

UNITED STATES DEPARTMENT OF THE INTERIOR
(BUREAU OF MINES)

MINERAL INVESTIGATION OF THE PALISADES RARE II AREAS
(NOS. W4613 and E4613), BONNEVILLE AND TETON COUNTIES, IDAHO;
LINCOLN AND TETON COUNTIES, WYOMING

By
John R. Benham

MLA 46-83

1983

This open file report summarizes the results of a Bureau of Mines wilderness study and will be incorporated in a joint report with the U.S. Geological Survey. The report is preliminary and has not been edited or reviewed for conformity with the U.S. Bureau of Mines standards and nomenclature. Work on this study was conducted by personnel from Western Field Operations Center, East 360 Third Avenue, Spokane, Washington 99202

FOREWORD

The U.S. Bureau of Mines and U.S. Geological Survey jointly conduct mineral surveys of lands which in the U.S. Forest Service Second Roadless Area Review and Evaluation (RARE II) program have been designated for further planning. These evaluations are used in the RARE II program which conforms with the Multiple-Use Sustained-Yield Act of 1960 (74 Stat. 215; 16 U.S.C. 528-531), the Forest and Rangeland Renewable Resources Planning Act of 1974 (88 Stat. 476, as amended; 16 U.S.C. 1601 note), and the National Forest Management Act of 1976 (90 Stat. 2949; 16 U.S.C. 1600 note). Reports on these surveys provide the President, Congress, the U.S. Forest Service, and the general public with information essential for determining the suitability of land for inclusion in the National Wilderness Preservation System.

This report is on the Palisades RARE II areas (Nos. W4613 and E4613), Bonneville and Teton Counties, Idaho; Lincoln and Teton Counties, Wyoming.

CONTENTS

	<u>Page</u>
Summary.....	4
Introduction.....	5
Assessment of mineral deposits.....	8
References.....	11

ILLUSTRATION

Figure 1. Location map of the Palisades RARE II study area, showing mines and prospects.....	6
---	---

TABLE

Table 1. Miscellaneous prospects, Palisades RARE II area.....	9
---	---

SUMMARY

Phosphate rock is the only mineral commodity, other than oil and gas, for which the Palisades study area has mineral deposits with moderate potential. Coal and limestone are also found; however, the coal occurs in small, discontinuous, steeply dipping seams, and the limestone is too far from markets. Resource potential for known deposits of both commodities is low; they can be used for local needs.

The phosphate rock occurs within the Permian Phosphoria Formation. As many as four phosphate-rock zones were in measured sections of the formation where it crops out in the study area. A total of 23 trenches were dug (ten by the U.S. Geological Survey) and sampled across the Meade Peak Phosphatic Shale Member of the formation. Based on the data, there is inferred to be 98 million tons (89 million t) of phosphate rock in deposits within 250 ft (76 m) downdip from the surface outcrops, grading at least 14 percent phosphorous pentoxide (P_2O_5), and ranging from 1.2 ft (0.4 m) to 11.9 m (3.6 m) in thickness.

The study area lies within the Idaho-Wyoming portion of the Overthrust Belt. Oil and gas have been found in this structure at nearby locales, which makes the area desirable for exploration. Thirty-two oil and gas lease applications currently blanket the area.

Portions of the southwestern part of the area have been classified by the U.S. Geological Survey as potentially valuable for geothermal steam and associated geothermal resources. There are no hot springs or other geothermal phenomena here, and no geothermal lease applications have been made.

INTRODUCTION

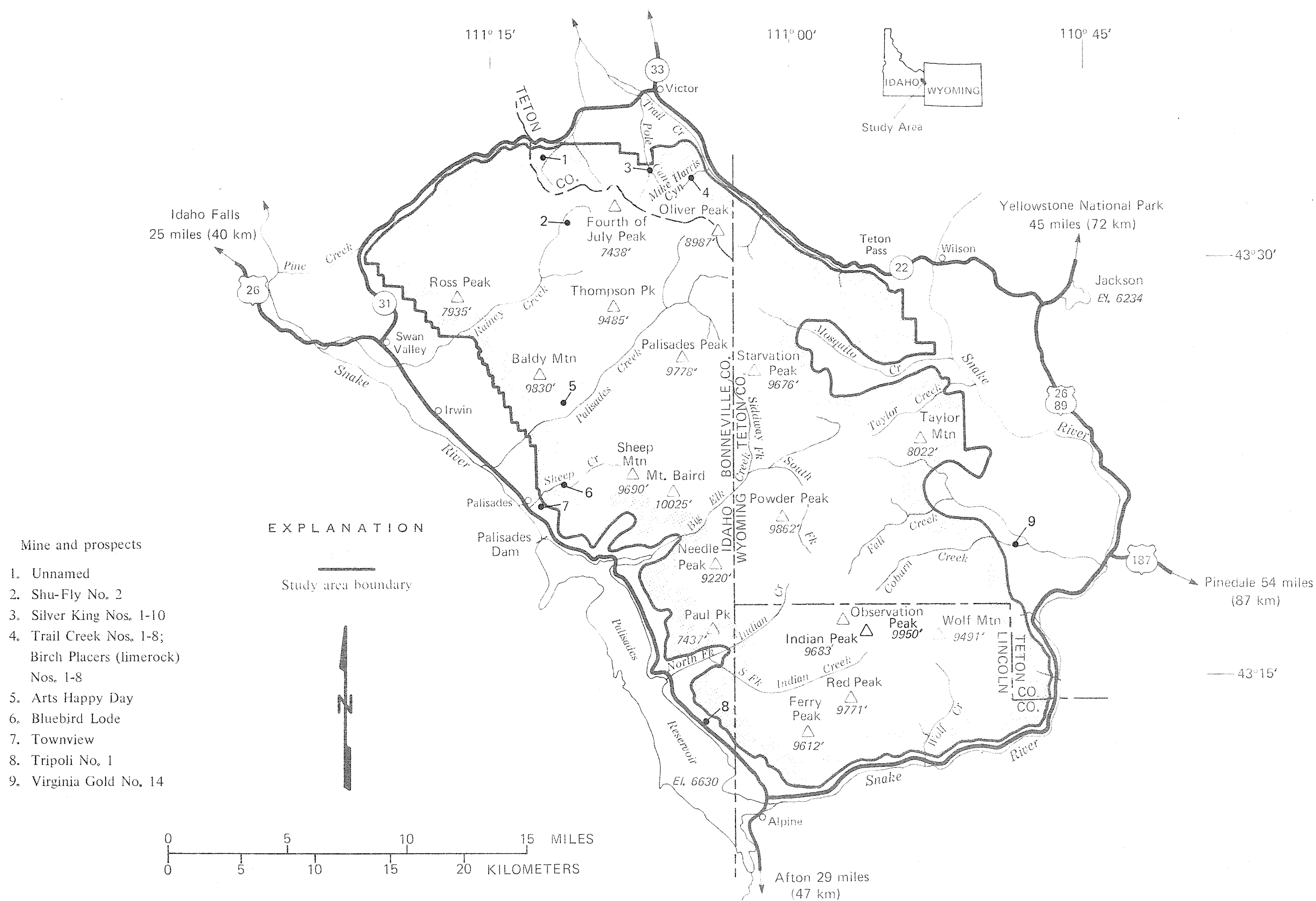
The Palisades RARE II area covers 247,090 acres (100,000 ha) in eastern Idaho and western Wyoming. It is subdivided into three Forest Service designated RARE II parcels: Palisades West, Wyoming [Targhee National Forest, 91,380 acres (36,980 ha)]; Palisades West, Idaho [Targhee National Forest, 111,250 acres (45,020 ha)]; and Palisades East, Wyoming [Bridger-Teton National Forest, 44,460 acres (17,990 ha)]. They lie in the Snake River Range between Idaho Falls, Idaho, and Jackson, Wyoming. Access to the northern part is by Idaho State Highway 31 and Wyoming State Highway 22. Access to the southern and eastern parts are by U.S. Highway 26 and 89, respectively (fig. 1).

The Bureau of Mines Western Field Operations Center in Spokane, Washington performed field examinations and searches of the literature and courthouse records on the Palisades RARE II area from March 1979 to January 1982. During the field seasons of 1979 and 1980, mines, claims, and mineralized sites were examined.

The majority of rocks in the area are sedimentary, ranging in age from Cambrian to Cretaceous. A thickness of up to 18,000 ft (5,500 m) of these rocks have been measured and divided into 23 formations (Staatz and Albee, 1966, p. 10). Lithologies include limestone, dolomite, sandstone, quartzite, shale, siltstone, chert, phosphorite, and conglomerate.

The only intrusive in the study area is a Tertiary diorite stock located at and just northeast of Indian Peak (Albee, 1973). It covers less than 400 acres (160 ha).

Along the northern flanks of the area are rhyolitic tuffs. These extrusive rocks are part of the Tertiary Kirkham Hollow volcanics (Pampeyan and others, 1967). Outcrops are sporadic but generally trend northwest.



Pine Creek is the only mining district in the study area. Its boundaries are vague, but it centers along the Snake River Range at the Pine Creek drainage. The earliest mining activity was in 1903 when several coal claims were located. Very little coal was mined. Outside the area, to the northwest, were larger producing coal mines within the same formation.

From 1922 to 1928, numerous claims were staked as "limerock" placers in Mike Harris and Pole Canyons. Limestone quarried from Pole Canyon was used for rip-rap; however, production was minimal.

The Snake River Range is within a primary oil and gas leasing area. The entire study area is blanketed by 32 oil and gas lease applications, which were filed by William Maddox of Denver, Colorado, and Carolyn Bloom of Park City, Utah.

The U.S. Geological Survey has classified portions of the southwestern part of the area as potentially valuable for geothermal steam and associated geothermal resources. There are no hot springs or other geothermal phenomena here and no geothermal leases have been applied for.

There were 71 claims located in the study area. Thirteen were lode, 19 were 160-acre (65-ha) coal claims, 35 were limestone, and 4 were placer claims. There are no active or patented claims.

Three mineral commodities have been found in the study area: phosphate rock, coal, and limestone. Phosphate rock is found in the Meade Peak Phosphatic Shale Member of the Permian Phosphoria Formation. This formation crops out extensively, but its continuity has been disrupted and deformed by thrust faulting. Coal is found within the Cretaceous Frontier and Bear River Formations as lenses and thin beds. Limestone suitable for cement, rip-rap, and other possible uses is found within the Mississippian Mission Canyon Formation. This limestone is well-exposed in valleys along the northeastern flank of the study area.

In addition to the phosphate, coal, and limestone deposits, other claimed areas were examined (table 1). No significant mineral occurrences were found at these miscellaneous prospects.

ASSESSMENT OF MINERAL DEPOSITS

Phosphate rock occurs in moderate quantities along the entire 74-mi (188-km)-long strike length of the Phosphoria Formation in the study area. The grade and total tonnages of known deposits are estimated as follows:

<u>Grade</u>	<u>Inferred tonnage</u>
Acid (>31 percent P_2O_5)	4,100,000 (3,700,000 t)
Furnace (24-31 percent P_2O_5)	49,000,000 (44,000,000 t)
Beneficiation (18-24 percent P_2O_5)	38,000,000 (34,000,000 t)
Mill shales (14-18 percent P_2O_5)	<u>6,700,000 (6,100,000 t)</u>
Total	97,800,000 (88,700,000 t)
Rounded total	98,000,000 (89,000,000 t)

Table 1.--Miscellaneous prospects, Palisades RARE II area

Map no.	Name	Summary	Workings	Sample data
5	Arts Happy Day Nos. 1, 2, 3 Lodes	Sec. 19 and 20, T. 1 N., R. 45 E. On and near Palisades Creek. St. John thrust fault, with altered zones, crosses the claim; country rock is limestone	None	Three samples: no significant assays
6	Bluebird Lode	SW1/4 SW1/4 sec. 32, T. 1 N., R. 45 E. In Sheep Creek Canyon. Quartzite and quartzite conglomerate. No economic minerals	One pit - 8 by 4 by 1 ft (3.4 by 1.2 by 0.3 m) deep	One sample: no significant assays
6 7	Townview 20 acre placer (south of study area boundary)	NW1/4 NW1/4 sec. 8, T. 1 S., R. 45 E., 1/4 mi (0.4 km) east of Palisades. Talus consisting of unconsolidated andesite cobbles, silts, and clays	None	Two pan samples: one contained three very small particles of gold
8	Tripoli No. 1 160 acre (65 ha) placer	W1/2 W1/2 sec. 27, T. 2 S., R. 46 E. In unconsolidated sands and gravels	None	Two pan samples: no gold was detected.
9	Virginia Gold No. 14 160 acre (65 ha) placer	NE1/4 sec. 24, T. 39 N., R. 117 W. 1/2 mi (0.8 km) west of mouth of Coburn Creek. In unconsolidated sands and gravels	None	Five pan samples: no gold was detected.

Future mining of the study area phosphate rock is possible. However, potential mining problems include folded, faulted, narrow, and discontinuous phosphate beds; outcrops located at high elevations that receive heavy snow during winter months; rugged terrain; and lack of access to the beds.

All phosphate ore in the western phosphate field of the United States is strip mined except for one underground mine in Montana. Overburden is usually removed by scrapers and bulldozers. The ore is selectively mined by shovels, scraping or trenching and hauled by truck or rail to a processing plant.

Coal in the study area occurs in seams and beds that are thin and pinch out at short distances. Also, the area has undergone extensive thrust faulting which has sometimes contaminated the coal. Two areas have been mined for coal in the study area, an unnamed prospect, and the Shu-Fly No. 2 Claim (fig. 1, nos. 1 and 2). The grade of coal is high volatile C bituminous at the Shu-Fly No. 2, and lignite at the other property. The amount of coal remaining is limited; but could supply small amounts for local needs.

Relatively pure limestone occurring in the study area trends northwest along ridges from south of Teton Pass to Pole Canyon. It is as much as 0.5 mi (0.8 km) wide, 12 mi (19 km) long, and dips 10 to 65° SW. Two groups of claims were located along these limestone exposures - the Silver King Nos. 1-10 (fig. 1, no. 3) and the Trail Creek Nos. 1-8 (fig. 1, no. 4) with its associated Birch Limerock Placers Nos. 1-8 - and were mined intermittently. The limestone is good quality, averaging 95.7 and 93.8 percent CaCO_3 , respectively, per property. However, other limestone sources outside the study area are closer to major markets; deposits in the area are useful only for local needs.

REFERENCES

- Albee, Howard F., 1973, Geologic map of the Observation Peak Quadrangle, Teton and Lincoln Counties, Wyoming: U.S. Geological Survey Map GQ-1081.
- Pampeyan, Earl H., Schroeder, Marvin L., Schell, Elmer M., and Cressman, Earle R., 1967, Geologic map of the Driggs Quadrangle, Bonneville and Teton Counties, Idaho, and Teton County, Wyoming: U.S. Geological Survey Map MF-300.
- Staatz, Mortimer H. and Albee, Howard F., 1966, Geology of the Garns Mountain quadrangle, Bonneville, Madison, and Teton Counties, Idaho: U.S. Geological Survey Bulletin 1205, 122 p.