

SUMMARY OF MINERAL RESOURCES AND MINING INDUSTRIES IN PULASKI COUNTY, VIRGINIA

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Division of Geology and Mineral Resources (DGMR)
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Active Mining

In 2018, four mines were in operation in Pulaski County producing non-fuel mineral products under DMME permits. There were no active coal mines or oil and gas extraction operations in the county. DMME permit records indicate 251 acres were under permit with about 131 acres bonded for surface mining disturbances (Table 1). Annual reports for 2017 show total production of 221,782 short tons of mineral products with an estimated value of about \$3.5 million (Table 2). The produced tonnage was about 0.7% less than that reported in 2016, but the estimated total value was higher by about 1.1%. The increase in value reflects a year-over-year 3% statewide increase in the average market value per ton of crushed stone aggregate in 2017. The four mines directly employed 30 workers earning approximately \$672 thousand in 2017 (Table 3). These figures are significantly reduced from the previous year (41 workers earning \$1.9 million reported in 2016) mainly due to the cessation of mining operations at Hoover Color Corporation in 2017.

Holston River Quarry, Inc., a subsidiary of Salem Stone Corporation, produces crushed stone aggregate at two permitted operations located along Interstate 81 south of Dublin. At the Newbern and Dublin Quarries, the company mines limestone from the Conococheague Formation of Cambrian age. In recent years, the Dublin Quarry has produced over 90% of the total tonnage reported in the county. Shale from the Cambrian-age Rome Formation is mined by JWB Contractors LLC in an open pit located about two and one-half miles northeast of Draper. The shale is sold for construction fill and road material.

At Hiwassee, the Hoover Color Corporation has produced natural iron-oxide pigments since 1973 from ocher and umber deposits that occur near the contact of the Erwin and Shady formations of Cambrian age. The material is processed and blended to produce lightfast, natural and synthetic pigments used in construction materials such as pavers, plaster, and concrete. Pigments are also used in plastics, paints and other coatings applications. Annual tonnage reports submitted to DMME show that mine production peaked in 1990 with about 1,500 tons reported that year. The company has reported no mined tonnages from the permitted area since 2013 and has mainly processed alternative materials imported from off-site sources. In mid-2016, Hoover Color was acquired by Cathay Industries, an iron-oxide pigments manufacturer based in Hong Kong with global operations. Cathy Industries plans to continue the production of pigments at the site, but the mine permit will be released after the reclamation of surface disturbances has been completed.

Historic Mining

Limestone and dolostone formations were quarried for construction aggregates at several inactive sites in Pulaski County. The Radford Limestone Company, Inc. operated a quarry located about 2.5 miles south of Radford on the west side of State Highway 605 (Figure 1). The company mined dark gray dolostone from the Beekmantown Formation of Ordovician age to

produce crushed stone aggregate (Gooch and others, 1960). Sandstone from the Price Formation of Mississippian age has been quarried for use as building stone.

Iron ores were mined in southwestern Pulaski County at the eastern end of an east-to-west trending belt of deposits known as the Pulaski-Smyth Limonite District. The deposits occur as residual limonite ores formed by the weathering of the mineral pyrite (iron sulfide) contained in limestone, shale and sandstone formations. The oxidation of the sulfide minerals causes leaching and the development of clay residuum containing grains and lumps of limonite, typically brown, amorphous hydrous ferric oxides. Over time, weathering and water circulation dissolved and re-precipitated the limonite into larger concentrated masses. Where the limonite is associated with shale residuum it is known as “mountain ore”, typically brown hematite ore. Underground mines near Allisonia were opened in the late 1880s and produced ore intermittently up until about 1930, by which time most iron mines in Virginia had closed (Gooch, 1954). At least two of the larger mines were developed by Virginia Iron, Coal, and Coke Company, which also operated the Boom charcoal furnace at Reed Island. The company operated coke furnaces located in Pulaski, as well as Max Meadows and Foster Falls in Wythe County. Several other iron mining operations were located on the flanks of Draper Mountain just south of Pulaski. There were at least four major iron furnaces that operated from the mid-1800s up until the early 1900s: Boom (1882-1906), Dora (1890-1930s), Pulaski (1887-1920), and Radford (1867-1900) served the regional iron mining industry to convert limonite ore to pig iron (Watson, 1907).

Lead and zinc minerals were prospected and mined for a brief period in the early 1900s near Delton and Allisonia. From 1902 to 1903, the Bertha Mineral Company, which was also actively mining lead and zinc ores at the Austinville Mine located in eastern Wythe County, mined about 8,000 tons of zinc ore at the Delton mines located in southwestern Pulaski County (Watson, 1907). Lead and zinc sulfide and oxide minerals are concentrated in breccia and replacement style deposits often associated with residual clays in the Shady Dolomite of Cambrian age.

Clay and shale were excavated in the past from small prospect pits located about one-half mile southeast of Draper along Brown Road, and also near Weldon. At the site near Weldon, residual clay formed above the Mississippian-age Maccrady Shale supplied material for the manufacture of brick reported to have been used in the construction of the nearby Major Bentley house in the nineteenth century (Ries and Somers, 1920). Samples of clay and shale from five locations in the county have been tested by DGMR and found to be potentially suitable for use in the manufacture of brick, tile, and lightweight aggregate (Sweet, 1976).

Virginia's Valley Coal Field region, which extends northeastward from western Bland and Wythe counties to southwestern Botetourt County crosses through the northern portion of Pulaski County. Coal of semianthracite rank occurs in the Price Formation of Mississippian age in numerous coal horizons, two of which are of sufficient thickness and extent that they were mined commercially. In Pulaski County these are the Merrimac coal bed averaging about five feet thick, and the Langhorne coal bed averaging about two and one-half feet thick (Brown and others, 1952). Records of coal mining in the region indicate strip mining occurred as early as 1770 (Whisonant, 2000), but most of the commercial-scale mining activity began in the late 1850s when railroad transport became available. Large-scale mining operations ended around 1953, and only minor and intermittent production has been reported since then. The two main coal fields in Pulaski County include the Little Walker Mountain field to the north, and the Pulaski field in the western part of the county near the town of Pulaski. There were about eighteen individual coal mines in the Little Walker Mountain field and four in the Pulaski field.

Near the present-day town of Parrott, the Kimball Coal Mining Company opened a mining camp in 1897 and operated an underground coal mine that was sold to the Pulaski Anthracite Coal Company in 1903. Developments in the mining town included a coal washing plant, homes, a commissary, and public school. Mining in primarily the Merrimac coal bed continued up until the onset of the Great Depression in the 1930s. More recently, coal refuse near Parrott was crushed and marketed as lightweight aggregate.

Near Pulaski, the Empire Mine was originally opened in 1914 and operated as the Wagon Mine until 1918. The Virginia Anthracite Coal Company leased the mine in 1919 and was reorganized in 1921 as the Empire Anthracite Coal Corporation, which was soon acquired in 1923 by the Empire Anthracite Coal Company. This company opened several new mines in the field mainly in the Langhorne coal bed and made substantial investments in mine operating improvements, railroad infrastructure, and the mine village at Empire. In 1926, the company was bankrupt and attempts to consolidate with several other companies operating in the area were not successful. Anthracite Coal and Briquetting Company operated the underground Empire Mine starting in 1931, but the mine closed permanently in 1938.

Nine oil and gas test wells have been drilled in northern Pulaski County, the earliest in 1960 and the most recent in 2003. None of these wells produced natural gas or oil products and all have been plugged and abandoned in accordance with state requirements (DGO, 2018).

Geology

Pulaski County lies on the boundary between the Blue Ridge and Valley and Ridge Provinces of Virginia. The older rocks of the Blue Ridge Province are located in the southeastern quarter of the county (Figure 1). Most of Pulaski County is part of the Valley and Ridge Province, which is underlain by folded and faulted Paleozoic sedimentary rocks including limestones, dolostones, sandstones and shales. These rock strata range in age from the Cambrian period to the Mississippian. The geologic rock formations in the county host a wide variety of mineral and energy resources that have fueled economic development in the past, and continue to provide jobs and the raw materials that will sustain that growth into the future.

Detailed geologic mapping at the scale of 1:24,000 has been completed in several of the U.S. Geological Survey 7.5-minute quadrangles that cover Pulaski County. DGMR's mapping program is also actively mapping in other quadrangles, with reports soon to be available. Figure 2 shows an index of maps currently available and in progress. Many of these are available in hard copy format for purchase and/or in digital format for free download from the DMME Web Store: <https://www.dmme.virginia.gov/commerce/>

References for Pulaski County, with commodity codes shown on Figure 1

Common clay and shale (cl, sh, fill)

Johnson, S.S., Denny, M.V., and Le Van, D.C., 1966, Analyses of clay, shale, and related materials – southwestern counties: Virginia Division of Mineral Resources, Mineral Resources Report 6, p. 56-65.

Ries, H., and Somers, R.E., 1920, The clays and shales of Virginia west of the Blue Ridge: Virginia Geological Survey Bulletin 20, p. 98.

Sweet, P.C., 1976, Clay material resources in Virginia: Virginia Division of Mineral Resources, Mineral Resources Report 13, 56 p.

Coal (coal)

- Bartholomew, M.J., and Brown, K.E., 1992, The Valley Coalfield (Mississippian age) in Montgomery and Pulaski counties, Virginia: Division of Mineral Resources Publication 124, 33 p.
- Brown, A., Berryhill, H.L., Taylor, D.A., and Trumbull, J.V.A., 1952, Coal resources of Virginia: U.S. Geological Survey Circular 171, 57 p.
- Campbell, M.R., and others, 1925, The Valley coal fields of Virginia: Virginia Geological Survey Bulletin 25, p. 191-222.
- Gwin, M.R., and Henderson, J.A., Jr., 1984, Coal resources data on federal lands in Virginia: Division of Mineral Resources Publication 54, 152 p.
- Whisonant, R.C., 2000, Geology and history of the Confederate coal mines in Montgomery County, Virginia: Division of Mineral Resources, Virginia Minerals, Vol 46, No. 1, 8 p.

Dimension Stone (DS)

- Cooper, B.N., 1939, Geology of the Draper Mountain area, Virginia: Virginia Geological Survey Bulletin 55, p. 86-91.
- Watson, T.L., 1907, Mineral resources of Virginia: The Virginia Jamestown Exposition Commission, J.P. Bell Company, Lynchburg, Virginia, p. 38-39.

General – geology and mineral resources

- Butts, C., 1940, Geology of the Appalachian Valley in Virginia, Part I – Geologic text and illustrations, Part II – Fossil plates and explanations: Virginia Geological Survey Bulletin 52, 568 p.
- Cooper, B.N., 1939, Geology of the Draper Mountain area, Virginia: Virginia Geological Survey Bulletin 55, 98 p.
- Dietrich, R.V., 1990, *Minerals of Virginia, 1990*: Virginia Division of Mineral Resources, Charlottesville, VA, 474 p.
- McDowell, R.C., 1068, Structural Geology of the Macks Mountain area Virginia: PhD. Thesis Virginia Tech, 147 p.
- Rader, E.K., and Evans, N.H., editors, 1993, Geologic Map of Virginia – Expanded Explanation: Division of Mineral Resources, 80 p.
- Schultz, A.P., Bartholomew, M.J., Brown, E.,K., Ingram, G.R., Lewis, S.E., and Blair, J.A., 2015, Geologic Map of the Pulaski Quadrangle, Virginia: Division of Geology and Mineral Resources Publication 183.
- Schultz, A.P., and Bartholomew, M.J., 2010, Geologic Map of the Radford South Quadrangle, Virginia: Division of Geology and Mineral Resources Open File Report 10-08.
- Schultz, A.P., and Bartholomew, M.J., 2010, Geologic Map of the Dublin Quadrangle, Virginia: Division of Geology and Mineral Resources Open File Report 10-09.
- VA Division of Mineral Resources, 2003, Digital representation of the 1993 geologic map of Virginia: Division of Mineral Resources Publication 174.
- Whisonant, R.C., 1997, Geology and the Civil War in southwestern Virginia: Union raiders in the New River Valley, May 1864: Division of Mineral Resources, Virginia Minerals, Vol 43, No. 4, p. 29-39.

Iron (Fe)

- Gooch, E.O., 1954, Iron in Virginia: Division of Mineral Resources, Mineral Resources Circular No. 1, 17 p.

Stose, A.J., and Stose, G.W., 1957, Geology and mineral resources of the Gossan Lead District and adjacent areas in Virginia: Virginia Geological Survey Bulletin 72, 233 p.

Watson, T.L., 1907, Mineral resources of Virginia: The Virginia Jamestown Exposition Commission, J.P. Bell Company, Lynchburg, Virginia, 618 p.

Iron mineral pigments (FeOx)

Johnson, S.S., 1964, Iron and titanium mineral pigments in Virginia: Division of Mineral Resources, Virginia Minerals Vol. 10, No. 3, p. 1-6.

Lead and zinc (Pb, Zn)

Currier, L.W., 1935, Zinc and lead region of southwestern Virginia: Virginia Geological Survey Bulletin 43, 122 p.

Luttrell, G.W., 1966, Base- and precious-metal and related ore deposits of Virginia: Division of Mineral Resources, Mineral Resources Report 7, 167 p.

Sweet, P.C., Good, R.S., Lovett, J.A., Campbell, E.V.M., Wilkes, G.P., and Meyers, L.L., 1989, Copper, lead, and zinc resources in Virginia: Division of Mineral Resources Publication 93, p. 125.

Watson, T.L., 1907, Mineral resources of Virginia: The Virginia Jamestown Exposition Commission, J.P. Bell Company, Lynchburg, Virginia, 618 p.

Limestone and dolomite (agg)

Gooch, E.O., Wood, R.S., and Parrott, W.T., 1960, Sources of aggregate used in Virginia highway construction: Division of Mineral Resources, Mineral Resources Report 1, p. 22.

Sweet, P.C., 1993, Directory of the mineral industry in Virginia, 1993: Division of Mineral Resources Publication 129, 28p.

Sweet, P.C., and Nolde, J.E., 1999, Coal, oil and gas, and industrial and metallic minerals industries in Virginia, 1998: Division of Mineral Resources Publication 153, 25 p.

Manganese (Mn)

Pegau, A.A., 1958, Virginia manganese minerals and ores: Division of Mineral Resources, Mineral Resources Circular No. 7, 24 p.

Watson, T.L., 1907, Mineral resources of Virginia: The Virginia Jamestown Exposition Commission, J.P. Bell Company, Lynchburg, Virginia, p. 254.

Oil and gas (oil, gas)

DGO (DMME Division of Gas and Oil), 2018, Interactive map and DGO data information system: <https://dmme.virginia.gov/dgo/dgolandingpage.shtml>