DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

OPEN-FILE REPORT OF 77-76 MAP--J
Mineral resource, geological, and geophysical maps of the New River Gorge area, Fayette, Raleigh and Summers Counties, West Virginia

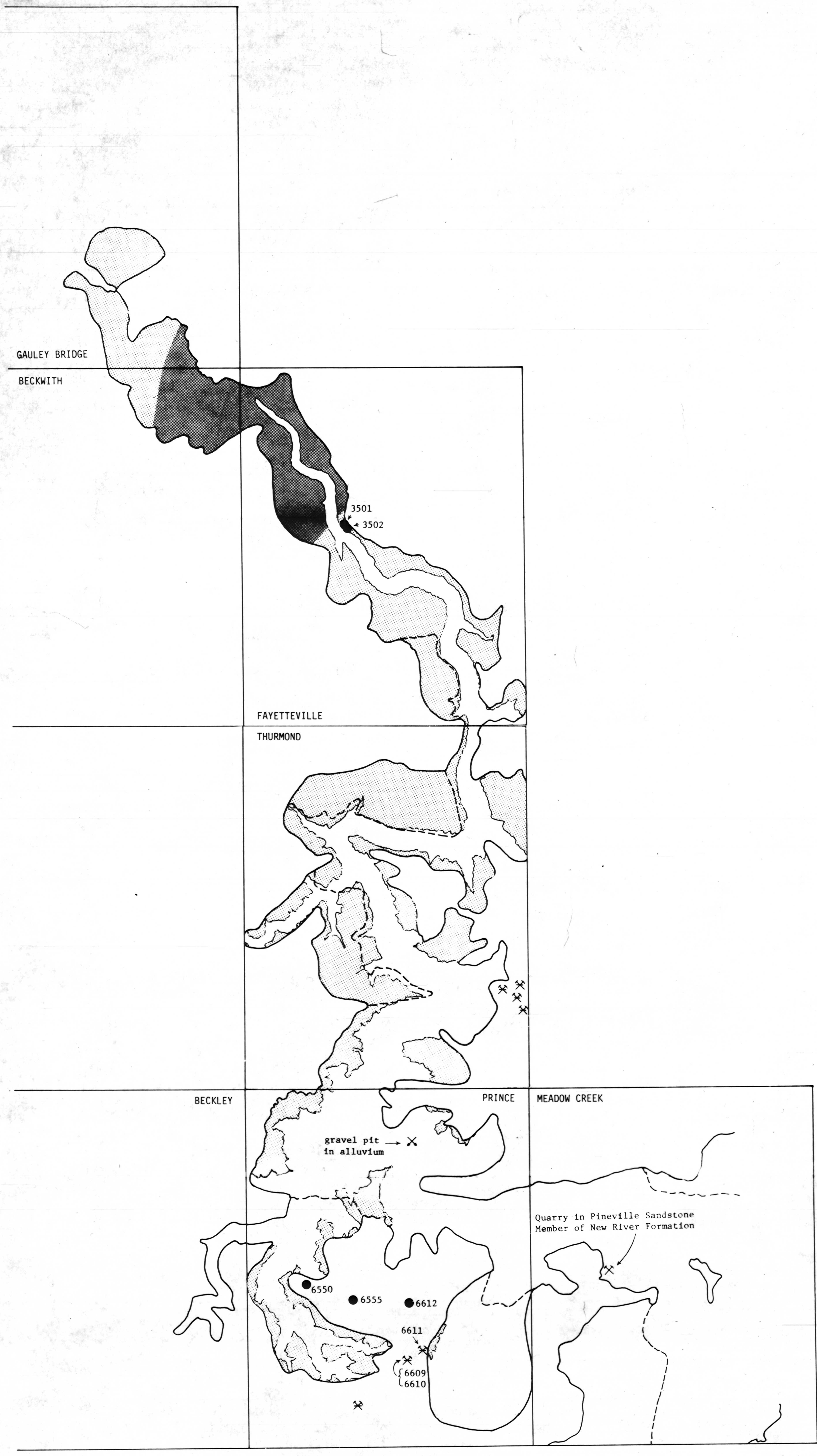

Figure 1.--Areal extent of upper part of Raleigh Sandstone Member of New River Formation.

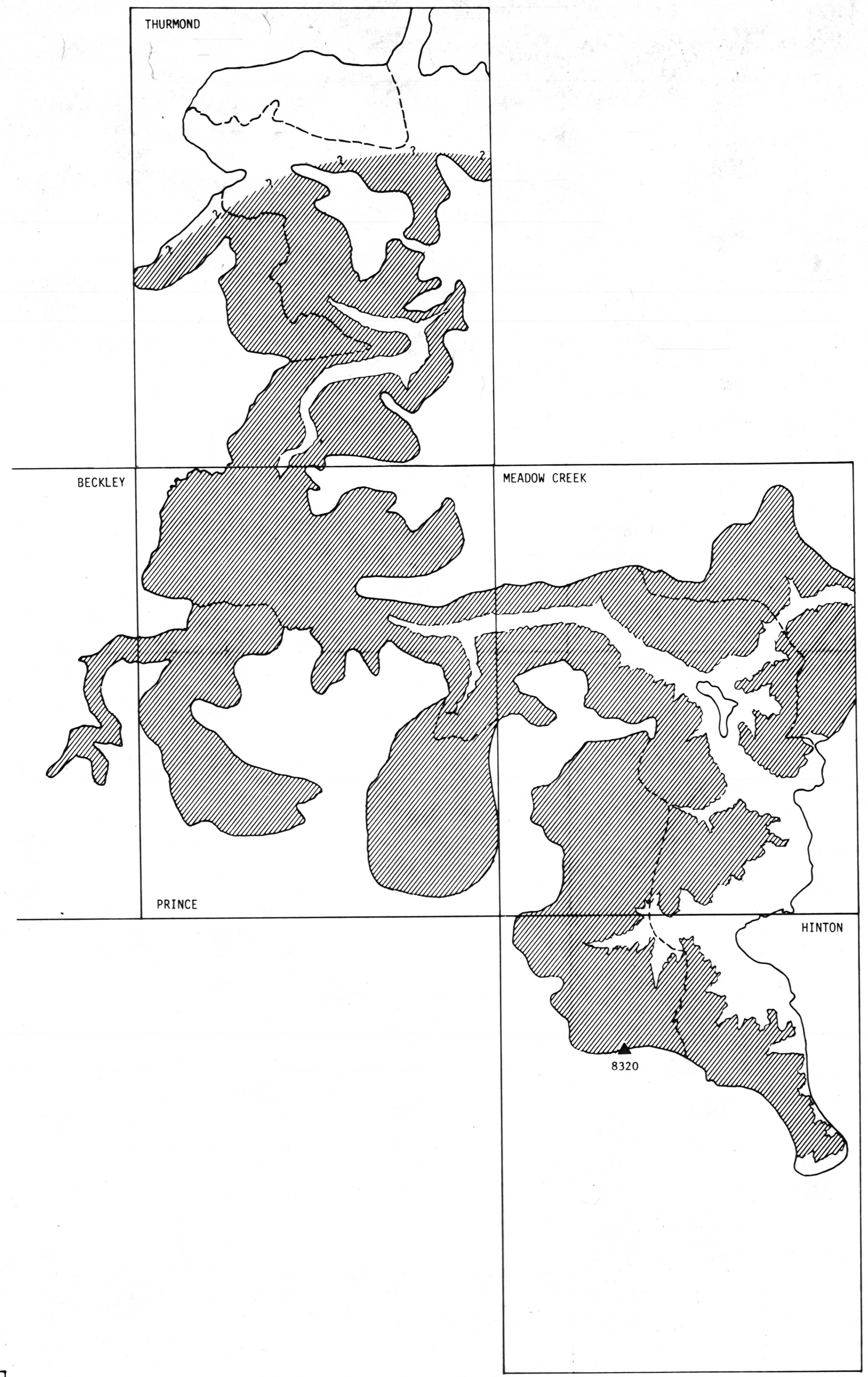

Figure 2.--Areal extent of Little Stone Gap Member of Hinton Formation and location of one sandstone sample from overlying Pocahontas Formation.

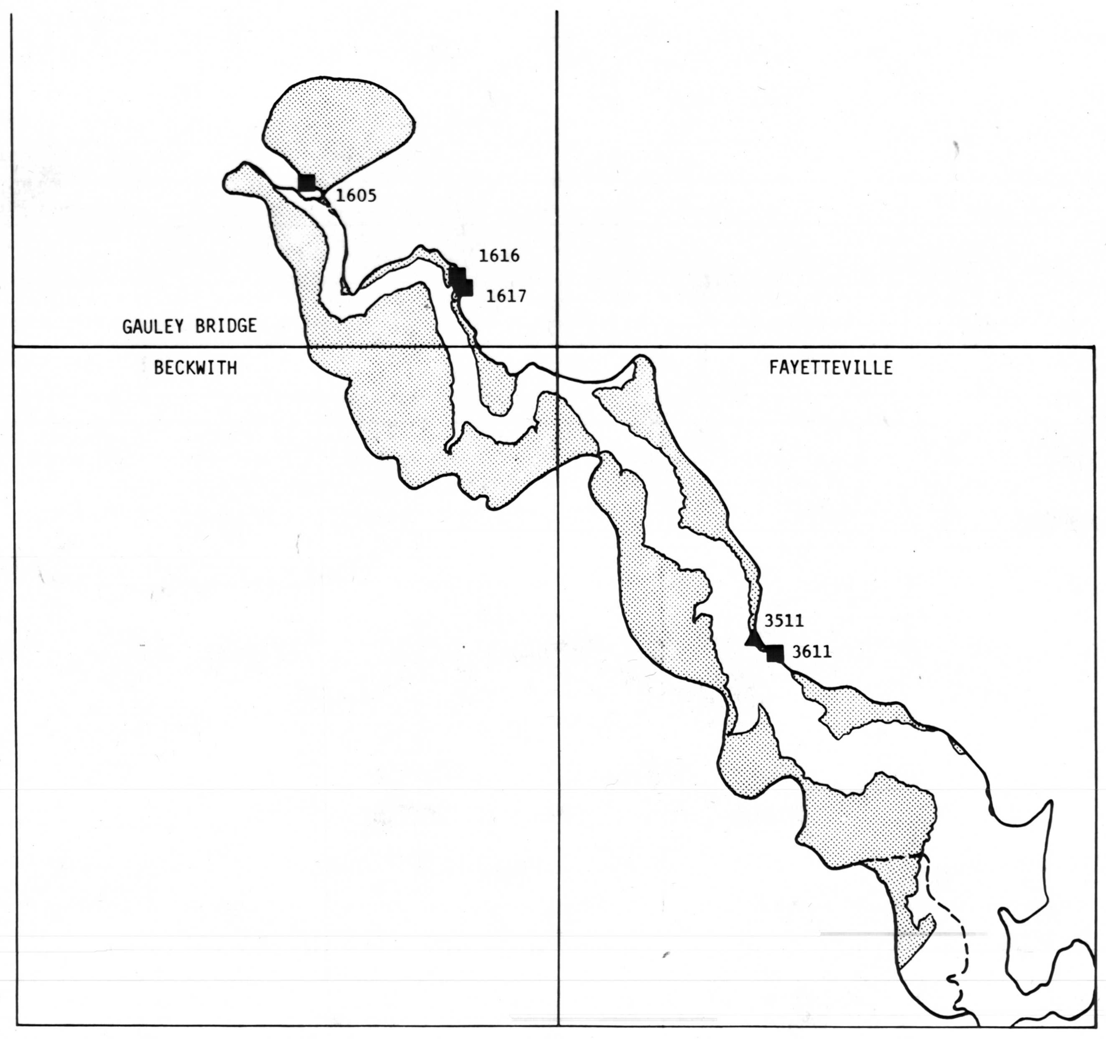

Figure 3.--Areal extent of lower part of Nuttall Sandstone Member of New River Formation.

Discussion

Nonmetallic mineral resources, other than fuels, in the New River Gorge area are sandstone, shale, limestone, and sand and gravel. All of these resources are as abundant and in some places even more abundant outside the study area as they are within it. The thick beds of sandstone that are suitable for construction materials and locally for high-silica sand are the most important in the Gorge area but are also abundant in much of the state (Arkle and Hunter, 1957, p. 27). Some of the shale may be suitable for manufacture of common brick, but none in the study area has been used. Underclay is found below most of the coal beds, but no thick beds of high-quality underclay (fire clay) are known to exist in the area (Hennen and others, 1919, p. 907; Krebs and Teets, 1916, p. 652). Very large resources of common clay and shale occur elsewhere in West Virginia (McCue and others, 1948) and fire clay is known to be present especially in northern West Virginia (Tallon and Hunter, 1959). The principal exposed limestone, the Little Stone Gap Member of the Hinton Formation of Mississippian age, is only 40 to 55 ft. (12-17 m.) thick and is generally siliceous (Reger, 1926, p. 727). It has been quarried in Mercer County to the south but not in the Gorge area. This limestone is probably of little economic importance (McCue and others, 1939, p. 55), but because no other limestone is readily available in this area its extent is shown on figure 2. The Greenbrier Limestone of Mississippian age crops out to the east and south of the study area in Monroe and Mercer Counties where it is quarried in many places (McCue and others, 1939, p. 25-54). Within the study area, however, the Greenbrier probably is not closer to the surface than 700 ft. (213 m.) and has little potential for quarrying (see Map G of this series). Alluvial deposits of sand and gravel are limited to narrow strips along the New River and its larger tributaries (Map A of this series); resources are limited, although one small gravel pit is located along the New River in the Prince quadrangle (fig. 1).

The stratigraphic units shown on Maps A and C of this series contain numerous sandstone beds of both Mississippian and Pennsylvanian age that are well exposed in the Gorge area. Some of these are probably suitable for crushed rock, and road material is obtained locally from a quarry in the Pineville Sandstone Member of the New River Formation (Pennsylvanian age) in the Meadow Creek quadrangle (fig. 1). A few of the sandstones are composed of 90 percent or more quartz sand and could be considered as potential sources of high-silica sand for use in glass-making, or as filter sand, engine sand, or blast sand. Distribution maps of the two principal sandstones, the upper part of the Raleigh Sandstone Member of the New River Formation and the lower part of the Nuttall Sandstone Member of the New River Formation, are shown in figures 1 and 3.

The most favorable areas for quarry sites in the upper part of the Raleigh Sandstone Member are outside the boundaries of the study area where the sandstone forms a broad upland surface and sandstone has been quarried for glass sand and engine sand at several places in the Prince and Thurmond quadrangles (fig. 1). The Nuttall Member has not been quarried in the study area.

A total of 124 sandstone samples was analyzed by semiquantitative spectrographic methods for 30 trace elements (Map I of this series). The silica and alumina content were not determined but two analyses of sandstone from the quarries in the Thurmond quadrangle (Hennen and others, 1919, p. 912) show silica to be 98.4 to 99.2 percent, alumina, 0.75 to 0.31 percent, and iron oxide 0.16 to 0.08 percent. Such material is a high-silica sand suitable for glass.

Megascopic examination suggests that both the Nuttall and Raleigh contain beds of sandstone that are more than 90 percent quartz sand or silica. The content of Fe, Ca, Mg, Ti, and Cr indicate the approximate content of some undesirable minerals. The content of Fe, Ti, and Cr is related partly to the amount of opaque, heavy mineral impurities in the rock, and the content of Ca and Mg indicates in part the amount of carbonate cement. Thus, clean-looking, white medium-to coarse-grained sandstones that contain more than 90 percent quartz sand and have less than 0.5 percent Fe and low Ca, Mg, Ti, and Cr are probably suitable for use as high-silica sandstones. Of the 124 sandstone samples analyzed, only 14 contained 0.5 percent or less iron (table 1). These 14 samples with low iron content are primarily from the lower part of the Nuttall Sandstone Member and the upper part of the Raleigh Sandstone Member. The distribution of the samples is shown on the maps. Analyses of three samples (6609, 6610, and 6611, table 1) of the upper part of the Raleigh from outside the study area are low enough in iron to be considered for use as glass sand. These samples were collected from weathered rock at inactive quarries. Samples 6550 and 6555 from natural outcrops and 6612 from drill core, also outside the area, are probably from the same stratigraphic interval but contain more iron (table 1). A facies of the upper part of the Raleigh Sandstone Member in the northern part of the Gorge area has been megascopically examined and has a quartz-sand content less than 70 percent. Thus, the sandstone in these beds in this area (see dark shaded portion of map) would not be a source of high-silica sand.

Table 1.--Analyses of sandstone having 0.5 percent or less Fe, New River Gorge area, Fayette, Raleigh, and Summers Counties, West Virginia. All analyses are by 6-step semiquantitative emission spectrographic methods. Values are reported to the nearest number in the series 1, 1.5, 2, 3, 5, 7, and 10, which represent approximate midpoints of group data on a geometric scale. The assigned groups for the series will include the quantitative value 30 percent of the time. Letter symbol: N, not detected; L, detected but below limit of determination given in parenthesis. Additional analytical data given in Siems, D. F., and others, 1977, Analyses of stream sediment, soil, and rock samples from New River Gorge area, Fayette, Raleigh, and Summers Counties, West Virginia: U. S. Geol. Survey Open-File Report OF-77-88.

Sample No.	Percent					
	Fe	Ca	Mg	Ti	Cr	Description
1605	0.1	0.07	0.03	0.1	0.002	2 m chip sample, white sandstone, 1.5 m above level of New River near mouth of Cane Creek, part of Nuttall Sandstone Member of New River Formation.
1616	.1	L(0.05)	.02	.03	L(0.001)	1 m chip sample, conglomeratic sandstone, near base of Nuttall Sandstone Member of New River Formation, exposure along W.Va. State Route 16 near Chimney Corner.
1617	.3	L(0.05)	.05	.15	.0015	1 m chip sample, sandstone, several meters above sample 1616.
3501	.2	L(0.05)	.05	.15	L(0.001)	Grab sample, light-pink sandstone, lower part of Raleigh Sandstone Member of New River Formation, on W. Va. State Route 82, near Fayette Station.
3502	.5	L(0.05)	.15	.02	.001	Grab sample, buff sandstone, lower part of Raleigh Sandstone Member of New River Formation, on W. Va. State Route 82, near Fayette Station.
3511	.5	0.1	.03	.15	.002	Grab sample, white, crossbedded sandstone lens near middle of New River Formation, on W. Va. State Route 82, near Fayette Station.
3611	.1	L(0.05)	.02	.01	.0015	2 m chip sample, conglomeratic sandstone, lower part of Nuttall Sandstone Member of New River Formation, on W. Va. State Route 82, above Fayette Station.
6550	.2	N(0.05)	.2	.07	.001	Grab sample, buff to yellow brown, friable sandstone, Raleigh Sandstone Member of New River Formation.
6555	.5	N(0.05)	.02	.15	.003	Grab sample, yellow to white, friable sandstone, Raleigh Sandstone Member of New River Formation.
6609	.05	N(0.05)	.02	.07	.001	2 m chip sample, white sandstone, lower part of abandoned quarry in Raleigh Sandstone Member of New River Formation.
6610	L(0.05)	N(0.05)	.02	.015	L(0.001)	3 m chip sample, white sandstone, upper part of quarry in Raleigh Sandstone Member of New River Formation.
6611	.05	N(0.05)	.02	.15	.005	Grab sample, white, conglomeratic sandstone, in quarry in Raleigh Sandstone Member of New River Formation.
6612	.1	L(0.05)	.02	.05	L(0.001)	Scattered chips of sandstone from drill core, Raleigh Sandstone Member of New River Formation.
8320	.2	N(0.05)	.03	.15	L(0.001)	Grab sample of light gray, friable sandstone, Pocahontas Formation.

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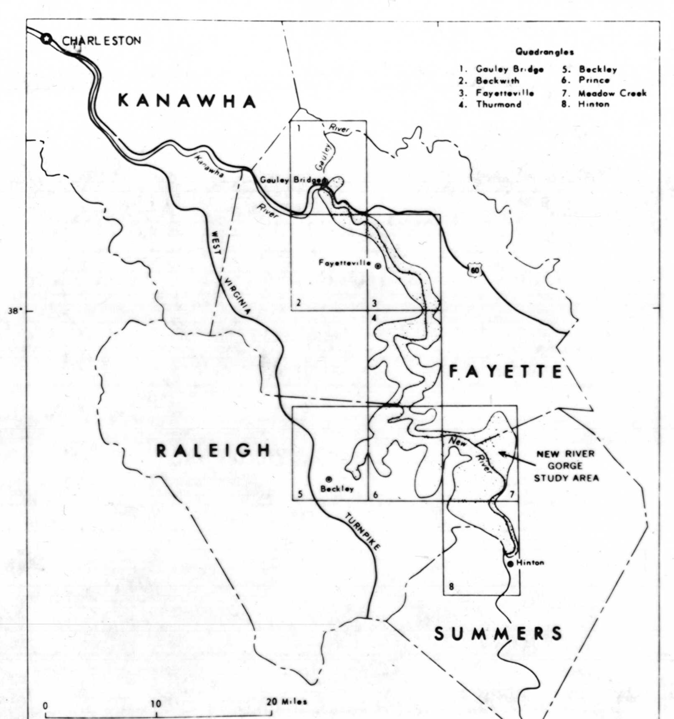
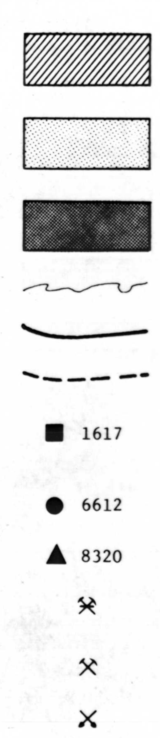


INDEX MAP

EXPLANATION



Areal extent of Little Stone Gap Member of Hinton Formation. Queried where approximately located.

Areal extent of quartz-rich sandstone.

Approximate area where more than 50% of upper part of Raleigh Sandstone Member of New River Formation contains less than 70% quartz sand grains.

Limit of resources.

Proposed National Park boundary.

Proposed Wild and Scenic River boundary.

1617 Location and number of sample from lower part of Nuttall Sandstone Member of New River Formation.

6612 Location and number of sample from Raleigh Sandstone Member of New River Formation.

8320 Location and number of other samples.

Abandoned quarry in upper part of Raleigh Sandstone Member of New River Formation.

Semiactive quarry in Pineville Sandstone Member of New River Formation.

Sand and gravel pit.

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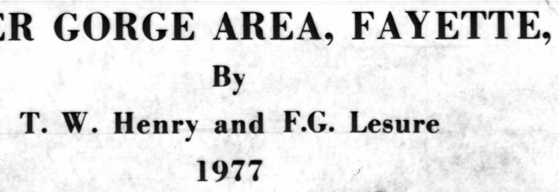
This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards or nomenclature.



MAPS OF NONMETALLIC MINERAL RESOURCES, NEW RIVER GORGE AREA, FAYETTE, RALEIGH, AND SUMMERS COUNTIES, WEST VIRGINIA

By

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West Virginia (New River Gorge area). Resources. VS. 1977
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