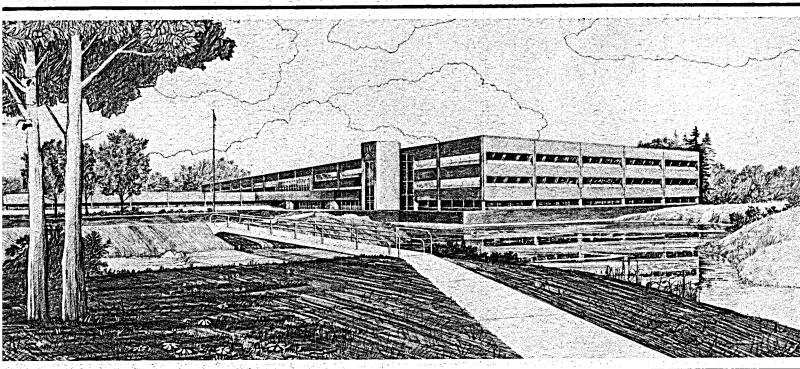
MOUNTAIN HOME KNOWN GEOTHERMAL RESOURCE

AREA: AN ENVIRONMENTAL ANALYSIS

Sue G. Spencer Brent F. Russell Editors

U.S. Department of Energy Idaho Operations Office • Idaho National Engineering Laboratory



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MOUNTAIN HOME KNOWN GEOTHERMAL RESOURCE AREA: AN ENVIRONMENTAL ANALYSIS

Sue G. Spencer
Brent F. Russell
Editors

EG&G Idaho, Inc. Idaho Falls, Idaho 83401

Published September 1979

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CONTENTS

ABST	TRACT	1
INTR	RODUCTION	1
EVAL	LUATION OF THE ENVIRONMENT	3
	Physical Environment	8
	Climatology and Meteorology Air Quality Geology Subsidence Seismicity Water Resources Soils	8 11 11 24 27 31 43
	Biological Environment	53
	Terrestrial Ecology	53 87
	Human Environment	88
REFE	DeomgraphyDescription and Inventory of Existing Data . Socioeconomics	88 96 107 112
	NDIX ASNAKE RIVER BASIN OVERVIEW REPORTS AND SUPPORTING MENTS	115
	FIGURES	
1.	Locations of KGRAs in the Snake River Basin	2
2.	Map of Mountain Home KGRA	4
3.	Topological map of Mountain Home	5
4.	LANDSAT photograph of Mountain Home and surrounding area	6
5.	Photograph of Mountain Home	7
6.	Generalized geological map of southwestern Idaho	15
7.	Stratigraphic nomenclature of the immediate Mountain Home area, western Snake River Plain	18

8.	Geological index map of the Mountain Home area	19
9.	Stratigraphic nomenclature of rock units exposed in the designated Mountain Home KGRA	21
10.	Historical seismicity from U.S. Coast and Geodetic Survey (NOAA), 1880-1975	29
11.	Seismicity for 1975-1976 from BSU network	30
12.	Map of Bennett Creek and Cold Springs Creek drainages near the Mountain Home KGRA area	32
13.	Irrigated area map	33
14.	Characteristic monthly run-off of Little Canyon Creek at Stout Crossing near Glenns Ferry	36
15.	Characteristic monthly run-off of Little Canyon Creek above Berry Ranch near Glenns Ferry	37
16.	Hydrograph of current ground-water observations near the Mountain Home KGRA	39
17.	Availability of ground water to wells	40
18.	Suitability of water for irrigation	42
19.	Location map of known water rights in the vicinity of the Mountain Home KGRA area	44
20.	Location of existing soil survey data	46
21.	Soil survey map from aerial photographs	47
22.	Mountain Home KGRA land-use map	51
23.	Deteriorated range near KGRAs in Elmore, Owyhee, Valley, and Washington Counties	54
24.	Recorded distribution of threatened and endangered plant species in Elmore county and their proximity to the KGRA, followed by specific information about each species	56
25.	Distribution of mule deer, <u>Odocoileus hemionus</u> , wintering habitat within Elmore County; generally illustrating its proximity to the Mountain Home KGRA	68
26.	Distributions of black bear, <u>Urus americanus</u> , elk, <u>Cervus</u> <u>canadensis</u> , and mountain lion, <u>Felis concolor</u> , habitats within Elmore County; generally illustrating their	
	proximities to the Mountain Home KGRA	69

2/.	Distribution of California quail, <u>Lophortyx californicus</u> , and wild turkey, <u>Meleagris gallopavo</u> , habitats within Elmore County; generally illustrating their proximities to the Mountain Home KGRA	70
28.	Distributions of chukar, Alectoris chukar, and mountain goat, Oreamnos americanus, habitats within Elmore County; generally illustrating their proximities to the Mountain Home KGRA	71
29.	Distribution of marten, Martes americana, lynx, Lynx canadensis, peregrin falcon, Falco peregrinus, and reproducing waterfowl habitats within Elmore County; generally illustrating their proximities to the Mountain Home KGRA	72
30.	Distribution of bald eagle, <u>Haliaectus leucocephalus</u> , prairie falcon, <u>Falco mexicanus</u> , and sage grouse, <u>Centrocercus urophasianus</u> , habitats within Elmore County; generally illustrating their proximities to the Mountain Home KGRA	86
31.	Map of the Mountain Home KGRA with its known heritage resource locations	110
	TABLES	
1.	Chemical Analyses of Mountain Home KGRA Wells	9
2.	Summary of Climatic Conditions	10
3.	Elmore County Emissions	12
4.	Twin Falls County Point Sources	13
5.	Information on Hydrologic Records Around the Mountain Home KGRA	35
6.	Water Quality Data for the Streams in the Vicinity of the Mountain Home KGRA	38
7.	Ground-Water Quality Analysis for Wells Near the Mountain Home KGRA	41
8.	Water Rights Information Related to the Mountain Home KGRA	45
9.	Amphibians in the Mountain Home KGRA	73
10.	Reptiles in the Mountain Home KGRA	74

11.	Birds in the Mountain Home KGRA	75
12.	Mammals in the Mountain Home KGRA	83
13.	Population Change of Elmore County, 1970-1976	89
14.	Summary Characteristics of the Elmore County Population, 1970	90
15.	Population and Employment Forecast of Elmore County	91
16.	Summary Education Data of Elmore County	93
17.	Name, Enrollment, and Location of Schools Near the Mountain Home KGRA, 1977-1978	94
18.	Crime Frequencies and Rates Per 100 000 Population of Elmore County, 1971-1976	95
19.	Summary Data on Health Care Capability of Elmore County, 1975	97
20.	Labor Force, Unemployment, Unemployment Rate, and Employment of Elmore County, 1974-1977	98
21.	Employment (Full- and Part-Time) by Type and Broad Industrial Sources of Elmore County, 1971-1976	99
22.	Employment (Full- and Part-TimeSummary Analysis) by Type and Broad Industrial Sources of Elmore County, 1971-1976	100
23.	Selected Housing Characteristics of Elmore County, 1970	102
24.	Personal Income by Major Sources of Elmore County, 1971-1976	103
25.	Personal Income by Major Sources of Elmore County, 1971-1976	104
26.	General Agricultural Data of Elmore County, 1974	105
7.	Summary Data on Land Use, Land Ownership, and Land-Use Control Mechanisms of Elmore County, 1976-1977	106
8.	Summary Data on Assessed Value and Property Tax Charges of Elmore County, 1977	108

Mountain Home KGRA



MOUNTAIN HOME KNOWN GEOTHERMAL RESOURCE AREA: AN ENVIRONMENTAL ANALYSIS

ABSTRACT

The Mountain Home KGRA encompasses an area of 3853 hectares (ha) at the foot of the Mount Bennett Hills in Elmore County, Idaho. The site is associated with an arid climate and high winds that generate an acute dust problem. The KGRA lies adjacent to the northwest-southeast trending fault zone that reflects the northern boundary of the western Snake River Plain graben. Data indicate that a careful analysis of the subsidence potential is needed prior to extensive geothermal development. Surface water resources are confined to several small creeks. Lands are utilized for irrigated farmlands and rangeland for livestock. There are no apparent soil limitations to geothermal development. Sage grouse and mule deer are the major species of concern. The potential of locating significant heritage resources other than the Oregon Trail or the bathhouse debris appears to be relatively slight.

INTRODUCTION

EG&G Idaho, Inc., has completed an environmental analysis for the Mountain Home known geothermal resource area (KGRA) as part of a comprehensive preplanning environmental program related to the KGRAs in the Snake River Basin. EG&G Idaho, Inc., is performing this preplanning environmental program under the auspices of the Office of Health and Environmental Research of the U.S. Department of Energy (DOE). KGRAs included under this program are Vulcan Hot Springs, Crane Creek, Castle Creek, Bruneau, Mountain Home, Raft River, Island Park, and Yellowstone (see Figure 1). The Mountain Home KGRA in Elmore County, Idaho is the subject of this report.

The ultimate goal of the preplanning environmental program is to reduce the delays in geothermal development while minimizing environmental impacts by (a) assessing the existing environmental baseline data for the KGRAs, (b) evaluating those data for adequacy and applicability, and (c) developing a plan for supplementing the existing data to achieve a sound environmental data base prior to geothermal development.

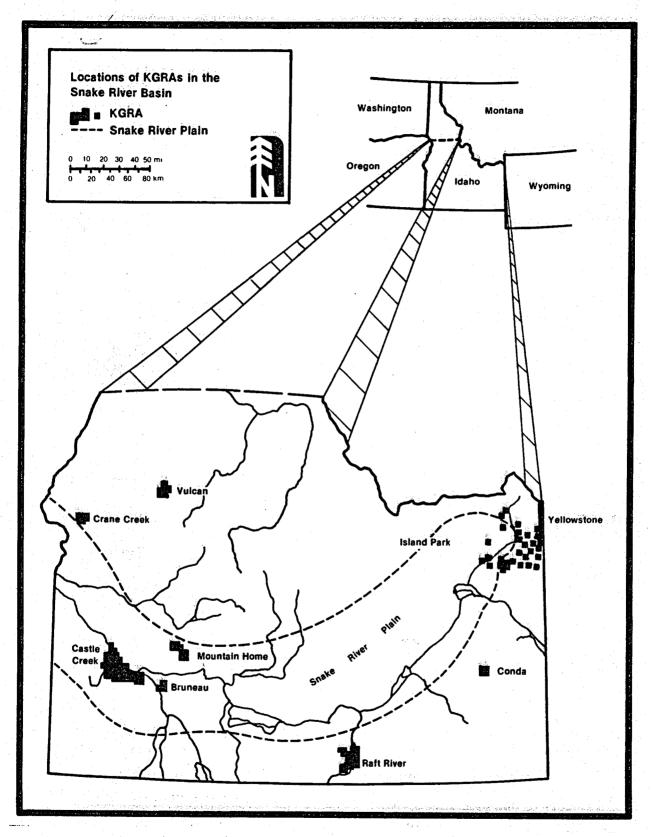


Figure 1. Locations of KGRAs in the Snake River Basin.

Results from the environmental program thus far include a summary of the environmental concerns related to geothermal development in each of the KGRAs, ¹ an annotated bibliography of reference materials, detailed reports on the various program elements for each of the KGRAs, a program plan identifying future research needs, and a comprehensive data file. These will serve as (a) planning tools for state and federal energy, environmental, and land management agencies, (b) reference documents for developers to shorten and simplify project environmental evaluations, and (c) identifiers of the significant environmental concerns for each KGRA so that mitigation measures can be incorporated early in the development process.

This report includes available environmental information for the Mountain Home KGRA. The information presented is a compilation of the most recent data available for analyzing the physical, biological, and human environments for this area. The sources providing the data are identified alongside the subject titles throughout the report. Current commitments and environmental concerns that might affect geothermal development in the region are discussed. Other reports in this series, as well as the technical reports that form the basis of this overview are listed in Appendix A and are available from Information Processing in the Information Division at EG&G Idaho, Inc., P.O. Box 1625, Idaho Falls, Idaho, 83401.

EVALUATION OF THE ENVIRONMENT

The Mountain Home KGRA encompasses 3853 ha at the foot of the Mount Bennett Hills in Elmore County, a few kilometers east of Mountain Home (see Figures 2-5). The KGRA consists of a valley with streams and farmland where forage is grown. A part of the valley is Bureau of Land Management (BLM) land where the major use is for grazing. In addition, the BLM land is used for geothermal because of the thermal wells and hot springs located there (as well as throughout Elmore County).

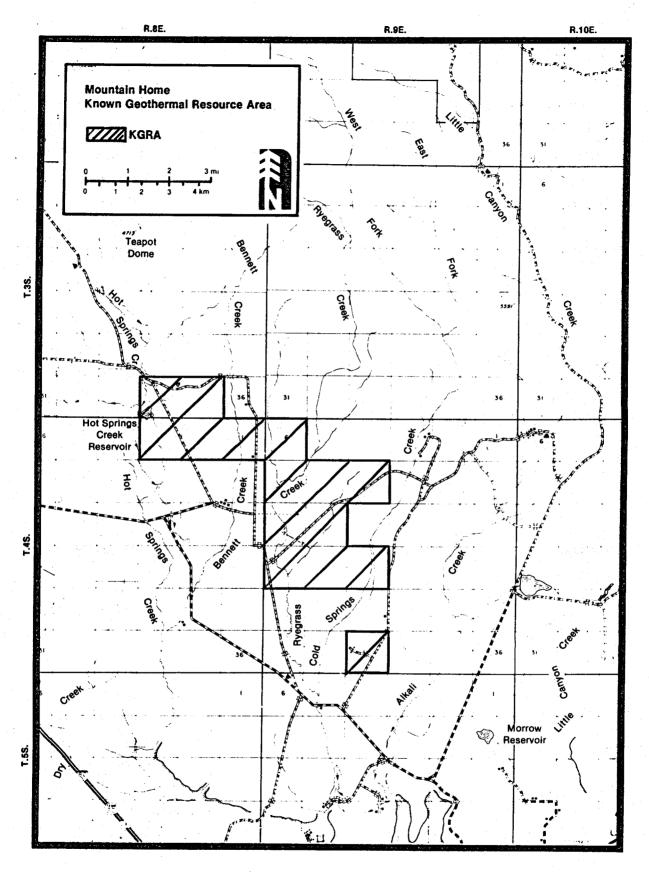


Figure 2. Map of Mountain Home KGRA.

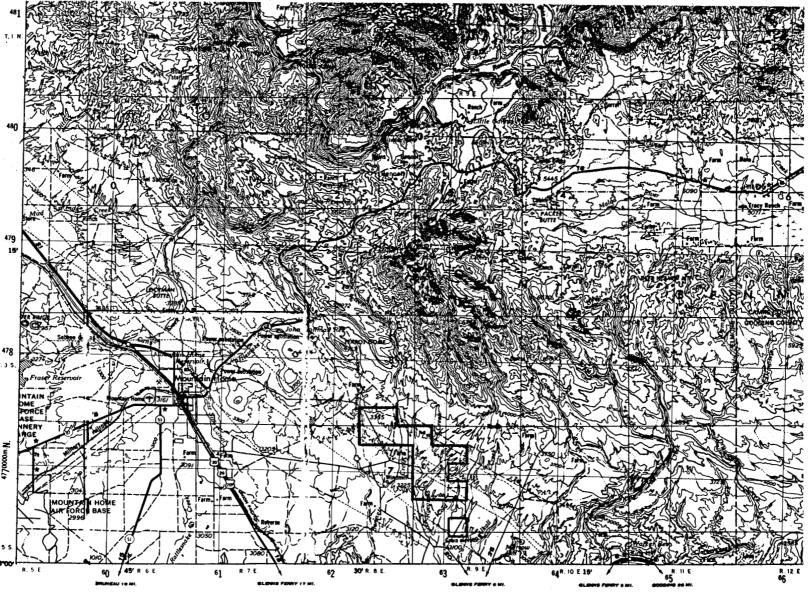


Figure 3. Topological map of Mountain Home.



Figure 4. LANDSAT photograph of Mountain Home and surrounding area.

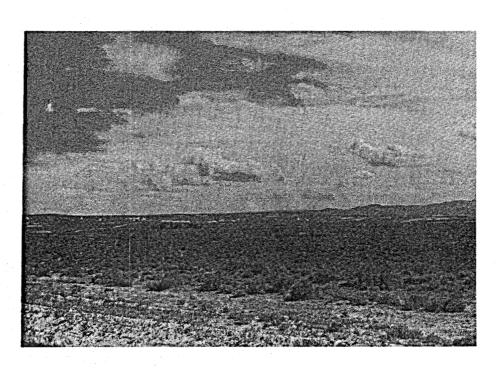


Figure 5. Photograph of Mountain Home.

In the early 1900s, the hot springs were considered the hottest in the state and were used as a medicinal drink. Today, interest has been expressed in developing the resource for space heating at the Mountain Home Air Force Base (AFB). But limited information is available on the geothermal resource potential, although prospects of hotter water at depth are possible. Chemical analyses from two wells in the area are shown in Table 1.

Physical Environment

Climatology and Meteorology (M. Delisio, GeoTechniques)

No primary climatology and meteorology data exist for the Mountain Home KGRA since there is no weather-monitoring system located there. Thus, the climatological and meteorological situation at the Mountain Home KGRA is interpolated and extrapolated primarily from three sources: Climatological Summary, Normals, Means and Extremes, Boise, Idaho, The Atlas of the Pacific Northwest, The Mean Annual Precipitation Map, 1930-1957, State of Idaho. A climatological summary for the Mountain Home region is provided in Table 2. Aridity with widely contrasting daily and annual temperatures is characteristic of the Mountain Home KGRA due to its elevation (958 m) and position in the lee of the Cascade Mountains. The average annual temperature at Mountain Home is 9.6°C. Average rainfall at Mountain Home is 381 mm and mean annual snowfall is 610 mm.

The area is in the Prevailing Westerlies and Polar Easterlies wind systems, where the contact of the two forming fronts generate much of the clouds and associated weather activity in the area. Most of the cool or cold air associated with frontal activity is maritime polar air from the Pacific Ocean, while some is the result of continental polar air from interior Canada. The generalized airflow is primarily evident from the 850 millibar (mb) level (approximately 1524 m) upward while surface airflow is greatly affected by land forms such as the Owyhee Mountains, Snake River Plain, and northern Rocky Mountains and by diurnal conditions. Average surface wind speed ranges from 13-18 km/hour.

TABLE 1. CHEMICAL ANALYSES OF MOUNTAIN HOME KGRA WELLS (In mg/l, Unless Otherwise Noted)

	Well 3S-8E-36CAD1	Well 4S-9E-8ACA1
Temperature (^O C)	68	62
Depth (m)	183	358
Discharge (1/s)	44	0
B	0	0
Carrier	1.5	0.9
kk 보다면 하고 있는데 이번 등이다.	0.80	0.80
Mg	0	0
Na	87	82
NH ₃	0	0
SiO ₂	86	85
C1 ⁷	4.5	3.2
C0 ₃ = /	50	41
#통통시 12. 보고 있다면 함께 12.	17	16
HC03	74	81
NO3	0.06	0.05
P0∰	0.04	0.03
S0 7	14	14
Conductivity (µmhos)	382	387
OH CONTRACTOR OF THE SECOND	8.5	9.2
TDS	297	282

TABLE 2. SUMMARY OF CLIMATIC CONDITIONS

Mean Annual Temperature (°C): 9.6

Precipitation (mm)

Mean Annual Total: 991

Wind

850 mb level airflow

Spring: surface--northwest

850 mb--west

Summer: surface--northwest

850 mb--west

Autumn: surface--west-northwest

850 mb--southwest

Winter: surface--southeast

850 mb--south-southeast

Stagnation (%)

Summer: Nighttime windspeed 11 km/hr or less--65%

Inversion based 150 m or less above ground--40%

Autumn: Nighttime windspeed 11 km/hr or less--50%

Inversion based 150 m or less above ground--53%

Occasional moderate dust storms occur during warmer months, usually at times of cold frontal passages and/or with a thunderstorm. A series of funnel clouds were sighted over the Mountain Home area in the summer of 1978 with at least one tornado reported a few kilometers west of the KGRA. The only other tornado that was reported occurred near Boise on June 2, 1967. Winds approaching destructive force are rare; the fastest, 98 km/hour, blew from the west at Boise on July 29, 1944.

Air Quality (E. Bentley, GeoTechniques)

Air quality data for the Mountain Home KGRA are collected by the Environmental Protection Agency and the Idaho Department of Health and Welfare. Elmore County, where the Mountain Home KGRA is located, exceeds the primary standard for particulates as does the KGRA. See Table 3 for the engineering estimates and sources for emissions in the county. Atmospheric circulation in this area, which is approximately 16 km east of Mountain Home, sometimes shifts from the general westeast direction to an east-west direction. Therefore, the ambient air of the Mountain Home KGRA will reflect the ambient air conditions for Twin Falls County, which lies about 116 km east of Mountain Home KGRA. Table 4 lists the point sources in Twin Falls County.

Due to the geographic location and the physical characteristics of the area, one major problem occurs with the high wind. Although it ensures ventilation, the wind blows an extreme amount of dust in the area. No other major air quality problem exists in the area.

Geology (R. Hardyman, Geolechniques)

The designated Mountain Home KGRA study area is on the eastern edge of the Mountain Home plateau portion of the western Snake River Plain. This KGRA is adjacent to the geologic boundary between the Snake River graben of the western Snake River Plain and the Idaho Batholith, which crops out approximately 13 km north of the KGRA (see Figure 6 and legend that follows).

TABLE 3. ELMORE COUNTY EMISSIONS

		nates (kilograms				
	<u>Particulate</u>	SO _X	CO		Hydro- carbon	NOx
Coal Cement & Asphalt Grain Elevators	127 887 6 349 9 070	872 534	1 520 1	32	36 280	552 363
	Point S	Source (kilogram	s per year)			
Sources	Location	<u>Particulate</u>		NOX	НС	СО
Mt. Home Air Force Base	Mt. Home	127 887	872 534	552 363	36 280	1 520 132
(AFB) Mt. Home Redimix Idaho Concrete Pipe	Mt. Home Mt. Home AFB	1 814 907				
Wilson & Dodge Mt. Home Redimix Farmers Warehouse Harvey Seed Co.	Glenns Ferry Mt. Home Glenns Ferry	2 721 907 5 442 3 628				
		143 306	872 534	552 363	36 280	1 520 132

TABLE 4. TWIN FALLS COUNTY POINT SOURCES (Kilograms per Year)

Source	Location	<u>Part</u>	NOX	<u>HC</u>	CO
Amalgamated Sugar	Twin Falls	427 197	585 015	11 791	39 908
Colonial Concrete	Twin Falls	1 814			
Beymer Paving	Twin Falls	19 047			
Gordon Paving	Twin Falls	24 489			
0. J. Childs Seed	Filer	7 256			
Bean Growers Whse Assn	Buh1	4 535			
Bean Growers Whse Assn	Filer	24 489			
Berger Plate	Kimberly	6 349			
Morgan Lindsay	Kimberly	8 163			
Rogers Bros.	Twin Falls	9 070			
Rangen Inc.	Buh 1	12 698			
N.W. Crane & Trnspt.	Twin Falls	3 628			*
Idaho Best	Twin Falls	3 628			
Gallatin Valley Seed	Twin Falls	2 721			
Chevron Pipeline	Twin Falls Farm			4 064	
Keystone Seed	Twin Falls	6 349		4 004	
Intermountain Bean Co.	Kimberly	6 349			
Valley Bean & Grain	Murtaugh	9 070			
Northrup King	Twin Falls	10 884			
So. Side Bean Co.	Twin Falls	4 535			
Twin Falls Feed & Ice	Twin Falls	3 628			
Idaho Bean & Elevator	Twin Falls	907			
Harvey Seed Co.	Twin Falls	6 349			
Globe Seed & Feed	Twin Falls	6 349			
• · · • • •	111111111111111111111111111111111111111	0 5-15			

TABLE 4. (continued)

Source	Location	<u>Part</u>	NOx	HC	CO
Beans Inc.	Filer	1 814			
Asgrow Seed	Filer	6 349			
Chester Brown Co.	Filer	6 349			
Allisons Feed Mills	Filer	2 721			
FMC Corp.	Filer	5 442			
Ferry Morse	Hansen	2 721			
Hansen Farmers Elevator	Hansen	8 163			
Moore Warehouse	Hansen	5 442			
Shields Seed Co.	Buh1	14 512			
Bean Growers Whse Assn	Kimberly	8 163			
			-		
		671 180	585 015	15 855	39 908 a

a. The above totals represent engineering estimates.

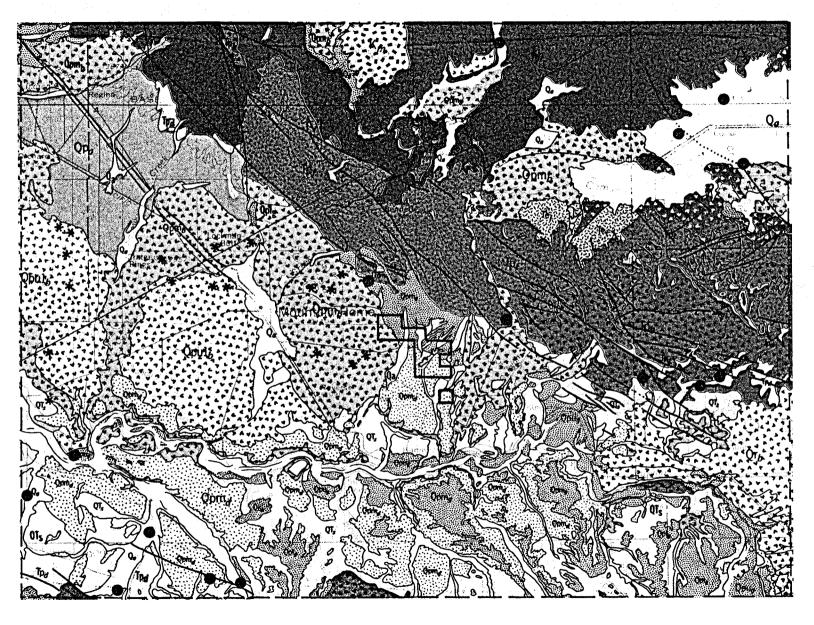


Figure 6. Generalized geological map of southwestern Idaho.

LEGEND

Quaternary alluvium; may contain some glacial deposits and colluvium in uplands. Qp_a Pleistocene waterlaid detritus; may be distal deposits of glacial floods and outwash. $\mathbf{Q}_{\mathbf{g}}$ Quaternary colluvium, fanglomerate and talus plus some glacial debris in upland valleys. Qp_{α} Pleistocene outwash, fanglomerate, flood and terrace gravels. Qpu_g Upper Pleistocene deposits $\operatorname{\mathsf{Qpm}}_{\mathsf{g}}$ Middle Pleistocene deposits Qp1 g Lower Pleistocene deposits Q_d Quaternary detritus; generally basin-filling deposits of central and southern Idaho. Pleistocene glacial-lake, ponded-water and shoreline sediments. Qp, Qpm_d Middle Pleistocene lava-dammed Snake Plain lake beds of silt, clay and diatomite Qw Quaternary wind-blown deposits; most commonly a loess mantle east of the Snake Plain Recent active sand dunes and eolian deposits Qr_w QT_s Pleistocene and Pliocene stream and lake deposits Ťď Tertiary continental sediments; predominantly Upper Tertiary in age Pliocene stream and lake deposits; may be due to volcanic and block-faulting events Tpd Qr_b Recent, relatively unweathered Snake Plain basalt flows and cinder cones Qpm, Middle Pleistocene plateau and canyon-filling basalt in and near the Snake Plain QT_b Lower Pleistocene to Pliocene basalts with associated tuffs and volcanic detritus Tpb Pliocene olivine basalt flows and associated tuff and detritus of southern Idaho QT_f Lower Pleistocene to Pliocene silicic volcanic un its near the Snake Plain $\mathsf{Tp}_{\mathbf{f}}$ Pliocene silicic welded tuff, ash and flow rock; most common in southwest Idaho Te_v Eocene mixed silicic and basaltic volcanic ejecta, flows and reworked debris T, Tertiary intrusive rock; where adequately dated, intrusions are denoted Eocene intrusions including large granitic plutons and dike swarms of central Idaho Te, Metamorphosed granitic intrusive rock; associated with pluton margins and stress areas K, Highly metamorphosed rock of central Idaho; age and origin of rock questionable.

SCALE 1:500,000

Figure 6. (continued).

Rocks within and adjacent to this area range in age from the Cretaceous to the Holocene ages. The oldest rocks (the Cretaceous) are plutonic igneous rocks, generally of granite, which constitutes the rocks of the Idaho Batholith. These rocks do not occur at the surface in the designated Mountain Home KGRA but are exposed 13 km north of the KGRA. The batholith in that area consists principally of granite and intrusive rocks of quartz monzonite, as well as aplite and pegmatite dikes. Basalt dikes crosscut the Idaho Batholith rocks northwest of Mountain Home (between Mountain Home and Boise, Idaho), but their abundance and distribution in this region is unknown.

The Quaternary volcanic rocks, lacustrine sediments, and fluvial sedimentary deposits constitute the majority of the rock units exposed at the present erosion level for the Mountain Home KGRA. These Quaternary deposits form the gently sloping plateau of the KGRA and are isolated in areal distribution from the older Idaho Batholith to the north by intervening the Tertiary volcanic rocks (see Figure 7). The Tertiary volcanic rocks constitute the Mount Bennett Hills, which form the northern physiographic boundary to the northwest-trending Snake River graben in the Mountain Home area. The composite thickness of the Tertiary volcanic rocks in the Mount Bennett Hills exceeds 600 m. The volcanic rocks date back to the Miocene and the Early Pliocene ages and were deposited prior to the initial subsidence of the western Snake River Plain graben. These rocks consist primarily of silicic volcanic deposits of devitrified welded ashflow tuff and lava flow ranging in composition from rhyolite to andesite. These early volcanic rocks have been mapped as Idavada Volcanics (see Figure 8).6,7 In part, individual units within the Idavada Volcanics in the Mount Bennett Hills correlate with silicic volcanic units of the Idavada Volcanics recently subdivided and mapped on the south side of the western Snake River Plain, in the Owyhee Mountains of western Owyhee County, Idaho. 8 Although the Idavada Volcanics do not crop out within the designated Mountain Home KGRA, they are exposed at the surface north of the KGRA and within the 8-km impact area of the KGRA.

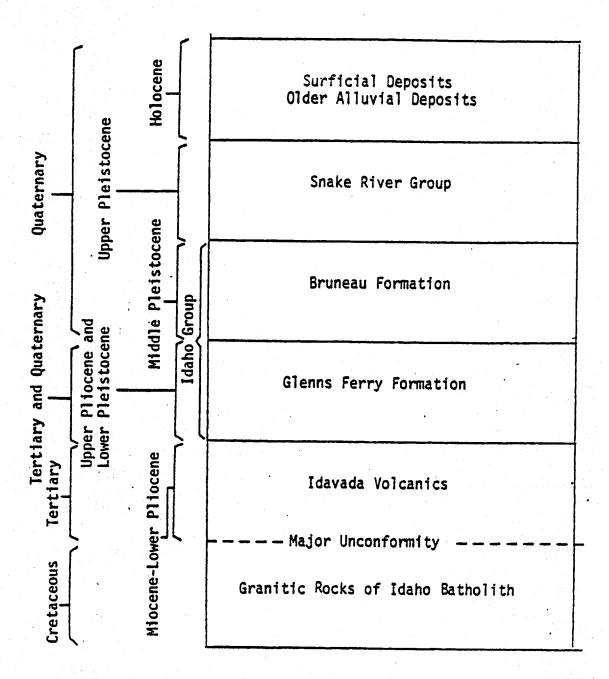


Figure 7. Stratigraphic nomenclature of the immediate Mountain Home area, western Snake River Plain.

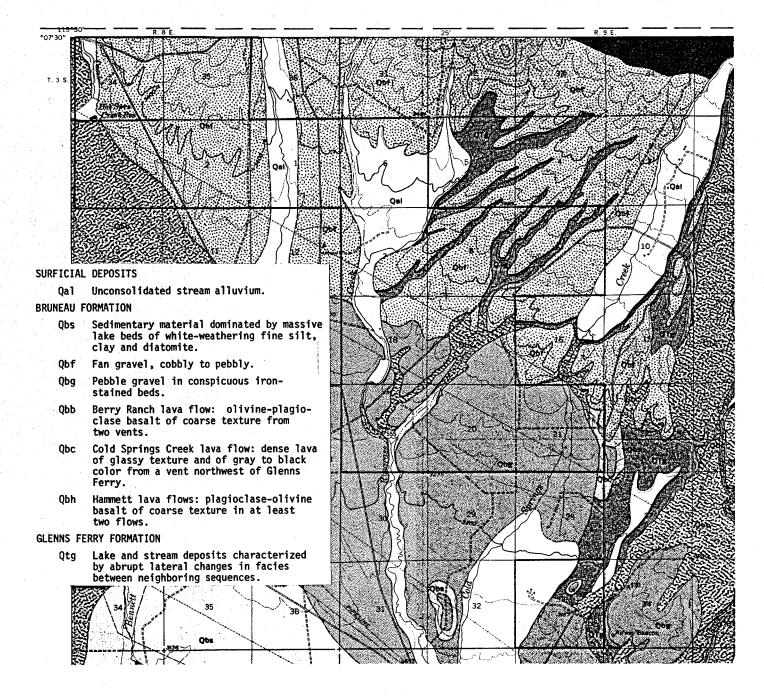


Figure 8. Geological index map of the Mountain Home area. Outlined area is approximate boundary of Mountain Home KGRA.

Stratigraphy. Rocks exposed at the surface within the Mountain Home KGRA are primarily basalt lava flows, unconsolidated canyonfilling fluvial deposits, and lake deposits of the Bruneau Formation of the Middle Pleistocene age (see Figure 9). Bruneau Formation rocks overlay the Glenns Ferry Formation rocks (the Later Pliocene and the Early Pleistocene ages) at various angles. The Bruneau Formation rocks contour the limited outcrops within the designated boundaries of the KGRA, while the rocks of the Glenns Ferry Formation shape extensive outcrops south and east of the Mountain Home KGRA and probably underlay all of the KGRA. The Glenns Ferry Formation consists of an intertonguing and nonindurated sequence of lacustrine, fluvial, and flood-plain deposits. Lacustrine facies are dominant in this formation and consist primarily of massive layers of silt. Lacustrine deposits as much as 200 m thick are exposed at the surface in the Glenns Ferry area southeast of the designated KGRA. Locally thin oolite beds occur at or near the base of the lacustrine silt deposits. The fluvial facies deposits found south of the KGRA are up to 106 m thick, consisting of a dense bed of sand and minor silt along with some thin shale interbeds. The flood-plain facies are up to 1 m thick with graded beds of fine-grained calcareous silt and clay with occasional intertonquing channel sand deposits. These flood-plain deposits are up to 168 m thick.

Locally the Glenns Ferry Formation contains lenses of arkosic sand, fine gravel, and a minor amount of conglomerate. Volcanic deposits constitue a minor amount of the Glenns Ferry Formation, consisting of several interlayers of olivine and basalt lava, some basaltic-pyroclastic material, and a minor amount of siliceous-volcanic ash in beds that are several kilometers thick.

The Bruneau Formation in the Mountain Home KGRA consists of lake beds of silt, clay, diatomite, and beach gravels that merge with fan gravels at higher elevations along the north edge of the KGRA. These unconsolidated sediments overlay and intertongue laterally (west and east) with laterally discontinuous basaltic lava that fill the canyon. Individual lava flows are 8-23 m thick, consisting of some

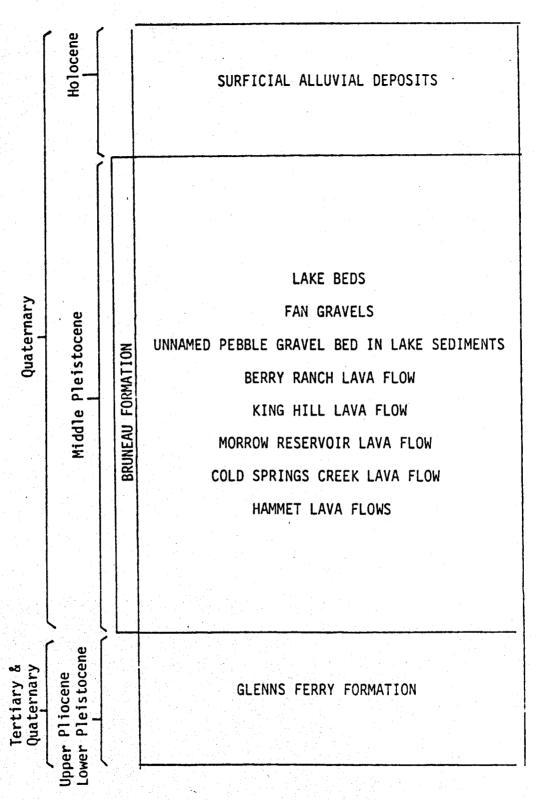


Figure 9. Stratigraphic nomenclature of rock units exposed in the designated Mountain Home KGRA.

porphyritic, plagioclase and olivine basalt that are dense and glassy, or coarse, textured, and vesicular. Subcrop extent of individual lava flows in the area is uncertain but at least five of the named lava flows mapped within the Bruneau Formation (refer back to Figure 9) are probably present in subcrop within the boundaries of the KGRA. Two of these flows are exposed west of the KGRA.

The sedimentary deposits of the Bruneau Formation are extremely lenticular, and numerous discontinuous nonconformities with many meters of relief exist within the formation. Lake deposits of laminated clay and silt with minor amounts of diatomite interbedded with sand dominate the sedimentary units. Separate layers of pebble gravels (up to 8 m thick) are intercalated between these lacustrine deposits.

Structures. The Mountain Home KGRA lies adjacent to the southeast end of the northwest-southeast-trending fault zone that reflects the northern boundary of the western Snake River Plain graben. The fault zone is approximately 11 m wide in the Mountain Home area and lies north-northeast of the designated KGRA. Faults within this zone are northwest trending, high angle, and normal dip slip with the relative sense of displacement being down to the southwest. Individual faults have traces up to 76 m on existing maps. 6

The northwest-trending faults displace the Idaho Batholith of the Cretaceous period, Idavada Volcanics (siliceous volcanic rocks of the Mount Bennett Hills) of the Early Pliocene period, and the Glenns Ferry Formation sediments of the Later Pliocene period. From existing published map data, no faults are shown that offset the Early Pleistocene period or younger rocks in the vicinity of the Mountain Home KGRA. Deposits of the Early Pleistocene age, noted elsewhere along this northwest-trending fault zone, however, are reportedly displaced several kilometers. 9

A total aggregated displacement across this fault zone of 2744 m is postulated. Drilling data in the Mountain Home area appears to substantiate this amount of down-faulting of the western Snake River Plain graben. A well drilled outside of the designated Mountain Home KGRA and on the down-faulted side of the graden boundary fault zone, reportedly bottomed in altered rhyolite at a total depth of 2950 m. The altered rhyolite in this well would presumably correlate with the silicic Idavada Volcanics in the Mount Bennett Hills on the upthrow of the fault. Regional gravity and limited seismic surveys also indicate down-faulting of the western Snake River Plain graben.

Other drill holes in the Mountain Home plateau area rarely exceed 300-500 m total depth and bottom out in either the Bruneau or the Glenns Ferry Formations. A well drilled in the Sailor Creek area, approximately 17 km south of the Mountain Home KGRA, was completed to a depth of 1161 m without penetrating the silicic volcanics. Although no faults that displace rock units exposed at the surface are shown on existing maps, the area is along the northwest projection of several faults mapped to the east-southeast that offset the Pliocene Glenns Ferry Formation of the Later Pliocene and the Early Pleistocene eras (refer back to Figure 8). The northwest continuation of these faults is uncertain, but the probability of buried, northwest-trending, high-angle faults existing in the Mountain Home KGRA subsurface is fairly high.

Geologic History. Eruption of volcanic rocks of the Idavada Volcanics sequence (the Miocene and the Early Pliocene eras) mark the inception of volcanism in the Mountain Home area of the western Snake River Plain. This early period of volcanism is represented by the silicic volcanic rocks (Idavada Volcanics) exposed in the Mount Bennett Hills north-northeast of the Mountain Home KGRA. Initial subsidence of the Snake River graben of the western Snake River Plain followed the deposits of these silicic lava and ashflow tuffs. The

Middle Pliocene basaltic volcanism, probably closely associated with the graben boundary fault in the Mountain Home area, followed initial rifting and deposited olivine-basalt lava (Banbury Basalt) along the northern margin of the developing graben. Locally, minor amounts of fluvial and lacustrine sediments occur interbedded with these early basalt flows.

Subsequent erosion coupled with continued block faulting (rifting) in the western Snake River Plain was accompanied by deposits of an intertonguing, laterally variable sequence of basin-filling fluvial deposits and lake beds of the Later Pliocene age (Glenns Ferry Formation). Minor basaltic lava occurs as canyon-filling flows within this sequence of basin-filling sediments.

The Later Pliocene period of basin subsidence and sedimentation was followed by a period of general planation of the basin sediments and continued minor block faulting that ended in a period of canyon cutting. These canyons, along with the early basin sediments, were subsequently buried, and alternately, partially exhumed during the Middle Pleistocene time. Canyon-filling deposits of this period constitute the unconsolidated sediments and interbedded basaltic lavas of the Bruneau Formation. Deposition of the Bruneau Formation was followed by a period of initial Snake River entrenchment that was followed by a complex history of lava damming of drainages, lacustrine and fluvial sedimentation, lava dam removal, and subsequent canyon cutting in the Later Pleistocene time.

<u>Subsidence</u> (J. Applegate, GeoTechniques)

Subsidence of the ground surface associated with the production of fluids (petroleum and water) has been documented in many areas of the world. A significant number of these areas are in the West such as Houston, Texas; portions of southern Arizona; Las Vegas, Nevada; the Wilmington and Inglewood oil fields of southern California; the San Joaquin Valley of California; the south bay area near San Jose,

California; and the Raft River Valley of Idaho. Generalized criteria can be established from assessing these areas where subsidence occurred. The areas of subsidence generally occur where there are youthful, relatively unconsolidated sedimentary rocks of the Cenozoic age. 11 These rocks are generally of lacustrine and/or alluvial origin, and include interbedded coarse-grained and fine-grained rocks. The permeable sands and/or gravel aguifers have low compressibility and are interbedded with clayey aquitards of low permeability, high compressibility, and variable thickness. The withdrawal of fluids causes a decrease in the hydrostatic head of the aguifers, and in turn causes a transfer of additional load to the matrix (grain-tograin load). This results in small amounts of generally elastic compaction in the coarse-grained aguifer and much larger amounts of inelastic compaction in the fine-grained aguitard. In the aguitard. the increase in effective stress results in a dewatering of the clays. 12 Montmorillonite is the common clay mineral in many of the previously mentioned cases of subsidence, ¹¹ and has the ability to lose large volumes of water.

Withdrawal of fluids appears to be the most likely subsidence mechanism in the KGRAs under study. However, two other potential mechanisms should be assessed: hydrocompaction and tectonic-related subsidence.

Hydrocompaction is subsidence due to the collapse of the soil structure of certain moisture-deficient deposits when these deposits lose their dry strength due to wetting. Hydrocompaction is a one-time process where excess moisture penetrates below the root-zone into moisture-deficient material. The process may continue to intensify as the water percolates downward, and deeper deposits become wetted.

Tectonic-related subsidence is uplift that is related to active tectonic processes within the earth such as movement along faults, aseismic movement, placement of igneous bodies, etc. As with subsidence related to fluid withdrawal, tectonic subsidence is best observed with repeated leveling, however, these data are extremely limited. There is some documentation of tectonic movements of 0.07 m in the Raft River Valley, Idaho. 14

The Mountain Home KGRA has limited subsurface data available. The subsurface geology of the Mountain Home area is not known as well as the geology of Bruneau and Castle Creek KGRAs, where both are located in close geographic proximity. However, generalized data from the geologic map of Idaho indicates that the area is covered by the Quaternary alluvium and the Middle Pleistocene basalt and lake beds including silt, clay, and diatomite. A cross section shows the Pleistocene and the Pliocene lake deposits and the Pliocene basalt, tuff, and volcanic detritus that overlay silicic welded tuff, ash, and flow rock. The geologic materials in this area have the characteristics described earlier as typical of areas where subsidence has been a problem.

A more detailed subsurface model, which is probably applicable, can be derived from the data for the Bruneau area, and additional geological and ground-water data can be extrapolated from Young. 16 The area covered by Young's ground-water report is slightly to the west of the study area. The basalt of the Bruneau Formation of the Idaho Group (the Pleistocene era) is the principal aquifer in the Mountain Home area with reported well yields ranging from 45 to 15,911 l/minute. The interbedded lake beds and fan deposits generally have low hydraulic conductivity. Recharge to the area comes from the Boise River drainage basin to the north, infiltration of local run-off, and precipitation on the surrounding Idavada Volcanics. Geothermal water from two wells in the area shows low total dissolved solids (TDS) of 283 and 491 mg/l. 17 Ground water shows similar results for TDS but somewhat different results in individual

elements. 16 Thus, there is not sufficient data to either postulate a unique source for the thermal water or to confirm that the thermal resource is deep circulating water. In addition, one can not argue from this data that one is dealing with a uniquely confined aquifer that would have different subsidence potential than the ground-water system. However the ground-water study indicates that a second criterion for subsidence, ground-water level declines of more than 6 m from 1968 to 1977, have occurred south of Mountain Home. These data suggest that a careful analysis of the subsidence potential is needed before extensive geothermal development.

Seismicity (J. Applegate, GeoTechniques)

Seismicity studies to determine levels of microearthquake activity have been one of the principal exploration tools to define areas of geothermal activity. It has been observed that many geothermal areas have many small earthquakes. It is postulated that the microseismic events are a function of the youthful geologic activities (volcanism, faulting, etc.) that are associated with geothermal areas. Thus, it is more common to find significant seismic activity in close proximity to geothermal systems. However, in this review, the objective is to evaluate the problems associated with seismic activity pertaining to development.

All of the KGRAs in this study are in Seismic Risk Zone II. (Zone O is the least risk, and Zone III has the highest risk.) However, the data base upon which this recommendation was made is somewhat limited. The problem is that the instrumental seismic data set represents only a limited time period. This is a major problem in the evaluation of seismic risk. In the last few years several additional seismic networks have been installed in the state. However, the only two that provide substantial data for this study are the networks surrounding the Idaho National Engineering Laboratory (INEL) and a three-station array in the vicinity of Boise which is operated by Boise State University (BSU).

With the limited seismic instrumental data base, it is necessary to assess other forms of data. The importance of assessing the geological criteria for evaluating seismicity has been emphasized strongly by Allen (1975). ¹⁸ These data indicate active faults (in areas where adequate investigations have been undertaken), evaluation of maps, lineaments, LANDSAT imagery, U-2 photos, and geophysical data including seismic reflection, gravity, and aeromagnetics.

In the portion of southwestern Idaho where the geothermal areas are located, there has been an operating seismograph network since 1975. This network recorded over 800 earthquakes during the period 1976-1977. Other available instrumental data comes from the INEL network (operating since 1971), and from the National Oceanic Atmospheric Administration (NOAA) computer files on earthquake activity for 1880-1975. Numerous workers have published geological reports on areas in southwestern Idaho. The most applicable report and map for this project was a map of active faults in Idaho compiled by Witkind. ²⁰

These data sets may be sufficient to evaluate the general seismicity of the area but the limited timespan for instrumental data and the small number of observation points does not make the data set applicable for detailed analysis of site specific areas. Geologic studies are generally limited in detail and spatial extent to the point that it is quite possible that all of the active faults have not been mapped.

Regional structural maps show the Mountain Home KGRA to be in the zone of faults marking the northern boundary of the Snake River Plain. 15,20 Witkind's map 20 delineates actual faults in close proximity to the Mountain Home KGRA whose last movement is suspected to have been recurrently active since the Middle Miocene time.

The historical seismicity for 1880-1975 (see Figure 10) shows no epicenters or felt reports within 80 km of the Mountain Home KGRA. The seismicity data for 1976-1977 (see Figure 11) from the BSU network indicate only a small number of events (less than 10) within 50 km of

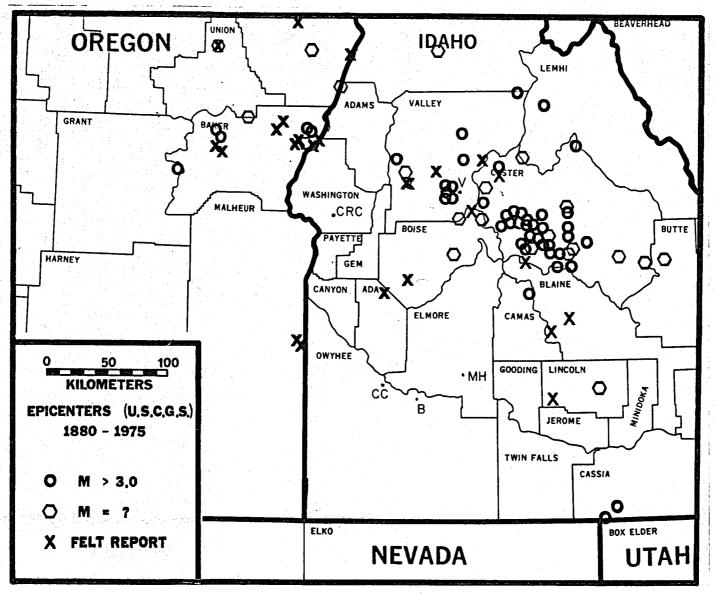


Figure 10. Historical seismicity from U.S. Coast and Geodetic Survey (NOAA), 1880-1975. KGRAs are noted on map: MH (Mountain Home), B (Bruneau), CC (Castle Creek), CRC (Crane Creek), and V (Vulcan).

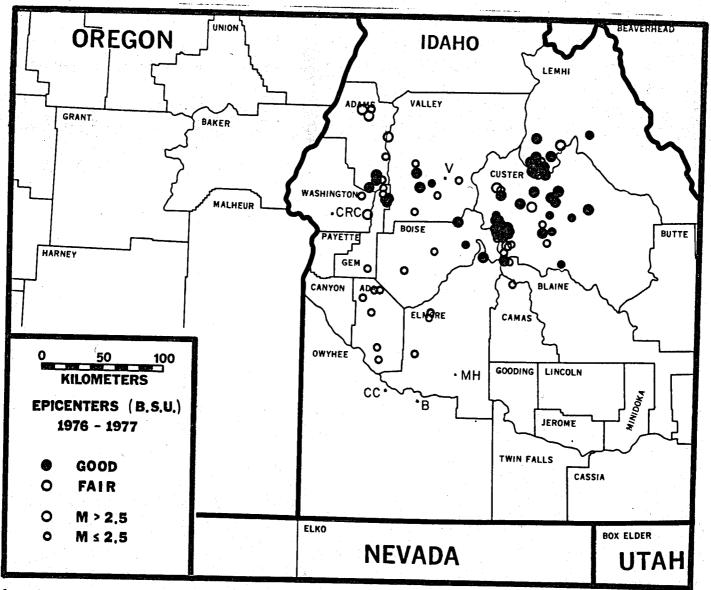


Figure 11. Seismicity for 1975-1976 from BSU network. KGRAs are noted on the map: MH (Mountain Home), B (Bruneau), CC (Castle Creek), CRC (Crane Creek), and V (Vulcan).

the area. Short-term microseismic studies 21 in the area of this KGRA detected no events in 1972. However, the periods of monitoring may have been so short as to be inconclusive. Smith 22 postulates that the lack of seismic activity within the Snake River Plain is due to high heat flow. The abnormally high heat flow causes the relief of stress to be limited to aseismic creep.

Detailed geologic mapping²³ of areas and observations of proprietary seismic reflection data from the Snake River Plain suggests that there are a number of faults that offset youthful horizons and have relatively large throws at shallow depths. Unfortunately this type of data is not available immediately within or from near the Mountain Home KGRA.

Water Resources

Hydrology. The 3853 ha of the Mountain Home KGRA area is drained by Bennett Creek, Hot Springs Creek, Cold Springs Creek, and Ryegrass Creek. Figure 12 shows a map of the drainage areas of Bennett Creek and Cold Springs Creek to a point south of the KGRA. Hot Springs Creek is a tributary to Bennett Creek, which discharges into the Snake River. The drainage area for Bennett Creek is 20 719 ha. Ryegrass Creek is a tributary to Cold Springs Creek that flows south and also discharges into the Snake River. The drainage area for Cold Springs Creek is 16 835 ha.

The topography of the Cold Springs drainage area is broken into a long, narrow, v-shaped canyon through which Cold Springs flows from its headwaters near Bennett Mountain and below the rolling and gentle slopes of the Mount Bennett Hills. Bennett Creek flows from its headwaters, northeast of Bennett Mountain, through a long, narrow canyon until it meets the northern boundary of the KGRA that is at the foot of the Mount Bennett Hills. Elevations in the drainage areas range from 2275 m at Bennett Mountain to 963 m at the bottom end of the Cold Springs Creek drainage area. Refer to Figure 13 for a map showing the irrigated area around the KGRA.

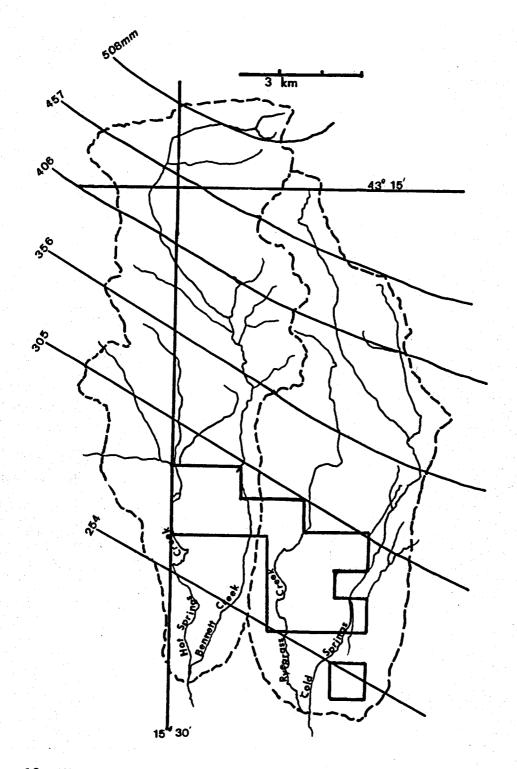
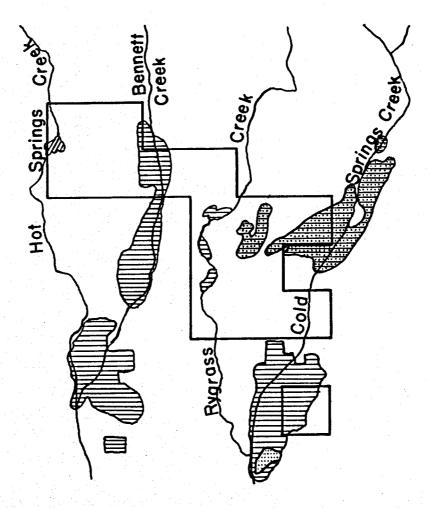


Figure 12. Map of Bennett Creek and Cold Springs Creek drainages near the Mountain Home KGRA area.



- Surface Water Land
- Groundwater Land
- Surface Water & Groundwater Land

Figure 13. Irrigated area map.

The hydrologic data base of the drainage area for the creeks that drain the Mountain Home KGRA consists of two rainfall and snowfall records. Rainfall and snowfall data are available for gages at Mountain Home and Glenns Ferry. Table 5 gives information concerning the records that form the hydrologic data base of the surface waters.

There are no streamflow gaging stations on any of the creeks that flow through the KGRA. But there are two stream gaging records available for Little Canyon Creek, not far from the KGRA, that could be used to synthesize streamflow characteristics for the creeks that flow through the KGRA. Figures 14 and 15 show the monthly distribution of run-off determined from the gaging sites on Little Canyon Creek. Table 6 contains information on streamflow for Bennett Creek and Cold Springs Creek.

The ground-water hydrology of the area surrounding the KGRA was studied by the Idaho Department of Water Resources, and the results were published as Water Information Bulletin No. 4.²⁴ Figure 16 is a water table contour map of the ground water. A single hydrograph of a ground-water well is available from the basic data release through the Idaho Department of Water Resources. This record is reproduced as Figure 17.

<u>Water Quality</u>. The water quality data base for the area surrounding the Mountain Home KGRA consists of records available in reports by various agencies. The surface water quality data is available from the Bureau of Land Management in EAR #11-010-5-77 for the Boise District. The ground-water quality data is available in Water Information Bulletin No. 4.²⁴ Table 7 and Figure 18 show the available ground-water quality data.

<u>Water Rights</u>. There are several recorded water rights concerning the surface streams of Bennett Creek and Cold Springs Creek that flow through Mountain Home KGRA area. In addition, there are water rights identified on the Warm Springs Creek and several springs. These are

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TABLE 5. INFORMATION ON HYDROLOGIC RECORDS AROUND THE MOUNTAIN HOME KGRA

Station	<u>Latitude</u>	<u>Longitude</u>	Type of Record	Period of Records	Length (months)	Annual Average
Mountain Home	430 091	1150 43'	Rainfall Snowfall	07/1948-12/1976 11/1948-12/1976	342 109	252 ml 391 ml
Glenns Ferry	420 56'	1150 19'	Rainfall Snowfall	01/1962-12/1976 01/1962-12/1976	180 72	263 ml 419 ml
Little Canyon Creek above Berry Ranch	430 04' 45"	1150 15' 06"	Streamflow	11/1960-10/1965	60	9 459 450 m ³
Little Canyon Creek at Stout Crossing	430 09' 14"	1150 18' 32"	Streamflow	11/1965-11/1971	73	8 660 750 m ³

a. Source: HISARS, University of Idaho

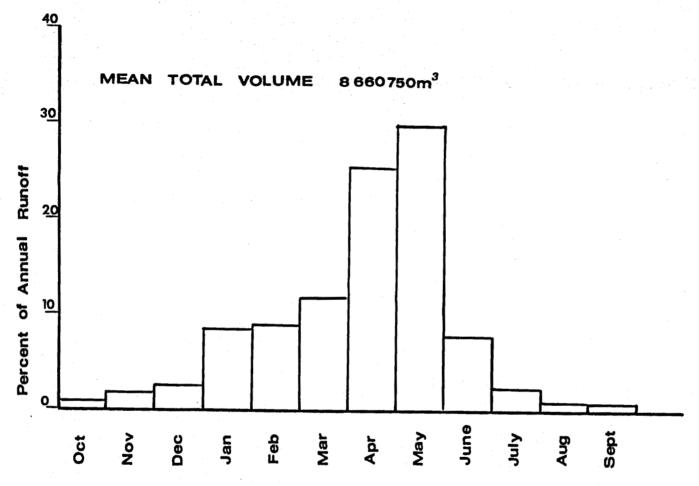


Figure 14. Characteristic monthly run-off of Little Canyon Creek at Stout Crossing near Glenns Ferry.

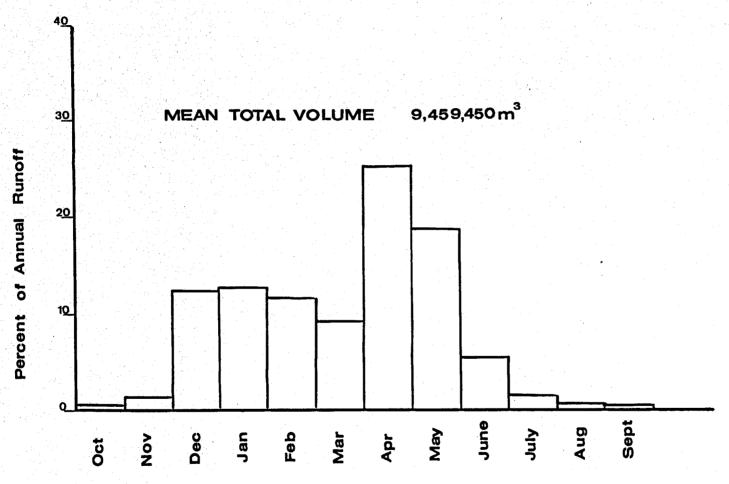


Figure 15. Characteristic monthly run-off of Little Canyon Creek above Berry Ranch near Glenns Ferry.

TABLE 6. WATER QUALITY DATA FOR THE STREAMS IN THE VICINITY OF THE MOUNTAIN HOME KGRA

	Streams	Alkali	Bennett	Cold Springs	Ryegrass
	Maximum flow (m ³ /s)	1.13	14.16	8.50	Unknown
	Average Flow (m ³ /s)	0.14	0.20	0.10	0.01
	Sediment	High	Low	Low to Medium	Low
	Dissolved Solids	Unknown	Unknown	Unknown	Unknown
	Chemicals	Unknown	Unknown	Unknown	Unk nown
	Toxicity	High	Low	Low	Low
	Nutrients	Unk nown	Unknown	Unknown	Unknown
	Solid debris	Unknown	Unknown	Unknown	Unknown
	Coliform	High	Unk nown	Unknown	Unknown
,	рН	7.2	7.8	7.8	7.3
	Dissolved Oxygen (mg/l)	11	10	9	7
	Temperature of Maximum (°C)	55	18	60	Unknown
	Radiological	Unknown	Unknown	Unknown	Unknown
	Temperature Average (°C)	19	18	17	16

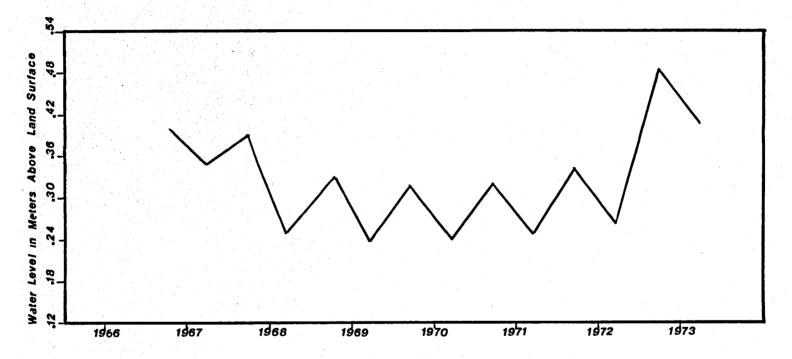


Figure 16. Hydrograph of current ground-water observations near the Mountain Home KGRA.

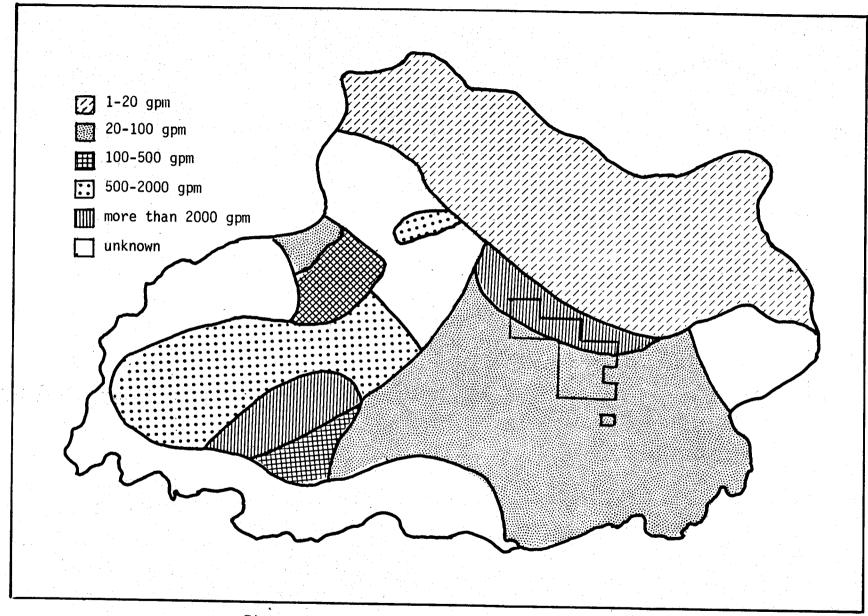


Figure 17. Availability of ground water to wells.

TABLE 7. GROUND-WATER QUALITY ANALYSIS FOR WELLS NEAR THE MOUNTAIN HOME KGRA

	**************************************											Ions i	n epm						
					Depth			·		Catio	ns				Anion	ıs			Temper-
	Loc	atio	n	Name	of Well (m)	EC (10- ³)	рН	<u>Ca</u>	Mg	<u>Na</u>	<u>K</u>	Total Cations	HCO ³	C03	<u>C1</u>	s0 ₄	Total Anions	SAR	ature, ^o F
1.	3S	8E	36ca	Ross #1	180	0.30	9.05	0.10	0.03	3.69	0.04	3.86	2.14	1.12	0.51	0.77	4.57	15.4	101
2.	3\$	8E	36ca	Ross #2	185	0.30	9.30	0.08	0.04	3.69	0.04	3.85	1.69	1.12	0.50	0.38	3.69	14.2	154
3.	45	7E	9dc	Grofsema	265	0.27	7.85	0.46	1.23	1.03	0.12	3.34	2.25		0.88	0.98	4.11	1.0	75
4.	45	8E	36bb	El Paso Sta. 11	570	0.53	8.30	0.13	0.03	6.41	0.11	6.68	3.61	1.12	0.77	0.45	5.94	22.9	112
5.	45	9E	3ba	Walker #4		0.15	7.75	0.56	0.45	0.54	0.09	1.64	2.14		0.58	0.72	3.44	0.7	57
6.	45	9E	8ab	Walker #1	356	0.31	9.25	0.08	0.04	3.56	0.04	3.72	1.69	1.12	0.38	1.03	4.22	15.0	150
7.	45	9E	10bb	Walker #3		0.20	7.90	1.31	0.33	0.94	0.16	2.74	2.47		0.58	0.65	3.70	1.0	70
8.	45	9E	10ac	Walker #2	183	0.20	7.90	1.00	0.33	0.84	0.15	2.32	2.36		0.58	0.60	3.54	1.0	70

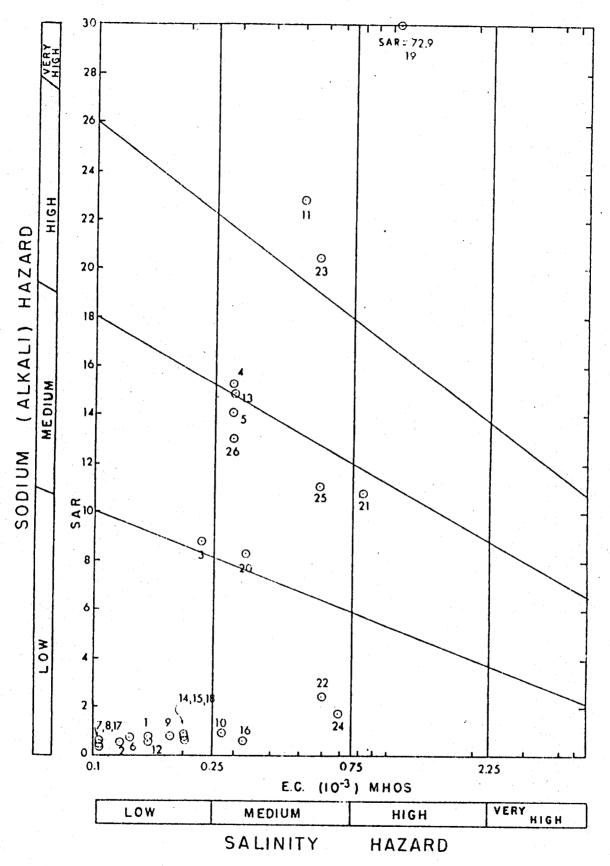


Figure 18. Suitability of water for irrigation.

for irrigation, watering stock, and domestic use. Filing water rights for ground-water are fairly extensive in the area. Figure 19 and Table 8 give details as to location and amount of water right filings.

<u>Soils</u> (Nancy Savage, Idaho Water Resources Research Institute, University of Idaho)

The Mountain Home KGRA contains both private and public lands administered by the Bureau of Land Management. The only soil survey presently available within the KGRA is a detailed soil survey conducted by the Elmore County Office of the Soil Conservation Service (SCS), 1970 (see Figures 20 and 21, and following legends). The land surveyed primarily consists of privately-owned, irrigated ranchlands along the creek bottoms (see Figure 22).

Soil descriptions are summarized in the Elmore County Handbook. It includes information on soil origin, structure, texture, composition, water-holding capacity, water-intake rate, and permeability, as well as slope of the land that is either irrigated or rangeland (refer to legends following Figure 21). The SCS central office has detailed descriptions of each soil series that include the following data:

Soil taxonomic class

Typical pedon (soil profile)

Depth

Color

Texture

Composition
pH

a. Office is located at Room 345, 304 North 8th Street, Boise, Idaho.

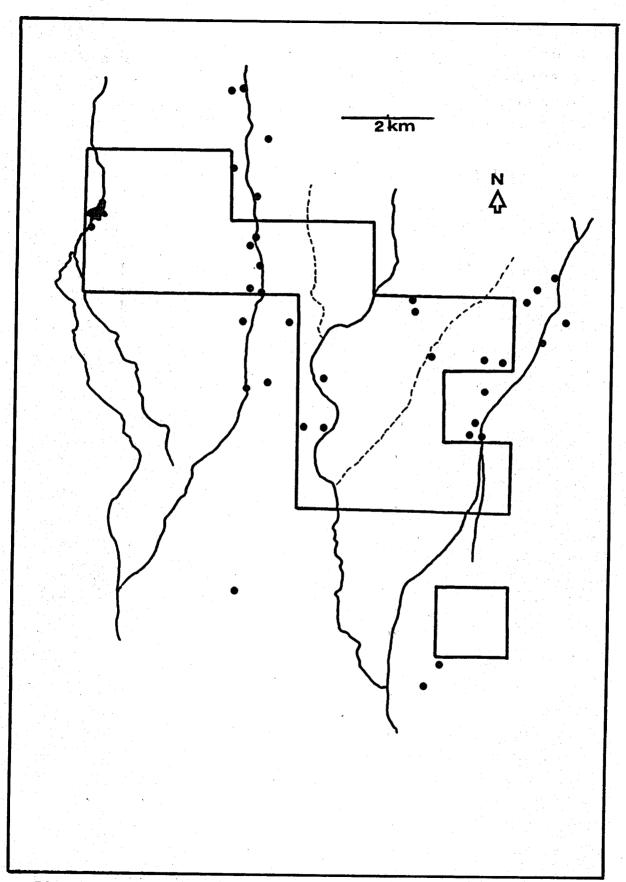


Figure 19. Location map of known water rights in the vicinity of the Mountain Home KGRA area.

TABLE 8. WATER RIGHTS INFORMATION RELATED TO THE MOUNTAIN HOME KGRA

File #	Quantity	Priority Date	Source
61-2006	3.6 cfs	1-28-08	Bennett Creek
61-2017	2.0 cfs	2-16-10	Springs
61-2008	9.4 cfs	2-26-08	Cold Springs Creek
61-2014	5.0 cfs	5-10-09	Bennett Creek
61-2013	1.05 cfs	3-17-09	Bennett Creek
61-2012	2.0 cfs	1- 5-09	Cold Springs Creek
61-2095	3.11 cfs	3- 7-53	Well
61-2034		cancelled	
61-2096	5.0 cfs	3- 5-53	Bennett Creek
61-2108	0.02 cfs	5-13-55	Well
61-2038	1.2 cfs	7-10-13	Cold Springs Creek
61-2109	1.28 cfs	6-10-55	Well
61-2199	6.0 cfs	7-19-66	Well
61-2230		lapsed	
61-2031	2.1 cfs	5-20-52	Cold Springs Creek
61-2225	164.07 ac-ft	4- 7-42	Warm Springs Creek
61-2114	0.02 cfs	7- 6-56	Well
61-2153	2.00 cfs	11-27-62	We]]
61-7340	2.00 cfs		Well
61-7273	100 ac-ft		Bennett Creek
61-7259	6.56 cfs		Well
61-7279	12.02 cfs		Well
61-7254	14.61 cfs		Well
61-7249	6.40 cfs	denied	Well
61-7288	16.00 cfs		Well
61-7336	3.20 cfs		Well

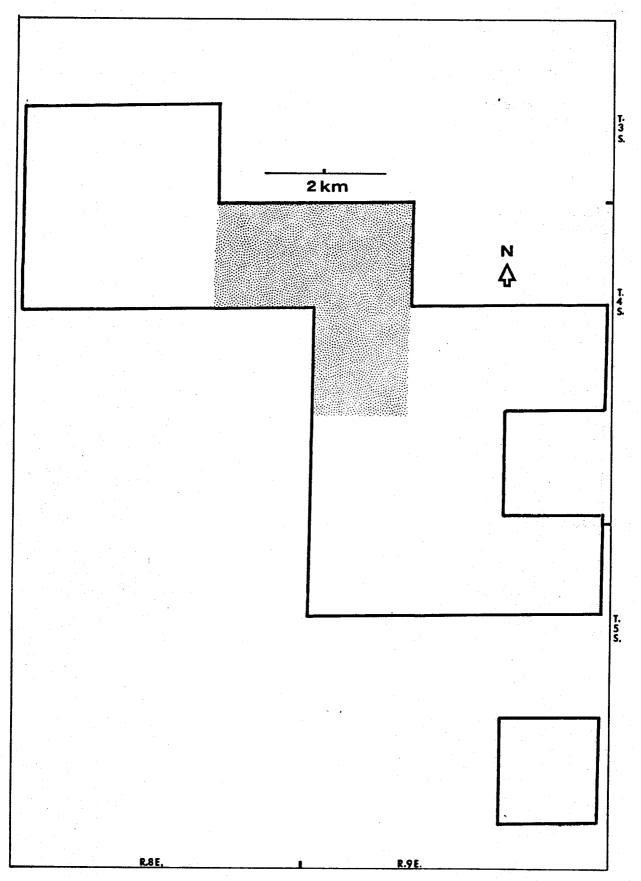


Figure 20. Location of existing soil survey data.

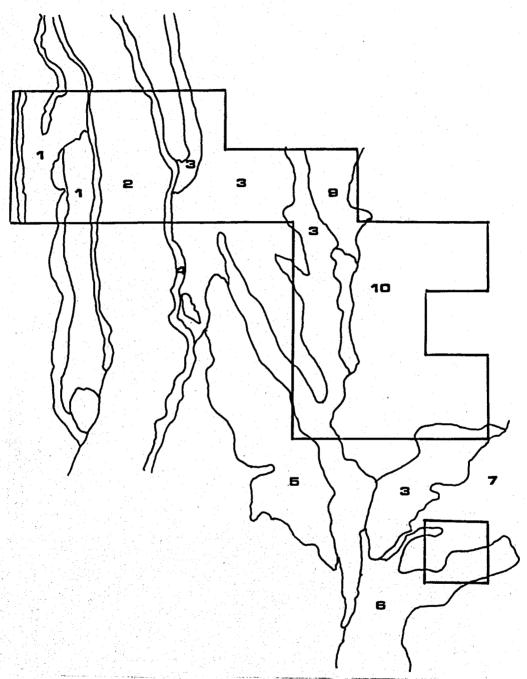


Figure 21. Soil survey map from aerial photographs.

DETAILED SOIL SURVEY LEGEND FROM ELMORE COUNTY HANDBOOK Soil Conservation Service Mountain Home, Idaho (Irrigated Areas)

VWA	Vanderhoff sandy loam	0-2% slope
WB	•	2-4% slope
VWC		4-7% slope
WD		7-12% slope

Moderately deep, well-drained soil formed in lake sediments. Surface and underlying layers are sandy loam. Substratum is laminated loam or sandy loam. The laminations occur at a depth of 508-1016 mm. Available water-holding capacity is 61-122 mm. Water intake rate is 20-36 m³/hour. Permeability of underlying layer is 15-51 mm and the substratum is 5-15 mm/hour.

GFA Goose Creek clay loam, moderately deep variant 0-2% slope

Moderately deep, somewhat poorly drained soil formed in alluvium. Surface is loam; underlying layer and substratum are loam or clay loam. Sand and gravel occur between 508 and 1016 mm. A seasonal water table is at 762 mm and recedes to over 1524 mm late summer. Available water-holding capacity is 102-191 mm. Intake rate is 18-36 mm/hour. Permeability of the underlying layer is 15-51 mm/h.

EJB	Elijah-View loams	2-4% slope
EJC		4-7% slope
EJF		12-30% slope

This complex is about 55-70% Elijah loam and 30-45% View loam. These soils have loam surfaces and clay loam subsoils. Elijah is 508-1016 mm to a hardpan. View is 508-1016 mm to gravel. The available water-holding capacity is 89-191 mm. Water intake rate is 15-30 mm/hour. Permeability of the subsoil is 15-51 mm/hour.

EhB	Elijah silt loam		2-4% slope
EhD	-	• :	7-12% slope

Moderately deep, well-drained soil developed in loess. Surface texture is silt loam; subsoil is clay loam; and substratum is loam. An indurated hardpan is at 508-1016 mm. Basalt bedrock or loamy material is under the hardpan. The available water-holding capacity is 89-191 mm. Water intake rate is 15-30 mm/hour. Permeability of the subsoil is 15-51 mm and the hardpan is less than 1.52 mm/hour.

CLB (CtB) Chilcott silt loam

2-4% slope

Moderately deep, well-drained soil formed in loess or loess-like alluvium. Surface is loam. Subsoil is clay, and substratum is silt loam, loam, or sandy loam. An indurated hardpan occurs between 508 and 1016 mm. Available water-holding capacity is 114-191 mm. Water intake rate is 15-30 mm/hour. Permeability of the subsoil is 5-15 mm and the hardpan is less than 1.52 mm/hour.

HaA Harpt loam

0.2% slope 2.4% slope

Deep, well-drained soil formed in alluvium. Surface, underlying layer, and substratum have loam texture. Stratified sand and gravel is below 1016 mm but may occur at the 762 mm depth. There is a possibility of overflow by floodwaters in 1 year out of 10 years. Available water-holding capacity is 178-254 mm. Water intake rate is 20-36 mm/hour. Permeability of the underlying layer is 15-51 mm/hour.

PuF Power-Purdam silt loams

20-30% slope

This complex consists of 60-70% Power silt loam and 30-40% Purdam. Power soils have a silt loam surface, clay loam subsoil, and silt loam substratum over mixed alluvium or hardpan below 1016 mm. Purdam soils have a silt loam surface, clay loam subsoil, and silt loam substratum over a hardpan between 508 and 1016 mm. The available water-holding capacities are Power, 203-254 mm and Purdam 102-203 mm. Water intake rates are 10-20 mm/hour. Permeability of the subsoil is 15-51 mm/hour.

(Rangeland Areas)

JnD

Jenness loam

7-12% slope

Deep, well-drained soil in alluvium. Surface, underlying layer and substratum have loam textures. Sand and gravel occurs at depths below 1016 mm. Available water-holding capacity is 178-254 mm. Water intake rate is 15-30 mm/hour. Permeability of the underlying layer is 15-51 mm/hour.

LtF LtG Lanktree loam

0-30% slope 30-60% slope

Deep, well-drained soils formed in mixed alluvium. Surface layer is loam, subsoil is clay loam or clay, and substratum is loam over

sand or gravel at depths of 1016-1524 mm. Available water-holding capacity is 178-254 mm. Permeability of subsoil is 1.52-5 mm/hour.

CaF Chilcott-Lanktree loam

0-30% slope

This complex consists of about 60% Chilcott loam and 40% Lanktree loam. Chilcott soils have a loam surface, a clay subsoil, and a loam substratum over an indurated hardpan at 508-1016 mm. Lanktree soils have a loam surface, a clay subsoil, and a loam substratum over sand and gravel at 1016 mm to over 1524 mm. Available water-holding capacity is Chilcott 76-152 mm and Lanktree 152-254 mm. Permeability of the subsoils are 1.52-5 mm/hour.

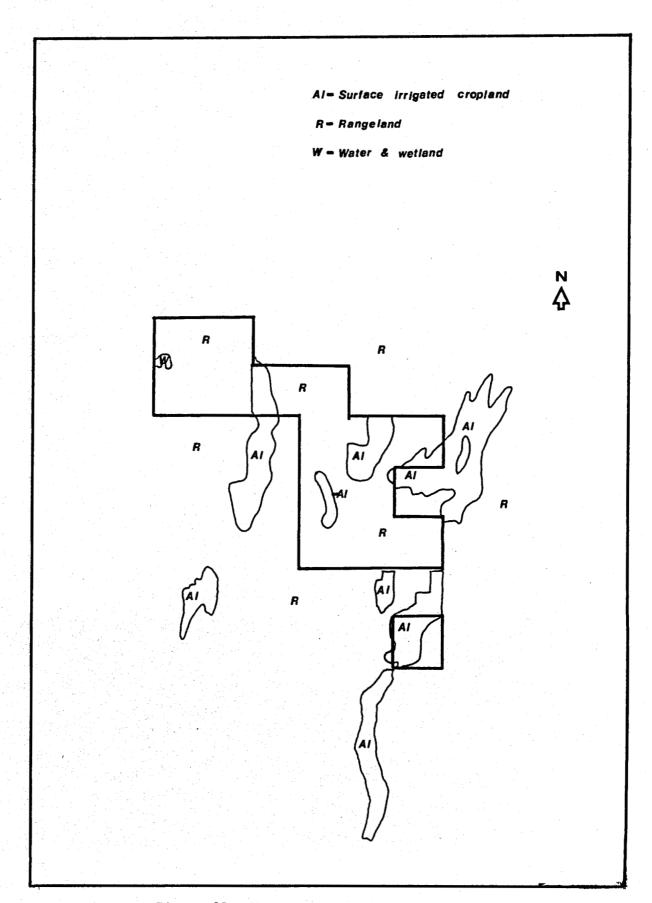


Figure 22. Mountain Home KGRA land-use map.

Range in characteristics

Mean annual soil temperature

Mean summer soil temperature

Depth to bedrock

Organic content

Structure

Geographic setting
Elevation
Slope
Parent materials
Climate

Drainage

Permeability
Available water capacity
Soil reaction (pHO
Salinity

Use and vegetation potentials
Sanitary facilities
Community development
Source materials
Water management
Wildlife habitat
Native vegetation
Crop use and potential.

The SCS detailed soil surveys are the most complete surveys available. The SCS has conducted a detailed survey of three sections (20%) of the Mountain Home KGRA (refer back to Figure 1). The remainder of the KGRA will be surveyed during the next 4 years as the Elmore County soil survey is completed.

Most land within the Mountain Home KGRA is presently being used either as irrigated farmland or as rangeland for livestock. Grain, corn, alfalfa, and pasture are grown for livestock feed on the irrigated lands (refer back to Figure 22). Most of the irrigable land is in private ownership, while the remaining rangelands are in public domain (BLM). According to an SCS source, dryland farming would be feasible on much of the nonirrigable land.

Ranchers in and near the KGRA with hot wells or springs on their property use the geothermal resource for irrigation and space heating, thus establishing a historical precedent for use of the resource for these purposes.

There are no apparent physical limitations to geothermal development in this area. The land varies from flat to hilly and open with generally well-drained soils.

Biological Environment

<u>Terrestrial Ecology</u> (T. L. Johnson and C. D. Jorgensen, Brigham Young University)

The terrestrial ecology for the Mountain Home KGRA was assessed in regard to the potential impact of possible geothermal development. Specifically, the habitat and their relative abundance within the KGRA were examined.

The Mountain Home KGRA consists of sagebrush as vegetative habitat, which has experienced serious deterioration of the range from overgrazing and the principal perturbation affecting wildlife (see Figure 23). 25 (However, some large areas of undeteriorated range still exist in the vicinity, mostly in adjoining areas.) Future development should consider deliberate efforts to manage grazing so as to improve the range rather than burden it further.

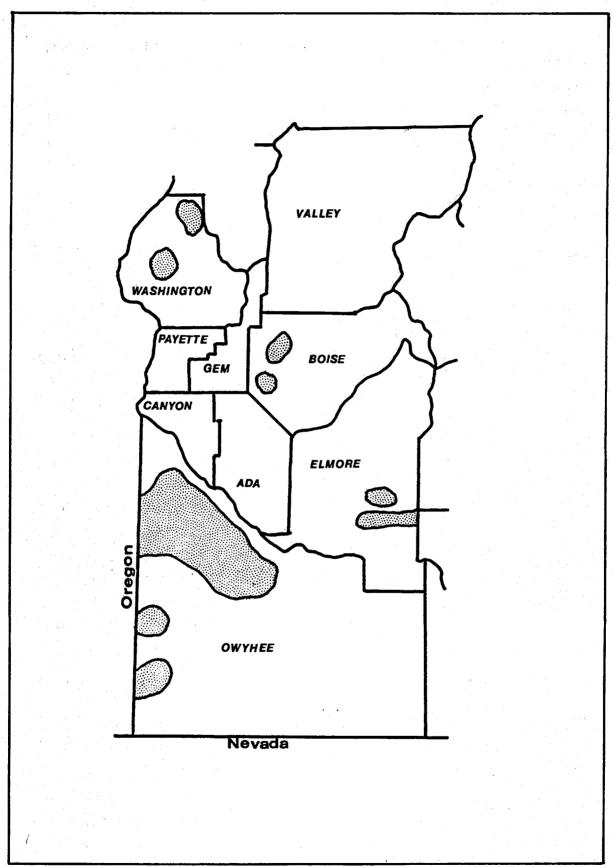


Figure 23. Deteriorated range near KGRAs in Elmore, Owyhee, Valley, and Washington Counties.

Threatened and endangered plant species are illustrated according to their proximity to the KGRA in Figure 24. Species included are Allium aaseae, Artemisia papposa, Astragalus purshii, Chaenactis Evermanii, Draba douglasii, Draba argyraea, Draba sphaerocarpa, Eriogonum thymoides, Haplopappus aberrans, Lepidium davisii, and Primula cusickiana. Most of the plant species records came from museum collections only, not from extensive studies.

Data for the proposed threatened and endangered plant species were taken directly from Henderson et al. 26 Their study not only recommends a species status based on the existing state of knowledge, but recommends change in the status. But those species whose status appear critical because of a lack of information or limited distributions are discussed beyond a status illustration.

In spite of this deteriorated range, much of the KGRA includes a mule deer wintering range (refer to Figure 25). Since the wintering range is critical to deer herd maintenance, this problem requires specific attention. An assessment of this wintering range needs to be made, determining the impact on the Mountain Home KGRA and vicinity, which is becoming no longer suitable for mule deer wintering habitat. However, note that the number of deer using the area is not known so that it is difficult to assess the total impact.

Other invertebrate distributions are presented in Figures 26-29 and Tables 9-12.

There may be a problem to consider with another game species—sage grouse. Although sage grouse ranges over a much broader area than the KGRA and its associated Noncompetitive Lease Application Area, an important strutting ground is located nearby (see Figure 30). Since these strutting grounds are established and maintained year after year, their preservation is essential to the reproductive success of the species. Eliminating or disturbing strutting grounds may have far-reaching impacts on the population size, especially since birds usually do not transfer to other grounds

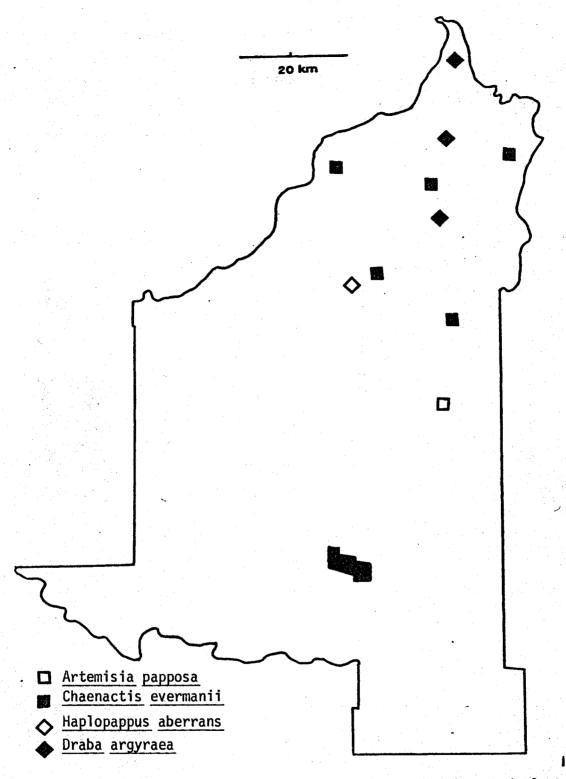


Figure 24. Recorded distribution of threatened and endangered plant species in Elmore county and their proximity to the KGRA, followed by specific information about each species.

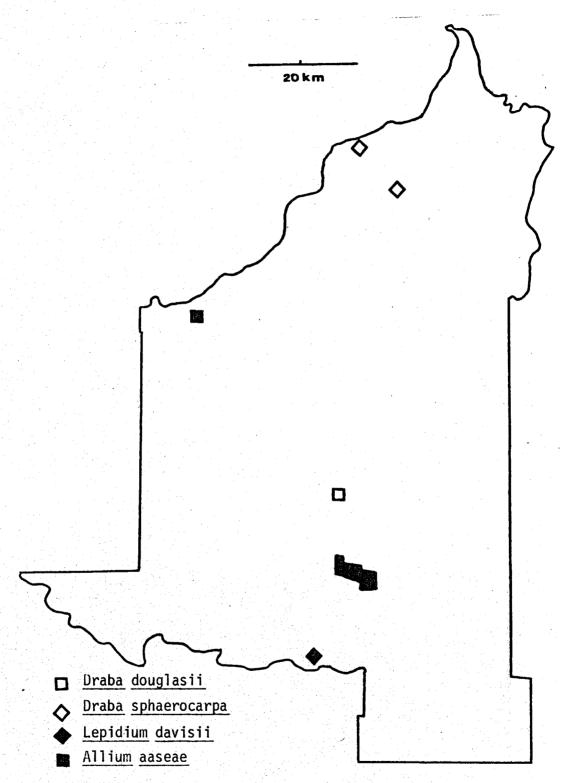


Figure 24. (continued).

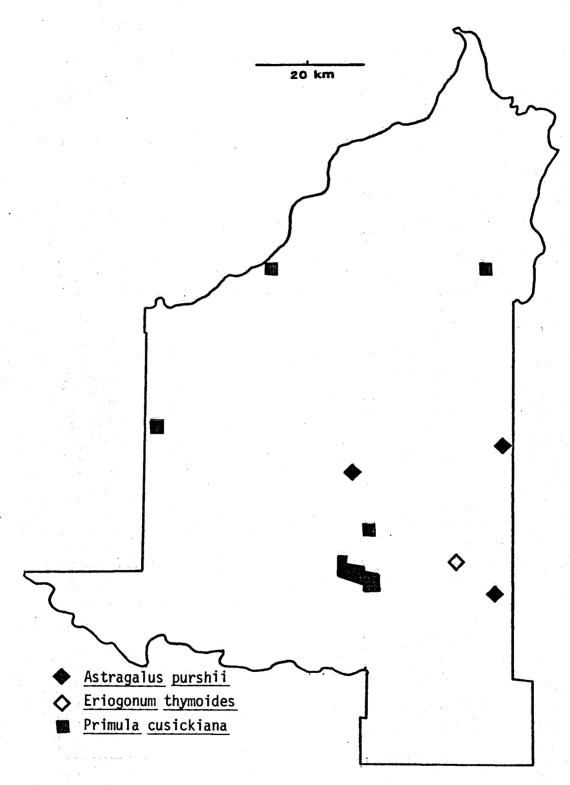


Figure 24. (continued).

BRASSICACEAE (Cruciferae)

Draba douglasii

Location: Idaho: Ada, Cassia, Custer, Elmore, Gooding, and

Owyhee counties; Oregon: Baker, Grant, Harney, Lane, Malheur, and Union counties; Nevada: Clark, Elko, Humboldt, Lauder, Ormsby, Storey, Washoe, and White Pine counties; California: Mendocino,

Modoc, Plumas, and San Bernardino counties;

Washington: Klickitat County.

Land Ownership: BLM, private and probably Idaho Department of

Lands.

Vegetation Type: Artemisia tridentata/Poa sandbergii.

Habitat: Dry, bare spots where there is little competition

from other plants. Soil type may vary from sand

to clay, 1219 to 3353 m.

Hazards: Range improvement programs.

Herbarium Data: Number of sites by county: Idaho--Ada-1,

Cassia-1, Custer-1, Elmore-1, Gooding-1, Owyhee-3;

number of collections in herbaria searched:

BOIS-2, CIC-5, ID-4 IDF-0, INT-1.

Remark: Distribution is highly discontinuous but it ranges

from southern Washington to San Bernadino County,

California.

Recommendation: Remove from Threatened List.

Reference: Hitchcock 1941.

Compiler: Pack ard.

Draba sphaerocarpa

Location: Idaho: Boise, Custer, Elmore, and Valley

counties: Idaho endemic.

Land Ownership: United States Forest Service (USFS) Boise, Challis

and Sawtooth National Forest (N.F.).

Vegetation Type: Mostly subalpine to alpine, one site Pinus

ponderosa/Purshia tridentata.

Habitat:

Gravel bars, ridges, and talus; scree slopes on ridges and on sliding debris of Challis; volcanics

(Phillips 1976).

Hazards:

Probably very few because of habitat and location.

Herbarium Data:

Number of sites by county: Idaho--Boise-4, Custer-4, Elmore-2, Valley-5; number of

collections in herbaria searched: BOIS-1, BS-0, CIC-2, ID-2, IDF-0, IDS-1, INT-0, RENO-7, UTC-5,

WS-9, WTU-12.

Remarks:

This plant has a relatively wide distribution and

occupies sites seldom disturbed by man. Threatened status appears unnecessary.

Recommendation:

Remove from Threatened List.

Compiler:

Steele.

Lepidium davisii

Location:

Idaho: Elmore and Owyhee counties; Oregon:

Malheur County

Land Ownership:

BLM, possibly private and Idaho Department of

Lands.

Vegetation Type:

Atriplex-Artemisia Zone.

Habitat:

Hard bottom playas.

Hazards:

These playas are being used for racetracks, stock watering ponds, and water reservoirs; their shape

and locations make them very vulnerable to

disturbance.

Herbarium Data:

Number of sites by county: Idaho--Elmore-1, Owyhee-1; number of collections in herbaria searched: BOIS-O, BS-O, CIC-2, ID-1, IDF-O.

Remarks:

Only three sites are known for this plant even though it ranges from Elmore County, Idaho, to

Malheur County, Oregon. The many highly

destructive uses which the habitat receives makes this a very vulnerable species in spite of its range. It is doubtful that more than a few other sites will be found; these will not likely affect

the endangered status of this species.

Recommendation:

Retain as endangered.

Reference:

Rollins 1948.

Compiler:

Pack ard.

Draba argyraea

Location:

Idaho: Blaine, Boise, Custer, Elmore, and Valley

counties; Idaho endemic.

Land Ownership:

USFS (Boise, Challis and Sawtooth N.F.).

Vegetation Type:

Upper subalpine.

Habitat:

In crevices and gravels of granitic rock.

Hazards:

Very few due to type of habitat and

inaccessibility.

Herbarium Data:

Number of sites by county: Idaho--Blaine-3, Boise-1, Custer-2, Elmore-5, Valley-2; number of collections in herbaria searched: BOIS-0, BS-0, CIC-1, ID-2, IDF-0, INT-0, RENO-8, UTC-7, WS-10,

WTU-3.

Remarks:

Relatively wide distribution; threatened status

appears unnecessary.

Recommendation:

Remove from Threatened List.

Compiler:

Steele.

ASTERACEAE (Compositae)

<u>Artemisia</u> papposa

Location:

Idaho: Blaine, Camas, Elmore, Gooding, Lincoln, and Owyhee counties; Oregon: Malheur County.

Land Ownership:

BLM, private and possibly Idaho Department of

Lands.

Vegetation Type:

<u>Artemisia tridentata - A. arbuscula</u> mosaics or Juniperus occidentalis/Artemisia tridentata.

Habitat:

Grows with or replaces A. arbuscula in shallow, stony, clayey, often alkaline soil that receives drainage from surrounding areas, 1372 to 1829 m.

Hazards:

Grazed by sheep; range improvement programs.

Herbarium Data:

Number of sites by county: Idaho--Blaine-1, Camas-3, Elmore-2, Gooding-1, Lincoln-1, Owyhee-3;

number of collections in herbaria searched: BOIS-1, CIC-2,, ID-6, IDF-3, UTC-1, WS-3, WTU-1.

Remarks:

This plant has a fairly broad range but a highly discontinuous distribution. It is abundant in one area on the north end of its range but rare and apparently decreasing in Owyhee County (Eidemiller 1976). It is confined to one habitat, making it vulnerable to anything affecting that habitat.

Recommendation:

Retain as threatened until we know more about its

ecology.

References:

Eidemiller 1976, Steele 1975.

Compiler:

Pack ard.

Chaenactis evermannii

Location:

Idaho: Blaine, Boise, Custer, Elmore, Lemhi, and Valley counties -- almost entirely within southern portion of Idaho Batholith; Idaho endemic.

Land Ownership:

USFS (Boise, Challis and Sawtooth N.F.), possibly

Idaho Department of Lands.

Vegetation Type:

Varies from open Pseudotsuga menziesii/Carex geyeri communities to Pinus albicaulis-Abies

lasiocarpa.

Habitat:

Usually on shifting granitic talus.

Hazards:

Because this plant prefers a disturbed unstable site, it faces little danger from man or his livestock and may be favored by road construction.

Herbarium Data:

Number of sites by county: Idaho--Blaine-1, Boise-2, Custer-4, Elmore-6, Lemhi-2, Valley-3; number of collections in herbaria searched: BOIS-5, BS-1, CIC-1, ID-8, IDF-0, IDS-1, INT-3, RENO-8, UT-1, UTC-5, WS-9, WTU-7.

Remarks:

Wide distribution and adaptability to unstable soils suggest that this species is not in jeopardy. One site is an old depleted sheep driveway (Phillips 1976).

Recommendation: Remove from threatened list.

Compiler: Steele.

Haplopappus aberrans

Location: Idaho: Blaine, Boise, and Elmore counties; Idaho

endemic.

Land Ownership: USFS (Boise and Sawtooth N.F.).

<u>Vegetation Type:</u> Upper <u>Abies lasiocarpa</u> zone.

<u>Habitat:</u> Rock crevices in granitic outcrops.

Hazards: Apparently in little danger due to its rock crevice habitat and rather inaccessible location.

Herbarium Data: Number of sites by county: Idaho--Blaine-1,

Boise-1, Elmore-1; number of collections in herbaria searched: BOIS-0, BS-0, CIC-0, ID-0, IDF-1, IDS-2, INT-0, RENO-2, UC-0, UTC-0, WS-0,

WTU-1.

Remark: Known distribution is fairly restricted.

Recommendation: Retain as threatened until more sites are found.

Compiler: Steele.

LILIACEAE

Allium aaseae

Location: Idaho: Ada, Gem, and possibly Elmore counties;

small isolated sites within an area about 32 km

long and 8 km wide; Idaho endemic.

Land Ownership: Almost entirely by private individuals; one site

is in a Boise City Park; possibly BLM and Idaho

Department of Lands.

Vegetation Type: Found mainly in a depauperate Purshia/Eriogoman

association within sagebrush/grass zone.

Habitat: Steep southerly aspects with fine gravel on the

surface. Soils of sedimentary origin, 869 to

1341 m.

Hazards:

Large animals easily disturb this plant by trampling. Land development is the greatest threat; much of this Allium's habitat is adjacent to and within suburban areas. Some sites have

been destroyed.

Herbariam Data:

Number of sites by county: Ada-7, Elmore-1 (resembles A. simillimun), Gem-3; number of collections in herbaria searched: BOIS-5, BS-3,

CIC-8, ID-4, IDF-2, WS-1, WTU-1.

Remarks:

Plants usually abundant on proper habitat but these sites are very restricted. Plants produce

seed: viability unknown.

Recommendation:

Retain on Endangered List.

Reference:

Steele 1975.

Compiler:

Steele.

FABACEAE (Leguminosae)

Astagalus purshii var. ophiogenes

Location:

Idaho: Blaine, Camas, Canyon, Elmore, Gooding, Lincoln, and Owyhee counties: Oregon: Malheur County.

Land Ownership:

BLM, private and possibly Idaho Department of Lands.

Vegetation Type:

Artemisia tridentata/Poa sandbergii.

Habitat:

Eroded, dry, rocky, or sandy river terraces and bluffs or dunes, 762 to 1219 m.

Hazards:

Range improvement programs.

Herbarium Data:

Number of sites by county: Idaho--Blaine-1, Camas-1, Canyon-1, Elmore-3, Gooding-1, Lincoln-1, Owyhee-3, (Barneby 1964); number of collections in herbaria searched: BOIS-O, CIC-5, ID-2, IDF-O,

WS-2.

Remarks:

This variety has a fairly wide range and is probably of fair abundance in that range. There are four to five forms of A. purshii in this area and only three varietal names available for use

Figure 24. (continued).

which leads to filing herbarium material without varietal identification. Also, since one of the key differences is flower color which fades on drying, one soon learns to leave them all in the field. These situations may account for the sparsity of herbarium data.

Recommendation:

One season of collecting should be adequate for this variety. If possible, Barneby should verify the identifications. Herbaria should be reviewed for unlabeled varieties. This variety is probably neither threatened nor endangered in spite of the scarcity of herbarium material.

References:

Eidemiller 1976, Barneby 1964.

Compiler:

Pack ard.

POLYGONACEAE

Eriogonum thymoides

Location:

Idaho: Blaine, Camas, possibly Elmore, Gooding, Lincoln, and Washington counties; Oregon: Union County; Washington: Chelan, King, and Kittitas counties.

Land Ownership:

BLM, private and possibly Idaho Department of Lands.

Vegetation Type:

Sagebrush/grass.

Habitat:

Thin, rocky soil.

Hazards:

Collected by "bonsai gardeners;" range improvement programs.

Herbarium Data:

Number of sites by county: Idaho--Blaine-2, Camas-1, Washington-2; number of collections in herbaria searched: BOIS-0, CIC-2, ID-3, IDF-4, IDS-2, WS-0.

Remarks:

This plant is common in the Bennett Hills area and has a wide distribution from there to Chelan County, Washington. It is rare in the Washington County area and may be locally jeopardized, especially near highways where it is apparently collected for "bonsai" arrangements.

Figure 24. (continued).

Recommendation:

Remove from Threatened List.

Compiler:

Pack ard.

PRIMULACEAE

Primula cusickiana

Location:

Idaho: Ada, Adams, Blaine, Boise, Camas, Custer, Elmore, Gem, Gooding, Idaho, Owyhee, Valley, and Washington counties; Oregon: Wallowa County.

Land Ownership:

BLM, USFS (Boise, Payette and Sawtooth N.F.), probably private and Idaho Department of Lands

Vegetation Type:

Mostly in grass meadows or sagebrush/grass.

Habitat:

The more northern population grows in mountain meadows in heavy clay soil. The southern populations grow in thin, rocky soil on steep slopes of eroded lake terraces and in seeps or where it is wet in spring.

Hazards:

Many populations are subject to grazing; many more have been destroyed by agriculture and housing developments. This plant is attractive and tempting to transfer to the garden but transplants very poorly.

Herbarium Data:

Number of sites by county: Idaho--Ada-9 (many since destroyed), Adams-2, Blaine-1, Boise-5, Camas-4, Custer-3, Elmore-7, Gem-1, Gooding-2, Idaho-2, Owyhee-1, Washington-2; number of collections in herbaria searched: BOIS-3, BS-5, CIC-18, ID-15, IDF-2, INT-9, WS-3, WTU-2.

Remarks:

Dr. Marion Ownbet said that probably three species of Primula are represented. The Hill City population being one undescribed species; the Boise area population being the now unrecognized P. wilcoxiana; and the more northern population being the typic P. cusickiana. The difference in habitat preference indicates that this might be true. If, as Ownbey indicated, this is actually three species, then the Hill City population is truly endangered and the Boise P. wilcoxiana is possibly threatened. The P. cusickiana of the Wallowa Mountains and west-central Idaho is neither endangered nor threatened.

Figure 24. (continued).

Recommendation:

Retain on Endangered List until the taxonomy of these populations has been clarified. Then remove or reduce in status any segment of the complex that does not warrant protection.

References:

Eidemiller 1976, Holmgren and Holmgren 1974, Williams 1936.

Compiler:

Packard.

Figure 24. (continued).

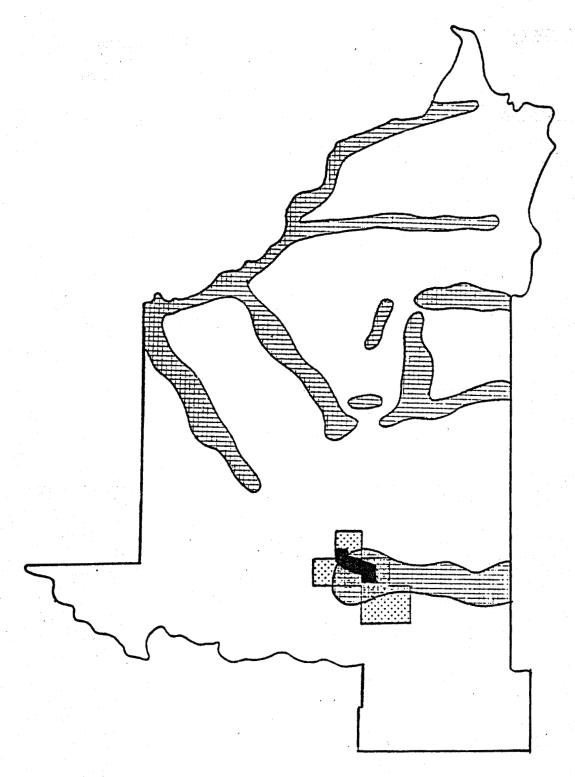


Figure 25. Distribution of mule deer, Odocoileus hemionus, wintering habitat within Elmore County; generally illustrating its proximity to the Mountain Home KGRA. (Stippled area around the KGRA is the Noncompetitive Lease Application Area.)

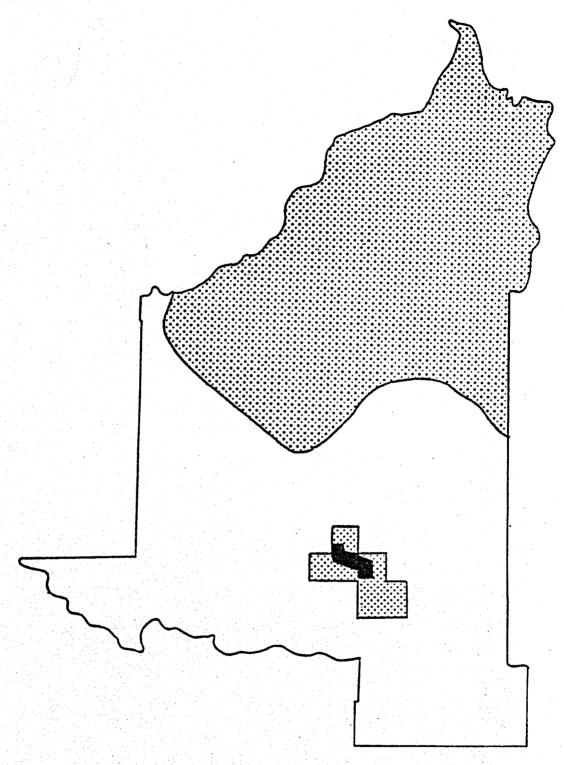


Figure 26. Distributions of black bear, <u>Urus americanus</u>, elk, <u>Cervus canadensis</u>, and mountain lion, <u>Felis concolor</u>, habitats within Elmore County; generally illustrating their proximities to the Mountain Home KGRA. (Stippled area around the KGRA is the Noncompetitive Lease Application Area.)

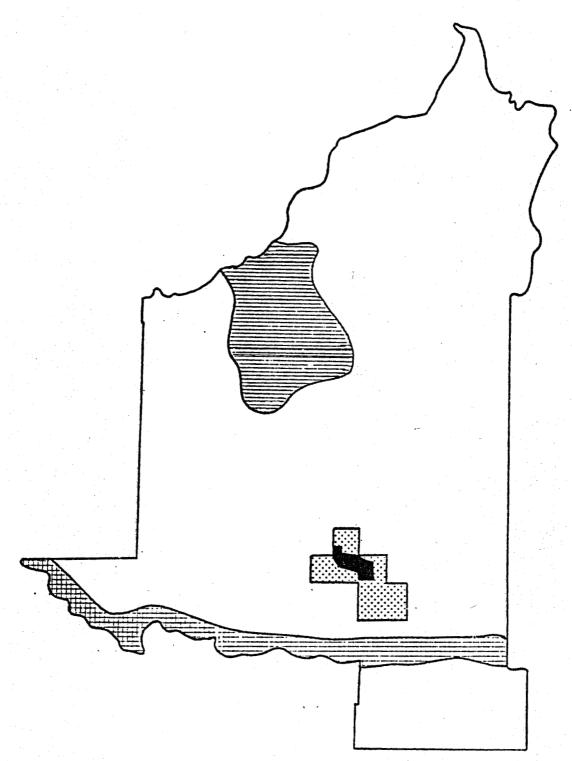


Figure 27. Distribution of California quail, Lophortyx californicus, (cross-hatched lines) and wild turkey, Meleagris gallopavo, (horizontal lines) habitats within Elmore County; generally illustrating their proximities to the Mountain Home KGRA. (Stippled area around the KGRA is the Noncompetitive Lease Application Area.)

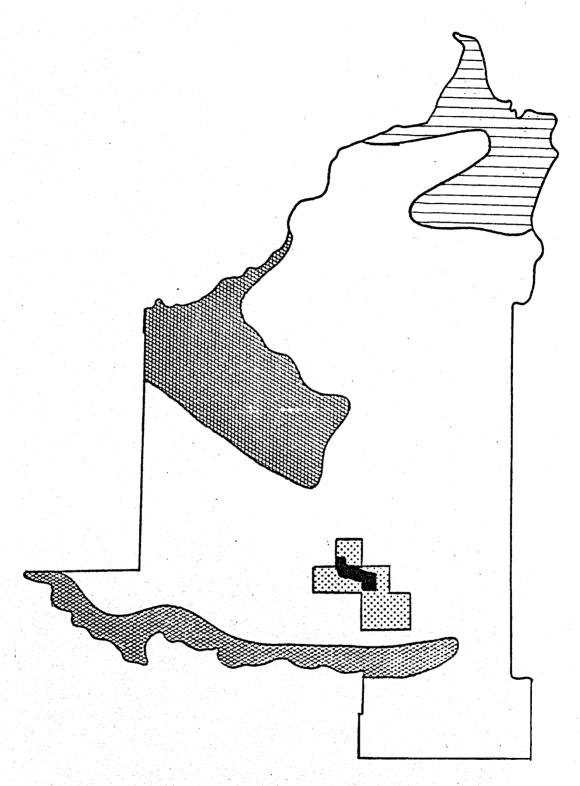


Figure 28. Distributions of chukar, Alectoris chukar, (cross-hatched lines) and mountain goat, Oreamnos americanus, (horizontal lines) habitats within Elmore County; generally illustrating their proximities to the Mountain Home KGRA. (Stippled area around the KGRA is Noncompetitive Lease Application Area.)

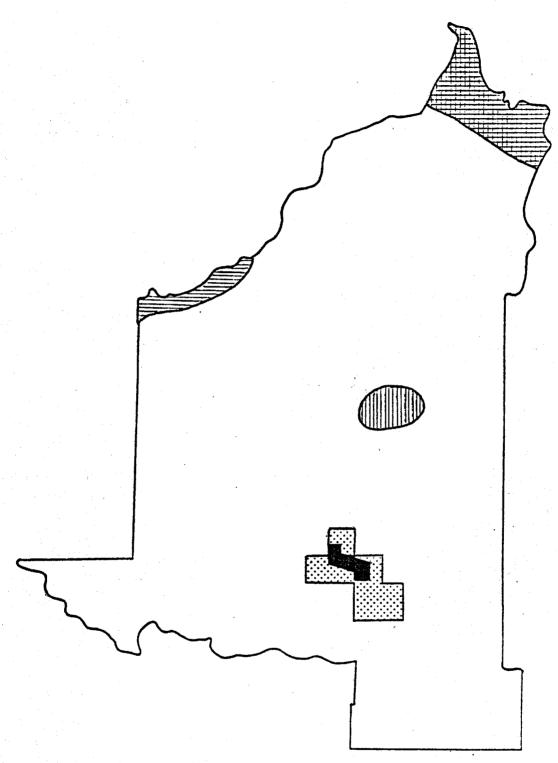


Figure 29. Distribution of marten, <u>Martes americana</u>, (cross-hatched lines), lynx, <u>Lynx canadensis</u>, (cross-hatched lines), peregrin falcon, <u>Falco peregrinus</u>, (horizontal lines), and reproducing waterfowl (vertical lines) habitats within Elmore County; generally illustrating their proximities to the Mountain Home KGRA. (Stippled area around the KGRA is the Noncompetitive Lease Application Area.)

TABLE 9. AMPHIBIANS IN THE MOUNTAIN HOME KGRA

Spo	ecles	Re	lative	ce a	Habitat Types			
Common Name	Scientific Name	Sp	Su	Fa	W1	1	2	3
Tiger Salamander	Ambystoma tigrinum	L	L	L	L		X	
Long-toed Salamander	Ambystoma macrodactylum	L	L	L	L		X	
Tailed Frog	Ascaphus truei	L	L	L	L		X	
Great Basin Spadefoot	Scaphiopus intermontanus	M	M	M	M	X	X	X
Western Toad	Bufo boreas	М	М	М	M	X	X	
Woodhouse's Toad	Bufo woodhouse1	M	M	M	M		X	
Chorus Frog	Pseudacris triseriata	L.	L	L	L		X	
Pacific Treefrog	Hyla regilla	L	L	L	L		X	
Spotted Frog	Rana pretiosa	M	M	M	M		X	
Leopard Frog	Rana pipiens	M	M	M	M		X	X
Bullfrog	Rana catesbelana	L	L	L	L		X	

^{*}Key to Relative Abundance: H=High, M=Medium, L=Low, A=Absent, P=Population level unknown, U=Presence unknown.

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TABLE 10. REPTILES IN THE MOUNTAIN HOME KGRA

Spe	Species Relative Abundance A							pes <u>b</u>
Common Name	Scientific Name	Sp	Su	Fa	Wi	1	2	3
Collared Lizard	Crotaphytus collaris	М	М	M	М	X	х	
Leopard Lizard	Crotaphytus wislizenii	· M	M.	M	M	X	X	
Western Fence Lizard	Sceloporus occidentalis	H	н	H	H	X	X	
Sagebrush Lizard	Sceloporus graciosus	H	H	H	Н	X		
Side-blotched Lizard	Uta stansburiana	H	. Н	H	H	X	X	
Desert Horned Lizard	Phrynosoma platyrhinos	L	L	L	L	X	X	
Short Horned Lizard	Phrynosoma douglassi	L	L	L	Ĺ	X	X	
Western Skink	Eumeces skiltonianus	H	H	H	H	X	X	
Western Whiptail	Cnemidophorus tigris	H	H	H	H	X	X	
Rubber Boa	Charina bottae	L	L	L	L	X	X	X
Racer	Coluber constrictor	М	М	M	М	X	X	
Striped Whipsnake	Masticophis taeniatus	M	M	M	М	X	X	
Gopher Snake	Pituophis melanoleucus	H	H	H	н	X	X	Х
Long-nosed Snake	Rhinocheilus lecontei	L	L	L	L	X	•	
Common Garter Snake	Thamnophis sirtalis	M	M	M	M	X	X	
Western Garter Snake	Thamnophis elegans	M	М	M	М	X	Х	*
Western Ground Snake	Sonora semiannulata	M	M	M	М	X	X	
Night Snake	Hypsiglena torquata	L	L	L	r e L	X		
Western Rattlesnake	Crotalus viridis	H	H	H	H	X	Х	Х

AKey to Relative Abundance: H=High, M=Medium, L=Low, A=Absent, P=Population level unknown, U=Presence unknown.

bKey to Habitat Types: 1=Sagebrush, 2=Stream Side, 3=Forest.

TABLE 11. BIRDS IN THE MOUNTAIN HOME KGRA

Spe	ecles	Re	lative	Abundan	ce <u>a</u>	Hab 1	tat Types
Common Name	Scientific Name	Sp	Su	Fa	Wi	1	2 3
Western Grebe	Aechmophorus occidentalis	L	L	L	M		X
Eared Grebe	Podiceps caspicus	H	L	L	L		X
Pied-billed Grebe	Podilymbus podiceps	M	M	M	M		X
Whistling Swan	Olor columbianus	M	L	L	M		X
Canada Goose	Branta canadensis	M	M	M	M		X
Mallard	Anas platyrhynchos	Н	M	M	H	X	X
Pintail	Anas acuta	M	L	M	11	X	X
Gadwal1	Anas strepera	L	L	M	M	X	X
Wigeon	Anas americana	M	L	M	Н	X	X
Northern Shoveler	Anas clypeata	M	M	M	M		X
Blue-winged Teal	Anas discors	M	M	М	P	X	X
Cinnamon Teal	Anas cyanoptera	H	M	L	P	X	X
Green-winged Teal	Anas crecca	H	M	M	M	X	X
Wood Duck	Aix sponsa	L	L	L	L		X
Redhead	Aythya americana	M	L	L	M		X
Canvasback	Aythya valisineria	L	L	L	L		X
Ring-necked Duck	Aythya collaris	M	P	L	M		X
Greater Scaup	Aythya marila	L	P	L	L		X
Lesser Scaup	Aythya affinis	H	L	L	H		X
Common Goldeneye	Bucephala clangula	H	М	M	H		X
Barrow's Goldeneye	Bucephala islandica	L	L	L	М		X
Bufflehead	Bucephala albeola	M	L	L	M		X
Ruddy Duck	Oxyura jamaicensis	M	L	L	М		X
Common Merganser	Mergus merganser	Ħ	М	M	H		X
Red-breasted Merganser	Mergus serrator	M	M	M	L		X

TABLE 11. (continued)

Sp	pecles	Re	lative	Abundan	ce ^a	Hab i	tat Ty	pes <u>b</u>
Common Name	Scientific Name	Sp	Su	Fa	W1	1	2	3
Hooded Merganser	Lophodytes cucullatus	L	P (1987)	L	L		X	
Turkey Vulture	Cathartes aura	M	M	Н	L	X	X	Х
Goshawk	Accipiter gentilis	M	M	M	L ·	X	X	X
Cooper's Hawk	Accipiter cooperii	М	M	M	L,	X	X	X
Sharp-shinned Hawk	Accipiter striatus	M	M.	M	M	X	X	X
Marsh Hawk	Circus cyaneus	M	М	M	н	. X	X	
Rough-legged Hawk	Buteo lagopus	M	M	M	H	X	X	
Red-tailed Hawk	Buteo jamaicensis	H	H	H	H	X	X	X
Ferruginous Hawk	Buteo regalis	L	L	L	M	X	X	
Swainson's Hawk	Buteo swainsoni	L	M	M	M	X	X	
Golden Eagle	Aquila chrysaetos	Н	н	H	н	x	X	X
Bald Eagle	Haliaeetus leucocephalus	L	L	M	M	X	X	Х
Osprey	Pandion haliaetus	L	L	L	L		X	
Prairie Falcon	Falco mexicanus	L	M	M	H	X	Χ.	
Peregrine Falcon	Falco peregrinus	L	I.	L	L	X		
American Kestrel	Falco sparverius	н	Н	Н	н	x	х	X
Wild Turkey	Meleagris gallopavo	U	บ	บั	U			
Blue Grouse	Dendragapus obscurus	M	M	M	M	X	X	X
Spruce Grouse	Canachites canadensis	L	L	L	M	X	X	X
Ruffed Grouse	Bonasa umbellus	M	M	M	M	X	X	Х
Sage Grouse	Centrocercus urophasianus	М	М	M	М	X	X	
California Quail	Lophortyx californicus	M	M	M	M	X	X	
Mountain Quail	Oreortyx pictus	L	L	L	L	X	X	
Ring-necked Pheasant	Phasianus colchicus	M	M	M	М	X	X	
Chukar	Alectoris chukar	М	M	Н	Н	X	X	

TABLE 11. (continued)

Spec	Les	Re	lative	Abunda	nce	<u>a</u>	F	labit	at Ty	pes <u>b</u>
Common Name	Scientific Name	Sp	Su	Fa		Wi		1	2	3
Gray Partridge	Perdix perdix	M	M	M	11	M		X	X	
Sandhill Crane	Grus canadensis	L	L	L		P			X	
Great Blue Heron	Ardea herodias	M	M	M		M			X	
Snowy Egret	Leucophoyx thula	L	L	L		P			X	
Black-crowned Night Heron	Nycticorax nycticorax	M	M	М		M			X	
American Bittern	Botaurus lentiginosus	L	L	L	:	P			X	
Virginia Rail	Rallus limicola	n.	U	U		U				
Sora	Porzana carolina	L	L	L		L			X	
American Coot	Fulica americana	. u	U	U		U				
American Avocet	Recurvirostra americana	L	L	L		P		x	X	
Killdeer	Charadrius vociferus	H	H	H		L		X	X	X
Long-billed Curlew	Numenius americanus	L	L	L		P			X	
Spotted Sandpiper	Actitis macularia	L	L	L		L			X	
Willet	Catoptrophorus semipalmatus	L	L	L		P			X _.	
Greater Yellowlegs	Totanus melanoleucus	U	U	ប		U				
Lesser Yellowlegs	Totanus flavipes	U	U	U		U				
Long-billed Dowitcher	Limnodromus scolopaceus	U	U	U		U :				
Short-billed Dowitcher	Limnodromus griseus	L	L	L		P			X	
Pectoral Sandpiper	Erolia melanotos	U	U	U		U				
Baird's Sandpiper	Erolia bairdii	U	U	ប		บ				
Least Sandpiper	Erolia minutilla	U	ี บ	U		บ				
Western Sandpiper	Ereunetes mauri	U ·	U	ប		ប				
Wilson's Phalarope	Steganopus tricolor	U	· U	U		U				

TABLE 11. (continued)

Spec	Les	Re	lative	Abundan	ce ^a	Habitat Types				
Common Name	Scientific Name	Sp	Su	Pa	W1	1	2	3		
Northern Phalarope	Lobipes lobatus	U	U	บ	U					
Common Snipe	Capella gallinago	U	U	ប	U					
California Gull	Larus californicus	H	M	H	M		X			
Ring-billed Gull	Larus delawarensis	M	T	M	L		X			
Franklin's Gull	Larus pipixcan	L	L	L	P		X			
Forster's Tern	Sterna forsteri	L	L	L	P		X			
Common Tern	Sterna hirundo	L	L	P	P		X			
Black Tern	Chlidonias niger	L	L	L	₽	-	X			
Mourning Dove	Zenaidura macroura	H	H	H	L	X	X	X		
Yellow-billed Cuckoo	Coccyzus americanus	U ,	บ	U	U					
Black-billed Cuckoo	Coccyzus erythropthalmus	. บ	U	U	U					
Barn Owl	Tyto alba	11	H	H	Н	X	X			
Screech Owl	Otus asio	L	M	L	L	X	X	X		
Great Horned Owl	Bubo virginianus	M	M	M	M	X	X	X		
Short-eared Owl	Asio flammeus	M	М	M	L	X	X	X		
Long-eared Owl	Asio otus	L	L.	L	L			x		
Great Gray Owl	Strix nebulosa	U .	U	U	U					
Burrowing Owl	Spectyto cunicularia	M	M	M	P	X	X			
Saw-whet Owl	Aegolius acadicus	H	L	L	L		X	X		
Poor Will	Phalaenoptilus nuttallii	L	M	L	P	X	X	X		
Common Nighthawk	Chordeiles minor	H	H	М	P	X	X	X		
Black-chinned Hummingbird	Archilochus alexandri	U	U	U	U		the April			
Broad-tailed Hummingbird	Selasphorus platycercus	. L	L	L	P	X	X	X		
Calliope Hummingbird	Stellula calliope	. U	U	U	U					
Rufous Hummingbird	Selasphorus rufus	L	L	L	P		X	X		

TABLE 11.(continued)

Spe	cies	Re	lative	Abundan	ce -	Hab1	tat Ty	es <u>b</u>
Common Name	Scientific Name	Sp	Su	Fa	Wi	1	2	3
Belted Kingfisher	Megaceryle alcyon	M	М	M	M		X	X
Common Flicker	Colaptes auratus	M	M	M	H	X	X	X
Pileated Woodpecker	Dryocopus pileatus	L	L	L	P		X	X
Lewis' Woodpecker	Asyndesmus lewis	L	L	L.	A	X	X	X
Hairy Woodpecker	Dendrocopos villosus	L	L	L	L		X	X
Downy Woodpecker •	Dendrocopos pubescens	L	L	L	L:		X	X
Eastern Kingbird	Tyrannus tyrannus	L	L	· L	P	X	X	
Western Kingbird	Tyrannus verticalis	L	M	L	P	X	X	
Say's Phoebe	Sayornis saya	M	М	· M	$_{i}\mathbf{P}$	X	X	
Traill's Flycatcher	Empidonax traillii	L	М	L	P	X	X	
Hammond's Flycatcher	Empidonax hammondii	U	U	U	U			
Dusky Flycatcher	Empidonax oberholseri	U	U	U	U			
Western Wood Pewee	Contopus sordidulus	L	L	L	P		X	X
Olive-sided Flycatcher	Nuttallornis borealis	L.	L	L	P	X		X
Horned Lark	Eremophila alpestris	H	Н	H	H	X	X	
Barn Swallow	Hirundo rustica	Н	H	L	¹ . Р	X	X	
Cliff Swallow	Petrochelidon pyrrhonota	H	H	L	L	X	X	
Violet-green Swallow	Tachycineta thalassina	L	L	L .	P	X	. X	X
Tree Swallow	Iridoprocne bicolor	L	L	L	P		X -	X
Bank Swallow	Riparia riparia	H	H	M	P _i	X	X .,	
Rough-winged Swallow	Stelgidopteryx ruficollis	L	L	L	P	x		
Steller's Jay	Cyanocitta stelleri	M	M	M	M		X	X
Gray Jay	Perisoreus canadensis	M	M	M	М		X	X
Black-billed Magpie	Pica pica	H	Н	Н	H.	X	X	X
Clark's Nutcracker	Nucifraga columbiana	М	M	M	M		X	X

TABLE 11. (continued)

Spec	cies	Re	lative	Abundan	e a	Habi	tat Ty	pes <u>b</u>
Common Name	Scientific Name	Sp	Su	Fa	W1	1	2	3
Common Raven	Corvus corax	H	H	Н	н -	X	x	×
Common Crow	Corvus brachyrhynchos	M	M	M	M	X	X	X
Black-capped Chickadee	Parus atricapillus	M	M	M	Н	X	X	X
Mountain Chickadee	خالفتار پر برسی برای به در این	L	L	L	M	. ,	X	X
	Parus gambeli Cinclus mexicanus	M	М	M	M		X	X
Dipper	Cincius mexicanus	n	. М	n	- FI		Λ	Λ
White-breasted Nuthatch	Sitta carolinensis	M	M	М	М		X	X
Red-breasted Nuthatch	Sitta canadensis	M	M	M	M		X	X
Pigmy Nuthatch	Sitta pygmaea	L	L	L	L		X	
Brown Creeper	Certhia familiaris	L	L	L	L		X	X
House Wren	Troglodytes aedon	L	М	L	L	X	X	X
Winter Wren	Troglodytes troglodytes	L	L	L	L.		· X	X
Long-billed Marsh Wren	Telmatodytes palutris	L	M	L	P		X	
Canyon Wren	Catherpes mexicanus	H	Н	H	Н	X		Х
Rock Wren	Salpinctes obsoletus	L	L	L	Ł	X		
Gray Catbird	Dumetella carolinensis	L	L	L.	L		X	
Sage Thrasher	Oreoscoptes montanus	M	H	М	P	x		
Robin	Turdus migratorius	Н	Н	H	М	X	X	X
Hermit Thrush	Hylocichla guttata	L	L ·	I.	P		X	X
Swainson's Thrush	Hylocichla ustulata	L	L	L	P		Х	X
Veery	Hylocichla fuscescens	M	M	L	P	X	X	X
Mountain Bluebird	Sialia currucoides	M	M	M	L	Х	X	X
Townsend's Solitare	Myadestes townsendi	L	L	L	L		X	X
Golden-crowned Kinglet	Regulus satrapa	L	L	L	L		X	X
Ruby-crowned Kinglet	Regulus calendula	L	L	L	L		X	X
Bohemian Waxwing	Bombycilla garrula	L	L	L	L		X	X

TABLE 11.(continued)

Spe	cies	Re	lative A	Abundand	ce ^a	Habit	at Ty	es b
Common Name	Scientific Name	Sp	Su	Fa	Wi	1	2	3
Cedar Waxwing	Bombycilla cedrorum	L	М	L	L		: X	X
Northern Shrike	Lanius excubitor	L	L	L	L	X	X	X
Loggerhead Shrike	Lanius ludovicianus	M	М	M	L	X	X	X
Starling	Sturnus vulgaris	Н	H	H	H	X	X	X
Red-eyed Vireo	Vireo olivaceus	U	U	U	U			
Warbling Vireo	Vireo gilvus	М	М	L	P		X	
Orange-crowned Warbler	Vermivora celata	U	II	U	U		Λ	
Yellow Warbler	Dendroica petechia	M	M	L	L		X	
Yellow-rumped Warbler	Dendroica coronata	L	L	L L	L	•	X	X
Townsend's Warbler	Dendroica townsendi	L	L	L	P		Α.	X
MacCillianaula Hawklan	0		•	y	n		v	v
MacGillivray's Warbler Common Yellowthroat	Oporornis tolmiei	L	L	Ļ	P		X	X
Wilson's Warbler	Geothlypis trichas	L	L M	L M	P		X	Х
Yellow-breasted Chat	Wilsonia pusilla Icteria virens	M	M M		P		X	Λ
House Sparrow	Passer domesticus	L H	m H	L H	P H	Х	X X	х
				-				
Bobolink	Dolichonyx oryzivorus	L	L	L	P		X	٠
Western Meadowlark	Sturnella neglecta	M	M	М	M	X	X	
Yellow-headed Blackbird	Xanthocephalus							
	xanthocephalus	M	M	L	P		. X	
Red-winged Blackbird	Agelaius phoeniceus	M	M	M	M	X	X	
Northern Oriole	Icterus galbula	L	M	L	P		X	•
Brewer's Blackbird	Euphagus cyanocephalus	н	н	н	М	X	X	
Brown-headed Cowbird	Molothrus ater	М	М	M	L	X	X	
Western Tanager	Piranga ludoviciana	M	M	M	P		X	Х
Black-headed Grosbeak	Pheucticus melanocephalus	L	L	L	L		. X	
Blue Grosbeak	Guiraca caerulea	U	U	U	U			

TABLE 11.(continued)

Spec	cies	Re	lative	Abundan	cea	Habi	tat Ty	pes <u>b</u>
Common Name	Scientific Name	Sp	Su	Fa	W1	1	2	3
Tanada Danada	P	4	т	7	D	•	X	
Lazuli Bunting	Passerina amoena	L	L L	L	P		Α.	v
Evening Grosbeak Cassin's Finch	Hesperiphona vespertina	L L		L	L	v	X	X X
	Carpodacus cassinii		L	L	L	X		X.
House Finch	Carpodacus mexicanus	M	M	M	L	X	X	
Pine Siskin	Spinus pinus	M	M	• М	L			Х
American Goldfinch	Spinus tristis	L	М	L	L	х	X	х
Red Crossbill	Loxía curvirostra	L	L	Ĺ	Ā	••		X
White-winged Crossbill	Loxia lecoptera	Ü	Ū	บ	IJ			••
Green-tailed Towhee	Chlorura chlorura	L	Ĺ	L	P	X		
Rufous-sided Towhee	Pipilo erythrophthalmus	M	M	M	L		X	
Savannah Sparrow	Passerculus sandwichensis	Н	н	Н	н	х		
Grasshopper Sparrow	Ammodramus savannarum	L	М	M	L	X		
Vesper Sparrow	Pooecetes gramineus	L	L	L	L	X		
Lark Sparrow	Chondestes grammacus	L	M	М	L	X ·	х	
Black-throated Sparrow	Amphispiza bilineata	U	U	บ	U			
Sage Sparrow	Amphispiza belli	P	P	P	P	X		
Dark-eyed Junco	Junco hyemalis	M	М	М	М	х	Х	X
Tree Sparrow	Spizella arborea	บ	U	บ	U			
Chipping Sparrow	Spizella passerina	M	M	M	L	X	X	X
Brewer's Sparrow	Spizella breweri	M	M	M	P	X		X
White-crowned Sparrow	Zonotrichia leucophrys	L	L	M	M	X	X	X
Fox Sparrow	Passerella iliaca	L	L	L.	L	X	X	X
Lincoln's Sparrow	Melospiza lincolnii	U	U	U	ប			
Song Sparrow	Melospiza melodia	M	M	L	I.	X	X ,	

^{**}Ekey to Relative Abundance: II=High, M=Medium, L=Low, A=Absent, P=Population level unknown, U=Presence unknown.

bKey to Habitat Types: 1=Sagebrush, 2=Stream Side, 3=Forest.

TABLE 12. MAMMALS IN THE MOUNTAIN HOME KGRA

Spec	:ies	Re	lative A	ce ^a	Habitat Types			
Common Name	Scientific Name	Sp	Su	Fa	Wi	1	2	3
Shrews		М	M	M	М	X	X	х
Vagrant Shrew	Sorex vagrans							
Masked Shrew	Sorex cinereus							
Dusky Shrew	Sorex obscurus					10 m		
Water Shrew	Sorex palustris							
Merriam Shrew	Sorex merriami							
Bats		M	M	М	M	X	X	X
Little Brown Myotis	Myotis lucifugus							
Yuna Myotis	Myotis yumanensis							
Long-eared Myotis	Myotis evotis							
Fringed Myotis	Myotis thysanodes	. `.						
Long-legged Myotis	Myotis volans							
California Myotis	Myotis californicus		•					
Small-footed Myotis	Myotis subulatus							
Silver-haired Bat	Lasionycteris noctivagans							
Western Pipistrel	Pipistrellus hesperus							
Big Brown Bat	Eptesicus fuscus							
Hoary Bat	Lasiurus cinereus	**						
Spotted Bat	Euderma maculata							
Western Big-eared Bat	Plecotus townsendi							
Black Bear	Ursus americanus	L	L	L	\mathbf{L}_{1}^{c}	X	X	X
Raccoon	Procyon lotor	M	M	M	M	X	X	Х
Weasel		M	M	M	M	Х	X	X
Shorttail Weasel	Mustela erminea							
Longtail Weasel	Mustela frenata							
Mink	Mustela vison	L	L	L.	L	X	X	X
River Otter	Lutra canadensis	L	L	L	L		X	
Badger	Taxidea taxus	H	H	H	H	X	X	X
Spotted Skunk	Spilogale putorius	L	M	L	L	X	X	X
Striped Skunk	Mephitis mephitis	M	M	M	M	X	X	X

TABLE 12. (continued)

Spec	les	Re	lative	Abundan	ce <u>a</u>	Habi	tat Ty	pes b
Common Name	Scientific Name	Sp	Su	Fa	Wi	1	2	3
		4	··					
Coyote	Canis latrans	H	Н	H	Н	X	X	X
Red Fox	Vulpes fulva	L	L	L	L	X	X	X
Mountain Lion	Felis concolor	L	L	L	L	X	X	X
Bobcat	Lynx rufus	M	M	M	М	X	X	X
Yellowbelly Marmot	Marmota flaviventris	H	H	Н	H	Х	X	X
Townsend Ground Squirrel	Spermophilus townsendi	М	М	M	М	X		
Belding Ground Squirrel	Spermophilus beldingi	P	P	P	P		X	
Columbian Ground Squirrel	Spermophilus columbianus	H	н	Н	H	X	X	
Golden-mantled Squirrel	Spermophilus lateralis	L	L	I.	L	X	X	х
Whitetail Antelope Ground				4.				
Squirrel	Ammospermophilus leucurus	L	L	. L	L	X		
Chipmunk		H	H	Н	н	X	X	Х
Least Chipmunk	Eutamias minimus	11	11	11	п	Λ	Λ	Λ
Yellow Pine Chipmunk	Eutamias amoenus							
Red Squirrel	Tamiasciurus hudsonicus	Н	Н	н	a T		X	v
- · · · · · · · · · · · · · · · · · · ·					H		A	X
Northern Flying Squirrel	Glaucomys sabrinus	L	L	L	L	,		X
Northern Pocket Gopher	Thomomys talpoides	M	M	M	M	X	Х	X
Townsend Pocket Gopher	Thomomys townsendi	P	P	P	P		X	
Great Basin Pocket Mouse	Perognathus parvus	P	. P	P	P	X		
Ord Kangaroo Rat	Dipodomys ordi	Н	H	H	Н	X		
Great Basin Kangaroo Rat	Dipodomys microps	P	P	P	P	X		
Beaver	Castor canadensis	M	M	M	M	X	X	
Western Harvest Mouse	Reithrodontomys megalotis	M	М	M	M	X	X	Х

TABLE 12. (continued)

Species			Relative Abundance				Habitat Types		
Scientific Name	Sp	Su	Fa	W1	i	2	3		
Peromyscus crinitus	P	р	P	р	X	×			
							X		
						4.			
						X ·	· X		
Neotoma lepida				••	••	-	•		
				•					
Phenacomys intermedius	P	P	P	P		X	X		
Clathrianamya ganari		7	7	Ŧ			. X		
						·v	X		
بالمريخ بالمراجع بالم							Λ		
		-	_	_			х		
Lagurus curtatus	P	P	P	P	X				
Ondatra zibathica	น	u	u	п		v			
			-						
		_	-		Y	Λ			
						x	Х		
Lepus townsendi	L	L	L	L	X		•		
Lepus americanus	M	M.	М	М	х	х	Х		
	н	Н	Н						
	. м	M		M					
	M	L		L	X				
Cervus canadensis	L	M	M	Н	X	X	X		
Odocoileus hemionus	Н	M	М	П	X	X	X		
Antilocapra americana	L	L	L	L	X				
-	Peromyscus crinitus Peromyscus maniculatus Onychomys leucogaster Neotoma lepida Neotoma cinerea Phenacomys intermedius Clethrionomys gapperi Microtus montanus Microtus longicaudus Microtus richardsoni Lagurus curtatus Ondatra zibethica Mus musculus Zapus princeps Erethizon dorsatum Lepus townsendi Lepus americanus Lepus californicus Sylvilagus nuttalli Sylvilagus idahoensis Cervus canadensis Odocoileus hemionus	Peromyscus crinitus Peromyscus maniculatus Onychomys leucogaster M Neotoma lepida Neotoma cinerea Phenacomys intermedius P Clethrionomys gapperi Microtus montanus Microtus longicaudus P Microtus richardsoni P Lagurus curtatus P Ondatra zibethica Mus musculus Zapus princeps Erethizon dorsatum Lepus townsendi Lepus americanus Lepus californicus Sylvilagus nuttalli Sylvilagus idahoensis Cervus canadensis L Odocoileus hemionus H	Peromyscus crinitus P P Peromyscus maniculatus M M Onychomys leucogaster M M Neotoma lepida Neotoma cinerea Phenacomys intermedius P P Clethrionomys gapperi L L Microtus montanus M M Microtus longicaudus P P Microtus richardsoni P P Lagurus curtatus P P Ondatra zibethica H H Mus musculus Zapus princeps M M Erethizon dorsatum M M Lepus townsendi L L Lepus americanus M M M Lepus californicus H H Sylvilagus nuttalli M M Sylvilagus idahoensis L M Odocoileus hemionus H M	Peromyscus crinitus P P P Peromyscus maniculatus M M M M Onychomys leucogaster M M M M Neotoma lepida Neotoma cinerea Phenacomys intermedius P P P Clethrionomys gapperi L L L Microtus montanus M M M M Microtus longicaudus P P P Microtus richardsoni P P P Lagurus curtatus P P P Ondatra zibethica H H H H Mus musculus P P P Zapus princeps M M M M Erethizon dorsatum M M M M Lepus townsendi L L L Lepus americanus M M M M Lepus californicus H H H Sylvilagus nuttalli M M M Sylvilagus nuttalli M M M Cervus canadensis L M M Odocolleus hemionus H M M	Peromyscus crinitus P P P P Peromyscus maniculatus M M M M M M M M M M M M M M M M M M M	Peromyscus crinitus P Peromyscus maniculatus M M M M M M M M M M M M M M M M M M M	Peromyscus crinitus P P P P X X Peromyscus maniculatus M M M M X X Onychomys leucogaster M M M M X X Neotoma lepida Neotoma cinerea Neotoma cinerea		

Akey to Relative Abundance: H=High, M=Medium, L=Low, A=Absent, P=Population level unknown, U=Presence unknown.

 $[\]frac{b}{K}$ ey to Habitat Types: 1=Sagebrush, 2=Stream Side, 3=Forest.

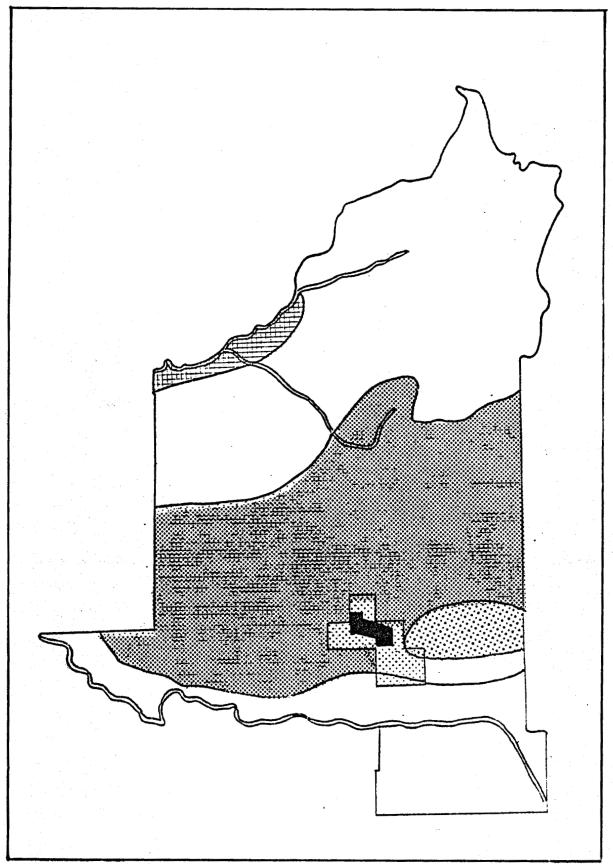


Figure 30. Distribution of bald eagle, <u>Haliaectus leucocephalus</u>, (double lines), prairie falcon, <u>Falco mexicanus</u>, (cross-hatched lines), and sage grouse, <u>Centrocercus urophasianus</u>, (horizontal lines) habitats within Elmore County; generally illustrating their proximities to the Mountain Home KGRA. (Stippled area around the KGRA is the Noncompetitive Lease Application Area.)

when the original one is no longer suitable, and they usually stop reproducing. Additional work needs to be started to determine (a) precisely where strutting grounds are in the vicinity of the KGRA, (b) how many birds visit and breed at these grounds, (c) what impact geothermal development will likely have on strutting success, (d) what impact reduced strutting success at the grounds will have on the population, and (e) the artificial establishment of new strutting grounds using captive-reared and -released birds. Such a study cannot be completed in 1 year; probably a 3-year study would provide minimum reliable data.

Snakes are considered by the State Department of Fish and Game to be of special interest because of their limited distribution in the state. Also, few collections are available. But their ranges are broad enough so that we are not overly concerned for the species as a whole. Species included are long-nosed snake, western ground snake, and night snake.

Aquatic Environment (K. McCarthy, EG&G Idaho, Inc.)

Few, if any of the streams in this resource area are perennial, resulting in scarce aquatic data. The only publication dealing at all with biological aspects of the Mountain Home (Bennett Mountain) area is the Environmental Analysis Record for Bruneau, Grand View, and Bennett Mountain, published by the Bureau of Land Management in 1977. 27

The following aquatic animal species were observed in the Mountain Home resource area: caddis flies, dragonflies, scavenger beetles, snails, Pacific tree frogs, mayflies, stoneflies, damsel flies, bullfrogs, rainbow trout, bridgelip sucker, redside shiner, speckled dace, leopard dace, alderflies, fishflies, beaver, water boatman, and water striders.

Aquatic plant species present were duckweed, cattail, various algal species, watercress, and white-water crowfoot.

Human Environment

<u>Demography--Description and Inventory of Existing Data</u> (W. C. Lewis, Lewis and Associates)

The socioeconomic impacts of any significant geothermal resource development at the Mountain Home KGRA should not impact all of Elmore County. Nevertheless, most of the socioeconomic data are reported on a county basis, and, in a sense, the county provides a relatively useful unit for analyzing economic activity. For these reasons, the reported data are for Elmore County.

Table 13 summarizes population data for Elmore county and the two principal population centers, Mountain Home and Glenns Ferry. Between 1970 and 1976, county population increased 16.5%. The largest part of this growth was outside of the two principal population centers. Despite the increased population growth, there was a net migration of 600 people out of the county during the 6-year interval. This suggests that employment growth was not sufficient to provide job opportunities for new entrants into the labor force. Summary characteristics of the population based on the 1970 census are reported in Table 14. As is true of most counties in southwest Idaho, the population is quite homogeneous with Caucasians accounting for 94.4% of the total population. The statistics on educational attainment and percent of 16- and 17-year-olds in school are about average for the region.

Projections of population, employment by industry, labor force, and school enrollment are reported in Table 15. These data are current (July, 1978) and provide an adequate level of detail for an environmental impact assessment. The projections are made through the year 2000. These data are essential for an environmental assessment in meeting two objectives: (a) to describe the future socioeconomic environment in the absence of any significant resource development and (b) to provide a baseline or standard against which impacts of development can be compared.

TABLE 13. POPULATION CHANGE OF ELMORE COUNTY, 1970-1976 a

		Population	
County (Cities)	1970	1976 (1975) ^a	% Change 1970-1976 (1975) ^a
Elmore County	17,479	19,500	16.5
(Glenn's Ferry)	1,386	1,449	4.5
(Mountain Home)	6,451	6,811	5.6

Components of Population Change, 1970-1976

Area	Population Change	Births	Deaths	Net <u>Migration</u>
Elmore County	2,000	3,200	600	-600

aCity data is for 1975.

Source: U. S. Bureau of the Census, 1977. Idaho Department of Health and Welfare, 1977. Idaho Division of Budget, Policy Planning, and Coordination, 1978.

TABLE 14. SUMMARY CHARACTERISTICS OF THE ELMORE COUNTY POPULATION, 1970

Characterist	ics	Number		Percent
Population:	White	16,503		94.4
	Black	675		3.9
	Other	301		1.7
			Male %	Female %
Median schoo	12.4	12.4		
Percent high	school	graduates	68.1	67.5
16-17 year-olds in school			90	0.4
Percent of p	opulatio	on foreign born		3.3
				:

Source: U. S. Bureau of the Census, 1972.

TABLE 15. POPULATION AND EMPLOYMENT FORECAST OF ELMORE COUNTY

							
C	меца		1 S U 1				
	1 272	1975	1 480	1985	1990	1995	2500
					- 13	496	462
IGHT CULT URE	769	680	610	<i>57</i> 9	5.32		
ONSTRUCTION	1 C8	170	20 2	234	270	304	342
DOD ATT KINDRED	28	30	36	43	50	58	66
goo ezani jc tu	. 81	163	1 62	200	220	2 38	239
THE MANUFACTURING	10	26	30	32	35	38 -	41
RANS. CHMM. AND LITES	234	209	278	287	297	306	317
INSEL AND METALL TRADE	911	1160	1267	1353	1445	1332	1 62 8
INANCE . 193. HEAL BUT	2 05	283	342	385	431	478	531
LAVILES AID HISC.	405	323.	342	355	370	386	404
TATE AND LOCAL SEVT.	657	786	829	876	926	973	1)25
FOR AL GOVE IN ALMT	787	1027	1106	1238	1375	1494	1 022
CTAL	4241	4917	5250	5588	5957	: 6306	6702
The second secon				A R Y			
	FORI	ECAST	3 U R				
						•	
	1973	1975	1980	1985	1995	1995	3000
DIAL PUPULATION	17470	19240	20800	22460	24120	25660	27563
UTAL EMPLOYMENT #	4240	4910	5250	5580	5950	6300	6700
AUDR FORCE ##	4460	4910	5250	5590	5960	6310	6700
DIAL SCHOOL CARCLEMENT	5150	5 3 9 0	3630	6030	6740	7080	7490
NURSCRY	60	70	80	80	90	90	100
KINDERGARTEN	220	310	410	440	473	480	.51.3
ELLMENTARY HIGH SCHOOL	3460	3350	3380	4040 1200	4310	4510 1720	4730
CCLLLGF	270	1410	1480	240	1610	263	. 293
C. C. C. C.	210	260	250	4-0	2-0	2.00	. 273
MOUSEHOLD HEADS	4750	5920	64.30	6970	7527	7950	9510

FIRST STATE STATE

COMPONENTS OF POPULATION GROWTH

	197	/J-1975 1	1975-1980	1983-1985	1985-1993	1790-1495	1995-2000
	TOTAL CHANGE	1764	1564	1661	1658	1540	1898
	NATURAL INCREASE BIRTHS DEATHS	1954 2479 516	2093 2667 574	2182 2830 648	2203 2940 737	2250 3092 842	2392 3343 961
_	MIGRATION EMPLOYMENT RETIREMENT	-211 -211 0	-593 -593 0	-585 -595 0	-61 4 - 61 4 0	108- 108-	-546 -546 0

Source: Idaho Department of Water Resources and Center for Research, Grants, and Contracts, Boise State Univ., July, 1978.

These data show steady population and employment increases through the end of the projection period. Population is expected to exceed 27 000 by the year 2000. Despite this growth, a continued pattern of net migration out of the area is predicted.

Summary data on school enrollment and number of teachers in the three school districts in Elmore County are reported in Table 16. Mountain Home accounts for the largest share of total enrollment and is likely to receive the largest impact of any significant geothermal resource development. The names, grades, and enrollment of elementary, junior high, and senior high schools in Mountain Home are reported in Table 17.

Crime frequencies and rates per 100 000 population for Elmore County are reported in Table 18. These data are typical of those for other low-population counties in the Intermountain West. The crime rate has increased significantly from 1971 to 1976, although the absolute levels of the crime rate are not alarming. These rates reflect the national trend of rising crime rates. The largest number of crimes are larceny, although there are relatively few crimes of violence. As a general statement, crime does not appear to be a significant problem in Elmore County. The crime rates are below that of many comparable counties and far below the rates in Ada County (Boise), the only part of southwest Idaho where the crime rate appears to be a serious problem.

Typically, the socioeconomic impact analysis suggests that rapid economic growth is almost always associated with significant increase in the crime rate. A review of several impacted communities suggest that the experience is varied. Some places have experienced a crime epidemic; other places have recorded no measurable change. Given the magnitude and potential development expected at the Mountain Home KGRA, it is not anticipated that crime should be a particular concern.

TABLE 16. SUMMARY EDUCATION DATA OF ELMORE COUNTY

		Enrol1me	nt			Student/	
District	Elementary ^a	Secondaryb	Total	Change From 1976-1977	Teachers	Teacher Ratio	
191 - Prairie	7	2	9	+2	1	9.0	
192 - Glenn's Ferry	365	295	660	+37	37	17.8	
193 - Mountain Home	2,354	1,825	4,179	+39	225	18.6	
Total	2,726	2,122	4,848	+78	263	18.4	

aGrades K-6.

Source: Idaho Department of Education, 1977 and 1978.

^bGrades 7-12.

TABLE 17. NAME, ENROLLMENT, AND LOCATION OF SCHOOLS NEAR THE MOUNTAIN HOME KGRA, 1977-1978

City	School	Grades	Enrollment
Mountain Home	Mountain Home Senior High School	10-12	849
Mountain Home	Mountain Home Town Junior High School	7-9	628
Mountain Home	East Elementary School	K-6	378
Mountain Home	North Elementary School	K-6	375
Mountain Home	West Elementary School	K-6	490

 $^{^{\}mathrm{a}}$ Excludes schools at the Mountain Home Air Force Base.

Source: Fennell, 1977.

TABLE 18. CRIME FREQUENCIES AND RATES PER 100 000 POPULATION OF ELMORE COUNTY, 1971-1976

	1971	1972	1973	1974	1975	1976
Part I Crimes (Rate)		352 (1,913.0)	464 (2,459.5)	451 (2,147.6)		•
Murder	1 (5.3)	(-)	(-)	0 (-)	3 (14.0)	2 (10.2)
Rape	2	7	8	9	3	0
	(10.6)	(38.0)	(42.4)	(42.9)	(14.0)	(-)
Robbery	1	1	7	4	5	5
	(5.3)	(5.4)	(37.1)	(19.0)	(23.3)	(25.4)
Aggravated assault	19	12	12	18	27	30
	(100.4)	(65.2)	(63.6)	(85.7)	(125.6)	(152.3)
Burglary	99	90	107	78	132	95
	(523.0)	(489.1)	(567.1)	(371.4)	(614.0)	(482.2)
Larceny	298	216	293	302	331	393
	(1,574.4)	(1,173.9)	(1,553.1)	(1,438.1)	(1,539.5)	(1,994.9)
Motor vehicle theft	12	26	37	40	33	30
	(63.4)	(141.3)	(196.1)	(190.5)	(153.3)	(132.3)

Source: Idaho Law Enforcement Planning Commission, 1978.

Health care capability is another area where concern is often voiced. Many low-population areas provide only limited medical facilities and personnel. Elmore County may fall into this category. There are only four doctors, implying a population per physician ratio of 4950. The county has two hospitals with a total of 77 beds. Ambulance services are available. Further investigation is necessary, although it is possible that any significant population growth may strain the ability of the county health care resources to service new residents (see Table 19).

In general, the demographic data must be regarded as at least adequate for environmental studies. The population data, both for the county and for principal population centers are relatively current. The data on population characteristics are outdated, having been collected in 1970, but probably are not of sufficient importance to warrant spending additional resources to provide an updated data set.

Socioeconomics (W. C. Lewis, Lewis and Associates)

Summary data on labor force, unemployment, and employment in Elmore County for 1974-1977 are reported in Table 20. The county unemployment rate has been in the range of 6-7% during this period with an average level of unemployment in 1977 of 389 workers. This unemployment pool is an indication of the amount of labor available to a potential new industrial development. Some of that employment is seasonal and does not reflect the availability of workers to move into other industry. However, it could be concluded that development requiring as many as 200 additional workers would not strain the ability of the local labor market to meet the demand.

Detailed employment data for 1971-1976 are reported in Table 21, and a detailed analysis of the employment data is reported in Table 22. Total employment has grown steadily with the exception of 1 year since 1971. Of particular interest are the location quotients, which indicate the relative specialization of industry in the county compared to both the nation and state. A location quotient in excess of

TABLE 19. SUMMARY DATA ON HEALTH CARE CAPABILITY OF ELMORE COUNTY, 1975

E:	lmore County
Physicians: Number	4
Persons per medical doctor	4,950
Ambulance services available?	Yes
Hospitals:	
Number	2
Acute care beds	77

Source: Idaho Division of Budget, Policy Planning, and

Coordination, 1978

TABLE 20. LABOR FORCE, UNEMPLOYMENT, UNEMPLOYMENT RATE, AND EMPLOYMENT OF ELMORE COUNTY, 1974-1977

Year	Labor Force	Unemployment	Unemployment Rate	Employment
1074	4 747	207	%	A 474
1974	4,717	283	6.0	4,434
1975	4,938	327	6.6	4,611
1976	5,409	399	7.4	5,010
1977	5,860	389	6.6	5,471

Source: Idaho Department of Employment Security, 1977, 1978a, and 1978b.

TABLE 21. EMPLOYMENT (FULL- AND PART-TIME) BY TYPE AND BROAD INDUSTRIAL SOURCES OF ELMORE COUNTY, 1971-1976

HEREN AND THE STATE OF THE STAT	1971 1/	1972 1/	1973 1/	1974 1/	1975 2/	1976 2/
DIMENT BY PLACE OF WORK						
TUTAL EMPLUYMENT 3/	7.948	8,344	8,898	9,227	9,113	10,03
NUMBER OF PROPRIETORS	641	699	697	739	701	70
PARM PROPRIETORS	294	297 •	302	•306	304	30
NONFARM PROPRIETORS	. 347	402	395	433	397	400
TOTAL WAGE AND SALARY EMPLOYMENT	7+307	7+645	8+201	8+488	8+412	9.33
FARM	782	859	919	1:062	1.062	1941
NUN-FARM	6.525	6,786	7.282	. 7,426	7.350	7+91
PRIVATE	1,725	1+671	1.939	1,923	2,100	2:27
AG.SERVFORFISHAND OTHER 4/	44	(U)	(0)	51	(D)	10
MINING	. 0	0	. 0	(D)	3	
CONSTRUCTION	212	109	166	145	172	17
MANUFACTURING	131	127	129	130	224	27
NON-DURABLE GOODS	42	39	(D)	41	43	8
DURABLE GCODS	89	88	(D)	89	181	190
THANSPURTATION AND PUBLIC UTILITIES	257	257	266	282	268	. 26
WHOLESALE TRADE	27	(D)	(0)	(D)	(0)	
RETAIL TRADE	572	603	706	704	727	80
FINANCE INSURANCE AND REAL ESTATE	124	142	163	178	198	21
SERVICES	358	355	422	392	368	38
GOVERNMENT AND GOVERNMENT ENTERPRISES	4.800	5+115	5,343	5+503	5+250	<u> </u>
FEDERAL + CIVILIAN	750	767	789	874	625	86
FEUERAL, MILITARY	3.351	3+666	3,854	3+905	3,914	4,03
STATE AND LOCAL	699	682	700	724	711	730

Source: Regional Economic Information System, Bureau of Regional Analysis, August, 1978.

^{1/} ESTIMATES BASED ON 67 SIC.

ESTIMATES BASED ON 72 SIC.
CUNSISTS OF WAGE AND SALARY JOBS PLUS NUMBER OF PROPRIETURS.

^{4/} INCLUDES NUMBER OF JOBS HELD BY U.S. RESIDENTS WORKING FOR INTERNATIONAL ORGANIZATIONS. PRIMARY SOURCE FOR PRIVATE NON-FARM EMPLOYMENT: ES-202 COVERED WAGES - IDAHO DEPT. OF EMPLOYMENT

TABLE 22. EMPLOYMENT (FULL- AND PART-TIME--SUMMARY ANALYSIS) BY TYPE AND BROAD INDUSTRIAL SOURCES OF ELMORE COUNTY, 1971-1976

ITEM	PERCENT OF U.S.	PERCENT OF STATE	% TOTAL W+5 EMPL	PERCENT 76/71		LOCATION QUOTIEN U.SSTAT 1976 197
	1976	1976	1976	10/11	10/15	
OYMENT BY PLACE OF WORK						
TOTAL EMPLOYMENT 1/	.0106	2.61	• 4.	26	io	
NUMBER OF PROPRIETURS	.0080	1.23		10	ō	
FARM PROPRIETORS	•0106	1.08		3	-i	
NONFARM PROPRIETORS	.0068	1.36		15	i	_ ::: : *****
The second secon						
TOTAL WAGE AND SALARY EMPLOYMENT	•0109	2.84		28	11	4 276 / 4 277
	.1014	5.90	15.16	81	33	9.3356 2.072
NUN-FAHM	.0094	2.60	84.84	21	8	.8624 .915
PRIVATE	.0034	1.00	24.36	32	8	.3132352
AG.SERVFCRFISHAND UTHER 2/	(D)	(0)	(0)	(0)	(0)	(D) (D
WINING	0003	06	•02		33	0236021
CONSTRUCTION	.0049	1.03	1.90	-17	3	.4504363
MANUFACTURING	.0015	+54	2.99	113	25	.1349188
NUN-DURABLE GOODS	•0010	• 35	.89	98	93	.0962 .121
DURABLE GOODS	.0018	•70	2.10	120		.1625245
THANSPORTATION AND PUBLIC UTILITIES	.0057	1.58	2.81	2	-2	•5277 •554
MHULESALE TRADE	(D)	(0)	(0)	(0)	(0)	(0)(0
RETAIL TRADE	.0061	1.54	8.67	41	11	.5602 .541
FINANCE INSURANCE AND REAL ESTATE	•0049	1.71	2.28	72	8	•4500 •599
SERVICES	.0024	•76	4.11	. 7	-1	.2181 .267
GOVERNMENT AND GOVERNMENT ENTERPRISES	.0319	7.32	60.48	18	8	2.9363 2.573
FEUERAL. CIVILIAN	•0302	7.79	9.30	16	39	2.7776 2.736
FEDERAL, MILITARY	.1618	33.35	43.27	21		14.8947 11.72
STATE AND LOCAL	.0060	1.37	7.91	. 6	. •	•5513 •481

Source: Regional Economic Information System, Bureau of Regional Analysis, August, 1978.

^{1/} CUNSISTS OF WAGE AND SALARY JOBS PLUS NUMBER OF PROPRIETURS.

2/ INCLUDES NUMBER OF JOBS HELD BY U.S. RESIDENTS WORKING FOR INTERNATIONAL ORGANIZATIONS.

PHIMARY SOURCE FOR PRIVATE NON-FARM WAGE AND SALARY EMPLOYMENT: IDAHO DEPT. OF EMPLOYMENT

(D) NOT SHOWN TO AVOID DISCLOSURE OF CONFIDENTIAL INFORMATION. DATA ARE INCLUDED IN TOTALS.

unity implies the county has more than a proportionate share of employment in that sector. Relative to the nation, Elmore County specializes in agriculture, federal civilian, and federal military activities. The Mountain Home Air Force Base accounts for most of this specialization. Between 1971 and 1976, the largest percentage of employment increases were reported in manufacturing and agriculture.

Selected housing characteristics from the 1970 U.S. Census of $Housing^{28}$ are reported for Elmore County in Table 23. While these data are interesting, they are seriously outdated and of only limited value in an environmental assessment.

Detailed data on personal income by major source and a set of summary analytics are reported in Tables 24 and 25. These data are provided from the Regional Economics Information System developed and managed by the Bureau of Economic Analysis of the U.S. Department of Commerce (1978). The level of per capita income in Elmore County, \$5184 in 1976, is comparable to that for Idaho but significantly below the national average. This is typical of most of the southwest Idaho counties with the exception of Ada and Valley Counties.

Data on agriculture are especially important because that sector may be impacted by geothermal resource development. Summary agricultural data from the 1974 Census of Agriculture³⁰ are reported in Table 26. This sector is relatively important in Elmore County, as it accounts for more than 10% of the total earnings. Average farm size is almost 688 ha, and the value of land and buildings per farm is \$438 000. Only 22% of the county land is farms, and only 5.1% is in cropland. Irrigated agriculture accounts for 16% of farmland and 3.5% of all county land. Geothermal development may impact the quantity and quality of water available from wells.

Summary land-use data are reported in Table 27. Urban use accounts for 0.6% of county land use, while rangeland is the largest land use. Land ownership is typical for the Intermountain West with the federal government owning almost 75% of total land area. Less

TABLE 23. SELECTED HOUSING CHARACTERISTICS OF ELMORE COUNTY, 1970

Characteristics	Total	Rural	
Number of year-round units	5,246	1,880	
Owner occupied: Number	2,176	1,056	
Percent	41.5%	56.0%	
Vacant units	488	318	
Vacancy rate	9.3%	16.9%	
With all plumbing facilities: Number	4,955	1,695	
Percent	95.2%	90.2%	
On public sewer: Number	3,790	592	
Percent	72.2%	31.5%	
Median valueowner occupied	\$13,800	\$10,400	
Contract rentrenter occupied	79	64	

Source: U. S. Bureau of the Census, 1972c.

TABLE 24. PERSONAL INCOME BY MAJOR SOURCES OF ELMORE COUNTY, 1971-1976 (Thousands of Dollars)

ITEM TO THE PROPERTY OF THE PR	1971 1/	1972 1/	1973 1/	1974:1/	1975 4/	1976 2/
TAL LAUCK AND PROPRIETORS INCOME BY PLACE OF WORK	3/					
BY TYPE TO BE SEED AND SEED OF						
HAGE AND SACARY DISBURSEMENTS	45,750	53,087	60,114	67,233	71,571	80,741
OTHER LABOR INCOME	904	1,014	1,238	1,554	1,815	2,366
PRCPRIETORS INCCME 4/	6,016	6,907	14,555	18,973	10,982	5,018
PARP	2,873	3,467	10,923	15+253	6,944	493
NON-FARM 4/	3,143	3,440	3,632	3.720	4,038	4,525
BY INCUSTRY						
FARM TO THE RESERVE THE PARTY OF THE PARTY O	5,980	7,339	15,177	21.002	13,096	8,952
NON-FARM	46,690	53,669	60,730	66+758	71,272	79.173
PRIVATE	13,645	13.985	16,528	17,713	20,090	23,043
AG. SERV FUR FISH AND OTHER 5/	249	(D)	(D)	285	(v)	(L)
MINING	0	0	0	(C)	(L)	(L) 3,071
CONSTRUCTION AND A SECOND AND A SECOND ASSESSMENT OF THE SECOND ASSESSM	2,836	2,144	2,768	2,804	3,019	2,957
MANUFACTURING	1,152	1,239	1,332	1,456	2,146	855
NCN-DURABLE GCODS	349	354	(0)	411	457	2,10
DURABLE GOCDS	803	885	(0)	1,045	1,609	4.009
THANSPORTATION AND PUBLIC UTILITIES	2,667	2,950	3,303	3+639	3,735	-
NHOLESALE TRADE	314	(0)	(0)	(0)	5.712	6,787
RETAIL TRAVE	3,656	4,099	4,954	5,153	1.605	1,893
FINANCE, INSCRANCE, AND REAL ESTATE	911	1,069	1,215	1+372	2,605	2.892
SERVICES	1,860	1,934	2,353	2,523	51.162	56,130
GOVERNMENT AND GOVERNMENT ENTERPRISES	33,045	39.684	44,202	49.045	7,804	9.081
FEDERAL, CIVILIAN	5,464	5,505	5,690	7,063	38,147	41,188
PEUERAL, MICITARY	24,154	30,359	34,379	37,296	5,171	5.86
STATE AND LCCAL	3,427	3,820	4,133	4+686	2421.	3,400.
ERIVATION OF PERSONAL INCOME BY PLACE OF RESIDENCE						
TOTAL LABOR AND PROPRIETORS INCOME BY			35 5		04 240	88,12
PLACE OF WORK	52.670	61,008	75,907	87.760	84,368	00112
LESS! PERSONAL CONTRIBUTIONS FOR SOCIAL			3 .00	2 4 25	3.758	4+30
INSURANCE BY PLACE OF WORK	1.905	2,188	5+904	3,425	34170	
NET LABOR AND FROPRIETORS INCORE BY		56 620	73.098	84.335	80.610	83.41
PLACE OF WORK	50,765	58,820	-2,675	-21942	-3,176	-3,48
PLUST RESIDENCE AUJUSTMENT	-2,419	-2,247	-64013	-61776	-31110	
NET LABOR AND PROPRIETORS INCOME BY	. ***40:344	E4 . E72 · ·	70-423	81.393	77.432	80.33
PLACE OF RESIDENCE	48,346	56.573	70,423	5,823	6,539	7,20
PLUS: DIVIDENUS, INTEREST, AND RENT 7/	3,366	4,392	5,200	91992	12.091	13.63
PLUS: TRANSFER PAYMENT	5.755	61682	8.068	71772		
PERSONAL INCOME BY PLACE OF RESIDENCE	57.467	67,647	83,691	97,208	96,062	101,23
PER CAPITA PERSONAL INCOME (DOLLARS)	3.129	3.634	4,438	4.885	4,974	5.18
TOTAL POPULATION (THOUSANDS)	18.4	18.6	18.9	19.9	19.3	19.
Inton Anabotton Itinanninal						
I/ ESTIMATES HASED CN 1967 SIC.	2/ E	STIMATES BASE	O'ON"1972 SIC."			
CONSISTS OF MAGE AND SALARY DISBURSEMENTS, CTHE	LAHOD INCOME	. AND PROPRIET	TORSE INCOME.			

^{7/} INCLUDES MAGE AND SALARIES OF U.S. RESIDENTS WORKING FOR INTERNATIONAL ORGANIZATIONS.
7/ INCLUDES THE CAPITAL CONSUMPTION ADJUSTMENT FOR RENTAL INCOME OF PERSONS.

(L) LESS THAN \$50.000. DATA ARE INCLUDED IN TOTALS.

Source: Regional Economics Information System, Bureau of Economic Analysis, July, 1978.

TABLE 25. PERSONAL INCOME BY MAJOR SOURCES OF ELMORE COUNTY, 1971-76 (Summary Analytics)

ITEM AND	PERCENT OF U.S.	PERCENT OF STATE	% TOTAL EARNINGS	PERCENT 76/71	CHANGE 76/75	LOCATIO U.S.	N QUOTIENT STATE
TAL LABOR AND PROPRIETORS INCOME BY PLACE OF WO	RK 3/						
WAGE AND SALARY DISBURSEMENTS	.0091	2.77	10 pt 1	. 76	13		
OTHER LABOR INCOME	.0031	1.01		162	30		•
PROPRIETORS INCOME 4/	.0057	•99		-17	-54		
FARM	.0027	•26		-83	-93		* * * * * * * * * * * * * * * * * * * *
NON-FARM 4/	.0065	1.42		. 44	12		
BY INDUSTRY						· · · · · ·	
FARM	.0358	2.61	10.16	50	-32	4.2535	1.0830
- NON-FARM	.0078	2.39	89.84	70	11	9204	9914
PRIVATE	.0028	.87	26.15	69	15	3275	.361
AG.SERV. FOR FISH. AND OTHER 5/	(D)	(D)	(D)	(D)	(0)	(D)	(D
MINING	(D)	(D)	(D)	· (D)	(D)	(D)	Ö
CONSTRUCTION	.0051	1.00	3.48	12,	ž	.6072	.415
MANUFACTURING	.0011	.44	3.36	157	38	.1295	.183
NON-DURABLE GOODS	.0009	.31	.97	145	87	.1016	.129
CURABLE GOODS	.0012	.53	2.39	162	24	.1458	.220
TRANSPORTATION AND PUBLIC UTILITIES	.0051	1.53	4,55	50	- i	.6089	634
WHOLESALE TRADE	(0)	(D)	(D)	(D)	(D)	(D)	(D
RETAIL TRADE	.0062	1.60	7.70		19	.7343	.662
FINANCE INSURANCE AND REAL ESTATE	.0034	1.32	2.15	108	ĨŽ	.4077	.547
SERVICES	.0017	-56	3.28	55	9	.1997	.231
GOVERNMENT AND GOVERNMENT ENTERPRISES	.0302	8.35	63,69	70	10	3.5851	3.466
FEDERAL CIVILIAN	.0202	5.07	10.30	66	15	2,3965	2.103
FEDERAL + MILITARY	.2236	56.94	46.74	71	8.	26.5347	23.625
STATE AND LOCAL	.0048	1.39	6,65	71	13	.5682	.578
ERIVATION OF PERSONAL INCOME BY PLACE OF RESIDENT TOTAL LABOR AND PROPRIETORS INCOME BY	ICE			· · · · · · · · · · · · · · · · · · ·			
PLACE OF WORK LESS: PERSONAL CONTRIBUTIONS FOR SOCIAL	•0084	2.41	. s 	67	4		
INSURANCE BY PLACE OF WORK NET LABOR AND PROPRIETORS INCOME BY	•0078	2.18		126	15		
NET LABOR AND PROPRIETORS INCOME BY	.0085	2.42		65	4		
PLACE OF RESIDENCE	.0081	2.30		. 66	•		
PLUS: DIVIDENDS, INTEREST, AND RENT 7/	.0038	1.24		116	11		
PLUST TRANSFER PAYMENTS	.0071	2.23		137	13		
PERSONAL INCOME BY PLACE OF RESIDENCE	•0074	2.16		76	5		

^{3/} CONSISTS OF WAGE AND SALARY DISBURSEMENTS. OTHER LABOR INCOME. AND PROPRIETORS! INCOME. PRIMARY SOURCE FOR PRIVATE NON-FARM WAGES: ES-202 COVERED WAGES -IDAHO DEPARTMENT OF EMPLOYMENT 1/ INCLUDES THE CAPITAL CONSUMPTION ADJUSTMENT FOR NON-FARM PROPRIETORS.

Source: Regional Economics Information System, Bureau of Economic Analysis, July, 1978.

^{5/} INCLUDES WAGE AND SALARIES OF U.S. RESIDENTS WORKING FOR INTERNATIONAL ORGANIZATIONS.

77 INCLUDES THE CAPITAL CONSUMPTION ADJUSTMENT FOR RENTAL INCOME OF PERSONS.

(D) NOT SHOWN TO AVOID DISCLOSURE OF CONFIDENTIAL INFORMATION. DATA ARE INCLUDED IN TOTALS.

TABLE 26. GENERAL AGRICULTURAL DATA OF ELMORE COUNTY, 1974

Number of farms	256
Land in farms (acres)	430,814
Average farm size (acres)	1,683
County land area (acres) Percent in farms	1,950,720 22.1%
Value of land and buildings Total (000) Per farm Per acre	\$112,189 \$438,237 \$260
Cropland (acres) Percent of all land Percent of all farmland	99,679 5.1% 23.1%
Irrigated land (acres) Percent of all land Percent of all farmland	69,171 3.5% 16.1%
Quantity of irrigation water applied (ac ft) Per acre (ac ft)	215,805 3.1
Value of agricultural products soldtotal (000) Average per farm	\$45,988 \$179,640
(집원한 보여는 후 환경보조를 가장하는 하는 것 같은 장면 되어서 무슨 문화 모양이라는 끝에게	

Source: U. S. Bureau of the Census, 1977.

TABLE 27. SUMMARY DATA ON LAND USE, LAND OWNERSHIP, AND LAND-USE CONTROL MECHANISMS OF ELMORE COUNTY, 1976-1977

	Acres	% of Total
Land Use1976:		
Urban	12,000	0.6
Agricultural	138,700	7.0
Rangeland Rangeland	1,299,300	65.9
Other	521,200	26.5
Land Ownership1977:		
Federal government	1,435,938	73.6
State government	129,003	6.6
Private	385,755	19.8
Local government	24	
Land-Use Control Mechanisms:		
Planning and Zoning Commission	Yes	
County Comprehensive Plan	No	
Subdivision Ordinance	Yes	
Zoning Ordinance	Partial	

Source: Idaho Division of Budget, Policy Planning, and Coordination, 1978

than 20% of the county is privately owned. A summary of available land-use control mechanisms is also reported in Table 27. Note that Elmore County has a Planning and Zoning Commission and Subdivision Ordinance.

Summary data on assessed value and property tax charges for 1977 are reported in Table 28. Assessed value of property in the county per capita is \$1882 with per capita property tax charges averaging \$148. Selected measures of uniformity in assessment ratios are also provided in that table. The coefficient of variation (26.34) suggests some disparity in assessment ratios among properties, and the existence of some equity problems in property taxation.

Heritage Resources (R. Knudson and M. Pfaff, University of Idaho)

<u>Paleontological Resources</u>. No paleontological survey has been performed in the Mountain Home KGRA. The bedrock is apparently the Middle Pleistocene era basalts and the Quaternary era sediments with little deep erosion, and there is little likelihood of finding exposures of fossil-rich deposits.

<u>Prehistoric Resources.</u> One professional archaeological survey has been conducted within the KGRA 31 by the Idaho State University Museum personnel under contract to the U.S. Bureau of Land Management. This survey used a sampling design whereby approximately 5% of the Mount Bennett Hills Planning Unit was field-surveyed in order to estimate the total density and settlement pattern within the unit. Within the areas designated at the Mountain Home KGRA, 2.35 km 2 of the total 24 km 2 area was field checked, or approximately 10% of the area. No prehistoric or historic sites were recorded during this survey. Within the Planning Unit (which extends north and east of the KGRA) 31 a general frequency of .21-.32 sites per 1.34-.51 km 2 at elevations similar to those of the KGRA were noted, thus predicting that the Mountain Home unit should be expected on a statistical basis to have few remnant cultural resources. In complement to the mathematical model, the occurrence of perennial streams and hot springs in

TABLE 28. SUMMARY DATA ON ASSESSED VALUE AND PROPERTY TAX CHARGES OF ELMORE COUNTY, 1977

Per capita \$14 Property tax charges-real and personal property-total (000) \$2,02 Per capita \$12 Measures of uniformity in assessment ratios: Weighted assessment ratio 16.80 Regression index 0.98	Assessed value of all propertytotal (000) Per capita	\$36,694 \$1,882
total (000) Per capita \$2,02 Measures of uniformity in assessment ratios: Weighted assessment ratio 16.80 Regression index 0.98		\$2,882 \$148
Weighted assessment ratio 16.80 Regression index 0.98	total (000)	\$2,028 \$124
20.54	Weighted assessment ratio	

Source: Idaho State Tax Commission, 1977a.

the KGRA could have supported more frequent human use of the area in the past; remnants of that use could be left. Two other smaller BLM surveys in the vicinity of the Mountain Home KGRA have recorded only small Euroamerican sheep camp scatters, but have not dealt specifically with the KGRA. 32

Ethnographically the area was exploited most intensively by the Shoshoni Indians. The area is in the path of a general ethnographic traffic pattern from the Snake River Plain or even south in the hills, up over the Mount Bennet Hills and into the Camas Prairie; it is also on the route of an important early Indian trail from Boise to Salmon Falls, which later was used by trappers and emigrants. It is not unlikely to assume that groups moving through the area might choose to camp near water and hot springs, hence the need for more thorough prehistoric archaeological survey within the KGRA. Cultural materials from Lydle Gulch and the Foothills Rockshelter indicate 3000-4000 years of cultural continuity along the northern edge of the western Snake River Plain. Also, the Simon Clovis and Thorn Creek sites on the Camas Prairie and Mount Bennett Hills.

Historic Resources. Historically the Mountain Home KGRA has been more of a traffic crossing than a residential zone. Donald Mackenzie and an early exploratory party of Astorians first discovered the hot springs in 1818. The Oregon Trail, following the old Indian trail, crossed from southeast to northwest across the KGRA³⁷ (see Figure 31). Its ruts are readily visible. This route was used extensively from 1840 until the end of the century. The U.S. Department of the Interior³⁸ study of the Oregon Trail, requested by Congress to assess the designation of the trail as a potential national historic entity. The study indicates that the KGRA hot springs was used for cooking by trail emigrants. The Kelton Road³⁹ was established in the late 1860s between Boise and the Central Pacific Railroad at Kelton, Idaho; this route passes through the northeast corner of the Mountain Home KGRA (refer back to Figure 21). The Kelton, or Salt Lake Road, was a major highway for moving goods

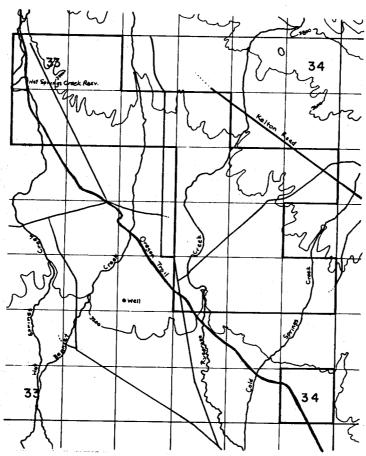


Figure 31. Map of the Mountain Home KGRA with its known heritage resource locations.

from manufacturing centers into the southwestern Idaho mines. Another travel route through the KGRA was used in 1878 by the Bannock War Campaigners. We recommend that the Idaho State Historical Society records of the campaign be checked to see if the army camped within the study unit. The first survey plot for any of the KGRA lands indicates that a cabin was present in the area in 1874, and today this is still one of the few homesteads in the Mountain Home unit. There is an archaeological ruin of a bathhouse at the springs, but this needs further description and evaluation. Some field reconnais—sance of the KGRA historic resources is needed, although the likelihood of there being other significant remnants besides the Oregon Trail or the bathhouse ruin appears to be relatively slight.

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APPENDIX A

SNAKE RIVER BASIN OVERVIEW REPORTS AND SUPPORTING DOCUMENTS

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APPENDIX A

SNAKE RIVER BASIN OVERVIEW REPORTS AND SUPPORTING DOCUMENTS

Reports prepared as part of the Snake River Basin environmental program are listed below. Copies of these reports are available from Information Processing in the Information Division at EG&G Idaho, Inc., Box 1625, Idaho Falls, Idaho 83401.

- EGG-2001 Potential Use of Geothermal Resources in the Snake River Basin: An Environmental Overview, S. G. Spencer, B. F. Russell, and J. S. Sullivan, editors.
- EGG-GTH-5001 Vulcan Hot Springs KGRA: An Environmental Analysis, S. G. Spencer and B. F. Russell, editors.
- EGG-GTH-5002 Crane Creek KGRA: An Environmental Analysis, S. G. Spencer and B. F. Russell, editors.
- EGG-GTH-5003 Castle Creek KGRA: An Environmental Analysis, S. G. Spencer and B. F. Russell, editors.
- EGG-GTH-5004 Bruneau KGRA: An Environmental Analysis, S. G. Spencer and B. F. Russell, editors.
- EGG-GTH-5005 Mountain Home KGRA: An Environmental Analysis, S. G. Spencer and B. F. Russell, editors.
- EGG-GTH-5006 Raft River KGRA: An Environmental Analysis, S. G. Spencer and B. F. Russell, editors.
- EGG-GTH-5007 Geothermal Development in Southwest Idaho: The Socioeconomic Data Base, W. Cris Lewis, Lewis & Associates.

- PG-G-79-001 KGRA Comprehensive Completion Report: Seismicity, J. K. Applegate, GeoTechniques.
- PG-G-79-002 KGRA Comprehensive Completion Report: Subsidence, J. K. Applegate, GeoTechniques.
- PG-G-79-003 Snake River Basin KGRA Environmental Report: Soils, N. Savage, Idaho Water Resource Research Institute.
- PG-G-79-004 KGRA Comprehensive Completion Report: Air Quality, E. Bentley, GeoTechniques.
- PG-G-79-005 KGRA Comprehensive Completion Report: Meteorology, M. Delisio, GeoTechniques.
- PG-G-79-006 Heritage Resources and Known Geothermal Resource Areas in Idaho: A Preliminary Review, R. Knudson and M. Pfaff, Idaho Water Resources Research Institute.
- PG-G-79-007 Assessment of Hydrology and Water Quality Data of the KGRAs of the Snake River Basin, C. L. Miller and C. C. Warnick, Idaho Water Resources Research Institute.
- PG-G-79-008 Literature Review and Assessment of Terrestrial Ecological Data for Selected KGRAs in the Snake River Plain, Idaho, C. D. Jorgensen and R. L. Johnson, Brigham Young University.
- PG-G-79-009 KGRA Comprehensive Completion Report: Geology, R. Hardyman, GeoTechniques.
- PG-G-79-010 Aquatics of Five Snake River Basin KGRAs, K. P. McCarthy and J. F. Sullivan, EG&G Idaho, Inc.

