarly affected.

Impacts on Sacred and Ancestral Sites (2.2.5.3.2)

Burial sites are scattered throughout Antelope, Spring, Steptoe, and Snake hydrologic units. It is not known whether project construction in the Snake and Spring valleys will directly impact burials since exact locations have not been disclosed. However, indirect impact due to increased site accessibility and numbers of recreationists may be anticipated there and in Antelope and Steptoe Valleys.

Springs and other watering spots used by ancestral and present-day Goshutes have a sacred nature due to their place in Shoshone cosmology. Such sites are located in the Fish Springs and the Snake hydrologic units, scheduled for a construction camp and clusters, respectively. While project construction will likely

avoid the actual water courses, increased accessibility and numbers of recreationists will threaten the pristine nature of such spots.

The Goshute Reservation is presently the most isolated of all the Great Basin reservations. The ancestral lands of the Goshute extend from the Great Salt Lake to the Steptoe Range in Nevada, north into southwestern Idaho, and south into Lower Steptoe, Antelope, and Spring valleys. The Goshute still travel these lands: visiting relatives and friends, attending hunting and gathering festivals, and participating in religious rituals.

For a worst-case analysis, all lands currently occupied, utilized, or perceived as sacred by Native Americans are assumed to form an integral part of their culture and heritage. Because of a cultural identity inseparably tied to the environment, the Goshute People consider all ancestral land as sacred. The adverse impacts associated with the worst-case include varying degrees of irreversible damage to the traditional cultures of those groups whose culturally significant lands are used or affected by M-X. A substantial part of Goshute ancestral land is included within the DDA, as are areas currently utilized by them on the northern edge of the DDA. An even larger area would be affected by project related activities and personnel. It is probable that M-X deployment in Nevada-Utah would hasten the destruction of traditional Goshute culture. Persistence of traditional culture has been maintained largely as a function of physical isolation. This isolation will be altered by M-X deployment in Nevada/Utah.

South Fork Reservations (2.2.5.4)

Under full basing, there is project activity south of Odger's Ranch in both Long and Butte-South valleys. Under the Proposed Action, Neward and Butte-South hydrologic units each contain a construction camp. Under split basing, the closest cluster is sited about 75 mi south in the White River Valley. The closest camp is in Coal Valley, 70 mi to the south.

Impacts on Hunting and Gathering (2.2.5.4.1)

Native Americans living on the South Fork Reservations continue to utilize a wide variety of animals, birds, and fish in the Ruby, Huntington, Clover, and Butte valleys and the surrounding mountain areas. Among these are antelope, bighorn sheep, and sage grouse. These species, particularly, will be effected by project-related noise, construction, and presence of people.

Both medicinal and food plants are gathered in the same areas, and the attendant gathering ceremonies and rituals are still practiced. One of the most important plant resources is the pine nut. Pine nuts are harvested commercially, and it is expected that this activity will appeal to recreationists.

No direct project related impact is expected for hunting and gathering resources, but the increased numbers of hunters and other recreationists could effect the range and variability of plants and animals now utilized by South Fork Reservations Shoshone.

Impacts on Sacred and Ancestral Sites (2.2.5.4.2)

Burials are scattered throughout the Huntington, Clover, Butte, and Ruby valleys. Since precise locations were not identified, it is not known whether project activity in Butte-South will directly impact burials located there. Indirect impact could occur to burials in all valleys due to increased numbers of recreationists.

The Ruby Mountain range and adjacent valleys are the homeland of the three Shoshone bands inhabiting the South Fork Reservations. The reservations were established after the Shoshone people in northeastern Nevada refused to move from their ancestral lands onto the Duck Valley Shoshone Reservation.

For a worst-case analysis, all lands currently occupied, utilized, or perceived as sacred by Native Americans are assumed to form an integral part of their culture and heritage. Because of a cultural identity inseparably tied to the environment, the Shoshone bands of the South Fork Reservations consider all ancestral land as sacred. The adverse impacts associated with the worst case include varying degrees of irreversible damage to the traditional cultures of those groups whose culturally significant lands are used or affected by M-X. The southern boundaries of the bands' ancestral lands are within the DDA, and would be affected by project related activities and personnel. Adequate protection of burial sites and floral and faunal conservation measures will lessen the probability that M-X construction will contribute to the destruction of the South Fork Reservations' traditional culture.

Yomba Reservation (2.2.5.5)

There is no project activity proposed for the Upper Reese River Valley under either the Proposed Action or any of the alternatives. However, with full basing there is project activity in the adjacent hydrologic unit of Big Smoky-Tonopah Flat to the south, and to the east in Monitor-North and Antelope valleys. Construction camps are located in Kobeh and Ralston, both within 60 mi of the reservation. Under split basing, there is no project activity in valleys identified by Yomba residents as containing cultural resources, and the nearest construction camp is in Hot Creek Valley, 80 mi east of the reservation.

Impacts on Hunting and Gathering (2.2.5.5.1)

The Yomba hunt deer and birds in areas surrounding the reservation. Hunting is an affirmation of the intimate relationship between Indian people and all of nature and, as such, reflects an important aspect of religious belief and world view. While direct construction and operating impacts on these resources will be minimal, the increased presence of recreationists will reduce the numbers of animals and alter the conditions of the hunt.

Pine nuts are gathered in the fall of the year in 5,000 to 7,000 ft elevations. Pine nuts are harvested commercially in the area, as well as by the Yomba and other tribes. It is expected that this activity will also appeal to recreationists.

Project construction, increased numbers of recreationists, and the accessibility afforded by the DTN will all effect the range and variability of the plant and animal resources now harvested by the Yomba people, both on and off the reservation.

Impacts on Sacred and Ancestral Sites (2.2.5.5.2)

Burial sites and ancestral camp sites are scattered throughout the Upper Reese River Valley, and in the Smoky, Monitor, and Antelope valleys. Before the influx of non-Indian settlers, burials were located in hilly areas. Later, however, after Indians were pushed off ancestral lands and camped close to non-Indian ranches, burials were located nearby on valley floor. Direct impact to the latter is probable. While direct impact to burials located in hilly areas is not likely, such locations are popular hunting and hiking locales, and indirect impact may occur. DTN and cluster roads will increase public accessibility and the corresponding threat of indirect impact.

The Yomba Reservation is remote and isolated. The Indians for whom the reservation was established were Shoshones whose traditional homes and camping places were scattered over a wide area in central Nevada. The most fertile valleys were usurped for non-Indian settlement beginning in the mid 1800s. The four tracts of land in the Upper Reese River Valley comprising the reservation were purchased for the landless Indians between 1937 and 1941. Today, the people of Yomba continue to live in harmony with their natural surroundings.

For a worst-case analysis, all lands currently occupied, utilized, or perceived as sacred by Native Americans are assumed to form an integral part of their culture and heritage. Because of a cultural identity inseparably tied to the environment, the Yomba people consider all ancestral land as sacred. The adverse impacts associated with the worst-case would include varying degrees of irreversible damage to the traditional cultures of those groups whose culturally significant lands are used or affected by M-X. The northern part of Yomba Shoshone ancestral lands are included within the DDA as are areas currently utilized by them on the western edge of the DDA. An even larger area would be affected by project-related activities and personnel. It is probable that M-X deployment in Nevada-Utah would hasten the destruction of the traditional Shoshone culture of the Yomba Reservation which is based on an harmonious balance between humans and their environment. Traditional culture has been maintained largely as a function of physical isolation. This isolation will be altered by M-X deployment in Nevada/Utah.

Opinions About M-X

"The land is most sacred as is the water flowing upon it; the growing things of the land, the air we breathe, and the food that grows for us to eat. All of these things were put here for our use by the Great Spirit and respect is given them by all Indian people of this land. The Western Shoshone people have a duty to protect these things.

"It is our sacred belief that all of nature is sacred. This includes all growing plants, animals from the largest to the smallest, the earth, water and the air we breathe. We believe all of these things were placed here by the Great Spirit for Man's use and that the use of these things be done with respect to it. In this same respect, many of the areas proposed for the installation of the M-X missile are in burial ground areas, tribal hunting areas, food gathering areas, and religious sanctuaries. It is our obligation to protect these things and we shall do so to the best of our abilities." (Western Shoshone Sacred Lands Association in Facilitators 1980:3.)

2.3 NEVADA SOUTHERN PAIUTES

INTRODUCTION (2.3.1)

The Mojave Desert is an area of broad valleys and basins, marked by numerous mountain ranges running north and south. Some of these are barren and desolate, but others, such as the Spring and Sheep Mountains, are rich in animal and plant life. The Nuwuvi (Southern Paiutes) have many sacred sites scattered throughout these mountains and their foothills. There are rock deserts here, where the wind has swept away the finer soil, leaving only a surface gravel called "desert pavement". But in some areas, the fine soils collect and are held together by sparse desert grasses. These areas are both useful and sacred to the remaining Southern Paiute bands. The Nevada Desert Southern Paiutes are groups of families or bands who have, for hundreds of years, lived on and held sacred these lands called desolate by others.

Ancestral lands extend from southern Nevada at the Utah border (Beaver Dam State Park), north to areas around Ely, Pioche and Panaca, west to Mt. Irish in Lincoln County, Nevada. Portions of the present Nevada Test Site, northwest to Beatty, Nevada, and south as far as Indian Springs, north of Las Vegas off Highway 95 also comprise the ancestral lands. In addition, these lands included Las Vegas west through Red Rock Canyon, the Spring Mountains, to Pahrump, San Bernardino and Twenty-Nine Palms, California; northeast to Hoover Dam and the Colorado Plateau and all areas in between including the Virgin River Gorge.

The six bands of desert people, Southern Paiutes that occupied this land are:

- The Matisabits of the Pioche-Panaca Dry Lake, Upper Meadow Valley Wash Area, Caliente, and Beaver Dam State Park areas.
- The Pahranagits to the west in the Pahranagat Valley, Hiko, and Mt. Irish.
- The Kweingomits, who occupied all the lands to the southwest centering in Indian Springs.
- The Pahrumpits, who lived in Pahrump Valley and on the western slopes of the Spring Mountains.
- The Pegesits, who lived around Las Vegas, Red Rock, Mount Charleston, Paradise Valley, and Hoover Dam.
- The Moapits, one of the larger bands, which held the area of Moapa Valley to the Virgin River, the Upper Muddy Valley, Kane, Coyote, and Hogan Springs. (ITC 1976(V))

Today, only two bands of Desert Southern Paiutes remain on homelands within Nevada. One of these is the Pegesits of the Las Vegas Colony, who live on 12.5 acres between the cities of Las Vegas and North Las Vegas. The other band, the Moapits, occupy the Moapa Indian Reservation, 50 mi northeast of Las Vegas. All other bands either joined these two remaining groups, moved away, or assimilated into the white population after non-Indian settlers and miners drove the Indians from

their ancestral territories. "Sometimes they would feed us and let us work. Sometimes they would shoot us....I saw an Indian man shot for fun when I was nine years old." (Smith in Facilitators, 1980:5-3)

The Southern Paiute bands in this area were loosely knit and usually only gathered together for communal hunts. However, they did share territories and harvests with other bands and even with other tribes, such as the Shoshones (Steward 1938:183). Today, they still share with each other--not only harvests but ceremonies, tribal concerns, and even land itself. Many displaced band members at the Las Vegas Colony and the Moapa Reservation still remember those areas which once belonged to them and which are still considered culturally important.

Traditionally, the Southern Paiute people derive their living from the land. Life followed seasonal cycles based on a yearly harvest of plants and animals. Times of hunting and harvest often brought together the scattered bands. The people learned to live with one another in small groups which traveled over vast territories, or when necessary, broke off into separate family units to find new water sources and useful lands within the Great Basin. Whatever the find, the bands were linked by the topography and shared the hunting-gathering patterns that persist today.

RELIGION AND WORLD VIEW (2.3.2)

Nuwuvi culture is inextricably tied to the natural environment and traditional Indians refer to it as "Mother Earth." Native American informants repeatedly express the value of living in harmony with the land. In a terrain as dry and rugged as the Great Basin, this harmony is rooted in a thorough knowledge of and respect for "Mother Earth." This appreciation forms the foundation of the beliefs and practices which constitute the Indian religion and world view.

"The Earth is our mother. It is up to her children, the Indian peoples, to listen to her, to respect her, or they will be lost." (Meyers, in Facilitators 1980:5.4). Reverence for the environment underlies the corpus of beliefs about the world shared by all the Desert Southern Paiutes. This attitude is represented in their myths, lore, ceremonies, social conduct, and general values, and forms the basis of their religious practices.

The desert is a source of constant uncertainty and change, taking and giving with little warning and always requiring respect and care. It is understandable, therefore, that the Desert Southern Paiute religion calls for the careful observance of this exacting setting, since to vary would mean certain death. Before their lands were usurped by non-Indians, the Nuwuvi lived in harmony with the earth, always aware of its potential wrath and generosity. Because a major portion of their time was spent gathering plants and small game for food, there was little time for elaborate rituals. Thus, they viewed their very existence as a continuous ceremony in harmony with "Mother Earth".

"One thing I have always respected about the Indian people is the repeated times I have seen them stop and thank the earth for their life.. She (a Moapa woman) would give thanks to the plant before she picked it, for giving life to her..." (Ostanik, in Facilitators 1980:5.5) While religious observation is an integral part of daily life, the Desert Southern Paiutes did have specific ceremonies as well. These

were usually conducted when the bands came together for communal hunts and food gathering, circle dances and pine nut festivals, or to honor their dead. Many of these ceremonies are still practiced today.

While all of nature is considered sacred, certain particular sites as well as the land areas around them are held special above all others. Befitting a desert environment, many of these places are springs or other watering spots. Some are food gathering areas while others hold a special place in Desert Southern Paiute cosmology and history.

KINSHIP NETWORKS (2.3.3)

Most small-scale societies are organized largely or entirely on the basis of kinship, a social relationship linking people through genealogical lines. The links of the chain connect the generations with each other and extend back to ancestors and forward to descendants. Kinship bonds among the Desert Southern Paiute remain extremely strong. These ties provide a deep sense of belonging and affirmation of personal and tribal identity, and are particularly important as a counter to adverse reactions from non-Indian society.

Individual identity is expressed with and through group participation. Acceptance and full participation by all tribal members is the rule; a person is not ostrasized for bad behavior. Respect is accorded even to the youngest; competition is not stressed, ridicule is the means to alter another's behavior.

The general feeling of kinship between Indian peoples is evidenced in the persistence of migration patterns which connect them: for work, school, funerals, ceremonies or social visits. Prime among these is migration along ancestral routes for traditional hunting and gathering activities, and the attendant rituals. Indian people at Moapa and Las Vegas Colony travel for religious and social gatherings such as powwows, festivals, and Indian athletic events. The pine nut fesitvals at Cedar City, Utah and Schurz, Nevada are attended by many Desert Southern Paiutes and this is indicative of the value of traditional customs to contemporary Indians. These migration patterns exemplify the Indian concept of land use by which people range over a wide territory and utilize the natural resources of an overall region rather than being tied, by ownership, to one location.

CULTURAL PERSISTENCE (2.3.4)

After non-Indian enchroachment and final placement of these semi-nomadic peoples on reservations and colonies, formal migration patterns which were a significant part of their culture and influenced their world view were ended. As the Desert Southern Paiutes adapted to farming or entered urban enviornments as menial laborers, many of the old ways were abandoned. Today much of the knowledge of medicinal and food plants, although retained, is no longer put into practice. Basket making and its raw materials are quickly disappearing. Pine nut gathering and deer hunting are still practiced seasonally and have become more important as a social event than as an economic activity. Interest in beadworking has revived after a leather and handicraft shop opened at Moapa Reservation. Traditional religious beliefs still persist but are intermingled with a non-Indian concept of the "deity." Yet no one religion has been able to attract significant numbers of converts. Mormom missions at Moapa and Las Vegas Colony have both

closed, and a fundamentalist Christian church at Moapa is sparsely attended. There is a definite resurgence of traditional Indian ceremonies with many people traveling long distances to attend.

A persistent cultural system is one that maintains integrity in language, customs, folk art and beliefs in spite of impositions from the dominant culture. Discrimination is a strong factor in the demise of cultural persistence. The Pegesits on the Las Vegas Colony suffer discrimination mostly on an individual basis because of the prevailing "dumb Indian" concept held by members of the surrounding white community. A good tactic that the Pegesits chose in the face of discrimination was to simply disappear by reducing their social visibility. As a result, most people are unaware of the existence of the Las Vegas Indian Colony.

Before Moapa began its economic development in 1968, the Indians there were treated paternalistically by the larger society and viewed as being generally helpless. Now, due to their economic success they are assuming a respected placed as citizens of the community. Many people are returning to the Moapa Reservation with a new hope for a better life among their tribe. Thus, their chances for cultural persistence are improving.

PROJECT IMPACTS (2.3.5)

The Coyote Spring OB lies on a major seasonal migration route of ancestral Southern Paiutes and is associated with both temporary and permanent habitation sites, burials, and a wide variety of other sacred features. Although precise site locational data are incomplete, general areas in and adjacent to the OB siting area are known to have been occupied by the ancestors of contemporary peoples. These include Coyote Spring, foothill areas adjacent to the White River from Coyote Spring north to Alamo in Pahranagat Valley, Riggs, Pahroc and Hogan Springs, Kane Springs Wash, the Sheep Range, all ephemeral streams and washes in Coyote Spring Valley which feed Muddy Springs, Muddy Springs proper, the entire length of the Muddy River, Meadow Valley Wash, and Delamar Valley. Site densities are expected to be high throughout the OB siting area with a high potential for direct impacts to ancestral settlements and associated burials during the construction phase.

Areas adjacent to the OB facilities will be opened up to more extensive public use during the operations phase. Indirect impacts to ancestral and sacred sites, such as pilfering and vandalism, will likely result from the substantial population in-migration associated with the base (see Table 2.3.5-1). Arrow Canyon, for example, which lies just southeast of the OB site, is regarded as sacred by contemporary Southern Paiutes. This holy place contains spiritual areas and important rock art sites, many of which have already been disturbed by vandals. Other significant Southern Paiute cultural resource sites, such as burials, surface settlements, and storage caves, which currently enjoy a high degree of integrity, are similarly imperiled by base development. At present, there are no known effective measures to prevent the recreational intrusion of surrounding pristine areas. Finally, contemporary Southern Paiutes continue to utilize the public lands in question for traditional activities, including the gathering of sacred plants. Any depletion of the water table associated with construction needs may reduce flow to springs and marshes on which such species depend, thereby limiting Native American access to sacred plants. Indirect impacts are expected to be more severe than direct impacts.

Table 2.3.5-1. Potential impacts to significant Native American cultural sites in the vicinity of Coyote Spring for the Proposed Action and for Alternatives 1, 2, 4, and 6.

Hydrologic Subunit No.	Name	Estimated No. of Native American Cultural Sites[1]	Presently Known No. of Sites	Short Term: Predicted No. of Direct Impacts[2]	Short Term: Known No. of Sites Within 1 Mi	Short Term: Direct Impact Potential	Long Term: Indirect Impact Potential[3]
181	Dry Lake, Nev.	615	23	15	13	*****	***
182	Delamar, Nev.	247	10	4	4	*****	*****
205	Meadow Wash, Nev.	N/D	13	0	0	-	*****
206	Kane Springs, Nev.	N/D	2	0	0	-	*****
209	Pahranagat, Nev.	400	35	2	0	*	*****
210	Coyote Spring, Nev.	359	3	6	0	*****	*****
218	California Wash, Nev.	N/D	1	0	0	-	*****
219	Muddy River Springs, Nev.	N/D	2	N/D	0	*	*****

T5288/9-23-81/F

[1]Estimated number of identifiable Native American cultural significant sites is based on: (1) sensitivity as predicted by preliminary archaeological field studies, (2) expected density figures for playas, mountain springs, valley springs, and streams, (3) area of hydrologic subunit, and (4) extrapolation of 6 percent of these sites as Native American cultural significant sites. Please note, 6 percent is the percentage of predicted archaeological sites which could be identified as significant Native American cultural sites based on the 100 sq. mi. sample survey[4]. For archaeological predictions and more detailed explanation please see section on archaeology.

Direct Impact Assessment:
- \- = no impact (no construction in this hydrologic subunit)
- * = 0-2 sites
- *** = 2.1-8 sites
- ***** = 8+ sites

Indirect Impact Assessment:
- * = Less than 10 percent of predicted sites impacted
- *** = Over 10 percent of predicted sites impacted
- ***** = Over 50 percent of predicted sites impacted or identified significant Native American cultural site[4] located in hydrologic subunit.

[2]Predicted number of sites occurring on project layout, and directly affected by construction.

[3]Indirect impact based on predicted number of off road vehicle (ORV) use days per hydrologic subunit, taking into account the degree of public accessibility based on relative proximity to ASCs, OBs, DTN and cluster roads, number of predicted total sites per hydrologic subunit, and known sacred/ancestral valuable sites.

[4]Significant Native American cultural sites are those sites which contain pottery artifacts specifically associated with traditional Shoshone and/or Paiute cultures. For further discussion of impact methodolgy and "significant Native American cultural sites" please refer to concluding paragraph of section 5.2.1 in ETR-21.

Moapa Reservation (2.3.5.1)

The Moapa Reservation is outside the DDA for the Proposed Action and all alternatives. Under full and split basing the nearest shelters are sited approximately 50 mi north in Delamar Valley. There are three clusters in Delamar and another nine farther north in Dry Lake. Coyote Spring, less than 15 miles northwest of the Reservation, is the first operating base location under the Proposed Action and Alternatives 1, 2, and 8. Under Alternatives 4 and 6, the second operating base is at Coyote Spring. With full and split basing, there is a construction camp located about 60 mi north of the Reservation.

Impacts on Hunting and Gathering (2.3.5.1.1)

The Moapa Southern Paiutes hunt and gather at Kane Spring, Hogan Springs, Meadow Valley Wash, Moapa, Dry Lake, and Delamar valleys. The resources are utilized as foods, medicine, and in craft production and religious rituals. Willow, a particularly important and relatively rare raw material for traditional handicrafts, grows in Kane Springs and Wash. Pine nut gathering and deer hunting, practiced seasonally, are important social events. These activities, particularly when conducted on ancestral lands, are a manifestation of cultural continuity.

Project activity in Dry Lake and Delamar valleys will directly impact floral and faunal resources there. Indirect impact will be experienced in all areas due to increased numbers of hunters and other recreationists. This condition will be intensified if an operating base is constructed at Coyote Spring. Any lowering of the water table will have corresponding effects on plants and animals.

Impacts on Sacred and Ancestral Sites (2.3.5.1.2)

Although precise locations are not known, burials and ancestral sites are scattered throughout Delamar, Meadow Wash, Kane Springs, and Moapa valleys. Since Delamar Valley is scheduled for project activity there is a high probability that burials there will be directly impacted. An OB located at Coyote Spring would threaten burials located there. Vandalism, illegal collection, and unintentional destruction can be expected to occur in all locations due to increased accessibility and numbers of recreationists.

Because of the life sustaining qualities of watering spots in this arid region, all springs and streams have a sacred character and hold an important place in Southern Paiute cosmology. Religious rituals were frequently conducted at these locations, and petroglyphs can often be found in association with them. Any lowering of the water table will have a negative effect on these traditional places of worship. Petroglyphs are highly susceptible to vandalism and are therefore endangered by the increased presence of non-Indians.

The Moapa Reservation Southern Paiutes are descendants of the Moapit band. The Moapits occupied the area of Moapa Valley to the Virgin River, the Upper Muddy Valley, and Kane, Coyote, and Hogan Springs.

Non-Indian encroachment and final placement of the seminomadic Moapit people on the reservation altered the ancestral migratory routes, but the underlying formal migration patterns which were a significant part of their culture and

influenced their world view, continues. Today, as they attempt to preserve their lifestyle, there is a definite resurgence of traditional Southern Pauite culture. Many persons are returning to the reservation. Residents and off-reservation tribal members still travel to ancestral areas to attend ceremonies and activities, but with the influx of people and related development these opportunities are diminishing. Since 1968 the Moapa Reservation has made great strides toward economic viability (see Chapter 4) without violating a world view which holds sacred all of the natural environment.

For a worst-case analysis, all lands currently occupied, utilized, or perceived as sacred by Native Americans are assumed to form an integral part of their culture and heritage. Because of a cultural identity inseparably tied to the environment, the Moapa Southern Paiute consider all ancestral land as sacred. Adverse impacts associated with the worst case include varying degrees of irreversible damage to the traditional cultures of those groups whose culturally significant lands are used or affected by M-X.

M-X construction will directly impact some areas held sacred and currently utilized by Moapa people. Project related activities could affect all of the remaining lands, particularly with OB siting at Coyote Spring. It is highly probably that M-X construction which includes a Coyote Spring OB will hasten the destruction of the traditional culture of the Southern Paiutes of the Moapa Reservation.

Opinion about M-X

"In today's time, the hardship among tribes are no different than from our ancestors. We, the Indians, are still struggling to keep up with survival. Survival today among the tribes means education. To educate ourselves in the fields of health, jobs, culture, etc., enables us to go forth in our lives. We cannot go back to the days when our lands, water, springs were taken from us. The Indians of today are becoming more educated. Water is the one resource not only we, the Indians, cannot do without, our non-Indian neighbors also rely on it...Our burial grounds, caves, sacred places have been disturbed, not by the Indians but by the non-Indians. Sites of these sorts were forbidden to the Indian people to enter (they were sacred places) and were respected and not disturbed. We, the Indian people, even today, respect the No Trespassing signs that are put up on private and government property....So what does M-X mean to me? I am against the M-X if it were to be put behind my back door. And I do not fully accept it. I'm sure there are other places for it, but on the other hand, the Indians of long ago had to make bows and arrows to fight back against their enemies for peace." (Hanks, in Facilitators 1980:5.15).

Las Vegas Colony (2.3.5.2)

The Las Vegas Colony is outside the DDA for the Proposed Action and all alternatives. Under full and split basing the nearest shelters are sited approximately 100 mi north in Delamar Valley. There are three clusters in Delamar and another nine farther north in Dry Lake. Coyote Spring, about 60 mi north, is the first operating base location under the Proposed Action and Alternatives 1, 2, and 8. Under Alternatives 4 and 6, the second operating base is at Coyote Spring. With full and split basing, there is a construction camp located about 110 miles north of the colony.

Impacts on Hunting and Gathering (2.3.5.2.1)

Colony residents utilize the same hunting and gathering areas as those previously mentioned for their Moapa neighbors, and these will be impacted to the same degree as discussed in that section. In addition, plants and animals are taken in the Spring and Sheep ranges and in Red Rock Canyon. These areas, although well outside the DDA, will not be affected by population increases. The symbolic aspect of hunting and gathering is perhaps greater for those bands, such as the Las Vegas Colony, which now reside in an urban environment.

Impacts on Sacred and Ancestral Sites (2.3.5.2.2)

Traditionally, the Pegesits band of Southern Paiutes occupied areas around Las Vegas Valley, Red Rock, Mount Charleston, Vegas Wash, Tule Springs, Paradise Valley, and Hoover Dam. Today, joined by remnants of other Southern Paiute bands, they occupy 12.5 acres on the outskirts of Las Vegas, but the former territory is still held sacred as the final resting place for their ancestors. All of these areas will be made vulnerable by a population influx.

Several sites identified by Colony residents are important in general Southern Paiute cosmology. These include Mummy Mountain (known to the Indians as Ocean Women Mountain), Music Cave, and several petroglyph and prayer sites. Although outside the DDA, the increased presence of recreationists will intrude on the pristine nature of these sacred places.

For a worst-case analysis, all lands currently occupied, utilized, or perceived as sacred by Native Americans are assumed to form an integral part of their culture and heritage. Because of a cultural identity inseparably tied to the environment, the Las Vegas Colony people consider all ancestral land as sacred. Like the Moapa Reservation, the Las Vegas Colony has incorporated remnants of displaced Southern Paiute bands into their membership. Therefore, the lands now considered to be ancestral extend far beyond the boundaries of those transversed by Pegesits ancestors alone. The adverse impacts associated with the worst case include varying degrees of irreversible damage to the traditional cultures of those groups whose culturally significant lands are used or affected by M-X. Some lands now considered ancestral by Las Vegas Colony residents are included within the DDA, as are many areas currently utilized. A larger area would be affected by project-related activities. It is probable that M-X deployment in Nevada/Utah would hasten the destruction of a traditional culture based on a harmonious balance between humans and their environment.

Opinion About M-X

"They've done so much to us there's not much more they can do. Move us or buy us. Take out water and if they give it back (the water) it'll be full of chemicals.

"They're going to drive over us. To ask our opinions is an insult. They're going to do what they want to do anyway. The opinions of Indians make them feel better about it (the M-X). Money is the only thing that means anything because they've taken everything else. My grandfather is buried up there (Red Rock area).

"They should scatter the M-X around everywhere so it won't be just these states (Nevada, Utah) that are hit. It should be located where the people are if they want to protect them.

"They've taken so much from the Indian people. What's left to take? It says in the Bible you shouldn't destroy anything from the past. The white people don't understand--they think Indians just do rain dances and stuff--they don't understand how much the Indian respects the Mother Earth. The Mother Earth provides us with everything and they (the whites) just want to destroy her. The Indian people are taught that if you do something wrong it'll come back on you. They (the whites) will probably be blown away by their own tactics. They're not satisfied with life the way it is. They're always trying to outdo each other.

"The way to prevent it (M-X) coming in, we should write to our congressmen and everybody everywhere, and if that doesn't work we should just move our little tents up there and just sit right there until M-X forcibly throws you off the land. There's nothing we can ask for in return because there's nothing that can replace the land." (Mitchell in Facilitators, 1980:5.92).

2.4 PAIUTE INDIAN TRIBE OF UTAH

INTRODUCTION (2.4.1)

For hundreds of years, the Southern Paiutes lived in an area encompassing what is now Southern Utah, northern Arizona, southern Nevada, and southeastern California. They lived in small groups, usually comprised of extended families. The Paiutes were nomadic, but most groups established a base near a water source. They travelled along an annual migratory route, hunting game and gathering plants for food and raw materials, but regularly returning to their home base to tend and harvest their crops.

The wanderings of the bands established their close ties to the land. A sedentary people need not always understand the intricacies of their land, since they can alter their immediate surroundings to make their environment hospitable. However, migratory groups must fit their culture to the demands of the terrain. It is this intimate interaction that developed the concept of land as a sacred entity. The Southern Paiutes of Utah still retain this feeling.

Southern Paiute society cannot be understood even at a most superficial level without an understanding of its ties to the land. Nor can the conflict between the Indian and dominant cultures be understood without a realization of conflicting value systems concerning the environment. "The White man is just now beginning to understand, maybe, what the Indian knew thousands of years ago: that man must live in harmony with his environment". (Facilitators, 1980:4.1).

After the influx of non-Indian settlers, the many Paiute bands in Southern Utah coalesced into five small bands: Shivwits, Indian Peaks, Kanosh, Koosharem, and Cedar City.

Today, they still hunt on the lands of their ancestors, pick blackberries, Brigham tea, sagebrush, cedar leaves, and pine nuts. They conduct their ceremonies, not in tribal halls, but on natural sites of historic significance. They

bury their dead and celebrate here. They regard the land as a link to their ancestors.

To a land based culture such as theirs, the utlimate tragedy is the loss of the land, a loss which the Utah Paiute bands (now referred to as the Paiute Indian Tribe of Utah) suffered due to termination in 1954. The causes and consequences of this action are discussed in Section 1.1.4.

RELIGION AND WORLD VIEW (2.4.2)

The religion, cultural identity and world view of the Paiute Indians are all based on reverence for the environment. Certain sites take on a crucial importance seldom found in non-Indian society. Thus, Utah Paiutes still vigorously claim lands, appropriated by non-Indians, as their own. The concept of land ownership was unknown to Indian peoples before the arrival of non-Indian settlers. To the Indian, land is sacred and, therefore, not subject to human ownership.

The integration of the secular and the sacred is a hallmark of Southern Paiute religious life. Even those contemporary Indians who adopt Western religions generally retain their traditional belief system in addition to Christianity. The pow-wow provides a good example of how the religious, social, cultural, and economic aspects are blended in one Indian event. Socially, the powwow provides personal interactions and recreation. Culturally, traditional values and oral history are transmitted to the younger generations. Religiously, the powwow provides a setting for Indian prayers and rituals. Economically, it is a time for trade of goods and the sharing of information about employment opportunities. The inbreeding of Utah Paiutes is extreme and the gathering allows young people to meet the eligible Indians from other reservations.

Burial customs reflect another religious outlook which differs from that of the non-Indian society. Graves, whether in established graveyards or in individual scattered locations, are not visited by relatives of the deceased. "The area is a sacred area. The site has not been visited for years for the people believe the dead must rest in peace...The dead is there to rest and not for the public to see." (Facilitators, 1980:49). And now, in the face of large scale development, there is the fear that the sanctity of these sacred places will be invaded by archaeologists and other non-Indians.

KINSHIP (2.4.3)

Traditionally, the Utah Paiutes did not differentiate between one's own children and the children of one's siblings. The word, and the concept, "cousin" did not exist in the Paiute language or kinship. Kinship ties were so strong that the children of a brother or sister were considered one's own children. Although the grouping of most families has shifted away from an extended family structure, the role of the family in Paiute life continues to be characterized by kinship ties to a diverse group of relatives.

The extended family within the reservation still functions as a means for childcare and support. Statistics indicate, and verbal reports confirm, that a large number of Indian women return to the reservation to give birth. This tie to their culture and their family support structure remains strong.

The network of relatives for most Paiutes stretches throughout the seven reservations in Southern Utah and Nevada. The boundaries of families do not correspond to the boundaries of a particular reservation and, thus, the migratory patterns of the Paiutes must be considered familial as well as economic. As intermarriage becomes more frequent, family ties extend out to other reservations and other tribes. Powwows serve the function of bringing these family members together from their diverse communities. Communication and interaction between reservations is crucial to the continuation of Southern Paiute family life.

Elders still retain a respected position in the Indian community. Although age is not the criterion it once was for political power, the revered nature of age and its accompanying wisdom continues to influence reservation life.

CULTURAL PERSISTENCE (2.4.4)

The Utah Paiutes have always been a peaceful, self-contained people. However, the pressures of modern society have slowly chipped away at their cultural heritage and threaten their remaining practices and beliefs. Yet the people still cling to ancestral traditions. On the Kanosh Reservation, a "crying stand" remains, a wooden awning sheltered by cut branches that shade tables and chairs. Beneath this lean-to, the older Indians gather to play their traditional games and the crying stand, not the tribal hall, is the center of reservation culture and social intercourse. Beneath such structures Indians traditionally gathered to wail their songs and prayers. They are no longer used for this purpose, and many of the Indians attend church in town.

Space, defined regionally, is still the primary orientation of the Paiutes. Travel between reservations essentially follows the old migratory routes. The life lines of the people fan out in all directions as a once nomadic group struggles to remain intact in a society that does not have a place for their migratory patterns. New ways of relating to the dominant society are being discovered. Their culture has been restricted by the demands of a system that has forced them to become sedentary, to organize tribal governments, to deal in an alien political manner, and to curtail cultural activities.

Historically, power of a political nature was not a coveted goal. With the leadership role came a separation from the community that was seen as undesirable. Thus, Indians have had a difficult time creating political institutions that conform to the larger society's structure of government. This has lead to an abandoning of some traditional values, as the non-Indian concept of power must be adopted to enact social change throughout the avenues afforded by the dominant society.

Recently there has been a resurgence of cultural pride by the younger members of the bands. The 1980 reinstatement and authorization of a 15,000 acre land withdrawal has paralleled the awakening of a new political consciousness, which fosters cultural persistence.

PROJECT IMPACTS (2.4.5)

Under both full and split basing, there is extensive project activity planned for the Western Utah valleys. Six clusters are planned for Hamlin Valley, and four for Pine Valley. A DTN is projected through the Needle Range withing a few miles of

the Wildlife Management area. Crescent Valley, east of the Wah Wah Range has 7.5 clusters. Under both full and split basing, there is a construction camp in Pine Valley less than 10 mi from Indian Peak and just outside the boundary of the old reservation. OB sites are proposed near three Utah towns in the vicinity of Paiute ancestral lands: Milford, Beryl, and Delta.

The northern Escalante Desert is part of the ancestral territory of the Kwiumpits band of Paiutes, whose farming settlements were concentrated along the Beaver River. Direct impacts to significant resources will occur as a result of support community construction in the vicinity of Milford, although disturbance in this area is already considerable due to irrigation farming. Direct impacts to campsites associated with seasonal food gathering and antelope drives are probable along ephemeral streams which flow from the Wah Wah Range and southern tip of the San Francisco Mountains into the Milford OB siting area.

Paiute Indians residing at Kanosh and Richfield have expressed concern to the U.S. Forest Service for burials located in the Pahvant Mountains west of the Delta OB siting area. The population influx associated with base development, along with the simultaneous development of the Intermountain Power Project at nearby Lynndyl, will lead to even greater demands on the Forest Service for increased recreational development of wilderness or roadless areas in which sensitive Native American resources are concentrated.

The Beryl OB is located within an area traditionally inhabited by the Paiutes, and some identified ancestral sites would be directly impacted. Campsites occur along ephemeral streams which emanate from surrounding mountain areas.

As a primary base, the Beryl site will involve additional ground disturbance in lowland regions for construction of the DAA and OBTS, thereby increasing the likelihood of direct impacts to ancestral habitation sites. Highest disturbance potential, however, is associated with construction of the DTN which links the DAA and OBTS with missile clusters in Pine Valley. The DTN will proceed through pristine areas of a major mountain pass known to be associated with dense ancestral settlements. Similarly, the DTN route flanks the eastern foothills of the Needle Range in Pine Valley, which includes the former population center of the Indian Peaks band of Utah Paiutes. This area has high sensitivity for contemporary peoples and is associated with significant resources of both a secular and sacred nature which continue to be used in the traditional manner.

As a rule, upper bajada and mountain areas hold the greatest potential for ancestral/sacred sites. Sites associated with Paiutes are known in the Dixie National Forest, and for canyon and mountain areas between Modena and Hamblin Valley. The southern Needle and Wah Wah Ranges composed the former population center of the Indian Peaks Band of Paiutes, and dense site concentrations are likely throughout this mountain region. These areas are still utilized for plant and animal resources. The anticipated increased recreational use of mountain areas adjacent to OB facilities during the construction and operations phases poses a substantial threat to the integrity of these resources, the majority of which are presently unrecorded.

Cultural resource data on the Paiute Indian Tribe of Utah are generally incomplete. Additional data for a Tier II analysis are being gathered in field studies at reservations and colonies in the area.

Impacts on Hunting and Gathering (2.4.5.1)

The Utah Paiutes continue to hunt and gather on the lands of their ancestors. Blackberries, Brigham tea, sagebursh, cedar leaves, pine nuts, and other plants used for food, medicine, and craft production are gathered in Cedar and Parowan valleys and in the surrounding mountain areas. Although precise locations have not been identified, some of these resources will be attractive to recreationists who will be using the area in increased numbers. The DTN will probably facilitate access to some locations.

Game and fish are taken in Fishlake National Forest, Beaver Dam and Cedar Mountains, and at Indian Peak. Project construction, increased numbers of recreationists, and the accessibility afforded by the DTN will all effect the range and variability of the animal resources as well as the traditional conditions of the hunt.

The negative impacts will be intesified by the construction camp in Pine Valley and by the siting of an OB in Delta, Milford, or Beryl.

Impacts on Sacred and Ancestral Sites (2.4.5.2)

Documented sites are located throughout the Fishlake and Dixie national forests and the Needle Range. More are expected in the Wah Wah Ranges and along the many ephemeral streams emanating from these ranges. Utah Paiutes continue to practice traditional ceremonies and to bury their dead on the lands of their ancestors. Precise locations of burials is not known. Such sites, however, and the petroglyphs located in Parowan Gap are highly susceptible to vandalism and will be indirectly impacted by project activities. Similarly, the sacred nature of Little Salt Lake, important in Paiute cosmology, will be threatened by increased numbers of recreationists. Sites important to Paiute history, such as powwow locations, are generally situated near water sources and are therefore attractive recreational destinations for non-Indians.

The ancestral lands of the Utah Paiutes encompassed what is now southern Utah, Northern Arizona, southern Nevada, and southeastern California. The ancestors of the Utah bands inhabited the area of southern Utah north of the Dirty Devil River. In 1954, the five bands were terminated and consequently lost much of their reservation land base. Following reinstatement in 1980, they have two years in which to select 15,000 acres to be withdrawn for reservation status.

For a worst-case analysis, all lands currently occupied, utilized, or perceived as sacred by Native Americans are assumed to form an integral part of their culture and heritage. Because of a cultural identity inseparably tied to the environment, the Utah Paiutes consider all ancestral land as sacred. The adverse impacts associated with the worst-case analysis, would include varying degrees of irreversible destruction of the traditional cultures of those groups whose culturally significant lands are used or affected by M-X. A large portion of Utah Paiute sacred lands are within the DDA, and it is probable that the entire area could be affected by project related activities and personnel. This probability is increased by the presence of a construction camp in Pine Valley and OB sites in Delta, Beryl, or Milford.

Opinions About M-X

"They have taken our lands away from us, and now, as long as I am alive, They aren't going to use this area for any government project." (Wall in Facilitators, 1980:4.9)

"It is going to be hard to stand by and watch the Air Force rape these lands of my fathers." (Wall in Facilitators, 1980:415)

PUBLIC COMMENT ON THE DRAFT EIS:

> "It is equally clear that the M-X Missile System, no matter what form it takes (save for its construction entirely within the Texas/New Mexico area) will adversely impact and affect the traditional hunting and gathering practices of the Southern Paiutes. A cornerstone to the continued practice of traditional Indian culture is the resource base from which it derives. To the extent that M-X partially destroys that base by the use of scarce water, the elimination of sacred religious areas required by the M-X system and the destruction of other natural resources, it may no longer by able for tribal members to carry on their cultural practices." (A1030-5-004)

2.5 MITIGATION MEASURES

Mitigation measures are undertaken to minimize adverse impacts of a proposed action. Mitigations can be accomplished through avoidance, reduction or elimination of impacts, or rehabilitation or restoration of the human or natural environment.

The Air Force has used the avoidance technique in selecting suitability zones by special consideration of Indian reservations and grazing lands and registered historic and archaeological properties, among others.

Mitigations relevant to Native American cultural resources involve both areal and regional/local siting decisions. Nevada/Utah has greater overall sensitivity for contemporary peoples than does Texas/New Mexico, where cultural resources are less densely distributed and where Native American attachments to deployment area lands have less spatial and temporal continuity. Full or partial siting of the project in the latter two states, therefore, will lessen the overall severity of M-X cultural resource impacts.

Within local siting regions, the principal form of mitigation is flexibility in the placement of project facilities in order to maximize avoidance of sites and areas which are known to be of cultural and religious significance to Native Americans. An inventory of these sensitive features is planned to be accomplished at three levels: (1) review of existing data (already completed); (2) site data collected from reservation and colony field studies (partially completed), and (3) onsite preconstruction archaeological and ethnographic survey of areas in which ground disturbance is proposed (to be accomplished through subsequent studies). The inclusion of Native American cultural resource specialists from local reservations on

these preconstruction survey teams will refine the identification procedure and thereby mitigate potential adverse effects.

A Programmatic Memorandum of Agreement (PMOA) for the preservation of historical properties and resources has been negotiated between the Air Force and the Advisory Council on Historic Preservation with participation by the Bureau of Land Management and the State Historic Preservation Officers of the affected states. This agreement will be maintained during the construction, operation, and maintenance phases of the M-X missile program. The PMOA establishes general procedures for compliance with existing federal laws which protect cultural resources. Native American ancestral and sacred sites, as properties eligible for nomination to the National Register of Historic Places, are included in terms of this agreement.

In summary, the PMOA states that:

1. The Air Force will establish a Review Committee to assist in oversight of all historic preservation related M-X activities.

2. The Air Force will afford the appropriate State Historic Preservation Offices (SHPO), and the State offices of BLM, opportunity to review and comment on all scopes of work involving historical preservation.

3. The Air Force will ensure that its contractors, Air Force personnel, and resident Air Force dependents are advised against illegal collection of historic and prehistoric materials.

4. In consultation with BLM and the appropriate SHPOs, the Air Force will locate and identify historic properties in the potential impact area, determine their significance, and assess the undertaking's impact upon them.

5. Where prudent and feasible, in consultation with the SHPOs and BLM, the Air Force will avoid adverse effects on historic and cultural properties through design of M-X facilities, by relocation of existing facilities, or by other means.

6. In consultation with the SHPOs and BLM, the Air Force will develop guidelines for documentation or data recovery from historic and cultural properties that cannot be avoided or protected.

7. When it is not prudent or feasible to avoid adverse effects upon a historic or cultural property, the Air Force will follow 36 CFR Part 1204 to determine whether the property is eligible for inclusion in the Register, and consult with the appropriate SHPO and BLM as appropriate.

8. During the implementation of any portion of the undertaking, should previously unknown historic or cultural properties be discovered, the Air Force will comply with 36 CFR, Section 800.7 and/or the data recovery guidelines developed by the Air Force and Advisory Council.

9. Before M-X construction is complete, the Air Force will consult with the SHPOs and the BLM to establish preservation mechanisms to accompany operation and maintenance of the facilities. Operation and maintenance will also be covered under this agreement.

10. Intensive surveys will be conducted in advance of any land-modifying activity and will be designed to avoid damage to historic properties.

11. If test excavations are necessary to obtain data needed for the evaluation of historic properties, the excavations will not be allowed to exceed the scope necessary for basic evaluation, will not use mechanized equipment without the approval of the appropriate SHPO and BLM, and will be carried out in accordance with strict archaeological controls.

In accordance with the PMOA, the M-X Cultural Resource Management Program will be developed by the Air Force and Corps specifically for the project in consultation with SHPO's Advisory Council on Historic Preservation, BLM, and Native Americans where appropriate. This includes specific criteria for avoidance, protection and data recovery decisions, specific criteria for determinations of National Register eligibility and data recovery methodology guidelines. A Cultural Resource Manager with authority to make decisions based on these criteria will be located in each Area Office. Mobile data recovery teams, with back-up lab, analysis, and report personnel and facilities will be available to the managers.

Cultural resource mitigations applicable to the construction phase concern procedures to be followed in the event of accidental or unavoidable disturbance of sensitive sites or features. A number of mitigative strategies will be developed in consultation with appropriate local tribal governments via liaisons established during the preconstruction onsite survey program. Mitigations, which will very according to the situational context, include data recovery and selective avoidance. The issue of curation will be considered in the M-X Cultural Resources PMOA Management Plan. In coordination with the BLM and SHPO, excavated artifacts may be returned to local Indian reservations for curation and/or display at existing or proposed tribal museums. Similarly, rare floral species utilized by Native Americans for food, medicinal, or craft purposes may be preserved by transplantation at on-reservation botanical gardens. Financial assistance for the development of tribal museums and botanical gardens is a potential compensatory mitigation. In some instances of accidental disturbance of cultural resources, site or feature avoidance may be instituted. If, for example, burial grounds are discovered during excavations for sand or gravel, borrow pit operations may be relocated to alternate areas. Similarly, a DTN segment may be moved to avoid highly sensitive cultural resources discovered during preliminary ground disturbance.

Mitigation of indirect impacts resulting from the activities of construction workers and their dependents will also be undertaken. Fences and signs can be used to protect highly significant sites which are attractive to pot hunters and located near camps. Secondly, through cooperation with existing local organizations, a recreation/education program could be developed for interested workers and their families, including slide shows, interpretive exhibits, demonstrations of Native Americans crafts, and tours of protected sites. Interpretative programs could be developed for specific audiences, e.g., school children, Native Americans, temporary workers. All this would be designed to increase sensitivity and appreciation for Native American cultures.

Indirect impacts to Native American cultural resources are expected during the operations phase as a result of public use of the DTN for recreational access to previously undisturbed wilderness areas. Since site destruction through pilfering, vandalism, and ORV ground disturbance cannot be effectively controlled over large regions by security patrols, a cultural resource monitoring program is the most feasible mitigative measure. This program will take the form of follow-up archaeological and ethnographic field studies to determine long-range project effects and to develop, as necessary, secondary mitigative programs to promote cultural resource preservation.

In accordance with NEPA regulations which mandate the consultation, coordination and cooperation with Indian tribal governments, the Air Force has agreed to the following:

1. Coordinate and consult with Native Americans on M-X planning activities

2. Avoid or otherwise protect cultural sites in accordance with the PMOA

3. Involve Native Americans in Cultural and Historical Resource Programs

4. Coordinate and cooperate with Native Americans on M-X siting activities

5. Initiate a separate funding mechanism for Community Impact Assistance Program for Native Americans in parallel with non-Native American assistance programs.

Mitigation, therefore, should involve Native Americans to the fullest extent possible. Tribal cultural resource advisors should assist in the identification of cultural properties in and near each deployment valley. Also, the Secretary of the Air Force and Executive Director of the Advisory Council for Historic Preservation could appoint a Native American representative to serve on the M-X PMOA Review Committee.

Financial aid to tribal governments for the establishment of reservation museums, and an established program for the return of requested utilitarian and sacred artifacts to tribal groups is a possible mitigative measure. Indian reservations and colonies throughout the proposed deployment area are currently placing emphasis on cultural heritage programs, including the development of tribal museums. Renewed and expanded competition between tribal governments and land management agencies over the jurisdiction, proper treatment, and ultimate allocation of this potentially large inventory of Indian artifacts, however, is a possible source of conflict.

A range of control measure options should be generated by the Air Force and evaluated in coordination with tribal governments and state and local planning programs. The control measures analyzed should include enforcement of laws and regulations protecting cultural resources, penalties for destruction of cultural resources, and provision of recreational opportunities to minimize unorganized and uncontrolled excursions into pristine areas.

The American Indian Religious Freedom Act specifically protects and preserves the inherent right of freedom to believe, express, and exercise traditional religions, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worhsip through ceremonials and traditional rights.

The infringement of religious freedom would take a number of forms:

1. The destruction of sacred land.

2. The destruction of sacred plants, areas, and animals.

3. Invasion of privacy.

4. Interference (visual and physical) by bunkers and roads.

5. Contamination and/or loss of water, grazing lands, and food resources such as pine nuts and game.

6. Interference with access to religious sites.

During project field studies, Native American consultants feared information on religious sites could ultimately become public, and that in the briefest time the sites would be disturbed. On the other hand, if they failed to reveal site locations, sites may be potential M-X siting areas and may be directly impacted.

Therefore, the only viable strategy that will conform to the environmental legislation and will enable site identification to occur is to establish local review committees with representatives from the various tribes to participate in on site M-X preconstruction surveys. Only such unrecorded verbal communication will ensure the nondisclosure of this highly sensitive information.

Provisions would be made to recognize religious sites as being those areas deemed sacred by Indian people; i.e., that some religiously significant areas will not render archaeological remains, but are still afforded protection under the Indian Religious Freedoms Act.

Funds could be provided for the documenting, recording, and teaching of cultural resources and practices as well as for language instruction. The purpose is to provide younger tribal members with the educational opportunity of learning about their culture. This cultural education, whether in remote areas or in a school setting, is best provided by the Indian people themselves.

In general, Native American cultural resources will incur two types of impacts as a result of M-X activity in Nevada/Utah. One type will result directly or indirectly from construction efforts; the other will be a product of large-scale, rapid population growth in the area of influence. These will affect both cultural remains and the cultural integrity of existing communities.

The reservations and colonies located in and adjacent to the DDA are not ethnic islands completely isolated from the larger society. Over the past decades the Indians and non-Indians of the Great Basin have accommodated to the lifestyles of one another. They share a unique environmental setting, largely rural in nature,

and have found a common ground for economic subsistence and social adjustment. With a large influx of outsiders, both the indigenous Indian and non-Indian populations could become minorities within their own environs. The social accommodations of a rural society would be severely tested in the presence of thousands of construction workers and their families.

It is an uncontestable fact that the lifestyle of the present residents will be changed considerably by M-X deployment in Nevada/Utah. Whether or not this will result in cultural decline depends, in a large part, on the effectiveness of the mitigation process.

The Western Shoshone and Southern Paiute people evolved a meaningful way of life in the Great Basin long before the intrusion of non-Indian settlers. The Indian people, their numbers decimated, survived this aggressive invasion. Confined to reservations or, worse yet, deprived of a land base entirely, their culture persisted. The framework of their traditional culture was infused with selected elements of the larger society to form a functional, evolving Indian identity.

The present lifestyle, cultural values, and world view of Indians currently living on reservations within and adjacent to the DDA could be affected by development and deployment of M-X. To mitigate the potential adverse effects on traditional Indian culture as a consequence of the project, an active consultation program is being developed between the Air Force and tribal governments. In this way, the effective planning strategies could be adopted to pursue the necessary material resources needed to support a larger Indian population. Cooperative participation to produce effective planning could result in mitigation measures that work to alleviate impacts on Indian culture.

3.0 LAND AND WATER USE

3.1 LAND USE AND IMPACTS TO LAND USE

INTRODUCTION (3.1.1)

This section discusses existing land-use patterns and the potential impacts of M-X-related activities on these land uses and land-based economic development plans (descriptions of non-land-based economic systems are contained in the "Economic Structure" section of this ETR). Land use is divided into three major categories: (1) farming and ranching on reservation lands and public lands (BLM and Forest Service), including projected farming and ranching operations (see ETR-40, for detailed analysis of impacts on grazing lands and potential mitigation measures); (2) other actual and projected land-based economic activities (e.g., mining and recreational pursuits); and (3) subsistence activities (hunting, gathering, and fishing) on reservation and nonreservation lands. (The religious and ideological uses and significance of the land to Native Americans). Of these, farming and ranching are the most important, since they provide the conventional economic base for the rural reservations in the study area. Livestock grazing, dry farming, and irrigated farming are the "three general categories of farming and ranching which are significant sources of Indian income" (Sorkin, 1978:10). However, agricultural productivity tends to be low, and nationally, "returns per acre are smaller on Indian operated farms than reservation farms owned or operated by non-Indians" (Sorkin 1978:11)

Among the many factors contributing to this widespread phenomenon, Sorkin (1978:11) lists the following:

(1) The quality of reservation land tends to be poorer than that of non-Native American land, and the higher quality reservation land is typically leased to non-Indians;

(2) Indian management of farms tends to be inefficient. Poor planning and negligent care reduce Indian crop and livestock yields, in part because of inadequate education and technical assistance, but also because most tribes do not have agricultural traditions and have not adapted readily to farming and ranching;

(3) Most Indians lack sufficient capital to make the investments in machinery, feed, fertilizer, and buildings that are necessary for efficient agriculture;

(4) Many Indian landholdings are too small to be efficient. The main obstacle to reallocating land in tracts of economic size is that land ownership has become quite fractioned over the years owing to the cumulative effects of the 1887 Allotment Act.

These problems have led to increasing fractionation of land holdings. Thus, while farming and ranching provide the dominant economic bases, they are not nearly sufficient to support reservation populations.

Mining and recreational enterprises play a much smaller role in reservation economies. Furthermore, revenues from these economic projects generally accrue to the tribal governments, rather than to individuals.

The importance of subsistence activities is difficult to quantify. Records of these activities are largely nonexistent, and the fact that hunting, gathering, or fishing may entail trespassing makes even informal data-gathering very difficult. Nonetheless, all the facts indicate that the noncash economy remains viable and important. Subsistence activities are widely relied upon among Great Basin tribes to augment meager cash incomes. Goods which are acquired without the medium of cash are readily exchanged for other goods or services similarly acquired. Barter remains a fundamental part of the overall economic picture of the Native Americans in the Nevada/Utah study area.

The religious and traditional uses of the land by Native Americans, and the potential impacts of M-X on Native American ideology, are discussed in Chapter 2. The Te Moak Shoshone land claim, and Paiute Indian Tribe of Utah land issues are discussed in Chapter 1. A full description of all reservation and colony lands in the study area is contained in Appendix A.

Some of the reservations and colonies included in the study area are outside the boundaries of the DDA. Thus, they are not close enough for project activity to impact their water and land. Other economic impacts to these reservations and colonies are discussed elsewhere in the ETR. Reservations and colonies in or adjacent to the DDA, or in proximity to a potential OB site, whose lands are expected to be impacted by M-X activity include Yomba, Goshute, South Fork, Duckwater and Moapa Reservations and Ely Colony.

Reservation lands are not used for deployment, hence there would be no direct impacts. However, project facilities may be sited at a distance of one mile from reservation boundaries, and the indirect effects associated with construction activities and population influx are discussed below. Under full basing in Nevada/Utah, the proximity of M-X facilities to all reservations and colonies in the study area is shown in Figure 3.1.1-1. Figure 3.1.1-2 depicts M-X activity under split basing.

Many of the public comments received during the review process concerned the loss of Native American ancestral lands to M-X construction and deployment activities. Although the Air Force has avoided siting on reservation lands or BLM and forest service lands used by Native Americans for stock grazing, proposed siting conflicts with land claimed by the Te Moak Shoshone. Also, land withdrawn for M-X construction is land unavailable for future Native American withdrawal, and other land uses. Representative comments are:

PUBLIC COMMENTS ON THE DRAFT EIS:

> "Particularly of concern to us is the American Indian, in this case, the Shoshone. We are angry to think that these people are expendable, that once again there is the possibility of treaty violations (an old and humiliating story), and that we may well be witnessing what Thomas Jefferson warned us about . . . "the tyranny of the majority." (A0846-5-004)

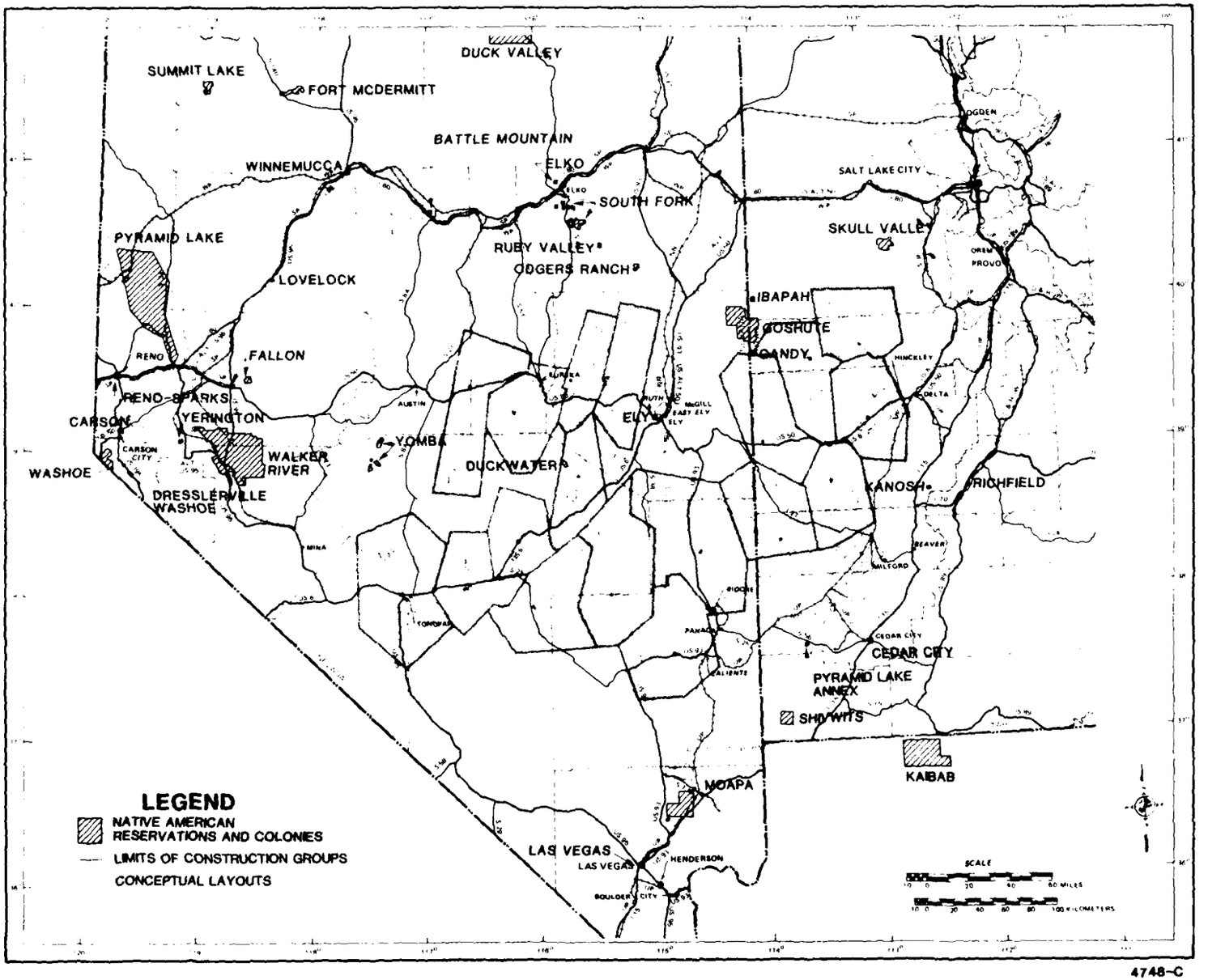


Figure 3.1.1-1. Native American reservations and colonies and M-X project activity in Nevada/Utah, full deployment.

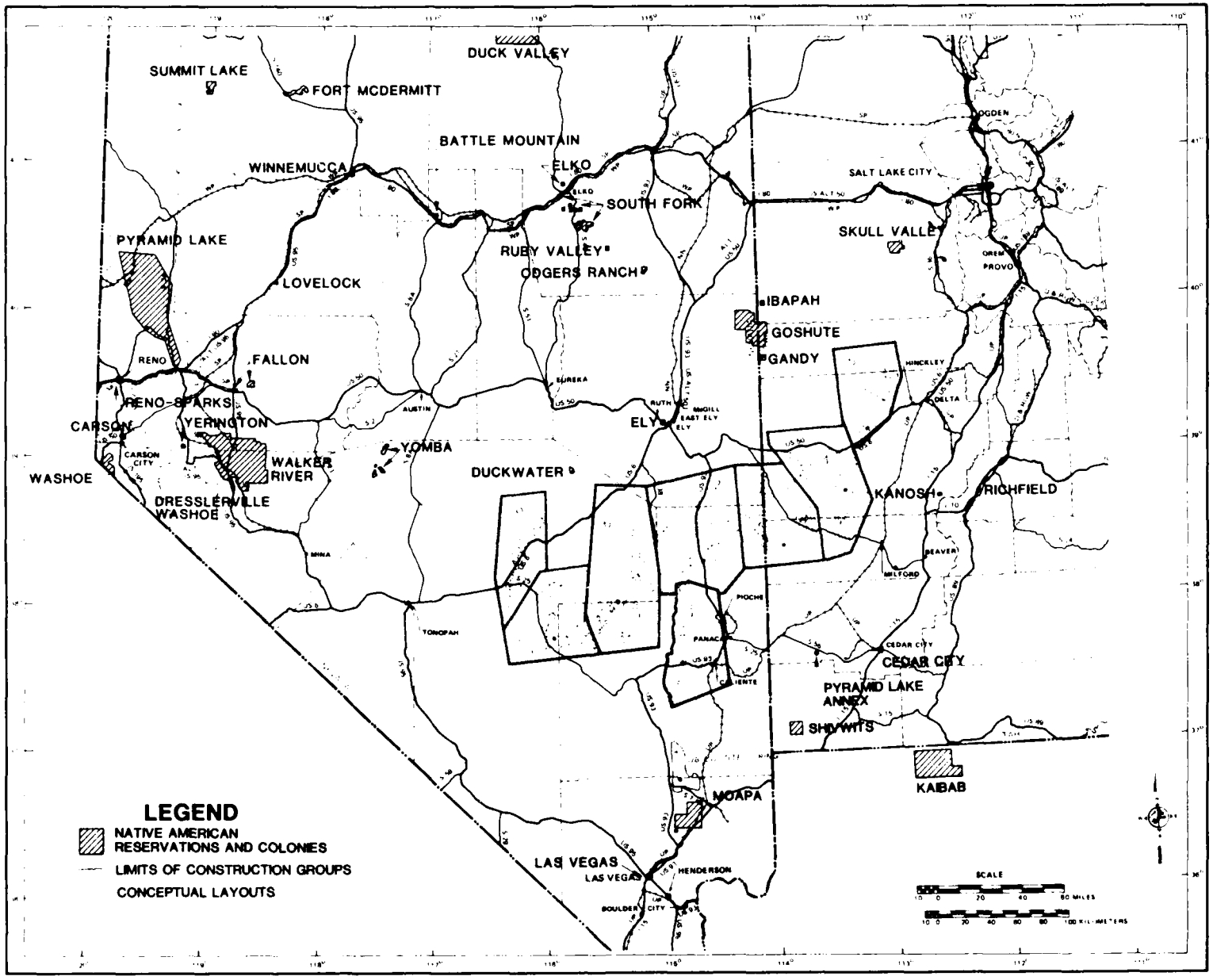


Figure 3.1.1-2. Native American reservations and colonies and M-X project activity in Nevada/Utah, split deployment.

"What do you say to the Native American when our government once again claims his sacred land?" (A0065-2-004)

"Up to 15,000 acres of land are at issue in areas likely to be affected by the M-X missile system...If the tribe's selection process is further hindered by its inability to obtain land because the M-X missile system has priority, the future of the tribe, its members and their descendants will be substantially and adversely impacted." (A1030-5-004)

"As a student of Native American cultures, I know that construction of the M-X missile in Nevada and Utah will destroy the culture of the Western Shoshone by taking their land from them. Loss of culture destroys the spiritual, emotional and physical lives of human beings and destruction of culture is tantamount to genocide." (A0983-6-007)

RESPONSE:

In response to these concerns, the Air Force has agreed to cooperate with Native Americans on M-X siting activities in order to minimize the restriction of alternatives for future Indian land use plans.

YOMBA RESERVATION (3.1.2)

Land Holdings (3.1.2.1)

The Yomba Reservation is located in central Nevada and consists of four tribally-owned ranches totalling 4,681.48 acres in the Upper Reese Valley (see Figure 3.1.2-1). These are Bowler Ranch, 1,560 acres; Doyle ranch, 2,161.48 acres; Dieringer ranch, 480 acres; and Worthington ranch, 480 acres. (For complete descriptions of the lands, see Appendix A.) In addition, Yomba Reservation Indians hold BLM grazing permits for 268,397 acres: a 216,954-acre allotment in Ione Valley, and two allotments totaling 51,443 acres in Upper Reese Valley (see Figure 3.1.2-2). They also hold 94,800 acres of U.S. Forest Service permits, 59 percent of which is suitable for grazing.

Land Use (3.1.2.2)

Farming and Ranching (3.1.2.2.1)

Farming and ranching are the primary economic activities of the Yomba Reservation. Of a total of 4,681.48 acres of reservation lands, 1,634 acres are under irrigation and another 2,200 acres are considered arable. Crops currently grown on the reservation contribute to the ranching operations: alfalfa hay and meadow hay are the principal crops.

Ranching is the fundamental occupation on the reservation. There are about twenty-one assignments of reservation land assigned to individuals who maintain the land and manage the cattle operations. The assignments average 80 acres. The total number of cattle raised on an annual basis has ranged from a low of 434 head to a high of over 1,700 (BRI Systems, inc. 1975:89). Thirty head were added to the

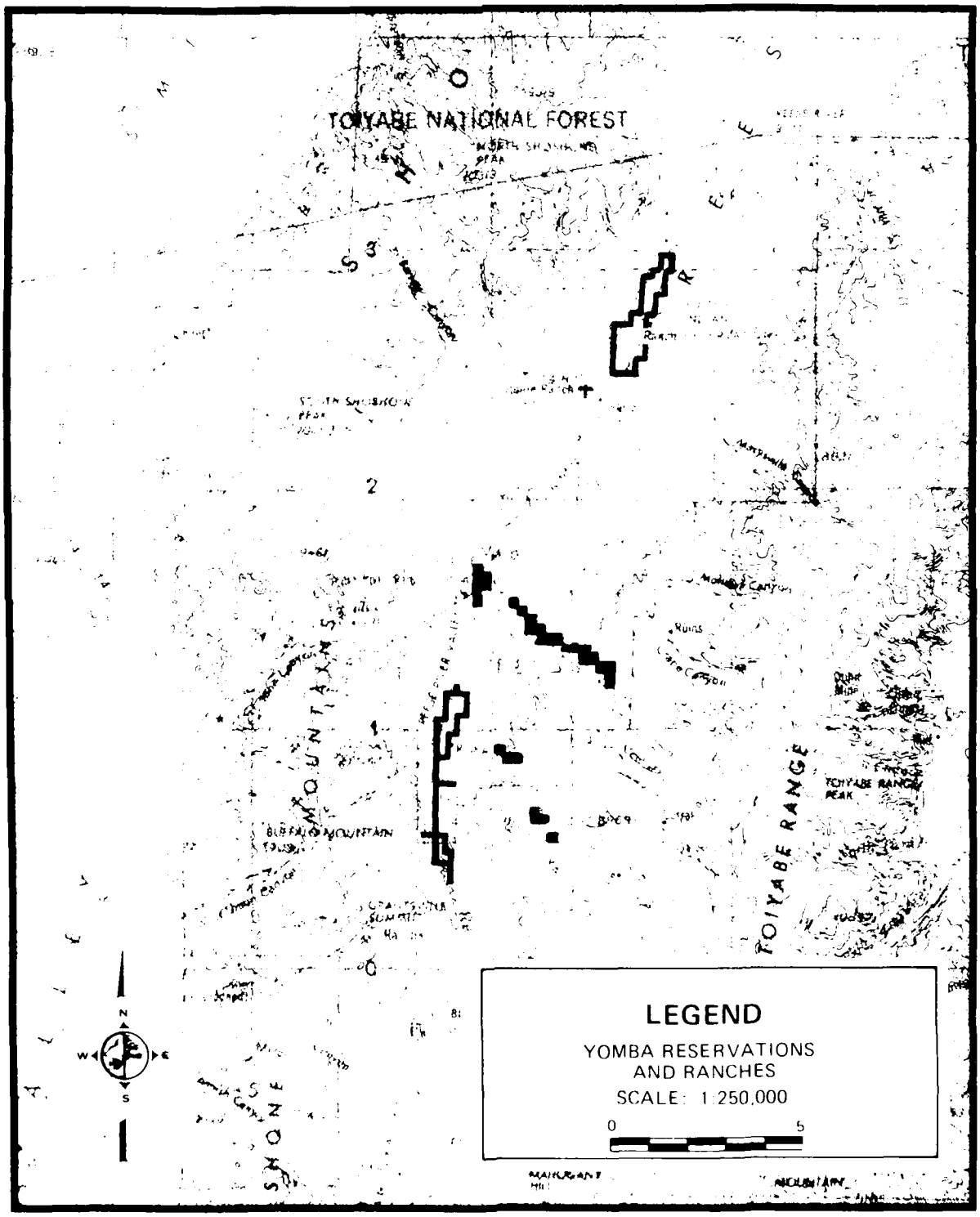


Figure 3.1.2-1. Yomba reservations and ranches.

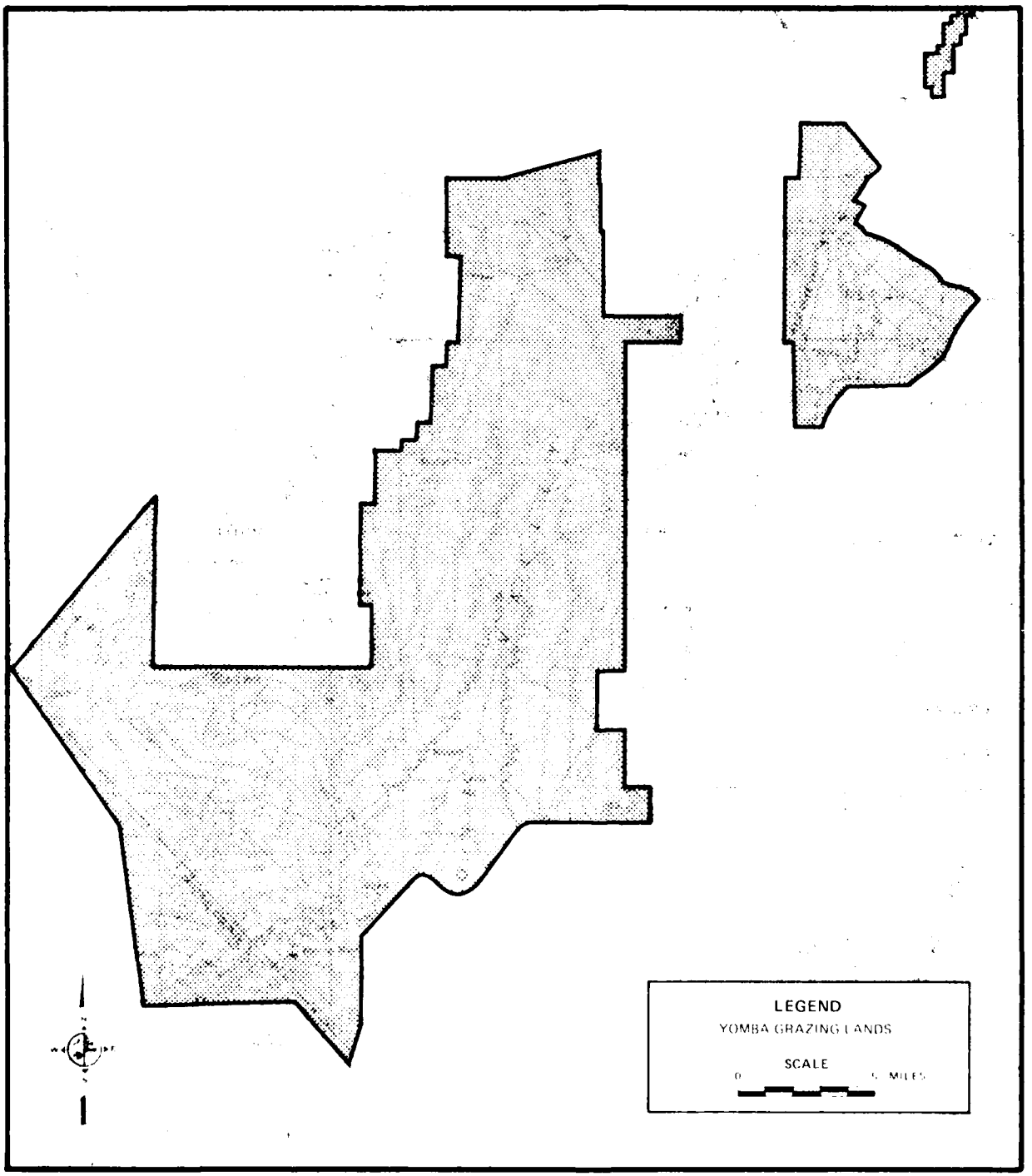


Figure 3.1.2-2. Yomba grazing lands.

herd in 1979, and there are plans to purchase 100 head annually through 1983. The Yomba depend on rangeland adjacent to the reservation for their cattle operations. Currently they hold grazing permits for approximately 8,000 AUMs on BLM land and 5,000 AUMs on USFS land.

The Yomba tribe's dependence on use of public lands for ranching is essential. The tribe recognizes that this fragile and insufficient economic base will have to be broadened and strengthened. The emphasis, it is hoped, will shift from subsistence ranching to a diversified economy, but expanded ranching and farming activities figure prominently in future economic development schemes. These plans include increasing rangeland acreage, expanding irrigated acreage, acquiring more reservation land, and improving the range.

Other Land-based Activities (3.1.2.2.2)

The general area around the Yomba Reservation has a rich mining history: mineral deposits of gold, silver, turquoise, and other valuable minerals have been found in the area. There are turquoise mining operations near the reservation. However, no precious minerals have been discovered on the reservation lands (BRI Systems, Inc. 1975).

Subsistence Activities (3.1.2.2.3)

Apart from the ranching and farming enterprises, land provides the resources for less visible but perhaps more important subsistence activities: hunting, gathering, and fishing. The cash economy lacks a permanent and stable base; thus, for the Yomba as for other Native American groups, it is the noncash sphere of exchange, the barter economy, which provides important daily subsistence needs. Fish and game resources in the Reese River Valley and surrounding mountains include: several species of trout such as brook, brown, and rainbow, stocked in nearby waterways; mule deer and mountain lion, as well as small game species such as sage grouse, chukar partridge, quail, dove, and cottontail, jack, and pygmy rabbits; and furbearing animals including bobcat, lynx, beaver, coyote, fox, badger, and weasel. Pine nuts are also abundant: they are commercially harvested by a Salt Lake City firm, as well as collected for subsistence purposes by Yomba, Walker River, and Fallon Indians.

Siting Information (3.1.2.3)

There is no project activity proposed for either the Upper Reese Valley or the Ione Valley under the Proposed Action or any of the alternatives. With full basing, there is project activity in the adjacent hydrologic unit, Big Smoky Tonopah Flat. Four clusters in this valley are sited between 20 and 30 mi southeast of grazing lands in Ione and Upper Reese valleys and 30 mi south of the reservation on state highway 21. There are an additional 6 clusters 40 mi east in Minitor-Northern, with no ready access to the reservation or its grazing lands. There is a construction camp about 50 mi northeast in Kobeh, and another 60 mi southeast in Ralston. These camps are both located near roads leading to state highway 21, provides access to the Yomba Reservation from both the north and the south (see Figure 3.1.1-1). Under split basing, the nearest clusters are sited 75 mi east in Hot Creek Valley, and the nearest construction camp is also in that valley about 80 mi east. Travel to the Yomba area from these locations would be circuitous (see

Figure 3.1.1-2). The nearest and most accessible proposed OB site is near Ely, about 180 mi east. Access to the reservation is provided by state highway 50, west, to state highway 21, then south 30 mi.

Impacts on Land Use (3.1.2.4)

Farming and Ranching (3.1.2.4.1)

There are no direct impacts to Yomba grazing land under the Proposed Action or any of the alternatives. The existence of construction camps, construction activities, and construction workers in the vicinity of the grazing lands could interfere with ranching operations. This would result more from non-work-related activities such as ORV use and other recreational pursuits than from construction. The proximity of state highway 21 to project activity will facilitate access to the Yomba Reservation and general area. The tribe at one time were lobbying for the state to upgrade the road, gravel for the most part, which can be impassable in the winter. However, they decided against the action in order to safeguard their isolation. Increased recreational pressure from M-X-related population could prompt the state to improve the road, opening the area up for intensive recreational activity. The Toiyabe Range is already used for recreational purposes, such as hunting, fishing, and hiking, and these activites will increase substantially. This could hamper ranching operations by disturbing and scattering the cattle. It is also probable that the incidence of cattle rustling will be accelerated. Rustling is aggravating to all ranchers, but the economic impact varies with herd size and can be felt acutely when the herd size is small.

The greatest concerns about M-X center on expanding ranching operations. The Yomba have only 4,700 acres of arid reservation land, and BLM lands are essential to expanding ranching activities. Heavy recreational use of the area could diminish productivity of the grazing lands, necessitating an increase in grazing permits or some other mitigative measures to restore and expand AUMs. If BLM lands are withdrawn for M-X, then expansion for ranching is curtailed; the land is not available for withdrawal by the tribe or for grazing. The extent to which M-X withdrawal of lands peripheral to reservation lands and grazing lands would actually restrict the potential increase in grazing permits is not known. The tribe could negotiate with the BLM to secure the rights to additional grazing permits west of the reservation where no project activity is planned.

Other Land-based Activities (3.1.2.4.2)

There are no organized recreational economic enterprises or tribal mining enterprises, and the Yomba Overall Economic Development Plan (OEDP) does not include plans for their development at this time.

Subsistence Activities (3.1.2.4.3)

The acceleration of recreational activities is expected to adversely affect subsistence activities. The Native Americans hunt and fish for subsistence purposes, but pressure on these resources will increase as numerous other individuals enter the area to hunt and fish for sport. A quantitative impact assessment cannot be made, because it is not known to what extent the tribe depend on these activities for their subsistence needs, nor to what extent the land and water resources in the area are

already exploited for these purposes. Nonetheless, increased pressure on the natural resources in the area may force the tribe to range farther afield than they now do to provide for basic subsistence needs.

Comparison of Alternatives (3.1.2.5)

All impacts to lands and land use will be much greater with full basing than with split basing. Impacts under Alternative 3 and 5 may be more severe because of the accessibility from the Ely OB. Alternatives are ranked as follows: Alternative 7, first; Alternative 8, second; Proposed Action and Alternatives 1, 2, 4, and 6, third; and Alternatives 3 and 5, fourth.

GOSHUTE RESERVATION (3.1.3)

Land Holdings (3.1.3.1)

The Goshute Reservation consists of approximately 110,000 acres of land, 38,000 of which are located in Utah and 72,000 in Nevada (Figures 3.1.1-1 and 3.1.3-1).

The tribe does not hold any BLM grazing permits (see Appendix A for land descriptions).

Land Use (3.1.3.2)

Farming and Ranching (3.1.3.2.1)

Tribal land holdings have been assigned and leased to tribal members for farming and residential purposes. Only 500 acres are farmed; the balance is rangeland. Total AUMs are 9,081. These land-based economic activities provide the reservation members with their only economic base and economic development goals include increasing the use of arable land, improving irrigation system to expand their irrigated acreage, upgrading range lands to improve their carrying capacity, and increasing tribal and individual herds.

Other Land-based Economic Activities (3.1.3.2.2)

There is no mineral development on the reservation, at present, nor formal recreational enterprises. The tribe, through a $100,000 SBA loan has developed the Goshute Enterprises. The firm has a GSA contract to manufacture cattle guards for the U.S. government. The tribe also intends to develop its recreational potentials. Water recreation is seen as a viable economic resource, and the Goshute intend to build a reservoir which, in addition to increasing irrigation capacity, could be an attractive fishing area for Salt Lake City and other community residents. The reservation is extremely isolated, but the tribe recognizes that there is attraction in this remoteness; with careful planning, this pristine natural environment can be used to economic advantage without damage. The tribe also plans to sponsor wilderness outings.

Subsistence Activities (3.1.3.2.3)

The Goshute rely on hunting, fishing, and gathering to supplement their dietary needs. We do not know to what extent these subsistence activities are relied on

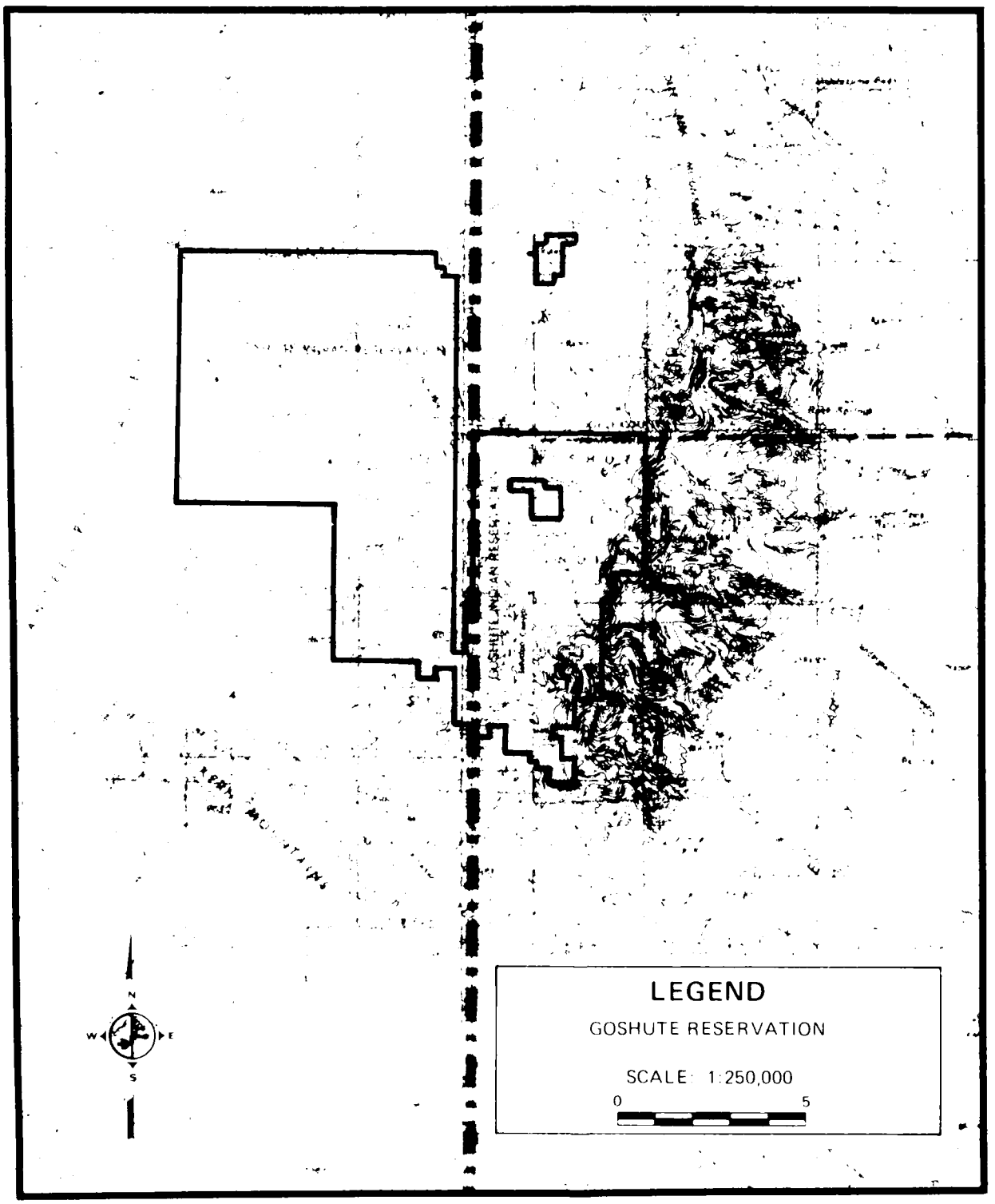


Figure 3.1.3-1. Goshute Reservation.

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day-to-day. However, the nearby mountain ranges, notably Deep Creek Range, the foothills, and the valleys, are still utilized by the Goshute for subsistence activities.

Siting Information (3.1.3.3)

With full basing in Nevada/Utah, clusters would be sited throughout much of Snake Valley, including several in the northern end of that hydrologic unit, within about 7 mi of the eastern edge of the Goshute Reservation. There are no roads on the eastern side of the reservation in Utah, so cluster and DTN roads would make the previously inaccessible eastern lands more accessible. A construction camp is proposed on the eastern side of Fish Spring hydrologic unit about 40 mi from the Reservation. With split basing, the nearest shelter is sited 50 mi southeast of the reservation in Sevier Desert, and the nearest construction camp is 70 mi from the eastern edge of the Reservation. Ely and Delta are the closest proposed operating base locations. Travel from either OB on existing roads would be arduous, and access from Ely would not be improved by DTN or cluster roads. DTN from Delta does improve accessibility from the east, however.

Impacts on Land Use (3.1.3.4)

Ranching and Farming (3.1.3.4.1)

Interference with current ranching practices would be similar to that expected for the Yomba Reservation, though less severe, since project activity does not occur near roads providing access to the reservation. Also, Goshute ranching operations are limited to reservation lands. Since these are not multiple-use BLM lands, trespassing regulations could be strictly enforced, thus reducing indirect impacts attributable to recreational use. Impacts on proposed ranching activities are not expected to be great. Proposed improvements in rangelands and herd increases focus on reservation land rather than on BLM land. It is unlikely, therefore, that withdrawal of lands in Snake Valley will interfere with the expansion of ranching activities.

Other Land-based Activities (3.1.3.4.2)

The Goshute intend to take advantage of the economic opportunities afforded them by their pristine wilderness and remoteness. The presence of M-X construction activities in the general area, the increased accessibility allowed by DTN and cluster roads, and the influx of thousands of construction workers and dependents into the area (construction camp) would limit, and perhaps preclude, this avenue of recreational development. On the other hand, if the tribe intends to go into commercial recreation (recreational pursuits associated with the reservoir), its increased accessibility because of new roads and the nearby location of a construction camp could be advantageous. More information is needed on the Goshute plans for economic development before further impact determinations can be made.

Subsistence Activities (3.1.3.4.3)

As was the case for the Yomba, the adverse impact on local resources and subsistence activities caused by increased hunting, fishing, and gathering pressure, cannot be realistically calculated.

Comparison of Alternatives (3.1.3.5)

Full basing would obviously have a much greater impact. Impacts from split basing would probably be minimal. Impacts would be greatest under Alternative 2, the only alternative with a Delta OB. Alternatives are ranked as follows: Alternative 7, first; Alternative 8, second; Proposed Action and Alternative 1, third; Alternatives 3 and 5, fourth; Alternatives 6 and 4, fifth; and Alternative 2, sixth.

SOUTH FORK RESERVATION (3.1.4)

Land Holdings (3.1.4.1)

There are three South Fork reservations: South Fork, Ruby Valley, and Odger's Ranch. The land base for the reservation complex is as follows: South Fork, 13,046 acres (10,661 irrigated farmland); Ruby Valley, 120 acres; and Odger's Ranch, 1,987 acres--total 15,153. In addition, the tribe holds grazing permits for 40,000 acres of BLM and USFS lands. The acreage near South Fork lies totally within the Dixie Creek and Tenmile Creek basin, just to the north of the study area. Most of the grazing land is near Odger's Ranch. The allotment is in four basins: Butte-north, Butte-south, Ruby, and Long (see Figure 3.1.4-1 and 3.1.4-2; for a complete description of the land holdings, see Appendix A. Also see Appendix A for information on the Ruby Valley Treaty.)

Land Use (3.1.4.2)

Farming and Ranching (3.1.3.2.1)

Farming is an important economic activity on these reservations. There are 28 families on the main reservation, and two at Odger's, with farm units ranging from 75 to 100 acres. South Fork has approximately 10,000 acres of irrigated farmland, producing about 200 tons of alfalfa hay and 2,400 tons of meadow hay annually.

Stock raising is the tribe's principal economic activity. Ranching operations and grazing lands are administered by the South Fork Community Committee and Te Moak Livestock Association. The latter holds grazing permits for tribal and public lands totalling 10,917 AUMs: 525 tribal, 10,227 BLM, and 345 USFS. The tribe currently runs about 1,400 head of cattle, who graze the 10,000-acre South Fork farmland in the winter and are moved to public lands in the vicinity of Odger's Ranch for the seven summer months. Approximately 250 head are marketed each year.

Agriculture and ranching are the tribe's principal sources of income, and are at the core of planning for future economic development.

Since 1970, all of the tribe's economic development efforts have been devoted to increasing the productive capacity of the land, by fencing the reservation into grazing units, developing spring water sources, improving irrigation canals, and constructing reservoirs. A $1.6 million irrigation system is scheduled for construction in 1981, providing irrigation water from two diversions on the South Fork of the Humboldt River. The South Fork Tribal Council, Bureau of Indian Affairs, Water and Power Resources Service staff, and independent engineeers began planning the system in 1976 (South Fork Tribal Council 1980 (III):3).

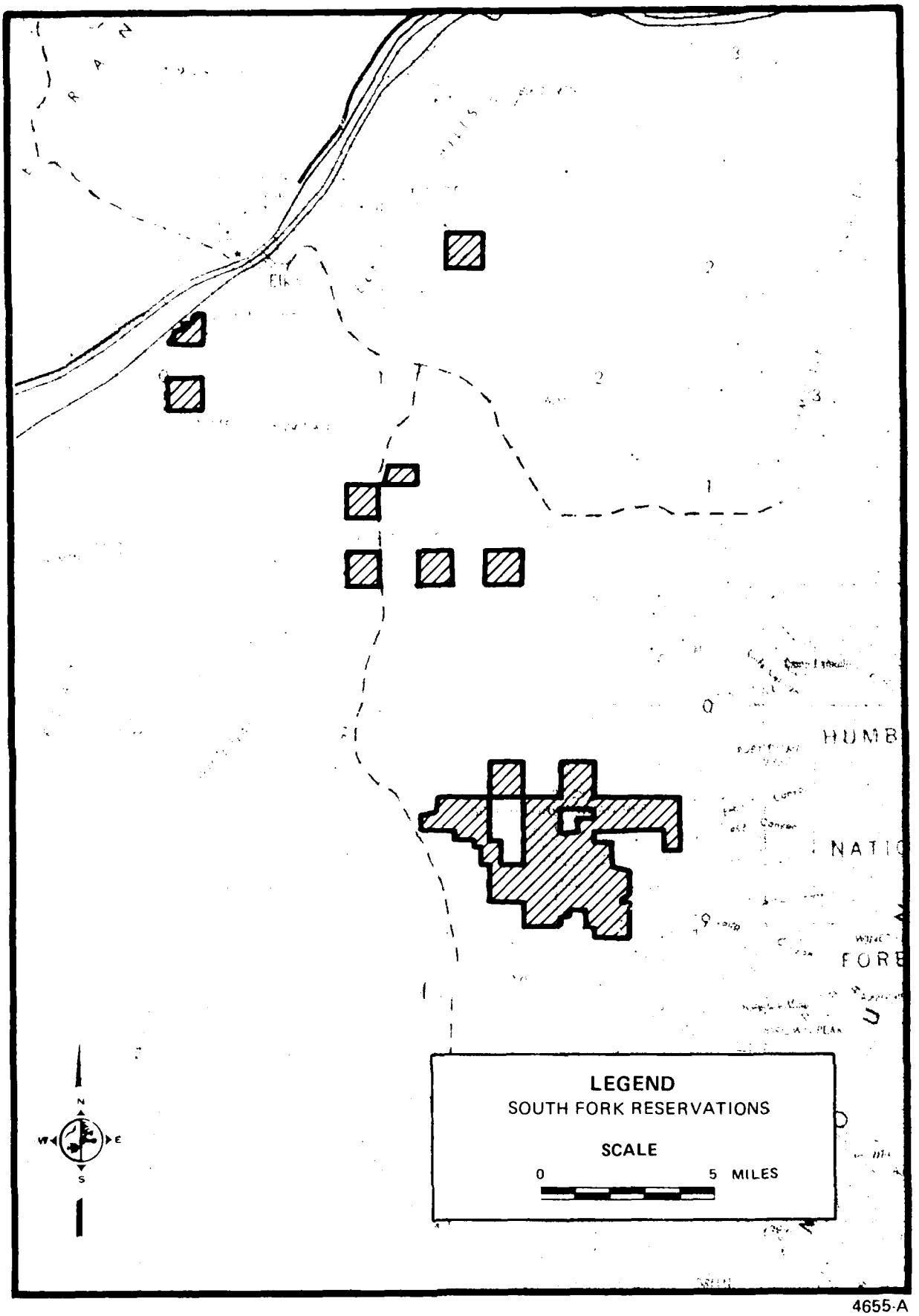


Figure 3.1.4-1. South Fork reservations.

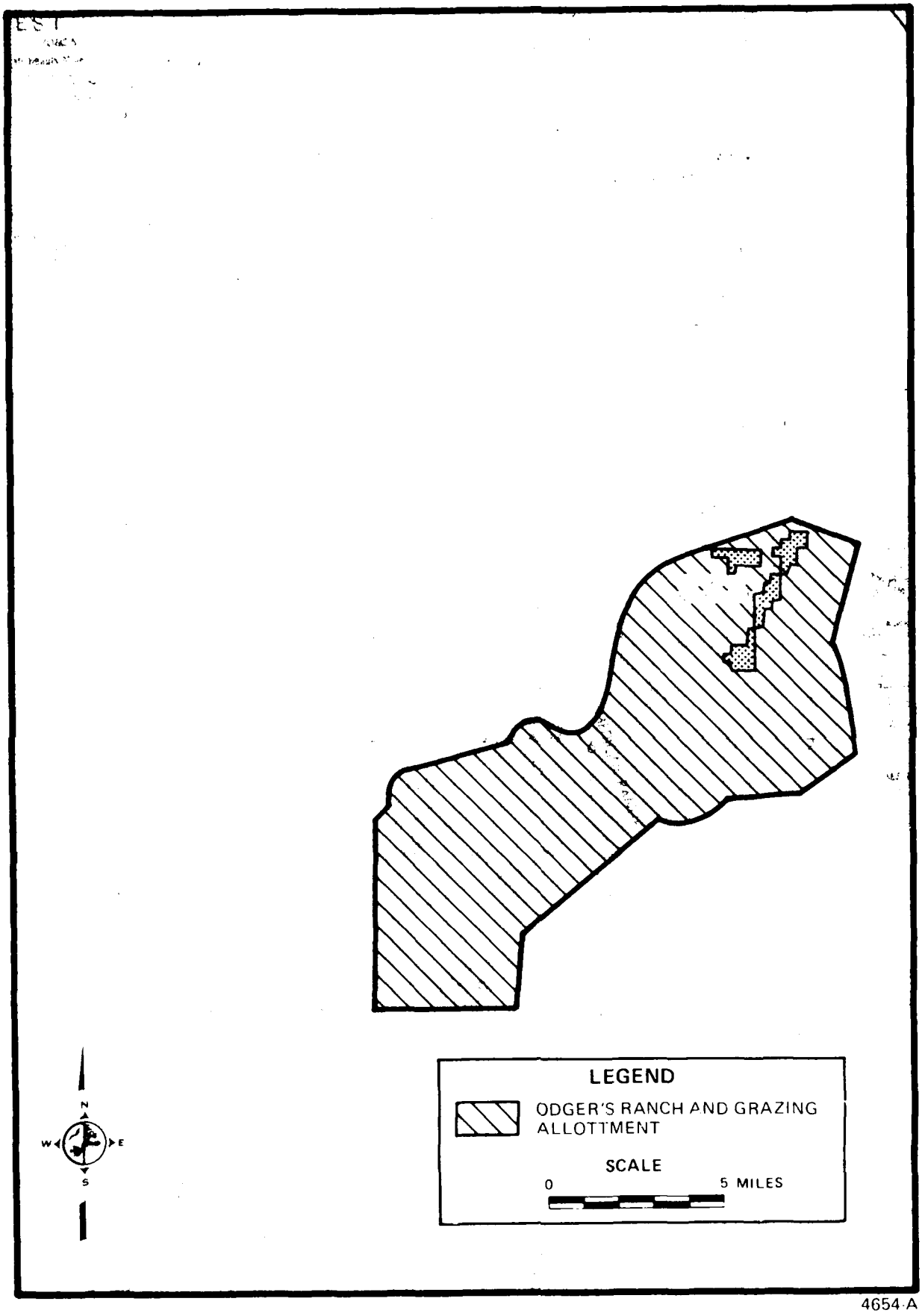


Figure 3.1.4-2. Odger's Ranch and grazing allotment.

Other Land-based Economic Activities (3.1.4.2.2)

No known mineral development potential exists for the South Fork reservations. When the South Fork ranches were purchased, mineral rights were reserved for the state of Nevada. No plans to develop recreation were reported.

Subsistence Activities (3.1.4.2.3)

At one time, many Shoshone people camped at South Fork during summer and fall, and migrated to the many locations where game, birds, and foodstuffs were available. The land along the South Fork of the Humboldt River offered an abundance of plant and animal foods, so that large groups could be supported during South Fork's fall festivals (Inter-Tribal Council of Nevada, 1976 (III):94).

The Shoshone people still gather and eat or use the pine nuts, watercress, doza, sagebrush, wild onions, wild asparagus, camas root, sunflower seeds, berries, and chokecherries available in the valley and mountain areas of the Northern Great Basin, Ruby, Huntington, Clover, and Butte valleys. The Cherry Creek Range to the east of Odgers and Medicine Range to the west were cited as important hunting and gathering areas. Among the wildlife hunted are deer, antelope, woodchucks, ground squirrels, groundhogs, rabbits, mountain sheep, duck, geese, and sagehen (grouse). Mountain streams are rich in trout, chub, and carp (ITC 1976(III)).

Siting Information (3.1.4.3)

Under full basing, there is project activity south of the Odger's grazing lands and the South Fork reservation in both Long and Butte-South valleys. There are three clusters in Long, with shelter construction beginning about 20 mi south of the southern end of the grazing lands. There are 4.5 clusters in Butte Valley South, with shelter construction beginning within 12 mi of the grazing lands. The clusters in both valleys are located between two county roads running north-south, one to Ruby Valley and the other to Odger's Ranch. County road 46, adjacent to the clusters, provides access to the other South Fork Reservations. Under the Proposed Action, there are two construction camps in the vicinity of the South Fork Reservation. In the Newark hydrological unit, the construction camp is proposed for an area 50 mi southwest of the grazing lands, near Eureka; and in Long, the camp would be located 40 mi south. Both of these camps are near county roads leading to South Fork and Ruby Valley reservations (see Figure 3.1.1-1).

Under split basing, the closest cluster is sited about 75 mi south in the White River hydrological unit. The closest camp is in Coal, another 70 mi to the south (see Figure 3.1.1-2). Ely is the closest proposed operating base location, but travel is largely restricted to unpaved county roads.

Impacts on Land Use (3.1.4.4)

Farming and Ranching (3.1.4.4.1)

Due to the proximity of clusters in the Long and Butte-south units, and the location of two construction camps within 50 mi of the grazing lands, disruption of current ranching activities is projected. Recreationists can be expected to use the grazing lands, with the heaviest usage expected during the summer months, when

the entire herd is located there. In addition, rustling could become a problem, and the productivity of the grazing lands could be reduced if mitigative measures were not taken (ETR-40).

As was stated previously, all of the tribe's planning for economic development was been directed toward increasing the productive capacity of the land and strengthening their agrarian economy. The vulnerability of their position lies in the fact that three fourths of their grazing acreage is managed by BLM. This vulnerability was highlighted in the spring of 1980, when BLM informed the tribe that their grazing units had been opened for other uses, including settlement under the Desert Lands Entry Act. This Act opens federal public-domain land to promote reclamation by irrigation through individual effort and private capital. The tribe, which has held permits to the units since 1941, now stands to lose all grazing lands within two years. If these lands are withdrawn, cattle operations will have to be reduced and future economic development plans will have to change (South Fork Tribal Council, 1980(III)). M-X is seen as an additional threat. Land withdrawn by the Air Force is land for which grazing permits cannot be obtained. Since there are difficulties in gaining and keeping grazing permits, and since these difficulties may be exacerbated with M-X, future plans for economic development may have to be more concerned with limited tribal lands than with public lands. The South Fork Community Committee is currently responding to the BLM announcement that federal public domain land will be opened to multiple use: the Committee is planning to reseed and improve 2,000 acres of tribal grazing units, potentially offsetting only 50 percent of the permit grazing lands expected to be lost (South Fork Tribal Council, 1980-81(III):5). Additional losses or restrictions resulting from M-X could tax current land use still more severely and inhibit economic growth.

Other Land-based Economic Activities (3.1.4.4.2)

There are no known plans for nonagricultural land based economic activities and no impacts are anticipated.

Subsistence Activities (3.1.4.4.3)

Impacts on subsistence activities will be similar to those already described. The intensity of the pressure on resources in the South Fork region could be greater because of the proximity of two construction camps.

Comparison of Alternatives (3.1.4.5)

Impacts to land and land use under full basing would be much greater than those expected from split basing. Impacts from the latter would probably be minimal. Alternatives 3 and 5 with an OB at Ely would have the most severe impacts. Alternatives are ranked as follows: Alternative 7, first; Alternative 8, second; Proposed Action and Alternatives 1, 2, 4, and 6, third; and Alternatives 3 and 5, fourth.

DUCKWATER RESERVATION (3.1.5)

Land Holdings (3.1.5.1)

The Duckwater Reservation in central Nevada consists of 3,785 acres. In addition, the Duckwater Tribe's chartered Duckwater Stockman's Association holds

permits on about 352,000 acres. The BLM has supplied the tribe with three descriptions of the allotment comprising about 350,000 acres; however, boundary descriptions are divergent. The general area of the BLM description lies in four hydrological units: Little Smoky-North, Little Smoky-Central, Little Smoky-South, and Railroad North (see Figures 3.1.1-1 and 3.1.5-1). The Tribe has requested legislation to place the approximately 350,000 acres in trust. The tribal action was taken in 1977 and is still pending.

Land Use (3.1.5.2)

Farming and Ranching (3.1.5.2.1)

Farming plays a small role in reservation economics; however, its importance is not easily measured. There are 930 irrigable acres on the reservation land. Cattle ranching forms the basis of the reservation's economy. Ranching operations are organized under a tribal cooperative, the Duckwater Stockman's Association, but herds are independently owned by individual families. Due to the general aridity of the area and inadequate water supplies, Indian and non-Indian ranchers depend upon large grazing allotments on adjoining BLM lands to supply adequate forage for their herds.

The Duckwater economy, which provides only the bare necessities of life, relies entirely on access to and successful utilization of range lands, lands over which they have no control. Grazing fee increases, livestock ear-tagging requirements, lack of range improvements, annual and seasonal fluctuations in grazing permits, inadequate mustang control, grazing allotment trespassing by non-Indian ranchers, and flood damages to reservation lands due to poor erosion control on upstream BLM ranges pose serious threats to the fragile Duckwater economy, and have been the subject of numerous Tribal Council protest resolutions.

Ranching and farming operations are fundamental to future economic development plans. The tribe intends to increase its economic potential agriculturally by improving the arable lands at its disposal, drilling the necessary irrigation wells, and improving its present irrigation systems. They have plans for land improvements to provide more arable land, establishing a large tribally owned cattle herd (as opposed to individually owned herds), and acquiring more land from the Bureau of Land Management and the Forest Service.

Other Land-based Activities (3.1.5.2.2)

The tribe intends to build a hydroponic greenhouse which will utilize the flow from natural warm springs located on the reservation land. With it they hope to develop a produce market in the area. Taking further advantage of geothermal springs, the tribe plans to develop Big Warm Spring into a camping and recreation area, build a recreational vehicle park and swimming pools, and stock sport fish. Economic development goals also include construction of an oil refinery on the reservation. This will refine oil which has recently been discovered just outside the reservation boundaries. Refinery construction is predicated on sufficient flow, approximately 4,000 barrels/day.

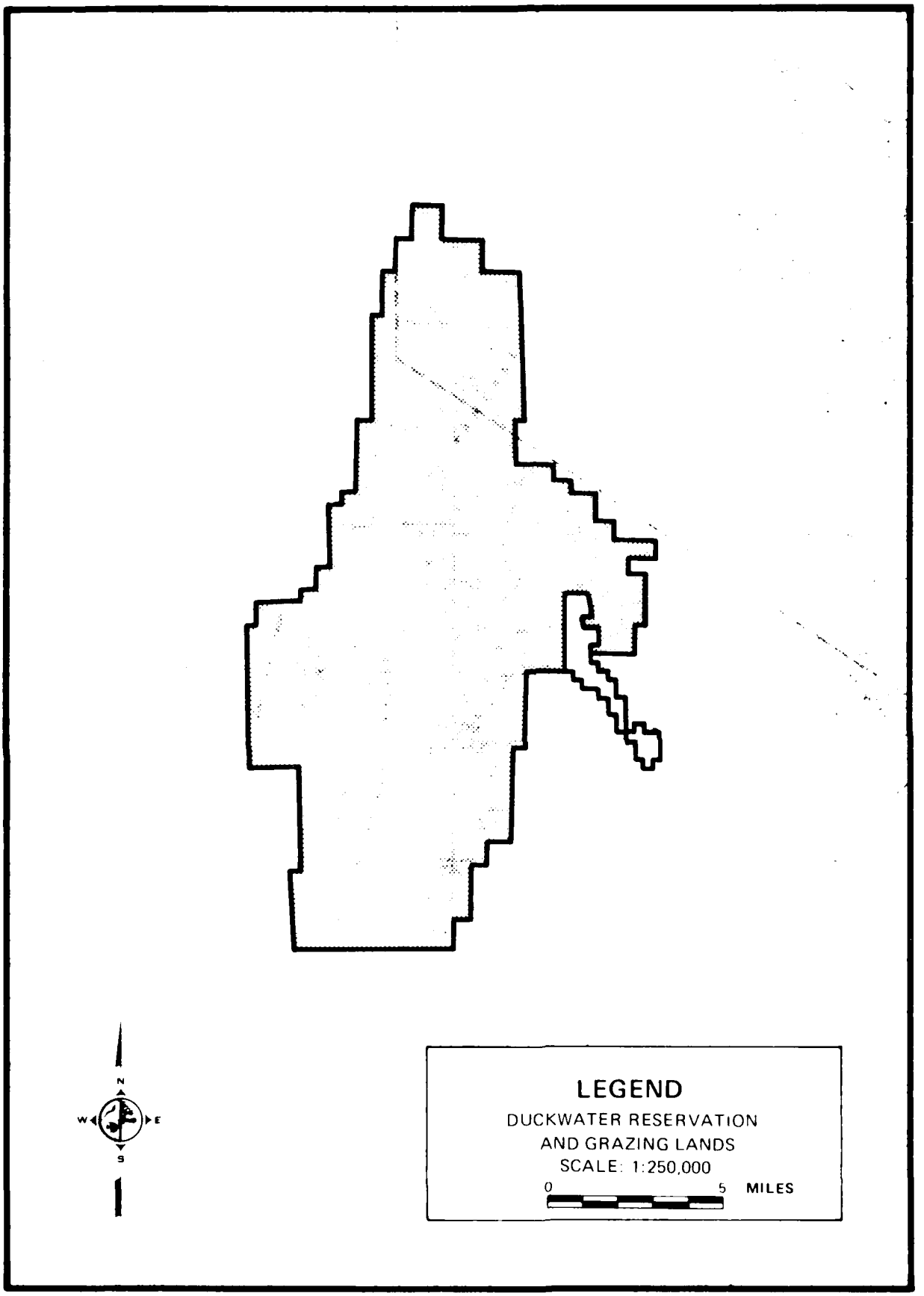


Figure 3.1.5-1. Duckwater Reservation and grazing lands.

Subsistence Activities (3.1.5.2.3)

Foothill areas, mountain ranges, and valleys over a widespread area around the Duckwater region are utilized by the western Shoshone for hunting, gathering, and fishing. Wild animal food sources for the Duckwater Shoshone include ducks, geese, sagehen, groundhog, ground squirrels, deer, antelope, mountain sheep, trout, chub, carp and bullfrogs, lynx, bobcat, coyote, fox, badger, and weasel. Gathering plants and herbs in yearly cycles is another important noncash economic activity. Native plant resources include white sage, black sage, sunflower, rye, sego lily roots, chokecherries, camus root, Indian tea, wild asparagus, wild onions, watercress, morning glory roots, tule roots, greasewood, juniper, and pine nuts. These plants and herbs are used for food and seasoning, and for medical purposes.

Siting Information (3.1.5.3)

Under the Proposed Action the DDA, clusters, and DTN surround the Duckwater grazing lands which coincide with the proposed withdrawal area. Numerous shelters are sited a mile from grazing land boundaries, and nearly 40 shelters are located within 5 mi of those lands; nearly 400 are sited within 10 mi of the boundary. A north/south running DTN is located along the eastern boundary of the grazing lands, and is less than 5 mi from the reservation itself. Another DTN skirts the northern boundary of the grazing land in the Fish Creek area, and still another ends about seven mi from the southern boundary of the proposed withdrawal (see Figure 3.1.1-1).

There are six construction camps around the reservation and the proposed withdrawal area with full basing; three of these are within 10 mi of the grazing lands, and one is two mi west of the reservation boundary. The following table indicates where these camps are; distances are approximate.

Hydrologic Unit	Distance from proposed withdrawal area	Distance from reservation
Little Smoky-south (155C)	20 mi	40 mi
Stone Cabin (149)	55 mi	75 mi
Railroad-northern (173B)	5 mi	2 mi
Newark (154)	20 mi	40 mi
Antelope (151)	15 mi	35 mi
Kobeh (139)	40 mi	60 mi

With split basing, the level of construction activity in the immediate area of the reservation and proposed withdrawal area would be greatly reduced (see Figure 3.1.1-2), and would be confined to the south of the proposed withdrawal area. There would be 1.5 clusters to the immediate south in Little Smoky-southern, and a number of shelters would be sited one mi from the southwestern corner of the proposed withdrawal. There would be only one construction camp in the vicinity, and that would be located toward the southern end of Little Smoky south, 20 mi south of the proposed withdrawal area and 40 mi southwest of the reservation.

The closest proposed operating base would be at Ely, 75 mi northeast of the reservation, which is fairly accessible from state route 6 to state route 20. Accessibility to the reservation and grazing land would be tremendously increased by DTN and cluster roads.

Impacts on Land Use (3.1.5.4)

Farming and Ranching (3.1.5.4.1)

No direct impacts to Duckwater grazing lands are expected; siting on these lands has been minimized. However, the proximity of project facilities and construction activities with full basing is expected to hamper current ranching activities. The grazing area would be virtually surrounded by construction of DTN, shelters, or construction camps. Construction-related noise, dust, etc., could limit usage of the perimeter of the grazing area. Grazing patterns might have to be adjusted in an attempt to graze cattle as far from ongoing construction as is feasible.

The concentrations of personnel in the six construction camps is expected to have more impact than that associated with the construction itself. There could be several thousand workers in proximity to the withdrawal area, and reservation and recreational activity in the region will increase dramatically. The lack of project activity within the boundaries of the grazing lands could enhance the attractiveness of "wilderness" recreation. The proximity of the construction-free 352,000 acre grazing allotment to the construction camps also will heighten its attractiveness; it is within easy walking distance of the Railroad-Northern camp. The intensity of recreational use will interfere with ranching operations, disturb and scatter cattle, and interrupt drives and other cattle movement. The probability of rustling, or of simply using the animals for target practice, must be addressed and regulations enforced to minimize these activities.

The tribe intends to establish a large tribally owned herd. The carrying capacity of the proposed withdrawal area is not known, but the tribe has stated that it plans to acquire more land from the BLM and Forest Service. It will be difficult to obtain grazing permits for contiguous land; only along the southwestern boundary of the grazing lands are there adjacent lands which are free of project activity. The tribe would have to look farther afield for additional grazing lands, to valleys where the level of project activity is reduced. This may hamper ranching activity by necessitating longer cattle drives; and temporarily the stock trails would have to wind through areas of heavy construction traffic and activity. The presence of project activity around the withdrawal areas will not, by itself, preclude the expansion of ranching operation, but careful planning and cooperation between the Air Force and the Duckwater Tribe are needed to avoid seriously restricting future ranching operations.

Other Land-based Activities (3.1.5.4.2)

Project activity could impede attainment of other development goals--notably the development of a hydroponic greenhouse utilizing flow from natural warm springs on the reservation, and development of a camping and swimming recreation park at Big Warm Springs. These projects are water dependent. (Discussion of potential impacts of M-X on Native American water resources is in Section 3.2, ETR-21). If the warm springs which the tribe intends to utilize are not affected, and the tribe undertakes the development of recreational facilities, then the proximity of the construction camps could be advantageous. The recreation park would have to be carefully planned, and developed with heavy usage in mind. Facilities not designed for intense visitor use would be overrun.

Subsistence Activities (3.1.5.4.3)

Traditional hunting, gathering, and fishing activities are still relied upon as dietary supplements. This pattern of reliance is attributable to the economic hardships which characterize the remote and underdeveloped reservation, and is therefore expected to continue as long as the tribal economy is weak. Construction of the system, the location of multiple clusters in and around traditional hunting and gathering areas, and an influx of some 20,000 people into the general area are expected to severely impede continuation of these subsistence activities. Hunting and gathering cycles and patterns will almost surely have to be modified because of M-X-related construction activity and population. Distances travelled for hunting and gathering will increase, and frequency of the activity will probably decline. This will have an adverse effect on the Duckwater subsistence economy, worsening the conditions of poverty there.

Comparison of Alternatives (3.1.5.5)

Impacts would diminish greatly with split-basing. Alternatives 3 and 5, with an Ely OB, would have the greatest impacts. Alternatives are ranked as follows: Alternative 7, first; Alternative 8, second; Proposed Action and Alternatives 1, 2, 4 and 6, third; and Alternatives 3 and 5, fourth.

ELY COLONY (3.1.6)

Land Holdings (3.1.6.1)

The Ely Colony consists of three distinct land areas. The "Old Ely Colony," is on 9.95 acres of steep, hilly terrain on the southwest side of town. The "new Ely Colony" is on 10.1 acres leased land in the foothills on the southeast side of Ely. There is a 90 acre undeveloped parcel of relatively flat land on the south side of Ely (see Figure 3.1.6-1).

Land Use (3.1.6.2)

Unlike reservations, colony lands are principally residential. This is the case for the Ely Colony although feasibility studies are planned for the development of the 90 acre parcel. Tentatively, the plan is to use the acreage for industrial development.

The mountains around the Ely area are rich in floral and faunal resources once utilized for subsistence and medicinal purposes. Mining activities have disrupted traditional hunting and gathering activities, though the extent to which these are still relied upon is unknown.

Siting Information (3.1.6.3)

Under the Proposed Action, there are four clusters planned for Jakes Valley, an area approximately 30 miles west of Ely. Ely Colony is well outside the DDA under split basing. Under alternatives 3 and 5, the Ely vicinity is the site of the second operating base.

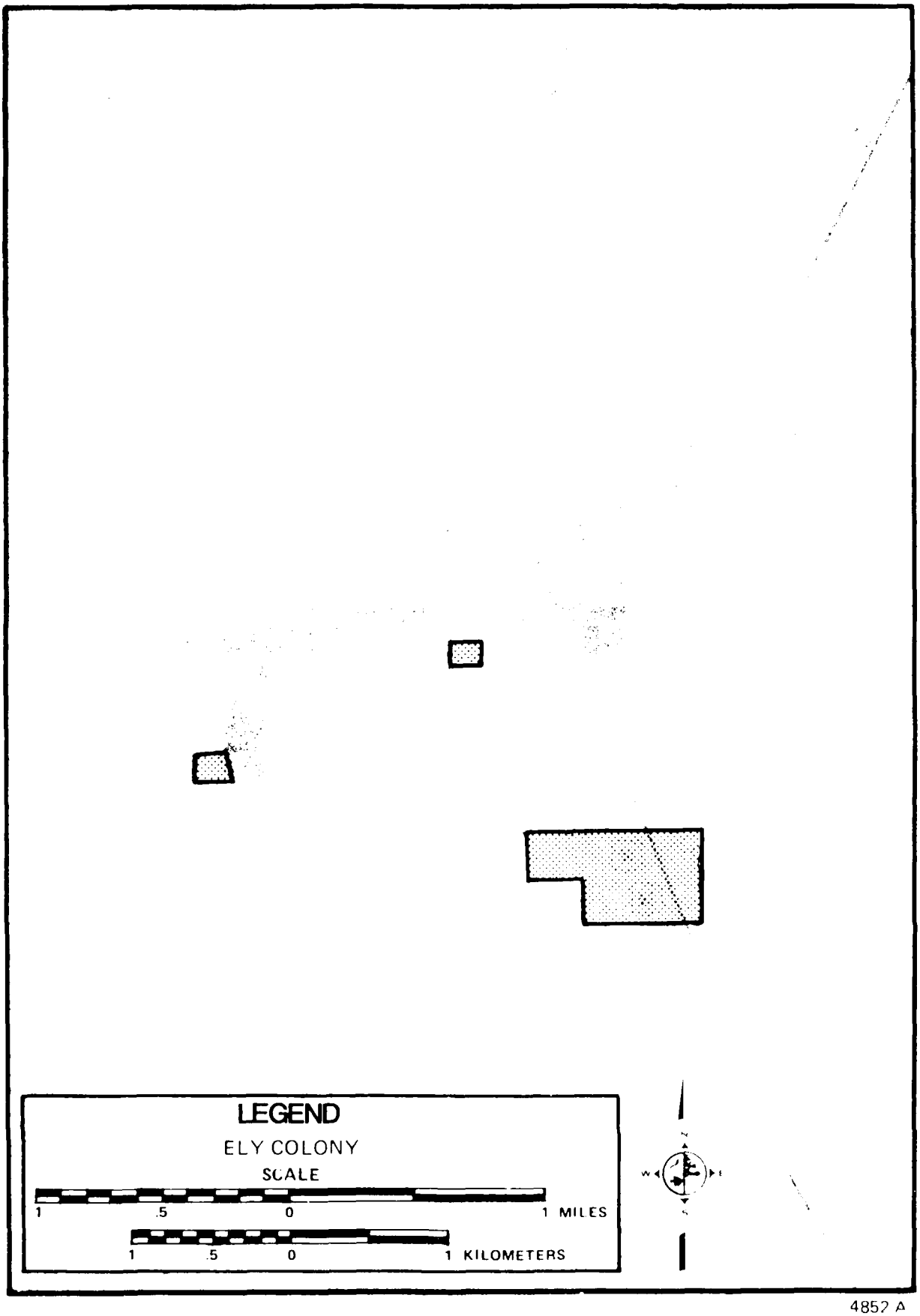
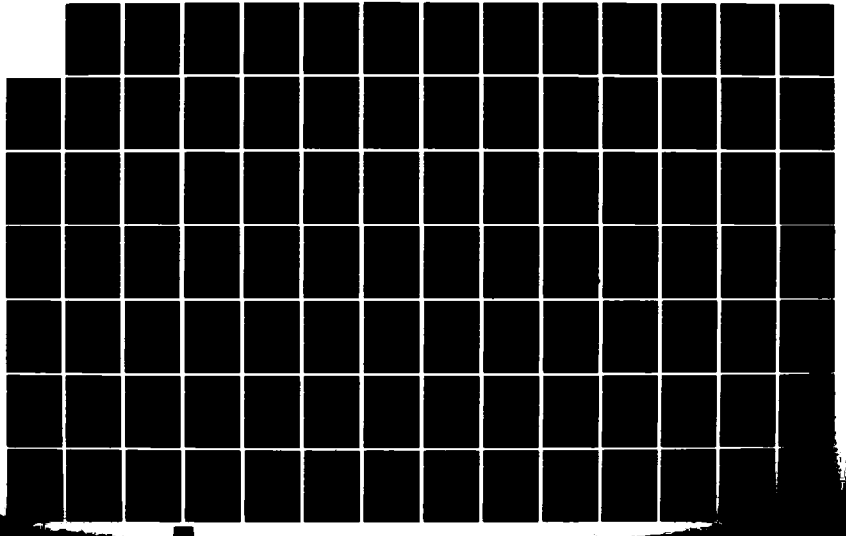
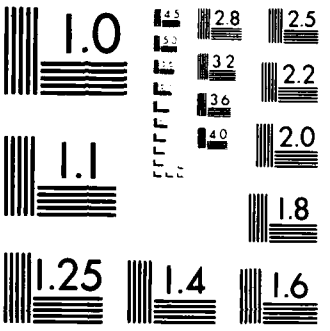


Figure 3.1.6-1. Ely Colony.

AD-A149 912 DEPLOYMENT AREA SELECTION AND LAND WITHDRAWAL/ACQUISITION M-X/MPS (M-X/MU..(U) HENNINGSON DURHAM AND RICHARDSON SANTA BARBARA CA 02 OCT 81 3/5

UNCLASSIFIED M-X-ETR-21 F/G 16/1 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

Impacts on Land Use (3.1.6.4)

The Ely Colony's location and plans for development contribute to this group's capacity to take advantage of nearby M-X activity. Clearly, industrial land-uses, especially those associated with transportation, are more likely to benefit from M-X construction and operations than are agricultural enterprises. Direct effects on colony lands resulting from M-X are, therefore, expected to be positive.

Comparison of Alternatives (3.1.6.5)

Alternatives 3 and 5, with an Ely OB, would have the greatest impacts. Alternatives are ranked as follows: Alternative 7, first; Alternative 8, second; Proposed Action and Alternatives 1, 2, 4 and 6, third; and Alternatives 3 and 5, fourth.

MOAPA RESERVATION (3.1.7)

Land Holdings (3.1.7.1)

The Moapa Indian Reservation consists of 72,012 acres (Figures 3.1.1-1 and 3.1.7-1).

On December 2, 1980, President Carter signed into law a Land Return Bill which added 70,566 acres to the previous 1,446-acre land base (see appendix for land descriptions and land actions). The Moapa do not have grazing permits for BLM or other public lands.

Land Use (3.1.7.2)

Farming and Ranching (3.1.7.2.1)

The Moapa economic base is much more diversified than that of the other reservations and colonies in the study area (see section on "Economy" for a description of the non-land-based economy and potential impacts on it). Nonetheless agricultural production and cattle operations are vital elements in it. Reservation land uses include about 300 irrigated acres in alfalfa, and 150 irrigated acres in barley, grain, milo, or pasture. Another 180 acres are irrigable. Approximately 71,000 acres are undeveloped (this includes the 1980 reservation expansion of 70,565 acres).

Farm

In the fall of 1968, the tribe decided to run its own farm rather than renew a lease with a local dairy. Tribal representatives obtained approval from the BIA to use over $150,000 of their own money held in trust, to purchase farm machinery and provide improvements on their run-down farm. In 1973, the tribe obtained an Economic Development Administration (EDA) grant which helped pay for major farm improvements. Since 1973, the tribe has purchased a neighboring ranch, expanding irrigable land to 721 acres, increased the cattle stock from 40 to 155, and expanded the production of alfalfa and barley. The farm presently provides employment for seven tribal members, and is operating on a nonsubsidized basis.

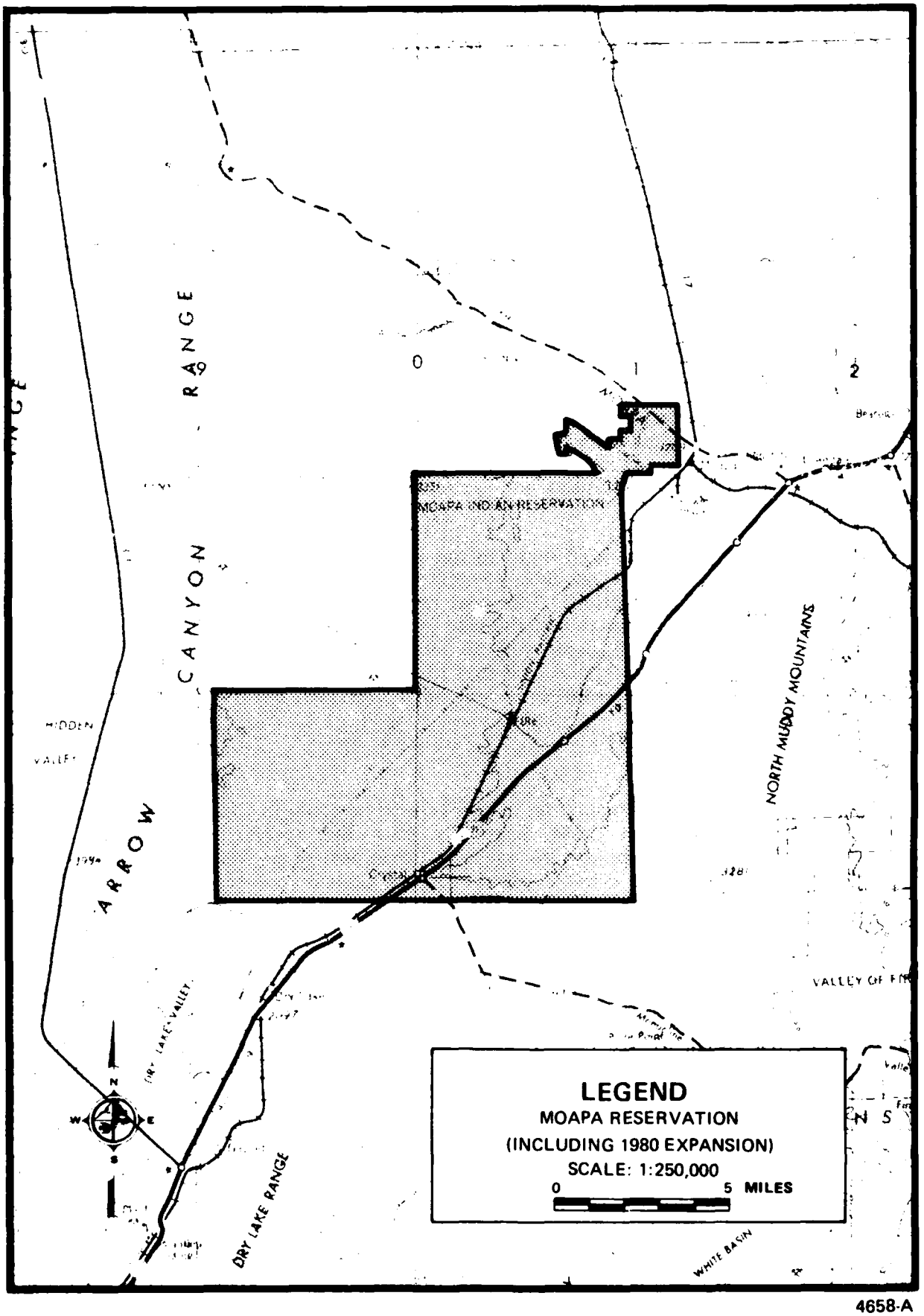


Figure 3.1.7-1. Moapa Reservation.

Greenhouse Harvesting Operation

The Moapa tribe took advantage of their skill base in field cropping and their climatic conditions to begin an ambitious venture: the production of greenhouse tomatoes. The tribe received a Department of Labor (DOL) CETA training grant in February 1978 to train 35 tribal members in all aspects of the tomato growing business, and borrowed money for the first half-acre. Later that year, HUD funded the tribe with a three-year Community Development Block Grant (CDBG) which was used to build greenhouses on five additional acres. The tribe used the DOL CETA trainees and its own construction firm to erect the greenhouses.

The tribe sells its "Paiute Brand Tomatoes" to hotels and restaurants in Las Vegas and Phoenix, and has already been highly successful in penetrating these markets. Success is partially attributed to the tribe's high-quality, high-yield tomato that is a result of a production method tribal representatives learned during their visit to some European countries. The tomatoes are grown in peat bags with a trickle irrigation system, and this has met with considerable success. The tribe has also been successful in cucumber propagation experimentation. The projected revenue for nine months of tomato and cucumber production was over one-half million dollars.

The tribe's goal over the next eight to ten years is to build a total of 15 acres of greenhouses, which would provide 75 tribal members full-time, year-round employment in tomato production. This goal recently suffered a serious setback, however. A freak hailstorm, with hail the size of tennis balls, hit the Upper Muddy area, in early September 1980, destroying 80 percent of the glasshouses. Although the tribe was covered by insurance, for loss of crop revenue as well as physical damage, a considerable amount of time will have been lost before the project is fully operational again.

Other Land Use (3.1.7.2.2)

A powerline corridor offering the best access from southern California through Clark County to Utah will cross diagonally over the reservation expansion. Presently, there is one high power transmission line; another is planned, and if the Harry Allen Generating Plant is constructed at Arrow Canyon, a coal slurry pipe line may be built. Southern California Gas is proposing the construction of a 36 in. natural gas line, which will cross the returned lands in the right-of-way corridor. This gas line will run from Wyoming to Southern California, and construction is expected to begin in early 1982 if proper clearances are secured. No revenue estimates are available on the proposed power, coal, or gas lines, but the tribe would receive some $26,000 annually for the existing high power transmission line (Ostanik 1980).

Subsistence Activities (3.1.7.2.3)

Numerous sites in the vicinity of the Moapa reservation were identified by Nevada Southern Paiutes (from Moapa Reservation and Las Vegas Colony) as important hunting and/or gathering areas. These include: Kane Springs Wash, Meadow Valley Wash, Coyote Spring, Delamar Flats, and the Sheep Mountains. Important floral and faunal resources found in these areas include: willow trees, Indian spinach, sage, cactus, mesquite, rabbits, tortoises, deer, pine nuts, Indian tea, yucca, and squawberries.

Many of these resources are hunted and gathered for dietary supplements; some plants and herbs are collected for their medicinal value. Willow trees are valued for their pliable wood, used in making cradle boards.

Siting Information (3.1.7.3)

The Moapa Reservation is outside the DDA for the Proposed Action and all alternatives. The nearest shelters under full and split basing are sited approximately 50 mi north in Delamar Valley. There are three clusters in Delamar and another nine farther north in Dry Lake. Under the Proposed Action and Alternatives 1, 2, and 8, the first operating base is located in Coyote Spring Valley, less than 15 mi northwest of the Moapa Reservation. The second operating base is at Coyote Spring Valley under Alternatives 4 and 6. In addition, there is a construction camp about 60 mi north of the reservation with full and split basing.

Impacts on Land Use (3.1.7.4)

Ranching and Farming (3.1.7.4.1)

The impact of project activity on current ranching and farming operations will be of the same type expected elsewhere: molestation of cattle by trespassers, for example. Since reservation lands are held in trust by the government, strict trespassing regulations can be enforced to reduce these indirect impacts. However, because of the numbers of recreationists, commuters, and others working and living in the immediate vicinity, enforcement could be very difficult. Jurisdictional issues relevant to enforcement of such regulations are discussed in Section 4.3.2.7 of this ETR.

Approximately 42,500 acres of the 70,000, acre addition are lands which are suitable for grazing and farming. The extent to which the Moapa plan to utilize the newly available lands for these purposes is unknown, and impacts on expanded ranching and farming activities cannot be assessed.

There are grave concerns regarding the potential impact of the base construction and operation as well as other project activity on water resources, and, consequently, on land use. See Water section for a discussion of these potential impacts.

Greenhouse Horticulture

The proximity of the OB could be advantageous for the greenhouse enterprises providing that impacts on water resources do not adversely affect operations and expansion plans (see section on water resources and the Water ETR-12). The OB could provide a large local market for the "Paiute Brand Tomatoes" and cucumbers, and serve as an impetus for rapid and large-scale development of that enterprise. The Moapa Reservation plans to develop economic enterprises in conjunction with the Air Force, and this type of collaboration would be important element in the success of the greenhouse enterprise.

Subsistence Activities (3.1.7.4.2)

Project activity in Dry Lake-Delamar will negatively impact hunting and gathering patterns in a manner similar to that discussed elsewhere. This will be

compounded significantly if an OB is constructed at Coyote Spring. The pressure on local floral and faunal resources will be greatly increased; yields from subsistence activities will be reduced, and the distances travelled for those purposes will probably increase.

Comparison of Alternatives (3.1.7.5)

DDA impacts from both full and split basing will be essentially the same. However, the impacts from the Coyote Spring OB under the Proposed Action and Alternatives 1, 2, 4, 6, and 8 will far outreach those expected from the deployment area. Alternatives are ranked as follows: Alternative 7, first; Alternatives 3 and 5, second; Alternative 8, third; Alternatives 4 and 6, fourth; Proposed Action and Alternatives 1 and 2, fifth.

PAIUTE INDIAN TRIBE OF UTAH (3.1.8)

Analysis of the potential impacts of M-X on the Paiute Indian Tribe of Utah land use is problematical. The Cedar City Band has about 5 acres in Cedar City, the Indian Peaks Band has no land; the Richfield-Koosharem Band's land consists of a one-acre industrial park; the Kanosh Band has 80 acres, largely residential; and the Shivwits Band, the only band to retain its reservation lands, has 28,160 acres. This is outside the DDA, and most of it is leased. On the surface, then M-X would not be expected to affect Utah Paiute's land use. The situation is considerably more complicated than that, however, because the Paiute Indian Tribe of Utah had reservation land until 1954, when they were terminated from federal trusteeship; and, as of April 1980, they have been restored to federal trusteeship. A total of 15,000 acres of land is to be withdrawn/acquired from Beaver, Iron, Millard, Sevier, or Washington counties, and reservation lands restored to the tribe. (See section 1.1.4 for a discussion of their termination and restoration.) A study is currently underway for developing land use plans.

Furthermore, the Paiute Indian Tribe of Utah did not stop using the land following their termination and subsequent loss of reservation lands. While there is no formal agrarian land base for these bands, nor are there other commercial enterprises, utilization of floral and faunal resources for subsistence and medicinal needs continues. The importance of continuing subsistence activities is not fully under stood; further investigation is necessary. It is known, however, that the tribe still hunt on their aboriginal lands, and collect, among other plants and herbs, blackberries, Brigham tea, sagebrush, cedar leaves, and pine nuts. Numerous sites in the mountains, valleys and foothills of western Utah were identified by the tribal informants as important sources of floral and faunal resources. Notable among these is the Indian Peaks area, in the Needle Range between Pine and Hamlin valleys about 30 mi north of Beryl. This area was once an Indian reservation; but, following termination, it was purchased by the state of Utah and is now a State Wildlife Management Area. The Indian Peaks Band still retains partial water rights and continues to have hunting and gathering privileges. Other important areas include the Pahrant, Crescent and Pine valleys, Kanosh Canyon, and Kimberly, Wah Wah and Beaver Dam mountains.

Siting Information (3.1.8.1)

There would be a considerable amount of project activity in the Western Utah valleys, under both full and split basing. There is heavy project activity on either side of the Needle Range: six clusters in Hamlin, and four in Pine. A DTN runs

through the Needle Range, within a few miles of the Wildlife Management area. Crescent Valley, east of the Wah Wah range, also has heavy project activity: 7.5 clusters. Under both full and split basing, there is a construction camp in Pine Valley less than 10 mi from Indian Peak and just outside the boundary of the old reservation. The proposed operating bases near Beryl, Milford, and Delta are located in the vicinity of three Utah Paiute Indian colonies--Kanosh, Richfield, and Cedar City--and the Shivwits Reservation. All Nevada/Utah full-basing alternatives except one, Alternative 3, have a proposed OB in western Utah.

Impacts (3.1.8.2)

The very high level of project activity in and around the mountains and valleys considered valuable by the Paiute Indian Tribe of Utah for their subsistence resources would adversely affect continued subsistence activities, as has been stated earlier. The negative impacts would be exacerbated by the siting of a construction camp in Pine Valley and an OB in Delta, Milford, or Beryl. The heavy population influx associated with OB construction and operation, and the related acceleration in recreational activities, will pressure the regional resources. The effects of this on the local Indian populations will be similar to those described earlier.

Since a portion of M-X is sited on the Utah Paiute's traditional lands which some tribal members may wish to withdraw for reservation restoration purposes, there is a possibility that there will be a conflict over land selection.

3.2 WATER RESOURCES AND IMPACTS

INTRODUCTION (3.2.1)

Major river systems in the Nevada/Utah study area which are of concern to Native American populations are the Humboldt, Reese, Walker, Muddy, and Sevier (see Figure 2.2.1-1). The Humboldt flows through or is adjacent to the Lovelock, Winnemuca, Battle Mountain, and Elko Indian reserves. The South Fork of the Humboldt and its tributaries are principal sources of water for the South Fork and Ruby Valley reservations. The Reese River, which flows into the Humboldt in the Battle Mountain area, is the principal source of water for the Yomba Reservation through which it flows. The Muddy is an important water source for the Moapa Reservation, and the Walker River flows through the Walker Reservation. The Sevier River and its tributaries are important to the Southern Paiutes in Utah.

In addition to major rivers and tributaries, there are numerous springs of varying sizes in the study area which are economically significant for reservation and colony Native Americans, especially those with extensive grazing lands. There are also thousands of small streams and creeks flowing out of the mountain ranges. Because of the general aridity of the Great Basin, most are ephemeral, but creeks are an important water resource on some Native American reserves nevertheless. Bull Creek and Fish Creek are primary sources of water for the Duckwater Shoshone. Spring Creek and Deep Creek are important to the Goshute Indians; and Hickman Creek is the principal water supply at the Skull Valley Reservation.

Throughout most of the Great Basin, the stream and creek flows are erratic and/or minimal. Much of the surface water, therefore, is not diverted and utilized, but seeps into the ground. As groundwater, its economic significance is great.

Wells are relied upon extensively by Indians and non-Indians for domestic, agricultural, industrial, and other purposes; groundwater storage volumes are of central concern to the area inhabitants.

Water is considered to be of critical importance to reservation Indians in general, and particularly to those living on reservations in arid regions. The BIA refers specifically to the "arid lands of the western United States" in its statement that the importance of water there "cannot be overemphasized" (BIA 1978:ii). However, serious difficulties arise over the question of which waters are Native American waters: this issue is complex and confusing. Multiple and sometimes contradictory statutes and principles, which are applied differently in varying contexts and states, are involved. The most broadly applied is the federal water rights doctrine, which was established in Winters v. U.S. 207 U.S. 564 (1908) and reaffirmed in Arizona v. California 373 U.S. 546 (1963). This doctrine holds that when an Indian reservation was created," there was reserved or confirmed not only the land but also the right to enough water to irrigate the irrigable portions of the reserved lands or otherwise fulfill the purposes of the reservation" (BIA 1978:1). The Winters decision, and subsequent decisions, establish that the priority date for the reserved right is the data of the creation of the reservation, not the date the water is put to beneficial use. Subsequent appropriation under state law by miners, farmers, ranchers, and others are junior. This generated considerable controversy, because the federal Indian water right is not based on the doctrine of prior appropriation which requires that a right cannot be obtained unless the water is put to a beneficial use. In the Winters case, the federal reserved right was measured by the amount of water necessary to irrigate the irrigable acres on the reservation. Theoretically, courts may adopt different or additional measures of the water reserved depending on the purpose for which the reservation was created.

Since the United States is trustee of Indian reservation lands, the United States has been involved in many cases defending or asserting federal reserved water rights on behalf of tribes. In evaluating Native American surface water rights, the federal doctrine therefore requires consideration of the purposes for which the reservation was created and the amount of water needed for those purposes, as well as an awareness of the impacts of state "first in time/first in right" water appropriation laws and state requirements that appropriated water be put to beneficial use.

Finally, there is the question of groundwater rights. "Judicial or congressional determination of Indian rights to groundwater has not been made" (BIA 1978:2). However, in Cappaert v. U.S. 426 U.S. 128 (1976), the Supreme Court held that the federal government had a federally reserved right to groundwater. Specifically, the decision protected groundwater below Devil's Hole National Monument from being diminished by outside pumping, but the potential ramifications of the case extend to other federal land. Reserved groundwater rights is the issue in a current case concerning Native Americans. In U.S. and Papago Indian Tribe v. City of Tucson, the Indians are trying to establish rights to reservation groundwater. The Santa Cruz River, which runs through the reservation, has been reduced to a dry channel by off-reservation pumping upstream. Should the courts decide in favor of the Tribe, the consequences would be far-reaching, since at issue is the establishment of groundwater rights for all Indian reservations (BIA 1978:3).

Because of these other problems surrounding the issue of Native American water rights, the exact nature, extent, and perpetuity of those rights remain controversial.

Most Native American reservations in the study area are located outside the DDA, and impacts on their water resources are not anticipated. The Goshute, Yomba, and South Fork tribes have reservation or grazing lands close to project activity, but because of the direction of water flow and/or distance and direction from project activity, no impacts on the water resources of these reservations are anticipated.

Those reservations within the DDA or close to a potential OB site are the Duckwater Reservation, Moapa Reservation, and Ely Colony. Ely Colony, however, uses water from the city of Ely. See ETR-12 (Water) for a description of potential impacts on water resources there.

DUCKWATER RESERVATION (3.2.2)

Water Resources (3.2.2.1)

The Duckwater Reservation is located in an arid region. Precipitation, in the forms of summer thundershowers and light snow flurries, averages less than 5 in. annually. Important water resources for the Duckwater Reservation and proposed withdrawal area include three perennial streams: Bull Creek, just west of the reservation; Currant Creek to the south; and Duckwater Creek, which runs through the reservation. There are also a number of ephemeral streams flowing out of the White Pine and Pancake ranges. Big Warm Springs, located in the reservation, has a 30 dfs flow year-long, and is the main source of reservation water during the winter months. There are also additional natural warm springs on the reservation (see Appendix B for further information on water resources and water issues).

Water Use (3.2.2.2)

The tribe utilizes water resources on the reservation for irrigation, to some extent, and plans to develop these capacities further. There are currently 1,166 irrigated acres. In 1977, a well located along the north boundary yielding 1,700 gpm was developed as a supplemental supply for the project. The Duckwater Tribal Council and Bureau of Indian Affairs are currently engaged in updating the project, to improve water efficiency and provide water for additional lands.

The tribe intends to further improve reservation arable lands by drilling additional irrigation wells. Other water-intensive development plans include construction of a hydroponic greenhouse, which will utilize natural water springs found on the reservation, and development of a recreational area around Big Warm Springs.

Water availability for livestock on the grazing lands in the Duckwater region is generally inadequate, and competition between livestock and wildlife is already acute at some locations. In Railroad Valley, there are only "seven or eight water sources in an area where there should be 15-20" (Duckwater Planning Unit, October 1972:14). "The only source of permanent water in the Pancakes for the Duckwater Wash drainage area north and west of the Indian Reservation are Gib

Louis and North Spring and Warm Springs around the Indian Reservation (DPU, October 1972:15). "Due to low precipitation, high evaportation and shallow soils, little or no potential exists for increasing water yields" (DPU, June 1972:3).

There are several areas in the Duckwater region which experience severe watershed problems and there are multiple zones of critical gully erosion. The Duckwater and Bull Creek Wash areas flood frequently; the Indian reservation and private lands in the Duckwater Creek and Bull Creek area flooded 10 of the 12 years from 1959 to 1970. Currant Creek, Cold Springs, Sand Springs, and Little Smoky watersheds are other areas of chronic flood and sediment damage and erosion.

Siting Information (3.2.2.3)

Under full basing, there is considerable project activity in the Duckwater region. There is a DTN which runs adjacent to Bull Creek for about 30 mi along the eastern boundary of the reservation and proposed withdrawal area. Another DTN runs adjacent to Fish Creek along the northern edge of the proposed withdrawal area. There are numerous protective shelters surrounding the grazing lands, including shelters adjacent to Bull Creek and Current Creek (see siting information under Land Use for more detailed information).

Impacts (3.2.2.4)

Vegetation manipulation and ground cover protection are extremely important flood-control and sediment-reduction methods. Construction entails removal of ground cover, and will exacerbate the problems already being experienced unless mitigative measures are taken. This is expected to be a major cause of concern for non-Indians and Indians alike. This is especially the case for the Duckwater Tribe, as the Indian Reservation frequently receives the brunt of the spring flooding.

It is unlikely M-X water requirements in the Duckwater area would have any meaningful effect on valley and regional water resources, but short-term localized effects on Duckwater Reservation irrigation and stock-watering springs and wells could occur. If M-X construction water extraction were to occur sufficiently close to existing wells and springs to lower the water table (diminishing supplies and lowering the productivity of irrigated land and that of cattle herds, especially if pumping were to coincide with a cycle of climatically dry years), this impact could be very significant.

Recovery would follow a few weeks or months after such pumping ceased and water-table levels returned to normal. Longer-term damage would occur if a temporary localized drawdown of the water table disrupted the underlying structure of springs and shallow wells, such that recovery were impaired. Analysis will depend on specific well placement and utilization levels, and appropriate model analysis.

It may be possible to avoid impacts on the Duckwater water resources if care is taken to locate M-X construction wells a sufficient distance from Duckwater sources to avoid drawdown. Depletion of the already taxed water supply in and around important water resources is a major area of concern among Native Americans, and poses a grave threat to the Duckwater Tribe. Economic development plans are water dependent, and there is fear among tribe members that M-X construction and operation could seriously affect those plans. The potential for

water table drawdown, and increased flooding and erosion, are causing and will continue to cause heated controversy.

Under split deployment, the potential impact to Duckwater reservation and grazing land water resources is significantly reduced. There is some possibility that water resources in Little Smoky South Valley may be moderately impacted.

MOAPA RESERVATION (3.2.3)

Water Resources (3.2.3.1)

This discussion of Moapa Reservation water resources focuses on the boundaries prior to the December 1980 land return. The Indian reservation straddles the spring-fed Muddy River in the upper part of the Moapa Valley. The headwaters of the river, which is approximately 25 miles long, transverse the Moapa Valley, flowing southeasterly into Lake Mead. The region in general is arid; precipitation averages little more than four inches/year. The Moapa Valley, however, because of the Muddy River, is relatively fertile.

The Muddy River is at the downstream end of a topographic trough that includes, from north to south, White River Valley, Pahroc Valley, Pahranagat Valley, Coyote Spring Valley, and Moapa Valley. The White River channel, which flows through this trough, and groundwater from adjacent ranges, notably the Sheep Range to the west and the Delamar and Dry Lake valleys to the east, provide the groundwater recharge for Muddy River Springs (Eakin, 1963, 1964). Discharge from these springs is the source of the Muddy River (see Figure 3.2.3-1). (For additional information, see ETR-12 (Water Resources)).

Water Use (3.2.3.2)

The Muddy River and 21 natural warm springs at the north end of the valley are the principal sources of water for the Moapa Reservation, and the Moapa are vulnerably dependent on those resources. Because the Moapa Valley is arid, characterized by low precipitation, high temperature, and high evaporation rates, the groundwater recharge for the springs is highly important. The Muddy River Springs "are the base of the agricultural economy of the Moapa Valley" (Eakin 1964:12), and agriculture is an economic mainstay of the Moapa Reservation. Furthermore, agriculture--irrigated cropland and greenhouse horticulture, both water-dependent--are central to Moapa's economic development plans. For example, the 5.5 acre Tomato Project, in full operation and at peak demand, will require 100 gallons/minute (see section on land use for a discussion of irrigation and greenhouse horticulture).

The Moapa depend on springs located at Warm Springs, 4 mi north of the reservation, for their domestic water supply. A single (old) line of the Moapa Valley Water Company that originates at the Springs supplies the reservation with all its domestic water. The system is plagued with problems, and the Moapa plan to construct a new, independent system utilizing river water. The new system would consist of a pumping station from the river, a sand filtration system, new storage tanks (200,000 gallon capacity) for the tomato project, a new housing project, and a tie into the existing distribution system.

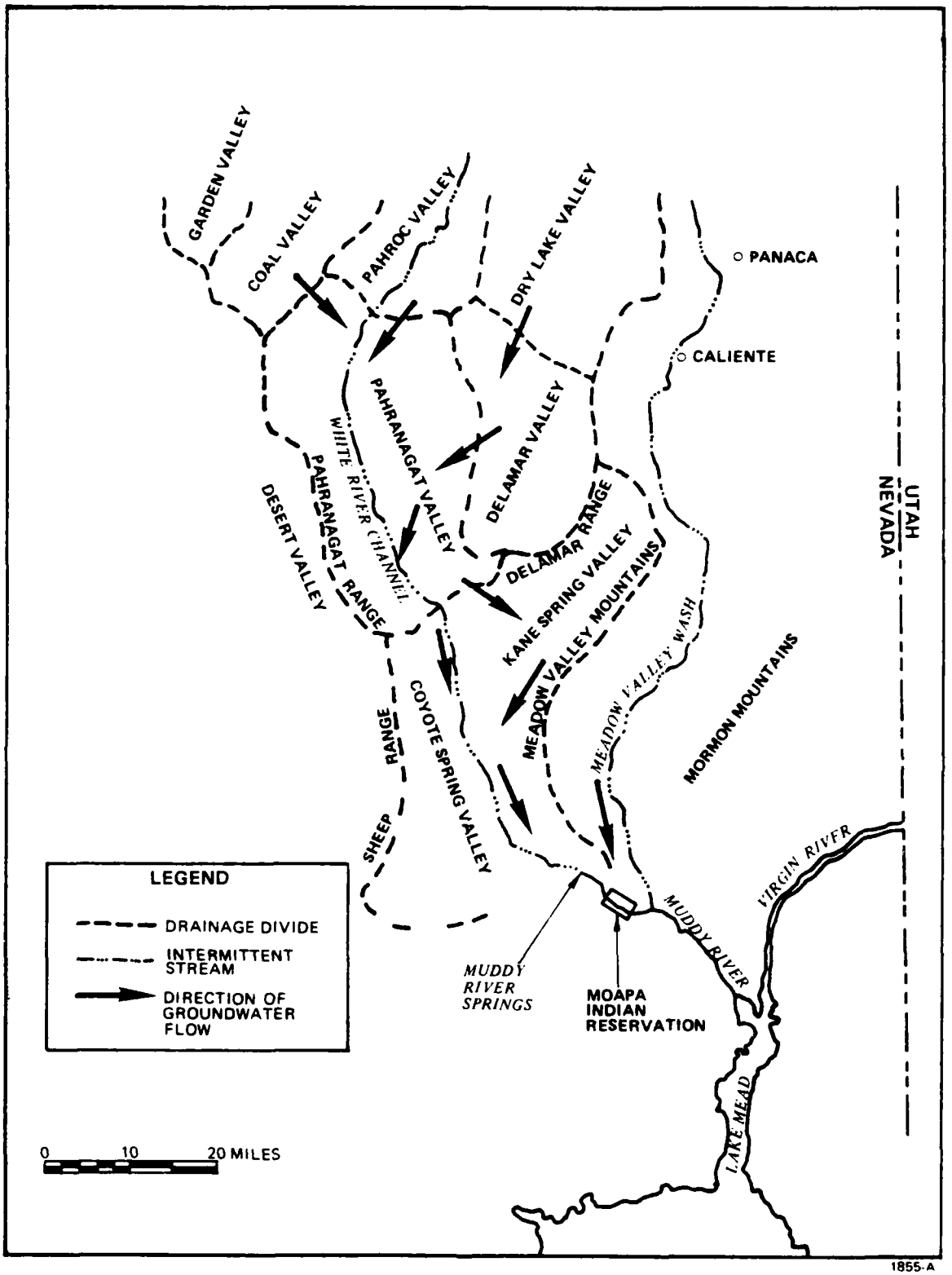


Figure 3.2.3-1. Muddy River drainage basin.

Siting Information (3.2.3.3)

Under both full and split basing, there are nine clusters in Dry Lake and three in Delamar, to the north of the Moapa Reservation. Groundwater from these valleys contributes to the recharge of Muddy River Springs. There is a construction camp at the northern end of Delamar, and under the Proposed Action and Alternatives 1, 2, 4, 6, and 8, there is an OB located 15 mi northwest of Moapa in Coyote Spring. The proposed site is upstream from the Muddy River Springs, east of the Sheep Range in an area traversed by the waters which ultimately recharge Muddy River Springs and other springs in the Moapa Valley.

Impacts (3.2.3.4)

DDA (3.2.3.3.1)

Construction demands in the White River drainage will be spread over several construction groups, and it is anticipated that little effect would be felt at the discharge of Muddy River Springs, unless construction coincides with a series of years of less than normal precipitation. Discharge at Muddy River Springs, and the perennial yield of the lower White River drainage (Coyote Spring, Kane Springs, Muddy River Springs), is a relatively constant 36,000 acre-ft/year. Removal of groundwater within the White River drainage (without natural recharge) would ultimately be felt at the Muddy River Springs. Reduction in flow at Muddy River Springs would hinder agriculture at the Moapa Reservation and could require curtailment of their plans for expanding irrigation systems and their tomato and cucumber projects.

Due to their ambitious economic development plans, the Moapa Band are especially concerned about the potential for loss of or damage to their primary resource, water. The following comment captures the anger and fear expressed by many Native Americans concerning the possible negative effects to this precious commodity:

PUBLIC COMMENTS ON THE DRAFT EIS:

"In all probability, the only way to get enough water will be to steal it from the Moapa Indians, which has already been planned. It has long been the racist tradition of Washington to steal anything and everything of value that Indians possess, simply because they are Indians. I see no indications that this will ever change.

"If I thought it would be of value to give the location of underground water, I would do it. But I admittedly oppose M-X mobile deployment and have no desire to do anything to aid in getting it accepted. I would still do it if I thought it would preserve the water rights of the Moapa Reservation. But in all probability, it is already planned to steal this water from them, and it will happen regardless of anything I can do. So let them drill dry wells all over the valley for all I care.

"Those Indians would almost certainly want to move out anyway if the base is actually built at the site. If their water is taken, the land will then become worthless. This will give them legal basis for compensation great enough to buy land elsewhere, and with good planning, may even end up better than their present location. I resent the racism that allows Washington to persecute Indians in this way, and wish I could see enough geological factors to say the site is unsuitable. But of all sites, this clearly is the most stable. Only lack of water will be a serious geological factor." (A0073-6-061)

The Air Force, in cooperation with the State Water Engineer, will develop a monitoring program designed to predict deviations from forecasted hydrological reaction. If, after receiving the approval of the State Water Engineer to withdraw water, an adverse impact appears to be occuring or might occur in the future, the Air Force will take remedial action to prevent adverse impact. This action applies to all water sources and a complete discussion appears in ETR-38 (Mitigations).

OB (3.2.3.3.2)

The Proposed Action operating base at Coyote Spring would directly affect the water flow of the Muddy River, and indirectly impact Moapa Reservation's present and pending agricultural land resources. Water demands for the operation of the base at Coyote Spring would be about 4,000 acre-ft per year; peak demands would be as high as 4,400 acre-ft/year. When this usage is combined with construction demands of clusters upstream in the White River drainage system, up to 10,500 acre-ft/year of groundwater could be used during the short-term construction years. This utilization would significantly affect the flow of the Muddy River Springs and the Muddy River, the lower outlet for the White River drainage, with a total flow of 36,000 acre-ft per year. This discharge is the long-term perennial yield of the Coyote Spring, Kane Springs, and Muddy River Springs subunits (Eakins, 1964:25).

During the long term, operations at the OB would require removal of 4,000 acre-ft/year at Coyote Spring, which would directly reduce the flow of Muddy River Springs for the life of the base. Total recharge from precipitation alone, in the Coyote Spring, Kane Springs, and Muddy River Springs areas combined, is only 2,600 acre-ft/year (Eakins, 1964:22).

Under existing conditions, the Muddy River Springs are fed by groundwater originating in the Coyote Spring, Kane Springs, Pahroc, Pahranagat, Dry Lake Delamar, White River, Long, Jakes, Cave, Garden, and Coal valleys. Flow at the Muddy River Springs is relatively constant, and serves the agricultural, stock raising, domestic, and craft needs of the Moapa Reservation, as well as those of other users in the Moapa Valley. A reduction in the flow of the Muddy River Springs would directly reduce Moapa access to water, and diminish present and planned economic activities. Such reduction would also limit water available for development of the land return area. Water for these expansion lands would be available after the demands of more senior users are met. Depletion of the groundwater upstream, including a short- or long-term lowering of the water table, would have a corresponding effect on the productivity of the Muddy River Springs.

Water is an extremely sensitive issue for the Moapa Indians, as well as for non-Indian farmers in the valley. Fear that M-X activity might diminish or pollute the Muddy River, or threaten the flow of the multiple springs in the valleys, is frequently expressed. Project planning without careful consideration of mitigation measures to prevent drawdown or pollution can be expected to draw concerned protest.

Mitigation of the water problem at Coyote Spring can best be dealt with by avoidance. Avoidance could take the form of purchases of surplus water from Las Vegas, covering construction and operation needs during the lifetime of the base. This would relieve any stress on local groundwater resources. Wastewater from the base could then be a resource itself, helping to improve regional groundwater resources or used for agriculture--especially for the Moapa, who face a water deficit in developing their land return area.

Other than avoidance, mitigation would be accomplished by the adoption of a strict water regime to minimize use: landscaping with native plants that require no irrigation, rejection of plans for watered recreational areas, flow restriction on showers, automatic faucet shutoffs, recycling and waterless toilets. These strategies would reduce base water consumption.

It is important to note that the unsolved issue of Native American water rights in the western United States makes an assessment of the potential efects on M-X deployment on Native American water resources difficult and tentative. Certain issues, such as on-reservation water resources, are relatively clear-cut. However, controversy persists about water on adjacent land, groundwater pumping, nonagricultural development needs, and other difficulties.

3.3 MITIGATION MEASURES

Mitigation measures will be taken to minimize the adverse impacts on Native American land and water resources. To the greatest degree possible, adverse impacts will be avoided through cooperative siting of M-X facilities. Other mitigative measures can be taken to minimize impacts that are not totally avoidable.

The Air Force will cooperate with Native Americans on M-X siting activities in order to avoid the restriction of alternatives for future Indian reservation expansion plans. The Air Force will not site M-X facilities on reservation lands or on Indian grazing lands. To avoid adverse impacts to Indian water resources, the Air Force will establish a comprehensive hydrologic monitoring program in cooperation with the state water engineer. In addition to these mitigation measures specific for land and water resources, the Air Force will aid in Native American comprehensive planning by establishing a community impact assistance program.

Several other mitigative measures could be adopted by the Air Force depending on actual impacts encountered. Several reservations have ranching operations which could be adversely affected by M-X developement. The Air Force could coordinate with BLM and tribal governments having adversely impacted ranching activities, to identify additional grazing lands. The Air Force could also work with impacted ranchers to develop range and stock management plans to compensate for loss of use of grazing acreage. To reduce the negative impacts on

ranching operations created by recreational activities, the Air Force could assist in developing regulations to limit or control such activities on grazing lands. Reservation trespass laws could be more strictly enforced to limit the adverse effects caused to on-reservation ranching operations.

Hunting, gathering and fishing could be adversely impacted as a result of a population increase and an acceleration in recreational activities. The Air Force could negotiate with the Fish and Game Department, BLM and other agencies to allow hunting and fishing for Native Americans in areas outside the deployment area, thereby expanding the availability of regions for subsistence activities. To minimize negative impacts on the availibility of subsistence species, the Air Force could, in cooperation with other agencies, strictly regulate hunting and fishing by non-Native Americans.

Water table drawdown or reduced spring or stream flow could occur and adversely impact water resources of Duckwater and Moapa reservations. The Air Force will attempt to avoid creation of impacts by appropriate siting of water wells. Other than by avoidance, mitigation could be effected by adoption of a strict water use regime: landscaping that requires no irrigation, flow restrictions on showers and faucets, recycling systems, and minimizing use of water for health and hygiene. Another mitigative measure could be adoption of agricultural methods requiring less water, such as hydroponic systems and greenhouses.

4.0 SOCIOECONOMIC CHARACTERISTICS

This section presents data portraying the most probable futures under both with and without project conditions within the Native American region of influence (ROI) and areas of analysis (AOAs) for key demographic, economic, and community infrastructure attributes. The baseline data represent two basic time periods: one is historical, from which average annual changes of the various attributes are assessed. The other is a projection of the various attributes into the long-term future (1992) based on extrapolation of historic trends. Thus, the baseline provides the reference from which variations for each of the attributes can be measured. Variations are determined by projecting for each of the attributes addressed under baseline conditions what would occur as a result of M-X construction and operations. The difference between what an attribute would be if M-X were not deployed compared to what it would be if M-X were deployed determines the magnitude of impacts. Thus, variations from the projected baseline data are impacts resulting from M-X project activities.

Two basic approaches were used to address the baseline attributes and the changes attributable to M-X project activities: one was subjective and qualitative; the other was objective and quantitative. In some instances it was not possible to quantify the impacts on an attribute, hence these attributes were discussed in a qualitative context. When possible, however, the attribute impacts were quantified and evaluated in a quantative approach.

In some instances a "comparative approach" was applied when quantification was not possible. The comparative method utilizes impacts experienced for other large-scale projects. While such an approach has validity, limitations of this approach are realized. For example, the M-X project has no historical antecedants because of the magnitude of the construction effort. Hence, there are no historical comparisons per se, but other smaller projects in the past have generated socio-economic impacts that would probably accompany the M-X construction. To the extent that many of the same socioeconomic impacts could occur, a comparative discussion in a qualitative sense does assist in projecting probable impacts that may be expected if M-X were deployed. A discussion of the caveats for using a comparative approach is presented later in this text.

Considerable public concern was expressed during the review of the Draft of this Environmental Impact Statement regarding the lack of Native American baseline data included in the report. The following comments exemplify this public concern.

PUBLIC COMMENTS ON THE DRAFT EIS:

> "Study completed by Facilitators, Inc. on Native Americans in the impact areas was not included in Tier 1 studies. This was a tremendous economic waste." (A1030-5150)

> "No reason is given for the lack of incorporation or selective incorporation of Facilitators, Inc. findings. Facilitators was hired as an Air Force subcontractor to collect current data on Indian Tribes. (B0156-9-632)

These studies have not been included -- why not?" (A0184-1-945)

This ETR and the Final EIS include much of Facilitators report of baseline socioeconomic characteristics.

4.1 DEMOGRAPHY

INTRODUCTION (4.1.1)

The demographic attributes of Native American life assessed in this section include population, age structure, household size, in-migration, out-migration, and mobility.

Native Americans have historically left the reservations for economic reasons. Primary among the economic reasons is the desire to obtain employment in order to support themselves and their families. With deployment of the M-X system in the Nevada/Utah region, it is assumed that creation of construction jobs within the ROI would trigger an in-migration of Native Americans who are in search of work and would like to reside in the designated Native American AOAs, e.g. reservations, colonies, or bands.

An in-migration of Native Americans into the AOAs could create many demographic impacts. The most obvious effect would be a change in the population sizes; an increase in population could likely change the existing age mix and household composition at the AOAs. The methodologies used to assess population, age and household size impacts resulting from M-X are listed in Section 5.1.3.1 of this ETR.

It is likely that in-migrating Native Americans who have close family relatives already residing on reservation lands would reside at the designated Native American AOAs. Although the accommodations would be temporary in most cases, it is assumed that immediate family members would likely accept relatives who wish to seek work on the M-X project.

Traditional patterns of mobility and migration would likely be altered with M-X deployment. Mobility would increase as Native Americans change residences in search of work. Also, mobility would increase as job commutes increase the total number of miles traveled annually by tribal members. These and other reasons for increased mobility are discussed in greater detail later in this report.

Central to an analysis of factors influencing reservation population changes is an understanding of land tenure systems of Native American reservations. All Native American trust lands within the AOAs are assigned to individual families by the various tribal councils. Tribal assignments tend to remain within the same family. Assignments are made and maintained at the pleasure of the governing councils of the reservations.

This is very important with respect to population in-migration. Approval of land assignments by tribal councils provides a built-in limiting mechanism.

The tribal council's power extends beyond land assignment approvals, however. Applications to enroll in a particular band and, thereby, to reside on a particular

reservation or colony require council approval. Therefore, even though employment opportunities created by M-X may be attractive to off-reservation Native Americans, it does not necessarily follow that reservations in the vicinity of M-X construction will experience significant increases in population.

Although the temporary accommodation of immediate family members might be condoned, it is highly unlikely that others, especially non-members, would seek (much less be allowed) to assume residence on a reservation in response to M-X opportunities. The probability of hundreds of off-reservation Indians "moving-in" is unrealistic. The established means by which the tribal governments of Native American Nations restrict access to scarce water and land are currently in effect and would continue to serve the interests of the reservation in the presence of M-X. Other factors which limit reservation population growth are the general lack of health and educational services and the absence of employment opportunities.

BASELINE DEMOGRAPHIC STRUCTURE (4.1.2)

The discussion of baseline demographic features includes those attributes that would be most likely affected by M-X construction. These attributes listed in order of discussion are population; age; household size; in- and out-migration; and mobility. Section 5.1.3.1 of this ETR describes in detail the methodologies used to project demographic baseline attributes.

Population (4.1.2.1)

As indicated in Table 4.1.2-1, the annual growth rates of population vary considerably among the AOAs. The Las Vegas colony had the lowest growth rate with 0.75 percent annual population growth. The highest growth occurred on the Duckwater reservation in which the population increased at an annual rate of 13.34 percent. The only data available on a consistent basis for all AOAs was for the years 1983 and 1980. Average growth rates were projected on an annual average basis and were assumed to be constant, throughout the years of project construction.

Table 4.1.2-2 lists population projections by AOAs based on historic rates of population change. As the table indicates, the overall population of the ten AOAs would increase at about 8 percent annually throughout the period of project construction. The 1992 population is projected to be about 2,135. The 1980 population was 1,096. Thus, the baseline total population change from 1980 to 1992 would be about 1,039 people. The total population of the AOAs are therefore projected to nearly double under baseline conditions during the 12 years from 1980 to 1992.

Table 4.1.2-3 lists Native Americans within the designated AOAs by tribal affiliation, location by county and state, and by 1980 population allocation by tribal group. The Goshute reservation is located in White Pine, Nevada, and Juab County of Utah. Only a portion of the Goshute reservation is located within the ROI and represents about 170 people.

The Shoshone Tribe is represented by three separate AOAs representing about 436 Native Americans. The tribal groups are located in Nye, and White Pine counties of Nevada. The Shoshone AOA represents about 40 percent of total Native Americans living within the ROI.

Table 4.1.2-1. Native American Resident Populations, 1973 and 1980.

Area of Analysis	1973	1980	Annual Change:[2] Percent
Duckwater	91	176	13.34
Yomba	66	95	6.28
Goshute	104	170	9.07
Moapa	116[1]	208	9.91
Las Vegas	95	100	0.75
Ely	132	165	3.57
Cedar City[3]	-	84	7.89
Kanosh[3]	-	44	7.89
Koosharem[3]	-	41	7.89
Indian Peaks[3]	-	13	7.89

T5934/10-2-81

[1] 1972 data.

[2] Annual Average Basis.

[3] The annual change is based on a weighted average annual growth rate of the above AOAs (reservations/colonies).

Table 4.1.2-2. Native American baseline population projections by areas of analysis.

Area of Analysis	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Duckwater	176	200	223	247	270	294	317	340	364	388	411	435	458
Yomba	95	101	107	113	119	125	131	137	143	149	155	161	167
Goshute	170	185	201	216	232	247	262	278	293	309	324	340	355
Moapa	208	229	249	270	290	311	331	352	373	393	414	434	455
Las Vegas	100	100	101	101	102	103	104	105	105	106	107	108	109
Ely	165	171	177	183	189	195	200	206	212	218	224	230	236
Cedar City[1]	84	91	97	104	111	117	124	130	137	144	151	157	164
Kanash[1]	44	48	51	55	58	62	65	68	72	76	79	83	86
Koosharem[1]	41	44	48	51	54	57	61	64	64	67	70	74	80
Indian Peaks[1]	13	14	15	16	17	18	19	20	21	22	23	24	25
Total	1,096	1,183	1,269	1,356	1,442	1,529	1,614	1,700	1,784	1,872	1,958	2,046	2,135

T5949/10-2-81

[1]Population figures after 1980 are based on a weighted average annual growth rate of the above areas of analysis (reservations/colonies).

Source: Facilitators, 1980.

Table 4.1.2-3. Nevada/Utah Native American populations, tribal affiliation, areas of analysis.

Area of Analysis	Location (County/State)	Tribe	1980 Population		
			Shoshone	Goshute	Paiute
Duckwater	Nye, Nev.	Shoshone	176	-	-
Yomba	Nye, Nev.	Shoshone	95	-	-
Goshute	White Pine, Nev.	Goshute	-	170	-
Moapa	Clark, Nev.	Paiute	-	-	208
Las Vegas	Clark. Nev.	Paiute	-	-	100
Ely	White Pine, Nev.	Shoshone	165	-	-
Cedar City	Iron, Utah	Paiute	-	-	84
Kanosh	Millard, Utah	Paiute	-	-	44
Koosharem	Sevier, Utah	Paiute	-	-	41
Indian Peaks	Beaver, Utah	Paiute	-	-	13
Total			436	170	490

T5935/10-2-81

Sources: Bureau of Indian Affairs, 1978; U. S. Department of Commerce, 1974; Facilitators, 1980.

The Paiute Tribe represents nearly 45 percent of the total Native American population within the ten AOAs. The total Paiute population within the AOAs was about 490 in 1980.

Age Structure (4.1.2.2)

The age distribution of residents varies considerably among the ten AOAs, as indicated by Table 4.1.2-4. For example, Facilitators' report indicates that nearly 65 percent of the Goshute residents are under 25 years of age; a similar trend is indicated for the Yomba, Cedar City, and Kanosh reservations and colonies.

In Native American communities, the out-migration of young adults for economic reasons, combined with a shorter lifespan, typically results in a disproportionate number of young people living within reservations and colonies. Another factor contributing to more young people is the custom of young parents returning to the reservation or colony when infants are born. The shorter lifespan of Native Americans compared to non-Native Americans can be partially explained by a combination of things such as a relatively higher incidence of alcoholism, accidental deaths, etc.

For the ten areas of analysis, the average age is under 25 years. As indicated in Table 4.1.2-4 the age breakdown is as follows: 57.6 percent are 24 years of age or younger; 35.6 percent are between the ages 25 to 64; and, less than 7 percent are over the age of 65.

Household Size (4.1.2.3)

Table 4.1.2-5 portrays the average household size in 1980 by area of analysis. As the table indicates, the average household ranges from 4.0 to 5.6 persons. For purposes of analysis, it is assumed that the average AOA household size of 4.7 would remain constant under baseline conditions throughout the period of analysis, 1980 through 1992.

The Kanosh Band had the lowest number ot persons per household in 1980. The largest household size of any area of analysis was on the Yomba Reservation. The number of persons per household for any given AOA is not necessarily an indication of relative affluency or poverty; rather a large household size could indicate that certain AOAs enjoy a stronger extended family than AOAs with a smaller household size.

The number of extended family units indicates the high incidence of several generations living within the same housing unit. This is a traditional social pattern among Native Americans, and may suggest a parental preference for raising children in a community which embraces traditional tribal values.

In-Migration of Native Americans (4.1.2.4)

In-migration into the AOAs could be triggered by a number of factors during normal conditions. In-migration is generally temporary in nature. The more permanent types of in-migration are usually in response to the creation of economic opportunities within the ROI. While very few economic opportunities typically occur within the AOAs proper, mineral exploration, energy and other industries'

Table 4.1.2-4. Percentage age distribution by residents, area of analysis.

Area of Analysis	0-24 Years	25-64 Years	65+ Years
Duckwater	38.5	51.8	9.7
Yomba	63.3	32.0	4.8
Goshute	64.7	28.2	7.1
Moapa	58.2	38.9	2.9
Las Vegas	N/A	N/A	N/A
Ely	55.0	39.0	6.0
Cedar City	64.2	32.8	2.9
Kanosh	63.6	28.6	3.8
Koosharem	52.9	32.9	14.2
Indian Peaks	N/A	N/A	N/A
Average	57.6	35.6	6.8

T5936/9-28-81

Note: AOA resident age distribution is assumed to be the same as total tribal populations within the ROI.

Source: Facilitators Report.

Table 4.1.2-5. Average household size by area of analysis.

Area of Analysis	1980 Population	Tribal Housing Units	Persons per Household
Duckwater	176	34	5.2
Yomba	95	17	5.6
Goshute	170	35	4.9
Moapa	208	4.3	4.8
Las Vegas	100	28	3.6
Ely	165	3.9	4.2
Cedar City	84	17	4.9
Kanosh	44	11	4.0
Richfield	41	8	5.1
Indian Peaks	13	N /A	N /A
Total Average	1,042[1]	224	4.7

T5937/10-27-81

[1]Excluding Koosharem.

Source: Facilitators, 1980.

investment in activities within the ROI may provide jobs and create an opportunity to permanently reside within the ROI.

For more traditonal reasons, Paiutes and Shoshones often return to the same areas their ancestors used to hunt, gather nuts, etc. The migratory patterns of these trips often follow ancient trails used by ancestors. To the extent that these foraging areas are located within the AOAs, in-migration of a temporary nature may occur.

Out-Migration of Native Americans (4.1.2.5)

Out-migration from the AOAs occur for a number of reasons. The most im portant factor triggering out-migration is the lack of economic opportunities and the desire of Native Americans to earn a living and to provide for themselves and their families. Temporary out-migration occurs because AOA residents leave to visit friends and relatives outside the ROI, or to engage in hunting or gathering activities.

Mobility of Native Americans (4.1.2.6)

Migration and visitation patterns of Native Americans within the ROI reflect several features of reservation life. The economic necessity of earning a living and the lack of employment opportunities on the reservations force many Native Americans to leave the reservation and seek employment elsewhere. Or, if employment opportunities exist within the general area, it usually implies a long commute between residence and place of employment. The lack of health and educational facilities on the reservations forces Native Americans living on the reservations to travel great distances in many instances. Other features, however, also tend to increase the mobility of Native Americans: among Great Basin Native Americans, current visitation patterns with friends and relatives to a large extent correspond to ancestoral migration patterns. In short, Native Americans living within the ROI are generally a highly mobile group.

Shoshone and Paiute bands have family ties which extend through virtually all other bands. Field studies suggest that many Indian families make one or more trips to another Indian community annually; some visit very frequently. Summer months are the traditional time for intertribal visitation, and the traffic between reservations can be extremely high during these months. The practice of selecting a mate from outside one's own group contributes to the volume of intertribal visits.

DEMOGRAPHIC IMPACTS (4.1.3)

Population (4.1.3.1)

Table 4.1.3-1 shows the estimated peak-year M-X related population influx into the areas of analysis along with the percent increase over the anticipated baseline population in that year, by alternative. It is important to bear in mind that the impact projections are very sensitive to the assumptions made in the methodological approach used, which is outlined in Section 5.1.3.1. These assumptions should be kept in mind given the peculiar land tenure system existing in the areas of analysis and the authority of the tribal councils to regulate in-migration.

Table 4.1.3-1. Peak year (1987) M-X related population influx and percent increase over baseline, for AOAs, proposed action, and alternatives.

Area of Analysis	Alternative							
	PA	1	2	3	4	5	6	8
Duckwater								
Baseline[1]	340	340	340	340	340	340	340	340
M-X In-migration[2]	33	33	33	33	33	33	33	17
Percent Increase	9.7	9.7	9.7	9.7	9.7	9.7	9.7	5.0
Yomba								
Baseline[1]	137	137	137	137	137	137	137	137
M-X In-migration[2]	18	18	18	18	18	18	18	9
Percent Increase	13.1	13.1	13.1	13.1	13.1	13.1	13.1	6.6
Goshute								
Baseline[1]	278	278	278	278	278	278	278	278
M-X In-migration[2]	33	33	33	33	33	33	33	17
Percent Increase	11.9	11.9	11.9	11.9	11.9	11.9	11.9	6.1
Moapa								
Baseline[1]	352	352	352	352	352	352	352	352
M-X In-migration[2]	210	237	270	39	237	39	210	177
Percent Increase	59.7	67.3	76.7	11.	67.3	11.1	59.7	50.3
Las Vegas								
Baseline[1]	105	105	105	105	105	105	105	105
M-X In-migration[2]	18	18	18	18	18	18	18	9
Percent Increase	17.1	17.1	17.1	17.1	17.1	17.1	17.1	8.6
Ely								
Baseline[1]	206	206	206	206	206	206	206	206
M-X In-migration[2]	30	30	30	216	30	249	30	15
Percent Increase	14.6	14.6	14.6	104.9	14.6	120.9	14.6	7.3
Cedar City								
Baseline[1]	130	130	130	130	130	130	130	130
M-X In-migration[2]	84	93	15	105	93	15	84	8
Percent Increase	64.6	71.5	11.5	11.5	71.5	11.5	64.6	6.2
Kanosh								
Baseline[1]	68	68	68	68	68	68	68	68
M-X In-migration[2]	45	9	54	9	9	66	45	5
Percent Increase	66.2	13.2	79.4	13.2	13.2	97.1	66.2	7.4
Koosharem								
Baseline[1]	64	64	64	64	64	64	64	64
M-X In-migration[2]	9	9	9	9	9	9	9	5
Percent Increase	14.1	14.1	14.1	14.1	14.1	14.1	14.1	7.8
Indian Peaks								
Baseline[1]	20	20	20	20	20	20	20	20
M-X In-migration[2]	3	3	3	3	3	3	3	2
Percent Increase	15.0	15.0	15.0	15.0	15.0	15.0	15.0	10.0
Total								
Baseline[1]	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700
M-X In-migration[2]	483	483	483	483	483	483	483	264
Percent Increase	28.4	28.4	28.4	28.4	28.4	28.4	28.4	15.5

T5929/10-2-81

[1]From Table 5.1.3.1-2., ETR-21.

[2]From Table 5.1.3.1-11., ETR-21.

Proposed Action (4.1.3.1.1)

In the worst case analysis, it is anticipated that as many as 483 Native Americans would migrate into the Region of Influence and seek residence in the existing reservations and colonies in the peak year. With a projected baseline population of 1,700, this influx would represent a 28.4 increase over baseline. Under the Proposed Action it is expected that the Moapa and Kanosh reservations and the Cedar City Colony would receive both construction and operation employment related in-migrants, while the remaining reservations, colonies or bands would receive only construction in-migrants. The Moapa Reservation is anticipated to experience the largest absolute number of in-migrants, 210, representing a 60 percent increase over projected baseline. However, both Kanosh Reservation and the Cedar City Colony can expect larger relative population increases with the 45 and 84 in-migrants, representing increases over baseline of 66 and 65 percent, respectively.

All of the other reservations, colonies or bands are projected to receive fewer in-migrants, ranging from only three for the Indian Peaks band to 33 for the Duckwater and Goshute reservations. Relative increases are similarly small, ranging from a 9.7 percent increase over baseline for Duckwater to a 17 percent increase for the Las Vegas colony (Table 4.1.3-1).

In the long term, after construction is completed and the steady-state operation phase has set in, all of the construction worker related in-migrants are expected to leave the host reservations, colonies and bands, with only the operation related in-migrants remaining. Thus, the Duckwater, Yomba, and Goshute reservations, the Las Vegas and Ely colonies and the Koosharem and Indian Peaks bands, all hosts of construction in-migrants, are not anticipated to have any long-term M-X related population increases. The Moapa Reservation near the Coyote Spring operating base, and the Cedar City Colony and the Kanosh Reservation near the Milford operating base, however, are projected to be the hosts of long-term operation related Native American in-migrants. Of these Moapa has the largest absolute long-term M-X related population increase (171 individuals representing a 38 percent increase over baseline and down from 210 individuals and a 60 percent increase in the peak-year), but both the Cedar City Colony and the Kanosh Reservation are expected to have larger percentage increases, both about 42 percent in the long-term (Table 4.1.3-2).

Alternative 1 (4.1.3.1.2)

For the Region of Influence as a whole, the total Native American in-migration is the same as under the Proposed Action for all the full-basing alternatives, due to the methodological approach employed. However, the distribution of impacts is different. The Duckwater, Yomba, Goshute reservations, the Las Vegas and Ely colonies, and the Koosharem and Indian Peaks bands are expected to experience the same level of in-migration as under the Proposed Action. With the second OB now near Beryl, the Cedar City Colony is expected to have greater in-migration than under the Proposed Action and, indeed, is now projected to experience the largest increase, 71.5 percent over the baseline. The Moapa Reservation's projected influx is also anticipated to be larger under this alternative, whereas the Kanosh Reservation, with only a 13 percent increase over the baseline can expect lower in-migration than under the Proposed Action.

Table 4.1.3-2. Long-term (1992), M-X related population influx and percent increase by AOA and alternatives.

Area of Analysis	Alternative PA	1	2	3	4	5	6	8
Duckwater								
Baseline[1]	458	458	458	458	458	458	458	458
M-X In-migration[2]	0	0	0	0	0	0	0	0
Percent Increase	0	0	0	0	0	0	0	0
Yomba								
Baseline[1]	167	167	167	167	167	167	167	167
M-X In-migration[2]	0	0	0	0	0	0	0	0
Percent Increase	0	0	0	0	0	0	0	0
Goshute								
Baseline[1]	355	355	355	355	355	355	355	355
M-X In-migration[2]	0	0	0	0	0	0	0	0
Percent Increase	0	0	0	0	0	0	0	0
Moapa								
Baseline[1]	455	455	455	455	455	455	455	455
M-X In-migration[2]	171	198	231	0	198	0	171	157
Percent Increase	37.6	43.5	50.8	0	43.5	0	37.6	34.5
Las Vegas								
Baseline[1]	109	109	109	109	109	109	109	109
M-X In-migration[2]	0	0	0	0	0	0	0	0
Percent Increase	0	0	0	0	0	0	0	0
Ely								
Baseline[1]	236	236	236	236	236	236	236	236
M-X In-migration[2]	0	0	0	186	0	219	0	0
Percent Increase	0	0	0	78.9	0	92.8	0	0
Cedar City								
Baseline[1]	164	164	164	164	164	164	164	164
M-X In-migration[2]	69	78	0	90	78	0	69	0
Percent Increase	42.1	47.6	0	54.9	47.6	0	42.1	0
Kanosh								
Baseline[1]	86	86	86	86	86	86	86	86
M-X In-migration[2]	36	0	45	0	0	57	36	0
Percent Increase	41.9	0	52.3	0	0	66.3	41.9	0
Koosharem								
Baseline[1]	80	80	80	80	80	80	80	80
M-X In-migration[2]	0	0	0	0	0	0	0	0
Percent Increase	0	0	0	0	0	0	0	0
Indian Peak								
Baseline[1]	25	25	25	25	25	25	25	25
M-X In-migration[2]	0	0	0	0	0	0	0	0
Percent Increase	0	0	0	0	0	0	0	0
Total								
Baseline[1]	2,135	2,135	2,135	2,135	2,135	2,135	2,135	2,135
M-X In-migration[2]	276	276	276	276	276	276	276	157
Percent Increase	12.9	12.9	12.9	12.9	12.9	12.9	12.9	7.4

T5928/10-2-81

[1]From Table 5.1.3.1-2., ETR-21.

[2]Elements in Table 5.1.3.1-11 minus elements in Table 5.1.3.1-8, ETR-21.

In the long-term, both the Moapa Reservation and the Cedar City Colony are projected to retain larger numbers of in- migrants than under the Proposed Action, whereas the Kanosh Reservation is not expected to retain any in-migrants under Alternative 1, as compared to some 36 under the Proposed Action (Table 4.1.3-2).

Alternative 2 (4.1.3.1.3)

Significant differences between Alternative 2 and the Proposed Action are expected to occur on the Moapa and Kanosh reservations and the Cedar City Colony. With the second operating base near Delta, the projected in-migration for the Moapa Reservation increases by 60 individuals, representing 76.7 percent over baseline, compared to a 60 percent increase under the Proposed Action. The Kanosh Reservation is expected to experience a greater number of in-migrants (9). Cedar City Colony is expected to receive 69 fewer in-migrants relative to the Proposed Action.

In the long term, the Moapa Reservation is anticipated to retain 231 in-migrants, in contrast to 171 under the Proposed Action. The Cedar City Colony is projected to have no long-term in-migrants compared to 69 under the Proposed Action (Table 4.1.3.1-2). Kanosh is expected to increase by 9 relative to the Proposed Action.

Alternative 3 (4.1.3.1.4)

Under this alternative the main operating base is located near Beryl and the second operating base near Ely. As a result significant differences between this alternative and the Proposed Action are expected to occur on the Moapa and Kanosh reservations and the Cedar City and Ely colonies. In the case of the Moapa Reservation, projected in-migration drops to only 39 individuals, compared to 210 under the Proposed Action, resulting in only an 11 percent increase over baseline in the peak-year, in contrast to a 60 percent increase under the Proposed Action. Kanosh Reservation similarly has a lower projected in-migration than under the Proposed Action due to the absence of operations related in-migrants. Only 9 peak-year in-migrants are expected, versus a 66 percent increase over baseline respectively (Table 4.1.3-1).

The Ely Colony, on the other hand, is expected to host more in-migrants, now that the second operating base is near Ely. Its projected number of in-migrants in the peak-year increases to 216, representing a 105 percent increase over baseline, compared to only 30 in-migrants and a 15 percent increase over baseline under the Proposed Action. With the first operating base now near Beryl, the Cedar City Colony is expected to host 105 in-migrants, compared to 84 under the Proposed Action. This influx under Alternative 3 would represent an 81 percent increase over baseline in the peak-year in contrast to a 65 percent increase under the Proposed Action (Table 4.1.3-1).

In the long term the significant differences between Alternative 3 and the Proposed Action occur on the Moapa Reservation and the Ely and Cedar City colonies. Unlike the situation under the Proposed Action, the Moapa Reservation is not expected to host any long-term in-migrants, while the Cedar City Colony can expect more: 90 versus 69, or a 55 percent increase over baseline compared to a 42 percent increase under the Proposed Action (Table 4.1.3-2). Ely Colony is now

expected to have 186 permanent long-term in-migrants, representing a 79 percent increase over baseline, in marked contrast to no long-term in-migrants under the Proposed Action (Table 4.1.3-2).

Alternative 4 (4.1.3.1.5)

The main operating base under Alternative 4 is near Beryl and the second base is near Coyote Spring. Consequently, the differences between Alternative 4 and the Proposed Action occur on Moapa and Kanosh reservations and on the Cedar City Colony. The Moapa Reservation is projected to receive 237 in-migrants, a 67 percent increase over baseline, compared to 210 in-migrants and a 60 percent increase over baseline under the Proposed Action. The Cedar City Colony is similarly projected to experience a slightly greater influx, 93 versus 84 individuals, by the peak-year, increasing the increase over baseline to 72 to 65 percent. The really significant difference is expected on the Kanosh Reservation, which is now projected to host only 9 in-migrants compared to 45 under the Proposed Action. This would represent a 13 percent increase in the peak year in contrast to a 66 percent increase under the Proposed Action. In the long-term, the differences between Alternative 4 and the Proposed Action similarly occur on the Moapa and Kanosh reservations and on the Cedar City Colony. Both the Moapa Reservation and the Cedar City Colony are expected to host slightly larger numbers of in-migrants with correspondingly higher percentage increases over baseline (Table 4.1.3-2). The Kanosh Reservation, further removed from the two operating bases is not expected to retain any in-migrants once construction activities are over. This is in marked contrast to the 36 permanent in-migrants under the Proposed Action (Table 4.1.3-2).

Alternative 5 (4.1.3.1.6)

Under this Alternative the main operating base is near Milford and the second operating base near Ely. Without the operating base near Coyote Spring, the Moapa Reservation is no longer expected to be the recipient of as many in-migrants, the number dropping from 210 under the Proposed Action to only 39 under Alternative 5, with a considerable drop in the percent over baseline figure. Cedar City Colony is projected to have a similar reduction in the number of in-migrants, 15 versus 84 under the Proposed Action, representing a 12 percent increase over baseline in contrast to a 65 percent increase under the Proposed Action. Both the Kanosh Reservation and the Ely Colony, however, are anticipated to host much larger numbers of in-migrants under this Alternative. The Kanosh Reservation is expected to receive 66 in-migrants, compared to 45 under the Proposed Action, representing a 97 percent increase over baseline versus a 66 percent increase. Ely Colony with the second operating base nearby, is projected to attract 249 in-migrants resulting in a 121 percent increase over the baseline population, compared to only 30 in-migrants and a 15 percent increase over baseline under the Proposed Action (Table 4.1.3-1)

In the long-term, the significant differences occur again on the same reservations and colonies. Moapa is not expected to retain any in-migrants in the long-term, compared to 171 under the Proposed Action (Table 4.1.3-2). The Kanosh Reservation is projected to host a larger number of long-term in-migrants, 57 versus 36, with the percent increases over baseline similarly greater. In contrast to the Proposed Action, the Ely Colony is anticipated to receive 219 in-migrants; a 93 percent increase over baseline. Under the Proposed Action, the Ely Colony is not projected to retain any long-term in-migrants (Table 4.1.3-2).

Alternative 6 (4.1.3.1.7)

Significant differences between Alternative 6 and the Proposed Action are anticipated on the Moapa and Kanosh Reservations and on the Cedar City colony. Both the Moapa and Kanosh Reservations are expected to receive larger numbers of in-migrants than under the Proposed Action. Moapa's influx of 267 would represent a 76 percent increase over baseline compared to 210 and a 60 percent increase under the Proposed Action. Kanosh's in-migrating population is expected to total 57 in the peak-year, in contrast to 45 under the Proposed Action and representing an increase over baseline of 84 percent versus 66 percent under the Proposed Action. With the Cedar City Colony further removed from the two operating bases under this Alternative its anticipated peak-year influx is only 15 in-migrants, compared to 84 under the Proposed Action. This would represent a 12 percent increase under the Proposed Action.

The long-term differences are confined to the same reservations and colonies. Both the Moapa and Kanosh reservations are expected to host larger numbers of in-migrants than under the Proposed Action; 228 versus 171 and 48 versus 36, respectively. The Cedar City Colony, on the other hand, is not projected to retain any long-term in-migrants once construction is completed, in contrast to the 69 expected under the Proposed Action (4.1.3-2).

Alternative 7 (4.1.3.1.8)

Under Alternative 7, full deployment would be in the Texas/New Mexico ROI where no Native American impacts would occur.

Alternative 8 (4.1.3.1.9)

Under this split-basing alternative the number of DDA facilities in the Nevada/Utah deployment region are reduced by half and only one operating base, the main one, is located in the region near Coyote Spring. Since employment opportunities are correspondingly reduced, so are the projected number of in-migrants. For those reservations, colonies, and bands affected only by construction related in-migration the anticipated number of in-migrants are reduced by approximately half. Thus, the Indian Peaks band are projected to host only two in-migrants compared to three under the Proposed Action, representing a 10 percent increase over baseline versus a 15 percent increase (Table 4.1.3-1). The other reservations and colonies that are affected by construction and operations related in-migration, are projected to experience much smaller influxes than under the Proposed Action, with the one exception of the Moapa Reservation which is nearest to the main operating base near Coyote Spring. For example, Kanosh Reservation's influx is anticipated to total only five individuals, representing a seven percent increase over baseline, in contrast to 45 individuals and a 66 percent increase over baseline under the Proposed Action. Similarly, the influx to the Cedar City Colony is also expected to be markedly less, with only eight individuals expected, versus 84 under the Proposed Action.

The Moapa Reservation, however, is projected to attract 177 in-migrants, representing a 50 percent increase over the projected baseline population in the peak-year, compared to 210 in-migrants and a 60 percent increase under the Proposed Action (Table 4.1.3-1).

In the long term, the only reservation, colony or band expected to host permanent in-migrants is the Moapa Reservation. Here some 157 in-migrants are projected, representing a 35 percent increase over baseline, compared to an expected 171 in-migrants and a 38 percent increase over baseline under the Proposed Action (Table 4.1.3-2).

Age Structure (4.1.3.2)

Since one of the basic assumptions in the methodological approach outlined in Section 5.1.3.1.2 is that the existing age structure of the Native American population is expected to remain stable during the period of the Proposed Action, no quantitative impact analysis is attempted. However, it can be assumed that the Native American in-migrants who are attracted to the area by M-X-related construction and operations employment opportunities are likely to be younger families. They are thus likely to skew the age distribution of the host reservations, colonies and bands downward; the degree of downward shifting of the age pyramid being a function of the number of families in-migrating (see Table 4.1.3-1).

An aspect of the anticipated movement of Native Americans to take advantage of M-X opportunities could be an increase in the number of children and adolescents on the potentially affected reservations and colonies. This occurred to villages in the vicinity of the Trans-Alaska Pipeline and resulted from parents placing children with relatives for care while they took project-related employment. Implications of the change in age structure among the AOAs are addressed in other attribute topics (e.g., schools, housing, health). The following sections address the potential changes in age structure of Native American AOAs under the Proposed Action and alternatives.

Proposed Action (4.1.3.2.1)

The downward shifts in age structure are likely to be the most pronounced on the Kanosh and Moapa Reservations and on the Cedar City Colony, both in the short and long term. All other reservations, colonies, and bands can expect less pronounced and only short-term shifts in their age structure.

Alternative 1 (4.1.3.2.2)

Under Alternative 1, the Moapa Reservation and the Cedar City Colony are still likely to experience age structure shifts, but, in contrast to the Proposed Action, the Kanosh Reservation impacts can be expected to be less noticeable and, moreover, only short-lived.

Alternative 2 (4.1.3.2.3)

The significant differences between this Alternative and the Proposed Action are expected to occur on the Cedar City Colony. With fewer projected in-migrants in the short term and none in the long term, the Cedar City Colony age structure is not likely to be substantially modified.

Alternative 3 (4.1.3.2.4)

Under Alternative 3, the Cedar City Colony is still likely to experience age structure shifts, perhaps more pronounced than under the Proposed Action; but in contrast, impacts at the Moapa and Kanosh reservations can be expected to be much less noticeable and, moreover, only short-lived. The really significant difference is projected to occur on the Ely Colony where the age-structure shift is anticipated to be much more noticeable than under the Proposed Action, particularly over the long-term.

Alternative 4 (4.1.3.2.5)

The significant differences between Alternative 4 and the Proposed Action are projected to occur on the Kanosh Reservation with much smaller age-structure shifts in the peak year and none in the long-term as compared to the Proposed Action. Both the Moapa Reservation and the Cedar City Colony are anticipated to experience more in-migration than under the Proposed Action and thus see greater age-structure changes, both in the short and long term.

Alternative 5 (4.1.3.2.6)

Under this alternative, the Ely Colony and the Kanosh Reservation can expect significantly greater age-structure shifts than under the Proposed Action, particularly the Ely Colony in the long term. On the other hand, both the Moapa Reservation and the Cedar City Colony, with fewer projected in-migrants by the peak year, and none in the long term, are not expected to see their age structures seriously modified.

Alternative 6 (4.1.3.2.7)

Under this alternative, the Moapa and Kanosh Reservations are projected to host larger numbers of Native American in-migrants than under the Proposed Action and thus can expect to see their age structures more noticeably altered. The Cedar City Colony, on the other hand, is projected to receive fewer in-migrants by the peak year and none at all in the long term, so its age-structure shifts will be significantly less pronounced than under the Proposed Action.

Alternative 7 (4.1.3.2.8)

Alternative 7 involves full deployment in the Texas/New Mexico ROI where no Native American impacts would occur.

Alternative 8 (4.1.3.2.9)

Significant differences between Alternative 8, the split-basing alternative, and the Proposed Action can be expected on all of the reservations and colonies. Since employment opportunities are essentially halved, so are the number of in-migrants. For those reservations and colonies affected only by construction-related in-migration, the anticipated number of in-migrants are reduced by approximately half and so are the age-structure impacts. The Ely and Cedar City Colonies and the Kanosh Reservation, affected by both construction and operations-related in- migration under the Proposed Action, would only be impacted

by construction-related in-migration, and thus the number of projected in-migrants and hence age-structure shifts should be significantly less noticeable than under the Proposed Action. The one exception is expected to be the Moapa Reservation, which is nearest the main operating base at Coyote Spring, whose age-structure impacts, while less marked, are not likely to be significantly different than those anticipated under the Proposed Action, particularly in the long term.

Household Size (4.1.3.3)

One of the basic assumptions in the methodology outlined in Section 4.1.3.1.2 is that the existing household size of the host reservation, or colony, is expected to remain stable during the period of the Proposed Action. It is furthermore assumed that the Native American in-migrants would have a household size of 3.0 and that other housing requirements will be filled. Thus, the in-migrating families would reduce the average household size of the host reservations, colonies, and bands, because their baseline sizes range from 3.6 to 5.6 (see Table 4.1.2-5). The reductions in household size would be directly proportional to the number of in-migrants (see Table 4.1.3-1)

Proposed Action (4.1.3.3.1)

The reduction in average household size would be most noticeable on the Moapa Reservation and on the Cedar City Colony, both in the short and long term time frames. The Kanosh Reservation's reduction in average household size would not be reduced as much, since its baseline household size of 4.0 is relatively low (see Table 4.1.2-5) even though the Kanosh Reservation is projected to host significant numbers of in-migrants. All other reservations, and colonies, could expect less pronounced and only short-term reductions in their average household size.

Alternative 1 (4.1.3.3.2)

Under Alternative 1, the Moapa Reservation and the Cedar City Colony would still experience household size reductions, but in contrast to the Proposed Action, the Kanosh Reservation household size reductions would be less noticeable and, only short-lived.

Alternative 2 (4.1.3.3.3)

The significant differences between this alternative and the Proposed Action is anticipated to occur on the Cedar City Colony. With fewer projected in-migrants in the short term and none in the long term, the Cedar City Colony household size would not be substantial reduced. However, the Moapa Reservation average household sizes may increase in comparison to the Proposed Action.

Alternative 3 (4.1.3.3.4)

Under Alternative 3, the Cedar City Colony would still experience reduction in average household, but in contrast, the reduction in household size for the Moapa and Kanosh reservations would be much less noticeable and, moreover, only short-lived. A significant difference is projected to occur in the Ely Colony where the average household size reduction is anticipated to be much more noticeable than under the Proposed Action, particularly over the long term.

Alternative 4 (4.1.3.3.5)

The significant differences between Alternative 4 and the Proposed Action are projected to occur on the Kanosh Reservation with a much smaller average household size reduction in the peak year, and none in the long-term as compared to the Proposed Action. Both the Moapa Reservation and the Cedar City Colony are expected to experience more in-migration than under the Proposed Action and thus see greater average household size reduction, both in the short and long term.

Alternative 5 (4.1.3.3.6)

Under this alternative the Ely Colony and the Kanosh Reservation could expect significantly greater household size reductions than under the Proposed Action, particularly the Ely Colony in the long term. Conversely, both the Moapa Reservation and Cedar City Colony wither fewer projected in-migrants by the peak year and none in the long term, are not expected to see their household sizes noticeably reduced.

Alternative 6 (4.1.3.3.7)

Under this alternative, the Moapa and Kanosh Reservations are projected to host larger numbers of Native American in-migrants than under the Proposed Action, and thus could expect to see their average household sizes noticeably reduced. The Cedar City Colony, conversely, is projected to host fewer in-migrants by the peak year and none at all in the long term, thus its average household size would be reduced significantly less than under the Proposed Action.

Alternative 7 (4.1.3.3.8)

Alternative 7 involves full deployment in the Texas/New Mexico region of influence, where no Native American impacts would occur.

Alternative 8 (4.1.3.3.9)

Significant differences between Alternative 8, the split-basing alternative, and the Proposed Action can be expected on all of the reservations, and colonies. Since employment opportunities are essentially halved, so are the numbers of projected in-migrants. In those reservation, and colonies affected only by construction-related in-migration, the anticipated number of in-migrants are reduced by apporximately half and in-turn so are the average household size impacts. The Ely and Cedar City Colonies and the Kanosh Reservation, affected by both construction and operation-related in-migrations under the Proposed Action, are now only impacted by construction-related in-migration, and thus the number of projected in-migrants and hence average household size reduction should be significantly less than under the Proposed Action. The one exception is anticipated to be the Moapa Reservation, which is nearest the main operating base near Coyote Spring, where average household size reduction is not likely to be significantly different than that anticipated under the Proposed Action, particularly in the long-term.

In-Migration (4.1.3.4)

Several of the impacts to Native American reservations and colonies that may occur as a result of M-X activity are unquantifiable and of a subjective nature. Some of the impacts, to the extent they occur, would be directly attributable to in-migration. These include: The introduction of unfamiliar ways and ideas, a decrease in the authority of elders, and increased political awareness. Other impacts may occur as indirect responses to undefined changes brought about by M-X activity. Among these effects is the potential for general social disruption that may result in incidences of aberrant behavior and alcoholism.

The introduction of unfamiliar ways and increased political awareness on reservations and colonies is likely to result from the in-migration of workers and their families, some with relatively greater experience in the non-Indian society. Likewise, the anticipated increase in the number of children, adolescents, and young adults may erode the authority of tribal elders.

Also, social disruption of an amorphous form, resulting from the general condition of change (e.g., reservation population increases, increased exposure to non-Indians, loss of traditional areas, increased access to cash incomes) may be translated into increased incidences of alcohol abuse and increased accident and suicide rates. It is impossible to project the extent to which such unquantifiable and subjective effects may occur as a result of M-X activity. It is important, however, to identify the potential for impacts which may be indirect, subtle or obscured.

Proposed Action (4.1.3.4.1)

Under the Proposed Action, with operating bases at Coyote Spring, Nevada and Milford, Utah, the reservations and colonies that are most likely to experience significant social stress as a result of in-migration and M-X activity are: the Moapa Reservation and both the Cedar City and Kanosh colonies. Other reservations and colonies within the region of influence would also experience similar stress but to a lesser extent. It is assumed that the degree to which these impacts are felt is a function of the percent increase of project-related populations over baseline projections for each reservation and colony. (see Table 4.1.3-1).

Alternative 1 (4.1.3.4.2)

Under Alternative 1, with OBs at Coyote Spring, Nevada and Beryl, Utah, only the Moapa Reservation and the Cedar City Colony are expected to experience significant social stress resulting from project-related in-migration.

Alternative 2 (4.1.3.4.3)

Under Alternative 2, with OBs at Coyote Spring, Nevada, and Delta, Utah, the Moapa Reservation and Kanosh Colony are expected to receive the greatest relative increases in population, and consequently they are expected to experience significant social stress. Significant reduction can be expected at Cedar City Colony.

Alternative 3 (4.1.3.4.4)

Under Alternative 3, with OBs at Beryl, Utah, and Ely, Nevada, both the Cedar City and Ely colonies are expected to experience significant social stress as a result of project-related in-migration.

Alternative 4 (4.1.3.4.5)

The impacts under Alternative 4 would be the same as those described for Alternative 1, with the exception that the sequence would be reversed. Under Alternative 4, Beryl would be the initial OB and construction of Coyote Spring would begin later in the project.

Alternative 5 (4.1.3.4.6)

Under Alternative 5, with OBs at Milford, Utah, and Ely, Nevada, both the Kanosh and Ely colonies would experience significant social stress resulting from in-migration.

Alternative 6 (4.1.3.4.7)

The impacts under Alternative 6 would be the same as those described for the Proposed Action, except that the sequence of OB construction would be reversed: Milford followed by Coyote Spring.

Alternative 7 (4.1.3.4.8)

Under Alternative 7, full basing in Texas/New Mexico, there would be no measurable impacts to Native Americans since none currently reside within the region of influence of the Texas/New Mexico DDA or OBs.

Alternative 8 (4.1.3.4.9)

Under the split-basing option, with OBs near Coyote Spring, Nevada, and Clovis, New Mexico, only the Moapa Reservation would be expected to experience significant social stress resulting from project-related in-migration.

Out-Migration (4.1.3.5)

Out-migration is defined as the departure of workers and their families from the temporary residences on host reservations and colonies (i.e., the designated AOAs) near M-X construction activity. The out-migration of temporary residents, corresponding with the decline of construction activity, may result in realignment of tribal political structures, reevaluation of tribal economic goals and the abandoning of tribal institutions formed in response to population increases or M-X construction activity. It must be noted that even though construction activity and direct impacts have scheduled conclusions, there may be lingering, residual effects on the quality of reservation life.

Generally, impacts resulting from the decline in construction activity and out-migration would involve adjustments, on the parts of individuals and tribal enterprises, to a condition of decreased economic opportunity.

Proposed Action (4.1.3.5.1)

Under the Proposed Action, with OBs at Coyote Spring and Milford, it is anticipated that significant impacts resulting from the out-migration of temporary residents following M-X construction would be experienced at both the Moapa and Kanosh reservations and the Cedar City Colony.

Alternative 1 (4.1.3.5.2)

Under Alternative 1, with OBs at Coyote Spring and Beryl, it is expected that significant impacts resulting from the out-migration of temporary residents following M-X construction would be experienced at the Moapa Reservation and the Cedar City Colony.

Alternative 2 (4.1.3.5.3)

Under Alternative 2, with OBs at Coyote Spring and Delta, it is expected that significant impacts resulting from the out-migration of temporary residents following M-X construction would be experienced at the Moapa Reservation and Cedar City Colony.

Alternative 3 (4.1.3.5.4)

Under Alternative 3, with OBs at Beryl and Ely, it is expected that significant impacts resulting from the out-migration of temporary residents following M-X construction would be experienced at the Cedar City and Ely colonies.

Alternative 4 (4.1.3.5.5)

Under Alternative 4, with OBs at Beryl and Coyote Spring, projected impacts are the same as those discussed for Alternative 1, except that the order of OB construction is reversed: Beryl followed by Coyote Spring.

Alternative 5 (4.1.3.5.6)

Under Alternative 5, with OBs at Milford and Ely, it is expected that significant impacts resulting from the out-migration of temporary residents following M-X construction would be experienced at the Kanosh Reservation and Ely Colony.

Alternative 6 (4.1.3.5.7)

Under Alternative 6, with OBs at Milford and Coyote Spring, projected impacts are the same as those discussed for the Proposed Action, except that the order of OB Construction is reversed: Milford followed by Coyote Spring.

Alternative 7 (4.1.3.5.8)

No impacts are projected under the Texas/New Mexico full basing option since no Native American reservation or colonies are located within the regions influence of the Texas/New Mexico DDA or OB sites.

Alternative 8 (4.1.3.5.9)

Under the split basing alternative, with OBs at Coyote Spring, Nevada and Clovis, New Mexico, only the Moapa Reservation would be expected to experience significant impacts resulting from the out-migration of temporary residents following M-X construction.

Mobility (4.1.3.6)

Native Americans living within the region of influence of the M-X project are highly mobile. Seasonal employment, social and religious gatherings, pine nut festivals, hunting and gathering seasons, rodeos and other sporting events provide occasions for mobility within the Great Basin and beyond.

Proposed Action (4.1.3.6.1)

The availability of subsistence resources may be affected by the Proposed Action mobility for subsistence purposes may be correspondingly reduced. Impacts to subsistence activities are considered in Section 4.2.3.5 of this report.

It is anticipated that employment opportunities resulting from the Proposed Action would increase the overall level of Native American mobility within the region of influence by creating foci of economic activity. Aside from projected impacts to subsistence-related mobility, no other adverse impacts to Native American mobility or visitation patterns have been identified.

Alternative 1 (4.1.3.6.2)

No significant Native Americans mobility impacts have been identified.

Alternative 2 (4.1.3.6.3)

No significant Native American mobility impacts have been identified.

Alternative 3 (4.1.3.6.4)

No significant Native American mobility impacts have been identified.

Alternative 4 (4.1.3.6.5)

No significant Native American mobility impacts have been identified.

Alternative 5 (4.1.3.6.6)

No significant Native American mobility impacts have been identified.

Alternative 6 (4.1.3.6.7)

No significant Native American mobility impacts have been identified.

Alternative 7 (4.1.3.6.8)

No significant Native American mobility impacts have been identified.

Alternative 8 (4.1.3.6.9)

No significant Native American mobility impacts have been identified.

4.2 ECONOMICS

INTRODUCTION (4.2.1)

This section addresses the baseline and impacts of economic structures within the Native American areas of analysis. The economics topic is disaggregated into five major attributes: income; labor force; public finance; inflation; and subsistence activities. Baseline data are presented in Section 4.2.2. Assumptions and rationales are also presented. The baseline information presented indicates the most probable future within the areas of analysis in the absence of the M-X project. Section 4.2.3 presents an analysis of projected M-X impacts on the five major economic attributes.

BASELINE ECONOMICS (4.2.2)

Income (4.2.2.1)

In general, personal income levels for Native Americans within the various areas of analysis tend to be well below state and national levels. The ability of the economic base of the various reservations and colonies to support sustained economic growth is limited. This is primarily due to the inadequacy of reservation and colony land bases and limitations on land use. The below-poverty level economic condition can also be attributed in part to the inability of the Native Americans within the AOAs to obtain entrepreneurial capital to establish businesses and thus improve the earnings levels of tribal members. For the most part, the Native Americans work off the reservations at low paying jobs. Table 4.2.2-1 lists per capita and total personal income levels in 1980 dollars for the various Native American areas of analysis. The Duckwater Reservation and Ely Colony have the lowest per capita incomes of any of the AOAs with annual per capita incomes of $700. By comparison, the 1980 per capita income for the state of Nevada was $11,600. As the figures indicate, per capita incomes at the Duckwater Reservation and Ely Colony are only 7 percent of the Nevada per capita income.

The highest per capita income within the areas of analysis was at the Goshute Reservation. The 1980 per capita income for this reservation was approximately $7,600. That portion of the Goshute Reservation within the AOA is located in two separate counties: White Pine County in Nevada and Juab County in Utah. The per capita income for the Goshute Reservation compares more favorably than the other areas of analysis with state and county per capita figures: for example, the Goshute per capita is 94.4 percent of the Utah state per capita of $8,200; and about 66 percent of the Nevada per capita. At the county level, Goshute compares more favorably: for example, the Goshute per capita income exceeds the Juab County per capita level of $5,800 by 33 percent, and compares favorably to the per capita income in White Pine County, Nevada of $8,000. The United States per capita

Table 4.2.2-1. Per capita incomes and total personal incomes for the Nevada/Utah Native American AOAs (1980 dollars).

Area of Analysis	Per Capita Income	Total[3] Personal Income
	$	$
Duckwater	700[1]	123,200
Yomba	1,010	95,950
Goshute	7,568	1,286,560
Moapa	2,442	507,936
Las Vegas	2,442	244,200
Ely	700[1]	115,500
Cedar City	2,442[2]	205,128
Kanosh	2,442[2]	107,448
Koosharem	2,442[2]	100,122
Indian Peaks	2,442[2]	31,746

T5932/10-2-81

[1]Average of Duckwater and Ely.

[2]Average of all tribes.

[3]Per capita income multiplied by total AOA population.

Source: Facilitators, 1980.

income for 1980 was $9,900, which was slightly above that of the state of Utah, but below that of Nevada. The low per capita incomes reflect a general lack of economic opportunities within the AOAs and in the surrounding areas.

The per capita income figures presented in Table 4.2.2-1 are assumed to remain constant during project construction.

Table 4.2.2-2 shows baseline projections of personal income by area of analysis from 1980 through 1992. Personal income for all the areas of analysis is expected to increase by about 8.1 percent annually under normal conditions. Much of the increase in personal income will occur as a result of the addition of tribal members earning incomes. These additions could occur as a result of births, in-migration and possibly a shift in the age mix.

During the baseline period from 1980 through 1992, personal income for the ten areas of analysis is expected to increase from $2.8 million in 1980 to $5.6 million in 1992. Income is expected to nearly double in 12 years under existing conditions, due to projected population increases.

Determination of sources of total personal income of Native Americans in the AOAs is not available (e.g. earnings by occupation and industry, transfer payments, etc.). The relatively low per capita incomes would suggest that many individuals would be qualified for various transfer payments.

Labor Force (4.2.2.2)

The size of the labor forces as of 1980 among the Native American AOAs are shown in Table 4.2.2-3. Participation rates range from a low of 31 percent for the Goshute AOA to 76 percent for the Cedar City, Konosh, Koosharem, and Indian Peaks AOAs. The labor force participation rates are expected to increase for many of the AOAs (Table 4.2.2-4).

The projected Native American baseline labor force listed in Table 4.2.2-5 represents the most probable labor force sizes from the areas of analysis without M-X activities. As indicated in the table, the Duckwater and Moapa reservations are the largest contributors to the total labor force within the areas of analysis. These two reservations represented almost one-third of the AOA labor force in 1980 and are projected to represent over one-third in 1987. The labor force is projected to more than double between 1980 and 1992, and will increase from about 501 in 1980 to 1,064 in 1992, an increase of about 563 workers. The methodologies and assumptions used to make the baseline labor force projections are discussed in Section 5.1.3.2.2 of this ETR.

Employment and unemployment levels as of 1980 among the Native American AOAs are shown in Table 4.2.2-6. The unemployment rates are extremely high for all the Native American AOAs with the exception of the Las Vegas Colony. Unemployment rates range from a low of 9.4 percent in Las Vegas to a high of 56 percent at the Duckwater Reservation (Table 4.2.2-6).

Such high unemployment rates reflect the lack of economic opportunity at the AOAs and within the commuting region. For the most part, Native Americans are not able to compete with non-Native Americans for available jobs. This is indicated

Table 4.2.2-2. Projected baseline personal income levels for the Nevada/Utah Native American AOAs (thousands of 1980 dollars).

Area of Analysis	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Duckwater	123	140	156	173	189	206	222	238	255	272	288	305	321
Yomba	96	102	108	114	120	126	132	138	145	151	157	163	169
Goshute	1,287	1,404	1,520	1,637	1,754	1,870	1,987	2,104	2,220	2,337	2,454	2,570	2,687
Moapa	508	558	609	659	709	759	810	860	910	960	1,011	1,061	1,111
Las Vegas	244	246	248	249	251	253	255	256	259	260	262	264	266
Ely	116	120	124	128	132	136	140	144	149	153	157	161	165
Cedar City	205	222	238	255	271	288	304	317	338	354	371	387	404
Kanosh	107	116	124	133	141	150	158	166	176	184	193	201	210
Koosharem	100	108	116	124	132	140	147	156	163	171	179	187	195
Indian Peaks	32	34	37	39	42	44	46	49	51	54	56	59	61
Total	2,818	3,050	3,280	3,511	3,741	3,972	4,201	4,428	4,666	4,896	5,128	5,358	5,589

T5931/10-2-81

Source: See Tables 5.1.3.2-1 and 5.1.3.2-2 for 1980 and baseline years. Other years estimated by linear interpolation.

Table 4.2.2-3. Labor force size and labor force participation rates by area of analysis, 1980.

Area of Analysis	Total Labor Force	Total Population	Labor Force Participation Rate
Duckwater	62	176	.35
Yomba	39	95	.41
Goshute	53	95	.31
Moapa	98	208	.47
Las Vegas	32	100	.32
Ely	79	165	.48
Cedar City[1]	64	84	.76
Kanosh[1]	33	44	.76
Koosharem[1]	31	41	.76
Indian Peaks	10	13	.76

T5876/9-27-81

[1]Bureau of Indian Affairs, Cedar City Office.

Source: Facilitators, 1980.

Table 4.2.2-4. Native American labor force participation rates, by area of analysis, 1980, 1987, and 1992.

Area of Analysis	Baseline 1980	Peak Year 1987	Long-Term 1992
Duckwater	.35	.40	.43
Yomba	.41	.43	.45
Goshute	.31	.38	.42
Moapa	.47	.47	.47
Las Vegas	.32	.39	.42
Ely	.48	.48	.48
Cedar City[1]	.76	.76	.76
Kanosh[1]	.76	.76	.76
Koosharem[1]	.76	.76	.76
Indian Peaks[1]	.76	.76	.76

T5877/9-27-81

[1]Based on data from B.I.A., Cedar City Office.

Source: Facilitators, 1980; BIA, Cedar City Office (see Table 5.1.3.2-21).

Table 4.2.2-5. Projected Native American baseline labor force sizes by year, 1980-1992.

Area of Analysis	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Duckwater	62	73	83	94	104	115	125	136	148	160	173	185	197
Yomba	39	42	45	48	50	53	56	59	62	65	69	72	75
Goshute	53	61	68	76	83	91	98	106	115	123	132	140	149
Moapa	98	108	117	127	136	146	155	165	175	185	195	204	214
Las Vegas	32	33	35	36	37	38	40	41	42	43	44	45	46
Ely	79	82	85	88	90	93	96	99	102	105	107	110	113
Cedar City[1]	64	69	74	79	84	89	94	99	104	109	115	120	125
Kanosh[1]	33	36	38	41	44	47	49	52	55	57	60	62	65
Koosharem[1]	31	34	36	39	41	44	46	49	52	54	56	59	61
Indian Peaks[1]	10	11	11	12	13	14	14	15	16	17	17	18	19
Total	501	549	592	640	682	730	773	821	871	918	968	1,015	1,064

T5878/9-27-81

[1]Estimated by BIA.

Source: Facilitators, 1980; BIA, Cedar City Office, and Table 5.1.3.2-22 and linear interpolation.

Table 4.2.2-6. Native American labor force, employment, unemployment, and unemployment rates, by area of analysis, 1980.

Area of Analysis	Total Labor Force (16 years & older)	Number Employed	Number Unemployed	Unemployment Rate
Duckwater	62	27	35	56.0
Yomba	39	21	18	53.8
Goshute	53	28	25	47.0
Moapa	98	63	35	36.0
Las Vegas	32	29	3	9.4
Ely	79	40	39	49.4
Cedar City	64	37	27	41.9[1]
Kanosh	33	19	14	41.9[1]
Koosharem	31	18	13	41.9[1]
Indian Peaks	10	6	4	41.9[1]

T5879/9-30-81

[1]Based on average unemployment rate for other AOAs.

Source: Facilitators, 1980.

by the Nevada/Utah unemployment rate during the same period of only 6.1 percent. Thus, during 1980 there was over a 35 percentage point difference in the unemployment rate between AOA residents and non-AOA residents.

Table 4.2.2-7 shows the employment breakdown for the major occupational categories of the workers within the AOAs. Most of the jobs held tend to be in farming, construction, clerical and service occupations. A larger percentage on the Moapa Reservation is employed in the government and administrative occupational category where nearly 37 percent of the total workforce is employed. The second largest category of employment for the Moapas was in farm and ranch work which represented nearly 34 percent of the total Moapa workforce.

Public Finance (4.2.2.3)

Although Native American reservations and colonies have historically experienced economic stagnation and high levels of unemployment, there is currently a movement in the Great Basin, and elsewhere, to reverse these conditions. All of those Native American AOAs have established goals concerning public finance which would encourage economic development projects. Some groups, such as the Moapa Tribe, have made substantial progress toward economic self-sufficiency. Other reservations, in particular Duckwater, have developed ambitious plans involving a wide range of possible commerical enterprises. Tribal businesses currently operating within the study region include: smokeshops, construction firms, metal and leather fabricating plants, greenhouse horticulture and gravel supply.

The following paragraphs summarize sources of tribal revenue and economic development plans established by the tribal governments of the reservations and colonies within the region of influence of the M-X project.

Duckwater Reservation (4.2.2.3.1)

Funds generated through HUD, EDA, and BIA are used to improve living conditions in order to create an economic base and to provide employment (Table 4.2.2-8).

The Duckwater tribal government has plans to further develop their economic base by developing their tribal resources. They have considerably improved their housing and community facilities over the past few years, as well as their agricultural and domestic water delivery systems. The Duckwater Shoshone intend to upgrade the quality of services available on the reservation, through tribal assistance programs provided by various government agencies.

Long-range goals for establishing a stable economic base include (1) acquisition of more arable land from the Bureau of Land Management and Forest Service; (2) improvement of the arable land within reservation; (3) drilling of wells and improvement of the present irrigation system; (4) acquisition of farm equipment; (5) fencing improvements; (6) development of the tribe's cattle herd; (7) construction of a hydroponic greenhouse using the flow from thermal springs on reservation land for heat; (8) development of Big Warm Spring into a recreation area for tourists and anglers; and (9) the establishment of a grocery-hardware store on

Table 4.2.2-7. Occupational classification of employed workers, by area of analysis.

Occupational Classification	Duck-water (1973)	Yomba (1979)	Goshute (1969)	Moapa (1980)	Las Vegas (1980)	Ely (1973)	Cedar City[1] (1980)	Kanosh[1] (1980)	Koosharem[1] (1980)	Indian Peaks[1] (1980)
Professional, technical and kindred	--	--	--	2	1	--	9	4	4	1
Government and Administration	--	4	--	23	8	--	--	--	--	--
Sales workers	--		--	--		--	9	3	4	1
Clerical	2	2	14	7	10	--	--			
Skilled craftsmen and foremen	7	--	4	3	5	4	5	2	2	1
Operatives	2	--	4		1	4	--	--	--	--
Arts and crafts	2	--	--	4		--	--	--	--	--
Construction and manufacturing	3	2	--	--	2	15	5	3	3	1
Farm and Ranch workers	13	4	10	21		--	3	4	3	1
Service workers	4	--	--	2	1	13	6	3	2	1
Other	--	7	1	1	1	--	--	--	--	--
Total	33	19	33	63	29	36	37	19	18	6

T5880/10-2-81

[1]Data based upon percent occupational distribution in Knack study: employment totals are based on Facilitators Study.

Source: Facilitators, 1980; Martha C. Knack, 1980, p. 34.

Table 4.2.2-8. Recent grants and loans to the Duckwater Tribe.

Activity	Year	Agency	Amount (Dollars)
Community Multipurpose Building	1979	EDA HUD	522,000 100,000
12 Mutual Help Homes	1978	HUD	595,000
Improved Irrigation System	1978	BIA	745,318

T5722/10-2-81

the reservation. The potential also exists for a tribal oil refinery, should the recently discovered field near the reservation yield a sufficient volume to justify the enterprise.

Yomba Reservation (4.2.2.3.2)

Tribal revenue has been limited to federal programs. The Yomba government for the past several years has applied for various federal grants in order to provide basic infrastructure to the reservation and to bolster the economy (Table 4.2.2-9).

Goshute Reservation (4.2.2.3.3)

Tribal revenue is derived from the sale of cattle, sheep, hay and cattle guards which are made and sold by the Goshute enterprises. Federal assistance has included a $100,000 land from small business administration (SBA) for the enterprise, $21,000 in Comprehensive Employment and Training Act (CETA) funds, housing grants from the Department of Housing and Urban Development (HUD), and technical assistance grants from the Bureau of Indian Affairs (BIA).

The primary emphasis for economic growth and employment is on agriculture. The tribe also intends to develop the reservation's recreation potential, expand its steel fabricating plant, expand and upgrade housing and improve communications, fire safety, and health services.

Agriculture and water improvement projects include increasing the use of arable land, providing more water by drilling wells, improving irrigation systems, building dams, and using free flowing springs and conducting year-round flow tests.

Moapa Reservation (4.2.2.3.4.)

The tribal economic structure has changed dramatically in the past decade by combining tribal labor with outside resources and participation in federal programs. Through the public finance assistance programs Moapa has achieved substantial economic development and there are several tribal enterprises. In 1972 the tribe began a small leather manufacturing company. The Moapa Handicraft Association produces hand-tooled, beaded items such as vests, hats, wallets, belts, and medallions, business and office accessories such as leather brief cases and portfolios and CB radio cases. In 1976, a Moapa tribal construction company was established. Contracts for two HUD housing projects were awarded to the new construction company in 1977 and 1979, and additional work will be forthcoming with the planned construction of 40 new homes and greenhouse repairs. The Moapa Tribe received an EDA Public Works grant in 1976 ($228,000) which was used to build a community center. A grocery store was established there which now serves the entire Upper Muddy Valley (Table 4.2.2-10).

The revenue generating goals of the Moapa Reservation, as outlined in their 1980 Overall Economic Development Plan, include development of BLM land that has been placed in trust as a result of Congressional action, improving the domestic water system, construction of a recreation complex for the young people, a gas station, another grocery store, and a new building for the leather shop.

Table 4.2.2-9. Recent grants and loans to the Yomba Tribe.

Activity	Year	Agency	Amount
Multi-purpose Community Center	1976	EDA	$ 223,000
	1978	EDA	65,000
	1978	HUD	50,000
Skills Training (PL 93-638)	1975	BIA	200,000[1]
	1976	BIA	198,000
Diversion Dams	1977	BIA	520,000
Two buildings moved from Nevada Test Site	1975	American Bicentennial Commission	4,300
Housing Units (22)	1976	HUD	1,700,000
Fire truck	1978	HUD	15,000
Plannng	1978	HUD	2,500
Water/Sewer Improvements	1977	HUD	50,000
		IHS	100,000
Central Water System/Electrical Line extension	1979	HUD(CDBG)	102,000
		HUD	40,000
	1980	IHS	40,000
Electrical Line to Reservation	1976	REA	N/A
Fire Station (Planned)	1981	HUD	--
Employment ITAC/Tribal	1979	BIA	200,000[1]
Purchase of Livestock (PL 93-638)	1980		200,000[1]
CETA positions	1980	DOL	18,749
Johnson-O'Malley Educational Supplements	1979	DOE	3,500
	1980	DOE	3,500

T5720/9-20-81/F

[1]Approximated.

Sources: 1977-1979 Yomba Grant applications to HUD and IHS; Hooper 1980; Bennett 1980.

Table 4.2.2-10. Recent grants and loans to the Moapa Tribe (Page 1 of 2).

Activity	Year	Agency	Amount
Water Lines	1962	IHS	$ 11,000
Water Lines	1970	IHS	94,680
Judgment monies including adult per capita/standard of living and the farm investment	1972		746,381
Water Lines	1972	IHS	16,000
Grant--Farm Improvement	1973	EDA	81,000
Secretarial election to release judgment monies to Tribe (Perpetual Fund, Community Bldg. and Economic Development)	1973		588,884[2]
Grant--Farm Improvement	1974	EDA	110,000
Leather Shop	1974	CHD[3]	15,000
Community Building	1975	EDA	228,000
Leather Shop	1975	CHD	30,000
Block Grant--Housing Rehabilitation	1976	HUD	114,500
Water Lines	1976	IHS	53,000
Block Grant--Housing Rehabilitiation	1977	HUD	278,000
Community Development Block Grant --Tomatoes	1978	HUD	570,000
Training for Greenhouse	1978	CETA	233,000
Grant--Civil Service Commission	1978	IPA	7,100
Tribal Specific Health Plan	1978	IHS	60,318

T5727/9-20-81/F

[1]This list does not show monies granted by HUD for new housing construction for 42 units.

[2]Principal; does not show accrued interest.

[3]CHD: Campaign for Human Development.

Table 4.2.2-10. Recent grants and loans to the Moapa Tribe (Page 2 of 2).

Activity	Year	Agency	Amount
Financial Support for Land Return	1979	CHD	$ 50,000
Community Development Block Grant --Tomatoes	1979	HUD	450,000
Grant--Greenhouse Packing Shed	1979	EDA	680,000
Training--Greenhouse	1979	CETA	193,000
Geothermal Exploration	1979	DOE	46,500
Civil Service Commission	1979	IPA	17,656
Public Works Transfer from Fallon to Moapa Tomatoe Project	1979	EDA/ITC	89,000
Health Management Structure	1979	IHS	35,945
Community Development Block Grant --Tomatoes	1980	HUD	450,000
Supplement/Parking Shed	1980	EDA	159,500

T5727/9-20-81/F

Source: Tribal Planner, September 1980.

Las Vegas Colony (4.2.2.3.5)

The Las Vegas Colony is located in an industrial and commercial area. Two tribally-owned smokeshops are located on the colony, selling cartons of cigarettes to the public at substantially lower prices than are paid at off-reservation locations. Based upon records maintained by the Nevada State Tax Commission, concerning the number of cartons sold to the Las Vegas Colony by tobacco wholesalers, the tribal government grossed in 1979 more than 1 million dollars in tobacco sales. Additional revenue has been in the form of HUD grants to construct a multipurpose community building. The tribal council is currently evaluating plans to develop the commercial potential of a recently acquired 2.5-acre lot with Main Street frontage.

Ely Colony (4.2.2.3.6)

At present, Ely Colony has no tribal enterprise. Recent grants include: 1973, Housing and Urban Development (HUD) 17 Mutual Self-Help Homes; 1978, HUD Multipurpose Community building, $300,000; 1978, HUD 12 low rent homes, and 1979, rehabilitation, $120,000.

The tribal council is responsible for reviewing and updating the Overall Economic Development Program (OEDP) annually, assessing progress, and developing goals. The council has outlined its goals for FY 1980-81, in five priority projects. These are: development of 90-acre trust land into an industrial park; land exchange of 11 acres on which the New Colony is built; housing improvements; establishment of a recreational program for the youth of the colony; and completion of fencing and retaining walls around the colony.

Paiute Indian Tribe of Utah (4.2.2.3.7)

The five bands of the Southern Paiute Tribe of Utah were terminated from federal trusteeship in 1954 and reinstated in April of 1980. Four of these bands-Cedar City, Kanosh, Koosharem, and Indian Peaks--are designated as AOAs. During the period of termination, most bands lost their land base, their tribal government no longer functioned, and the maintenance of archival records was minimal. Although the bands have been in the process of reorganization since 1980, there are significant deficits in the data regarding social and economic conditions. The Interium Tribal Council of the tribe is in the process of organizing baseline data concerning their constituent bands.

From the 1950s, when the termination of the four bands effectively severed agency relationships, there has been little systematic planning for the colonies. The establishment of the Utah Paiute Tribal Corporation, which handles planning and grant writing for the five bands, was a step toward prerestoration planning. Now that federal services will once again be available to the bands, it is likely that a more comprehensive plan of improvements will be implemented.

The Utah Paiute Development Corporation (UPDC) is a consulting group which was formed and staffed by five Paiute members. The UPDC offers suggestions to the tribal council; if accepted, the UPDC develops the program, writes the proposals, and administers the project.

The status of the UPDC will probably change as the tribal government assumes a more direct role in the affairs of the Paiute Indian Tribe of Utah. Currently, HUD grants are administered through the commissioners of the five county commissions, and consequently the UPDC has direct contact with local government. The UPDC has applied for, and received, grants from HUD for housing in the area, for the administration of tribal enrollment, and a HUD weatherproofing program.

The role of the UPDC may also change as government agencies reestablish contact with the Paiute bands.

Inflation (4.2.2.4)

Inflation is generally defined as an increase in the prices of goods and services over time. The inflation may be product specific and thus limited in its effect, or it may occur for many products and be regional.

The level of inflation currently being felt on the reservations and colonies within the ROI varies for each area of analysis. The inflationary impacts felt by any given AOA depends in part upon the extent to which its residents rely upon goods and services manufactured outside the AOA. In most instances, the economic base of the AOAs does not provide very much isolation from regional inflation; however, to the extent that gardens produce vegetables and other food items and the tribal members are able to manufacture many of their own goods and provide necessary community services, the effects of regional inflation felt on the AOAs can be lessened.

Inflation is an ordinary feature of a market economy. Inflation generally occurs even in a free market place because of supply bottlenecks and other unforeseeable occurrences that result in an inbalance between the supply of and the demand for goods and services. Consequently, even under baseline conditions, inflation occurs within the ROI and the areas of analysis.

The rate of inflation occurring in the areas of analysis tends to be about the same as the regional rate of inflation. This is the result of a general lack of effective isolation of the AOAs from the regional economy.

Subsistence Activities (4.2.2.5)

The importance of Great Basin natural resources to Native American subsistence activities is discussed in the Land and Water Use Section of this report (i.e., Section 3.0). The extent to which subsistence activities--hunting, gathering, and fishing--contribute to overall household incomes has not been defined. It is known, however, that subsistence activities are of critical importance in supplementing meagre cash incomes to many individual Native Americans within the region of influence.

For hunting and gathering purposes, both Paiutes and Shoshones generally return to the favored areas of their ancestors, following paths which are often distinct to each tribe. Pursuit of subsistence resources is a primary impetus for seasonal travel throughout the Great Basin. These migration and utilization patterns have endured since long before the commencement of non-Indian settlement. In addition to the economic value of subsistence activities to many Native Americans,

the persistence of ancestral patterns such as these is viewed as critical to the maintenance of a distinct Native American way of life.

IMPACTS (4.2.3)

Income (4.2.3.1)

Income levels in a community reflect its level of economic activity. Increases in income increase the opportunities available to individuals. Income increases are assumed to be beneficial while income decreases are assumed to be detrimental. Changes in income can be expressed in a number of ways: the absolute dollar change; the percentage change from a no-action ("contemporary" baseline) alternative; and the percentage change from a previous period (peak year). Each has its place in the analysis and is used in the following sections. All dollar amounts are expressed in constant 1980 dollars. Table 4.2.3-1 shows the estimated peak-year M-X related income changes relative to the "contemporary" baseline in that same peak year (1987). The projections are directly related to population projections presented earlier.

Table 4.2.3-2 shows the expected long-term changes in total personal income. The M-X-related changes are shown as (1) total dollar amount and (2) the percentage decrease from peak-year activity. The net percentage change (M-X-related income less long-term natural growth) is also shown in Table 4.2.3-2.

Proposed Action (4.2.3.1.1)

At the peak of M-X-related activity, total personal income associated with Native Americans residing in the AOAs may increase by as much as 49.7 percent. The largest dollar changes are expected on the Moapa Reservation in association with its proximity to the operation base at Coyote Spring. The Moapa are expected to share in both construction and operations employment. Kanosh and Cedar City locations are also expected to experience large increases in total personal income due to their proximity to the operating base at Milford. These three AOAs are expected to account for almost 60 percent of the change in personal income in the entire AOA.

During 1987, the largest percentage changes relative to the 1987 baseline are expected to occur at Ely (257 percent), Kanosh (209 percent), Cedar City (201 percent) and Moapa (187 percent). The construction related changes expected at Ely appear large because the baseline would be relatively low. Other percentage changes range from a low of 19 percent at the Goshute Reservation to 171 percent at Duckwater. It should be noted that large percentage changes on some reservations and small percentage changes on others may only be a reflection of the low base from which the projected change is occurring.

The long-term projected changes in income for the AOAs depend on their proximity to the operating bases. It is assumed that the construction workers allocated to each reservation would leave the AOAs following completion of all construction activity. Only operations workers are assumed to remain as permanent residents of the AOAs. Thus, the greatest long-term changes would occur on those AOAs that received that largest number of in-migrants during the early years of project construction.

Table 4.2.3-1. Peak-year (1987) M-X related total personal income (1980 dollars) and percent increase over baseline by AOA and alternative (Page 1 of 2).

Area of Analysis	PA	Alternative 1	2	3	4	5	6	8
Duckwater								
Peak Year Baseline	238,000	238,000	238,000	238,000	238,000	238,000	238,000	238,000
Net M-X Change	408,210	408,210	408,210	408,210	408,210	408,210	408,210	222,660
Percent Change	171.	171.	171.	171.	171.	171.	171.	94.
Yomba								
Peak Year Baseline	138,370	138,370	138,370	138,370	138,370	138,370	138,370	138,370
Net M-X Change	222,660	222,660	222,660	222,660	222,660	222,660	222,660	111,330
Percent Change	161.	161.	161.	161.	161.	161.	161.	80.
Goshute								
Peak Year Baseline	2,103,904	2,103,904	2,103,904	2,103,904	2,103,904	2,103,904	2,103,904	2,103,904
Net M-X Change	408,210	408,210	408,210	408,210	408,210	408,210	408,210	222,660
Percent Change	19.	19.	19.	19.	19.	19.	19.	11.
Moapa								
Peak Year Baseline	859,584	859,584	859,584	859,584	859,584	859,584	859,584	859,584
Net M-X Change	1,605,330	1,782,630	1,999,330	482,430	1,782,630	482,430	1,605,330	1,165,970
Percent Change	187.	233.	207.	56.	207.	56.	187.	136.
Las Vegas								
Peak Year Baseline	256,410	256,410	256,410	256,410	256,410	256,410	256,410	256,410
Net M-X Change	222,660	222,660	222,660	222,660	222,660	222,660	222,660	111,330
Percent Change	87.	87.	87.	87.	87.	87.	87.	43.
Ely								
Peak Year Baseline	144,200	144,200	144,200	144,200	144,200	144,200	144,200	144,200
Net M-X Change	371,100	371,100	371,100	1,592,500	371,100	1,809,200	371,100	185,500
Percent Change	257.	257.	257.	1,104.	257.	1,255.	257.	129.
Cedar City								
Peak Year Baseline	317,460	317,460	317,460	317,460	317,460	317,460	317,460	317,460
Net M-X Change	638,650	697,750	185,550	776,550	697,750	185,550	638,650	111,330
Percent Change	201.	220.	58.	245.	220.	58.	201.	35.

T5927/9-30-81

Table 4.2.3-1. Peak-year (1987) M-X related total personal income (1980 dollars) and percent increase over baseline by AOA and alternative (Page 2 of 2).

Area of Analysis	PA	Alternative 1	2	3	4	5	6	8
Kanosh								
Peak Year Baseline	166,056	166,056	166,056	166,056	166,056	166,056	166,056	166,056
Net M-X Change	347,730	111,330	406,830	111,330	111,330	111,330	347,730	74,220
Percent Change	209.	67.	245.	67.	67.	67.	209.	45.
Koosharem								
Peak Year Baseline	156,288	156,288	156,288	156,288	156,288	156,288	156,288	156,288
Net M-X Change	111,330	111,330	111,330	111,330	111,330	485,630	111,330	74,220
Percent Change	71.	71.	71.	71.	71.	293.	71.	47.
Indian Peak								
Peak Year Baseline	48,840	48,840	48,840	48,840	48,840	48,840	48,840	48,840
Net M-X Change	37,110	37,110	37,110	37,110	37,110	37,110	37,110	0
Percent Change	76.	76.	76.	76.	76.	76.	76.	0
Total AOA								
Peak Year Baseline	4,429,112	4,429,112	4,429,112	4,429,112	4,429,112	4,429,112	4,429,112	4,429,112
Net M-X Change	4,372,990	4,372,990	4,372,990	4,372,990	4,372,990	4,372,990	4,372,990	2,279,270
Percent Change	98.7	98.7	98.7	98.7	98.7	98.7	98.7	51.5

T5927/9-30-81

Source: Tables 5.1.3.2-2 to 11 of ETR-21.

Table 4.2.3-2. Long-term (1992) M-X related total personal income (1980 dollars) and changes, by Area of Analysis, Proposed Action, and Alternatives (Page 1 of 2).

Area of Analysis	Alternative							
	PA	1	2	3	4	5	6	8
Duckwater								
Peak Year Baseline	646,210	646,210	646,210	646,210	646,210	646,210	646,210	460,660
Net M-X Change[1]	-325,610	-325,610	-325,610	-325,610	-325,610	-325,610	-325,610	-140,060
Percent Change	50.4	50.4	50.4	50.4	50.4	50.4	50.4	30.4
Yomba								
Peak Year Baseline	361,030	361,030	361,030	361,030	361,030	361,030	361,030	249,700
Net M-X Change[1]	-192,360	-192,360	-192,360	-192,360	-192,360	-192,360	-192,360	-81,030
Percent Change	53.3	53.3	53.3	53.3	53.3	53.3	53.3	32.5
Goshute								
Peak Year Baseline	2,512,114	2,512,114	2,512,114	2,512,114	2,512,114	2,512,114	2,512,114	2,326,564
Net M-X Change[1]	-0-[2]	-0-[2]	-0-[2]	-0-[2]	-0-[2]	-0-[2]	-0-[2]	-0-[2]
Percent Change	--	--	--	--	--	--	--	--
Moapa								
Peak Year Baseline	2,464,914	2,642,214	2,858,914	1,342,014	2,642,214	1,342,014	2,839,214	2,025,554
Net M-X Change[1]	-230,904	-230,904	-230,904	-230,904	-230,904	-230,904	-230,904	-8,244
Percent Change	9.4	8.7	8.1	17.2	8.7	17.2	8.1	.04
Las Vegas								
Peak Year Baseline	479,070	479,070	479,070	479.070	479,070	479,070	479,070	367,740
Net M-X Change[1]	-212,892	-212,892	-212,892	-212,892	-212,892	-212,892	-212,892	-101,562
Percent Change	44.4	44.4	44.4	44.4	44.4	44.4	44.4	27.6
Ely								
Peak Year Baseline	515,300	515,300	515,300	1,736,700	515,300	1,953,400	515,300	329,750
Net M-X Change[1]	-350,100	-350,100	-350,100	-350,100	-350,100	-350,100	-350,100	-185,550
Percent Change	67.9	67.9	67.9	20.2	67.9	17.9	67.9	56.3
Cedar City								
Peak Year Baseline	956,110	1,015,210	503,010	1,094,010	1,015,210	503,010	503,010	428,790
Net M-X Change[1]	-98,522	-98,522	-98,522	-98,522	-98,522	-98,522	-98,522	-24,302
Percent Change	10.3	9.7	19.6	9.0	9.7	19.6	19.6	5.7

T5930/10-2-81

Table 4.2.3-2. Long-term (1992) M-X related total personal income (1980 dollars) and changes, by Area of Analysis, Proposed Action, and Alternatives (Page 2 of 2).

Area of Analysis	Alternative							
	PA	1	2	3	4	5	6	8
Kanosh								
Peak Year Baseline	513,786	277,386	572,886	277,386	277,386	277,386	277,386	240,276
Net M-X Change[1]	-67,374	-67,374	-67,374	-67,374	-67,374	-67,374	-67,374	-30,264
Percent Change	13.1	24.3	11.8	24.3	24.3	24.3	24.3	12.6
Koosharem								
Peak Year Baseline	267,618	267,618	267,618	267,618	267,618	267,618	267,618	230,508
Net M-X Change[1]	-72,258	-72,258	-72,258	-72,258	-72,258	-72,258	-72,258	-35,148
Percent Change	27.0	27.0	27.0	27.0	27.0	27.0	27.0	15.2
Indian Peaks								
Peak Year Baseline	85,950	85,950	85,950	85,950	85,950	85,950	85,950	48,840
Net M-X Change[1]	-24,900	-24,900	-24,900	-24,900	-24,900	-24,900	-24,900	-0-
Percent Change	29.0	29.0	29.0	29.0	29.0	29.0	29.0	-0-
Total AOA								
Peak Year Baseline	8,802,102	8,802,102	8,802,102	8,802,102	8,802,102	8,802,102	8,802,102	6,708,382
Net M-X Change[1]	-1,574,920	-1,574,920	-1,574,920	-1,574,920	-1,574,920	-1,574,920	-1,574,920	-606,160
Percent Change	17.9	17.9	17.9	17.9	17.9	17.9	17.9	9.0

T5930/10-2-81

[1]Net M-X Change is defined as the M-X related decrease in income less the natural growth between 1987 and 1992. (Table 5.1.3.2-2 and Table 4.2.3.1-1.)

[2]Natural income growth is projected to be greater than M-X related income changes.

Source: Tables 4.2.3-1 and 5.1.3.2-2. of ETR-21.

During the long-term, the largest income changes relative to the peak year income are expected to occur at Ely (-72.0 percent), Duckwater (-63.0 percent), and Yomba (-61.7 percent). In-migrants at these AOAs are projected to be only construction workers. The largest dollar change is projected to occur on the Moapa Reservation where, because of its size, it would attract a larger number of construction workers than other AOAs.

While incomes would decline after the peak-year, part of this decline would be offset by the natural growth in incomes. Thus, when construction activity income level decreases would be partially offset by a natural growth in other income levels. As an example, the $371,100 growth at Ely associated with construction employment (Table 4.2.3.1-1) will be followed by a decline of a similar amount in the long-term. However, in the interval between the peak and the long term, natural growth would have increased incomes by $21,000 ($165,200-$144,200), partially offsetting the decline.

Alternative 1 (4.2.3.1.2)

Under this alternative, the Moapa Reservation and Cedar City Colony would show modest increases over the Proposed Action, while Kanosh will experience a slight decrease. All other AOAs will remain constant relative to the Proposed Action (Table 4.2.3-1).

The long-term projections are also similar to those of the Proposed Action, with a modest change in the percentage decline for Cedar City and Moapa due to the increase in the peak year baseline. The decline in income to the Kanosh Reservation results in a relatively large percentage decline in the long term relative to the Proposed Action.

Alternative 2 (4.2.3.1.3)

In the peak year, greater growth is projected to occur in the Moapa and Kanosh Reservations, while smaller growth is projected for the Cedar City Colony relative to the Proposed Action. The remaining AOAs in the ROI are expected to show similar changes relative to the Proposed Action. Incomes are projected to increase 233 percent over baseline for the Moapa and 245 percent for the Kanosh Reservations. Relatively large percentage changes are projected for all the AOAs except for the Goshute Reservations.

The long-term projection for Alternative 2 are very similar to those of the Proposed Action (Table 4.2.3-2).

Alternative 3 (4.2.3.1.4)

Under this alternative, the Moapa is projected to experience a much smaller rate of growth than under the Proposed Action. Very large changes are projected to occur on the Ely (1,104 percent increase) and Cedar City (245 percent), higher than the projections for the Proposed Action. The remaining AOAs would experience very similar changes under this alternative (Table 4.2.3-1).

In the long term, the Moapa and Kanosh Reservations are projected to show a larger percentage declines over the Proposed Action due to their smaller baselines.

By the same reasoning, Ely is projected to experience a much smaller percentage decline (even though the dollar decline is the same) due to the higher base from which the decline occurs.

Alternative 4 (4.2.3.1.5)

In the peak year, Alternative 4 would stimulate slightly more income on the Moapa Reservations and Cedar City Colony, with slightly smaller changes occurring on the Kanosh AOA relative to the Proposed Action. All other AOAs will experience peak year changes similar to the Proposed Action (Table 4.2.3-1).

The long-term impacts of Alternative 4 are only slightly different than those of the Proposed Action, with the Kanosh Reservation showing a slightly higher percentage decline (Table 4.2.3-2).

Alternative 5 (4.2.3.1.6)

Under this alternative, peak year changes would increase for the Ely and Koosharem colonies, while decreases in growth are projected for the Moapa, and Kanosh reservations and Cedar City Colony relative to the Proposed Action. The Ely Colony is projected to experience a significant change in income, both absolute and relative to the Proposed Action alternatives (Table 4.2.3-1). The Koosharem Band is projected to experience a similar, but smaller, increase over the Proposed Action alternative.

The long-term changes in dollar amount are the same for Alternative 5 as they are for the Proposed Action, but due to changes in the peak year baseline, the percentage declines are different. A larger percentage decline will occur for the Moapa and Kanosh reservations and the Cedar City Colony with a smaller percentage decline occurring in the Ely AOA relative to the Proposed Action.

Alternative 6 (4.2.3.1.7)

In the peak year, this alternative allocates greater increases to the Koosharem Band and less to the Cedar City Colony and Kanosh Reservation relative to the Proposed Action (Table 4.2.3-1). Moapa, Ely, and Koosharem are projected to increase over 200 percent each from baseline incomes. Other AOAs show smaller changes and are identical to the Proposed Action.

The long-term changes in income under Alternative 6 are very similar to the Proposed Action with only a small change in Kanosh due to the change in the peak year baseline (Table 4.2.3-2).

Alternative 7 (4.2.3.1.8)

This alternative is for full deployment in Texas/New Mexico and has no impacts on Native Americans.

Alternative 8 (4.2.3.1.9)

In the peak year, this alternative reduces the increase for all AOAs relative to the Proposed Action since it represents a 50 percent reduction in the size of the

Proposed Action. The relative impacts among the AOAs show the Ely Colony and the Duckwater, and Yomba reservations with the highest relative change, but this array is a function of the reduced expenditure against an unadjusted baseline.

The long-term impacts are smaller for all AOAs relative to the Proposed Action, with the greatest percentage decline occurring on the Ely (-56.3 percent) and Duckwater (-30.4 percent) AOAs. The decline projected for the Moapa in the long-term under this alternative is very small and compares to a 10 percent decline associated with the Proposed Action.

4.2.3.2 Labor Force

There are a number of ways in which to measure impacts on the labor force in the ROI, such as employment, unemployment, and labor force participation rates. However, the unemployment rate summarizes all these variables and is used in this section. Details on these other statistics can be found in Sec. 5.1.3.2.2.1.

Proposed Action (4.2.3.2.1)

Under the Proposed Action, the peak year unemployment rates are projected to sharply decline in all AOAs except the Las Vegas colony (Table 4.2.3-3). Because of its location in Las Vegas, unemployment has not been a problem and the unemployment rate has been close to zero. The Proposed Action, because it increases the population and the labor force participation rate (Sec. 5.1.3.2.2.1), raises the unemployment over the baseline for Las Vegas Colony. Unemployment rates at the Indian Peaks Band are projected to remain high (although decline from baseline) due to the relatively small size of the labor force (baseline 17, see Sec. 5.1.3.2.2.1).

In the long term, unemployment is projected to increase as construction jobs decrease. Only those AOAs with relatively large numbers of operation workers snow smaller increase in unemployment (Moapa, Cedar City, and Kanosh). Las Vegas colony is projected to return to the preaction unemployment rates.

Alternative 1 (4.2.3.2.2)

Peak year change in unemployment rates are identical for all AOAs except Cedar City and Kanosh relative to the Proposed Action. The rate at Cedar City is projected to decline somewhat while the Kanosh rate increases. Both changes are relatively small.

In the long-term, unemployment rates are shown to be almost identical to the Proposed Action with only a very modest increase at Kanosh (Table 4.2.3-3)

Alternative 2 (4.2.3.2.3)

The unemployment rate at Moapa shows a slight decline while the rate at Cedar City increases under this alternative. All other changes are identical to the proposed action.

Table 4.2.3-3. Unemployment rates, baseline year, peak year (1987), and long-term (1992), by AOA and Alternative.[1]

Area of Analysis	Alternative							
	PA	1	2	3	4	5	6	8
Duckwater								
Baseline	38.0%	38.0%	38.0%	38.0%	38.0%	38.0%	38.0%	38.0%
Peak	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.8
Long-term	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.9
Yomba								
Baseline	53.8	53.8	53.8	53.8	53.8	53.8	53.8	53.8
Peak	8.9	8.9	8.9	8.9	8.9	8.9	8.9	9.5
Long-term	31.4	31.4	31.4	31.4	31.4	31.4	31.4	31.7
Goshute								
Baseline	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0
Peak	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.8
Long-term	25.1	25.1	25.1	23.4	25.1	23.2	25.1	25.4
Moapa								
Baseline	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Peak	6.4	6.2	5.8	9.3	6.2	9.3	5.9	7.1
Long-term	15.7	15.6	15.4	17.2	15.6	17.2	15.4	16.1
Las Vegas								
Baseline	.9	.9	.9	.9	.9	.9	.9	.9
Peak	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.9
Long-term	.9	.9	.9	.9	.9	.9	.9	.9
Ely								
Baseline	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
Peak	8.9	8.9	8.9	4.9	8.9	4.6	8.9	9.4
Long-term	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.5
Cedar City								
Baseline	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
Peak	6.1	5.9	9.1	5.6	5.9	9.1	9.1	9.5
Long-term	17.5	17.4	19.0	17.3	17.4	19.0	19.0	19.2
Kanosh								
Baseline	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
Peak	5.8	8.5	5.4	8.5	8.5	4.9	5.2	8.9
Long-term	17.4	18.7	16.7	18.7	18.7	16.9	17.1	18.9
Koosharem								
Baseline	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
Peak	8.9	8.9	8.9	8.9	8.9	8.9	8.9	9.4
Long-term	18.9	18.9	18.9	18.9	18.9	18.9	18.9	19.2
Indian Peaks								
Baseline	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
Peak	11.8	11.8	11.8	11.8	11.8	11.8	11.8	12.5
Long-term	20.3	29.3	20.3	20.3	20.3	20.3	20.3	20.7

T5881/10-2-81

[1] Alternative 7 (Texas/New Mexico full deployment) does not impact Native Americans.

Source: Tables 5.1.3.2-47 and 5.1.3.2-48. of ETR-21.

In the long term, the rate at Cedar City shows an increase of 1.5 percentage points over the rate under the Proposed Action (Table 4.2.3-3). This change reflects the shift of operating bases under the alternative.

Alternative 3 (4.2.3.2.4)

Under this alternative, peak year unemployment rates would be the same for all AOAs except: Moapa (increases), Kanosh (increases), Ely (decreases) and Cedar City (decreases). These changes reflect the shift of the operating base under the alternative. The increase at Moapa would be almost 3.0 percentage points above the Proposed Action, while the increase at Kanosh would be slightly higher than 3 percentage points. The decline at Ely is almost 4.0 percentage points.

The long term changes for the alternative are very similar to those of the Proposed Action. Slight change in the rate of some AOAs (Goshute, for example) are attributed to the methodology. The Moapa rate increases slightly over the proposed action as does the Kanosh rate.

Alternative 4 (4.2.3.2.5)

Under this alternative, the Moapa rate declines very slightly as does the Cedar City rate reflecting the shift from Milford to Beryl for one operating base. The Kanosh rate, as a result, shows a slight increase over the Proposed Action.

The long run rates depict similar changes, with the Kanosh rate showing a slight increase over the Proposed Action (Table 4.2.3-3)

Alternative 5 (4.2.3.2.6)

Unlike peak year, this alternative raises the unemployment rate in the Moapa Reservation and Cedar City Colony, while reducing the rate in Ely and Kanosh. These changes reflect the shift of the operating base from Coyote Spring for Ely under this Alternative.

In the long term, rates will increase slightly for Moapa and Cedar City, with a small decline at Kanosh and Goshute.

Alternative 6 (4.2.3.2.7)

This alternative is identical to the Proposed Action except for the order in which the operating bases are developed. Both peak year and long-term results are identical.

Alternative 7 (4.2.3.2.8)

This alternative is for total deployment in the Texas/New Mexico region where no impacts to Native Americans are expected.

Alternative 8 (4.2.3.2.9)

Under this alternative, only half the Proposed Action is proposed. Rates in Cedar City and Kanosh are shown to increase substantially, while only minor adjustments occur in the remaining AOAs.

In the long term, slight increases in the unemployment rate are projected for both Kanosh and Cedar City, with smaller changes elsewhere.

Public Finance (4.2.3.3)

Negative impacts to the financial structure of tribal governments may involve increased costs resulting from increased demand on tribal councils to provide services and facilities. Also, the productivity of tribal agricultural operations may be decreased as a result of the loss of key personnel to higher paying M-X employment and/or due to damage to grazing lands or tribal herds.

Conversely, the profitability of certain tribal enterprises (e.g., smokeshops, retail sales, construction firms) may increase as a result of project-related population increases. In addition to existing businesses, tribal enterprises specifically designed to take advantage of M-X opportunities may be formed, providing the potential for both individual and tribal incomes.

Finally, the Air Force's Community Impact Assistance Program for Native Americans may be a source of funds to mitigate the negative impacts of M-X activity on the public finance sector of tribal governments.

Proposed Action (4.2.3.3.1)

Under the Proposed Action, the Moapa and Kanosh reservations and the Cedar City Colony are the most likely groups to experience significant negative impacts to the public finance sector. This is attributable to projected percent increases in population resulting from their relative proximities to operating bases at Coyote Spring and Milford.

The Moapa Tribe, however, is the group most prepared to take advantage of M-X generated opportunities (e.g., commercial vegetable production, tribal construction firm).

Alternative 1 (4.2.3.3.2)

Under Alternative 1, with OBs at Coyote Spring and Beryl, only the Moapa Reservation and Cedar Colony are expected to experience significant impacts to public finance.

Alternative 2 (4.2.3.3.3)

Under Alternative 2, with OBs at Coyote Spring and Delta, the Moapa and Kanosh reservations are expected to experience significant impacts to public finance.

Alternative 3 (4.2.3.3.4)

Under Alternative 3, with OBs at Beryl, Utah, and Ely, Nevada, both the Cedar City and Ely colonies are expected to experience significant impacts in the area of public finance, resulting from substantial project-related population increases (see Table 4.1.3-1).

Alternative 4 (4.2.3.3.5)

Projected impacts under Alternative 4 would be the same as those described for Alternative 1, except that the sequence of OB construction would be reversed: Beryl, followed by Coyote Spring.

Alternative 5 (4.2.3.3.6)

Under Alternative 5, with OBs at Milford, Utah, and Ely, Nevada, both the Kanosh Reservation and Ely Colony would receive significant impacts to tribal financial structure as a result of substantial project-related increases in population.

Alternative 6 (4.2.3.3.7)

The projected impacts under Alternative 6 would be the same as those described for the Proposed Action, except that the sequence of OB construction would be reversed: Milford, followed by Coyote Spring.

Alternative 7 (4.2.3.3.8)

Under Alternative 7, full basing in Texas/New Mexico, there would be no impacts to tribal public finance, since no Native American reservations or colonies are within the regions of influence of the Texas/New Mexico DDA or OB sites.

Alternative 8 (4.2.3.3.8)

Under the split-basing option, with OBs near Coyote Spring, Nevada, and Clovis, New Mexico, only the Moapa Reservation would experience significant impacts to public finance as a result of M-X activity.

Inflation (4.2.3.4)

Inflation is defined as an increase in price levels of goods and services over time. Inflation can be either local or regional in occurrence. Regional inflation in the ROI could increase substantially as a result of M-X activities. For instance, Jorgenson states that "It is the sine qua non of rural industralization, particularly energy booms in the west, that precipitous inflation is a consequence of extremely rapid population growth, and the influx of new money through nigh salaries paid to newcomers" (Jorgenson, 1980:10). During the construction of the TransAlaska Pipeline, however, inflation was not a critical factor to rural residents. Although the costs of off-reservation housing increased dramatically (motels, hotels, and rental units) and the price of restaurant meals skyrocketed, most items necessary for rural life actually declined in cost (e.g., clothing, hardware, and lumber). The stock was also larger and more varied in most of the stores in the construction area (Reckord, 1979:119). The applicability of this analogy to the proposed project cannot be determined. Regional inflation in the costs of goods and services could increase and may erode some of the advantages of higher wages.

Since M-X-caused inflation would likely be most pronounced in the cost of off-reservation housing, Native Americans out of the work force and dependent upon fixed incomes would be most vulnerable. Impacts to these individuals would be particularly significant and may result in the necessity of tribal governments to

provide accommodations on reservations and colonies to low income members who currently reside off reservation in rental housing and are unable to cope with inflated costs.

Proposed Action (4.2.3.4.1)

Under the Proposed Action, regional inflationary impacts are expected to be felt on all AOAs, but those feeling the effects of inflation most would be those Native Americans living on fixed incomes: these are basically the elderly and disabled persons. Inflationary impacts on housing would be experienced on the AOAs to the extent that new buildings are constructed and the cost of building materials inflate as a result of M-X construction activities. Some regional inflation is expected in the housing construction industry as a result of increased cost for skilled labor and materials.

In most of the areas of analysis, very little of the total consumption of goods and services is produced within the reservations and colonies. Consequently, much of the items are purchased from the local economies within neighboring communities. Regional inflation would be felt in the prices of some goods and services. Retail level goods are not expected to be inflated very much under project conditions because they can be readily transported from major transportation hubs such as Salt Lake City or Las Vegas. However, if the supply of goods and services cannot increase at the same rate as the increase in demand, inflation will occur in the form of price increases.

Price inflation would probably occur in the area of health services. Large population increases within the ROI during project construction would greatly stress existing hospital and medical services. It is expected that in the short-term there would be excessive demand for available health services. According to classical economic theory, such a condition would imply increases in the cost of health care and services. Native American residents of the AOAs could experience extreme difficulties in obtaining these goods and services because their incomes are not expected to keep up with those of the newcomer construction workers who would be competing for the available services.

The degree to which residents of the various areas of analysis will be able to cope with regional inflation under project conditions would depend upon their ability to refrain from engaging in the regional market economies for goods and services. Thus, improvements in tribal AOA self-sufficiency through either increases in personal disposal income or through becoming more self-reliant and isolated from the non-AOA economy would lessen the impacts of regional inflation.

Alternative 1 (4.2.3.4.2)

Inflationary impacts under this alternative are essentially the same as those felt under the Proposed Action.

Alternative 2 (4.2.3.4.3)

Impacts under this alternative are essentially the same as those felt under the Proposed Action.

Alternative 3 (4.2.3.4.4)

Inflationary impacts under this alternative are essentially the same as those felt under the Proposed Action.

Alternative 4 (4.2.3.4.5)

Inflationary impacts under this alternative are essentially the same as those occurring under the Proposed Action.

Alternative 5 (4.2.3.4.6)

Inflationary impact under this alternative are essentially the same as those occurring under the Proposed Action.

Alternative 6 (4.2.3.4.7)

Inflationary impacts under this alternative are essentially the same as those occurring under the Proposed Action.

Alternative 7 (4.2.3.4.8)

Under full deployment in the Texas/New Mexico DDA, Native American lands are not located within the deployment area; consequently, there would be no inflationary impacts on Native American areas of analysis for this alternative.

Alternative 8 (4.2.3.4.9)

With split deployment between Nevada/Utah and Texas/New Mexico, the probability of inflation occurring of the same magnitudes as under the Proposed Action would be lessened.

Subsistence Activities (4.2.3.5)

Native American subsistence activities include hunting, fishing, and the gathering of wild plant resources.

Decreases in subsistence activity resulting from the departure of reservation and colony residents in search of employment, and in some cases due to loss of available hunting and gathering areas, is a probable impact of M-X construction and operations. The degree to which subsistence resources are depended upon by Native Americans in Nevada/Utah has not been quantified. It is known, however, that to many individual Native Americans, hunting and gathering activities are critical factors in household income. Since wild foodstuffs are frequently exchanged and/or provided to needy residents, primarily elders, it is expected that significant impacts to subsistence activities would be experienced on all reservations and colonies in the region of influence.

A discussion of subsistence activities and potential impacts resulting from M-X construction and operations is contained in the section of this document concerned with Land Use and Impacts to Land Use (Section 3.1).

Proposed Action (4.2.3.5.1)

Indirect significant impacts on subsistence activities could possibly occur at reservations and colonies outside the AOAs. Such indirect impacts could result from a loss of young workers who would be expected to migrate to the designated Native American AOAs in search of higher paying jobs. This, in turn, could decrease the available supply of labor which currently performs the subsistence activities.

Alternative 1 (4.2.3.5.2)

Significant impacts to Native American subsistence activities are anticipated just as in the Proposed Action.

Alternative 2 (4.2.3.5.3)

Significant impacts to Native American subsistence activities are anticipated just as in the Proposed Action.

Alternative 3 (4.2.3.5.4)

Significant impacts to Native American subsistence activities are anticipated just as in the Proposed Action.

Alternative 4 (4.2.3.5.5)

Significant impacts to Native American subsistence activities are anticipated just as in the Proposed Action.

Alternative 5 (4.2.3.5.6)

Significant impacts to Native American subsistence activities are anticipated just as in the Proposed Action.

Alternative 6 (4.2.3.5.7)

Significant impacts to Native American subsistence activities are anticipated just as in the Proposed Action.

Alternative 7 (4.2.3.5.8)

No impacts to Native American subsistence activities are anticipated under the Texas/New Mexico full-basing option.

Alternative 8 (4.2.3.5.9)

Significant impacts to Native American subsistence activities are anticipated under the split-basing option, but not to the extent which they would be expected under the Proposed Action.

4.3 COMMUNITY INFRASTRUCTURE

INTRODUCTION (4.3.1)

Community infrastructure attributes include schools; health; housing; public services, which include utilities, police and fire protection; transportation; communications; and tribal jurisdiction. Baseline data for each of these attributes are shown in Section 4.3.2 and impacts of M-X activities on these attributes are discussed in Section 4.3.3.

Population increases would create new demands upon the existing community. New services could be required or else the quality and the level of current community services might be altered. This section evaluates the potential for such realignments.

BASELINE COMMUNITY INFRASTRUCTURE (4.3.2)

Schools (4.3.2.1)

The majority of the school aged children of residents of the AOAs attend school within the neighboring communities. Only the Duckwater area of analysis has a tribal school. The Duckwater Reservation Elementary School had 10 pre-schoolers and 28 students in grades one through eight enrolled during the 1979-80 school year (Facilitators, 1980). Table 4.3.2-1 lists the baseline projections of school age children of ages 6 through 17. Table 5.1.3.1-3 lists the percentage breakdown of age mix of Native Americans within the various areas of analysis. The age mix is assumed to remain constant through the period of analysis. According to the projections, the baseline number of school age children will nearly double from 1980 to 1992; they will increase in number from 311 in 1980 to 606 in 1992, a 94 percent increase in 12 years, or an 8 percent annual increase.

Most of the additional costs of schooling for the increased Native American school enrollments during the baseline years will be absorbed by state and local general fund expenditures. The total quantity of funds going toward education is expected to increase during the next twelve years.

It is possible that the Duckwater Reservation Elementary School may have to expand in order to accommodate the projected baseline increases in the number of Native American school age children from that AOA. The number of children attending this school are expected to nearly triple between 1980 and 1992. Total school age children on the Duckwater Reservation are projected to increase from 50 in 1980 to about 130 in 1992, an increase of 160 percent over the 1980 level. It should be noted that the projection of these increases were based upon population increases experienced during the decade of the 1970s.

Health (4.3.2.2)

Some reservations still rely on traditional medical practices. These services have historically been provided by tribal members to those in need of medical assistance. For example, tribal members on both the Duckwater and Goshute reservations practice traditional naturopathic medicine which makes use of herbs, plants and other items found in the natural environment. Traditional Native

Table 4.3.2-1. Native American school age children baseline projections, by AOA, 1980-1992.

Area of Analysis	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Duckwater	50	57	63	70	76	83	89	96	103	109	116	122	130
Yomba	27	29	30	32	34	35	37	39	40	42	44	45	47
Goshute	48	52	57	61	66	70	74	79	83	88	92	97	101
Moapa	59	65	71	76	82	88	94	100	106	111	117	123	129
Las Vegas	28	28	29	29	29	30	30	30	30	31	31	31	31
Ely	47	49	50	52	54	55	57	59	60	62	64	65	67
Cedar City	24	26	28	30	32	34	45	37	39	41	43	45	47
Kanosh	12	13	14	15	16	17	18	19	20	21	22	23	24
Koosharem	12	13	14	15	16	17	18	18	19	20	21	22	23
Indian Peaks	4	4	4	5	5	5	6	6	6	7	7	7	7
Total	311	336	360	385	410	434	458	483	506	532	557	580	606

T5882/10-2-81

Source: Tables 5.1.3.3-1 and 5.1.3.1-3 and linear interpolation.

American medical philosophies have incorporated a holistic approach: the individual and his physical surroundings are viewed as parts of the same environment - each is integrated with the other. Maladies and sickness are assumed to occur when an imbalance develops. Traditional medicine then seeks to restore the natural balance between man and his environment

During the past decades, however, this traditional pattern of medical assistance has changed somewhat: tribal members are beginning to rely on medical services provided by local communities. Native Americans living within the AOAs are eligible for Indian Health Services (IHS). These services are provided through tribal contracts with private doctors in local communities, or at IHS service units. The health services are provided free of charge to eligible AOA residents through grants from the U.S. Department of Health and Human Services.

Even with Indian Health Services, Native Americans do not receive the same level and quality of medical services available to others living in the ROI off the reservations and colonies. This does not necessarily imply that Native Americans are less healthy than non-Native Americans. It does, however, imply that medical visitation rates for Native Americans tend to be less than those for non-Native Americans. Low medical visitation rates are a result of the great distances Native Americans often have to travel to obtain medical care. For example, members of the Moapa Reservation must travel 350 miles to receive IHS medical services. The nearest IHS facility to this reservation is the Schurz Hospital in Northern Nevada. Most Moapa residents use contract health care services provided by medical facilities in the city of Las Vegas.

It should be noted that even though AOA residents are eligible for Indian Health Services, budget constraints at the national level are lowering the aggregate amount of health services available to Native Americans.

According to Richard Jameson's Native American Study of the Southwestern Utah Tribe, 1981, many of the "...poor health habits of the Tribe are related to a lack of understanding by the members of what constitutes good health practices. This is particularly evident in the incidence of obesity among the Tribe. In addition to nutritional counseling, health education needs to be provided to . . ." deal with accidents, alcoholism, dental care, family planning, and a range of other medical problems.

One significant conclusion of Jameson's report is "that the most significant problem is a general lack of health services. The Tribal members do not have the needed resources to obtain health care from the private sector and there is not an IHS service unit in reasonably close proximity to the Tribe." As a result, he concludes, it would be "most helpful if IHS services or contract health or equity funding could be extended to the Tribe to help them obtain the health care they need on a regular basis."

Housing (4.3.2.3)

Housing conditions on the AOAs have improved in recent years due to increased funding. Many homes remain substandard and overcrowded, nonetheless, and the outlook for improvements, in light of federal budget cutbacks, is dim.

According to field studies conducted during the preparation of this report, over 80 percent of the housing units occupied by members of the Cedar City, Kanosh, Indian Peaks and Koosharem bands of the Paiute Tribe were either in sound condition, or required minor repairs costing less than $500. The study also indicated that approximately 65 percent of the residents lived in single family dwelling units and 17 percent lived in mobile homes. Table 4.3.2-2 lists the total number of persons per dwelling unit by area of analysis. As the table indicates, the number of residents per housing unit ranges from 2.2 for Indian Peaks to 5.6 for the Yomba Reservation. The average for the non-AOA Nevada/Utah residents within the ROI is assumed to be about 3 persons per housing unit. The number of people per housing unit for each AOA is assumed to remain constant through 1992.

Table 4.3.2-3 presents the baseline total number of housing units of all types projected to be required at the AOAs from 1980 through 1992. Projections of housing units were based upon the existing number of people per housing unit and the baseline population projections listed in Table 4.1.2-2 Housing unit requirements are obtained by dividing the total AOA population for a given year by the number of people per housing unit.

As Table 4.3.2-3 indicates, total housing units for the ten areas of analysis are projected to increase by 223 units between 1980 and 1992, or by 91 percent. The Moapa reservation had the greatest number of housing units for any of the AOAs during 1980: this reservation is also expected to require the greatest number of housing units in 1992, and will increase by 121 percent during the 12-year period. The smallest number of housing units in 1980 was for the Indian Peaks band. The total demand for housing units within the ten areas of analysis is projected to increase by about 8 percent annually.

Public Services (4.3.2.4)

This section presents baseline data on existing public services at the Native American AOAs. Public service attributes include utilities, fire and police protection.

Sanitation services and utilities vary by reservation and colony AOAs. In general, colonies, which are in or adjacent to towns, are serviced by municipal water, electricity and telephone; garbage and waste disposal may be colony responsibilities. Rural reservations tend to have minimal sewage or sanitation disposal services. Septic tanks and drainage fields are the most common sewage disposal means and garbage is burned or hauled to a landfill.

There is also considerable variation in public and safety services. Colonies have greater access to fire and police protection services, than do reservations. Rural reservations may be too far from fire protection for it to be of much use, or the reservation may not have the water resources or hydrant system necessary to effectively use fire fighting equipment. There has been little need for police services on most reservations to date; however, BIA police may be stationed at a reservation or may be made available to other reservations as needed. In addition, some tribal governments maintain a small tribal police force. This is more likely to be the case on urban colonies than on reservations. Finally, tribal governments may enter into contractual agreements with nearby towns to share the services of municipal police.

Table 4.3.2-2. Number of persons per household at Native American AOAs, 1980.

Area of Analysis	1980 Population	Total Number of Housing Units	Persons Per Household (1980)
Duckwater	176	34	5.2
Yomba	95	17	5.6
Goshute	170	35	4.9
Moapa	208	43	4.8
Las Vegas	100	28	3.6
Ely	165	39	4.2
Cedar City	84	17	4.9
Kanosh	44	11	4.0
Koosharem	41	15[1]	2.7
Indian Peaks	13	6[1]	2.2
Total	1,096	245	4.5

T5884/9-30-81

[1]Richard Jameson, 1981, Native American Study of the Southwestern Utah Tribe.

Source: Facilitators, 1980.

Table 4.3.2-3. Native American housing units baseline projection by AOA, 1980-1992.

Area of Analysis	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Duckwater	34	39	43	48	52	57	61	66	70	75	79	84	88
Yomba	17	18	19	20	21	22	24	25	26	27	28	29	30
Goshute	35	38	41	44	47	50	53	57	60	63	66	69	72
Moapa	43	47	52	56	60	65	69	73	78	82	86	91	95
Las Vegas	28	28	28	28	29	29	29	29	29	29	30	30	30
Ely	39	40	42	43	45	46	47	49	50	52	53	55	56
Cedar City	17	18	20	21	22	24	25	27	28	28	29	31	33
Kanosh	11	12	13	14	15	16	16	17	18	19	20	21	22
Koosharem	15	16	18	19	20	21	23	24	25	26	28	29	30
Indian Peaks	6	7	7	8	8	9	9	9	10	10	11	11	12
Total	245	263	283	301	319	339	356	376	392	411	430	450	468

T5883/9-30-81

Source: Based on population projection and average household size, Tables 4.1.2-2 and 4.1.2-5 of ETR-21.

The following paragraphs summarize the public services and facilities available on the reservations and colonies designated as AOAs.

Duckwater Reservation (4.3.2.4.1)

Utilities

Although there is a high mineral content, the domestic water supply at Duckwater is considered to be adequate. There are 6 to 8 wells and pumps which are usually in operation to serve all the facilities and homes on the Duckwater Reservation. Duckwater is served electrical power by the Mount Wheeler Power Company. It is on a "dead end" power transmission line and thus plagued alternately with high voltage spikes and low voltage transmissions which frequently blow out or overheat the water pumps. Even though it may take several days to replace parts (from Reno or Salt Lake City), there are alternate systems (funded by IHS, 1972) to forestall any great inconveniences.

Duckwater operates 2 to 3 small solid waste dump sites on the reservation. Currently all new homes and facilities are connected to sewage drainage fields.

There is one law enforcement officer on the Duckwater Reservation whose salary is provided by the Bureau of Indian Affairs: he is on-call to assist on other reservations as needed.

A volunteer fire protection unit of 12 members was formed in 1978. One fire truck is available.

Yomba Reservation (4.3.2.4.2)

Utilities

Since 1977, annual applications to the Department of Housing and Urban Development (HUD) and in 1977 to the Indian Health Service (IHS) have requested assistance to provide a much needed central water system, a fire truck, water hook-ups to 10 homes (there were already 8 wells supporting portions of the community in 1977) and community facilities, as well as indoor plumbing and septic tanks for approximately the same number of units. HUD funds have provided bathrooms for 13 of the 17 units. Applications have been recently approved to provide the central water system at a cost of about $180,000 with financial participation from HUD and IHS. There are no established disposal areas and each household is responsible for collecting and disposing of its own solid waste.

The Rural Electrification Administration extended electrical service to Yomba in late 1976 and all housing units and facilities now have electricity. Power is provided by a single line, however, and outages occur frequently and may last several hours.

Police

The Bureau of Indian Affairs provides officers from the Fallon or Walker River Reservations to the Yomba Reservation on an as-needed basis. In addition, officers

of the Nye County Sheriff's Department, one of whom is from Yomba, are cross-deputized and provide protection on the reservation.

The Yomba Reservation maintains a contract with a Fallon judge who travels to Yomba whenever court services are needed. Crime at the reservation is an infrequent occurrence and is usually associated with alcohol abuse.

Fire Protection

There is no fire protection system at Yomba at the present time; the reservation lacks a central water distribution system with fire hydrants. Yomba hopes to obtain the needed central water system soon with the assistance of HUD and IHS at a total cost of $180,000. In 1978 HUD approved $15,000 for the purchase of a fire truck for Yomba and they plan to apply for HUD funds to construct a fire station to house the truck and equipment.

Goshute Reservation (4.3.2.4.3)

Utilities

In 1969-70 the Service Unit of the Public Health Service sampled domestic water on the Goshute Reservation and found it to be contaminated. At that time, the Rural Electrification Administration had begun to establish the Mount Wheeler Power Company for the purpose of providing electric power in the area. The Goshute Reservation was included in this project. The Public Health Service provided a two-phase plan. Phase One (preelectricity) called for the test pumping of 7 existing wells; the drilling, grouting, and casing of 8 new wells; the provision of new hand pumps; and the provision of household plumbing (toilets, kitchen sinks, lavatories); the installation of electric water pumps, pressure tanks, and controls; the construction of domestic waterlines; the installation of septic tanks and leach fields; and the provision of one set of complete facilities for the community building. Phase Two provided electricity to the reservation. Currently all new HUD homes and the new community building have adequate and safe water supplies.

Because of its remote location, Goshute residents operate three small solid waste dump sites with individuals responsible for their own collection and disposal. All HUD homes have standard septic tank systems and leach fields, as does the new community building and welding shop. Currently, the Goshute reservation's power is supplied by the Mount Wheeler Power Company, located in Ely.

Police

There is one tribal policeman to patrol the Goshute Reservation. Wendover and Ely both have municipal police, offices of the county sheriff, state highway patrol units, and emergency dispatch and ambulance service.

Fire Protection

The reservation has one truck; water is pumped from tribal wells. Fire protection is provided by a tribal volunteer team.

Moapa Reservation (4.3.2.4.4)

Utilities

The Moapa Reservation receives all of its domestic water from the old line of the Moapa Valley Water Company. The line originates near Warm Springs, approximately 4 mi north of the reservation. Indian Health Service is responsible for the design and construction of the water system; the tribe is responsible for its maintenance and collects a monthly charge from all users for this purpose.

The quality of the water, tested regularly, is barely acceptable by health standards and requires chlorination. The Moapa Valley Water Company does not properly chlorinate the water, and the reservation's own chlorination system functions sporadically. The older main line from the Moapa Springs suffers numerous breaks, and foreign debris has been found in the filtering system.

A recommendation for a new independent system was made after completion, of test drilling for geothermal resources on the reservation in 1980. Funded by the Department of Energy Alternative Energy Program, three test wells were drilled, from 350 to 500 ft deep, to ascertain the geothermal potential in the area. The possibility of tapping thermal sources is based on the proximity of the reservation to Moapa Springs. The springs, located 4 mi north of the reservation, maintain an average surface temperature of 90°F. The purpose of the drilling was to search for potential geothermal resources that could be tied to the greenhouses, the homes and community buildings for heating purposes. The test wells have been completed and an evaluation is in progress to determine the advisability of proceeding with the thermal project.

The waste water system consists of a 6 to 8-in diameter collection system discharing into a 3-cell open lagoon. Forty-three houses and one mobile home are connected to this system. The lagoon system, constructed with the first housing project in 1971, is effective. Three trailers have inadequate septic tanks consisting of 55-gallon drums. Garbage is taken by each individual or tribal business to a landfill site maintained by the tribe.

The reservation is supplied power by Overton Power Company; in early 1975, 3-phase power was made available to the reservation. The power company provides regular maintenance, and with the recent agreements they have signed to secure additional power sources (the Ely and Harry Allen Plants), the indications are that there is a sufficient supply of power to accommodate anticipated growth in the area.

Police

Law enforcement on the Moapa Reservation is administered through a Public Law 93-638 Judicial Services Contract with the BIA. The Moapa Tribal Judicial System deals with misdemeanors and civil cases; major crimes are the responsibility of the FBI. The Tribal Judicial System operates under the Code of Federal Regulations (CFR 25), but the tribe has developed and is seeking implementation of their own judicial code. The Clark County Sheriffs Department provides backup support when the two BIA policemen are not available.

Fire Protection

At present, there is no formal fire protection on the reservation. In 1977 the tribe acquired an old surplus fire engine, but training in its used has not been provided. The Moapa Township Volunteer Fire Department owns a fire engine and an ambulance; the estimated response time is 30 minutes.

Las Vegas Colony (4.3.2.4.5)

Utilities

Water is supplied by the Las Vegas Valley Water District; electricity by the Nevada Power Company; natural gas by the Southwest Gas Company and the California-Pacific Utilities Company. The sewer system is municipally owned.

Police

In addition to its own tribal law enforcement unit of five junior cadets (no affiliation with BIA) under the supervision of one adult tribal law enforcement officer, colony residents have the additional advantage of non-Indian metropolitan law enforcement, when requested.

Fire Protection

Fire protection is provided by the City of Las Vegas.

Ely Colony (4.3.2.4.6)

Utilities

Water is supplied to the colony by the Ely Municipal Water Department, whose sources are deep wells and springs in outlying areas. The City of Ely is responsible for the operation and maintenance of the water system on the colony. The Ely Colony is connected to the City of Ely's sewer system, and it is the city's responsibility to operate and maintain the system. The City of Ely operates a sanitary landfill. Ely Colony residents have the option of disposing of their refuse themselves, or of paying $4.50 per month to the Ely Disposal Company, a privately owned firm, to dispose of it for them (IHS 179 (I):4).

Power to Ely and to the Ely Colony is supplied by the U. S. Bureau of Reclamation and Utah Power and Light Company. Power is distributed by Mount Wheeler Power Company, which is a participant in the Intermountain Power Project and the White Pine Power Project.

Police

In 1973 the Native American Reservations in Nevada voted either to proceed under federal laws or to remain under state jurisdiction. All but the Ely Colony voted for federal jurisdiction. City police serve the colony as if it were the city. All municipal regulations apply to the colony. There are 13 police department personnel and 19 employed by the sheriff's department (White Pine County Development Corporation 1979:3).

Fire Protection

The City of Ely has six full-time fire department personnel, 45 volunteers, and six pump trucks provides fire protection for both the City and the Ely Colony.

Cedar City Colony/Indian Peaks Band (4.3.2.4.7)

Utilities

Most of the utilities in use by the colony are provided by the Cedar City municipal system; four residences maintain private wells. No natural gas is available in Iron County. California Pacific National provides 100 percent of Cedar City's electricity.

Police

The Iron County Sheriff's Office provides countywide coverage. There are ten officers and ten patrol cars in the department. Cedar City also has a city police department that serves the colony as well as the city.

Fire Protection

Cedar City's fire department consists of three full-time employees and 30 volunteers. The equipment, in good working order, and includes two pumpers, each rated at 1,250-gallons per minute. One is stationed at the airport, and all other equipment is housed in the fire station. The fire department served the colony and is less than two miles away.

Kanosh Reservation (4.3.2.4.8)

Utilities

The reservation has a fresh water spring from which residents derive thier water. The reservation is served by the Kanosh city waste disposal system, which uses a landfill. Contracts are arranged by individual households.

Police

The Kanosh Reservation is served by the County Sheriff, however, crime on the reservation is virtually unknown. The head of the Utah Paiute Development Corporation, UPDC, a resident of the reservation, is also a state deputy.

Fire Protection

The Town of Kanosh, located approximately 1-1/2 mi from the reservation, has fire fighting equipment readily available for their use.

Koosharem (4.3.2.4.9)

Utilities

Of the 16 residences on the Richfield Colony, 15 are served by municipal water and one maintains a private well. Likewise, all but one of the homes is connected to the Richfield sewer system. All residences have electric power.

Police

Police services are provided by the City of Richfield.

Fire Protection

Fire protection is provided by the Richfield Municipal Fire Department.

Transportation (4.3.2.5)

The following paragraphs summarize the data regarding transportation and accessibility of reservations and colonies designated at AOAs.

Duckwater Reservation (4.3.2.5.1)

The Duckwater Reservation has approximately 20 mi of nonmaintained paved road. All transportation, with the exception of school buses, is by private automobile or truck. The distance to Eureka is 40 mi via gravel road; the total distance to Ely is 75 mi.

Yomba Reservation (4.3.2.5.2)

The only route passing through Yomba, State Highway 21, is in poor condition. Except for 12 mi of pavement east of Gabbs, the road is gravel. During periods of spring run-off, when flooding occurs frequently, and during heavy snows the highway becomes impassable (Laidlaw 1976:42). The Yomba have considered having the rest of the road paved but this would invariably lead to increases in traffic through the reservation. For example, the Ichthyosaur Paleontologic State Monument, seven mi west of Yomba, now averages about 1,000 tourists a month during the summer, despite poor road conditions and there are already many hunters and fishermen in the immediate area of the reservation. Yomba leaders fear that paving the road would promote increased travel, thereby disturbing the natural environment, the livestock grazing areas, and the peaceful existence at Yomba.

The BIA has provided funds for road maintenance and snow removal; the Tribal Council hires a member to provide this service. The Bureau of Indian Affairs is also responsible for about 17 mi of feeder roads which provide access to individual assignments on the reservation.

Goshute Reservation (4.3.2.5.3)

The two major roads connecting to U.S. Alternate 50 are gravel except for 20 mi of the road to Wendover, which the BIA has paved. The states of Nevada and Utah and the BIA are responsible for road maintenance. The nearest public

transportation is available in Wendover and Ely, including bus service and minimal air transportation. Both Wendover and Ely have railroad freight service.

Moapa Reservation (4.3.2.5.4)

On the Moapa Indian Reservation, all of the major roads are paved with the exception of roads leading to seven homesites, one to the Housing Authority Office, and one to the planned 40-unit homesite located. However, these roads will be paved in conjunction with housing project construction.

Highway 7 connects with U.S. 93, running from Las Vegas on the eastern side of Nevada north to Alamo, Caliente, Pioche, Ely and on toward Elko and I-80. Highway 7, which is in fair condition, also connects to I-15, which provides access to Las Vegas (55 mi) or Salt Lake City (389 mi).

The town of Glendale, with a cafe, service station, and motel on I-15, six mi from the reservation, is a regular stop for Greyhound bus service between Las Vegas and St. George, Utah. The Union Pacific Railroad operates their main line from Los Angeles to Salt Lake City, passing within one mi of the reservation. There is a railraod siding at the town of Moapa (two mi from the reservation). The Moapa Valley Freight Company handles shipments daily and provides access to the freight transportation network located in Las Vegas. United Parcel Service makes daily deliveries and pick ups on the reservation. There are airplane landing strips at Glendale and Overton; the nearest commercial airport is McCarran International in Las Vegas.

Las Vegas Colony (4.3.2.5.5)

The road which divides the 10-acre colony is paved with curbs and storm drains; it is maintained bythe City of Las Vegas. All public transportation systems are available for use by colony residents. The colony is located approximately four mi from the railroad depot, 12 mi from the McCarran International Airport, and one mi from downtown Las Vegas. Las Vegas has excellent transportation connections with all parts of the nation. It is served by four major highways, which connect the city with such metropolitan areas as Los Angeles (289 mi to the west), Phoenix (291 mi to the southeast), and Reno (448 mi to the northwest). Bus service includes Greyhound, Continental Trailways, LTR Stage Lines, Sun Valley, Las Vegas Transit and Transportation Unlimited. Scheduled air service is furnished by 16 air carriers. Commuter lines include Nevada Air Lines, Ross Aviation, Lake Havasu, Scenic, and Skywest. Air service provides nonstop service to many of the major population centers with connections to almost every city in the nation.

Freight rail service is provided by Union Pacific Railroad, and Amtrak provides passenger service from Los Angeles and Salt Lake City with stops in between. Internally, the city is serviced by two bus lines, over 500 taxis (including limousines and tour vehicles), and approximately 15 car-rental agencies.

Ely Colony (4.3.2.5.6)

There is about one-quarter mile of road in Old Colony and New Colony combined. Pine Street, in Old Colony, is a 200 ft gravel road. The road in New Colony is a paved two-way street maintained by the City of Ely.

The colony is located about one-half mile from U.S. Highways 93, 50, and 6, five mi away from Nevada Northern Railway (available twice weekly), and seven mi from the nearest airport, which is Yelland Field (with a 6000 ft runway). There are two flights daily, one to Elko, Reno, and San Francisco, and one to Salt Lake City and Denver (Facilitators, 1980:3.103).

Cedar City Colony/Indian Peaks Band (4.3.2.5.7)

Cedar City is a major southern Utah municipality, with excellent vehicular access. Interstate 15 and Utah State Roads 56, 14, and 130 all lead to Cedar City. The road that leads into the colony from Main Street, Cedar City, is paved but minimally maintained.

Freight train service is available in Cedar City, but there is no passenger service by rail in Iron County. Cedar City also has an airport with a paved, 8,400 ft runway, and an 80-plane tie-down capacity. Cedar City is also served by the Greyhound Bus line.

Kanosh Reservation (4.3.2.5.8)

The Kanosh Reservation is eight mi from Interstate 15. State Route 133 intersects the gravel and dirt road that leads one-half mi into and through the reservation. All of the residences on the reservation are located on this road, and its poor condition is evidenced by many ruts and clouds of dust generated by vehicular traffic.

The nearest railroad freight service is located in Fillmore which is on the Union Pacific Line. There is no railroad passenger service in Millard County. Fillmore has an airport, with a 5,000-ft runway, and five-plane hangar and tie-down services. Skywest Air provides passenger service which flies once daily, Monday through Friday, between Salt Lake City, Delta, and Fillmore. Fillmore also claims the only Greyhound bus service in Millard County and a full complement of inter and intrastate trucking possibilities (Facilitators, 1980:4.52).

Koosharem Colony (4.3.2.5.9)

The Koosharem Colony is presently located in Richfield, Utah. U.S. Highway 89 passes through the City of Richfield, and U.S. Highway 12 begins just northeast of the city. Rail service is provided by the Rio Grande Railroad, operating in south/central Utah.

Communications (4.3.2.6)

The following paragraph summarizes the variety and availibility of formal communications media on Native American reservations and colonies within the designated areas of analysis.

Duckwater Reservation (4.3.2.6.1)

Both radio and television reception is generally poor due to the mountain ranges which surround the Duckwater Reservation. Local and regional newspapers

are available in Ely or through the mail. There are seven party-line telephones, 12 citizen band radios, 27 AM radios, and 22 television sets on the reservation.

Yomba Reservation (4.3.2.6.2)

The Yomba Reservation is very remote. Mail is delivered from Austin, Nevada, to Yomba three days a week. The closest post office is located 35 miles away at Gabbs.

There are several newspapers received at Yomba including The Nevada State Journal and The Native Nevadan. These papers usually arrive about a week late. According to a health plan survey in February, 1979, about 12 Yomba families own radios which receive Fallon stations and 8 own televisions (Arno, 1979(I):18). Only one Reno television channel is received and reception is very poor.

In 1975, the Yomba Action Team purchased a membership in the area telephone cooperative in order to have a single telephone installed in the Tribal Headquarters at a cost of about $5,000, and this remains the only telephone on the reservation. (The cost of service to individual households is prohibitive, $1,600-$1,800.) Static is prevalent even under optimum conditions. Yomba residents and nearby ranchers who are members of the telephone cooperative are responsible for maintaining the line.

Goshute Reservation (4.3.2.6.3)

The tribal building has telephone service. The post office in Ibapah has a pay phone. Service is very limited due to the reservations extreme isolation. Regional newspapers are delivered to a few tribal members by U.S. mail.

Moapa Reservation (4.3.2.6.4)

The Moapa Reservation receives all Las Vegas television stations (four commercial and one public). All of the Las Vegas radio stations are available to the area, with poor reception reported during the day but excellent reception in the evenings. There is no cable television available on the reservation. Two Las Vegas newspapers are available locally on a daily basis; two Overton papers are also available: the Lake Mead Monitor (weekly) and the Moapa Valley Herald (bi-monthly). In 1970, the tribal chairman had the only telephone on the reservation. Currently, there are at least 30 private telephones and service for each of the tribal enterprises. Each residence has a radio or television.

Las Vegas Colony (4.3.2.6.5)

The Las Vegas Colony receives all Las Vegas television and radio stations. Two large, daily newspapers are available as well as one weekly and several regional publications. All family units own either radios or televisions or both, and all have telephones.

Ely Colony (4.3.2.6.6)

In 1979, 36 Ely Colony residents had telephone service, 47 owned radios and TVs, and 9 were equipped with CBs. Telephone service is supplied by Nevada Bell,

and most homes have party lines. The Ely Daily Times, published in Ely, is delivered to the Colony. The Ely Record is published weekly, and newspapers from Reno, Las Vegas, and Salt Lake City are also available. Ely has one local radio station, KELY, and receives KSL-M from Salt Lake City. There is television reception from stations located in Reno (ABC and CBS), Las Vegas (CBS,NBC,PBS), and Salt Lake City (ABC,NBC,and CBS) via translators, which are maintained by the White Pine Television District, at the cost of $20 per household annually. The city of Ely provides postal service and there is one telegraph office (White Pine Chamber of Commerce 1979:6).

Cedar City Colony/Indian Peaks Band (4.3.2.6.7)

The Cedar City area is served by a daily newspaper (the Cedar City Spectrum) and a weekly paper (Iron County Record), both of which are published in Cedar City. Both are readily available to colony residents.

Iron County receives the major Salt Lake City television stations, and cable television service is available in Cedar City. There are four Salt Lake City stations, and an additional four on cable. Cedar City has three radio stations of its own, another is located in Parowan (Iron County). Three other radio stations are received from Salt Lake City. There are 17 telephones, 26 televisions, and 25 radios on the colony.

Kanosh Reservation (4.3.2.6.8)

The Kanosh Reservation has telephone service and receives Salt Lake City stations. There are 7 telephones, 16 televisions, 16 radios, and 4 citizen band radios on the Kanosh Reservation.

Koosharen Colony (4.3.2.6.9)

The Richfield Reaper and two Salt Lake daily newspapers are available locally. Four television channels, one of them PBS, are received in Richfield. Telephone service is provided by Mountain Bell.

Tribal Jurisdiction (4.3.2.7)

An analysis of jurisdictional concerns and responsibilities was provided through the public comments forum by the Nevada Indian Legal Services, Inc. Edited excerpts from that agency's analysis of tribal jurisdiction impacts which may result from M-X deployment follows: (excerpts from A0989-3-002)

Reservations and colonies are literally islands within state boundaries in terms of jurisdiction. They are distinct, independent, political communities. The issues are complex as they include legislative, regulatory and court jurisdiction. Furthermore, the issues involve tribal, state and federal jurisdiction and conflicts between two or more of these powers.

Tribal governments possess sovereign powers to regulate activities of tribal members within their jurisdictional boundaries. These powers include the right to regulate land use, taxation and tribal membership among others. The tribal government also has a strong interest in divorce, child custody, inheritance and

contracts involving tribal members and non-members. The rights of tribal governments to regulate persons and activities are absolute except where the federal government has pre-empted these powers, Warren Trading Post v. Arizona Tax Commission, 380 U.S. 685 (1965); or where these powers have been expressly granted to the states. McClanahan v. Arizona State Tax Commission, 411 U.S. 164 (1973).

Recently there have been increased conflicts between tribal and state governments concerning non-Indian activities over which both assert an interest. These disputes have involved taxations powers, zoning regulations, fireworks, gambling, and liquor. The disputes over regulatory power are directly related to the decreasing isolation of reservations; the influx of nonmembers, especially non-Indians, onto tribal lands and surrounding areas; increasing mobility of tribal members; and increased interaction between members and nonmembers. States have attempted to gain regulatory control where they perceive state interests are affected. State jurisdiction is foreclosed in areas where federal law has preempted the area. Warren Trading Post v. Arizona Tax Commission, supra. States have been excluded where tribal regulations have preempted the area. 54 Wash. L. Rev. 633 (1979). Additionally, the states cannot regulate non-Indians where such regulation would infringe tribal self-government. Williams v. Lee, 358 U.S. 217 (1959).

Tribal governments have an interest in regulating activities on the reservations and colonies. Tribal courts have been found to be "appropriate forums for exclusive adjudication of disputes affecting important personal and property interests of Indians and non-Indians." Santa Clara Pueblo v. Martinez, 436 U.S. 49 (1978). However, non-Indians are generally reluctant to pursue legal actions in tribal courts. State court adjudication of on-reservation disputes between tribal members and non-Indians constitutes intrusion upon tribal self government. The result may be a subtle erosion of tribal regulatory jurisdiction. Even if the state does not attempt to formally regulate people and transactons within tribal boundaries, in effect the tribal government is weakened. Without the ability to retain exclusive court jurisdiction over these civil matters, the tribal regulatory powers are substantially weakened.

Tribal courts have jurisdiction over Indians who commit crimes within the boundaries of the reservation or colony. There are some limitations on this inherent jurisdiction. The federal government has assumed jurisdiction over major crimes committed by Indians on Indian lands. Major Crimes Act, 18 USC Sec. 1153. The Indian Civil Rights Act limits tribal court punishment to $500 or six months imprisonment, or both. 25 USC Sec. 1302.

State courts have exclusive jurisdiction over crimes by non-Indians against non-Indians committed on reservations and colonies. United States v. McBratney 164 U.S. 240 (1896). If the crime committed by the non-Indian on the reservation or colony is a victimless crime, there is an unresolved conflict as to whether federal or state courts have jurisdiction. The practical question concerns which jurisdiction is more likely to prosecute the case. The less serious the crime, the more difficult it is to be prosecuted.

The following excerpt from the Jurisdiction in Indian Reservation, Part II, Hearing before the Select Committee on Indian Affairs (Aug. 11, 1980 comments by

Caleb Shields, Member of the Fort Pect Tribal Executive Board) points out the problems of federal jurisdiction:

As you are no doubt aware on many Indian reservations, federal law enforcement has been seriously deficient. In cases where a non-Indian commits a crime against an Indian on a reservation, neither the State nor the tribes has jurisdiction to prosecute. Only the United States has jurisdiction over such offense. See 18 U.S.C. 13. 1152. However, except for the 13 major crimes, 18 U.S.C. 1153. jurisdiction is not generally exercised over offenses committed by non-Indians against Indians. The most common crimes, such as assaults or small burglaries, simply are not prosecuted in the vast majority of instances. In large part, this is because the necessary federal resources have not been allocated to meet the law enforcement needs of Indian reservations. Existing federal law enforcement is generally too distant from reservations. U.S. attorneys, federal courts, and FBI agents are frequently several hundred miles away. In addition, U.S. attorneys often have more work than they can handle and typically assign a very low priority to the prosecution of offenses on Indian reservations.

Under existing laws, U.S. magistrates are already authorized to try an Indian on an Indian reservation, 19 U.S.C. 3401. But because most magistrates are part time only, they are limited in their assignments and seldom devote time to Indian reservation matters. Because their jurisdiction depends on the consent of each defendant, magistrates as they exist today have not been an effective law enforcement presence on reservations.

The federal government has not involved itself in tribal civil jurisdiction to the extent of its involvement in criminal matters. Theoretically, state civil jurisdiction is only permitted where "essential tribal relations were not involved and where the rights of Indians would not be jeopardized." Williams v. Lee, 358 U.S. 217 (1959). This case established the *infringement* test which has been used and abused in attempts to resolve conflicts between state and tribal civil jurisdiction.

State courts appear anxious to hear matters which were previously considered exclusively within tribal court jurisdiction. State intrusions have increased in areas where there are substantial numbers of non-Indians found within tribal boundaries.

Tribal judicial systems on the reservation and colonies designated as AOAs in this study are of three distinct forms: Duckwater, Goshute and Ely are served by part-time magistrates; Yomba, Moapa and the Las Vegas Colony operate under individual Public Law 93638 contracts, hiring their own judges; and the Paiute Indian Tribe of Utah are under state, civil and criminal jurisdiction.

IMPACTS (4.3.3)

This section discusses Native American community infrastructure impacts which could occur should the Proposed Action or alternatives be implemented. Community infrastructure attributes evaluated include schools, health, housing, public services,transportation, communications, and tribal jurisdiction.

Schools (4.3.3.1)

Public schools would be impacted to the extent that school-age populations are affected by the Proposed Action and the alternatives. Only the Duckwater tribe currently has a school on the reservation. The projections are for all school-age children in grades kindergarten through 12.

Proposed Action (4.3.3.1.1)

Under the Proposed Action, only the Moapa, Cedar City, and Kanosh AOAs would experience relatively large absolute changes in their school-age populations (Table 4.3.3-1). The remaining AOAs all experience nominal changes ranging from one to nine students by the peak year.

In the long term, only the Moapa, Cedar City, and Kanosh AOAs would retain new students (related to operations workers).

The large change at the Moapa AOA (70 students by the peak year) and Cedar City AOA (24 students) could require the addition of two- and one-teacher units, respectively (assuming an average class size of 30 students). It is not expected that additional physical plants would be required to accommodate these new students. Similar impacts would occur in the long term.

Alternative 1 (4.3.3.1.2)

This alternative is similar in its relative impact to the Proposed Action. The three AOAs impacted in the long term are the same as the Proposed Action. The changes appear large enough to require additional teacher units of two for Moapa and one for Cedar City by both the peak year and the long term.

Alternative 2 (4.3.3.1.3)

Under this alternative, a greater impact in the peak year would occur on the Moapa AOA. With a smaller impact expected on Cedar City, the additional 17 students expected under this alternative relative to the Proposed Action is not expected to require any additional physical plant, but may justify an additional teacher unit.

In the long-term, only the Moapa AOA would experience a relatively large change (66 students). All the remaining AOAs, with the exception of Kanosh, would show net long term changes of zero. Two teacher units may be required for the Moapa AOA.

Alternative 3 (4.3.3.1.4)

Relative to the Proposed Action, this alternative places considerably more children in the Ely AOA (an increase of 52 children), and a slight increase on the Cedar City AOA (6 children more) in the peak year. Reductions in school-age population are projected for the Moapa (49 less than with the Proposed Action) and the Kanosh (10 less). All other AOAs are expected to show identical changes to the Proposed Action. Two additional teacher units at the Ely AOA may be required by the peak year.

Table 4.3.3-1. Absolute changes in school age population, peak-year and long-term, by AOA and alternative (Page 1 of 2).

Area of Analysis	Alternative							
	PA	1	2	3	4	5	6	8
Duckwater								
Peak Year	+9	+9	+9	+9	+9	+9	+9	+5
Long Term	-9	-9	-9	-9	-9	-9	-9	-5
Change	0	0	0	0	0	0	0	0
Yomba								
Peak Year	+5	+5	+5	+5	+5	+5	+5	+3
Long Term	-5	-5	-5	-5	-5	-5	-5	-3
Change	0	0	0	0	0	0	0	0
Goshute								
Peak Year	+9	+9	+9	+9	+9	+9	+9	+5
Long Term	-9	-9	-9	-9	-9	-9	-9	-5
Change	0	0	0	+0	0	+0	0	0
Moapa								
Peak Year	+60	+67	+77	+11	+67	+11	+60	+50
Long Term	-11	-11	-11	-11	-11	-11	-11	-6
Change	+49	+56	+66	0	+56	0	+49	+44
Las Vegas								
Peak Year	+5	+5	+5	+5	+5	+5	+5	+3
Long Term	-5	-5	-5	-5	-5	-5	-5	-3
Change	0	0	0	0	0	0	0	0
Ely								
Peak Year	+9	+9	+9	+61	+9	+71	+9	+4
Long Term	-9	-9	-9	-9	-9	-9	-9	-4
Change	0	0	0	52	0	62	0	0
Cedar City								
Peak Year	+24	+26	+4	+30	+26	+4	+24	+1
Long Term	-4	-4	-4	-4	-4	-4	-4	-1
Change	+20	+22	0	+26	+22	0	+20	0

T5926/10-2-81/a

Table 4.3.3-1. Absolute changes in school age population, peak-year and long-term, by AOA and alternative (Page 2 of 2).

Area of Analysis	Alternative							
	PA	1	2	3	4	5	6	8
Kanosh								
Peak Year	+13	+3	+15	+3	+3	+19	+13	+1
Long Term	-3	-3	-3	-3	-3	-3	-3	-1
Change	+10	0	+12	0	0	+16	+10	0
Koosharem								
Peak Year	+3	+3	+3	+3	+3	+3	+3	+1
Long Term	-3	-3	-3	-3	-3	-3	-3	-1
Change	0	0	0	0	0	0	0	0
Indian Peaks								
Peak Year	+1	+1	+1	+1	+1	+1	+1	0
Long Term	-1	-1	-1	-1	-1	-1	-1	0
Change	0	0	0	0	0	0	0	0
Total AOA Changes	+79	+78	+78	+78	+78	+78	+79	+44

T5926/10-2-81/a

Source: Tables 5.1.3.3-2 to 5.1.3.3-9. of ETR-21.

In the long-term, this alternative shifts the major impact from the Moapa AOA (48 children) to the Ely AOA (53 children). A slight increase from the Proposed Action increase is projected for the Kanosh AOA, as is a slight increase for the Cedar City AOA (Table 4.3.3-1). Additional teacher units would be shifted from the Moapa AOA to the Ely AOA.

Alternative 4 (4.3.3.1.5)

In the peak year, this alternative projects a slight increase in school-age children for the Moapa (7 children) and Cedar City (2 children) relative to the Proposed Action. A slight reduction at Kanosh accounts for the only other difference between the alternative and the Proposed Action.

For the long term, the Moapa and Cedar City AOAs show very similar positive impacts to the Proposed Action (Table 4.3.3-1), while the Kanosh impact would be reduced by 10 children. Additional teacher units are the same as in the Proposed Action.

Alternative 5 (4.3.3.1.6)

This alternative shifts the major impact of school-age children away from the Moapa AOA to the Ely AOA. A reduced impact is also projected for the Cedar City AOA. A slight increase is shown for Kanosh compared to the Proposed Action in the peak year.

In the long-term, reduced impacts are shown for the Moapa and Cedar City AOAs, while increased impacts occur on the Ely and Kanosh AOAs.

Teacher unit requirements are shifted from the Moapa to the Goshute AOA under the alternative.

Alternative 6 (4.3.3.1.7)

This alternative is identical in its impacts to the Proposed Action in both the peak year and in the long-term. This alternative simply reverses the order in which the two operating bases are developed and does not affect the projected changes in school-age populations (Table 4.3.3-1).

Alternative 7 (4.3.3.1.8)

This alternative is for full deployment in Texas/New Mexico and is not expected to impact Native Americans.

Alternative 8 (4.3.3.1.9)

This alternative splits the Proposed Action between Texas/New Mexico and Nevada/Utah. Thus, it reduces the magnitude of the impacts in Nevada/Utah and the relative ranking of those impacts among the AOAs. In the peak year, the greatest impact is still projected for the Moapa AOA, with only a slight reduction compared to the Proposed Action (10 children). A considerable reduction is projected for the Cedar City and Kanosh AOAs, reflecting the move of the operating base from Milford to Clovis, New Mexico. All other peak year impacts are relatively the same

when compared to the Proposed Action. Teacher units required are approximately one compared to three for the Proposed Action.

In the long term, slight reductions in impacts are projected for Moapa (down 10), Cedar City (down 20), and Kanosh (down 10) compared to the Proposed Action. There are no increased impacts in the AOAs relative to the Proposed Action in the long-term.

Health (4.3.3.2)

The health needs of a community are, in part, a function of the size and composition of the population. Additions to the population, without increases in the number or availability of professional services, tend to reduce the quality of those services. The shortage of physicians in rural areas in general suggests that even moderate population increase will have significant impacts on the availability of health services in the ROI.

For major health needs, the residents of the ROI may travel outside the ROI to the Phoenix Indian Medical Center or similar facilities in other areas. Population changes inside the ROI are not expected to impact the quality of this type of service.

Proposed Action (4.3.3.2.1)

Under the peak year impacts, an additional 210 people are projected for Moapa and an additional 84 at Cedar City AOAs. These increases would place pressures on health related facilities in the area and are considered the only significant health related impact under the proposed action (Table 5.1.3.1-11)

In the long-term, permanent increases in population at Moapa and Cedar City are projected to create a need for increases in the permanent health care delivery systems.

Alternative 1 (4.3.3.2.2.)

In the peak year and in the long-term, this alternative will have very similar impacts on health care needs among the AOAs compared to the proposed action.

Alternative 2 (4.3.3.2.3.)

Under this alternative, slight population increases are expected at the and Kanosh Moapa AOA's. The population reductions at Cedar City would cause significant reductions in health care needs for this AOA (Table 5.1.3.1-11).

In the long-term, the permanent increases in population at Moapa and Konosh will continue the need for increased health care services established in the peak year.

Alternative 3 (4.3.3.2.4)

This alternative shifts the population increase away from the Moapa AOA to the Ely AOA by the peak year. The relatively large population increase at Ely is

projected to create a need for additional services at the Ely, but reduce the need at the Moapa AOA (Table 5.1.3.1-11)

Long term impacts are greater for the Ely, but less for the Moapa under this alternative compared to the proposed action.

Alternative 4 (4.3.3.2.5)

This alternative is very similar to the impacts in the peak year compared to the proposed action. The long-term impacts are also very similar, with only slight variations (Table 5.1.3.1-11)

Alternative 5 (4.3.3.2.6)

This alternative shifts the major population change from the Moapa to the Ely AOA. A minor shift occurs to the Cedar City and Konosh AOAs, but these should not affect health care needs significantly. Table 5.1.3.1-11)

In the long-term, the major difference is again between the Moapa AOA (Proposed Action) and the Ely (Alternative 5) in terms of health care needs.

Alternative 6 (4.3.3.2.7)

The impacts under this alternative are identical to those under the proposed action for both the peak year and long-term.

Alternative 7 (4.3.3.2.8)

This alternative is for full deployment in Texas/New Mexico and is not expected to impact Native Americans.

Alternative 8 (4.3.3.2.9)

Under this alternative, half of the proposed action is shifted to Texas/New Mexico, focusing the major population impact to the Moapa AOA. This large increase (315 new residents) may create pressures on the existing health care facilities in the AOA.

The long-term impacts are similar to the peak year, and compared to the proposed action create additional demand on the Moapa AOA.

Housing (4.3.3.3)

It is assumed that each family in-migrating to the ROI would require an individual housing unit. These units may in fact be part of a multiple family structure (apartment complex, duplex), but they are considered as individual units. While it is likely that there will be some sharing of housing units among families, the projections here assume the worst case scenario.

Proposed Action (4.3.3.3.1)

In the peak year, increased housing will be needed on all AOAs in the ROI. The greatest increases will occur on the Moapa (70 units), Cedar City (28 units) and Kanosh (15 units) AOAs. The remaining AOAs may experience housing needs ranging from one unit at Indian Peaks to 11 units at Duckwater and Goshute. These housing demands for Moapa, Cedar City, and Kanosh are considered significant impacts under the Proposed Action (Table 4.3.3-2).

In the long-term, increases in housing needs are projected only for Moapa (57 units), Cedar City (23 units) and Kanosh (12 units), reflecting the location of these AOAs near the proposed operating bases. These increases are considered significant.

Alternative 1 (4.3.3.3.2)

The peak year impacts under this alternative are very similar to those of the Proposed Action with the exception of Kanosh, which shows a reduction of 12 housing units. The Moapa and Cedar City AOAs show increases of nine and three units respectively (Table 4.3.3-2).

In the long-term, slight increases are shown for the Moapa (nine units) and Cedar City (three units) AOAs. The Kanosh AOA shows a reduction of twelve required. The increased needs relative to the Proposed Action are not deemed significant, while the reductions at Kanosh are likely to ease housing pressures significantly.

Alternative 2 (4.3.3.3.3)

In the peak year, this alternative results in a considerable increase in housing demand for the Moapa AOA (up 20 units) compared to the Proposed Action. A sizeable reduction in demand is projected for Cedar City (a decrease of 23 units).

For the long-term, the only changes compared to the Proposed Action are at Moapa (up 20 units) and Cedar City (down 23 units), both significant changes.

Alternative 3 (4.3.3.3.4)

By the peak year, this alternative would generate a large increase for housing at Ely (62-unit increase), and a moderate increase at Cedar City (up seven units). A sizeable reduction is projected for Moapa (down 57 units) and a smaller reduction at Kanosh (down 12 units). These changes are significant compared to the Proposed Action.

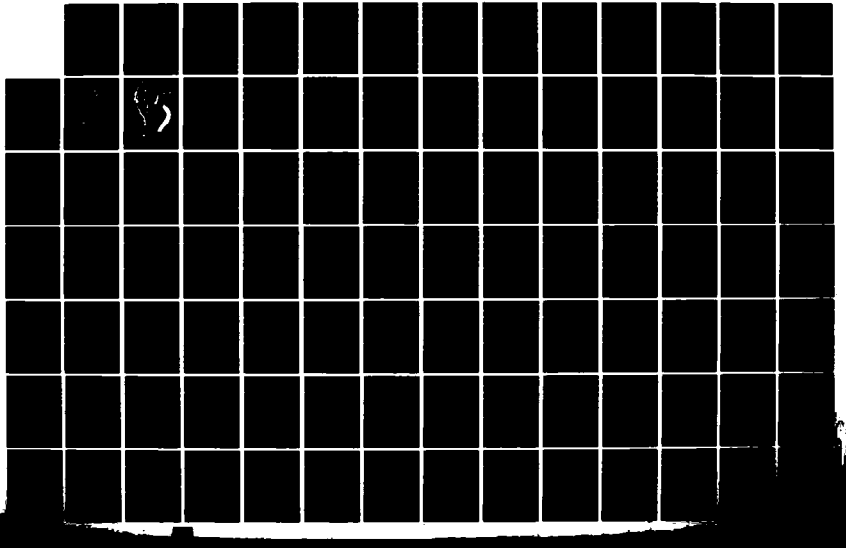
In the long-term, the significant changes are at Ely (up 62 units) and Moapa (down 57 units). A smaller change occurs at Cedar City (up seven units) compared to the Proposed Action.

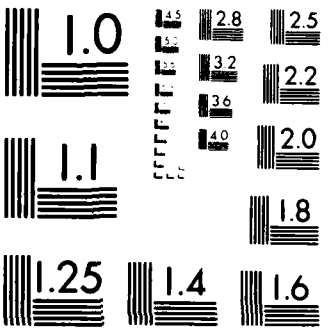
Alternative 4 (4.3.3.3.5)

This alternative shows a slight increase in housing demand for the Moapa (up nine units) and Cedar City (up three units) AOAs. A reduction in demand is projected

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Table 4.3.3-2. Absolute changes in housing demand, peak year (1987) and long-term (1992), by AOA and Alternative (Page 1 of 2).

Area of Analysis	Alternative							
	PA	1	2	3	4	5	6	8
Duckwater								
Peak year	11	11	11	11	11	11	11	6
Long-term	-11	-11	-11	-11	-11	-11	-11	-6
Change	0	0	0	0	0	0	0	0
Yomba								
Peak year	6	6	6	6	6	6	6	3
Long-term	-6	-6	-6	-6	-6	-6	-6	-3
Change	0	0	0	0	0	0	0	0
Goshute								
Peak year	11	11	11	11	11	11	11	6
Long-term	-11	-11	-11	-11	-11	-11	-11	-6
Change	0	0	0	0	0	0	0	0
Moapa								
Peak year	70	79	90	13	79	13	70	59
Long-term	-13	-13	-13	-13	-13	-13	-13	-7
Change	+57	+66	+77	0	+66	0	+57	+52
Las Vegas								
Peak year	6	6	6	6	6	6	6	3
Long-term	-6	-6	-6	-6	-6	-6	-6	-3
Change	0	0	0	0	0	0	0	0
Ely								
Peak year	10	10	10	72	10	83	10	+5
Long-term	-10	-10	-10	-10	-10	-10	-10	-5
Change	0	0	0	62	0	73	0	0
Cedar City								
Peak year	28	31	5	35	31	5	28	3
Long-term	-5	-5	-5	-5	-5	-5	-5	-3
Change	+23	+26	0	+30	+26	0	-23	0

T5875/9-30-81

Table 4.3.3-2. Absolute changes in housing demand, peak year (1987) and long-term (1992), by AOA and alternative (Page 2 of 2).

Area of Analysis	Alternative							
	PA	1	2	3	4	5	6	8
Kanosh								
Peak year	15	3	18	3	3	22	15	2
Long-term	-3	-3	-3	-3	-3	-3	-3	-2
Change	12	0	15	0	0	19	12	0
Koosharem								
Peak year	3	3	3	3	3	3	3	2
Long-term	-3	-3	-3	-3	-3	-3	-3	-2
Change	0	0	0	0	0	0	0	0
Indian Peaks								
Peak year	1	1	1	1	1	1	1	0
Long-term	-1	-1	-1	-1	-1	-1	-1	0
Change	0	0	0	0	0	0	0	
Net AOA changes	92	92	92	92	92	92	92	52

T5875/9-30-81

Source: Tables 5.1.3.3-20 to 5.1.3.3-27.

for Kanosh (down 12 units) compared to the Proposed Action. These changes are not significant compared to the Proposed Action.

In the long-term, additional housing units at Moapa (up nine) and Cedar City (up three) are the only changes compared to the Proposed Action, and these changes are not considered significant.

Alternative 5 (4.3.3.3.6)

By the peak year, this alternative is projected to show a significant increase in housing demand for the Ely Colony (up 73 units). AOAs compared to the Proposed Action. Reduction of 57 units at Moapa and 23 units at Cedar City are also projected. These shifts are considered significant for the above AOAs.

In the long-term, the major changes compared to the Proposed Action are projected to occur at Ely (up 73 units), Moapa (down 57 units) and Cedar City (down 23 units). All other long-term impacts are the same (zero) as in the Proposed Action (see Table 4.3.3-2).

Alternative 6 (4.3.3.3.7)

This alternative is identical in its housing impacts to the Proposed Action in both the peak year and in the long term. Alternative 6 simply reverses the order in which the operating bases are constructed compared to the Proposed Action.

Alternative 7 (4.3.3.3.8)

This alterntive is for full deployment in Texas/New Mexico and is not expected to impact any Native American lands.

Alternative 8 (4.3.3.3.9)

This alternative is a split-basing alternative with one half the Proposed Action scheduled for Nevada/Utah. Thus, the housing demand is reduced in terms of absolute needs because of the placing of one operating base in Texas/New Mexico.

In the peak year, considerable reductions in housing demand are projected for Cedar City (down 25 units) Kanosh (down 13 units), and Moapa (down 11 units), while reductions projected for the rest of the AOAs are moderate to minimal by comparison.

In the long term, only Cedar City and Kanosh AOAs show significant changes (down 23 and 12, respectively) compared to the Proposed Action. These changes reflect the elimination of the proposed operating base at Milford and the placing of that base in Clovis, New Mexico. The slight reduction in housing demand at Moapa (down nine units) is not considered significant (Table 4.3.3-2).

Public Services (4.3.3.4)

Public Services are interpreted to include utilities (water, power and waste disposal) and police and fire protection.

Proposed Action (4.3.3.4.1)

All colonies designated as AOAs - Ely, Las Vegas, Koosharem, Kanosh, Cedar City, and Indian Peaks - are served by municipal water systems and by the same utility companies as their associated municipalities. In these cases, the extent to which the municipality and the adjoining colony might be impacted by M-X deployment and the additional service requirements attributable to M-X activities are projected in ETR-39 (Wastewater Analysis), ETR-24 (Energy), and ETR-12 (Water).

The situation for reservations designated as AOAs is different from that of colonies since rural reservations cannot rely upon municipal services. The degree to which these reservations' utility services and facilities may be able to accommodate a population increase varies.

Since electrical power is only adequate at Yomba, even a moderate in-migration (projected to be 13 percent by 1987 under all alternatives except numbers 7 and 8) may contribute to a decline in electric service. Similarly, the domestic water supply is barely adequate; there is no excess capacity. No central water system exists on Yomba and residents depend on wells. Additional wells or a water system may be required to accommodate an increased population. Solid waste disposal may also be a problem. There are no established solid waste disposal sites; individuals are responsible for their own waste disposal. If there were a significant population influx, some structured method of garbage and waste collection and disposal would be required.

Infrastructural services at Duckwater are generally better currently than at Yomba, although Duckwater is also at the end of a power line and frequently experiences outages. It is anticipated that Duckwater may experience a 10 percent project-related population increase by the peak year of construction.

The Goshute Reservation has electricity, waterlines, septic tanks, leach fields and three solid waste dump sites. The data indicate that this reservation could accommodate a moderate population increase without substantially impacting these infrastructural services. A 12 percent project-related increase is projected by 1987 under the Proposed Action. As with other reservations, however, these services have been provided to accommodate existing structures and population and a significant population in-migration would render existing systems inadequate.

Finally, at Moapa the adequacies of utility services and facilities vary. There is sufficient electric power for existing facilities and capacity is reported to be adequate to accommodate growth. The reservation has a sewer system which connects with almost all homes; a population which could be accommodated in existing structures would stress the system somewhat. The capability of the system to accommodate additional connections is not known. Moapa would experience significant stress on all public services under the Proposed Action.

The domestic water supply at Moapa is poor, as is the water quality. The "old water line" is barely holding up under existing pressures; any additional requirements could probably not be met and Proposed Action impacts could be significant.

A need for additional police personnel could result from the increased population on or near the reservations and colonies. This problem is expected to be particularly acute at the Moapa reservation and residential colonies at Las Vegas, Cedar City, Kanosh, Richfield, and Ely since these areas are expected to experience population in-migration due to OB construction and operation under the Proposed Action.

A lack of police protection could also create a problem on rural reservations such as Duckwater and Moapa where crime rates have been extremely low. Because of the proximity of an operating base or construction camps to those reservations and the improved access provided by DTN and other roads, vandalism, trespassing and other civil or criminal transgressions are expected to increase and would require police intervention. The problem of BIA or tribal police staffing may be compounded by the lure of M-X security-related jobs. During the construction of the TransAlaska Pipeline, most of the available law enforcement personnel (including chiefs of police) left their public service positions to take jobs as security guards for the oil consortium, at approximately 4 times their accustomed rate of pay. If the same demand for security officers materializes as a result of M-X, a serious shortage of both BIA and conventional police could be expected.

Since most reservations are both remote and lacking in effective fire fighting equipment and hydrant systems, a loss of volunteer personnel to outside employment could contribute to the treat of fire. This possibility applies to both AOAs and those reservations and colonies outside the ROI who may supply personnel to M-X employment. Under the most likely scenario of moderate population increases on most AOAs and significant project-related increases on others, an increased fire hazard would result from overcrowding of existing housing.

It is anticipated that significant impacts to public services would occur at all areas of analysis. Among the AOAs the most significant impacts, determined by estimated project-related population increases, would occur at Moapa, Kanosh, and Cedar City Colony.

Alternative 1 (4.3.3.4.2)

Projected impacts to public services are the same as those discussed under the Proposed Action except that the greatest impacts would occur at Moapa and Cedar City.

Alternative 2 (4.3.3.4.3)

Projected impacts to public services are the same as those discussed under the Proposed Action except that greatest impacts would occur at Moapa and Kanosh.

Alternative 3 (4.3.3.4.4)

Projected impacts to public services are the same as those discussed under the Proposed Action except that greatest impacts would occur at the Ely and Cedar City Colonies.

Alternative 4 (4.3.3.4.5)

Projected impacts to public services are the same as those discussed under Alternative 1.

Alternative 5 (4.3.3.4.6)

Projected impacts to public services are the same as those discussed under the Proposed Action, except that the greatest impacts would occur at Kanosh and the Ely Colony.

Alternative 6 (4.3.3.4.7)

Projected impacts to public services are the same as those discussed under Alternative 2.

Alternative 7 (4.3.3.4.8)

No impacts to Native American public services are projected, since no Native American reservations or colonies are located within the ROI of the Texas/New Mexico ROI.

Alternative 8 (4.3.3.4.9)

Only the Moapa Reservation is expected to experience significant impacts to public services as a result of the split basing option.

Transportation (4.3.3.5)

M-X-related impacts to transportation to and from Native American reservations and colonies would occur as a result of the construction of access roads and the DTN.

Proposed Action (4.3.3.5.1)

Since access to all rural reservations within the ROI is likely to increase as a result of project activity, it is reasonable to expect increased incidences of trespassing and vandalism on these AOAs. Conversely, the benefits of improved road access may be shared by rural reservation residents. Both considerations represent significant changes from baseline conditions.

All rural reservations designated as AOAs, Duckwater, Yamba, Goshute, Moapa and Kanosh are expected to experience significant impacts resulting from the transportation network established by the construction of the M-X system. Moapa and Kanosh are expected to receive the greatest impacts due to their location near OB sites, and the Duckwater Reservation due to its location surrounded by DDA and construction camps. Colonies within the ROI, already located in proximity to municipalities, are not expected to experience significant project-related transportation impacts.

Alternative 1 (4.3.3.5.2)

Impacts would be the same as those described under the Proposed Action except that Kanosh would not be as seriously impacted.

Alternative 2 (4.3.3.5.3)

Impacts would be the same as those described under the Proposed Action.

Alternative 3 (4.3.3.5.4)

Impacts would be the same as those described under the Proposed Action except that Moapa would not be significantly impacted.

Alternative 4 (4.3.3.5.5)

Impacts would be the same as those described under the Proposed Action except that Kanosh would not be as seriously impacted.

Alternative 5 (4.3.3.5.6)

Impacts would be the same as those described under the Proposed Action except that Moapa would not be significantly impacted.

Alternative 6 (4.3.3.5.7)

Impacts would be the same as those described under the Proposed Action.

Alternative 7 (4.3.3.5.8)

No impacts are projected under the Texas/New Mexico full basing option.

Alternative 8 (4.3.3.5.9)

No significant impacts to rural AOAs relating to transportation are anticipated under the split basing alternative.

Communications (4.3.3.6)

Communications are defined in this technical report to include both printed and electronic media. Section 4.3.2.6 contains baseline data regarding current accessibility to formal communications networks on Native American reservations and colonies within the M-X region of influence (ROI). This section evaluates potential impacts on communications with respect to Native Americans in the designated AOAs.

Proposed Action (4.3.3.6.1)

M-X construction and operation would result in substantial population increases in communities, operating bases and construction camps within the ROI. This may be translated into significant increases in the variety and accessibility of information and entertainment sources. It is conceivable that the markets created

by in-migration of workers and their families to communities and construction camps within the region of influence will result in additional local radio and television programming and the expansion of video cable systems. It is also likely that additional repeaters and satellite earth stations would be established in the ROI increasing the availability and variety of televised programming.

The extent to which the project-related expansion of information networks in the Great Basin would affect rural reservations cannot be quantified, but the level of exposure to the off-reservation population would undoubtedly increase. This increased level of exposure could result in significant indirect social impacts, such as loss of respect for tribal elders by younger tribal members.

Alternative 1 (4.3.3.6.2)

Impacts would be the same as those described for the Proposed Action.

Alternative 2 (4.3.3.6.3)

Impacts would be the same as those described for the Proposed Action.

Alternative 3 (4.3.3.6.4)

Impacts would be the same as those described for the Proposed Action.

Alternative 4 (4.3.3.6.5)

Impacts would be the same as those described for the Proposed Action.

Alternative 5 (4.3.3.6.6.)

Impacts would be the same as those described for the Proposed Action.

Alternative 6 (4.3.3.6.7)

Impacts would be the same as those described for the Proposed Action.

Alternative 7 (4.3.3.6.8)

No M-X system impacts to Native Americans are expected under the Texas/ New Mexico full basing options.

Alternative 8 (4.3.3.6.9)

Impacts to the variety and accessibility of communications media under split basing would be similar to those described for the Proposed Action, but they are likely to be less pronounced.

Tribal Jurisdiction (4.3.3.7)

As described in the baseline section of this report (Section 4.3.2.7), tribal judicial systems to which the reservations and colonies designated as areas of analysis subscribe are of three district forms: Duckwater, Goshute and Ely are

served by part-time magistrates; Yomba, Moapa and the Las Vegas Colony also retain judicial responsibilities for Native American infractions committed on tribal lands; the bands of the Paiute Indian Tribe of Utah, however, are under state, civil, and criminal jurisdiction. Consequently, the latter group is insulated from project-related impacts to tribal jurisdiction.

The primary source of anticipated conflict, however, would not result from infractions committed by Native Americans on tribal lands but by non-Indians over whom the tribal police and judicial systems have little authority. It is also to this conflict that projected impacts are addressed.

Proposed Action (4.3.3.7.1)

Under the Proposed Action it is anticipated that all reservation and colonies within the ROI that maintain tribal judicial systems would experience significant impacts resulting from increased conflict and jurisdictional disputes. Impacts are related to proximity to construction activity and increased reservation access made possible by DTN construction. AOAs expected to receive impacts are: Duckwater, Goshute, Ely, Yomba, Las Vegas Colony and Moapa. It is anticipated that the Moapa Reservation would experience the greatest impacts due to its location near the Coyote Spring OB.

Alternative 1 (4.3.3.7.2)

Projected impacts would be the same as those described for the Proposed Action.

Alternative 2 (4.3.3.7.3)

Projected impacts would be the same as those described for the Proposed Action.

Alternative 3 (4.3.3.7.4)

Projected impacts would be the same as those described for the Proposed Action except that the Ely Colony would receive the greatest impacts due to proximity to the Ely OB.

Alternative 4 (4.3.3.7.5)

Projected impacts would be the same as those described for the Proposed Action.

Alternative 5 (4.3.3.7.6)

Projected impacts would be the same as those described for the Proposed Action except that the Ely Colony would receive the greatest impacts due to its location near the Ely OB.

Alternative 6 (4.3.3.7.7)

Projected impacts would be the same as those described for the Proposed Action.

Alternative 7 (4.3.3.7.8)

No impacts to tribal jurisdiction are projected under the Texas/New Mexico full basing option.

Alternative 8 (4.3.3.7.9)

Under the split basing alternative, it is expected that only the Moapa Reservation would experience significant impacts to tribal jurisdiction due to its proximity to the Coyote Spring OB.

4.4 MITIGATION MEASURES

Mitigation of M-X deployment related impacts on Native American socioeconomics would be effected through various means depending on the nature of the impact. Impacts on the economies and infrastructures of Native American reservations and colonies in the M-X-affected area will occur as a result of population fluctuations. Mitigation measures therefore must be designed to address the M-X-related impacts.

The Air Force has proposed legislation to provide special impact assistance to M-X-impacted Native Americans. The Air Force is creating a planning and assistance mechanism for Native Americans that closely parallels the existing community impact assistance program for state and local governments. (A comprehensive discussion of the state and local community impact assistance program can be found in ETR-38 (Mitigations)). This program addresses the demographic, economic, and community infrastructural impacts identified for reservations and colonies in the M-X impacted area. The special impact assistance program is not the only federal program responding to infrastructural impacts at reservations and colonies; several federal, public assistance programs exist that could respond to housing shortages, health service needs, and other possible impacts. (Further discussion of such public assistance programs can be found in ETR-38 (Mitigations)).

The Air Force has agreed to coordinate and consult with Native Americans on M-X planning and siting. By careful siting of facilities and structures, impacts will be avoided and the need for mitigative measures reduced. The Air Force will not site any M-X structures or facilities on Native American reservations or on BLM grazing lands for which Native Americans hold permits. Socioeconomic impacts can be reduced by coordinating the planning and siting of M-X activities.

In addition to avoiding impacts by coordinated planning and siting, and by not siting on Native American lands, the Air Force is considering a large number of other mitigative measures. These measures could be further developed and implemented as program progress dictates. Generally these mitigative measures would address tribal and individual participation in M-X-created employment

opportunities, tribal economic development, and intergovernmental cooperation and coordination.

A possible mitigation strategy would be to provide for the maintenance of reservation economies during the construction phase of the program. Alternative employment opportunities might be created at reservations and colonies to reduce the numbers of members leaving in search of M-X employment. This could tend to stabilize and support personal incomes, and in turn be supportive of reservation economies.

For those tribal members who choose to pursue M-X employment, several measures could be taken to assist them. In the preconstruction phase of the program, an appropriate strategy could be developed to ensure Native American participation in M-X employment opportunities. Based on experiences from other major construction projects, appropriate steps would include creation of a job training program and adoption of an affirmative action hiring plan. Training programs for Native Americans could be implemented by direct aid to local educational institutions or to Native American organizations. Such aid would be used to support relevant vocational skills training. The Air Force and other federal agencies could implement an affirmative action hiring plan to provide employment to Native Americans.

Another potential mitigative strategy would be to promote economic development of colonies and reservations that could participate in M-X construction needs. This strategy could respond to individual member employment needs and simultaneously provide opportunity for tribal economic development. Existing tribal development plans may be consistent with M-X construction needs. For example, at the Moapa Reservation further development of greenhouse horticulture is planned which could satisfy a need of an increase in produce requirements in the construction area. Similarly, the Duckwater tribe development plans include the creation of a grocery and hardware store which could possibly supply the needs of an increased population in the surrounding area.

Besides economic impacts, population fluctuation could well result in substantial infrastructural impacts upon Native American reservation and colonies. The Air Force has proposed legislation for impact assistance. Presently the Air Force is developing a consultation and coordination program to facilitate cooperative planning for impact mitigations. Six tribes which would potentially be impacted by development of M-X have taken steps to establish an intertribal organization to address M-X-related impacts. The Air Force has been acting in coordination with this confederation of six tribes to establish a working relationship for planning and impact assistance purposes. Through this relationship the Air Force intends to provide Native Americans the opportunity to plan for M-X impacts and to provide community impact assistance to respond to identified reservation and colony infrastructural needs.

Additional mitigation measures could be created and implemented as program development takes place. Such measures could be tailored to needs identified during the course of the project.

5.0 IMPACT ASSESSMENT

5.1 IMPACT METHODOLOGIES

CULTURAL RESOURCES (5.1.1)

Impacts were assessed by comparing both known and predicted locations of Native American sensitive sites and areas within the proposed DDA and OB layouts. Over 500 such sites are known, and may be precisely located. These, however, represent only a small part of the total Native American cultural resource base. Areas of predicted site densities were identified for deployment area valleys on the basis of historic and ethnographic accounts, and from information provided by local Native Americans during M-X field studies. The data base is incomplete and allows only preliminary conclusions. Additional field studies are currently being conducted.

Known sites and predicted high sensitivity areas were mapped and overlaid for the DDA and at Beryl, Coyote Spring, Delta, Ely, and Milford. Two general criteria were applied to the impact assessment:

1. Proximity. The geographical relationship of culturally significant sites and resource zones to areas slated for project construction and operations is the most important criterion for impact assessment. Highest impact probability is projected for sites and resource zones that lie within a one-mile radius of proposed construction areas. Ideally, sites and resource zones outside this radius of disturbance will be less subject to impact in proportion to distance. The proximity index may be conceived as a series of radiating belts of varying distance from construction areas. *All other factors being equal*, the radius of direct and indirect impacts is expected to vary with the nature of project facilities. The impact radii drawn around construction camps and OBs are due to associated population influxes, considerably larger than the one-mile zone assumed for individual roadways, and other project components. Indirect impacts to Native American cultural resources are expected to extend considerable distances from new population centers. It is estimated these impacts will be most concentrated within 35 mi of construction camps and within 50 mi of OBs, and that these impacts will decrease proportionately with distance.

2. Accessibility. The accessibility criterion adds both spatial correlates and a time dimension to the assessment of impact probabilities. Geographical proximity must be qualified by a measure of the likelihood of areal penetration and damage by vandals and recreationists. Land terrain factors and the availability of access roads or corridors may reduce or increase the probability of site impacts predicted solely on the basis of proximity. For example, a habitation site in a relatively inaccessible region of a mountain range flanking a DDA valley may be less susceptible to indirect project impacts than a rock art site 50 mi from clusters in a lowland tank area of the same valley. In this case, new project roads and the flatness of valley floor terrain may, in the short-term, open wide areas to ORV traffic, whereas the rugged topography of more proximal mountain regions may discourage penetration over a comparable time interval.

Impacts to Native American cultural resources have two primary sources: ground disturbance associated with construction; and pilfering, vandalism, and ground disturbance (ORV traffic, erosion) associated with increased public access to previously isolated areas. As noted above, it is assumed that direct impacts will occur to sensitive sites and areas which fall within one mile of construction activities. Indirect impacts during the construction and operations phases will be more intense due to the wider radius of potential disturbance to nonrenewable cultural resources. Studies in comparable environments, such as the adjacent California desert (Lyneis, Weide, and Warner, 1980), indicate that recent public use of the area for recreation has resulted in extremely high vandalism rates to rock art (80 percent), ancestral habitation sites (74-78 percent), ceremonial sites or structures (66 percent), and battlefields (65 percent). A comparable level of indirect disturbance is predicted for the majority of DDA valleys.

A third type of impact, which cannot be quantified, is the symbolic and spiritual effect on Native American traditional religions and cultural persistence. The M-X system will irreversibly alter the sacred lands of Shoshone and Southern Paiute peoples. Since these sites and features are nonrenewable, the destruction or defacement of cultural resources represents an irretrievable loss to the Native American and scientific communities.

The impact methodology utilized for Native American cultural resources may be briefly illustrated with two DDA valley examples. The first, Delamar Valley, is an example of high impact probability, and the second, Cactus Flat, an example of low impact probability (See Figures 5.1.1-1 and 5.1.1-2). Due to the confidential nature of cultural resource locational data (which is mandated by law to enhance the protection of sites from vandalism), reference will be made here to only broadly defined sensitivity areas.

Delamar Valley was formerly occupied on a seasonal basis by Southern Paiutes, and is characterized by high site densities. Although only 10 sites associated with historic Indians have been precisely located historic accounts and Southern Paiute oral testimony indicate that this region was a major stopping place on the annual migration routes of individual families and clans. The valley is known to contain extensive settlements and burials in both lowland and bajada zones, a Southern Paiute battleground, two rock art sites, and contemporary pine nut gathering areas. All of these cultural resources are highly sensitive to members of the Moapa Reservation. The conceptual layout used for analysis would directly impact two known sites (1 or 2 studies may resolve these conflicts but the analysis is based on the conceptual layout). The valley area to be disturbed by construction activities, however, is expected to contain a large number of unrecorded settlement and burial sites. The potential for direct impacts to Southern Paiute cultural resources on the basis of proximity is therefore high. Indirect impacts to sensitive sites and areas are also predicted to be high due to: (1) the improved accessibility to the valley provided by the DTN and cluster roads, (2) the close proximity of resources to these roadways and to potential recreational attractions such as Delamar ghost town, and (3) the proximity of the valley to the Coyote Spring OB site, and its associated in-migrant population.

In contrast to Delamar Valley, Cactus Flat hydrologic subunit was only sparsely occupied in late prehistoric and early historic times. Three known Shoshone campsites are located in the adjacent Kawich Range, where water was more

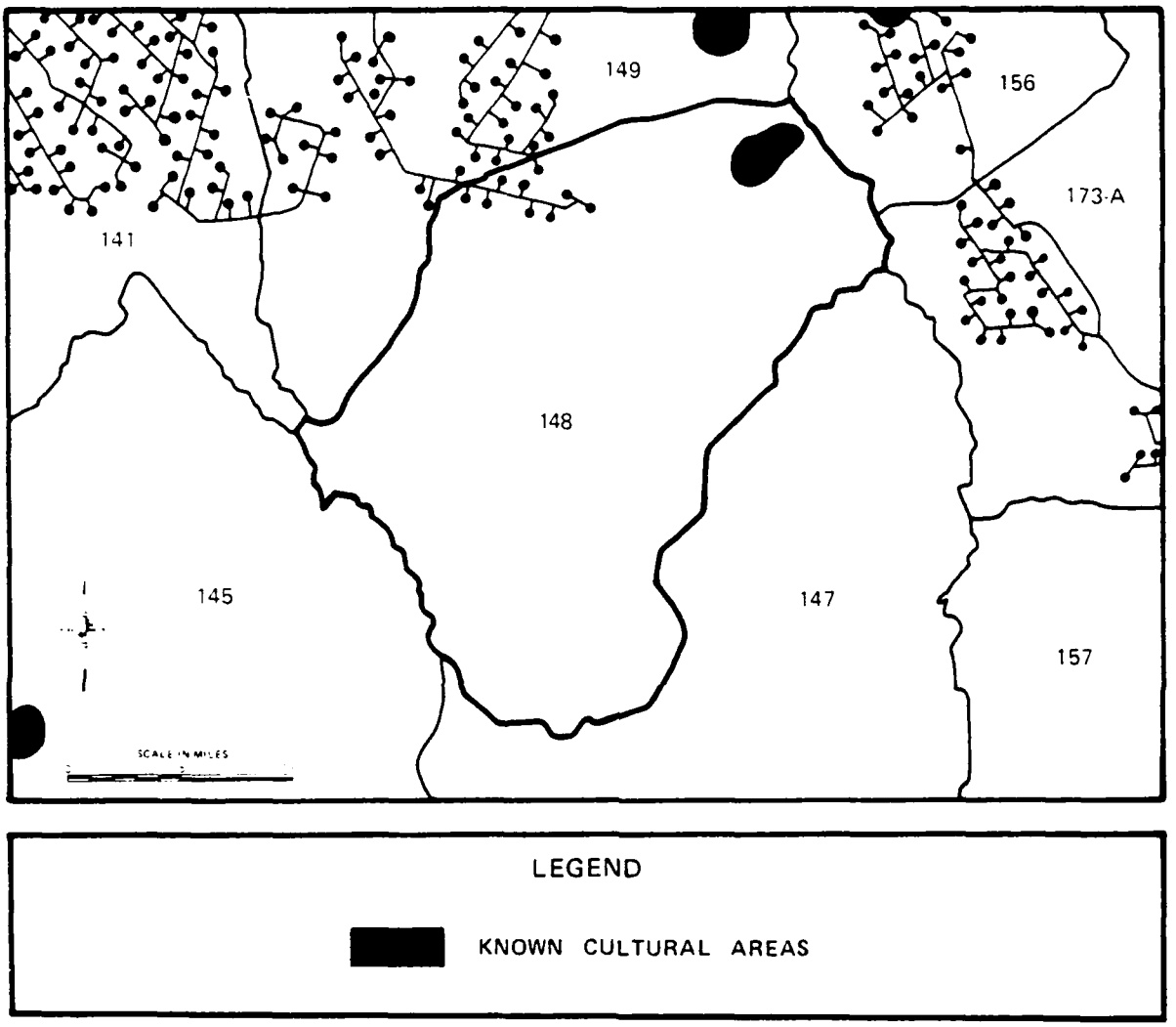


Figure 5.1.1-1. Native American sensitive sites and areas in the vicinity of Delamar Valley.

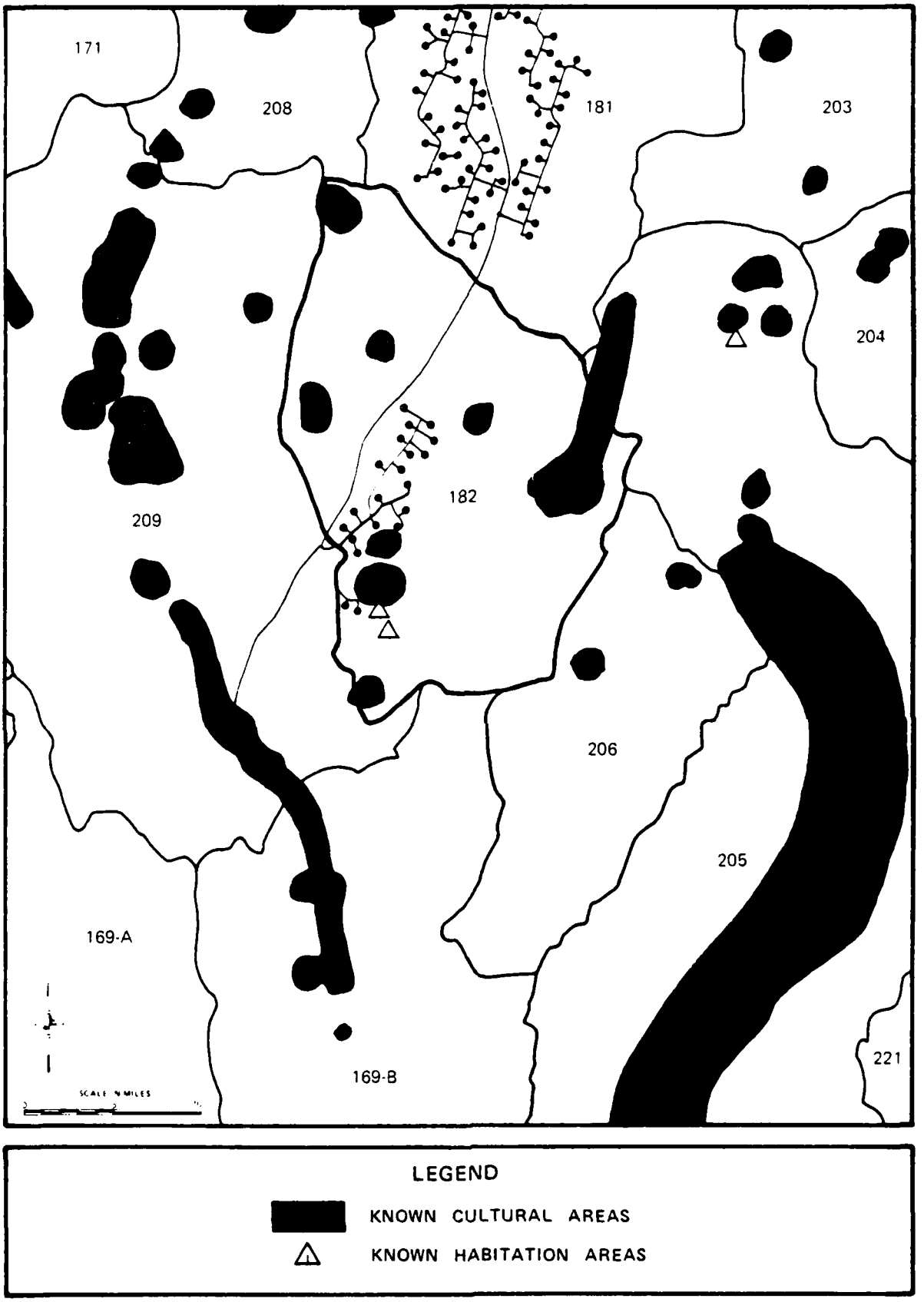


Figure 5.1.1-2. Native American sensitive sites and areas in the vicinity of Cactus Flat Valley, Nevada.

plentiful. Oral testimony collected from Shoshone elders earlier in the century indicates that the valley floor region was utilized primarily for seasonal rabbit and antelope drives. No sites are recorded for the area of Cactus Flat hydrologic subunit to be directly impacted by the proposed cluster road and missile shelters. Although Shoshone campsites may occur in this region, site densities are expected to be low and the total disturbance area is limited. Indirect impacts attributable to the Proposed Action are also predicted to be low for two primary reasons: (1) the cluster road does not significantly enhance accessibility to known and probable high sensitivity areas, such as the Kawich Range and (2) the Cactus Flat area is not proximal to proposed OB sites or other project facilities associated with population in-migration.

LAND AND WATER (5.1.2)

Native American land and water resources were compared to M-X requirements when projecting potential impacts. During environmental review, land resources that potentially may be impacted by deployment were gradually excluded from the design; thus leaving no Native American land resources directly impacted. Indirect impacts on future and claimed lands were assessed by using as criterion the Native Americans' concern expressed for these potential resouces that might be affected by the Prposed Action, or by any project alternative.

Potential impacts to Native American land and water resources are discussed in Sections 3.1 and 3.2. Impact significance levels are presented in Section 5.2.2. Proposed mitigations to Native American land and water use impacts are summarized in Section 3.3.1.

SOCIOECONOMIC CHARACTERISTICS (5.1.3)

There are three distinct characteristics of the socioeconomic structure of a community: (1) demographic, (2) economic, and (3) community infrastructure. The probable impact of M-X deployment on these characteristics is an important dimension in the overall assessment of the M-X program. This section discusses the general methodological approach for estimating probable impacts on demographic, economic, and community infrastructure characteristics of the Native Americans. For each attribute under these characteristics, it is necessary to develop the project impact at two time frames: (1) the peak (1987) estimate and (2) the long-term (1992) estimate. This allows for assessment of the initial increase in activity associated with construction followed by the decreased activity associated with operation compared to baseline estimates at these peak and long-term years to establish the relative importance of the impact.

Two methodologies are associated with each socioeconomic attribute; the first concerns the methodology by which the baseline projections are obtained, while the second concerns the methodology for estimating potential impacts resulting from the construction and operation phases of M-X. Since these methodologies may vary with the particular characteristics and attributes being examined, they are discussed separately in this section.

Demographic Methodologies (5.1.3.1)

The Native American attributes discussed under this section include the total population, the age structure of that population, the average household size, in-

migration, out-migration and mobility. Projections of baseline populations for each of the Areas of Analysis (AOAs) are obtained by a process of extrapolation of the existing average annual rate of growth. The age stucture and the average family size of the baseline population is assumed to remain stable in the absence of the M-X program. Migrants are expected to be younger and have a smaller average family size than existing residents of the AOA. In-migration is expected to be triggered by the availability of employment and is assumed equal to the total number of unemployed Native Americans who are enrolled at reservations and colonies in the study areas. The Region of Influence (ROI) and the AOAs are defined in Section 1.2.3 of this ETR.

Population Projections (5.1.3.1.1)

Baseline population projections are obtained by extrapolating recent population growth rates to the peak and the long-term years. Table 5.1.3.1-1 presents basic population data used in these calculations. Two data points were used for each calculation to produce an average annual rate of growth; however, for four of the AOAs, only one data point was available. In these 4 AOAs, the weighed average population growth rate of the five other zones was used as an assumed growth rate. Using these population growth rates, extrapolations of total population were obtained for each AOA for the peak year (1978) and the long-term year (1992). The projections are shown in Table 5.1.3.1-2.

The three components of population change are births, deaths, and migration. By using an average annual historic growth rate, it is implicitly assumed that there would be no substantive changes in these rates (birth, death and net migration) during the period of the baseline forecast. In the absence of the M-X program, it has been assumed these rates would remain stable and consequently, the historic growth rate was used to represent reasonable future growth rates.

Age Structure (5.1.3.1.2)

The existing age structure of the Native American population in the Nevada/Utah ROI is expected to remain stable during the period of the Proposed Action. The estimated distribution of Native Americans in the AOAs is given in Table 5.1.3.1-3.

Because of the lack of data specific to each reservation in the ROI, it is assumed that the age distribution in the Walker River Reservation is representative for all the reservations in the ROI.

The relative percentage distributions shown in Table 5.1.3.1-3 were multiplied times the projected population control totals for the respective AOA, and results are shown in Table 5.1.3.1-4.

Average Household Size (5.1.3.1.3)

The impact of population changes on housing demand is a function of the number of persons per household. The average number of persons per household for the designated Areas of Analysis is shown in Table 5.1.3.1-5. It is assumed that the in-migrating families will have an average size of 3.0, reflecting a more traditional family structure relative to the resident population.

Table 5.1.3.1-1. Estimate of average annual population growth rates, by area of analysis.

Area of Analysis	Population		Population Change	Average Annual Growth Rate (Percent)
	1980	1973		
Duckwater	176	91	85	13.34
Yomba	95	66	29	6.28
Goshute	170	104	66	9.07
Moapa	208	116[1]	92	9.91
Las Vegas	100	95	5	.75
Ely	165	132	33	3.57
Cedar City	84	[2]	-	7.89[3]
Konosh	44	[2]	-	7.89[3]
Koosharem	41	[2]	-	7.89[3]
Indian Peaks	13	[2]	-	7.89[3]

T5938/10-2-81

[1]1972 data.

[2]Data before 1980 limits to pre-1954.

[3]The weighted average (population) growth rate for the first six AOA's.

Source: Facilitators, 1980.

Table 5.1.3.1-2. Baseline population projections, by area of analysis, 1987 and 1992.

Area of Sensitivity	1980	Peak Year (1987)	Long-Term (1992)
Duckwater	176	340	458
Yomba	95	137	167
Goshute	170	268	355
Moapa	208	352	455
Las Vegas	100	105	109
Ely	165	206	326
Cedar City	84	130[1]	
Konosh	44	68[1]	86[1]
Koosharem	41	64[1]	80[1]
Indian Peak	13	20[1]	25[1]

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[1]Based on a weighted average annual growth rate of the above reservations/colonies.

Source: Table 5.1.3.1-1. and assumed constant rate of growth.

Table 5.1.3.1-3. Estimated age distribution, area of analysis.

Age Group	Percent of Total
Under 6	20.4
6-18	28.4
18-64	43.0
Over 65	8.4
Total	100.0[1]

T5940/9-28-81

[1]Total does not add to 100.00 due to rounding in original.

Source: Facilitators, 1980.

Table 5.1.3.1-4. Age distributions, by area of analysis, for peak year and long term.

Area of Analysis	Age Group							
	Under 6		6 to 17		18 to 64		Over 65	
	1987	1992	1987	1992	1987	1992	1987	1992
Duckwater	69	93	97	130	146	197	29	38
Yomba	28	34	39	47	59	72	12	14
Goshute	57	72	79	101	120	153	23	30
Moapa	72	93	100	129	151	196	30	38
Las Vegas	21	22	30	31	45	47	9	9
Ely	42	48	59	67	89	101	17	20
Cedar City	27	33	37	47	56	71	11	14
Kanosh	14	18	19	24	29	37	6	7
Koosharem	13	16	18	23	28	34	5	7
Indian Peaks	4	5	6	7	9	11	2	2

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Source: Tables 5.1.3.1-2 and 5.1.3.1-3.

Table 5.1.3.1-5. Estimated 1980 persons per household, by area of analysis.

Area of Analysis	Population	Total Housing Units	Persons per Household
Duckwater	176	34	5.2
Yomba	95	17	5.6
Goshute	170	35	4.9
Moapa	208	43	4.8
Las Vegas	100	28	3.6
Ely	165	39	4.2
Cedar City	84	17	4.9
Konosh	44	11	4.0
Koosharem	41	N/A	N/A
Indian River	13	N/A	N/A
Total/Average	1,096[1]	224	4.7

T5941/10-2-81

[1]Excluding Koosharem and Indian Peaks.

Source: Facilitators, 1980.

In-Migration (5.1.3.1.4)

The M-X program would be expected to trigger in-migration of Native Americans to the areas of analysis. It is also assumed that all out-migration would during project construction, resulting in the net-migration being equal to the in-migration. The following assumptions are made regarding the in-migration of Native Americans:

(a) Only enrolled members of tribes would be allowed to locate on the Native American lands comprising the Areas of Analysis.

(b) All unemployed but enrolled tribal members living outside the ROI would in-migrate to the Areas of Analysis (i.e., reservations or colonies). While some unemployed may, in fact, not relocate, some employed tribal members may seek employment in the ROI. It is assumed that these two groups would be approximately equal.

(c) It is assumed that the job skills of in-migrating Native Americans are as follows:

30 percent are qualified for construction work; 20 percent are qualified for operation jobs; 50 percent are qualified for indirect employment.

(d) It is assumed that 50 percent of the inmigrating construction workers to the Areas of Analysis would bring families while the remaining 50 percent are either single or would leave their families.

(e) The single construction workers are assumed to locate in construction camps while the workers with families would locate in the Areas of Analysis. Those workers locating on reservations may in fact live in construction camps during the week and travel to the reservations on the weekends. These individuals are assumed to be residents of the reservation.

(f) Because of the absence of employment opportunities on reservations or colonies (with the exception of Moapa), all in-migrating indirect workers are assumed to locate off the reservations.

(g) For simplification, it is assumed that all in-migrating Native Americans who locate in the areas of analysis would find employment. In fact, some number of in-migrants would be unable to match their job skills with available employment.

Based on the above assumptions, the following procedure is adopted:

(1) The total number of enrolled members of tribes located in the Areas of Analysis numbered 6,892 individuals in 1980. (Facilitators, 1980)

(2) Of the 6,892 individuals, 3,202 (46.5 percent) lived on reservations while 3,690 (53.5 percent) lived off reservations. (Facilitators, 1980)

(3) Of the 6,892 enrolled members, 2,109 already live in the Region of Influence. This leaves a potential pool of 4,783 in-migrants, 1,042 of whom reside on the AOAs.

(4) The labor force participation rate for reservation Native Americans is 0.446 (1,429 - 3202) and for non-reservation Native Americans is 0.457 (884,700 - 1,931,000). The weighted average rate is 0.458.

(5) Using the total pool of in-migrants of 4,783 and the labor force participation rate of 0.458 it is estimated that there is a potential labor force pool of in-migrating workers of 2,191.

(6) The unemployment rate of on-reservation Native Americans is 37.5 percent and for nonreservation Native Americans is 7.0 percent (assumed equal to the general population). The weighted average rate is 21.0 percent ((0.465 x 0.375) + (0.535 x 0.07)).

The pool of unemployed Native Americans living outside the ROI is estimated to be 460 workers (2,191 x 0.21).

The next step is to allocate these in-migrating workers among the three classes of employment (construction, operations, and indirect employment). The distribution of skills is assumed to be such that the following can be expected:

Construction (30 percent) x 460	=	138
Operations (20 percent) x 460	=	92
Indirect (50 percent) x 460	=	230
Total		460

Based on the assumption that only half of the construction workers would bring families and only those with families would seek location on the reservation, only 69 workers and their families would locate on reservations within the ROI.

It is assumed that none of the indirect workers would seek locations on the reservations since there are currently no sources of employment on or near the reservations.

The operation workers would tend to locate on those reservations nearest the operting bases. It is assumed that all other in-migrating Native Americans (construction workers with families) would locate on reservations within the ROI in proportion to the population of those reservations. Table 5.1.3.1-6 identifies those areas of analysis which will be impacted by operation workers, while Table 5.1.3.1-7 illustrates the weights used to allocate construction workers.

The average family size of in-migrating Native Americans is assumed to be 3.0. Thus the total number of in-migrating construction individuals allocated to each of the AOAs can be determined as shown in Table 5.1.3.1-8.

The distribution of operation workers (92) and their families is a function of each alternative and the location of the two operating bases. It is assumed that these families would locate on the reservation closest to the two bases. Where there are two or more reservations located within a 30 mile driving distance of an

Table 5.1.3.1-6. Areas of analysis within 30 miles of operating bases, by alternative.

Area of Analysis	Alternative									
	PA	1	2	3	4	5	6	7	8	NA
Duckwater										
Yomba										
Goshute										
Moapa	X	X	X		X		X		X	
Las Vegas										
Ely				X		X				
Cedar City	X	X		X	X		X			
Kanosh	X		X			X	X			
Koosharem										
Indian Peaks										

T5885/9-27-81

Source: HDR Sciences.

Table 5.1.3.1-7. Allocation of construction worker in-migrants by area of analysis.

Area of Analysis	1980 Population	Percent Distribution	Allocated Construction Workers (69)
Duckwater	176	16.06	11
Yomba	95	8.67	6
Goshute	170	15.51	11
Moapa	208	18.99	13
Las Vegas	100	9.12	6
Ely	165	15.05	10
Cedar City	84	7.66	5
Konosh	44	4.01	3
Koosharem	41	3.74	3
Indian Peak	13	1.19	1
Total	1,096	100.00	69

T5942/9-28-81

Source: Table 5.1.3.1-1.

Table 5.1.3.1-8. Estimated in-migration of construction workers and their households, by area of analysis, Peak Year (1978).

	Construction Workers	Average Household Size	Total In-Migration[1]	In-Migration, Alternative 8
Duckwater	11	3	33	17
Yomba	6	3	18	9
Goshute	11	3	33	17
Moapa	13	3	39	20
Las Vegas	6	3	18	9
Ely	10	3	30	15
Cedar City	5	3	15	8
Konosh	3	3	9	5
Koosharem	3	3	9	5
Indian Peaks	1	3	3	2
Total	69	XX	207	107

T594 3/9-28-81

[1] Proposed action and all Alternatives but 8.

Source: Table 5.1.3.1-7.

operating base, the in-migrating workers are assumed to locate on the reservations in proportion to the relative populations of those reservations. In Table 5.3.1-9, operations workers are allocated to reservations closest (within 30 mi) to the operating bases associated with that alternative.

In Table 5.1.3.1-10, the projected total population change associated with operation workers is shown, assuming an average household size of 3.0. Table 5.1.3.1-11 combines the projected population changes associated with both operation and construction workers for each reservation by alternative for the peak year. For Alternative 8, it is assumed that only half of the job opportunities will be available and thus only one half of the in-migration would be expected. To obtain the long-term permanent population influx subtact the elements in either columns 3 or 4 of Table 5.1.3.1-8 for the respective alternative from the relevant elements in Table 5.1.3.1-11.

It is important to point out that tribal councils have the authority to regulate in-migration. The extent to which a population influx may occur is affected by political decisionmaking and therefore is subject to political vicissitudes, factionalism, and other subjective factors.

Out-migration (5.1.3.1.5)

During the period referred to as the long-term, out-migration is expected from the reservations. The degree of out-migration would in part, be a function of employment opportunities elsewhere as well as the lack of employment opportunities at the AOAs. It is assumed that those who have demonstrated a mobility by in-migrating to the AOAs during the construction phase would retain that mobility and thus would out-migrate subsequent to the peak-year. All construction workers are expected to leave the areas of analysis while all of the operationg workers are expected to remain.

Mobility (5.1.3.1.6)

Migration and visitation patterns of Native Americans reflect several features of reservation life: economic necessity, extreme distance from health and eductional facilities, the need for social exchange and the desire to participate in one's cultural heritage. Seasonal employment, social and religious gatherings, pine nut festivals, hunting and gathering seasons, rodeos and other sporting events provide occasions for mobility within and beyond the areas of analysis and the ROI. Native American migration and visitation patterns cannot be seperated into mobility for economic purposes and mobility for social or religious puposes; many events contain elements of all of these.

Mobility for purposes of powwows, hunting and gathering expeditions, and other social, religious, cultural, and economic events is high, primarily during the summer months. M-X construction and operation activities are evaluated with respect to how they would affect mobility patterns. For example, access to some hunting and gathering areas would be decreased and mobility for subsistance purposes would be correspondingly diminished. The basic methodological approach is to assess each scenario in a generic sense.

Table 5.1.3.1-9. Allocation of operation in-migrants (workers) to areas of analysis, by alternative.

Area of Analysis	Alternative									
	PA	1	2	3	4	5	6	7	8	NA
Duckwater										
Yomba										
Goshute										
Moapa	57	66	77		66		57		46	
Las Vegas										
Ely				62		73				
Cedar City	23	26		30	26		23			
Kanosh	12		15			19	12			
Koosharem										
Indian Peaks										
Total	92	92	92	92	92	92	92	XX	46	XX

T5886/10-2-81

Source: HDR Sciences.

Table 5.1.3.1-10. Total in-migration of operation workers and their families by area analysis and by alternative.

Area of Analysis	Alternative									
	PA	1	2	3	4	5	6	7	8	NA
Duckwater										
Yomba										
Goshute										
Moapa	171	198	231		198		171		138	
Las Vegas										
Ely				186		219				
Cedar City	69	78	0	90	78	0	69	0	0	0
Kanosh	36		45			57	36	0	0	0
Koosharem										
Indian Peaks										

T5888/10-2-81

Source: Table 5.1.3.1-9 and assumed average household size of 3.

Table 5.1.3.1-11. Total in-migration by area of analysis, by alternative.

Area of Analysis	Alternative									
	PA	1	2	3	4	5	6	7	8	NA
Duckwater	33	33	33	33	33	33	33	-	17	0
Yomba	18	18	18	18	18	18	18	-	9	0
Goshute	33	33	33	33	33	33	33	-	17	0
Moapa	210	237	270	39	237	39	210	-	177	0
Las Vegas	18	18	18	18	18	18	18	-	9	0
Ely	30	30	30	216	30	249	30	-	15	0
Cedar City	84	93	15	105	93	15	84	-	8	-
Kanosh	45	9	54	9	9	66	45	-	5	0
Koosharem	9	9	9	9	9	9	9	-	5	0
Indian Peaks	3	3	3	3	3	3	3	-	2	-

T5887/10-2-81

Source: Tables 5.1.3.1-8 and 5.1.3.1-10.

Economic Methodologies (5.1.3.2)

Income (5.1.3.2.1)

There are two measures which can be used to monitor changes in income as a result of the M-X program. Total personal income is the sum of earnings derived from all sources, such as wages and salaries, transfer payments, dividends, interest payments, etc. Dividing this by total population generates a per capita personal income estimate.

Baseline projections (in 1980 dollars) are obtained by multiplying the per capita income estimate, assumed to remain constant, by the projected baseline populations. These estimates are shown in Table 5.1.3.2-1 and 5.1.3.2-2.

The project-induced change in total personal income is estimated by multiplying the number of construction and operations workers estimated for each reservation by the average wage (in 1980 dollars). Table 5.1.3.2-3 through 5.1.3.2-19 presents these calculations for each alternative for both the peak year and long-term periods.

For calculating the change in total personal income for the peak year period, it is assumed that construction workers would leave the reservations, but operation workers would remain. It is assumed that the gross employment multiplier for the reservation is 1.0: this reflects the assumed lack of employment opportunites on the reservations and the probable lack of sufficient funds to justify development of secondary employment opportunities on the reservation.

The percentage change in total personal income from the peak year baseline and peak year total are presented for each alternative and the Proposed Action in Table 5.1.3.2-12 through 5.1.3.2-19.

Labor Force (5.1.3.2.2)

There are a number of different attributes associated with the labor force; each requiring a different methodological approach. These attributes are (1) the size of the labor force, (2) the composition of employment, and (3) the unemployment rate.

Size of the Labor Force

The size of the labor force depends on the size of the population (Section 5.1.3.1) and the labor force participation rate. In this report, the labor force participation rate is defined as that fraction of the total population working or actively seeking work (i.e., employment and unemployment). The existing labor force participation rate for the AOAs are presented in Table 5.1.3.2-20 The large differences between the last four zones (all members of the Paiute Tribe of Utah) stem from their small amount of and consequent residence and status in communities with comparatively greater employment opportunities.

It is assumed that for the baseline years, the difference between the existing Native American labor force participation rate at the AOAs and the Native American rate for those living in local communities would decline by 50 percent

Table 5.1.3.2-1. Estimates of total personal income and per capita personal income for 1980, by area of analysis (in 1980 dollars).

Area of Analysis	Income Measure: Total Personal Income[5]	Income Measure: Per Capita Personal Income
Duckwater	$ 123,200	$ 700[1]
Yomba	95,950	1,010[2]
Goshute	1,286,560	7,568[3]
Moapa	507,936	2,442[4]
Las Vegas	244,200	2,442[4]
Ely	115,500	700[1]
Cedar City	205,128	2,442[4]
Kanosh	107,448	2,442[4]
Koosharem	100,122	2,442[4]
Indian Peaks	31,746	2,442[4]

T5962/10-2-81/a

[1] Average of Duckwater and Ely.

[2] 1977-1978.

[3] 1973,

[4] Average of all tribes.

[5] Per capita income multiplied by total population.

Source: Facilitators, 1980.

Table 5.1.3.2-2. Projected baseline total personal income, by area of analysis for the peak year and long term (in 1980 dollars).

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	$ 238,000	$ 320,600
Yomba	109,600	133,600
Goshute	2,103,904	2,686,640
Moapa	859,584	1,111,110
Las Vegas	256,410	266,178
Ely	144,200	165,200
Cedar City	317,460	404,488
Kanosh	166,056	210,012
Koosharem	156,288	195,360
Indian Peaks	48,840	61,050

T5963/10-2-81/a

Source: Tables 5.1.3.1-2 and 5.1.3.2-1.

Table 5.1.3.2-3. Change in total personal income for peak year 1987, by area of analysis, for the Proposed Action, (in 1980 dollars).

Area of Analysis	Construction			Operations			Change in Total Personal Income
	Number	Wage[1]	Total	Number	Wage[1]	Total	
Duckwater	11	$37,110	$408,210	--	$19,700	$ --	$ 408,210
Yomba	6	37,110	222,660	--	19,700	--	222,660
Goshute	11	37,110	408,210	--	19,700	--	408,210
Moapa	13	37,110	482,430	57	19,700	1,122,900	1,605,330
Las Vegas	6	37,110	222,660	--	19,700	--	222,660
Ely	10	37,110	371,100	--	19,700	--	371,100
Cedar City	5	37,110	185,550	23	19,700	453,110	638,650
Kanosh	3	37,110	111,330	12	19,700	236,400	347,730
Koosharem	3	37,110	111,330	--	19,700	--	111,330
Indian Peaks	1	37,110	37,110	--	19,700	--	37,110
Total	69		$2,560,590	92		$1,812,400	$4,372,990

T5964/10-2-81/a

[1]ETR-27.

Source: Tables 5.1.3.1-8 and 5.1.3.1-9.

Table 5.1.3.2-4. Change in total personal income for peak year 1987, by area of analysis, for Alternative 1, (in 1980 dollars).

Area of Analysis	Construction			Operations			Change in Total Personal Income
	Number	Wage[1]	Total	Number	Wage[1]	Total	
Duckwater	11	37,110	408,210	--	--	--	408,210
Yomba	6	37,110	222,660	--	--	--	222,660
Goshute	11	37,110	408,210	--	--	--	408,210
Moapa	13	37,110	482,430	66	19,700	1,300,200	1,782,630
Las Vegas	6	37,110	222,660	--	--	--	222,660
Ely	10	37,110	371,100	--	--	--	371,100
Cedar City	5	37,110	185,550	26	19,700	512,200	697,750
Kanosh	3	37,110	111,330	--	--	--	111,330
Koosharem	3	37,110	111,330	--	--	--	111,330
Indian Peaks	1	37,110	37,110	--	--	--	37,110
Total	69		2,560,590	92		1,812,400	4,402,990

T5965/10-2-81/a

[1]ETR-27.

Source: Tables 5.1.3.1-8 and 5.1.3.1-9.

Table 5.1.3.2-5. Change in total personal income for the peak year 1987, by area of analysis, for Alternative 2, (in 1980 dollars).

Area of Analysis	Construction			Operations			Change in Total Personal Income
	Number	Wage[1]	Total	Number	Wage[1]	Total	
Duckwater	11	$37,110	$408,210	--	$ --	$ --	$ 408,210
Yomba	6	37,110	222,660	--	--	--	222,660
Goshute	11	37,110	408,210	--	--	--	408,210
Moapa	13	37,110	482,430	77	19,700	1,516,900	1,999,330
Las Vegas	6	37,110	222,660	--	--	--	222,660
Ely	10	37,110	371,100	--	--	--	371,100
Cedar City	5	37,110	185,550	--	--	--	185,550
Kanosh	3	37,110	111,330	15	19,700	295,500	406,830
Koosharem	3	37,110	111,330	--	--	--	111,330
Indian Peaks	1	37,110	37,110	--	--	--	37,110
Total	69		$2,560,590	92		$1,812,400	$4,372,990

T5966/10-2-81/a

[1]ETR-27.

Source: Tables 5.1.3.1-8 and 5.1.3.1-9.

Table 5.1.3.2-6. Change in total personal income, Peak Period (1987), by area of analysis, alternative 3 (1980 dollars).

AREA OF ANALYSIS	CONSTRUCTION NUMBER	CONSTRUCTION WAGE[1]	CONSTRUCTION TOTAL	OPERATIONS NUMBER	OPERATIONS WAGE[1]	OPERATIONS TOTAL	CHANGE IN TOTAL PERSONAL INCOME
Duckwater	11	$37,110	$408,210	--	$ --	$ --	$ 408,210
Yomba	6	37,110	222,660	--	--	--	222,660
Goshute	11	37,110	408,210	--	--	--	408,210
Moapa	13	37,110	482,430	--	--	--	482,430
Las Vegas	6	37,110	222,660	--	--	--	222,660
Ely	10	37,110	371,100	62	19,700	1,221,400	1,592,500
Cedar City	5	37,110	185,550	30	19,700	591,000	776,550
Kanosh	3	37,110	111,330	--	--	--	111,330
Koosharem	3	37,110	111,330	--	--	--	111,330
Indian Peaks	1	37,110	37,110	--	--	--	37,110
Total	69		$2,560,590	92		$1,812,400	4,372,990

[1] ETR-27

Source: Table 5.1.3.1-8 and 5.1.3.1-9.

Table 5.1.3.2-7. Change in total personal income, Peak Year (1987), by area of analysis, alternative 4 (1980 dollars).

AREA OF ANALYSIS	CONSTRUCTION NUMBER	CONSTRUCTION WAGE[1]	CONSTRUCTION TOTAL	OPERATIONS NUMBER	OPERATIONS WAGE[1]	OPERATIONS TOTAL	CHANGE IN TOTAL PERSONAL INCOME
Duckwater	11	$37,110	$408,210	--	$ --	$ --	$ 408,210
Yomba	6	37,110	222,660	--	--	--	222,660
Goshute	11	37,110	408,210	--	--	--	408,210
Moapa	13	37,110	482,430	66	19,700	1,300,200	1,782,630
Las Vegas	6	37,110	222,660	--	--	--	222,660
Ely	10	37,110	371,100	--	--	--	371,100
Cedar City	5	37,110	185,550	26	19,700	512,200	697,750
Kanosh	3	37,110	111,330	--	--	--	111,330
Koosharem	3	37,110	111,330	--	--	--	111,330
Indian Peaks	1	37,110	37,110	--	--	--	37,110
Total	69		2,560,590	92		1,812,400	4,372,990

[1] ETR-21

Source: Table 5.1.3.1-8 and 5.1.3.1-9.

Table 5.1.3.2-8. Change in total personal income, Peak Year (1987), by area of analysis, alternative 5 (1980 dollars).

AREA OF ANALYSIS	CONSTRUCTION NUMBER	CONSTRUCTION WAGE[1]	CONSTRUCTION TOTAL	OPERATIONS NUMBER	OPERATIONS WAGE[1]	OPERATIONS TOTAL	CHANGE IN TOTAL PERSONAL INCOME
Duckwater	11	$37,110	$408,210	--	$ --	$ --	$ 408,210
Yomba	6	37,110	222,660	--	--	--	222,660
Goshute	11	37,110	408,210	--	--	--	408,210
Moapa	13	37,110	482,430	--	--	--	482,430
Las Vegas	6	37,110	222,660	--	--	--	222,660
Ely	10	37,110	371,100	73	19,700	1,438,100	1,809,200
Cedar City	5	37,110	185,550	--	--	--	185,550
Kanosh	3	37,110	111,330	--	--	--	111,330
Koosharem	3	37,110	111,330	19	19,700	374,300	485,630
Indian Peaks	1	37,110	37,110	--	--	--	37,110
Total	69		2,560,590	92		1,812,400	4,372,900

[1] ETR-27

Source: Table 5.1.3.1-8 and 5.1.3.1-9.

Table 5.1.3.2-9. Change in total personal income, Peak Year (1987), by area of analysis, alternative 6 (1980 dollars).

AREA OF ANALYSIS	CONSTRUCTION NUMBER	CONSTRUCTION WAGE[1]	CONSTRUCTION TOTAL	OPERATIONS NUMBER	OPERATIONS WAGE[1]	OPERATIONS TOTAL	CHANGE IN TOTAL PERSONAL INCOME
Duckwater	11	$37,110	$408,210	--	$ --	$ --	$ 408,210
Yomba	6	37,110	222,660	--	--	--	222,660
Goshute	11	37,110	408,210	--	--	--	408,210
Moapa	13	37,110	482,430	57	19,700	1,122,900	1,122,900
Las Vegas	6	37,110	222,660	--	--	--	222,660
Ely	10	37,110	371,100	--	--	--	371,100
Cedar City	5	37,110	185,550	23	--	453,110	453,110
Kanosh	3	37,110	111,330	12	--	236,400	236,400
Koosharem	3	37,110	111,330	--	--	--	426,530
Indian Peaks	1	37,110	37,110	--	--	--	37,110
Total	69		2,560,590	92		1,812,400	4,372,990

[1] ETR-27

Source: Table 5.1.3.1-8 and 5.1.3.1-9.

Table 5.1.3.2-10. Change in total personal income, Peak Year (1987), by area of analysis, alternative 8 (1980 dollars).

AREA OF ANALYSIS	CONSTRUCTION NUMBER	CONSTRUCTION WAGE[1]	CONSTRUCTION TOTAL	OPERATIONS NUMBER	OPERATIONS WAGE[1]	OPERATIONS TOTAL	CHANGE IN TOTAL PERSONAL INCOME
Duckwater	6	$37,110	$222,660	--	$ --	$ --	$ 222,660
Yomba	3	37,110	111,330	--	--	--	111,330
Goshute	6	37,110	222,660	--	--	--	222,660
Moapa	7	37,110	259,770	46	19,700	906,200	1,165,970
Las Vegas	3	37,110	111,330	--	--	--	111,330
Ely	5	37,110	185,550	--	--	--	185,550
Cedar City	3	37,110	111,330	--	--	--	111,330
Kanosh	2	37,110	74,220	--	--	--	74,220
Koosharem	2	37,110	74,220	--	--	--	74,220
Indian Peaks	0	37,110	-0-	--	--	--	-0-
Total	37		$1,373,070	46		$ 906,200	$2,279,270

[1] ETR 27

Source: Table 5.1.3.1-8 and 5.1.3.1-9.

Table 5.1.3.2-11. Change in total personal income, Long-Term (1992), by area of analysis, proposed action and all alternatives (1980 dollars).

AREA OF ANALYSIS	CONSTRUCTION NUMBER	CONSTRUCTION WAGE[1]	CONSTRUCTION TOTAL	OPERATIONS NUMBER	OPERATIONS WAGE[1]	OPERATIONS TOTAL	CHANGE IN TOTAL PERSONAL INCOME[2]
Duckwater	11	$37,110	$408,210	--	$ --	$ --	$ 408,210
Yomba	6	37,110	222,660	--	--	--	222,660
Goshute	11	37,110	408,210	--	--	--	408,210
Moapa	13	37,110	482,430	--	--	--	482,430
Las Vegas	6	37,110	222,660	--	--	--	222,660
Ely	10	37,110	371,100	--	--	--	371,100
Cedar City	5	37,110	185,550	--	--	--	185,550
Kanosh	3	37,110	111,330	--	--	--	111,330
Koosharem	3	37,110	111,330	--	--	--	111,330
Indian Peaks	1	37,110	37,110	--	--	--	37,110
Total	69		$2,560,590				$2,560,590

[1] ETR-27

[2] For Alternative 8, one-half this change is expected since only one-half the in-migration of construction workers is assumed.

Source: Table 5.1.3.1-8.

Table 5.1.3.2-12. Percentage change in total personal income, by area of analysis, for the Proposed Action.

Area of Analysis	Peak Year (Percent)	Long Term	
		From Projected Baseline at 1992 (Percent)	From Peak Year 1987 (Percent)
Duckwater	171	127	63
Yomba	161	132	67
Goshute	19	15	16
Moapa	187	43	20
Las Vegas	87	84	46
Ely	257	225	72
Cedar City	201	46	19
Kanosh	209	53	22
Koosharem	71	57	42
Indian Peaks	76	61	43

T5973/10-2-81/a

Source: Tables 5.1.3.2-2 and 5.1.3.2-3

Table 5.1.3.2-13. Percentage change in total personal income, by area of analysis, for Alternative 1.

Area of Analysis	Peak Year (Percent)	Long Term	
		From Projected Baseline at 1992 (Percent)	From Peak Year 1987 (Percent)
Duckwater	171	127	63
Yomba	161	167	67
Goshute	19	15	16
Moapa	207	43	18
Las Vegas	87	84	46
Ely	257	225	72
Cedar City	220	46	18
Kanosh	67	53	40
Koosharem	71	57	42
Indian Peaks	76	61	43

T5974/10-2-81/a

Source: Tables 5.1.3.2-2 and 5.1.3.2-4.

Table 5.1.3.2-14. Percentage change in total personal income, by area of analysis, for Alternative 2.

Area of Analysis	Peak Year (Percent)	Long Term	
		From Projected Baseline at 1992 (Percent)	From Peak Year 1987 (Percent)
Duckwater	171	127	63
Yomba	161	167	67
Goshute	19	15	16
Moapa	233	43	36
Las Vegas	87	84	46
Ely	257	225	72
Cedar City	58	46	11
Kanosh	245	53	12
Koosharem	71	57	42
Indian Peaks	76	61	43

T5975/10-2-81/a

Source: Tables 5.1.3.2-2 and 5.1.3.2-5.

Table 5.1.3.2-15. Percentage change in total personal income, by area of analysis, for Alternative 3.

Area of Analysis	Peak Year (Percent)	Long Term	
		From Projected Baseline at 1992 (Percent)	From Peak Year 1987 (Percent)
Duckwater	171	127	63
Yomba	161	167	67
Goshute	77	-15.2	-13.2
Moapa	56	43	36
Las Vegas	87	85	46
Ely	257	225	-68.5
Cedar City	245	46	17
Kanosh	67	53	40
Koosharem	71	57	42
Indian Peaks	76	61	43

T5976/10-2-81/a

Source: Tables 5.1.3.2-2 and 5.1.3.2-6.

Table 5.1.3.2-16. Percentage change in total personal income, by area of analysis, for Alternative 4.

Area of Analysis	Peak Year (Percent)	Long Term	
		From Projected Baseline at 1992 (Percent)	From Peak Year 1987 (Percent)
Duckwater	171	127	63
Yomba	161	167	67
Goshute	19	15	16
Moapa	207	43	18
Las Vegas	87	84	46
Ely	257	225	72
Cedar City	220	46	18
Kanosh	67	53	40
Koosharem	71	57	42
Indian Peaks	76	61	43

T5977/10-2-81/a

Source: Tables 5.1.3.2-2 and 5.1.3.2-7.

Table 5.1.3.2-17. Percentage change in total personal income, by area of analysis, for Alternative 3.

Area of Analysis	Peak Year (Percent)	Long Term	
		From Projected Baseline at 1992 (Percent)	From Peak Year 1987 (Percent)
Duckwater	171	127	63
Yomba	161	167	67
Goshute	88	15	13
Moapa	56	43	36
Las Vegas	87	84	46
Ely	257	225	68
Cedar City	58	46	37
Kanosh	67	53	40
Koosharem	311	57	17
Indian Peaks	76	61	43

T5978/10-2-81/a

Source: Tables 5.1.3.2-2 and 5.1.3.2-8.

Table 5.1.3.2-18. Percentage change in total personal income, by area of analysis, for Alternative 6.

Area of Analysis	Peak Year (Percent)	Long Term	
		From Projected Baseline at 1992 (Percent)	From Peak Year 1987 (Percent)
Duckwater	171	127	63
Yomba	161	132	67
Goshute	19	15	16
Moapa	230	43	20
Las Vegas	87	84	46
Ely	257	225	72
Cedar City	201	46	19
Kanosh	209	53	22
Koosharem	71	57	42
Indian Peaks	76	61	43

T5979/10-2-81/a

Source: Tables 5.1.3.2-2 and 5.1.3.2-9.

Table 5.1.3.2-19. Percentage change in total personal income, by area of analysis, for Alternative 8.

Area of Analysis	Peak Year (Percent)	Long Term	
		From Projected Baseline at 1992 (Percent)	From Peak Year 1987 (Percent)
Duckwater	94	69	41
Yomba	80	83	45
Goshute	11	8	8
Moapa	55	23	11
Las Vegas	43	42	29
Ely	129	112	53
Cedar City	35	28	43
Kanosh	45	35	26
Koosharem	47	38	28
Indian Peaks	0	0	0

T5980/10-2-81/a

Source: Tables 5.1.3.2-2 and 5.1.3.2-10.

Table 5.1.3.2-20. Labor force participation rates, by area of analysis.

Area of Analysis	Labor Force Participation Rates
Duckwater	0.35
Yomba	0.41
Goshute	0.31
Moapa	0.47
Las Vegas	0.32
Ely	0.48
Cedar City	0.76[1]
Kanosh	0.76[1]
Koosharem	0.76[1]
Indian Peaks	0.76[1]

T5981/10-12-81

[1]Average of the four AOAs

Source: Facilitators 1980 and BIA, Cedar City Office.

between each baseline period (i.e., peak year and long-term). Where existing labor force participation rates for the Native Americans residing in the ten AOAs is greater than the Native Americans who reside outside the AOAs, the rate is assumed to remain stable over the period of the M-X construction program. These assumptions suggest that labor force participation rates would increase slightly for those residing in the AOAs but that the rate would remain well below the non-Native American rate because of the relative isolation of the reservations in question. Table 5.1.3.2-21 shows the projected labor force participation rates for the peak year and the long-term.

Employment

With the exception of Las Vegas and Moapa, employment on reservations is extremely limited. The Moapa reservation contains several employment areas, such as greenhouse activities, a leather shop, and a retail store. The Las Vegas Colony members are employed in clerical, retail and service occupations in the Colony or the City of Las Vegas. The remaining reservation or colonies offer little employment outside of agriculture or tribal employment.

The M-X proposal is likely to change the structure of employment with a heavy emphasis toward construction and operations. There may be some additional shift away from agricultural and tribal activities to the extent that individuals seek alternative employment in M-X-related activity.

Unemployment Rates

Unemployment rates on the reservations will change for two reasons. First, existing unemployed are assumed to find employment to the extent that the unemployment rate exclusive of in-migration will fall to 10 percent. This 10 percent reflects a combination of frictional unemployment and the lack of job skills among some of the members of the labor force.

A second factor influencing the unemployment rate is the change in the size of the labor force resulting from the in-migrating population. Table 5.1.3.2-22 through 5.1.3.2-30 present projections of the labor force for each alternative. In combination, these two changes will result in new unemployment rate for each reservation and colony.

Based on the above assumptions, Tables 5.1.3.2-22 through 5.1.3.2-47 present the development of the projected unemployment rates at the peak year and the long-term period.

For the long-term period, it is assumed the unemployment rate will rise by half the difference between the baseline rate and the peak year rate. This assumption reflects the likelihood that some employment growth in the areas of analysis will be permanent, while some will be transitory. Table 5.1.3.2-48 presents a summary of unemployment rates for the baseline, peak year and long-term.

Public Finance (5.1.3.2.3)

Public finance is typically defined as the income and expenditures of a governmental unit. Native American reservations and colonies represent unique

Table 5.1.3.2-21. Projected labor force participation rates, by area of analysis, peak year and long term.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	0.40	0.43
Yomba	0.43	0.45
Goshute	0.38	0.42
Moapa	0.47	0.47
Las Vegas	0.39	0.42
Ely	0.48	0.48
Cedar City	0.76	0.76
Kanosh	0.76	0.76
Koosharem	0.76	0.76
Indian Peaks	0.76	0.76

T5982/10-13-81

Source: HDR Sciences

Table 5.1.3.2-22. Projections of baseline labor force, by peak year and long-term, by area of analysis.

AREA OF ANALYSIS	PEAK YEAR 1987 POPULATION	PEAK YEAR 1987 LFPR[1]	PEAK YEAR 1987 LABOR FORCE SIZE	LONG-TERM 1992 POPULATION	LONG-TERM 1992 LFPR[1]	LONG-TERM 1992 LABOR FORCE SIZE
Duckwater	340	0.40	136	458	0.43	197
Yomba	137	0.43	59	167	0.45	75
Goshute	278	0.38	106	355	0.42	149
Moapa	352	0.47	165	455	0.47	214
Las Vegas	105	0.39	41	109	0.42	46
Ely	206	0.48	99	236	0.48	113
Cedar City	130	0.76	99	164	0.76	125
Kanosh	68	0.76	52	86	0.76	65
Koosharem	64	0.76	49	80	0.76	61
Indian Peaks	20	0.76	15	25	0.76	19

[1] LFPR is Labor Force Participation Rate.

Source: Table 5.1.3.1-2 and 5.1.3.2-21.

Table 5.1.3.2-23. Projected changes in the size of the labor force, by peak year and long-term, by area of analysis, proposed action.

AREA OF ANALYSIS	PEAK YEAR 1987			LONG-TERM 1992		
	CHANGE IN POPULATION	LFPR[1]	LABOR FORCE SIZE	CHANGE IN POPULATION	LFPR[1]	LABOR FORCE SIZE
Duckwater	33	0.40	13	33	0.43	14
Yomba	18	0.43	8	18	0.45	8
Goshute	33	0.38	13	33	0.42	14
Moapa	210	0.47	99	39	0.47	18
Las Vegas	18	0.39	7	18	0.42	8
Ely	30	0.48	14	30	0.48	14
Cedar City	84	0.76	64	15	0.76	11
Karosh	45	0.76	34	9	0.76	7
Koosharem	9	0.76	7	9	0.76	7
Indian Peaks	3	0.76	2	3	0.76	2

[1]LFPR is Labor Force Participation Rate.

Source: Tables 5.1.3.1-11 and 5.1.3.2-21.

Table 5.1.3.2-24. Projected changes in the size of the labor force, by peak year and long-term, alternative 1.

AREA OF ANALYSIS	PEAK YEAR 1987 CHANGE IN POPULATION	PEAK YEAR 1987 LFPR[1]	PEAK YEAR 1987 LABOR FORCE SIZE	LONG-TERM 1992 CHANGE IN POPULATION	LONG-TERM 1992 LFPR[1]	LONG-TERM 1992 LABOR FORCE SIZE
Duckwater	33	0.40	13	33	0.43	14
Yomba	18	0.43	8	18	0.45	8
Goshute	33	0.38	13	33	0.42	14
Moapa	237	0.47	111	39	0.47	18
Las Vegas	18	0.39	7	18	0.42	8
Ely	30	0.48	14	30	0.48	14
Cedar City	93	0.76	71	15	0.76	11
Kanosh	9	0.76	7	9	0.76	7
Koosharem	9	0.76	7	9	0.76	7
Indian Peaks	3	0.76	2	3	0.76	2

[1]LFPR is Labor Force Participation Rate.

Source: Tables 5.1.3.1-11 and 5.1.3.2-21.

Table 5.1.3.2-25. Projected changes in the size of the labor force, by peak year and long-term, alternative 2.

AREA OF ANALYSIS	PEAK YEAR 1987 CHANGE IN POPULATION	PEAK YEAR 1987 LFPR[1]	PEAK YEAR 1987 LABOR FORCE SIZE	LONG-TERM 1992 CHANGE IN POPULATION	LONG-TERM 1992 LFPR[1]	LONG-TERM 1992 LABOR FORCE SIZE
Duckwater	33	0.40	13	33	0.43	14
Yomba	18	0.43	8	18	0.45	8
Goshute	33	0.38	13	33	0.42	14
Moapa	270	0.47	127	39	0.47	18
Las Vegas	18	0.39	7	18	0.42	8
Ely	30	0.48	14	30	0.48	14
Cedar City	15	0.76	11	15	0.76	11
Kanosh	54	0.76	41	9	0.76	7
Koosharem	9	0.76	7	9	0.76	7
Indian Peaks	3	0.76	2	3	0.76	2

[1]LFPR is Labor Force Participation Rate.

Source: Tables 5.1.3.1-11 and 5.1.3.2-21.

Table 5.1.3.2-26. Projected changes in the size of the labor force, by peak year and long-term, alternative 3.

AREA OF ANALYSIS	PEAK YEAR 1987 CHANGE IN POPULATION	PEAK YEAR 1987 LFPR[1]	PEAK YEAR 1987 LABOR FORCE SIZE	LONG-TERM 1992 CHANGE IN POPULATION	LONG-TERM 1992 LFPR[1]	LONG-TERM 1992 LABOR FORCE SIZE
Duckwater	33	0.40	13	33	0.43	14
Yomba	18	0.43	8	18	0.45	8
Goshute	33	0.38	13	33	0.42	14
Moapa	39	0.47	18	39	0.47	18
Las Vegas	18	0.39	7	18	0.42	8
Ely	216	0.48	104	30	0.48	14
Cedar City	105	0.76	80	15	0.76	11
Kanosh	9	0.76	7	9	0.76	7
Koosharem	9	0.76	7	9	0.76	7
Indian Peaks	3	0.76	2	3	0.76	2

[1] LFPR is Labor Force Participation Rate.

Source: Tables 5.1.3.1-11 and 5.1.3.2-21.

Table 5.1.3.2-27. Projected changes in the size of the labor force, by peak year and long-term, alternative 4.

AREA OF ANALYSIS	PEAK YEAR 1987 CHANGE IN POPULATION	PEAK YEAR 1987 LFPR[1]	PEAK YEAR 1987 LABOR FORCE SIZE	LONG-TERM 1992 CHANGE IN POPULATION	LONG-TERM 1992 LFPR[1]	LONG-TERM 1992 LABOR FORCE SIZE
Duckwater	33	0.40	13	33	0.43	14
Yomba	18	0.43	8	18	0.45	8
Goshute	33	0.38	13	33	0.42	14
Moapa	237	0.47	111	39	0.47	18
Las Vegas	18	0.39	7	18	0.42	8
Ely	30	0.48	14	30	0.48	14
Cedar City	93	0.76	71	15	0.76	11
Kanosh	9	0.76	7	9	0.76	7
Koosharem	9	0.76	7	9	0.76	7
Indian Peaks	3	0.76	2	3	0.76	2

[1] LFPR is Labor Force Participation Rate.

Source: Tables 5.1.3.1-11 and 5.1.3.2-21.

Table 5.1.3.2-28. Projected changes in the size of the labor force, by peak year and long-term, alternative 5.

AREA OF ANALYSIS	PEAK YEAR 1987 CHANGE IN POPULATION	PEAK YEAR 1987 LFPR[1]	PEAK YEAR 1987 LABOR FORCE SIZE	LONG-TERM 1992 CHANGE IN POPULATION	LONG-TERM 1992 LFPR[1]	LONG-TERM 1992 LABOR FORCE SIZE
Duckwater	33	0.40	13	33	0.43	14
Yomba	18	0.43	8	18	0.45	8
Goshute	33	0.38	13	33	0.42	14
Moapa	39	0.47	18	39	0.47	18
Las Vegas	18	0.39	7	18	0.42	8
Ely	249	0.48	120	30	0.48	14
Cedar City	15	0.76	11	15	0.76	11
Kanosh	66	0.76	50	9	0.76	7
Koosharem	9	0.76	7	9	0.76	7
Indian Peaks	3	0.76	2	3	0.76	2

[1] LFPR is Labor Force Participation Rate.

Source: Tables 5.1.3.1-11 and 5.1.3.2-21.

Table 5.1.3.2-29. Projected changes in the size of the labor force, by peak year and long-term, alternative 6.

AREA OF ANALYSIS	PEAK YEAR 1987 CHANGE IN POPULATION	PEAK YEAR 1987 LFPR[1]	PEAK YEAR 1987 LABOR FORCE SIZE	LONG-TERM 1992 CHANGE IN POPULATION	LONG-TERM 1992 LFPR[1]	LONG-TERM 1992 LABOR FORCE SIZE
Duckwater	33	0.40	13	33	0.43	14
Yomba	18	0.43	8	18	0.45	8
Goshute	33	0.38	13	33	0.42	14
Moapa	210	0.47	99	39	0.47	18
Las Vegas	18	0.39	7	18	0.42	8
Ely	30	0.48	14	30	0.48	14
Cedar City	84	0.76	64	15	0.76	11
Kanosh	45	0.76	34	9	0.76	7
Koosharem	9	0.76	7	9	0.76	7
Indian Peaks	3	0.76	2	3	0.76	2

[1] LFPR is Labor Force Participation Rate.

Source: Tables 5.1.3.1-11 and 5.1.3.2-21.

Table 5.1.3.2-30. Projected changes in the size of the labor force, peak year and long-term, Alternative 8.

Area of Analysis	Peak Year 1987			Long-Term 1992		
	Change in Population	LFPR[1]	Labor Force Size	Change in Population	LFPR[1]	Labor Force Size
Duckwater	17	0.40	7	17	0.43	7
Yomba	9	0.43	4	9	0.45	4
Goshute	17	0.38	7	17	0.42	7
Moapa	158	0.47	74	20	0.47	9
Las Vegas	9	0.39	4	9	0.42	4
Ely	15	0.48	7	15	0.48	7
Cedar City	8	0.76	6	8	0.76	6
Kanosh	5	0.76	4	5	0.76	4
Koosharem	5	0.76	4	5	0.76	4
Indian Peaks	2	0.76	1	2	0.76	1

T5889/9-27-81

[1]LFPR = Labor Force Participation Rate.

Source: Tables 5.1.3.1-10 and 5.1.3.2-21.

Table 5.1.3.2-31. Projected labor force for peak year 1987, by area of analysis, for the Proposed Action.

Area of Analysis	Baseline Labor Force	Change in Labor Force	Peak-Year Projected Labor Force
Duckwater	136	13	149
Yomba	59	8	67
Goshute	106	13	119
Moapa	165	99	264
Las Vegas	41	7	48
Ely	99	14	113
Cedar City	99	64	163
Kanosh	52	34	86
Koosharem	49	7	56
Indian Peaks	15	2	17

T5991/10-2-81/a

Source: Table 5.1.3.2-22 and 5.1.3.2-23.

Table 5.1.3.2-32. Projected labor force for peak year 1987, by area of analysis, for Alternative 1.

Area of Analysis	Baseline Labor Force	Change in Labor Force	Peak-Year Projected Labor Force
Duckwater	136	13	149
Yomba	59	8	67
Goshute	106	13	119
Moapa	165	111	276
Las Vegas	41	7	48
Ely	99	14	113
Cedar City	99	71	170
Kanosh	52	7	59
Koosharem	49	7	56
Indian Peaks	15	2	17

T5992/10-2-81/a

Source: Table 5.1.3.2-22 and 5.1.3.2-24.

Table 5.1.3.2-33. Projected labor force for peak year 1987, by area of analysis, for Alternative 2.

Area of Analysis	Baseline Labor Force	Change in Labor Force	Peak-Year Projected Labor Force
Duckwater	136	13	149
Yomba	59	8	67
Goshute	106	13	119
Moapa	165	127	292
Las Vegas	41	7	48
Ely	99	14	113
Cedar City	99	11	110
Kanosh	52	41	95
Koosharem	49	7	56
Indian Peaks	15	2	17

T5993/10-2-81/a

Source: Table 5.1.3.2-22 and 5.1.3.2-25.

Table 5.1.3.2-34. Projected labor force for peak year 1987, by area of analysis, for Alternative 3.

Area of Analysis	Baseline Labor Force	Change in Labor Force	Peak Year Projected Labor Force
Duckwater	136	13	149
Yomba	59	8	67
Goshute	106	13	119
Moapa	165	18	183
Las Vegas	41	7	48
Ely	99	104	203
Cedar City	99	80	179
Kanosh	52	7	59
Koosharem	49	7	56
Indian Peaks	15	2	17

T5994/10-2-81/a

Source: Table 5.1.3.2-22 and 5.1.3.2-26.

Table 5.1.3.2-35. Projected labor force for peak year 1987, by area of analysis, for Alternative 4.

Area of Analysis	Baseline Labor Force	Change in Labor Force	Peak-Year Projected Labor Force
Duckwater	136	13	149
Yomba	59	8	67
Goshute	106	13	119
Moapa	165	111	276
Las Vegas	41	7	48
Ely	99	14	113
Cedar City	99	71	170
Kanosh	52	7	59
Koosharem	49	7	56
Indian Peaks	15	2	17

T5995/10-2-81/a

Source: Table 5.1.3.2-22 and 5.1.3.2-27.

Table 5.1.3.2-36. Projected labor force for peak year 1987, by area of analysis, for Alternative 5.

Area of Analysis	Baseline Labor Force	Change in Labor Force	Peak-Year Projected Labor Force
Duckwater	136	13	149
Yomba	59	8	67
Goshute	106	13	119
Moapa	165	18	183
Las Vegas	41	7	48
Ely	99	120	219
Cedar City	99	11	110
Kanosh	52	50	102
Koosharem	49	7	56
Indian Peaks	15	2	17

T5996/10-2-81/a

Source: Table 5.1.3.2-22 and 5.1.3.2-28.

Table 5.1.3.2-37. Projected labor force for peak year 1987, by area of analysis, for Alternative 6.

Area of Analysis	Baseline Labor Force	Change in Labor Force	Peak-Year Projected Labor Force
Duckwater	136	13	149
Yomba	59	8	67
Goshute	106	13	119
Moapa	165	99	264
Las Vegas	41	7	48
Ely	99	14	113
Cedar City	99	64	163
Kanosh	52	34	86
Koosharem	49	7	56
Indian Peaks	15	2	17

T5997/10-2-81/a

Source: Table 5.1.3.2-22 and 5.1.3.2-29.

Table 5.1.3.2-38. Projected labor force for peak year 1987, by area of analysis, for Alternative 8.

Area of Analysis	Baseline Labor Force	Change in Labor Force	Peak-Year Projected Labor Force
Duckwater	136	7	143
Yomba	59	4	3
Goshute	106	7	113
Moapa	165	74	239
Las Vegas	41	4	45
Ely	99	7	106
Cedar City	99	6	105
Kanosh	52	4	56
Koosharem	49	4	53
Indian Peaks	15	1	16

T5998/10-2-81/a

Source: Table 5.1.3.2-22 and 5.1.3.2-30.

Table 5.1.3.2-39. Projected unemployment rates for peak year 1987, by area of analysis for the Proposed Action.

Area of Analysis	Projected Labor Force	Unemployment[1]	Unemployment Rate
Duckwater	149	14	9.4
Yomba	67	6	9.0
Goshute	119	11	9.2
Moapa	276	17	6.4
Las Vegas	48	4	8.3
Ely	113	10	8.9
Cedar City	163	10	6.1
Kanosh	86	5	5.8
Koosharem	56	5	8.9
Indian Peaks	17	2	11.8

T5999/10-2-81/a

[1]Assumes a 10 percent unemployment rate for baseline.

Source: Table 5.1.3.2-31.

Table 5.1.3.2-40. Projected unemployment rates for peak year 1987, by area of analysis for Alternative 1.

Area of Analysis	Projected Labor Force	Unemployment[1]	Unemployment Rate
Duckwater	149	14	9.4
Yomba	67	6	8.9
Goshute	119	11	9.2
Moapa	276	17	6.2
Las Vegas	48	4	8.3
Ely	113	10	8.9
Cedar City	170	10	5.9
Kanosh	59	5	8.5
Koosharem	56	5	8.9
Indian Peaks	17	2	11.8

T6000/10-2-81/a

[1]Assumes a 10 percent unemployment rate for baseline.

Source: Table 5.1.3.2-32.

Table 5.1.3.2-41. Projected unemployment rates for peak year 1987, by area of analysis for Alternative 2.

Area of Analysis	Projected Labor Force	Unemployment[1]	Unemployment Rate
Duckwater	149	14	9.4
Yomba	67	6	9.0
Goshute	119	11	9.2
Moapa	292	17	5.8
Las Vegas	48	4	8.3
Ely	113	10	8.9
Cedar City	110	10	9.1
Kanosh	93	5	5.4
Koosharem	56	5	8.9
Indian Peaks	17	2	11.8

T6001/10-2-81/a

[1]Assumes a 10 percent unemployment rate for baseline.

Source: Table 5.1.3.2-33.

Table 5.1.3.2-42. Projected unemployment rates for peak year 1987, by area of analysis for Alternative 3.

Area of Analysis	Projected Labor Force	Unemployment[1]	Unemployment Rate
Duckwater	149	14	9.4
Yomba	67	6	9.0
Goshute	119	11	9.2
Moapa	183	17	9.3
Las Vegas	48	4	8.3
Ely	203	10	4.9
Cedar City	179	10	5.6
Kanosh	59	5	8.5
Koosharem	56	5	8.9
Indian Peaks	17	2	11.8

T6002/10-2-81/a

[1]Assumes a 10 percent unemployment rate for baseline.

Source: Table 5.1.3.2-34.

Table 5.1.3.2-43. Projected unemployment rates for peak year 1987, by area of analysis, for Alternative 4.

Area of Analysis	Projected Labor Force	Unemployment[1]	Unemployment Rate
Duckwater	149	14	9.4
Yomba	67	6	9.0
Goshute	119	11	9.2
Moapa	276	17	6.2
Las Vegas	48	4	8.3
Ely	113	10	8.9
Cedar City	170	10	5.9
Kanosh	59	5	8.5
Koosharem	56	5	8.9
Indian Peaks	17	2	11.8

T6003/10-2-81/a

[1]Assumes a 10 percent unemployment rate for baseline.

Source: Table 5.1.3.2-35.

Table 5.1.3.2-44. Projected unemployment rates for peak year 1987, by area of analysis, for Alternative 5.

Area of Analysis	Projected Labor Force	Unemployment[1]	Unemployment Rate
Duckwater	149	14	9.4
Yomba	67	6	9.0
Goshute	119	11	9.2
Moapa	183	17	9.3
Las Vegas	48	4	8.3
Ely	219	10	4.6
Cedar City	110	10	9.1
Kanosh	102	5	4.9
Koosharem	56	5	8.9
Indian Peaks	17	2	11.8

T6004/10-2-81/a

[1]Assumes a 10 percent unemployment rate for baseline.

Source: Table 5.1.3.2-36.

Table 5.1.3.2-45. Projected unemployment rates for peak year 1987, by area of analysis, for Alternative 6.

Area of Analysis	Projected Labor Force	Unemployment[1]	Unemployment Rate
Duckwater	149	14	9.4
Yomba	67	6	9.0
Goshute	119	11	9.2
Moapa	264	17	6.4
Las Vegas	48	4	8.3
Ely	113	10	8.9
Cedar City	163	10	6.1
Kanosh	86	5	5.8
Koosharem	56	5	8.9
Indian Peaks	17	2	11.8

T6005/10-2-81/a

[1]Assumes a 10 percent unemployment rate for baseline.

Source: Table 5.1.3.2-37.

Table 5.1.3.2-46. Projected unemployment rates for peak year 1987, by area of analysis, for Alternative 8.

Area of Analysis	Projected Labor Force	Unemployment[1]	Unemployment Rate
Duckwater	143	14	9.8
Yomba	63	6	9.5
Goshute	113	11	9.7
Moapa	239	17	7.1
Las Vegas	45	4	8.9
Ely	106	10	9.4
Cedar City	105	10	9.5
Kanosh	56	5	8.9
Koosharem	53	5	9.4
Indian Peaks	16	2	12.5

T6006/10-2-81/a

[1]Assumes a 10 percent unemployment rate for baseline.

Source: Table 5.1.3.2-38.

Table 5.1.3.2-47. Projected unemployment rates, Peak Year (1987), by area of analysis, by alternative.

AREA OF ANALYSIS	ALTERNATIVE									
	PA	1	2	3	4	5	6	7	8	NO ACTION
Duckwater	9.40	9.40	9.40	9.40	9.40	9.40	9.40	38.0	9.79	38.0
Yomba	8.96	8.96	8.96	8.96	8.96	8.96	8.96	53.8	9.52	53.8
Goshute	9.24	9.24	9.24	9.24	9.24	9.24	9.24	41.0	9.73	41.0
Moapa	6.44	6.16	5.82	9.29	6.16	9.29	6.44	25.0	7.11	25.0
Las Vegas	8.33	8.33	8.33	8.33	8.33	8.33	8.33	0.9	8.88	0.9
Ely	8.85	8.85	8.85	4.93	8.85	4.57	8.85	37.5	9.43	37.5
Cedar City	6.13	5.88	9.09	5.59	5.88	9.09	6.13	28.9	9.52	28.9
Kanosh	5.81	8.47	5.38	8.47	8.47	4.90	5.81	28.9	8.93	28.9
Koosharem	8.93	8.93	8.93	8.93	8.93	8.93	8.93	28.9	9.43	28.9
Indian Peaks	11.76	11.76	11.76	11.76	11.76	11.76	11.76	28.9	12.50	28.9

Source: Tables 5.1.3.2-39 to 5.1.3.2-46.

Table 5.1.3.2-48. Projected unemployment rates, Long Term 1992, by area of analysis, by alternative.

AREA OF ANALYSIS	ALTERNATIVE									
	PA	1	2	3	4	5	6	7	8	NO ACTION
Duckwater	23.7	23.7	23.7	23.7	23.7	23.7	23.7	38.0	23.9	38.0
Yomba	31.4	31.4	31.4	31.4	31.4	31.4	31.4	53.8	31.7	53.8
Goshute	25.1	25.1	25.1	23.4	25.1	23.2	25.1	41.0	25.4	41.0
Moapa	15.7	15.6	15.4	17.2	15.6	17.2	15.7	25.0	16.1	25.0
Las Vegas	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Ely	23.2	23.2	23.2	23.2	23.2	23.2	23.2	37.5	23.5	37.5
Cedar City	17.5	17.4	19.0	17.3	17.4	19.0	17.5	28.9	19.2	28.9
Kanosh	17.4	18.7	17.4	18.7	10.7	16.9	17.4	28.9	18.9	28.9
Koosharem	18.9	18.9	18.9	18.9	18.9	18.9	18.9	28.9	19.2	28.9
Indian Peaks	20.3	20.3	20.3	20.3	20.3	20.3	20.3	28.9	20.1	28.9

Source: Tables 5.1.3.2- to 5.1.3.2-

exceptions in this regard since there is a lack of customary forms of government revenue, taxes and municipal bonds. Likewise, Native Americans, both individually and as tribal governments, are usually excluded from conventional financing since lands held in trust by the government are limited for use as collateral. Consequently, tribal governments' main sources of income are profits from tribal enterprises and to government grants as sources of support for tribal activities (administration and services).

Due to recent trends and uncertainties regarding the future of federal programs, qualitative assessments have been made regarding the potential effects of M-X deployment and operations on Native American public finance.

Inflation (5.1.3.2.4)

The effects of the M-X system on price levels in the ROI will be a function of the overall inflationary impact outside the reservations. The absence of a fully developed on-reservation market economy suggests that whatever inflationary impact occurs will be a function of off-reservation inflationary pressures. These impacts will in turn depend upon the particular city community and the degree to which incomes change in or near that community.

Subsistence Activity (5.1.3.2.5)

Subsistence activity remains an important element in the total household income of Great Basin Native Americans. Construction activity and increased access by reservationists to traditional Native American hunting and gathering areas are likely to result in decreased availability of subsistence resources to Native Americans. A quantitative impact assessment cannot be calculated because it is not known to what extent subsistence activities contribute to household incomes. However, since Native Americans cash incomes are generally low, it is assumed that any project activity that would reduce access to subsistence resources would result in adverse effects.

Community Infrastructure Methodologies (5.1.3.3)

Community infrastructure is defined as those institutional facilities which support the growth and development of the local area. These include schools, health facilities, housing stock, and public services (police and fire protection and utilities).

Schools (5.1.3.3.1)

The impact of the M-X system on local schools depends on the change in the population of school-age children on each reservation. Currently, only one reservation contains a school (Duckwater). It is assumed that the projected changes in school age population are not sufficient to justify the construction of new schools. The baseline populations are shown in Table 5.1.3.3-1. Changes in school age populations, by alternative, are shown in Tables 5.1.3.3-2 to 5.1.3.3-9. The percentage changes are shown in Tables 5.1.3.3-10 through 5.1.3.3-17. Summaries for the peak year and long-term are given in Table 5.1.3.3-18 and 5.1.3.3-19.

Table 5.1.3.3-1. Projected Baseline School Age Population (6-17)

RESERVATION	"BOOM"	"BUST"
Duckwater	96	130
Yomba	39	47
Goshute	79	101
Moapa	100	129
Las Vegas	30	31
Ely	59	67
Cedar City	37	47
Kanosh	19	24
Koosharem	18	23
Indian Peaks	6	7

Source: Compiled from Tables 5.1.3.1-2 and 5.1.3.1-3.

Table 5.1.3.3-2. Projected change in school-age population (ages 6 to 17), by area of analysis, for the peak year and long term, Proposed Action.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	9	-9
Yomba	5	-5
Goshute	9	-9
Moapa	60	-11
Las Vegas	5	-5
Ely	9	-9
Cedar City	24	-4
Kanosh	13	-3
Koosharem	3	-3
Indian Peaks	1	-1

T6010/10-2-81/a

Source: Table 5.1.3.1-3. and 5.1.3.1-11.

Table 5.1.3.3-3. Projected change in school-age population (ages 6 to 17), by area of analysis, peak year and long term, Alternative 1.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	9	-9
Yomba	5	-5
Goshute	9	-9
Moapa	67	-11
Las Vegas	5	-5
Ely	9	-9
Cedar City	26	-4
Kanosh	3	-3
Koosharem	3	-3
Indian Peaks	1	-1

T6011/10-2-81/a

Source: Table 5.1.3.1-3. and 5.1.3.1-11.

Table 5.1.3.3-4. Projected change in school-age population (ages 6 to 17), by area of analysis, peak year and long term, Alternative 2.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	9	-9
Yomba	5	-5
Goshute	9	-9
Moapa	77	-11
Las Vegas	5	-5
Ely	9	-9
Cedar City	4	-4
Kanosh	15	-3
Koosharem	3	-3
Indian Peaks	1	-1

T6012/10-2-81/a

Source: Table 5.1.3.1-3. and 5.1.3.1-11.

Table 5.1.3.3-5. Projected change in school-age population (ages 6 to 17), by area of analysis, peak year and long term, Alternative 3.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	9	-9
Yomba	5	-5
Goshute	9	-9
Moapa	11	-11
Las Vegas	5	-5
Ely	61	-8
Cedar City	30	-4
Kanosh	3	-3
Koosharem	3	-3
Indian Peaks	1	-1

T6013/10-2-81/a

Source: Table 5.1.3.1-3. and 5.1.3.1-11.

Table 5.1.3.3-6. Projected change in school age population (ages 6 to 17), by area of analysis, peak year and long term, Alternative 4.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	9	-9
Yomba	5	-5
Goshute	9	-9
Moapa	67	-11
Las Vegas	5	-5
Ely	9	-4
Cedar City	26	-4
Kanosh	3	-3
Koosharem	3	-3
Indian Peaks	1	-1

T6014/10-2-81/a

Source: Table 5.1.3.1-3. and 5.1.3.1-11.

Table 5.1.3.3-7. Percentage change in school-age population (ages 6 to 17), by area of analysis, for the peak year and long term, for Alternative 5.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	9	-9
Yomba	5	-5
Goshute	9	-9
Moapa	11	-11
Las Vegas	5	-5
Ely	71	-8
Cedar City	4	-4
Kanosh	19	-3
Koosharem	3	-3
Indian Peaks	1	-1

T6015/10-2-81/a

Source: Table 5.1.3.1-3. and 5.1.3.1-11.

Table 5.1.3.3-8. Percentage change in school-age population (ages 6 to 17), by area of analysis, for the peak year and long term, for Alternative 6.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	9	-9
Yomba	5	-5
Goshute	9	-9
Moapa	60	-11
Las Vegas	5	-5
Ely	9	-9
Cedar City	24	-4
Kanosh	13	-3
Koosharem	3	-3
Indian Peaks	1	-1

T6016/10-2-81/a

Source: Table 5.1.3.1-3. and 5.1.3.1-11.

Table 5.1.3.3-9. Percentage change in school-age population (ages 6 to 17), by area of analysis, for the peak year and long term, for Alternative 8.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	5	-5
Yomba	3	-3
Goshute	5	-5
Moapa	50	-6
Las Vegas	3	-3
Ely	4	-4
Cedar City	1	-1
Kanosh	1	-1
Koosharem	1	-1
Indian Peaks	0	0

T6017/10-2-81/a

Source: Table 5.1.3.1-3. and 5.1.3.1-11.

Table 5.1.3.3-10. Percentage change school-age population (ages 6 to 17), by area of analysis, for the peak year and long term, for the Proposed Action.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	9.3	-6.9
Yomba	12.8	-10.6
Goshute	11.4	-8.9
Moapa	60.0	-8.5
Las Vegas	16.7	-16.1
Ely	15.3	-11.9
Cedar City	64.9	-8.5
Kanosh	68.4	-12.5
Koosharem	16.7	-13.0
Indian Peaks	16.7	-14.3

T6018/10-2-81/a

Source: Table 5.1.3.3-1. and 5.1.3.3-2.

Table 5.1.3.3-11. Percentage change in school-age population (ages 6 to 17), by area of analysis, for the peak year and long term, for Alternative 1.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	9.3	-6.9
Yomba	12.8	-10.6
Goshute	11.4	-8.9
Moapa	67.0	-8.5
Las Vegas	16.7	-16.1
Ely	15.3	-11.9
Cedar City	70.3	-8.5
Kanosh	15.8	-12.5
Koosharem	16.7	-13.0
Indian Peaks	16.7	-14.3

T6019/10-2-81/a

Source: Table 5.1.3.3-1. and 5.1.3.3-3.

Table 5.1.3.3-12. Percentage change in school-age population (ages 6 to 17), by area of analysis, for the peak year and long term, for Alternative 2.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	9.1	-6.9
Yomba	12.8	-10.6
Goshute	11.4	-8.9
Moapa	11.0	-8.5
Las Vegas	16.7	-16.1
Ely	15.3	-11.9
Cedar City	148.6	-8.5
Kanosh	157.9	-12.5
Koosharem	16.7	-13.0
Indian Peaks	16.7	-14.3

T6020/10-2-81/a

Source: Table 5.1.3.3-1. and 5.1.3.3-4.

Table 5.1.3.3-13. Percentage change in school-age population (ages 6 to 17), by area of analysis, for the peak year and long term, for Alternative 3.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	9.3	-6.9
Yomba	12.8	-10.6
Goshute	11.4	-8.9
Moapa	11.0	-8.5
Las Vegas	16.7	-16.1
Ely	103.4	-11.9
Cedar City	81.1	-8.5
Kanosh	15.8	-12.5
Koosharem	16.7	-13.0
Indian Peaks	16.7	-14.3

T6021/10-2-81/a

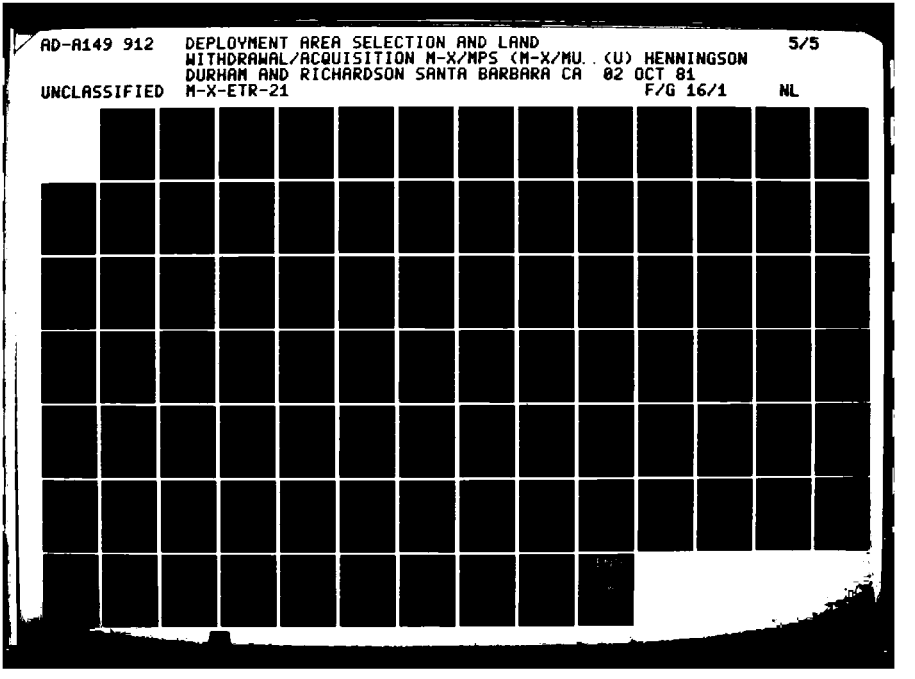
Source: Table 5.1.3.3-1. and 5.1.3.3-5.

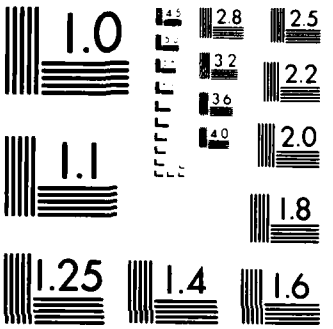
Table 5.1.3.3-14. Percentage change in school-age population (ages 6 to 17), by area of analysis, for the peak year and long term, for Alternative 4.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	9.3	-6.9
Yomba	12.8	-10.6
Goshute	11.4	-8.9
Moapa	67.0	-8.5
Las Vegas	16.7	-16.1
Ely	15.3	-11.9
Cedar City	70.3	-8.5
Kanosh	15.8	-1..5
Koosharem	16.7	-13.0
Indian Peaks	16.7	-14.3

T6022/10-2-81/a

Source: Table 5.1.3.3-1. and 5.1.3.3-6.


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Table 5.1.3.3-15. Percentage change in school-age population (ages 6 to 17), by area of analysis, for the peak year and long term, for Alternative 5.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	9.3	-6.9
Yomba	12.8	-10.6
Goshute	11.4	-8.9
Moapa	11.0	-8.5
Las Vegas	16.7	-16.1
Ely	120.3	-11.9
Cedar City	10.8	-8.5
Kanosh	100.0	-12.5
Koosharem	16.7	-13.0
Indian Peaks	16.7	-14.3

T6023/10-2-81/a

Source: Table 5.1.3.3-1. and 5.1.3.3-7.

Table 5.1.3.3-16. Percentage change in school-age population (ages 6 to 17), by area of analysis, for the peak year and long term, for Alternative 6.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	9.3	-6.9
Yomba	12.8	-10.6
Goshute	11.4	-8.9
Moapa	60.0	-8.5
Las Vegas	16.7	-16.1
Ely	15.3	-11.9
Cedar City	64.9	-8.5
Kanosh	68.4	-12.5
Koosharem	16.7	-13.0
Indian Peaks	16.7	-14.3

T6024/10-2-81/a

Source: Table 5.1.3.3-1. and 5.1.3.3-8.

Table 5.1.3.3-17. Percentage change in school-age population (ages 6 to 17), by area of analysis, for the peak year and long term, for Alternative 8.

Area of Analysis	Peak Year (1987)	Long Term (1992)
Duckwater	5.2	-3.8
Yomba	7.7	-6.4
Goshute	6.3	-5.0
Moapa	50.0	-4.7
Las Vegas	10.0	-9.7
Ely	6.8	-6.0
Cedar City	5.4	-4.3
Kanosh	5.3	-4.3
Koosharem	5.6	-8.7
Indian Peaks	16.7	-0-

T6025/10-2-81/a

Source: Table 5.1.3.3-1. and 5.1.3.3-9.

Table 5.1.3.3-18. Percentage change in school-age population, for the peak year, by area of analysis and alternative.

Area of Analysis	Alternative									
	Proposed Action	1	2	3	4	5	6	7	8	No Action
Duckwater	9.3	9.3	9.3	9.3	9.3	9.3	9.3	0	5.2	0
Yomba	12.8	12.8	12.8	12.8	12.8	12.8	12.8	0	7.7	0
Goshute	11.4	11.4	11.4	11.4	11.4	11.4	11.4	0	6.3	0
Moapa	60.0	6.7	77.0	11.0	67.0	11.0	59.0	0	50.0	0
Las Vegas	16.7	16.7	16.7	16.7	16.7	16.7	16.7	0	10.0	0
Ely	15.3	15.3	15.3	103.4	15.3	120.3	15.3	0	6.8	0
Cedar City	64.9	70.3	10.8	81.1	70.3	10.8	64.9	0	5.4	0
Kanosh	68.4	15.8	157.9	15.8	15.8	100.0	68.4	0	5.3	0
Koosharem	16.7	16.7	16.7	16.7	16.7	16.7	16.7	0	5.6	0
Indian Peaks	16.7	16.7	16.7	16.7	16.7	16.7	16.7	0	16.7	0

T6026/10-2-81/b

Source: Tables 5.1.3.3-1. to 5.1.3.3-17.

Table 5.1.3.3-19. Percentage decrease in school-age population, for the long term, by area of analysis and alternative.

Area of Analysis	Alternative									
	Proposed Action	1	2	3	4	5	6	7	8	No Action
Duckwater	-6.9	-6.9	-6.9	-6.9	-6.9	-6.9	-6.9	0	-3.8	0
Yomba	-10.6	-10.6	-10.6	-10.6	-10.6	-10.6	-10.6	0	-6.4	0
Goshute	-8.9	-8.9	-8.9	-8.9	-8.9	-8.9	-8.9	0	-5.0	0
Moapa	-8.5	-8.5	-8.5	-8.5	-8.5	-8.5	-8.5	0	-4.7	0
Las Vegas	-16.1	-16.1	-16.1	-16.1	-16.1	-16.1	-16.1	0	-9.7	0
Ely	-11.9	-11.9	-11.9	-11.9	-11.9	-11.9	-11.9	0	-6.0	0
Cedar City	-8.5	-8.5	-8.5	-8.5	-8.5	-8.5	-8.5	0	-4.3	0
Kanosh	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5	0	-8.3	0
Koosharem	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	0	-8.7	0
Indian Peaks	-14.3	-14.3	-14.3	-14.3	-14.3	-14.3	-14.3	0	0	0

T6027/10-2-81/b

Source: Tables 5.1.3.3-10 to 5.1.3.3-17.

Health (5.1.3.3.2)

Health facilities for on-reservation Native Americans are provided by Public Health Service employees. The permanent facilities are located outside the ROI and serve an area larger than the DDA. There is a mobile health clinic which services the area. Since most of the in-migrating Native Americans are assumed to be enrolled members of the tribes in the ROI (who are likely to be resident, near the ROI), it is not likely that the total number of Native Americans served by the Public Health Service will change as a result of the M-X deployment.

Housing (5.1.3.3.3)

The demand for new housing is a function of both replacement housing and net additions to the housing stock caused by population growth. It is assumed that each family unit in-migrating to a reservation will require a housing unit. These units may in fact be part of multiple housing units (duplex, triplex, or apartments). It is probable and has been assumed that some of this housing demand will be satisfied with mobile housing brought in by construction workers during the peak year period. These units will then tend to be removed in the long-term. To the extent that some units remain, they may be used to upgrade the existing substandard stock of housing.

Tables 5.1.3.3-20 through 5.1.3.3-29 present the changes in housing demand resulting from the M-X proposal by alternatives. In calculating changes in housing demand, it is assumed that the average number of persons per household of in-migrating households is three. This is a smaller number than the existing average of 4.7 (Table 5.1.3.1-5), but is consistent with the probability that in-migrating workers will not exhibit the same extended family patterns as the resident population.

Public Services (5.1.3.3.4)

Police protection for on-reservation Native Americans is provided by BIA and the tribes. Fire protection is provided by a system of volunteers. For Native Americans living in colonies in urban areas, police and fire protection is provided by the urban government to the same extent it exists for non-Native Americans.

Utilities, such as water and sewer services are provided by the Public Health Service for on-reservation Native Americans. Because of the relatively small population changes expected (absolute numbers), it is assumed that capacity exists to absorb the additional demands.

Similar assumptions are made for the colonies who are served by the local governments in the urban areas where they reside.

Transportation (5.1.3.3.5)

Access to several rural reservations is currently limited due to road conditions. Some areas, such as Yomba, are inaccessable during winter months. Although during the construction phase of the proposed project temporary impediments to road transportation are anticipated, the overall accessability of rural reservations is expected to increase as a result of project activity. Impacts to areas of analysis are considered on an individual basis. They would primarily result from

Table 5.1.3.3-20. Changes in housing demand, by area of analysis, Peak Year and Long-Term, proposed action.

AREA OF ANALYSIS	PEAK YEAR (1987)	LONG-TERM (1992)
Duckwater	11	-11
Yomba	6	-6
Goshute	11	-11
Moapa	70	-13
Las Vegas	6	-6
Ely	10	-10
Cedar City	28	-5
Kanosh	15	-3
Koosharem	3	-3
Indian Peaks	1	-1

Source: Table 5.1.3.1-11and assumed 3 persons per household.

Table 5.1.3.3-21. Changes in housing demand, by area of analysis, Peak Year and Long-Term, Alternative 1.

AREA OF ANALYSIS	PEAK YEAR (1987)	LONG-TERM (1992)
Duckwater	11	-11
Yomba	6	-6
Goshute	11	-11
Moapa	79	-13
Las Vegas	6	-6
Ely	10	-10
Cedar City	31	-5
Kanosh	3	-3
Koosharem	3	-3
Indian Peaks	1	-1

Source: Table 5.1.3.1-11and assumed 3 persons per household.

Table 5.1.3.3-22. Changes in housing demand, by area of analysis, Peak Year and Long-Term, Alternative 2.

AREA OF ANALYSIS	PEAK YEAR (1987)	LONG-TERM (1992)
Duckwater	11	-11
Yomba	6	-6
Yoshute	11	-11
Moapa	90	-13
Las Vegas	6	-6
Ely	10	-10
Cedar City	5	-5
Kanosh	18	-3
Koosharem	3	-3
Indian Peaks	1	-1

Source: Table 5.1.3.1-11and assumed 3 persons per household.

Table 5.1.3.3-23. Changes in housing demand, by area of analysis, Peak Year and Long-Term, Alternative 3.

AREA OF ANALYSIS	PEAK YEAR (1987)	LONG-TERM (1992)
Duckwater	11	-11
Yomba	6	-6
Goshute	11	-11
Moapa	13	-13
Las Vegas	6	-6
Ely	72	-10
Cedar City	35	-5
Kanosh	3	-3
Koosharem	3	-3
Indian Peaks	1	-1

Source: Table 5.1.3.1-11 and assumed 3 persons per household.

Table 5.1.3.3-24. Changes in housing demand, by area of analysis, Peak-Year and Long-Term, Alternative 4.

AREA OF ANALYSIS	PEAK YEAR (1987)	LONG-TERM (1992)
Duckwater	11	-11
Yomba	6	-6
Goshute	11	-11
Moapa	79	-13
Las Vegas	6	-6
Ely	10	-10
Cedar City	31	-5
Kanosh	3	-3
Koosharem	3	-3
Indian Peaks	1	-1

Source: Table 5.1.3.1-11 and assumed 3 persons per household.

Table 5.1.3.3-25. Changes in housing demand, by area of analysis, Peak Year and Long-Term, Alternative 5.

AREA OF ANALYSIS	PEAK YEAR (1987)	LONG-TERM (1992)
Duckwater	11	-11
Yomba	6	-6
Goshute	11	-11
Moapa	13	-13
Las Vegas	6	-6
Ely	83	-10
Cedar City	5	-5
Kanosh	22	-3
Koosharem	3	-3
Indian Peaks	1	-1

Source: Table 5.1.3.1-11 and assumed 3 persons per household.

Table 5.1.3.3-26. Changes in housing demand, by area of analysis, Peak Year and Long-Term, Alternative 6.

AREA OF ANALYSIS	PEAK YEAR (1987)	LONG-TERM (1992)
Duckwater	11	-11
Yomba	6	-6
Goshute	11	-11
Moapa	70	-13
Las Vegas	6	-6
Ely	10	-10
Cedar City	28	-5
Kanosh	15	-3
Koosharem	3	-3
Indian Peaks	1	-1

Source: Table 5.1.3.1-11 and assumed 3 persons per household.

Table 5.1.3.3-27. Changes in housing demand, by area of analysis, Peak Year and Long-Term, Alternative 8.

AREA OF ANALYSIS	PEAK YEAR (1987)	LONG-TERM (1992)
Duckwater	6	-6
Yomba	3	-3
Goshute	6	-6
Moapa	59	-7
Las Vegas	3	-3
Ely	5	-5
Cedar City	3	-3
Kanosh	2	-2
Koosharem	2	-2
Indian Peaks	0	0

Source: Table 5.1.3.1-11 and assumed 3 persons per household.

Table 5.1.3.3-28. Changes in housing demand, by area of analysis, by alternative, Peak Year (1987).

AREA OF ANALYSIS	ALTERNATIVE PA	1	2	3	4	5	6	7	8	NO ACTION
Duckwater	11	11	11	11	11	11	11	-0-	6	-0-
Yomba	6	6	6	6	6	6	6	-0-	3	-0-
Goshute	11	11	11	11	11	11	11	-0-	6	-0-
Moapa	70	79	13	13	79	13	70	-0-	59	-0-
Las Vegas	6	6	6	6	6	6	6	-0-	3	-0-
Ely	10	10	10	72	10	83	10	-0-	5	-0-
Cedar City	28	31	65	35	31	5	28	-0-	3	-0-
Kanosh	15	3	18	3	3	22	15	-0-	2	-0-
Koosharem	3	3	3	3	3	3	3	-0-	2	-0-
Indian Peaks	1	1	1	1	1	1	1	-0-	-0-	-0-

Source: Tables 5.1.3.3-20 to Table 5.1.3.3-27.

Table 5.1.3.3-29. Changes in housing demand, by area of analysis, by alternative, Long-Term (1992).

AREA OF ANALYSIS	ALTERNATIVE									
	PA	1	2	3	4	5	6	7	8	NO ACTION
Duckwater	11	11	11	11	11	11	11	-0-	6	-0-
Yomba	6	6	6	6	6	6	6	-0-	3	-0-
Goshute	11	11	11	11	11	11	11	-0-	6	-0-
Moapa	13	13	13	13	13	13	13	-0-	7	-0-
Las Vegas	6	6	6	6	6	6	6	-0-	3	-0-
Ely	10	10	10	10	10	10	10	-0-	5	-0-
Cedar City	5	5	5	5	5	5	5	-0-	3	-0-
Kanosh	3	3	3	3	3	3	3	-0-	2	-0-
Koosharem	3	3	3	3	3	3	3	-0-	2	-0-
Indian Peaks	1	1	1	1	1	1	1	-0-	-0-	-0-

Sources: Tables 5.1.3.3-20 to 5.1.3.3-27.

increased trespassing and recreationist use of tribal lands made possible by construction roads and the DTN. Qualitative impacts of the ten designated areas of analysis are evaluated individually.

Communications (5.1.3.3.6)

Qualitative judgments were made regarding potential impacts to formal communications networks in the study region. It was assumed that both the variety and availability of printed and electronic media would increase in response to the market growth resulting from M-X activities.

Tribal Jurisdiction (5.1.3.3.7)

Potential impacts to tribal jurisdiction were assessed on the basis of the proximity of the Native American AOAs to M-X construction activity.

Potential impacts to tribal jurisdiction were assessed on the basis of the proximity of the Native American AOAs to M-X construction activity. Qualitative measures were employed to project these impacts to tribal legal systems resulting from increased populations, both Native American and non-Indian, in the vicinities of reservations and colonies.

5.2 IMPACT SIGNIFICANCE LEVELS

This section summarizes in tabular form the results of analyses of resources signficantly impacted by the Proposed Action and project alternatives. Criteria utilized in the assignment of impact significance levels for cultural and socio-economic resources in DDA and other affected hydrologic subunits are discussed.

CULTURAL RESOURCES (5.2.1)

Tables 5.2.1-1 through 5.2.1-7 summarize projected impacts to Native American cultural resources.

Potential short- and long-term effects for the Proposed Action and Alternatives 1 through 6 appear in Table 5.2.1-1. Short-term direct impacts are the predicted number of sites which would be directly affected by ground disturbance due to construction activities (i.e., those sites with locations coinciding with shelter and cluster road locations). The short-term potential impact was ranked high if over eight sites would be directly impacted, moderate if over two but less than eight sites would be directly impacted, and low if two or less sites would be directly impacted. Hydrologic subunits with high site density, and a high number of shelters and extensive roadways would rank high in direct impact potential, compared to hydrologic subunits with high density of sites and little or no construction area.

Long-term effects are, for the majority of valleys, predicted to be more intense than short-term effects, due to the nonrenewable nature of the resource. The long-term indirect impact potential is rated high if construction in or near the subunit will provide high public accessibility. Indirect impact estimates of public accessibility are based on proximity to construction roads and shelters, proximity to population loci, and the desirability of the location for recreation purposes. Indirect impacts are associated with recreation (particularly ORV use), vandalism, and illegal

Table 5.2.1-1. Potential impacts to significant Native American cultural sites in the vicinity of Coyote Spring for the Proposed Action and for Alternatives 1-6.

Hydrologic Subunit No.	Name	Estimated No. of Native American Cultural Sites[1]	Presently Known No. of Sites	Short Term: Predicted No. of Direct Impacts[2]	Short Term: Known No. of Sites Within 1 Mi	Short Term: Direct Impact Potential	Long Term: Indirect Impact Potential[4]
4	Snake, Nev./Utah	1,481	38	19	10	*****	*****
5	Pine, Utah	530	18	9	5	*****	*****
6	White, Utah	482	24	9	11	*****	*****
7	Fish Springs, Utah	166	5	3	1	***	*
8	Dugway, Utah	157	0	3	0	***	*
9	Government Creek, Utah	439	4	2	1	***	*
46	Sevier Desert, Utah	2,054	21	16	2	*****	*****
46A	Sevier Desert-Dry Lake, Utah	436	2	9	0	*****	***
54	Wah Wah, Utah	365	0	10	0	*****	***
137A	Big Smoky-Tonopah Flat, Nev.	874	3	7	0	***	***
139	Kobeh, Nev.	715	1	10	0	*****	***
140A	Monitor-North, Nev.	415	5	10	1	*****	*****
140B	Monitor-South, Nev.	471	5	2	1	***	*****
141	Ralston, Nev.	548	4	8	2	*****	***
142	Alkali Spring, Nev.	146	3	6	0	***	*
148	Cactus Flat, Nev.	255	3	1	0	*	*
149	Stone Cabin, Nev.	562	14	8	3	*****	*****
151	Antelope, Nev.	394	2	10	2	*****	***
154	Newark, Nev.	617	7	7	1	***	***
155A	Little Smoky-North, Nev.	427	4	8	3	*****	***
155C	Little Smoky-South, Nev.	304	3	7	1	***	*****
156	Hot Creek, Nev.	758	29	11	6	*****	*****
170	Penoyer, Nev.	323	1	6	0	***	*
171	Coal, Nev.	296	4	8	2	*****	*****
172	Garden, Nev.	351	6	9	5	*****	***
173A	Railroad-South, Nev.	339	1	8	1	*****	*****
173B	Railroad-North, Nev.	1,487	54	17	13	*****	*****
174	Jakes, Nev.	246	5	5	1	***	***
175	Long, Nev.	450	6	5	2	***	*
178B	Butte-South, Nev.	337	4	7	4	***	*
179	Steptoe, Nev.	1,659	40	13	1	***	*****
180	Cave, Nev.	248	10	4	2	***	*****
181	Dry Lake, Nev.	615	23	15	13	*****[3]	***
182	Delamar, Nev.	247	10	4	4	*****[3]	*****
183	Lake, Nev.	281	19	7	12	*****[3]	*****
184	Spring, Nev.	910	73	1	3	***[3]	*****
196	Hamlin, Nev./Utah	338	3	11	0	*****	***
202	Patterson, Nev.	198	2	1	0	***	*****
207	White River, Nev.	1,143	2	13	0	*****	*****
208	Pahroc, Nev.	295	7	2	0	*	*****
209	Pahranagat, Nev.	400	35	0	0	-	*****

T5289/9-28-81/F

[1]Estimated number of identifiable Native American cultural significant sites is based on: (1) sensitivity as predicted by preliminary archaeological field studies, (2) expected density figures for playas, mountain springs, valley springs, and streams, (3) area of hydrologic subunit, and (4) extrapolation of 6 percent of these sites as Native American cultural significant sites. Please note, 6 percent is the percentage of predicted archaeological sites which could be identified as significant Native American cultural sites based on t ≥ 100 sq. mi. sample survey[5]. For archaeological predictions and more detailed explanation please see section on archaeology.

Direct Impact Assessment:
- \- = no impact (no construction in this hydrologic subunit)
- * = 0-2 sites
- *** = 2.1-8 sites
- ***** = 8+ sites

Indirect Impact Assessment:
- * = Less than 10 percent of predicted sites impacted
- *** = Over 10 percent of predicted sites impacted
- ***** = Over 50 percent of predicted sites impacted or identified significant Native American cultural site[5] located in hydrologic subunit.

[2]Predicted number of sites occurring on project layout, and directly affected by construction.

[3]Impact rating was raised based on known data being higher than predicted data.

[4]Indirect impact based on predicted number of off road vehicle (ORV) use days per hydrologic subunit, taking into account the degree of public accessibility based on relative proximity to ASCs, OBs, DTN and cluster roads, number of predicted total sites per hydrologic subunit, and known sacred/ancestral valuable sites.

[5]Significant Native American cultural sites are those sites which contain pottery artifacts specifically associated with traditional Shoshone and/or Paiute cultures. For further discussion of impact methodology and "significant Native American cultural sites" please refer to concluding paragraph of section 5.2.1 in ETR-21.

Table 5.2.1-2. Potential impacts to significant Native American cultural sites in the vicinity of Coyote Spring for the Proposed Action and for Alternatives 1, 2, 4, and 6.

Hydrologic Subunit		Estimated No. of Native American Cultural Sites[1]	Presently Known No. of Sites	Short Term			Long Term
No.	Name			Predicted No. of Direct Impacts[2]	Known No. of Sites Within 1 Mi	Direct Impact Potential	Indirect Impact Potential[3]
181	Dry Lake, Nev.	615	23	15	13	*****	***
182	Delamar, Nev.	247	10	4	4	*****	*****
205	Meadow Wash, Nev.	N/D	13	0	0	-	*****
206	Kane Springs, Nev.	N/D	2	0	0	-	*****
209	Pahranagat, Nev.	400	35	2	0	*	*****
210	Coyote Spring, Nev.	359	3	6	0	*****	*****
218	California Wash, Nev.	N/D	1	0	0	-	*****
219	Muddy River Springs, Nev.	N/D	2	N/D	0	*	*****

T5288/9-23-81/F

[1]Estimated number of identifiable Native American cultural significant sites is based on: (1) sensitivity as predicted by preliminary archaeological field studies, (2) expected density figures for playas, mountain springs, valley springs, and streams, (3) area of hydrologic subunit, and (4) extrapolation of 6 percent of these sites as Native American cultural significant sites. Please note, 6 percent is the percentage of predicted archaeological sites which could be identified as significant Native American cultural sites based on the 100 sq. mi. sample survey[4]. For archaeological predictions and more detailed explanation please see section on archaeology.

Direct Impact Assessment:
- \- = no impact (no construction in this hydrologic subunit)
- * = 0-2 sites
- *** = 2.1-8 sites
- ***** = 8+ sites

Indirect Impact Assessment:
- * = Less than 10 percent of predicted sites impacted
- *** = Over 10 percent of predicted sites impacted
- ***** = Over 50 percent of predicted sites impacted or identified significant Native American cultural site[4] located in hydrologic subunit.

[2]Predicted number of sites occurring on project layout, and directly affected by construction.

[3]Indirect impact based on predicted number of off road vehicle (ORV) use days per hydrologic subunit, taking into account the degree of public accessibility based on relative proximity to ASCs, OBs, DTN and cluster roads, number of predicted total sites per hydrologic subunit, and known sacred/ancestral valuable sites.

[4]Significant Native American cultural sites are those sites which contain pottery artifacts specifically associated with traditional Shoshone and/or Paiute cultures. For further discussion of impact methodolgy and "significant Native American cultural sites" please refer to concluding paragraph of section 5.2.1 in ETR-21.

Table 5.2.1-3. Potential impacts to significant Native American cultural sites in the vicinity of Milford for the Proposed Action and for Alternatives 5 and 6.

Hydrologic Subunit No.	Name	Estimated No. of Native American Cultural Sites[1]	Presently Known No. of Sites	Short Term: Predicted No. of Direct Impacts[2]	Short Term: Known No. of Sites Within 1 Mi	Short Term: Direct Impact Potential	Long Term: Indirect Impact Potential[3]
4	Snake, Nev./Utah	1,481	38	19	10	*****	*****
5	Pine, Utah	530	18	9	5	*****	*****
6	White, Utah	482	24	9	11	*****	*****
46	Sevier Desert, Utah	2,054	21	16	2	*****	*****
46A	Sevier Desert-Dry Lake, Utah	436	2	9	0	*****	***
50	Milford, Utah	647	0	6	0	*****	*****
52	Lund District, Utah	558	0	9	0	*****	*****
53	Beryl-Enterprise District, Utah	1,372	2	10	0	*****	*****
54	Wah Wah, Utah	365	0	10	0	*****	***

T5287/9-23-81/F

[1]Estimated number of identifiable Native American cultural significant sites is based on: (1) sensitivity as predicted by preliminary archaeological field studies, (2) expected density figures for playas, mountain springs, valley springs, and streams, (3) area of hydrologic subunit, and (4) extrapolation of 6 percent of these sites as Native American cultural significant sites. Please note, 6 percent is the percentage of predicted archaeological sites which could be identified as significant Native American cultural sites based on the 100 sq. mi. sample survey[4]. For archaeological predictions and more detailed explanation please see section on archaeology.

Direct Impact Assessment:
- * = 0-2 sites
- *** = 2.1-8 sites
- ***** = 8+ sites

Indirect Impact Assessment:
- * = Less than 10 percent of predicted sites impacted
- *** = Over 10 percent of predicted sites impacted
- ***** = Over 50 percent of predicted sites impacted or identified significant Native American cultural site[4] located in hydrologic subunit.

[2]Predicted number of sites occurring on project layout, and directly affected by construction.

[3]Indirect impact based on predicted number of off road vehicle (ORV) use days per hydrologic subunit, taking into account the degree of public accessibility based on relative proximity to ASCs, OBs, DTN and cluster roads, number of predicted total sites per hydrologic subunit, and known sacred/ancestral valuable sites.

[4]Significant Native American cultural sites are those sites which contain pottery artifacts specifically associated with traditional Shoshone and/or Paiute cultures. For further discussion of impact methodology and "significant Native American cultural sites" please refer to concluding paragraph of Section 5.2.1 in ETR-21.

Table 5.2.1-4. Potential impacts to significant Native American cultural sites in the vicinity of Beryl for Alternatives 1, 3, and 4.

Hydrologic Subunit No.	Name	Estimated No. of Native American Cultural Sites[1]	Presently Known No. of Sites	Short Term: Predicted No. of Direct Impacts[2]	Short Term: Known No. of Sites Within 1 Mi	Short Term: Direct Impact Potential	Long Term: Indirect Impact Potential[3]
5	Pine, Utah	530	18	9	5	*****	*****
50	Milford, Utah	647	0	6	0	***	***
52	Lund District, Utah	558	0	9	0	*****	*****
53	Beryl-Enterprise District, Utah	1,372	2	10	0	*****	*****
54	Wah Wah, Utah	365	0	10	0	*****	***
198	Dry, Nev.	N/D	6	0	0	-	***
199	Rose, Nev.	N/D	4	0	0	-	***
200	Eagle, Nev.	N/D	5	0	0	-	*****
201	Spring, Nev.	N/D	9	0	0	-	*****
203	Panaca, Nev.	N/D	6	0	0	-	*****
204	Clover, Nev.	N/D	13	0	0	-	*****

T5285/9-23-81/F

[1]Estimated number of identifiable Native American cultural significant sites is based on: (1) sensitivity as predicted by preliminary archaeological field studies, (2) expected density figures for playas, mountain springs, valley springs, and streams, (3) area of hydrologic subunit, and (4) extrapolation of 6 percent of these sites as Native American cultural significant sites. Please note, 6 percent is the percentage of predicted archaeological sites which could be identified as significant Native American cultural sites based on the 100 sq. mi. sample survey[4]. For archaeological predictions and more detailed explanation please see section on archaeology.

Direct Impact Assessment:
- \- = No impact (no construction in this hydrologic subunit)
- * = 0-2 sites
- *** = 2.1-8 sites
- ***** = 8+ sites

Indirect Impact Assessment:
- * = Less than 10 percent of predicted sites impacted
- *** = Over 10 percent of predicted sites impacted
- ***** = Over 50 percent of predicted sites impacted or identified significant Native American cultural site[4] located in hydrologic subunit.

[2]Predicted number of sites occurring on project layout, and directly affected by construction.

[3]Indirect impact based on predicted number of off road vehicle (ORV) use days per hydrologic subunit, taking into account the degree of public accessibility based on relative proximity to ASCs, OBs, DTN and cluster roads, number of predicted total sites per hydrologic subunit, and known sacred/ancestral valuable sites.

[4]Significant Native American cultural sites are those sites which contain pottery artifacts specifically associated with traditional Shoshone and/or Paiute cultures. For further discussion of impact methodology and "significant Native American cultural sites" please refer to concluding paragraph of section 5.2.1 in ETR-21.

N/D - No data.

Table 5.2.1-5. Potential impacts to significant Native American cultural sites in the vicinity of Delta for Alternative 2.

Hydrologic Subunit		Estimated No. of Native American Cultural Sites[1]	Presently Known No. of Sites	Short Term			Long Term
No.	Name			Predicted No. of Direct Impacts[2]	Known No. of Sites Within 1 Mi	Direct Impact Potential	Indirect Impact Potential[3]
6	White, Utah	482	24	9	11	*****	*****
7	Fish Springs, Utah	166	5	3	1	***	*
8	Dugway, Utah	157	0	3	0	***	*
9	Government Creek, Utah	439	4	2	1	***	*
46	Sevier Desert, Utah	2,054	21	27	2	*****	*****
46A	Sevier Desert-Dry Lake, Utah	436	2	9	0	*****	***
54	Wah Wah, Utah	365	0	10	0	*****	***

T5286/9-23-81/F

[1]Estimated number of identifiable Native American cultural significant sites is based on: (1) sensitivity as predicted by preliminary archaeological field studies, (2) expected density figures for playas, mountain springs, valley springs, and streams, (3) area of hydrologic subunit, and (4) extrapolation of 6 percent of these sites as Native American cultural significant sites. Please note, 6 percent is the percentage of predicted archaeological sites which could be identified as significant Native American cultural sites based on the 100 sq. mi. sample survey[4]. For archaeological predictions and more detailed explanation please see section on archaeology.

Direct Impact Assessment:
* = 0-2 sites
*** = 2.1-8 sites
***** = 8+ sites

Indirect Impact Assessment:
* = Less than 10 percent of predicted sites impacted
*** = Over 10 percent of predicted sites impacted
***** = Over 50 percent of predicted sites impacted or identified significant Native American cultural site[4] located in hydrologic subunit.

[2]Predicted number of sites occurring on project layout, and directly affected by construction.

[3]Indirect impact based on predicted number of off road vehicle (ORV) use days per hydrologic subunit, taking into account the degree of public accessibility based on relative proximity to ASCs, OBs, DTN and cluster roads, number of predicted total sites per hydrologic subunit, and known sacred/ancestral valuable sites.

[4]Significant Native American cultural sites are those sites which contain pottery artifacts specifically associated with traditional Shoshone and/or Paiute cultures. For further discussion of impact methodology and "significant Native American cultural sites" please refer to concluding paragraph of section 5.2.1 in ETR-21..

Table 5.2.1-6. Potential impacts to significant Native American cultural sites in the vicinity of Fly for Alternatives 3 and 5.

Hydrologic Subunit No.	Hydrologic Subunit Name	Estimated No. of Native American Cultural Sites[1]	Presently Known No. of Sites	Short Term: Predicted No. of Direct Impacts[2]	Short Term: Known No. of Sites Within 1 Mi	Short Term: Direct Impact Potential	Long Term: Indirect Impact Potential[3]
4	Snake, Nev./Utah	1,481	38	19	10	*****	*****
174	Jakes, Nev.	248	5	5	1	***	***
178B	Butte-South, Nev.	337	4	7	4	***	*
179	Steptoe, Nev.	1,659	41	13	1	*****	*****
180	Cave, Nev.	248	10	4	2	***	*****
184	Spring, Nev.	910	73	1	3	***	*****
207	White River, Nev.	1,143	2	13	0	*****	*****

T5284/9-22-81/F

[1]Estimated number of identifiable Native American cultural significant sites is based on: (1) sensitivity as predicted by preliminary archaeological field studies, (2) expected density figures for playas, mountain springs, valley springs, and streams, (3) area of hydrologic subunit, and (4) extrapolation of 6 percent of these sites as Native American cultural significant sites. Please note, 6 percent is the percentage of predicted archaeological sites which could be identified as significant Native American cultural sites based on the 100 sq. mi. sample survey[4]. For archaeological predictions and more detailed explanation please see section on archaeology.

Direct Impact Assessment:
- * = 0-2 sites
- *** = 2.1-8 sites
- ***** = 8+ sites

Indirect Impact Assessment:
- * = Less than 10 percent of predicted sites impacted
- *** = Over 10 percent of predicted sites impacted
- ***** = Over 50 percent of predicted sites impacted or identified significant Native American cultural site[4] located in hydrologic subunit.

[2]Predicted number of sites occurring on project layout, and directly affected by construction.

[3]Indirect impact based on predicted number of off road vehicle (ORV) use days per hydrologic subunit, taking into account the degree of public accessibility based on relative proximity to ASCs, OBs, DTN and cluster roads, number of predicted total sites per hydrologic subunit, and known sacred/ancestral valuable sites.

[4]Significant Native American cultural sites are those sites which contain pottery artifacts specifically associated with traditional Shoshone and/or Paiute cultures. For further discussion of impact methodology and "significant Native American cultural sites" please refer to concluding paragraph of section 5.2.1 in ETR-21.

Table 5.2.1-7. Potential impacts to significant Native American cultural sites in Nevada/Utah split basing DDA, Alternative 8.

No.	Hydrologic Subunit Name	Estimated No. of Native American Cultural Sites[1]	Presently Known No. of Sites	Short Term: Predicted No. of Direct Impacts[2]	Short Term: Known No. of Sites Within 1 Mi	Short Term: Direct Impact Potential	Long Term: Indirect Impact Potential[4]
	Subunits or Counties with M-X Clusters and DTN						
4	Snake, Nev./Utah	1,481	38	19	10	*****	*****
5	Pine, Utah	530	18	9	5	*****	*****
6	White, Utah	482	24	9	11	*****	*****
7	Fish Springs, Utah	166	5	3	1	***	*
46	Sevier Desert, Utah	2,054	21	16	2	*****	*****
46A	Sevier Desert-Dry Lake, Utah	436	2	9	0	*****	***
54	Wah Wah, Utah	365	0	10	0	*****	***
155C	Little Smoky-South, Nev.	304	3	7	1	***	*****
156	Hot Creek, Nev.	758	29	11	6	*****	*****
170	Penoyer, Nev.	323	1	6	0	***	*
171	Coal, Nev.	296	4	8	2	*****	*****
172	Garden, Nev.	351	6	9	5	*****	***
173	Railroad-North and South, Nev.	1,826	55	25	14	*****	*****
180	Cave, Nev.	248	10	4	2	***	*****
181	Dry Lake, Nev.	615	23	15	13	*****	***
182	Delamar, Nev.	247	10	4	4	***	*****
183	Lake, Nev.	281	19	7	12	*****[3]	*****
184	Spring, Nev.	910	73	1	3	***[3]	*****
196	Hamlin, Nev./Utah	338	3	11	0	*****	***
202	Patterson, Nev.	198	2	1	0	*	*****
207	White River, Nev.	1,143	2	13	0	*****	*****

T5283/9-23-81/F

[1]Estimated number of identifiable Native American cultural significant sites is based on: (1) sensitivity as predicted by preliminary archaeological field studies, (2) expected density figures for playas, mountain springs, valley springs, and streams, (3) area of hydrologic subunit, and (4) extrapolation of 6 percent of these sites as Native American cultural significant sites. Please note, 6 percent is the percentage of predicted archaeological sites which could be identified as significant Native American cultural sites based on the 100 sq. mi. sample survey[5]. For archaeological predictions and more detailed explanation please see section on archaeology.

Direct Impact Assessment:
* = 0-2 sites
*** = 2.1-8 sites
***** = 8+ sites

Indirect Impact Assessment:
* = Less than 10 percent of predicted sites impacted
*** = Over 10 percent of predicted sites impacted
***** = Over 50 percent of predicted sites impacted or identified significant Native American cultural site[5] located in hydrologic subunit.

[2]Predicted number of sites occurring on project layout, and directly affected by construction.

[3]Impact rating was raised based on known data being higher than predicted data.

[4]Indirect impact based on predicted number of off road vehicle (ORV) use days per hydrologic subunit, taking into account the degree of public accessibility based on relative proximity to ASCs, ORs, DTN and cluster roads, number of predicted total sites per hydrologic subunit, and known sacred/ancestral valuable sites.

[5]Significant Native American cultural sites are those sites which contain pottery artifacts specifically associated with traditional Shoshone and/or

excavation and collection. The indirect impact assessment was ranked low if less than 10 percent of the predicted sites would be impacted, moderate if between 10 and 50 percent would be impacted, and high if over 50 percent would be impacted or if identified as a sacred and ancestral site by a contemporary Native American during M-X 1980 field studies.

Potential impacts to significant Native American cultural sites in the vicinity of Coyote Spring, Milford, Beryl, Delta, and Ely OB sites appear in Tables 5.2.1-2, 5.2.1-3, 5.2.1-3, 5.2.1-4, 5.2.1-5, and 5.2.1-6, respectively. Short-term effects include a consideration of only direct impact potentials. Those subunits with no construction plans were rated N/A "no direct impacts" but could still be ranked hign for indirect impacts. Due to the paucity of sites precisely located in the archaeological record, estimates of direct impacts are based on the relative proximity of construction activities to areas predicted to be highly sensitive. The long-term rank is an estimate of the cumulative effects of construction plus the indirect effects projected during the operations phase and beyond. Key factors in the long-term disturbance are proximity to the OB and the degree of public accessibility provided by the DTN and cluster roads in each subunit, and predicted area sensitivity (or site density).

Potential impacts to significant Native American cultural sites associated with the split-basing Alternative 8 (with the primary OB at Coyote Spring) appear in Table 5.2.1-7. Short-term effects are the predicted number of sites which would be directly impacted by ground disturbance due to construction. Hydrologic units were ranked high if over eight sites would be directly impacted and low if less than two sites would be directly impacted. The long-term impact level is an estimate based on the cumulative effects of construction plus the indirect effects projected during the operations phase. Key factors in the long-term disturbance are proximity to the Coyote Spring OB and the degree of public accessibility provided by the DTN and cluster roads in each subunit.

The estimated number of identifiable significant Native American cultural sites in each hydrological subunit was used to predict short-term and long-term effects. The estimates were based on expected sensitivity of different areas. Sensitivity expectations vary according to number of playas, mountain springs, valley springs, streams, and senstivity trends indicated by preliminary archaeological field surveys, anthropological field studies, and records of historic occupation. In the 100 sq mi sample survey, six percent of all sites found contained Shoshone and/or Paiute pottery and are therefore considered potentially significant to contemporary Native Americans occupying the study area. Of the total number of predicted archaeological sites, only six percent could therefore reasonably be predicted as potentially significant to contemporary Native Americans occupying the study area, i.e., those sites which contain pottery artifacts specifically associated with traditional Shoshone and/or Paiute cultures. Henceforth, these sites are referred to as "Native American cultural sites", as opposed to sites of prehistoric significance. Of course, some hydrologic subunits would have a higher percentage and some a lower percentage of sites, but six percent is a reasonable working figure used for planning purposes. Rather than disregard or give a low impact rating to hydrologic units with a few or no known sites due to lack of field data, six percent was used to give a rough estimate which was extrapolated from field survey results. This is not to imply that any of the remaining 94 percent of archaeological sites are not of significance to Native Americans, rather to state

that only six percent can be positively identified with a contemporary Native American group. Some Native Americans have expressed the opinion that all Indian archaeological resources are culturally meaningful. It is important to emphasize that assigned impact levels are based on predictions, not on complete data, are preliminary in nature, and are subject to revision.

LAND AND WATER (5.2.2)

The level of potential M-X impacts on Native American water accessibility and agricultural land use was determined by the degree of Native American dependence on water resources and the M-X water requirements demand for that resource.

In Table 5.2.2-1, potential M-X impacts are shown for the Nevada/Utah Designated Deployment Area (DDA)--where construction of roads and protective structures would actually occur. In Table 5.2.2-2 potential impacts are shown for a possible Operating Base (OB) at Coyote Spring. M-X DDA water requirements (almost totally for construction) overlap the water resources of two Native American reservations in Nevada, the Duckwater Reservation and the Moapa Reservation. Water requirements for a possible OB at Coyote Spring overlap the water resources of the Moapa Reservation (see Section 3.2.3).

The degree of Native American dependence on these water resources was judged low if the water resources of a given hydrologic subunit made a minor contribution to their needs; moderate if these resources provided a major component of their needs; and high if these resources provided all of their needs.

Potential short-term impacts were judged moderate if the overlap of M-X effect on Native American water resources was restricted in time, and any effect on Native American water resources was dependent on the worst case of exceptionally dry years corresponding to the years of M-X groundwater pumping for construction purposes. Short-term impacts were judged high if any M-X groundwater pumping diminished the availability of groundwater for Native American use.

Potential long-term impacts were judged low if M-X groundwater pumping during the construction years would potentially affect the long-term yield and high if M-X requirements extended over time (OB requirements) and directly diminished the availability of groundwater for Native American use.

Native American reservation and grazing lands have been excluded from DDA and OB siting. Consequently no direct impacts to Native American lands are expected as a result of M-X activity.

SOCIOECONOMIC CHARACTERISTICS (5.2.3)

Population Growth and Decline (5.2.3.1)

Certain social scientists have maintained that most communities' infrastructures and institutions begin to falter beyond an annual growth rate of 15 percent, and that a 5 percent annual growth rate is all a community can comfortably absorb (see ETR-35). The more commonly accepted notion, however, is that there

Table 5.2.2-1. Potential impact to Native American water accessibility and land use in the Nevada/Utah DDA for the Proposed Action and Alternatives 1-6.

Hydrologic Subunit No.	Name	Native American Dependence on Water Resources[1]	Estimated Overall Short Term Impact	Estimated Overall Long Term Impact[1]
	Subunits with M-X Clusters and DTN			
4	Snake, Nev./Utah	-	-	-
5	Pine, Utah	-	-	-
6	White, Utah	-	-	-
7	Fish Springs, Utah	-	-	-
8	Dugway, Utah	-	-	-
9	Government Creek, Utah	-	-	-
46	Sevier Desert, Utah	-	-	-
46A	Sevier Desert-Dry Lake, Utah[2]	-	-	-
54	Wah Wah, Utah	-	-	-
137A	Big Smoky-Tonopah Flat, Nev.	-	-	-
139	Kobeh, Nev.	-	-	-
140A	Monitor-North, Nev.	-	-	-
140B	Monitor-South, Nev.	-	-	-
141	Ralston, Nev.	-	-	-
142	Alkali Spring, Nev.	-	-	-
148	Cactus Flat, Nev.	-	-	-
149	Stone Cabin, Nev.	-	-	-
151	Antelope, Nev.[2]	-	-	-
154	Newark, Nev.[2]	-	-	-
155A	Little Smoky-North, Nev.	***	***	*
155C	Little Smoky-South, Nev.	***	***	*
156	Hot Creek, Nev.	-	-	-
170	Penoyer, Nev.	-	-	-
171	Coal, Nev.	***	***	-
172	Garden, Nev.	***	***	-
173A	Railroad-South, Nev.	*	-	*
173B	Railroad-North, Nev.	***	***	*
174	Jakes, Nev.[2]	***	***	-
175	Long, Nev.	***	***	-
178B	Butte-South, Nev.	-	-	-
179	Steptoe, Nev.	-	-	-
180	Cave, Nev.	***	***	-
181	Dry Lake, Nev.[1]	***	***	-
182	Delamar, Nev.	***	***	-
183	Lake, Nev.	***	***	-
184	Spring, Nev.	-	-	-
196	Hamlin, Nev./Utah	-	-	-
202	Patterson, Nev.	-	-	-
207	White River, Nev.	***	***	-
208	Pahroc, Nev.	***	***	-
209	Pahranagat, Nev.	***	***	-
210	Coyote Spring, Nev.[3]	*****	***	-
219	Muddy River Springs, Nev.[3]	*****	***	-
	Overall DDA Impact	***	***	-

T3837/8-5-81

[1]Degree of Native American dependence on the water resource. Also, the level of potential impact on present or future Native American productivity.

- = None
* = Low
*** = Moderate
***** = High

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

[3]Hydrologic subunit associated with OB.

Table 5.2.2-2. Potential impact to Native American water accessibility and land use in the Coyote Spring operating base suitability zone for the Proposed Action and Alternatives 1, 2, 4, 6, and 8.

Hydrologic Subunit No.	Name	Native American Dependence on Water Resources[1]	Estimated Overall Short Term Impact	Estimated Overall Long Term Impact[1]
	Subunits within the OB Suitability Zone			
210	Coyote Spring, Nev.	*****	*****	*****
219	Muddy River Springs, Nev.	*****	*****	*****
	Other Affected Subunits			
171	Coal, Nev.	***	***	-
172	Garden, Nev.	***	***	-
174	Jakes, Nev.[2]	***	***	-
175	Long, Nev.	***	***	-
180	Cave, Nev.	***	***	-
181	Dry Lake, Nev.[2]	***	***	-
182	Delamar, Nev.	***	***	-
207	White River, Nev.	***	***	-
208	Pahroc, Nev.	***	***	-
209	Pahranagat, Nev.	***	***	-
	Overall OB (White River Drainage)		*****	*****

T3838/8-3-81

[1]Degree of Native American dependence on the water resource. Also, the level of potential impact on present or future Native American resource use.

- = None
* = Low
*** = Moderate
***** = High

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

are no state or local standards or normative criteria for deciding how much population growth any given community can cope with. There are no standards or criteria that could apply to the peculiar circumstance of Native America reservations, colonies or bands, either. However, since the overall population of the existing reservations, colonies and bands is expected to increase at about 8 percent annually throughout the period of project construction, it is arbitrarily assumed that a growth rate in excess of one and one-half times this, or 12 percent annually, is a significant growth rate.

Out-migration which begins to erode the preexisting indigenous Native American population base can be considered significant. Population decline that involves temporary migrants leaving the reservations, colonies or bands once construction activities in the ROI are completed would probably be welcomed. This out-migration of temporary, short-term residents should relieve pressure on the existing reservation, colony or band infrastructure, institutions and organizations. Thus, population decline that only represents out-migration of the short-term in-migrants is not considered significant.

Age Structure (5.2.3.2)

Any given age structure change would have both positive and negative consequences. Any age structure change that substantially increases the proportion of the population in the working-years age group, for example, can be considered to be significant since it has the potential of increasing the income of the community. Similarly, an age structure change that markedly reduces the median age of the population and contributes to the erosion of the authority of and respect accorded to tribal elders has to be considered significant. Moreover, it is the secondary impacts that result from such changes that could be termed significant rather than change in the age structure itself.

Persons Per Dwelling Unit (5.2.3.3)

It is very hazardous to make unequivocal judgements about the significance of changes in the number of persons per dwelling unit, particularly in the context of Native American communities. Normally, a substantial increase in the numbers of persons per dwelling unit would be considered a significant adverse development in that it would signify overcrowding with all its negative connotations. Conversely, a substantial reduction in the numbers of persons per dwelling unit would be considered a significant positive development in that it would suggest a reduction in overcrowding. However, the number of persons per dwelling unit on any given reservation, colony or band of Native Americans, may have less significance for overcrowding than for the strength of extended family bonds. That is, a large number of persons per dwelling unit, or an increase in the number of persons per dwelling unit may be indicative of a cultural preference for large extended families living together. Therefore, no measure of significance will be attached to this attribute.

Mobility Patterns (5.2.3.4)

To the extent that access to cultural resources is reduced and subsistence activities are inhibited by M-X related development, mobility would be significantly

impacted. M-X related impacts on visitation patterns cannot be considered significant.

Total Personal Income and Per Capita Income (5.2.3.5)

Since total personal income and per capita incomes are two universal measures of the degree of economic well-being as affluence of a community, any increases in either one has to be considered as significant and positive.

Labor Force (5.2.3.6)

The size of the labor force has indications for the size of the local economy and total personal income, which in turn have implications for the number and range of goods and services that can be supported. Consequently, any increase in the size of the labor force can be considered significant. Similarly, an increase in the laborforce participation rate has implications for increase in family earnings and per capita income, which are considered positive. Therefore, any increase in the labor force participation can be considered significant.

Public Finance Stress (5.2.3.7)

Recent changes in the political and economic climate at the national level are now being felt on reservations and colonies in the Great Basin, and increased stress on the abilities of tribal governments to provide needed facilities and services is the result. Indian Action Team (IAT) job training programs, viewed by many Native Americans as a channel for upward socioeconomic mobility, have recently been terminated. Likewise, Comprehensive Employment and Training Act (CETA) funding, responsible for much of the on-reservation employment in the study region, has also been cancelled. Reservations such as Moapa, which have relied extensively upon federal grants, may experience an interruption in their development plans of economic self-sufficiency resulting from reductions in and termination of federal programs. Other reservations may likewise be frustrated in their planned attempts at economic development.

Coupled with uncertainties regarding the future of Department of Housing and Urban Development (HUD) financed housing and the capacity of the Indian Health Service (IHS) to continue to provide services and infrastructural improvements, tribal governments are expected to experience substantial stress in the near future, even in the absence of M-X impacts. The addition of in-migrants to reservations and colonies with tribal governments already under stress to supply services and facilities would contribute to existing problems for tribal councils. Increased devisiveness and factionalism among tribal members may occur in the absence of clear objectives and policies regarding issues, such as in-migration, related to the M-X project. In essence, there currently is no excess capacity in the AOAs with respect to public finance, and any additional population increase would be termed significant.

Regional Inflation (5.2.3.8)

Any inflationary pressures caused by the influx of Native American in-migrants to the host reservations, colonies and bands over and above that produced by national inflationary factors can be considered significant.

Subsistence Activities (5.2.3.9)

Any decrease in the access to, or availability of, areas that support subsistence resources can be considered a significant impact.

Schools (5.2.3.10)

Any increase in the number of school age children on the host reservations, colonies and bands that requires the construction of additional classrooms or the erection of temporary facilities can be considered a significant impact. The necessity of additional teachers can be considered of low to moderate significance.

Housing (5.2.3.11)

If tribal councils allow project related housing construction and if HUD or the Air Force provide additional funds for the construction, any additional housing required as a result of Native American in-migrants would be considered a significant impact.

Public Services (5.2.3.12)

Any increase in the need for additional firefighting or law enforcement personnel, equipment or facilities as a result of project related Native American in-migration can be considered significant given the absence of excess capacity on the host reservations, colonies or bands. Similarly, any need for additional utilities can be considered significant.

Tribal Services and Governments (5.2.3.13)

Any increase in the demands placed on reservation services and government attendant upon a 10 percent population growth rate, or more, can be considered significant.

Transportation and Communications (5.2.3.14)

Although the road network created as part of the M-X project would increase the accessibility of some rural reservations, this is not universally perceived to be a positive impact. Most residents of rural reservations value the isolation of their surroundings and would prefer their lands to remain inaccessable to the general public. Potential impacts to tribal lands, attributable to increased project-related accessibility, would occur as a result of trespassing by recreationists and construction workers (e.g., destruction of habitat, vandalism to sacred sites and tribal herds). Since increased access would be shared by reservation residents and other tribal members, negative impacts may be somewhat offset.

Increased access is not expected to be a significant factor on the Native American colonies in the ROI, since all are currently located within or adjacent to larger communities. Project-related increases in populations of those communities is, however, expected to result in moderately increased instances of intrusion on colony property.

It is assumed that significant increases in both the variety and availability of print and electronic media would occur in response to the substantial growth in markets, that is demand, resulting from M-X construction and operations. Just as the road network, increased availability of print and electronic media would not universally be perceived to be a positive impact. Potential transportation and communication impacts are evaluated for significance of impacts in a qualitative analysis.

Tribal Jurisdiction (5.2.3.15)

M-X construction and operation would create a potential for conflict between local, state, federal, and tribal jurisdictions in civil and criminal affairs. Population increases in general and the intrusion of increased numbers of non-Indians onto reservation or colony lands would negatively affect tribal criminal justice systems and further confound the distinctions between municipal/county, state, federal, and tribal jurisdictions.

Quantitative projections of impacts to tribal courts resulting from M-X construction and operation are not possible. It is expected, however, that significant stress would be experienced by the tribal legal systems within the ROI.

6.0 PROJECTED BASELINE WITHOUT M-X

NEVADA/UTAH

In the absence of M-X, no significant change in the integrity of the Native American cultural resource base or of traditional lifeways is foreseen over the next decade. Culturally significant features, such as ancestral sites, sacred areas, and native flora and fauna, are preserved largely through their isolation from major population centers, large-scale development, and tourist or recreational traffic. The rural areas in which the bulk of cultural resources occur continue to support native species in their natural habitats, are only sparsely populated, and remain generally inaccessible to the public.

The natural growth which is projected for Nevada/Utah in the next decade is not expected to significantly alter the landscape or isolation of rural areas. Planned mining developments, such as Pine Grove Molybdenum (Pine Valley), Alunite (Wah Wah Valley), Anaconda Molybdenum (Big Smoky Valley), and Kennecott (Steptoe Valley), will create only localized ground disturbance and very limited population in-migration. Similarly, proposed power plants, such as the Intermountain Power Project (Lynndyl) and White Pine Power Project and their associated transmission lines, pose a threat to cultural resources only within a limited radius of project facilities. Large-scale commercial and industrial development, such as housing tracts, shopping centers, and industrial parks, will be concentrated on the fringes of major population centers. While disruption of natural ecosystems and some loss of cultural remains through ground disturbance will accompany this growth, the effects will be localized and minimal in terms of the total Native American cultural resource base.

Population in the proposed deployment area will also undergo a process of natural growth in the next decade, and with this growth an expanded need for recreational outlets will occur. As in the case of commercial and industrial development, however, population growth and recreational use will be a gradual rather than a boom phenomenon, and will be most pronounced within the radius of the existing urban centers. Recreation-related loss of cultural resources will remain largely peripheral to these growth effects because the maintenance of relative isolation and inaccessibility.

Native Americans will continue to utilize plant and animal resources for food, and for raw materials for income-producing crafts. In the absence of M-X deployment, water resources which support native flora and fauna will be preserved and plant and animal resources will remain relatively undisturbed through large-scale development or public accessibility.

The Native American quality of life in the region is improving with increased housing, increased cultural awareness, increasing population, and a growing sophistication in dealing with government agencies and in using litigation to achieve their goals. All of these trends would combine to help ensure their social and cultural persistence.

Possible regional development projects such as the proposed White Pine Power Project and the Intermountain Power Project, as well as new mining activities would

not significantly affect these Native American trends. These projects would not threaten Native American land or water resources, nor would they be expected to promote Native American migration that might threaten the productivity or persistence of existing reservations and colonies. Construction venues of these projects are sufficiently distant from Native American reservations and colonies so as not to overwhelm existing social relationships or regional population balances.

In the absence of M-X deployment, the gradual trend toward social, economic, and cultural stability will continue and can be expected to gather momentum over the next decade. Preliminary data indicate that active programs for increased housing and the expansion of tribal enterprises are underway, and that Native American reservation, colony, and band populations are gradually expanding as members return to take advantage of these improvements.

In conclusion, without M-X, Native Americans in the study area will continue their gradual process of growth and economic diversification. They will continue their efforts for expansion of tribal land and water sources, both of which are necessary for economic survival and future development. Stable social and cultural conditions will provide the opportunity for self-directed growth and the maintenance of Native American traditions and identity.

7.0 APPENDICES

APPENDIX A. LAND ISSUES AND LAND DESCRIPTIONS

A.1 Ruby Valley Treaty

A.2 Utah Southern Paiute Termination and Reinstatement

A.3 Descriptions of Reservation Lands in or Peripheral to the DDA

A.3.1 South Fork, Odgers Ranch, and Ruby Valley Reservations (Te Moak)

A.3.2 Yomba Reservation

A.3.3 Duckwater Reservation

A.3.4 Goshute Reservation

A.3.5 Moapa Reservation

APPENDIX A: LAND ISSUES AND LAND DESCRIPTIONS

A.1 RUBY VALLEY TREATY*

THE TREATY OF 1863

Treaty of Peace and Friendship made at Ruby Valley, in the Territory of Nevada, this first day of October, A.D. one thousand eight hundred and sixty-three, between the United States of America, represented by the undersigned commissioners, and the Western Bands of the Shoshonee Nation of Indians, represented by their Chiefs and Principal Men and Warriors, as follows:

Article 1.

Peace and friendship shall be hereafter established and maintained between the Western Bands of the Shoshonee nation and the people and Government of the United States; and the said bands stipulate and agree that hostilities and all depredations upon the emigrant trains, the mail and telegraph lines, and upon the citizens of the United States within their country, shall cease.

Article 2.

The several routes of travel through the Shoshonee country, now or hereafter used by white men, shall be forever free, and unobstructed by the said bands, for the use of the government of the United States, and of all emigrants and travellers under its authority and protection, without molestation or injury from them. And if depredations are at any time committed by bad men of their nation, the offenders shall be immediately taken and delivered up to the proper officers of the United States, to be punished as their offences shall deserve; and the safety of all travellers passing peaceably over either of said routes is hereby guaranteed by said bands.

Military posts may be established by the President of the United States along said routes or elsewhere in their country; and station houses may be erected and occupied at such points as may be necessary for the comfort and convenience of travellers or for mail or telegraph companies.

Article 3.

The telegraph and overland stage lines having been established and operated by companies under the authority of the United States through a part of the Shoshonee country, it is expressly agreed that the same may be continued without hindrance, molestation, or injury from the people of said bands, and that their property and the lives and property of passengers in the stages and of the employees of the respective companies, shall be protected by them. And further, it being understood that provision has been made by the government of the United States for the construction of a railway from the plains west to the Pacific ocean, it is stipulated by the said bands that the said railway or its branches may be located, constructed, and operated, and without molestation from them, through any portion of country claimed or occupied by them.

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*Intertribal Council of Nevada, 1976b.

Article 4.

It is further agreed by the parties hereto, that the Shoshonee country may be explored and prospected for gold and silver, or other minerals; and when mines are discovered, they may be worked, and mining and agricultural settlements formed, and ranches established whenever they may be required. Mills may be erected and timber taken for their use, as also for building and other purposes in any part of the country claimed by said band.

Article 5.

It is understood that the boundaries of the country claimed and occupied by said bands are defined and described by them as follows: On the north by Wong-goga-da Mountains and Shoshonee River Valley; on the west by Su-non-to-yah Mountains or Smith Creek Mountains; on the south by Wi-co-bah and the Colorado Desert; on the east by Po-ho-no-be Valley or Steptoe Valley and Great Salt Lake Valley.

Article 6.

The said bands agree that whenever the President of the United States shall deem it expedient for them to abandon the roaming life, which, they now lead, and become herdsmen or agriculturalists, he is hereby authorized to make such reservations for their use as he may deem necessary within the country above described; and they do also hereby agree to remove their camps to such reservations as he may indicate, and to reside and remain therein.

Article 7.

The United States, being aware of the inconvenience resulting to the Indians in consequence of the driving away and destruction of game along the routes travelled by white men, and by the formation of agricultural and mining settlements are willing to fairly compensate them for the same; therefore, and in consideration of the preceding stipulations, and of their faithful observance by the said bands, the United States promise and agree to pay to the said bands of the Shoshonee nation parties hereto, annually for the term of twenty years, the sum of five thousand dollars in such articles, including cattle for herding or other purposes, as the President of the United States shall deem suitable for their wants and condition, either as hunters or herdsmen. And the said bands hereby acknowledge the reception of the said stipulated annuities as a full compensatiion and equivalent for the loss of game and the rights and privileges hereby conceded.

Article 8.

The said bands hereby acknowledge that they have received from said commissioners provisions and clothing amounting to five thousand dollars as presents at the conclusion of this treaty.

Done at Ruby Valley the day and year above written.

James W. Nye
James Duane Doty

Te-moak, his x mark
Mo-ho-a
Kirk-weedgwa, his x mark

Po-on-go-sah, his x mark
Par-a-woat-ze, his x mark

Ga-ha-dier, his x mark

To-nag, his x mark
To-so-wee-so-op, his x mark

Ko-ro-kout-ze, his x mark

Pon-ge-mah, his x mark

Sow-er-e-gah, his x mark

Buck, his x mark

Witnesses:

J.B. Moore, lieutenant-colonel Third Infantry California Volunteers.
Jacob T. Lockhart, Indian Agent Nevada Territory
Henry Butterfield, Interpreter

Ratified on June 26, 1866.

A.2 PAIUTE INDIAN TRIBE OF UTAH TERMINATION AND REINSTATEMENT*

The history of the Utah Southern Paiutes after the westward migration of the white man is one of extreme poverty.

The settlers' cattle were destroying Southern Paiute food sources, their land claims were driving the Indians off their aboriginal land, and their guns were depleting food sources that the Southern Paiute depended upon.

The pressures of white encroachment led to the establishment of the five reservations and the relocation of the Southern Paiutes to these areas. The philosophy of the government was to establish the Indians as an agrarian people; and many federal programs of the past 100 years have been directed toward this goal. The General Allotment Act of 1887, for instance, allotted land to individual Indians to "till and develop (only Koosharem and Kanosh received allotments in southern Utah). Reservation land was dissected and distributed, to encourage individuals to begin to farm lands that belonged to them. A nomadic people, as were all Great Basin Indians, the Southern Paiutes did not readily adapt to agricultural life.

The Indian Reorganization Act (Wheeler-Howard Act) which Jacobs (1974) credits with being the precursor to termination, was instituted in 1934. The Southern Paiute bands at this time were neglected, and histories recounting this period usually jump from the 1920s to the 1940s when the Southern Paiutes began to establish constitutions and tribal governments. (ITC 1975(V):115) The Indian Reorganization Act did little to aid the Utah bands, although under its provisions Shivwits and Kanosh both set up constitutions and bylaws in 1940 and 1943, respectively.

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*From Facilitators, 1980.

It is important to recognize that once again the United States changed its stated position to a polar opposite one, whereby the encouragement of individual Indian development was replaced by a pervasive philosophy of tribal organization. John Collier, Commissioner of Indian Affairs, laid out the specific goals of the Indian Reorganization Act in a Commissioner's Circular:

> The Indian Office is moving from guardian to advisor, from administrator to friend-in-court. In this transition, many powers hitherto exercised by the Indian Service have been transferred to the organized tribes; many more such powers will be transferred. As Indians advance in self-government, they will begin to provide many of their own technical and social services, or will depend more and more on the services ordinarily provided in American communities. I think we can agree, however, that federal advisory supervision ought not to be withdrawn until Indians have attained a fair political, economic and cultural equality equivalent to that guaranteed by the four freedoms.

The vacillation of the government between a philosophy of collective betterment of Indian tribes and individual assimilation of Indians into white society has created conflict since the earliest days of federal Indian programs. The General Allotment Act of 1887 was instituted and then canceled. The General Reorganization Act of 1934 was established and then canceled, when, in the 1940s, the United States government began pursuing a policy of integration of Indian peoples into non-Indian society, partially by removing government aid from certain tribes. This policy was labeled "termination."

TERMINATION

The reasons that termination became the pervasive philosophy in the United States in midtwentieth century are complex. Jacobs (1974) cites a variety of reasons: a congressional animosity toward the Bureau of Indian Affairs for its failures with Indian programs and its reluctance to follow congressional dictates; the failure of other methods to move the Indians toward self-determination and independence; a spiraling budget that could be clipped by cutting out Indian programs; and a constant request by BIA for more funds.

On February 8, 1947, William Zimmerman, Acting Commissioner of Indian Affairs, testified before a Senate committee concerning a four-part formula, to test a tribe's readiness for termination (Echohawk, 1979):

> The first one is the degree of acculturation of the particular tribe. That includes such factors as the admixture of white blood, the percentage of illiteracy, the business ability of the tribe, their aceptance of white institutions and their acceptance by the whites in the community.
>
> The second factor is the economic condition of the tribe, principally the availability of resources to enable either the tribe or the individuals, out of their tribal or individual assets, to make a reasonably decent living.
>
> The third factor is the willingness of the tribe and its members to dispense with Federal aid.

> The last criterion is the willingness and ability of the State in which the tribe is located to assume the responsibility. (H.R. 2680, 83rd Cong. 2d Sess.:8-9)

Mr. Zimmerman also included a timetable for termination in three parts--those reservations ready to be terminated immediately, those to be ready in ten years, and those for which no date could be determined. The Southern Paiutes were not included in any of these three categories. (Jacobs, 1974) In a report prepared by the BIA in 1953, only Indian Peaks, of the five Utah bands, was considered ready to manage its own affairs upon the fulfillment of certain unspecified conditions. (Echohawk et al., 1979) In a list submitted in 1954, the Shivwits, Kooshareim, and Kanosh bands were listed as being "unready" (ITC 1976(V):117).

Perhaps the best illustration of the attitude taken by the Congress regarding the Indians' desires on the matter were summed up in the statement of Congresswoman Bosone from Utah in 1950:

> I believe that this legislation is long past due. I find that most of the Indian leaders feel they have outgrown the outmoded system of federal wardship and more than anything else the Indian wishes to live like the whiteman. (Jacobs 1974)

Congresswoman Bosone included with her statement a resolution to terminate the tribes and dissolve the BIA, which was defeated in the Senate.

Tribal readiness for termination was to be determined by William Zimmerman's four-part list: degree of acculturation, economic readiness, the tribe's willingness to be independent, and the attitudes of state and local officials. What is clear is that the four officially terminated Southern Paiute bands in southern Utah (the Cedar City band was never "officially" terminated) were ill-prepared for the tremendous economic and cultural pressures accompanying termination, nor did they fit the stated bureaucratic conditions for their termination.

S. D. Aberle, who interviewed the four bands in 1958, concluded her report as follows:

> Some of the evils predicted by those who opposed quick termination for Indians who have been judged by BIA as not ready for termination, can be seen in this small group of Paiutes. Two meetings with one-third of the members of the four bands brought out various difficulties.
>
> One crucial problem is that terminated Indians do not automatically become average non-Indian citizens, with birth certificates, social security numbers, recorded land deeds and a command of English and know-how which allows them to operate in white society. They have difficulty in knowing how to register to vote, how to comply with government regulations for a fishing or hunting license, how to obtain a Farmers Home loan or Soil Conservation Service assistance or other benefits the Federal or State government offers its citizens. So termination actually puts them in the class something like the newly arrived peasant immigrants.

> Therefore, the policy statement of Congress "...to make Indians...subject to the same laws and entitled to the same privileges as are applicable to citizens of the United States," from any realistic evaluation, is not accomplished by the legislation passed for this purpose.
>
> This miscarriage of policy and intent is brought about by the speed with which termination is undertaken, lack of explaining the problems to the Indians, lack of a consideration for the Indians' wishes or their needs, and the disregard or absence of consent from the Indians themselves.

Economically, the bands were equally stricken. In 1953, Harry Gilmore, the Superintendent of the Uintah-Ouray Agency of the BIA reported to the Commission of Indian Affairs on the economic readiness of the four bands, concluding: "In no case have these Indians shown themselves competent to manage their own affairs without positive direct supervision." (Jacobs, 1974) Senator Watkins of Utah described their situation: "As it stands now, these Indians are in the deptns of poverty..." (Echohawk et al., 1979) quotes abound that adequately illustrate the obvious economic deprivation of the Southern Paiutes.

The only issue that seems at question was the bands' attitude about termination. Conflicting reports were offered supporting and denying the bands' desire to be released from federal trust. What does seem clear is that they had no idea what the implications of termination were to their welfare. S. D. Aberle reports on McKay Pikyavit, Chairman of Kanosh, to a query on their lack of vocal objection to termination:

> McKay Pikyavit said that when the hearings were in progress, Wes Levi was Kanosh tribal chairman. He had never been to school a day in his life and he did not know what was going on. He said they had no attorney to explain things to them, that the hearings were held in Washington, D.C., and no one could afford the trip to Washington. He said he would like to go to the lawyers in town but had no money to pay them. Another trouble he had was the bad title to one piece of Kanosh land and he did not know who to go to and get this fixed.

Also important to note here were promises of tax breaks, monies, and equipment that were given to the Indians verbally, yet never written down and thus left unenforced. (Echohawk et al., 1979)

The state and local officials in Utah favored termination, perhaps in the hope that it would lessen federal involvement in their areas. Termination also facilitated their acquiring Indian lands when termination imposed heavy tax burdens on the tribes. Most of the land belonging to the Southern Paiutes as little as 30 years ago has been sold since termination simply to pay the property tax on the land. The Paiutes have lost thousands and thousands of acres to taxes.

Despite the obvious unpreparedness for termination, the southern Utah Paiutes were the first group terminated. The ITC speculates that it was due to Senator Watkins' desire to make an example of this people to the other states, so that they, too, would actively begin termination. (ITC 1976(V):116)

Termination left these bands without aid, in utter poverty, unable to pay taxes on their land, and, according to Indian leaders in 1958, unable to gain an audience

with those Salt Lake City bankers appointed as trustees over their lands. (Aberle 1958)

The Indians retained subsurface rights for ten years to all lands, and federal indebtedness was canceled, but lands were subject to taxation. Tribal governments established under the Indian Reorganization Act were revoked. Salt Lake City was the base of Walker Bank trustees, hours away from the bands. The BIA officials complained that there was not nearly adequate time to prepare these bands for termination. Yet they were cut loose from federal trust on February 21, 1957.

THE INTERIM YEARS

The aftermath of termination was devastating to the bands as cultural entities. The Kanosh band, unable to support the tax burden of their land (no longer eligible for "trust status" taxation rights), began to sell it, so that today only 80 of the original 4,280 acres remains in their possession. The Indian Peaks band sold their 8,960 acres and moved to Cedar City Colony. Shivwits had its 26,680 acres put in trust and leased to ranchers, for which they received five dollars per year rent. (Jacobs, 1974) Four hundred acres returned by the bank to Koosharem were lost to unpaid taxes. Cedar City Colony, which escaped official termination by oversight, was effectively cut off from BIA aid until the mistake was identified in the 1960s, when minimal agency services were returned to them (ITC 1976(V):132). A study by the BIA in 1968 to distribute the $7,253,165.19 Indian Claims Commission judgment reported:

> While the Cedar City Band has not gone through the "termination" process its members have received very few services from the Bureau of Indian Affairs, mainly because they do not and have not had a reservation or other property held in trust by the United States. Having had little contact with any of these groups for several years, the Bureau of Indian Affairs had little information on the people involved and was in poor position to supervise the disbursement and use of the funds. Furthermore, its legal relationship with the first four bands raised some administrative problems.

The above report is the only assessment of the five bands for the government since termination. (BIA 1968(VI))

RESTORATION

Section 7(c) of the Paiute Indian Tribe of Utah Restoration Act states: (PL 96-227):

> Inasmuch as the Kanosh, Koosharem and Indian Peaks Bands of Paiute Indians lost land which had been their former reservations and the Cedar City Band of Paiute Indians had never had a reservation, the Secretary shall negotiate with the tribe or bands, or with representatives of the tribe chosen by the tribe or bands, concerning the enlargement of the reservation for the tribe established pursuant to subsection (a) and shall within two years after the date of enactment of this Act, develop a plan for the enlargement of the reservation for the tribe. The plan shall include acquisition of not to exceed a total of fifteen thousand acres of

land to be selected from available public, State, or private lands within Beaver, Iron, Millard, Sevier, or Washington Counties, Utah. Upon approval of such plan by the tribal officials elected under the tribal constitution and bylaws adopted pursuant to Section 6, the Secretary shall submit such plan, in the form of proposed legislation, to the Congress.

This 15,000-acre withdrawal is to replace the lands lost due to termination. One parcel that is sought is the Indian Peaks area, about 25 mi northeast of Beryl, Utah. The Indian Peaks Band still retains partial water rights to this land, and still enjoy hunting, gathering, and Christmas tree cutting privileges.

In preparing a report to present in support of the Paiute Restoration Act, Echohawk et al. (1979) commented on the present conditions of the five bands (excerpted):

> Each band has their own community and resides in their own traditional geographical locations which are on or near the location of their originally occupied or former reservation lands; the bands have continued to perform self-governing functions, either through elected representatives or in meetings of the bands' general membership. The Paiutes continue to use their aboriginal language and retain their traditional customs and cultures.
>
> Although the Paiute lands were never considered by the BIA to be of significant value for purposes of grazing, they did constitute a home for the Bands. The impact of total loss of a land base is most significant. Because they have no land and can not afford to purchase land, at least one of the Bands has not been able to benefit from the availability of HUD low-income housing from which other Paiutes have benefitted.
>
> In 1975 the Paiutes formed the Utah Paiute Tribal Housing Authority and received funding from the Department of Housing and Urban Development for the construction of low-rent and mutual help housing units. Those bands who were able to retain a portion of their land or who are living on land provided by a local church have thus been able to benefit from the availability of new housing. It is only within the last three years that running water and electricity have been available to many homes occupied by the Paiutes. Some of the Paiutes continue to reside in homes which are primarily head by coal or wood, do not have hot or cold running water, and do not have indoor toilet facilities.
>
> The continuing discrepancy between the economic well-being of the Paiutes and their non-Indian neighbors is reflected in per capita income levels. The average per capita income for the Paiutes in 1979 is $1,968.00, whereas the estimated average per capita income for Utah citizens in general in 1979 was $7,004.00.
>
> For at least one of the Paiute Bands, nearly 60 percent of the adults surveyed had not completed high school.

Termination has exacted an economic and cultural toll on the Southern Paiutes of damaging proportions. Only the strong attachment and historical and religious

respect they have for their lands have allowed these Indians to remain in their colonies. The process of rebuilding their communities in the spirit of the Restoration Act promises to be a delicate one, as those who moved to the cities for employment begin to return to the new reservation lands, which at this time have not been chosen or secured.

The lack of socioeconomic data for these bands is acute. Having had no federal recognition, and often no land, the only specific Indian agency at their disposal was the Utah State Division of Indian Affairs in Salt Lake City.

The five bands of southern Utah are now to be served by a BIA agency and the other agencies charged with Indian affairs. There is a movement under way by these bands to establish a new agency office that would serve the five bands, the Moapa Reservation, and the Las Vegas Colony, which are the main centers of the Southern Paiute Tribe.

A.3 DESCRIPTIONS OF RESERVATION LANDS IN OR PERIPHERAL TO THE DDA

SOUTH FORK, ODGERS RANCH, AND RUBY VALLEY RESERVATIONS (TE MOAK) (A.3.1)

The South Fork Reservation comprises landholding in three areas: (1) the main reservation situated along the south fork of the Humboldt River around Lee, Nevada (Griswold, Drown, Ogilvie, and Dewar Ranches), (2) Odgers Ranch in Butte Valley, and (3) Lamoille Grazing Unit on Ten-Mile Creek along State Route 46, some 3.5 mi west of Lamoille, Nevada. In total, 15,680.38 acres were purchased by the United States in trust for the Te Moak bands of Western Shoshone Indians and are described as follows:

YOMBA RESERVATION (A.3.2)

The Yomba Reservation is located on the Reeser River in northwestern Nye County with a discontinuous land area of 4,718 acres. Four ranches were purchased and identified as land holdings of the Yomba Shoshone Tribe. These ranches include the Bowler Ranch, Doyle Ranch, Deringer Ranch, and Worthington Ranch. The total land holdings of the Yomba Reservation comes to 4,681 acres and are described as follows:

> Current Yomba tribe grazing permits on BLM lands include a private allotment (Clear Creek), 1,075 AUMs in the Reese River Unit, 5, 848 AUMs in the Ione Unit in common with other users; and 856 AUMs in the Stewart Springs Allotment adjacent to the Ione Unit (BRI System, Inc., 1975).

Currently, Yomba Tribe grazing permits on National forest includes 2,000 AUMs, Paradise Division; 2,400 AUMs, South Shoshone Division; and 600 AUMs, Illinois Division.

Griswold Ranch: A description of the land follows:

Township (North)	Range (East)	Section	Description	Acres
31	56	1	All	641.40
31	56	3	All	648.38
31	56	4	E ½; SW ¼	486.00
31	56	10	N ½ NW ¼; NE ¼	320.00
31	56	10	E ½ SE ¼	
31	56	11	SW ¼ NW ¼; W ½ SW ¼	120.00
31	56	14	N ½	320.00
32	56	35	All	640.00
31	57	3	W ½	320.00
31	57	4	All	641.42
31	57	5	All	641.02
31	57	6	SE ¼; SW ¼ NE ¼	280.12
31	57	6	SE ¼ NW ¼; NW ¼ NW ¼	
31	57	7	All	642.14
31	57	10	NW ¼	160.00
Total				5,862.00

T6072/10-2-81

Drown Ranch: 2,195.63 acres. A description of the land follows:

Township (North)	Range (East)	Section	Description	Acres
31	56	12	SW ¼; SW¼ SE ¼	200.00
31	56	13	N ½	320.00
31	57	8	S ½ NW ¼; SW ¼	240.00
31	57	17	NW ¼; N ½; SW ¼ NE ¼; NE ¼ SE ¼	473.93
31	57	17	NW ¼ SE ¼	
31	57	18	N ½	321.32
32	57	31	All	640.38
Total				2,195.63

T6073/10-2-81

Ogilvie Ranch: A description of the land follows:

Township (North)	Range (East)	Section	Description	Acres
31	56	12	N ½ SE ¼; SE ¼ SE ¼	120.00
31	56	12	N ½	320.00
31	56	113	SW ¼, Part SE ¼	283.00
31	56	14	S ½	320.00
31	56	24	N ½ SE ¼; NE ¼	240.00
31	56	24	Part of NW ¼	115.00
31	57	19	Lot 1; Part of Lot 2; Part of Lots 3 & 4 (NE ¼ SW ¼); Part of Sec. 19	116.96
Total				1,514.96

T6074/10-2-81

Dewar Ranch: This property, adjoining the Ogilvie Ranch (on the east) and the Drown Ranch (on the South) was approved by the Department of the Interior in March 1943. To follow is a description of the land:

Township (North)	Range (East)	Section	Description	Acres
31	56	13	Parcel (E ½ SE ¼)	1.45
31	56	24	Parcel (NW ¼)	125.00
31	56	24	N ½ SW ¼	
31	57	17	Parcel (N ½ SW ¼)	7.50
31	57	17	Parcel (SE ¼ SE ¼)	11.25
31	57	17	S ½ SW ¼; SW ¼ SE ¼	126.07
31	57	18	S ½	314.00
31	57	19	SE ¼ NE ¼; NE ¼ NW ¼	188.50
31	57	19	Parcel (N ½ NE ¼)	
31	57	19	Parcel (NE ¼ SE ¼)	
31	57	20	All	638.50
34	56	6	Parcel (SW ¼) Traded*	
33	56	19	All	633.70
33	56	29	NW ¼	160.00
33	56	31	All	634.50
33	56	33	All	640.00
33	56	35	All	640.00
Total				4,120.47

T6075/10-2-81

*Traded 140 acres for Dewar lands T. 33 N., R. 56 E. Sections 19, 29, 31, 33, and 35.

Odger's Ranch: Over 1,000 acres. A description of the land follows:

Township (North)	Range (East)	Section	Description	Acres
27	61	1	Lot 1 (NE ¼ NE ¼)	
27	62	3	NW ¼ SE ¼	
28	61	11	SE ¼ SE ¼	
28	61	12	S ½ S ½	
28	61	13	N ½ NE ¼; E ½ NW ¼	
28	61	19	NW ¼ SE ¼	
28	61	25	E ½ NE ¼; NE ¼ SW ¼	
28	61	35	S ½ SW ¼; SE ¼	
28	61	36	N ½ NE ¼; NE ¼ NW ¼	
28	61	36	NE ¼ SW ¼	
28	62	7	NE ¼ SE ¼; S ½ SE ¼	
28	62	7	Lot 4 (SW ¼ SW ¼)	
28	62	8	S ½ NW ¼; N ½ SW ¼	
28	62	8	SW ¼ SW ¼	
28	62	17	NW ¼ NW ¼	
28	62	18	E ½ NE ¼; W ½ SE ¼	
28	62	18	SE ¼ SW ¼; Lot 1 (NW ¼ NW ¼)	
28	62	19	NW ¼ NE ¼; E ½ NW ¼	
28	62	19	Lots 1-4 (W ½ W ½)	
28	62	36	NW ¼ NW ¼; SE ¼ NE ¼	
Total				1,987.07

T6076/10-2-81

Bowler Ranch contains 1,560 acres of land from John F. and Emma Bowler. Following is a brief description of the land area:

Township (North)	Range (East)	Section	Description	Estimated* Acres
14	41	4	Lot 4 (NW ¼)	40+
14	41	4	SW ¼, NW ¼; NW ¼, SW ¼	80
14	41	5	Lot 1 (NE ¼); SE ¼	200-
14	41	5	S ½, NE ¼	80
14	41	7	E ½, SE ¼	80
14	41	8	N ½, NE ¼; SW ¼, NE ¼	120
14	41	8	SE ¼, NW ¼; W ½, SE ¼	120
14	41	8	SW ¼	160
14	41	17	NW ¼, NE ¼; W ½	360
14	41	18	E ½, E ½	160
15	41	33	SW ¼	160
Total				1,560

T6077/10-2-81

*Recorded total acres.

Doyle Ranch contains 2,161.48 acres from H.S. Doyle and M.T. Doyle. Following is a brief description of the land area:

Township (North)	Range (East)	Section	Description	Estimated* Acres
10	38	38	SW ¼, NW ¼	40
12	38	31	SE ¼, NW ¼	40
12	40	3	SW ¼, NW ¼; W ½, SW ¼	120
12	40	4	NE ¼, NE ¼; S ½, NE ¼	120
12	40	4	SE ¼	160
12	40	9	NE ¼; E ½, W ½	320
12	40	9	W ½, SE ¼	80
12	40	11	W ½, SW ¼	80
12	40	14	NE ¼, NW ¼; NW ¼, NE ¼	80
12	40	16	E ½, W ½; NW ¼, NE ¼	200
12	40	16	S ½, SE ¼	80
12	40	21	E ½, W ½	160
12	40	24	W ½, SW ¼; SE ¼, SW ¼	120
12	40	25	SW ¼, NE ¼	40
12	40	28	NE ¼, NW ¼; S ½, NW ¼	120
12	40	28	SW ¼, NE ¼; E ½, SW ¼	120
12	40	28	W ½, SE ¼; SE ¼, SE ¼	120
12	40	33	NE ¼, NW ¼; N ½, NE ¼	120
12	40	33	NE ¼, NE ¼; NE ¼, SE ¼	80
Total				2,161.48

T6078/10-2-81

*Recorded total acres.

Dieringer Ranch contains 480 acres from Herman Dieringer, George A. Dieringer, and John Dieringer. The following is a brief description of the land area:

Township (North)	Range (East)	Section	Description	Estimated* Acres
13	40	5	E ½, SW ¼	80
13	40	15	SW ¼, SE ¼	40
13	40	22	NE ¼, NW ¼; NW ¼, NE ¼	80
13	40	22	SE ¼, NE ¼; NE ¼, SW ¼	80
13	40	23	NE ¼, SW ¼; SW ¼, SE ¼	80
13	40	25	NW ¼, SW ¼	40
13	40	26	E ½, NE ¼	80
Total				480

T6079/10-2-81

*Recorded total acres.

Worthington Ranch contains 480 acres from S.C. Worthington and A.E. Worthington. The following is a brief description of the land area:

Township (North)	Range (East)	Section	Description	Estimated* Acres
13	40	25	SW ¼, NW ¼; NW ¼, SW ¼	80
13	40	25	SE ¼, SE ¼; NE ¼, SW ¼	80
13	41	30	S ½, SW ¼	80
13	41	31	NW ¼, NE ¼; SE ¼, NE ¼	80
13	41	31	NE ¼, NW ¼	40
13	41	32	SW ¼, NW ¼; W ½, SW ¼	120
				480

T6080/10-2-81

*Recorded total acres.

DUCKWATER RESERVATION (A.3.3)

Members of the Duckwater Shoshone Tribe of the Duckwater Reservation are descendants of the Western bands of Shoshones. The Western Shoshones were the most northerly and constituted the largest single tribe of the Shoshonean stock.

Tract No. 1 contains 2,280 acres of land from A.C. Florio and Angel Florio. Following is a brief description of the land area:

T 12 N, R 56 E, M.D.B.M.

Section 5:	W ½ NE ¼; NW ¼ SE ¼; SE ¼ NW ¼; NE ¼ SW ¼; SW ¼ SW ¼
Section 6:	All of section, excepting E ½ NE ¼
Section 7:	All of section excepting SW ¼ SW ¼
Section 8:	SW ¼ NW ¼; NW ¼ NW ¼; SE ¼ NW ¼; S ½ SW ¼; NW ¼ SW ¼
Section 17:	SW ¼
Section 18:	NE ¼

T 12 N, R 56 E, M.B.D.M.

Section 29:	W ½ SW ¼
Section 30:	SE ¼ SW ¼
Section 31:	E ½ NW ¼; NE ¼ SW ¼
Section 32:	N ½ NW ¼

Tract No. 2 contains 960 acres of land. A brief description of the land is given below:

T 13 N, R56 E, M.D.B.M.

Section 19:	SW ¼ SE ¼
Section 29:	SE ¼ SW ¼; W ½ NW ¼
Section 30:	NE ¼ and E ½ of NW ¼; SE ¼ SE ¼; N ½ SW ¼; SW ¼ SW ¼; N ½ SE ¼
Section 31:	E ½ NE ¼; W ½ NW ½; S ½ SW ¼; NW ¼ SW ¼
Section 32:	SW ¼ NW ¼

Tract No. 4 contains 142.5 acres. These holdings are described as: T. 12 N., R. 56 E., M.D.B. & M.

Section 5:	SE ¼ SW¼ (Part); SE ¼ SE¼
Section 8:	NE ¼ NW¼ NW¼ NE¼

Tract No. 3 is comprised of Parcels 1 and 2. The southern boundary of the A.C. Florio ranch (Tract No. 1) is 0.3 mi north from the northern boundary of Parcel No. 1, which is the main portion of the ranch. Parcel No. 2 comprises 40 acres and is located 4 mi north of Parcel No. 1. It adjoins land on the south and east which was acquired by the United States as Tracts Nos. 1 and 2 of this project. Most of the water used for irrigation in Duckwater Valley comes from Big Warm Springs located on Parcel No. 2.

The deed executed December 17, 1942, by C.S. Munson and Lydia Munson, recorded in Book 49 of Deeds, page 395, Nye County, Nevada, records, contains the following land description:

1. All those portions of the N ½ NW ¼ and of the NW ¼ NE ¼ of Section 20, T 12 N, R 56 E, M.D.M., lying generally north of, outside and excluding what is called Tract "E" which is described as follows: Beginning at a point whence the southwest corner of the SE ¼ of Section 17 of said township and range bears N. 0" 3' E. 637 feet; thence N. 89° 54' W, 2651.5 feet; thence S. 0° 3' W. 683 feet; thencce S. 89° 54' E. 3978.8 feet; thence N. 0° 3' E. 299.5 feet; thence N. 25° 2' W. 382.1 feet; thence N. 43° 13' W. 51.2 feet; thence N. 89° 54' W. 1130.9 feet, more or less to the place of beginning.

2. The NE ¼ NE ¼ of Section 20 and the NW ¼ NW ¼ of Section 21, T 12 N, R 56 E, M.D.M., also all of those portions of the NE ¼ NW ¼ of Section 21. Township and range aforesaid excepting and excluding therefrom what has heretofore been called Tract "B" described as follows: Beginning at the northeast corner of the SE ¼ NW ¼ of Section 21, Township and range aforesaid, thence N. 0° 3' E. 16 feet; thence N. 89° 54' W. 582.07 feet; thence S. 50° 3' E. 20.48 feet thence S. 89° 54' E. 562.91 feet, more or less to the place of beginning.

3. All of those portions of the NE ¼ NE ¼ and of the SE ¼ NE ¼ of Section 20 of the N ½ NW ¼ and of the S ½ NW ¼ of Section 21, township and range aforesaid comprising an area described as follows and called Tract "D": Beginning at the point whence the southwest corner of the SE ¼ of Section 17, township and range aforesaid, bears N. 89° 54' W. 1760 feet and N. 0° 3' E. 1304 feet; thence S. 50° 35' E. 365 feet; thence N. 67° 43' E. 2375 feet; thence S. 41° 3' E. 245 feet; thence N. 68° 45' E. 380 feet; thence N. 50° 3' W. 290.45 feet; thence N. 89° 54' W. 2980 feet; more or less to the place of beginning.

4. All portions of the SW ¼ SW ¼ of Section 16, of the S ½ S ½ of Section 17, and of the SE ¼ SE ¼ of Section 18, township and range aforesaid, excepting and excluding therefrom what has heretofore been called Tract "G" described as follows: Beginning at a point whence the southwest corner of the SE ¼ of Section 17, township and range aforesaid, bears N. 89° 54' W. 504.9 feet and S. 0° 3' W. 780 feet; thence N. 21° 25' W. 276 feet; thence N. 89° 54' W. 3040.4 feet; thence N. 89° 54' E. 6604 feet; thence S. 0° 5' E. 570.4 feet; thence N. 89° 54' W. 3466 feet, more or less to the place of beginning.

5. The SE ¼ NW ¼ of Section 32, T 13 N, R 56 E, M.D.M.

Request for Additional Lands

The Duckwater Shoshone Tribe acting through Tribal Council by Resolution #76-D-28, enacted September 2, 1976, requesting a minimum of 349,173 acres of public land, now in the grazing allotment above described, be added to the Duckwater Reservation. Portions of the subject lands under request are:

Section	Township	Range	Acres
13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35, 36	10 N	53 E	7,680
14 (partial), 15, 16, 17, 18, 19, 20, 21, 22, 23, 26 (partial), 27, 28, 29, 30, 31, 32, 33, 34 (partial)	10 N	54 E	10,400
14 (partial), 15, 16, 17, 18, 19, 20, 21, 22, 23, 26 (partial), 27, 28, 29, 30, 31, 32, 33, 34 (partial)	10 N	54 E	10,400
18 sections (E ½)	11 N	53 E	11,620
All	11 N	54 E	23,040
4 (partial), 5, 6, 7, 8, 9 & 16 (partial), 17, 18, 19, 20, 21 & 29 (partial), 30 & 31 (partial)	11 N	55 E	7,600
1, 2, 11, 12, 13, 14, 23, 24, 25, 26, 35, 36	12 N	52 E	7,600
All	12 N	53 E	23,040
All	12 N	54 E	23,040
1, 2, 3, 4, 5, 6, 7, 8, 9, 10 & 15 (partial), 16, 17, 18, 19, 20, 21, 22 & 27 (partial), 28, 29, 30, 31, 32, 33, 34 (partial)	12 N	55 E	14,240
6 (partial)	12 N	55 ½ E	580
3 & 4 (partial), 5 & 6 (partial), 7 & 8 (partial), 9, 10 & 16 (partial), 17 & 18 (partial)	12 N	56 E	2,750
24 (partial), 25, 26 & 35 (partial), 38	13 N	52 E	2,460
All except 3, 4, 5, 6, 7, 8, 9, 14 & 15 (partial), 16 & 17 (partial), 18 & 19 (partial)	13 N	53 E	15,575
All	13 N	54 E	23,060
All	13 N	55 E	23,040
6, 7, 18, 19, 30, 31	13 N	55 ½ E	3,840

3 (partial), 4, 5, 6, 7, 8, 9, 10 & 15 (partial), 16, 17, 18, 19 (partial), 20, 21, 22, 27, 28, 29 & 30 (partial), 31 & 32 (partial), 33, 34	13 N	56 E	14,762
23 & 24 (partial), 25, 35 & 36 (partial)	13 ½ N	53 E	2,790
19 & 20 (partial), 21 & 22 (partial), 23 & 24 (partial), 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36	13 ½ N	54 E	9,186
SA?????	13 ½ N	55 E	9,186
19 (partial), 30, 31	13 ½ N	55 ½ E	1,580
12 & 13 (partial), 24 & 25 (partial), 26 & 35 (partial), 36	14 N	53 E	1,898
All	14 N	54 E	23,040
1/All except, 1, 2, 3 & 4 (partial), 11 & 12 (partial)	14 N	55 E	20,559
1/7 & 17 (partial), 18, 19, 20, 21 (partial), 28, 29, 30, 31, 32, 34 (partial)	14N	56E	6,720
2/All except, 6 & 7 (partial), 18 & 19 (partial), 30 & 31 (partial)	15 N	54 E	21,200
3 (partial), 4, 5, 6, 7, 8, 9, 10 & 15 (partial), 16, 17, 18, 19, 20, 21 & 28 (partial), 29, 30, 31, 3/32, 33 (partial)	15 N	55 E	11,000
1, 2, 3, 4 & 9 (partial), 10, 11, 12, 13, 14, 15, 16 & 17 (partial), 20 (partial), 21, 22, 23, 24, 25, 26, 27, 28, ?/ 29 (partial), 32, 33, 34, 35, 36	16 N	54 E	15,772
5 (partial), 6, 7, 8 & 16 (partial), 17, 18, 19, 20, 21, 22 & 27 (partial), 28 3/29, 30, 31, 32, 33, 34 (partial)	16 N	55 E	9,173
25 & 26 (partial), 27 & 34 (partial), 3/35, 36	17 N	54 E	2,222
3/30 & 31 (partial)	17 N	55 E	640
	Total		349,173

GOSHUTE RESERVATION (A.3.4)

The first action to reserve land for the Goshute Indians' use was taken with issuance of Executive Order 1539 on May 29, 1912, setting aside 160 acres for scnool and agency purposes. The order in part read:

> It is hereby ordered that the SW ¼ of the NE ¼, the SE ¼ of the NW ¼, the NW ¼ of the SE ¼, and the NE ¼ of the SW ¼ of Sec. 8 and the S ½ of the SW ¼ of Sec. 9, T 11 S, R 19 W of the Salt Lake meridian, in the county of "Tooele," State of Utah, be, and the same are hereby reserved from settlement, entry, sale or other disposal and set aside for school, agency, and other necessary uses, for th benefit of Indians on the public domain in the State of Utah, subject, however, to any valid existing rights of any persons thereto.

There were added some 33,688 acres surrounding the school-agency site by Executive Order 1903 on March 23, 1914. This order in part read:

> All of township 11 south, range 19 west, except section 36; sections 2 to 11, inclusive, and sections 14 to 22, inclusive, township 12 south, range 19 west of the Salt Lake meridian.

There were 66,077.22 acquired acres by Act of Congress on April 13, 1938, adjoining public lands in Nevada and authority for purchase of private holdings (Triune Ranch). This act in part read:

> The east half section 1; east half section 12; northeast quarter section 13, township 22 north, range 69 east; sections 1 to 18, inclusive; east half section 24, east half section 25, east half section 36, township 23 north, range 69 east (unsurveyed); all of township 24 north, range 69 east (unsurveyed); sections 3 to 10, inclusive, north half; north half south half; southwest quarter of southwest quarter section 15; east half section 16; northwest quarter; north half northeast quarter section 17; north half section 18; northeast quarter section 21; west half northwest quarter section 22; fractional township 22 north, range 70 east; all of fractional township 23 north, range 70 east (unsurveyed); all of fractional township 24 north, range 70 east, except lot 5; northeast quarter southwest quarter and north half section 3, Mount Diablo base and meridian, Nevada.

There were added to the Goshute Reservation by purchases and exchanges 8,934,245 acres.

The Goshute Reservation lies along the Nevada-Utah border some 70 mi south of Wendover, Utah. There are total land holdings of some 108,699 acres of tribal land and an 80-acre trust allotment with 70,569 acres in Nevada and 38,210 acres in Utah.

MOAPA RESERVATION (A.3.5)

The Moapa Indian Reservation is located in the northeastern part of Clark County, Nevada, 55 mi northeast of Las Vegas and 5 mi north of I-15 off Nevada

Highway 7. The current Moapa Indian Reservation is situated in a fertile valley surrounded by mountains and straddling the spring-fed Muddy River in an otherwise arid land. The 1,466.35-acre reservation is approximately 2 mi long and ½ to 1 mi wide. In 1979 the tribe purchased the adjoining 203-acre Perkins Ranch. The tribe also has a Land Return Bill pending before Congress for 70,565.96 acres of BLM land.

The original reservation created in 1873 involved 3,900 sq mi. In 1874 100,000 acres were added to the reservation. The reservation was described by Executive Order as follows:

> Beginning at a point in the middle channel of the Colorado River of the West 8 miles east of the one hundred and fourteenth degree of west longitude; thence due north to the thirty-seventh degree of north latitude; thence west with said parallel to a point 20 miles west of the one hundred and fifteenth degree of west longitude; thence due south 35 miles; thence due east 36 miles; thence due south to the middle of the main channel of the Colorado River of the West; thence up the middle of the main channel of said river to the place of beginning.

After a reduction to 1,000 acres in 1875 the reservation was described as:

> Commencing at a stone set in the ground, extending three feet above, whereon is cut "U.S. No. 1," which stone marks the northeast corner of the reservation, standing on a small hill known as West Point and set 18 feet in a northeasterly direction from the corner of a building designated as the office and medical depository located in said reservation and running thence north 60° west 80 chains to a stone upon which is cut "U.S. No. 2;" thence north 70° west 97 chains to a stone upon which is cut "U.S. No. 3;" thence south 56 chains and 50 links to a monument of stones at the top of a hill; thence south 70° west 97 chains to a monument of stones at the base of a hill; thence south 60° east 80 chains to a stone set in the ground 2 feet above, upon which is cut "U.S. S.E. corner;" thence north 56 chains and 50 links to place of beginning.

On July 31, 1903, a 50.37-acre tract of land lying in Section 36, Township 14 South, Range 65 East, and 52.91 acres in Setion 31, Township 14 South, Range 66 East, were set aside by Executive Order and added to the existing reservation. This addition was described as:

> Lot 4, containing 38.75 acres, and Lot 5, containing 11.62 acres, in Section 36, Township 14 S, Range 65 E
> Lot 3, containing 39.20 acres, and Lot 4, containing 13.71 acres, in Section 31, Township 14 S, Range 66 E

A Presidential Order of October 26, 1912, setting aside 89.70 acres was canceled by Executive Order dated November 26, 1912, which set aside 128.37 acres as an addition to the Moapa Reservation. This later order in part read:

> It is hereby ordered that the following described tracts of land, aggregating 89.70 acres, namely the Lots 3 and 4 and the NE/4 of the NW/4 of Section 1, Township 15 South of Range 65 East of the Mount Diablo

Meridian in Nevada, be, and the same are hereby, reserved from settlement, entry, sale or other disposition, and set aside as an addition to the Moapa River Indian Reservation: Provided, that the withdrawal hereby made shall be subject to any prior valid rights of any persons to the lands described herein.

On January 28, 1974, from Voris G. Perkins and Ina N. Perkins, 11.59 acres, deed of record on file with Clark County, Book 440, No. 399858, described as:

A tract of land located in Clark County, State of Nevada, being a portion of the North Half (N ½) of Section Thirty-Six (36), the Southwest Quarter (SW ¼) of the Southwest Quarter (SW ¼) of Section Twenty-five (25) and the Southeast Quarter (SE ¼) of the Southeast Quarter (SE ¼) of Section Twenty-six (26), Township Fourteen (14) South, Range Sixty-five (65) East, Mount Diablo Base and Meridian, that is more particularly described as follows:

Commencing at brass cap Number Five (5), which is the Northwest (NW) corner of the Southeast Quarter (SE ¼) of the Northeast Quarter (NE ¼) of Section Thirty-six (36); thence South one degree seven minutes East (S1° 07'E) six hundred forty-three and forty-two hundredths (643.42) feet to the true point of beginning; thence South one degree seven minutes East (S1° 07'E) three hundred eighty-seven and fifty hundredths (387.50) feet; thence North forty-four degrees thirty-eight minutes West (N44° 38'W) sixteen hundred fifty-five and ninety-four hundredths (1655.94) feet; thence North fifty-four degrees forty-two minutes West (N54° 42'W) two thousand fifty-three and ninety-two hundredths (2053.92) feet; thence North fifty-three degrees fifteen minutes West (N54° 15'W) two hundred eighty-six and two hundredths (286.02) feet; thence South eighty degrees three minutes East (S80° 03'E) one hundred seventy-six and twenty-one hundredths (176.21) feet; thence South fifty-three degrees twenty-nine minutes East (S53° 29'E) five thousand sixty-seven and sixty-nine hundredths (5067.69) feet to the point of beginning containing eleven and fifty-nine hundredths (11.59) acres more or less.

On July 6, 1979, from Alyce Perkins, 203.14 acres, deed of record on file with Clark County, Book 1084, No. 1043883, described as:

PARCEL "A":

Government Lot Three (3), being situate in the Northeast Quarter (NE ¼) of Section 36, Township 14 South, Range 65 East, M.D.B.&M.

PARCEL "B":

The Easterly 50 feet of Government Lot Two (2), being situated in the Northeast Quarter (NE ¼) of Section 36, Township 14 South, Range 65 East, M.D.B.&M.

PARCEL "C":

The Southwest Quarter (SW ¼) of the Southeast Quarter (SE ¼) of Section 25, Township 14 South, Range 65 East, M.D.B.&M.

EXCEPTING THEREFROM the Southerly 1155.00 feet of the Westerly 165.00 feet thereof.

PARCEL "D":

The Southeast Quarter (SE ¼) of the Southwest Quarter (SW ¼) of Section 25, Township 14 South, Range 65 East, M.D.B.&M.

EXCEPTING THEREFROM the Southerly 330 feet of the Westerly 990 feet AND the Easterly 330 feet of the Southerly 1155 feet therof.

PARCEL "E":

The Northerly 50 feet and the Westerly 50 feet of the Southwest Quarter (SW ¼) of the Southwest Quarter (SW ¼) lying Northerly of the North boundary line of the MOAPA INDIAN RESERVATION, being situate in Section 25, Township 14 South, Range 65 East, M.D.B.&M.

PARCEL "F":

The Northerly, Easterly and Westerly 50 feet of Government Lot One (1) being situate in the Southeast Quarter (SE ¼) of Section 26, Township 14 South, Range 65 East, M.D.B.&M.

ALSO EXCEPTING from the hereinabove described Parcels "A", "E" and "F" any portion of said land lying within the boundaries of the following described real property:

A tract of land located in Clark County, State of Nevada, being a portion of the North Half (N ½) of Section 36, the Southwest Quarter (SW ¼) of the Southwest Quarter (SW ¼) of Section 25 and the Southeast Quarter (SE ¼) of the Southeast Quarter (SE ¼) of Section 26, Township 14 South, Range 65 East, M.D.B.&M., that is more particularly described as follows:

COMMENCING at brass cap Number Five (5), which is the Northwest (NW) corner of the Southeast Quarter (SE ¼) of the Northeast Quarter (NE ¼) of Section 36;

THENCE South 1°07' East, 643.42 feet to the TRUE POINT OF BEGINNING;

THENCE South 1°07' East 387.50 feet;
THENCE North 44°38' West, 1655.94 feet;
THENCE North 54°42' West, 2053.92 feet;
THENCE North 53°15' West, 1485.99 feet;
THENCE North 54°15' West, 286.02 feet;
THENCE South 80°03' East, 176.21 feet;
THENCE South 53°29' East, 5067.69 feet to the POINT OF BEGINNING, conveyed to THE UNITED STATES OF AMERICA in Trust for the BAND OF PAIUTE INDIANS, by Deed recorded July 8, 1974 as Document No. 399858 in Book 440 of Official Records, Clark County, Nevada.

The Moapa Band of Paiutes have recently expanded their reservation by 70,565.46 acres:Township 15 south, Range 65 east, Mount Diablo Meridian, Nevada.

Section 1: Lot 1; south half northwest quarter, south half 439.89 acres.
Section 2: All 639.56 acres.
Section 3: All 639.28 acres.
Section 4: All 638.48 acres.
Section 5: All 638.44 acres.
Section 6: All 638.41 acres.
Section 7: All 640.16 acres.
Section 8: All 640.00 acres.
Section 9: All 640.00 acres.
Section 10: All 640.00 acres.
Section 11: All 640.00 acres.
Section 12: All 640.00 acres.
Section 13: All 640.00 acres.
Section 14: All 640.00 acres.
Section 15: All 640.00 acres.
Section 16: All 640.00 acres.
Section 17: All 640.00 acres.
Section 18: All 640.28 acres.
Section 19: All 640.24 acres.
Section 20: All 640.00 acres.
Section 21: All 640.00 acres.
Section 22: All 640.00 acres.
Section 23: All 640.00 acres.
Section 24: All 640.00 acres.
Section 25: All 640.00 acres.
Section 26: All 640.00 acres.
Section 27: All 640.00 acres.
Section 28: All 640.00 acres.
Section 29: All 640.00 acres.
Section 30: All 640.12 acres.
Section 31: All 640.80 acres.
Section 32: All 640.00 acres.
Section 33: All 640.00 acres.
Section 34: All 640.00 acres.
Section 35: All 640.00 acres.
Section 36: All 640.00 acres.
Total acreage 22,835.66.

Township 16 South, Range 65 east, Mount Diablo Meridian, Nevada.
Section 1: All 640.36 acres.
Section 2: All 640.76 acres.
Section 3: All 640.86 acres.
Section 4: All 640.96 acres.
Section 5: All 641.02 acres.
Section 6: All 640.74 acres.
Section 7: All 639.24 acres.
Section 8: All 640.00 acres.
Section 9: All 640.00 acres.
Section 10: All 640.00 acres.

Section 11: All 640.00 acres.
Section 12: All 640.00 acres.
Section 13: All 640.00 acres.
Section 14: All 640.00 acres.
Section 15: All 640.00 acres.
Section 16: All 640.00 acres.
Section 17: All 640.00 acres.
Section 18: All 639.26 acres.
Section 19: All 639.20 acres.
Section 20: All 640.00 acres.
Section 21: All 640.00 acres.
Section 22: All 640.00 acres.
Section 23: All 640.00 acres.
Section 24: All 640.00 acres.
Section 25: All 640.00 acres.
Section 26: All 640.00 acres.
Section 27: All 640.00 acres.
Section 28: All 640.00 acres.
Section 29: All 640.00 acres.
Section 30: All 639.32 acres.
Section 31: Lots 3, 4; east half west half, east half 559.93 acres.
Section 32: All 640.00 acres.
Section 33: All 640.00 acres.
Section 34: All 640.00 acres.
Section 35: All 640.00 acres.
Section 36: All 640.00 acres.
Total acreage 22,961.65.

Township 16 south, Range 64 east, Mount Diablo Meridian, Nevada.
Section 1: All 640.48 acres.
Section 2: All 641.00 acres.
Section 3: All 641.10 acres.
Section 4: All 641.26 acres.
Section 5: All 641.52 acres.
Section 6: All 642.52 acres.
Section 7: All 641.40 acres.
Section 8: All 640.00 acres.
Section 9: All 640.00 acres.
Section 10: All 640.00 acres.
Section 11: All 640.00 acres.
Section 12: All 640.00 acres.
Section 13: All 640.00 acres.
Section 14: All 640.00 acres.
Section 15: All 640.00 acres.
Section 16: All 640.00 acres.
Section 17: All 640.00 acres.
Section 18: Lots 1, 2, 3, 4; north half northeast quarter, northeast quarter southeast quarter northeast quarter, northwest quarter wouthwest quarter northeast quarter, east half west half, southwest quarter northwest quarter southeast quarter, southwest quarter southeast quarter 471.16 acres.
Section 19: All 640.94 acres.
Section 20: All 640.00 acres.

Section 21: All 640.00 acres.
Section 22: All 640.00 acres.
Section 23: All 640.00 acres.
Section 24: All 640.00 acres.
Section 25: All 640.00 acres.
Section 26: All 640.00 acres.
Section 27: All 640.00 acres.
Section 28: All 640.00 acres.
Section 29: All 640.00 acres.
Section 30: All 640.78 acres.
Section 31: All 640.36 acres.
Section 32: All 640.00 acres.
Section 33: All 640.00 acres.
Section 34: All 640.00 acres.
Section 35: All 640.00 acres.
Section 36: All 640.00 acres.
Total acreage 22,882.52.

Township 14 south, Range 66 east, Mount Diablo Meridian, Nevada
Section 29: West half 320.00 acres.
Section 30: All 630.38 acres.
Section 31: East half of Lot 1; east half, east half northwest quarter, southwest quarter northwest quarter, northeast quarter southwest quarter 499.99 acres.
Section 32: West half 320.00 acres.
Total acreage 1,769.87.

Township 17 south, Range 64 east, Mount Diablo Meridian, Nevada
Section 7: Lots 5 and 6; south half northeast quarter 115.76 acres.

APPENDIX B. WATER ISSUES ON RESERVATIONS IN OR PERIPHERAL TO THE DDA

B.1 South Fork, Odgers Ranch, and Ruby Valley Reservations (Te-Moak)

B.2 Yomba Reservation

B.3 Duckwater Reservation

B.4 Goshute Reservation

B.5 Moapa Reservation

APPENDIX B. WATER ISSUES ON RESERVATIONS IN OR PERIPHERAL TO THE DDA

B.1 SOUTH FORK, ODGERS RANCH, AND RUBY VALLEY RESERVATIONS (TE-MOAK)

The South Fork Reservation consisting of four adjoining ranches and one ranch in Ruby Valley was established by Secretarial proclamation on February 8, 1941, under Section 7 of the Indian Reorganization Act.

Griswold Ranch: Purchase was approved by the U.S. Department of the Interior on September 17, 1938, and recorded on October 21, 1938, in the County of Elko. The purchase included all water, water rights, dams and ditches used inconnection with the properties together with all range and range watering rights.

Drown Ranch: Purchase as approved by the Department of the Interior on March 18, 1938, and recorded on March 31, 1938, in the County of Elko. The purchased 2,195.63 acres included all water, water rights, dams, and ditches upon or in connection with the property, along with all range and range rights used inconnection with the property except lands lying in Section 17, T 31 N, R 57 E (NW 1/4 SW 1/4 portions) as referenced in the deed.

Ogilvie Ranch: Purchase was approved by the Department of the Interior on March 21, 1939, and recorded April 5, 1939, in the County of Elko. The land purchase included all water, water rights, dams, and ditches now or heretofore used upon or in connection with the property along with all range and range watering rights.

Odger's Ranch: Purchase was approved October 6, 1939, and recorded December 10, 1938, in Book 49, pages 651 and 652, Elko County, Nevada. The ranch consisted of some 900 acres of irrigated meadow and pasture, and over 1,000 acres of sagebrush grass and grazing privileges which are shared in common with other ranches.

Dewar Ranch: (Tract No. 4 of the South Fork-Humboldt 1942 contractual land acquisition project) was entered into pursuant to authority contained in the Act of June 23, 1941 (55 Stat. 303, 312). This property, adjoining the Ogilvie Ranch (on the east) and the Drown Ranch (on the south) was approved by the Department of the Interior in March 1943, and recorded in Book 52 of Deeds (pages 43-45), Elko County. The purchase included all waters, water rights, rights for use of water, dams, ditches, canals, pipes, pipelines, and any other means for the diversion and/or use of water apportionment to be used in connection with the properties along with all grazing rights and privileges and stock watering rights used in connection with the real estate.

The United States government purchased the adjoining hay and livestock ranches of Drown, Griswold, Ogilvie, and Dewar; the appurtenant water rights were also acquired.

The main differences between the Decrees are that the Bartlett Decree incorporates the "Doctrine of Relation" while the Edwards Decree does not. Judge Edwards took into consideration the "pooling" of waters on legal tract lands whereby

water may be used on any lands that are "bracketed" within a legal subdivision which allows multiple sharing over respective lands of the user.

The basis of the irrigation system for the South Fork Reservation lands are the decreed water rights as set forth in the Edwards Decree of 1935 and subsequent permits issued by the State Engineer, Division of Water Resources. In general, the Decree provides for a flow of 1 cubic ft per second to irrigate 81.30 acres of decreed land or at proportional rates therefor for the irrigation season. The Edwards Decree sets forth that lands with "Harvest Crop" have an irrigation season from April 15 to August 15 of each year, and that lands designated as "Diversified Pasture" have an irrigation season from April 15 to May 15 of each year. The reservation has water rights dating back to 1867 and extending through 1916, applicable to 4,073.89 acres.

B.2 YOMBA RESERVATION

Four (4) ranches were purchased under authority of the Indian Reorganization Act--IKA (48 Stat. 984) which created the Yomba Reservation.

In addition to land there were conveyed all water and water rights, ditches and ditch rights, dams and reservoirs, range rights and livestock water held on public lands. The range and water rights will be summarized for all four ranches following discussion on land holdings.

Also with the land there were included all water, water rights, dams or ditches now or therefore used upon or in connection with the premises together with all range rights and privileges of every kind and description had and possessed in connection with the real estate.

These deeds conveyed the lands with all water, water rights, ditch and ditch rights, and any water developments made or owned on the public domain now being used as a range for livestock in connection with the premises. The deeds were recorded in Nye County on July 11, 1941, in Deed Book 48, on pages 291 and 293, respectively.

Also conveyed were water, water rights, range rights and privileges incident or appurtenant thereto.

The Yomba Reservation has vested rights of the original ranch owners (via the deeds of purchase). The water rights were filed in the 1889 period. Four problems exist with the early filings: (1) Diversions were not always clearly identified, (2) water duties were not generally specified, (3) irrigated acreages were not always identified, and (4) many filings in this period claimed waters in great excess to what they could have potentially used. (T.E. Eakin et al, 1965)

A study conducted in 1975 by BRI Systems for the Bureau of Indian Affairs identified the on-reservation water rights and projected needs for the four ranches as:

> The Bowler Ranch unit (reference Map Plate #2) has vested claims extending between 1863-1864 on diversions located at NE NE Sec. 19, NW Sec. 20, and NE Sec. 8 using waters from the Reese River and NW

Sec. 17 from Marysville Creek. Some 650-665 acres could possibly have been under irrigation in Sections 4, 5, 7, 8, 17 and 18, T 14 N, R 41 E and Section 33, T 15 N, R 41 E assuming a water duty of 3 acre-feet annually (between March 15 and September 15). It must be noted that no determination can be made without further extensive research as to the land use priority which may be claimed on these lands (i.e., harvest, meadow, or diversified pasture). Table 7-2 shows that some 800-900 acres may be developed and a total of 1,120-1,260 acres may be irrigated, assuming double cropping. If these lands were all harvested, they would require some 3,360-3,780 acre-ft of water as compared to a (projected) vested right of 1,995 acre-ft as shown in Table 7-3. Actual land use mix would encompass both, harvest and diversified pasture land uses. Table 7-4 shows that under such use a deficiency of 795 acre-ft of water rights would arise for an 85 percent efficient irrigation system.

The Dieringer Ranch unit (reference Map Plate #4) has vested claims extending between 1870-1872 on diversions located at SE NE Sec. 22 using Clear Creek waters and NE SW Sec. 22 using Reese River waters (T 13 N, R 41 E) to irrigate an estimated 125 acres in Sections 15 and 22, T 13 N, R 40 E.

The Worthington Ranch unit should have an 1882 priority (Land Patent #4981 and #3977 issued on Feb. 14, 1899 to Joseph Holley). Further research is required to investigate and trace the filings of Gooding and Holly to determine all actual water rights which may exist in this area for the Yomba Reservation, based upon land exchanges and sales in the 1880-1930 period. Best estimates within the scope of the study indicate that about 100-105 acres were irrigated in Secitons 23, 25 and 26, T 13 N, R 40 E and Sections 30-32, T 13 N, R 41 E. Investigation of the lands and potential watershed indicate this figure may be higher, but it cannot be substantiated without further extensive research. The total estimated vested irrigated acreage for the Dieringer-Worthington properties is 229 acres as shown in Table 7-2. The table also indicates that some 260-280 acres are considered arable and assuming double cropping practices, about 380 acres may be irrigated. The projected water duty for full harvest land use is 950 acre-ft for a 95 percent efficient irrigation system as denoted in Table 7-3. Assuming a harvest and diversified pasture land mix balance, some 866 acre-ft would be required in comparison to a projected vested right of 687 acre-ft (assuming the right is based upon harvested land use). This is shown in Table 7-4.

The Doyle Ranch unit water rights date back to 1867-1870 Book C, Miscellaneous Records, (Page 405) for diversions at NW NW Sec. 3, T 12 N, R 40 E(1), NW NE Sec. 16, T 12 N, R 40 E, and NW SE Sec. 9, T 14 N, R 40 E to irrigate Sections 3, 4, 9, 16, 21, 28 and 33, T 12 N, R 40 E. Best estimates indicate that perhaps some 1,150 acres could have been under irrigation at some period in the 1870's. Table 7-2 estimates about 990-1,060 acres considered to be arable because of topography and shows that about 1,440 acres can be irrigated in a given year, assuming double cropping. The (projected) water right of

4,440 acre-ft is based upon harvest land use on the Doyle properties and is sufficient for the acres projected to be developed. The total water duty required for the acres projected to be developed. The total water duty required for an 85 percent efficient irrigation system is 3,450 acre-ft annually as shown in Table 7-4." (BRI Systems, Inc. 1975)

The BRI study gave the following accounting and comments on water rights held by the Yomba tribe on public lands:

Rights Identified with Purchase

The water rights that have been identified with the purchase of the Bowler, Dieringer, Worthington and Doyle Ranches are discussed in this section.

Taylor Spring, also called Sale Spring, located in the SE SW Sec. 24, T 7 N, R 36 E, was filed upon in 1918 by Charles Taylor. It was assigned to F.E. Bell in 1929 and reassigned to the Yomba Tribe (2) in 1944 allowing 0.025 CFS for livestock watering purposes. The filing is in good standing and Certificate 585 was issued in 1922 for its use.

Mud Springs located at Lot 4, Section 2 in T 7 N, R 36 E was also filed upon by Charles Taylor in 1918. The water right was assigned to F.E. Bell in 1929 and subsequently assigned to the Yomba Tribe in 1944. Certificate 586 has been issued for 0.025 CFS for lifestock watering purposes.

Mitchell Spring was filed upon by Charles Taylor in 1917 and transferred to the Plymouth Land and Stock Company in 1918. Subsequent assignments include F.E. Bell in 1928 and the Yomba Tribe in 1944. Certificate 1573 has been issued for 0.05 CFS for stockwatering purposes between March and December. The spring is located at NW SE Sec. 25, T 7 N, R 36 E.

Two filings were made at Storey Springs which impact the Yomba Tribe's water rights. Filing No. 8434 by F.E. Bell in 1928 was subsequently cancelled by the Carson Indian Agency in 1948 and is discussed in Section 4.3. A second filing was located, Application No. 4756, filed in 1917 by Charles R. Lewis. The right was assigned to the Plymouth Land and Stock Company in 1919 and reassigned to F.E. Bell in 1928. Subsequently, it was reassigned to the Yomba Tribe in 1944. Certificate 1811 was issued for 0.025 CFS for stockwatering purposes in Township 8 North, Range 37 East.

Wild Horse Corral Spring was filed in 1916 by Charles H.Taylor. He assigned the rights to this spring to the Plymouth Land and Stock Company in 1918. F.E. Bell purchased the rights in 1928 and they were subsequently reassigned to the Yomba Tribe n 1944. The spring located at SE SE Sec. 12, T 9 N, R 34 E, has a water right of 0.05 CFS appropriated.

Jack Rabbit Spring located in the SW NE Sec. 35, T 10 N, R 33 E, was filed by F.E. Bell in 1928. The rights were reassigned to the Yomba Tribe in 1944 for 0.50 CFS as shown in Appendix A. No certificates has been issued.

Finger Rock Well was claimed by C.L. Heath in 1926. It was transferred to F.E. Bell in 1928 and later reassigned to H.S. Doyle in 1933. The Yomba Tribe was assigned this right in 1946. No certificate has been issued for a claimed 0.025 CFS right located in T 10 N, R 36 E.

Goldyke Well (T 10 N, R 37 E) was filed by Bell (Nye County Recorder, Book 1, Page 241). An application was made to the State Engineer (No. 5749) and Certificate No. 937 was issued in 1923 for 0.0375 CFS for 1250 cattle between February and July. The right was transferred to the Yomba Tribe in 1944.

Last Chance Well, also called Bell Well No. 2, in SW NW Sec. 21, T 10 N, R 38 E, was filed by F.E. Bell in 1927. No certificate has been issued and the rights were assigned to the Yomba Tribe in 1944.

An unnamed well in SE NW Sec. 21 (Application No. 13185) was also filed by F.E. Bell. Reference is made to the filing on Page 338, Book 2, Nye County and at the State Engineer's Office, file number 13185. Certificates 3961-64 were issued in 1949 for 0.013 CFS. This filing is an adjudicated right of the Yomba Tribe via Government purchase of the Doyle (Bell) Ranch.

The Yomba Tribe also has rights to Kelly Well located at NE SE Sec. 18, T 11 N, R 36 E, along with other claimants such as W.W. Whitaker (Application No. 12066). The filing made in 1945 is also recorded in Nye County (Book 2, Page 199). A certificate was issued for 0.016 CFS in 1946.

An unnamed well located at NE SW Sec. 14, T 11 N, R 38 E, was filed upon in 1949 for the Yomba Tribe. The claim was protested by David Stevens who withdrew his protest in 1952. Certificate 3961 was issued in 1953 for 0.013 CFS for stockwatering purposes. This claim (Application No. 13183) should not be confused with the F.E. Bell claim in the same area (Application No. 8097) which is discussed in Section 4.3.

Upper Antelope Spring located at SE NW Sec. 31, T 12 N, R 38 E was filed in 1926 by C.L. Heath. The right was assigned to F.E. Bell in 1928, James Lister in 1932, H.S. Doyle and K.G. Foster in 1933, H.S. Doyle in 1936, and the Yomba Tribe in 1946. Certificate 2942 was issued in 1946 for 0.015 CFS with a priority of 1926.

Lower Antelope Spring located at SE SE Sec. 31, T 12 N, R 38 E, was filed in 1926 by C.L. Heath. The right was assigned to F.E. Bell in 1928, James Lister in 1932, H.S. Doyle in 1946 and the Yomba Tribe in 1946. Certificate 2943 was issued in 1946 for 0.015 CFS for stockwatering purposes.

An underground well located at NE NW Sec. 36, T 13 N, R 38 E, was filed in 1949 for the Yomba Tribe. Certificate 3962 was issued in 1953 for 0.013 CFS for stockwatering purposes (Application No. 13184 State Engineer's Office; No. 337, Nye County, Book 2).

The George N. Dieringer Clear Creek water rights are specified in Book C, Page 404 at the Nye County Recorder's Office. They were filed in 1889. The diversions are not specified in legal coordinates but the filing references indicate that diversions located at SE NE Sec. 22, and possibly at SW SW Sec. 32, NW NE Sec.31, and NW NW Sec. 31, T 13 N, R 41 E, should represent the locations claimed. Further, research of filing data references (given in terms of feet from the Dieringer dwelling, etc.) into factual diversion coordinates. There are some discrepancies that appear between the Dieringer 1889 filings and those of John Gooding on Page 405, Book C, Nye County Recorder's Office, 1889. The diversions of Gooding appear to include SW SE Sec. 25, NW SW Sec. 25, T 13 N, R 41 E, and NW NW Sec. 5, T 12 N, R 41 E, and diversions located at Sec. 31 and Sec. 32, T 13 N, R 41 E. A review of these claims shows that they should include all the Clear Creek diversions which irrigate both, the purchased Dieringer and Worthington properties.

It is noted that the early filings at the Nye County Recorder's Office were made in very "general" language. For example, Mathias Merton (Book C, Page 395; August 12, 1889) claimed all the water of the reese River north of George Keough's house. This claim is located between the Bell and Schmaling Ranches of the 1920 period.

The G.N. Dieringer vested diversions at NE SW Sec. 22, T 13 N, R 41 E, withdrawing waters from the Reese River was filed on Page 404, Book C, Nye County recorder's Office. The filing references indicate a diversion to be one-half mile south of the dwelling; this appears to meet the identified diversion source coordinates in Section 22.

The P.M. Bowler claims appear in Book C, Page 406 of the Miscellaneous Records, Nye County Recorder, 1889. Identified diversions from the Reese River appear to be those at Sections 8 in T 14 N, R 41 E. Other filings were made by John F. Bowler between 1918-20 for diversions which appear to be those located in Sections 19 and 20, T 14 N, R 41 E. The application (No. 4824) was cancelled in 1938 due to applicant failure to comply with filing all the requested information to the State. This claim represents a potential right.

The diversions irrigating the Bowler Ranch unit are identified in Book C, Miscellaneous Records, Tonopah with a priority between 1863 and 1864. Estimated water requirements are not stated, although it would require about 3 acre-ft of water annually for each acre irrigated.

The Doyle Ranch unit priorities, also recorded in Book C, vary between 1867-1870 and Dieringer's priority is 1870 for Clear Creek and 1872 for the Reese River diversions. Water duty is not specified in either filing. (BRI Systems, Inc. 1975)

B.3 DUCKWATER RESERVATION

Lands were conveyed with the following rights and improvements:

> Together with all water, water rights, springs, water applications, and water permits, or privileges, connected with, belonging, appurtenant or incident to the lands and all dams, tunnels, ditches, reservoirs, tanks, canals, corrals, pipelines, houses, troughs, or other works for storage or carrying of water, and any other improvements made and now being used along with any spring,well, stream or other water development; also all water rights of every kind,nature and description owned by the parties of the first part, or in which they have any interest, including all stock-water rights, privileges and permits, incident to appurtenant to the said lands.
>
> Together with all houses, fences and other improvements on said lands.
>
> Together with all range rights, range water rights, and range privileges used in connection with the said lands. And also those certain water rights used in connection to said described lands, or incident said lands or appurtenant to said lands, as situate in the County of White Pine, State of Nevada, described as follows:
>
> Application No. 7379, Rye Grass Spring, SW 1/4 NW 1/4 Section 22, T 14 N, R 55 E, Stockwatering;
>
> Application No. 7580, Little Nevada Spring, NW 1/4 SE 1/4 Section 20, 16 N, R 55 E. Stockwatering;
>
> Application No. 7377, Nevada Governor Spring, SW 1/4 SW 1/4 Section 25, T 15 N, E 55 E;
>
> That Application No. 5853, Greasegood Spring, (about 2 mi from Soda Spring and near road to Duckwater, Nevada) was made to the State Engineer and that said spring has been cancelled, but that parties of the first part claim a possessory right in and to said spring;
>
> Application No. 7578, Pogue Wells, 1, 2, and 3, SE 1/4 NE 1/4 Section 11, T 15 N, R 54 E, Stockwatering;
>
> Application No. 1633, Hillside Spring,Certificate No. 44, SE 1/4 NW 1/4 Section 22, T 16 N, R 55 E, Stockwatering.

The water filings are discussed in detail in a letter of August 3, 1940, from the Nevada State Engineer to Assistant Land Field Agent Clark, United States Indian Service.

The lands were conveyed together with the following rights and improvements:

> Together with all water, springs, water rights, water applications and water permits, or privileges, connected with, belonging, appurtenant or incident to the lands hereby conveyed, or used in connection with all or

any part of the above described premises, or used or usable in connection with all or any part of the above described premises, or used or usable in connection therewith, reserving therefrom all springs and water rights in Eureka County, State of Nevada, except Cow Well #1, application No. 9398, and Cow Well #2, Application No. 9411, as above described, and all dams, tunnels, engines,ditches, reservoirs, tanks, canals, corrals, pipelines, houses, troughs or other works for storage or carrying of water, and any other improvements made and now being used along with any spring, well, stream or other water development, as owned by parties of the first part, or in which they now have any interest; and all applications now pending in the office of the State Engineer of the State of Nevada, for any and all waters to be used upon any part or portion of the above described lands, or used in connection therewith; also all water rights of every kind, nature and description owned by the parties of the first part, or in which they have any interest, including all stockwatering rights, privileges and permits, incident to or appurtenant to the hereinabove described lands, except such water rights in Eureka County, Nevada, as herein reserved.

The water rights mentioned in the quote above are described in the deed as follows:

All those certain water rights, water filings and appropriations situated in the Pancake Mountains or vicinity, known as

Portugese Spring, Application No. 9423, Nevada State Engineer's Certificate Record No. 1995, recorded in the Office of the County Recorder of Nye County, Nevada in Book 2 of Water Appropriations, page 69;

Cook Tank Spring, Application No. 9427, Nevada State Engineer's Certificate Record No. 1999, recorded in the Office of the County Recorder of Nye County, Nevada in Book 2 of Water Appropriations, page 72;

Mahogany Spring, Application No. 9422, Nevada State Engineer's Certificate Record No. 1994, recorded in the Office of the County Recorder of Nye County, Nevada in Book 2 of Water Appropriations, page 68;

McClure Spring, Application No. 9424, Nevada State Engineer's Certificate Record No. 1996, recorded in the Office of the County Recorder of Nye County, Nevada in Book 2 of Water Appropriations, page 70;

Sand Spring (San Springs), Application No. 9425, Nevada State Engineer's Certificate Record No. 1997, recorded in the Office of the County Recorder of Nye County, Nevada in Book 2 of Water Appropriations, page 71;

Moody Spring, Application No. 9421, Nevada State Engineer's Certificate Record No. 1993, recorded in the Office of the County Recorder of Nye County, Nevada in Book 2 of Water Appropriations, page 67;

Big Louis Spring, Application No. 9426, Nevada State Engineer's Certificate Record No. 1998, recorded in the Office of the County Recorder of Nye County, Nevada in Book 2 of Water Appropriations, page 70;

Cow Well #1, Application No. 9398, State Engineer's Office of Nevada, NW 1/4 SE 1/4 Section 20, T 16 N, R 56 E; in Eureka County, Nevada;

Cow Well #2, Application No. 9411, State Engineer's Office of Nevada, NW 1/4 SE 1/4 Section 6, T 15 N, R 54 E, unsurveyed. Domestic and stockwatering. NW corner Section 30, T 16 N, R 56 E, bears N. 76 degrees 56 minutes E. 61,687 ft; in Eureka County, Nevada;

Corner Spring, Application No. 9408, State Engineer's Office of Nevada, NE 1/4 SW 1/4 Section 16, T 11 N,R 55 E, or S. 67 degrees 22 minutes W. 37,460 feet from SW corner of Section 34, T 12 N, R 36 E, unsurveyed;

Butte Station Springs, Application No. 9420, State Engineer's Office of Nevada, NW 1/4 NW 1/4 Section 1, T 14 N, R 54 E, or S. 40 degrees 26 minutes W. 55, 550 f from NW corner of Section 30, T 16 N, R 56 E, (unsurveyed);

Young Florio, Application No. 6769, State Engineer's Office of Nevada, SE 1/4 Section 27, T 13 N, R 55 E, and N. 72 degrees 56 minutes W. 375.7 chains from NW Corner Section 6, T 12 N, R 56 E, Stockwatering and domestic;

Jones Canyon Spring, no application made, claim priority use, exact location not of record. Not located on public survey. Located between Big Louis Spring and Cook Tank Spring on Moody Mountain;

Rock Spring, no application made, claim priority use, exact location not of record. No located on public survey. Located between Cook Tank Spring and Butte Station Springs on Moody Mountain, facing Fish Creek Flat;

North Mahogany Spring, no applicationmade, claim priority use, exact location not of record. Not located on public survey. Located high on Moody Mountain and facing Fish Creek Flat;

Mammoth Reservoir, no application made, located in Nye County, Nevada. Exact location on public survey not of record. Not in use (Sept. 20, 1938). Used for stockwatering. Water impounded by earth dam. Depends on rainfall.

An abstract of the records of the State Engineer regarding these water filings is contained in a letter of August 3, 1940, from the State Engineer to the Assistant Land Field Agent, United States Indian Service.

The Eureka Land and Stock Company had protested water filings on Cow Well #1 (Application No. 9398) and Cow Well #2 (Application No. 9411), as is noted in the abstract of records of the State Engineer. The applications were denied by the State Engineer, however, both Indians and non-Indians have continued to use Cow Well #1.

These two tracts (Nos 1 and 2) make up the land area, containing 3,240 acres, which, on November 13, 1940, was proclaimed to be an Indian Reservation.

Tract No. 3 containing 402.93 acres of land, was purchased from C.S. Munson, et ux., as part of the Duckwater 1942 Land Acquisition Project.

Most of the water used for irrigation in Duckwater Valley comes from Big Warm Springs located on parcel No 2.

The lands were conveyed together with all water and range rights, permits, privileges, etc., incident to or appurtenant to said lands and together with all houses, fences, and other improvements on said lands.

A quitclaim deed executed by the Munsons on December 17, 1942, conveyed to the United States water development on the public domain:

> "All water developments on the public domain now being used as a range for livestock in connection with the ranch, as located on Duckwater Creek, in Nye County, State of Nevada, now known as the Munson Ranch, formerly the Mendes Ranch, which said ranch is particularly described in that certain Deed and made between the same parties as to this Deed, being dated December 17th, 1942."

Decreed water rights are referred to in the deed in the following manner:

> Together with all those certain water rights, water permits, and vested water rights used in connection to said described lands, or incident to said lands, as situated in the County of Nye, State of Nevada, described as follows:
>
> Being that portion and part of the water rights pertaining to said hereinabove described land and as described in the decree in the case of Louisa Irwin, plaintiff, versus J. C. Tognoni, et al., defendants, Case No. 2198, in the Fifth Judicial District Court of the State of Nevada, in and for the County of Nye, which said water rights to W. F. Mendez and Mary Mendes were awarded as follows:
>
> That said codefendants W. F. Mendes and Mary Mendes, his wife, of 4.2 sq ft per second of time of the waters and flow of said creek, in connection with and for the irrigation of their said lands, measured at their headgates or points of diversion:--
>
> also,
>
> "That the said parties are the owners of and entitled to the use of the surplus waters and flow of said Duckwater Creek, if any there be, for the irrigation and cultivation of their said lands and for stock and domestic purposes, and that the same be divided among them pro rata according to the amounts of their several rights and appropriations as herebefore decreed to them;--and that none of the other parties appearing to or having defaulted in this action have any right to any of the said waters of said stream"
>
> And that part and portion of said water rights as above described and being commonly known as the Irene McElligott water right, as pertaining

to said lands as described in the decree, and as particularly described in File No. 2813, in the Seventh Judicial District Court of the State of Nevada, in and for the County of White Pine, in the Matter of the Estate of Mary A. Mendes, deceased, Estate No. 726, and as filed and of record in the office of County Recorder of Nye County, Nevada, on July 14th, 1933, which said Decree particularly sets forth the water rights pertaining to the hereinabove described lands, as follows:

Fourth: As to the water right appurtenant to the said Mendes Home Ranch as a whole in and to the waters of Duckwater Creek, from which waters the said ranch has been heretofore irrigated as a unit, chiefly from and through five certain diversions of the basin of said creek and through numerous ditches now existing and best designed to serve the various areas with water for irrigation, the said William F. Mendes and Irene McElligott, having by recitals in said agreement of March 21, 1935, recognized one another as the owner of an easement in any and all ditches, headgates and other water works serving his or her portions of land hereinabove under Second and Third described, and the right to have such waters of said creek as being appurtenant to the said ranch as a whole, continue to flow through said ditches and water works during the irrigation season of each year, that is to say, beginning with the first day of April of each year and thereafter continuing throughout the irrigation season under a program and agreed to plan of rotational irrigation providing, in substance, that (a) the said William F. Mendes, beginning with the first day of April in each year from and after the execution of said agreement, should have the right to the entire flow of such water for a period of five and one-half successive days; that (b) immediately following such last mentioned period of use the said Irene McElligott should have the right to the entire flow of such water for the ensuing period of three and one-half successive days, with (c) such periods of use thereafter alternating in the same manner throughout each of such irrigation seasons, provided (d), however, that notwithstanding the above recitals, not to exceed one-fourth sq ftper second of water should at all times thereafter be allowed to run, as theretofore, from Diversion Ditch No. 5 situated as threin described in the site formerly occupied by the Old Meader residence, theretofore burned, other buildings and gardens arid last mentioned premises; and the Court hereby ratifies and adopts all of the provisions relative to such water right hereinabove mentioned and decrees accordingly.

Tract No. 4 containing 142.5 acres was acquired from Nye County by Tax Deed on December 5, 1941, and approved by the Department of Interior on January 27, 1955.

There were no water rights or grazing privileges identified with this tract. The combined land holdings constituting the Duckwater Reservation are 3,785.43 acres more or less.

The Duckwater Reservation lies in upper Duckwater Valley, an arid area with less than five inches of precipitation occuring as summer thunderstorms and light now flurries. During the winter months the main water supply comes from Big Warm Springs located on the reservation flowing some 20 CFS year long. Water

rights for agricultural use were adjudiccated by the 5th District Court, Nye County, Nevada, Irwin v. Tognoni et als., Civil #2198. In an order dated December 1, 1910, the terms of the decree were amended by an order of the court dated March 27, 1930. The Duckwater Creek Decree is under the administration of the State of Nevada, Department of Conservation and Natural Resources, Division of Water Resources.

The Duckwater Shoshone Tribe hold water rights under the subject decree for 10.36 CFS continuous flow with a priority of 1868. There is under irrigation 1,166 acres on the reservation. In 1977 a well located along the north boundary yielding 1,700 GPM was developed as a supplemental supply for the project. The Duckwater Tribal Council and Bureau of Indian Affairs are currently engaged in updating the project to improve water efficiency of the system, thus providing water for additional lands.

B.4 GOSHUTE RESERVATION

Water supply for the reservation is mainly Deep Creek, Spring Creek, and numerous wells and springs on open rangeland. Prior to reservation status, the District Court in and for Tooele County, State of Utah, adjudicated Deep Creek, order entered July 18, 1905. The decree awarded Goshute Indians one-third of Fifteen Mile Creek and with the purchase of Probert and Snively a one-third right was purchased. Rights to the other significant stream, Spring Creek, was acquired with the purchase of the Georgetta Ranch.

Farming is restricted to available water supply and project works. A study by the Bureau of Indian Affairs in 1975, reported some 2,500 acres could be placed under irrigation with available land and water.

B.5 MOAPA RESERVATION

The Moapa Valley is located along the Muddy River drainage in northeastern Clark County, Nevada, some 60 mi northeast of Las Vegas, Nevada. The Muddy River was a natural tributary to the Virgin River and now discharges into Lake Mead. The Muddy River Basin, a subbasin of the lower Colorado River Basin, has a watershed area of approximately 4,300 sq mi, with approximately 1,500 sq mi upstream from Moapa Reservation.

Water rights of fee land have been adjudicated by the District Court of Clark County in and for the State of Nevada in a final decree entered January 26, 1926. This decree purported to adjudicate rights for the Moapa Reservation to irrigate 87.0 acres. Position of the tribe and the federal officials have been the decree is not enforceable on the reservation since rights can only be established through the federal courts.

In an Act of Comity and to demonstrate a reasonable use of water, the Moapa Tribal Council has in recent years entered into short-term agreements with the Muddy Valley Irrigation Company whereby diversion will not exceed 12 CFS for use on some 591 acres of farmland on the Moapa Reservation. The Moapa Liberty Enterprise is actively engaged in making improvements on the system and lands to gain maximum use of water resources.

WELLS

With the purchase of the Bob Perking Ranch, the tribe secured ownership of two wells for irrigation purposes. The wells are certified by the State of Nevada, and they are for 2.5 CFS each with a maximum flow of 5 acre ft per acre (203.14) or 1015.7 acre ft.

The Moapa Tribe receives all of its domestic water from the old line of the Moapa Valley Water Company that originates at the Springs located at Warm Springs approximately 4 mi north of the reservation. This 8 in. line used to run from the Moapa Springs all the way to Overton/Logandale and service customers along the way. It was, however, replaced with a new 14-inch high pressure line in June 1977. Pressure on the new line varies due to altitude from 25 lbs. at the highest elevations to 140 lbs. at the lowest elevations before it goes through pressure reducing stations. The system averages 80 lbs. pressure. The only major customers on the old line are the tribe and the Nevada Power Company generating station, Reid Gardner. The tribe pays a flat rate of $120 per month and their water is not metered.

The Moapa Indian system consists of an elevated 100,000-gallon storage tank with gravity flow that creates a pressure system averaging 60 psi. The main line to the tank is three in. and the loop distribution system to the houses is two in. There are seven 2-in. stand pipes on the system for a fire system, but they are judged inadequate.

The proposed water system would use river water purified by a sand filtration system. This recommendation is made in light of the poor quality and service the tribe has received over the years; the fact that the Moapa Valley Water System wants to install meters on the reservation and charge an actual usage and not a flat rate as they have been doing; and the fact that the tribe's 5 1/2-acre Tomatoe Project, in full operation, will use tremendous quantities of water at a substantial cost.

Funded for $46,500 by the Department of Energy, Alternative Energy Program, the tribe drilled three test wells from 350 to 500 ft deep to ascertain the geothermal potential in the area. The potential for geothermal is based on the fact that the Moapa Springs, 4 mi north of the reservation, average 90°F. at the surface. The purpose of the drilling was to search for potential geothermal resources that could be developed and tied into the greenhouses and the homes/community buildings for heating purposes. The wells are being completed and testing will be conducted by GeothermeX out of San Fransisco as to the advisability of proceeding with actual production wells. The final report will be submitted by October 31, 1980.

This testing initally promised to result not only in a geothermal resource but also in the location of a good alternative domestic water resource. However, the domestic quality of the water of the wells was totally unacceptable. The two wells acquired with the Bob Perkins Ranch, can be used only for field irrigation purposes due to their quality.

A new proposed system would consist of a pumping station from the river, a sand filtration system, new storage tanks (200,000 gallon capacity) for the Tomato

Project and the 40-unit new housing project, as well as tie into the existing distribution system. Initial estimated costs are $350,000. The tribe has already begun discussions with Indian Health Service regarding review of the matter and funding of a full-scale engineering study.

In addition to the $60,000 committed by IHS, the tribe funded for $30,000 by Farmer's Home Administration for an Industrial Developeinnt grant, which will be used to increase the availabilityof water in the greenhouse area so that an industrial park can be developed. These monies could also be used in connection with the new proposed overall system.

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