DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1337-D
PAMPHLET ACCOMPANIES MAP

MINERAL RESOURCE POTENTIAL MAP OF THE JAMES RIVER FACE WILDERNESS, BEDFORD AND ROCKBRIDGE COUNTIES, VIRGINIA

By
C. Ervin Brown[1] and Gertrude C. Gazdik[2]
1982
[1]U.S. Geological Survey [2]U.S. Bureau of Mines

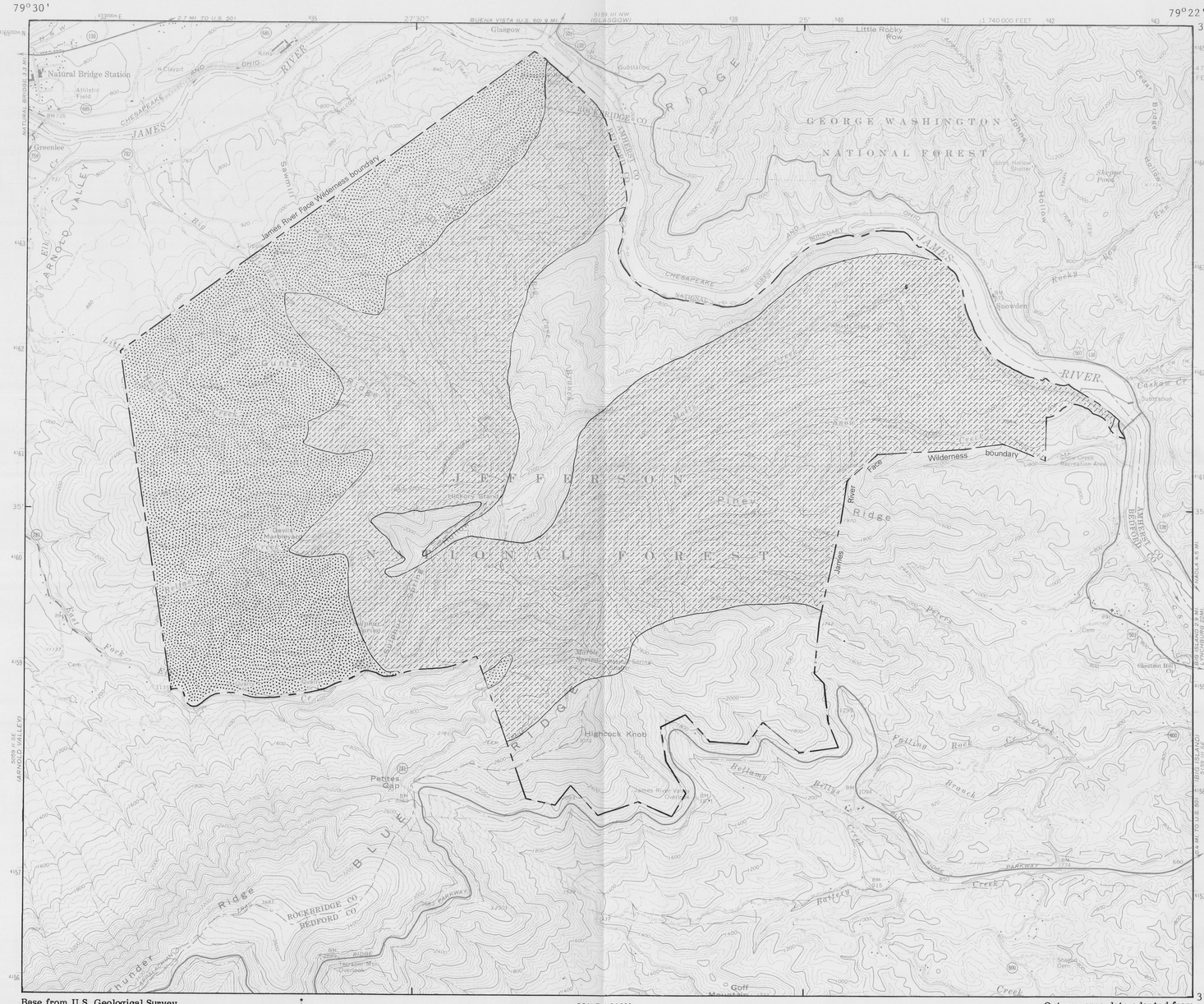


Figure 1.—Outcrop area of quartzite and shale resources in the James River Face Wilderness.

EXPLANATION

Quartzite outcrop area. Rock unit is as much as 600 ft (183 m) thick. Three quarries in this area supplied quartzite for use in the production of ferrosilicon. Chemical analyses of samples collected at random in the wilderness indicate a suitability for metallurgical-grade quartzite. Rock also is useable for road metal, concrete aggregate, railroad ballast, and as sand in cement and mortar.

Shale outcrop area. Contains three discontinuous quartzite units each less than 300 ft (91 m) thick, occupying less than 5 percent of the area. Shale also underlies the quartzite outcrop area, where it is covered by 0 to 1000 ft (0 to 350 m) of rock. Shale is mined north and northeast of the wilderness for use as raw material for structural clay products and for lightweight aggregate. Tests on samples from the wilderness show that the shale there also is useable for those products.

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mineral resource potential survey of the James River Face Wilderness, Jefferson National Forest, Bedford and Rockbridge Counties, Virginia, which was established as a wilderness by Public Law 93-622, January 3, 1975.

INTRODUCTION

The James River Face Wilderness is bounded on the northeast by the James River where it flows eastward through the Blue Ridge. Part of the southern boundary of the wilderness is coincident with the boundary of the Blue Ridge Parkway, and part of the southwestern boundary is along State Route 781, a gravel mountain road that extends southeast from Arnold Valley to a junction with the Blue Ridge Parkway at Petites Gap. The area is 18.5 mi (30 km) northwest of Lynchburg and about 16 mi (25 km) south of Lexington, Va., and encompasses 8,800 acres (3,561 ha) of steep-sloped land in the Jefferson National Forest.

SUMMARY

Metallurgical-grade quartzite and shale potentially useful for lightweight aggregate and structural clay products are the principal mineral resources of the wilderness. Quartzite has been mined at three places in the area and used as a source of silicon for the manufacture of ferrosilicon; byproducts were road metal, concrete aggregate, railroad ballast, and sand. The rock is potentially useable as ganister for silica brick and as specialty sand such as filter and furnace sand. A large resource of quartzite exists in the area.

Ceramic and bloating tests made on shale samples from within and adjacent to the wilderness showed that some of the shale is suitable for lightweight aggregate and structural clay products. A large area of shale exists in the wilderness.

The Federal Government owns all surface rights in the wilderness and all mineral rights except those on about 300 acres (121 ha) along the James River in the extreme eastern part of the wilderness (fig. 2).

GEOLOGY

The following discussion is abstracted from the report on the geology of the James River Face Wilderness by Brown and Spencer (1981). Sedimentary rocks in the James River Face Wilderness are clastic rocks of the Chilhowee Group that rest unconformably on a basement composed of meta-igneous rocks and intrusive rocks of the Virginia Blue Ridge Complex of Brown (1958) of Proterozoic age. The Chilhowee Group in ascending order includes the Unicoi (Weverton) and Harpers (Hampton) Formations of Early Cambrian(?) age and the Antietam (Erwin) Quartzite of Early Cambrian age.

The Unicoi (Weverton) Formation consists of graywacke, pebbly quartzite, shale, and fine-grained tuffaceous rock. The Harpers (Hampton) Formation consists of dark-gray shale, siltstone, and thin quartzites. Also included in the Harpers (Hampton) are three discontinuous quartzite zones that each are as much as 300 ft (91 m) thick. These are lithologically similar to the overlying Antietam (Erwin) Quartzite that consists mainly of vitreous bluish-gray orthoquartzite. The Shady Dolomite overlies the rocks of the Chilhowee Group, but does not occur in the wilderness.

The geologic structure in the James River Face Wilderness and vicinity is essentially a southwest-plunging, broad anticline. The southeast limb of the fold is cut off by a steeply dipping fault that brings the Harpers (Hampton) Formation down against older beds of the Unicoi (Weverton) Formation. Where the fault crosses the James River, rocks of the Harpers (Hampton) Formation are faulted against gneisses of Proterozoic age.

A major thrust sheet that is part of a system of thrust faults throughout the Blue Ridge extends east-west across the mapped area. It truncates the broad, plunging anticline and has placed gneisses of Proterozoic age across the southern part of the wilderness.

GEOCHEMICAL SURVEY

The U.S. Geological Survey (USGS) made a reconnaissance geochemical survey (Brown and Siems, 1982) of the James River Face Wilderness and nearby area to test for unidentified and (or) unexposed mineral deposits that might be recognized by their geochemical halos. Except for thin iron-rich quartzites in the Harpers (Hampton) Formation, no metallic mineral deposits are known in the study area and no evidence of deposits was found during the geochemical studies. Results and their interpretation are discussed by Brown and Siems (1982). Samples from the wilderness contain no obviously anomalous metal concentrations that might be related to significantly mineralized rock.

MINES AND PROSPECTS

The U. S. Bureau of Mines (USBM) examined the area for evidence of old mines and prospects. Three inactive quarries in quartzite are the only known mineral operations in the wilderness (Gazdik and Ross, 1982). They were mined for metallurgical-grade silica rock used as ore for silicon in the production of ferrosilicon. Rock from these quarries was also utilized for railroad ballast, concrete aggregate, road metal, and sand for cement and mortar.

OIL AND GAS POTENTIAL

Rocks of the wilderness are not suitable reservoirs for oil and gas because they are metamorphosed and porosity is low. These rocks, however, are part of the large eastern overthrust system (Milici, 1980), and thus at some speculative depth below a detachment zone there are rocks that might contain oil and gas. Leonard Harris (USGS, oral commun., 1981) estimates that in this area the detachment zone is 10,000 to 15,000 ft (3000 to 4600 m) deep.

MINERAL RESOURCE POTENTIAL

Metallurgical-grade quartzite and shale potentially useful for lightweight aggregate and structural clay products are the principal mineral resources of the area. Quartzite has been mined at three places in the area and used as a source of silicon for the manufacture of ferrosilicon, and byproducts were road metal, railroad ballast, and sand. The rock is potentially useable as ganister for silica brick and as specialty sand such as filter and furnace sand. A large resource of quartzite exists in the area (fig. 1)

The USBM collected shale samples from within and adjacent to the wilderness, and ceramic and bloating tests found that some of the shale is suitable for structural clay products and lightweight aggregate (Gazdik and Ross, 1982). Figure 1 shows a large area of shale in which this type occurs in the wilderness.

REFERENCES CITED

Brown, C. E., and Siems, D. F., 1982, Geochemical survey of the James River Face Wilderness, Bedford and Rockbridge Counties, Virginia: U.S. Geological Survey Miscellaneous Field Studies Map MF-1337-B.

Brown, C. E., and Spencer, E. W., 1981, Geologic map of the James River Face Wilderness, Bedford and Rockbridge Counties, Virginia: U.S. Geological Survey Miscellaneous Field Studies Map MF-1337-A, scale 1:24,000.

Brown, W. R., 1958, Geology and mineral resources of the Lynchburg quadrangle, Virginia: Virginia Division of Mineral Resources Bulletin 74, 99 p.

Gazdik, G. C., and Ross, R. B., Jr., 1982, Map showing quarries, mines, prospects, and sample data in and near the James River Face Wilderness, Bedford and Rockbridge Counties, Virginia: U.S. Geological Survey Miscellaneous Field Studies Map MF-1337-C .

Milici, R. C., 1980, Relationships of regional structure to oil and gas producing areas in the Appalachian basin: U.S. Geological Survey Miscellaneous Investigations Map I-917-F, 5 sheets.

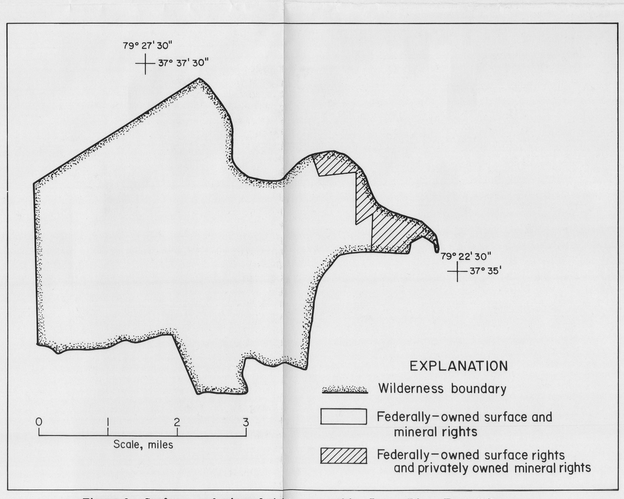
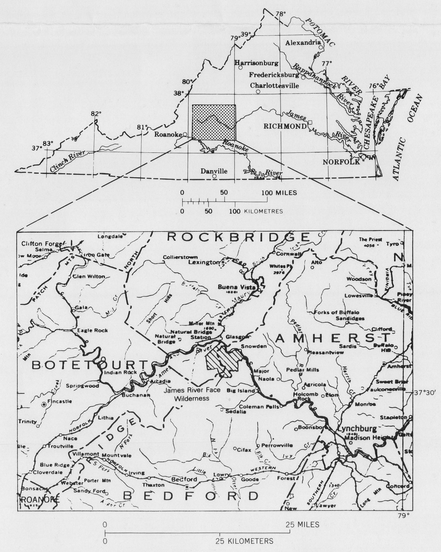


Figure 2.—Surface- and mineral-rights ownership, James River Face Wilderness.



Index map showing location of James River Face Wilderness.

INTERIOR—GEOLOGICAL SURVEY, RESTON, VA.—1982

For sale by Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, VA 22202