

CHAPTER 3
AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the PRA. It emphasizes resources and land uses that are addressed by the planning issues or that would be affected by the proposed alternatives.

The information presented in this chapter is summarized from more detailed information available in the Pocatello Resource Area Office.

MINERALS MANAGEMENT

Geologic Setting

Physiographically, the PRA lies in the northernmost extension of the Basin and Range Province. To the immediate west and north of the PRA lies the Snake River Plain section of the Columbia Intermountain Province. The Snake River Plain consists of a series of recent lava flows that are as much as 70 miles wide. Many of these flows are so recent that soil cover has not yet developed on them.

To the east of the PRA lie the Wyoming Mountain Ranges, a series of ranges that form the western boundary of the Middle Rocky Mountain or Wyoming Basin Physiographic Province. The Snake River, Salt River, and Pruess Ranges represent a belt of closed folds and thrust faults in which movement has been eastward along westward dipping fault planes. These ranges are part of the geologically complex Overthrust Belt which extends north-south through the Rocky Mountain region.

Within the southern half of the PRA, the topography and structure is typical of that found in the Great Basin. The Malad and Bear River Ranges, and to a somewhat lesser extent the Portneuf Range, extend north-south, rise abruptly from the adjacent valley floors, and are products of block faulting along the perimeters. The ranges are separated from each other by broad alluvial valleys. Elevations in these ranges rise to 9,600 feet; some are 4,000 feet above the adjacent valley floors.

In the northern portion of the PRA, a series of less prominent ranges, the Chesterfield and Blackfoot Mountains, form a transitional zone to the Snake River Plain. Although sedimentary rock units are found in these mountains, the foothills and valleys are covered with volcanic rock units from the adjacent Snake River Plain.

Exposed rock units in the southern portion of the PRA are of sedimentary origin. The mountain ranges consist of a series of sandstones, limestones, dolomites, shales, and siltstones which range in age from

Cambrian to Tertiary. The mountain ranges are extensively faulted and are structurally complex. Young alluvial material fills the intervening valleys.

Hydrology

Groundwater flow systems in the PRA are closely tied to the structurally complex thrust fault fold/horstgraben geology of the area. Minor flow systems are also associated with limestone caverns, intra-canyon lava flows, geothermal convection, lake beds, and flood gravels.

Rolston and Mayo, et al.(1983), completed a study of the hydrology and springs associated with the Meade Peak Thrust System in 1983. The study indicated the presence of a deep, thrust block controlled system that allows water to move from the eastern high mountain ranges west into the Blackfoot Reservoir and Bear River area. Other studies completed in the Portneuf River and Bear River Range indicate that flow systems in these areas also cut across mountain ranges, producing inter-basin flows.

Dissolved solids in these deep flow systems and the thermal flow systems in the PRA are high. Total dissolved solids range from 800 to 2400 mg/l in the eastern portion of the PRA and from 500 to 43,000 mg/l in the western portion of the PRA. Radioactive levels in springs and surface flows in the Soda Springs and Pocatello areas is the subject of an ongoing Environmental Protection Agency study. Radioactive elements are present in the springs and streams near Soda Springs; however, the concentrations are within existing Federal standards and do not exceed background levels observed in the western United States. Phosphate ore, which is mined extensively in the PRA, is not water soluble prior to being processed. Thus, it has no effect on water quality in the area.

Shallow ground water flow systems are also found in the valleys throughout the PRA. Recharge for these systems takes place in the adjacent mountain ranges. Springs that originate from these systems have low conductivity, low dissolved solids, good water quality, and variable flows.

Federal Mineral Estate

Because the reserved mineral estate varied with different land disposal laws at the time lands were patented, the Federal mineral estate managed by the BLM within any given area is generally different than the surface acres managed. The Federal mineral estate of the PRA is outlined by category in Table 3.1.

TABLE 3.1
MINERAL STATUS OF LANDS WITHIN THE PRA

	<u>Oil & Gas</u>	<u>Geothermal</u>	<u>Phosphate</u>	<u>Locatable Minerals</u>	<u>Salable Minerals</u>
BLM Surface with Mineral Estate	264,001	264,001	264,001	264,001	264,001
Other Federal Mineral Estate	22,860	22,860	22,860	22,860	22,860
Private Surface/ Federal Minerals	101,270	95,488	255,097	95,488	95,488
State Surface/ Federal Minerals	5,272	5,112	101,001	5,112	5,112
Total Mineral Estate	393,403	387,461	642,959	387,461	387,461
Not Available for Mineral Exploration and Development	38,895	38,895	38,895	57,211	68,604
Total Acres Available	354,508	348,566	604,064	330,250	318,157
Total Acres Leased	275,000 (est.) 1/	0	17,372 2/	-	-
Total Mining Claims/Permits	-	-	-	125 claims (2,500 acres)	12 permits (200 acres est.)
Total Acres Under Application	75,000 (est.)	0	702 3/ 3,148 4/	-	-
	Simult. and Other Offers				

1/ est. = Estimate

2/ Excludes USFS and Indian lands

3/ Prospecting Permits/Applications

4/ Lease/Fringe Applications

Solid Leasable Minerals

The PRA is situated in one of the world's major phosphate producing regions. Phosphate mining has been an economic factor in southeastern Idaho since 1907.

The development in 1946 of the Gay Mine, located on the Fort Hall Indian Reservation, signaled the beginning of Idaho's present-day phosphate mining/fertilizer industry. High mining costs plus technological advances in mining equipment and larger capacity shovels and trucks forced the labor intensive underground phosphate mines to close. The western phosphate rock demands are met by a few high volume, capital intensive open pit operations in southeastern Idaho's higher-grade, more easily accessible deposits.

Several open-pit mines opened during the early 1960s, including: Simplot's Conda Mine, El Paso Natural Gas Company's Dry Valley (Maybe Canyon) Mine, and Stauffer's Wooley Valley Mines. During the early 60s, the fertilizer industry expanded, but a sudden loss of market, rising mining costs, and competition from cheaper Florida phosphate operations caused a slowdown in Idaho's phosphate industry.

Activity again peaked in 1974 when the world price for phosphate increased dramatically and the majority of Florida's production went into the export market. Since that time, the western field has gone through cyclic periods of phosphate rock demand. Presently, the fertilizer industry is in a slump, however, the elemental phosphorous industry is holding its own.

Estimated phosphate resources and reserves presently under lease within the PRA are about 554,360,000 tons. A large, but unquantified, tonnage of phosphate is contained within other lands classified as prospectively valuable for phosphate or evaluated as Known Phosphate Leasing Areas (KPLAs). Phosphate resources within the PRA which are not under lease equals or exceeds the amount presently under lease.

Within the PRA, not including lands within the boundaries of the Caribou National Forest, there are about 144,825 acres of land classified as prospectively valuable for phosphate. This includes about 20,195 acres which have been classified as KPLA (high potential).

There are six mine operators and two mining contractors who mine phosphate in southeastern Idaho. These companies directly employ about 1,900 with an annual payroll of about \$90,000,000. Additionally, these operations spend another \$115,000,000 on operating expenses (capital expenditures, tires, parts, fuel, electricity, gas, railroad, overhead, equipment rental, custodial and guard service, etc.). The annual tonnage and royalty production from Federal leases over the past 10 years is shown in Table 3.2.

TABLE 3.2
ANNUAL TONNAGE AND ROYALTY FOR PRODUCTION FOR SELECTED
IDAHO FEDERAL PHOSPHATE OPERATIONS, 1975-1985
(VALUES IN 1000'S OF TONS AND 1000'S OF DOLLARS)

	Year										
	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
TOTALS											
Tonnage	6692	5778	5855	6633	7152	7508	7287	5577	6744	6969	6497
Royalty	2841	2851	2657	3388	3595	3633	3579	2794	4295	5024	5116

The current situation with Agri-business (record high inventories of corn and grain, low agricultural exports, and high finished fertilizer inventories) have produced low phosphate rock demands. This condition is expected to last for the balance of 1987 and 1988. Expected annual production from leases within the PRA and on adjacent Forest Service land will be in the 4 to 6 million tons per year range for the next two years. Growth in the western phosphate industry is expected to keep pace with the growth in the Nation's Gross National Product, or about 3 percent. This is lower than the expected growth rate indicated in the 1976 Phosphate EIS.

Although only one-half of Idaho's phosphate production is consumed by the fertilizer industry, mine production will continue to be dependent upon the strength of the agricultural sector, especially the mid-western United States. The elemental phosphorous industry has declined somewhat during the 1970s and is expected to maintain present levels during the length of this RMP.

Fluid Leasable Minerals

Oil and Gas

Oil and gas exploration in the PRA intensified following the discoveries at Pineview, Utah, in 1975. Approximately 30 exploration wells have been drilled in the PRA since that discovery. Federal permits for geophysical exploration (NOIs) were issued at a rate of 10 per year until 1984. Since that time, exploration has slowed to 1 to 3 permits per year.

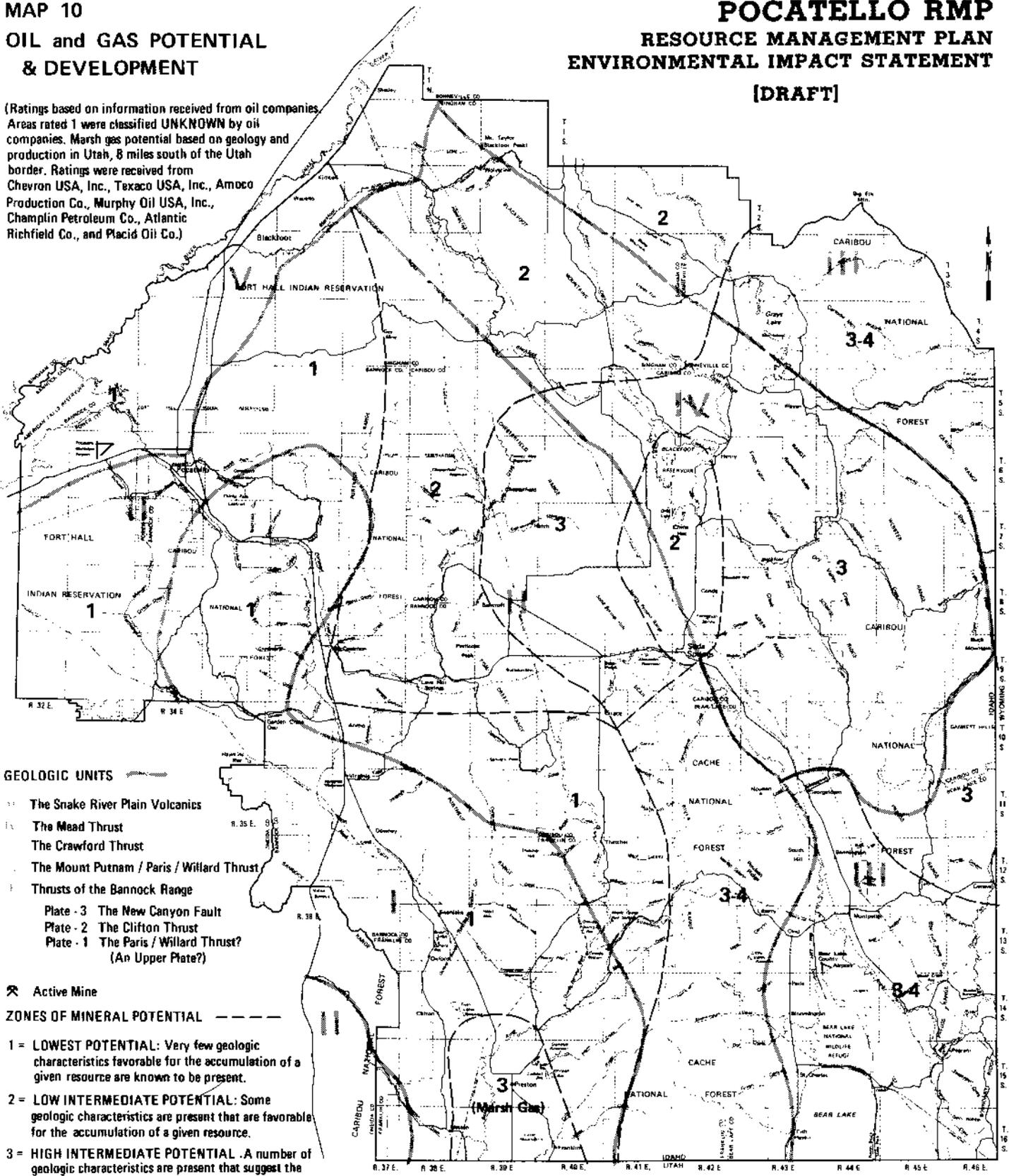
No production has resulted from the exploration in southeastern Idaho; however, the Idaho-Wyoming-Utah portion of the Overthrust Belt is still considered to be the most promising new oil and gas province in the U.S. Even though no discoveries have been made, several tests in various exploration wells have had good oil and gas shows. Exploration activities will probably slow down the next few years; however, any discovery could again bring a significant increase in activity.

MAP 10

OIL and GAS POTENTIAL
& DEVELOPMENT

(Ratings based on information received from oil companies. Areas rated 1 were classified UNKNOWN by oil companies. Marsh gas potential based on geology and production in Utah, 8 miles south of the Utah border. Ratings were received from Chevron USA, Inc., Texaco USA, Inc., Amoco Production Co., Murphy Oil USA, Inc., Champlin Petroleum Co., Atlantic Richfield Co., and Placid Oil Co.)

POCATELLO RMP
RESOURCE MANAGEMENT PLAN
ENVIRONMENTAL IMPACT STATEMENT
[DRAFT]



GEOLOGIC UNITS

- 1 The Snake River Plain Volcanics
- 2 The Mead Thrust
- 3 The Crawford Thrust
- 4 The Mount Putnam / Paris / Willard Thrust
- 5 Thrusts of the Bannock Range
 - Plate - 3 The New Canyon Fault
 - Plate - 2 The Clifton Thrust
 - Plate - 1 The Paris / Willard Thrust? (An Upper Plate?)

⊗ Active Mine

ZONES OF MINERAL POTENTIAL

- 1 = **LOWEST POTENTIAL**: Very few geologic characteristics favorable for the accumulation of a given resource are known to be present.
- 2 = **LOW INTERMEDIATE POTENTIAL**: Some geologic characteristics are present that are favorable for the accumulation of a given resource.
- 3 = **HIGH INTERMEDIATE POTENTIAL**: A number of geologic characteristics are present that suggest the occurrence of a given resource.
- 4 = **HIGHEST POTENTIAL**: Many geologic features are present that indicate the occurrence of a given resource.

(To convert to ratings used in RMP: 1= Low, 2= Moderate, 3&4= High Potential, See Appendix G)

In 1981, the USGS estimated that the Overthrust Belt contains undiscovered recoverable reserves of 6.7 billion barrels of oil and 58.4 trillion cubic feet of gas (PI, 1981). Probable reserves of natural gas were estimated to be 13.2 to 19.2 trillion cubic feet by the Potential Gas Committee in 1985.

The PRA received a rating of the oil and gas potential of various parts of the area from six companies. Chevron was the only company which rated nearly the entire PRA. These companies rated most areas east of the Portneuf Range at 2-3 (on a scale of 1-4) and rated most of the remaining areas as unknown. Placid, Amoco, and Texaco rated most of the eastern portion of the PRA (east of the Soda Hills and the Bear River Range) as being the highest potential (4) for oil and gas (See Map 10).

Most of the exploration for oil and gas in the PRA has taken place east of the Paris-Willard Thrust. Chidsey (1984) has defined a 6-mile wide area along the leading edge of the Paris-Willard Thrust as a source for several subthrust targets. So far, no wells have penetrated either the Crawford Thrust or the Paris-Willard Thrust in spite of the presence of an estimated 49,000 foot section of "stacked" sedimentary beds.

Geothermal

Geothermal exploration peaked between 1978-80 in the PRA. Most of the exploration activity during this period targeted the Grays Lake area, although some activity took place near Freedom and Soda Springs.

Three geothermal exploration wells have been drilled. Two wells were drilled by Sun Oil Company near Preston and one well was drilled by Phillips and Hunt near Soda Springs. The bottom hole temperature of the well near Preston was 250 degrees F. The geothermal resources of the area are confined to the highly faulted belt of the Basin and Range Geothermal Province which lies just west of the Wasatch front and extends north from Utah through this area.

The Idaho Department of Water Resources classifies the Preston/Cleveland area as high potential for warm water geothermal resources. Other areas which have potential are Lava Hot Springs, Downey, Soda Springs/Blackfoot Reservoir, Grays Lake, Freedom, Bear Lake, and north of Chubbuck.

The development of geothermal resources in the PRA will likely be limited to warm water utilization such as space heating and swimming pools.

Locatable Minerals

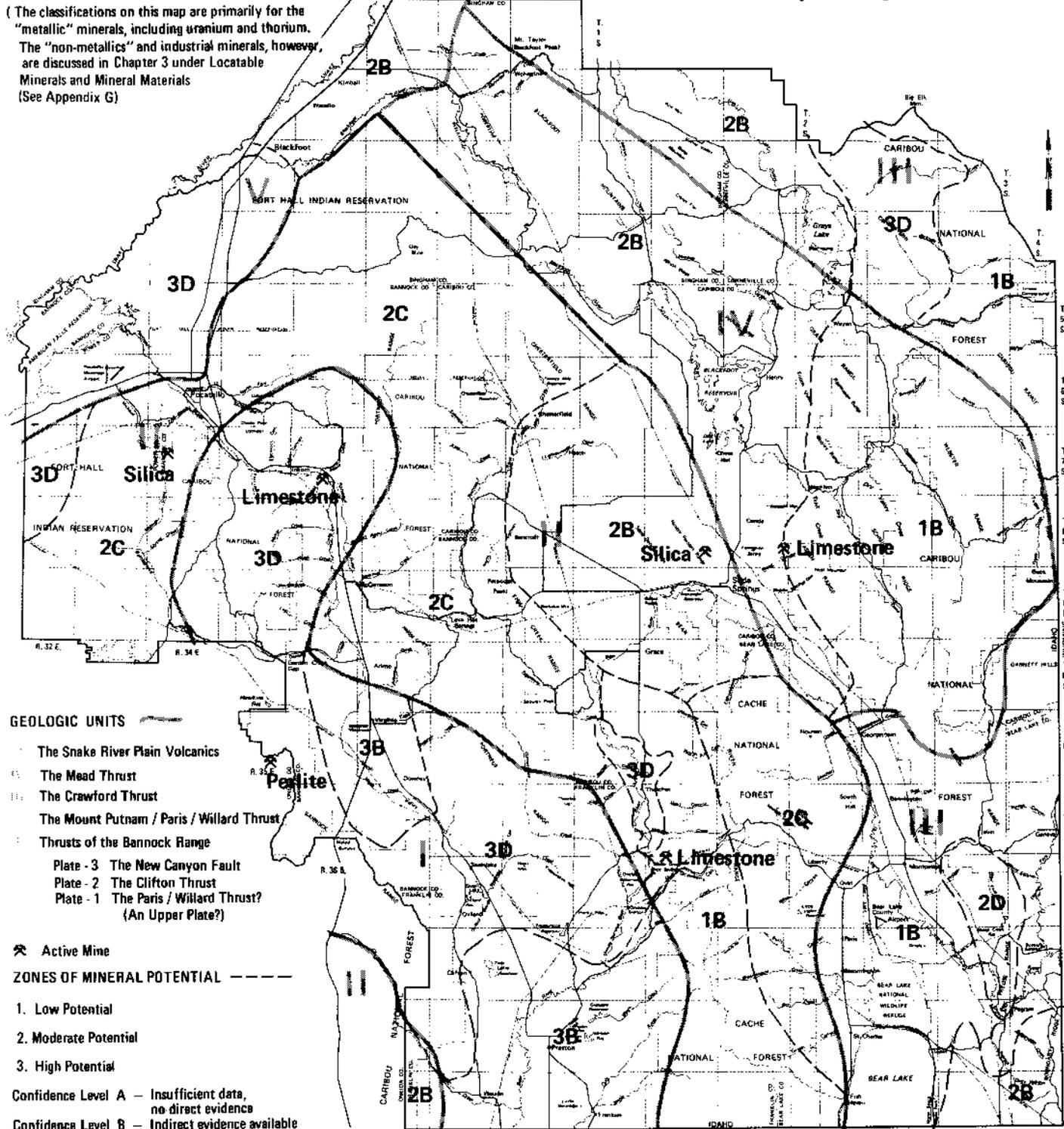
Potential mineral deposits in the PRA include gold, copper, manganese, silver, lead, zinc, barium, iron, vanadium, mercury, sulphur, aluminum, molybdenum, cobalt, tungsten, and the rare earths. Industrial minerals found in the PRA (perlite, diatomite, gypsum, calcite, dolomite,

MAP 11

LOCATABLE MINERAL POTENTIAL & DEVELOPMENT

POCATELLO RMP
RESOURCE MANAGEMENT PLAN
ENVIRONMENTAL IMPACT STATEMENT
[DRAFT]

(The classifications on this map are primarily for the "metallic" minerals, including uranium and thorium. The "non-metallics" and industrial minerals, however, are discussed in Chapter 3 under Locatable Minerals and Mineral Materials (See Appendix G)



GEOLOGIC UNITS

- I The Snake River Plain Volcanics
- II The Mead Thrust
- III The Crawford Thrust
- IV The Mount Putnam / Paris / Willard Thrust
- Thrusts of the Bannock Range
 - Plate - 3 The New Canyon Fault
 - Plate - 2 The Clifton Thrust
 - Plate - 1 The Paris / Willard Thrust? (An Upper Plate?)

☉ Active Mine

ZONES OF MINERAL POTENTIAL - - - -

1. Low Potential
2. Moderate Potential
3. High Potential

- Confidence Level A - Insufficient data, no direct evidence
- Confidence Level B - Indirect evidence available
- Confidence Level C - Direct evidence but quantitatively minimal
- Confidence Level D - Abundant direct and indirect evidence

(See Appendix G)

limestone, etc.) are also included, unless the particular industrial mineral is classified as "common variety". Mining claims are staked for these minerals as either placer or lode or both.

Mining for gold took place in the Mount Pisgah (Caribou) Mining District from 1870 to 1890. An estimated \$250,000 to \$3,000,000 per year was produced. Gold, copper, silver, and lead were mined from the Fort Hall Mining District, south of Pocatello, from 1902 to 1930, and again in 1956. A total ore value of about \$700,000 was recovered. Minor gold, silver, copper, and lead mining also took place in the Bear Lake and Montpelier Mining Districts around the turn of the century.

At the present time, perlite, limestone, and silica are being mined in the PRA. The limestone and silica is being developed mostly from non-Federal mineral estate lands.

Perlite is being mined on Forest Service lands near Malad, and cement is being produced from private lands near Inkom, Idaho. The perlite plant near Malad produces expanded product for shipment. Much of the silica produced in the PRA is used in the elemental phosphate industry. These silica quarries are located on patented mining claims. Limestone mined from patented mining claims is used in a process by Kerr McGee to recover vanadium from ferrophosphorous, a by-product of the elemental phosphorous industry.

There are about 125 active mining claims located on public land in the PRA. In 1985, twenty-two new claims were staked in the Fort Hall Mining District near Pocatello. Activity was also taking place on nearby Forest Service lands where 260 new claims were staked. Most claims are concentrated in the Fort Hall, the Mount Pisgah, and the Bear Lake Mining Districts.

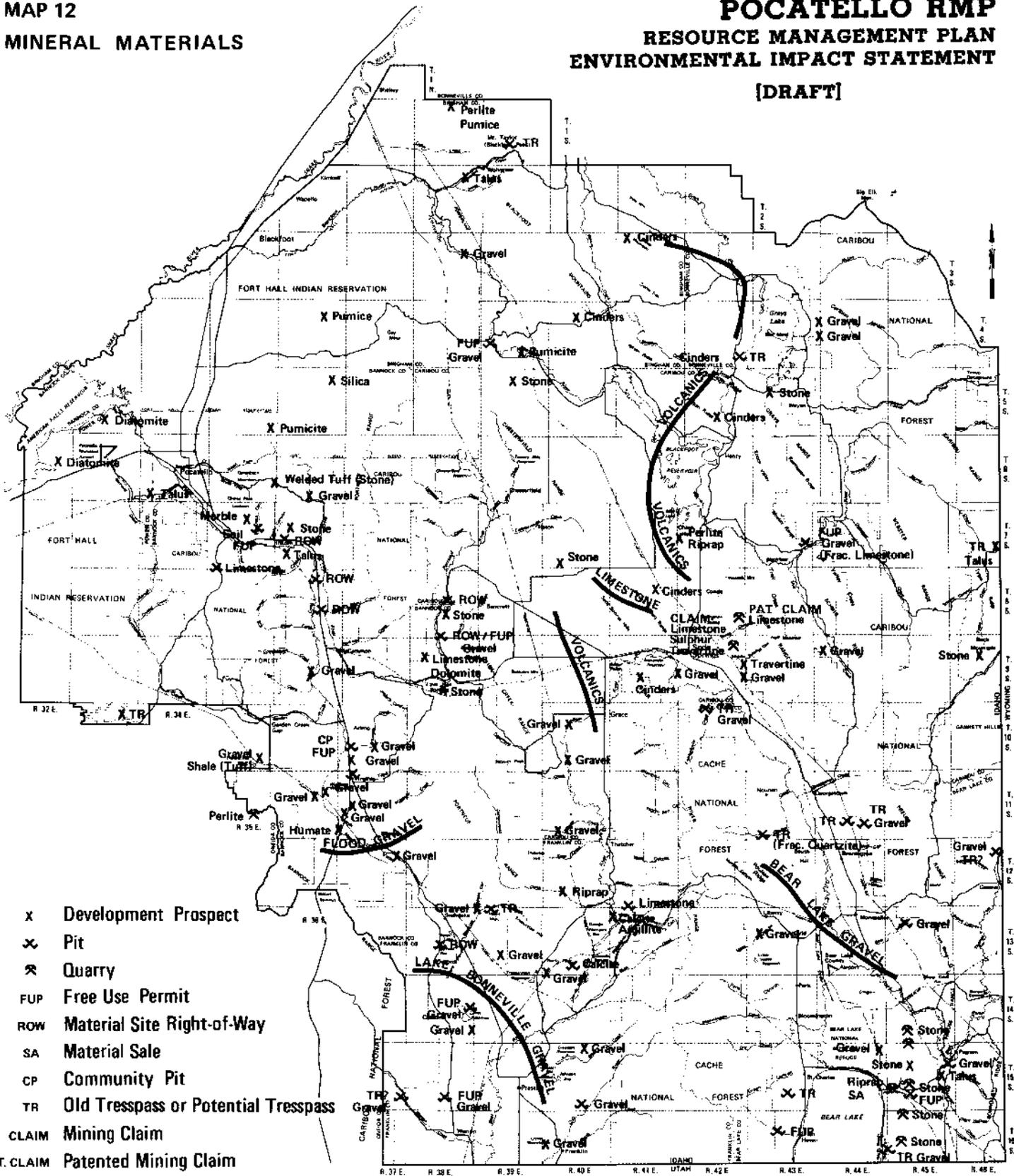
Mineral Materials

Common varieties of minerals and mineral materials are found in many geologic environments throughout the PRA. Good quality sand and gravel is in demand and is in relatively short supply. Sand and gravel deposits are associated with rivers, lake beds, and flood deposits (see Map 12). Sand and gravel is used primarily for road building and road maintenance. High quality sand and gravel for concrete work is also in short supply.

Pumice and pumicite, volcanic scoria (cinders), limestone, silica, dolomite, building stone, talus, etc., are present in rather large quantities. Pumice is mined near Blackfoot and Idaho Falls and on Forest Service lands north of Malad.

**MAP 12
MINERAL MATERIALS**

**POCATELLO RMP
RESOURCE MANAGEMENT PLAN
ENVIRONMENTAL IMPACT STATEMENT
[DRAFT]**



- X Development Prospect
- X Pit
- X Quarry
- FUP Free Use Permit
- ROW Material Site Right-of-Way
- SA Material Sale
- CP Community Pit
- TR Old Trespass or Potential Trespass
- CLAIM Mining Claim
- PAT. CLAIM Patented Mining Claim