

Map C—Zinc resource potential

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The mineral-resource assessment for zinc utilizes knowledge of past production localities (D'Agostino and Rowe, in press), and information on anomalous concentrations of zinc (and associated anomalous lead) in pan concentrates of stream sediments (Griffiths, Whitlow, Dattwiler, Sims, and Wick, 1985). Such features help to identify geologically favorable areas from among the formations mapped in the Charlotte quadrangle by Goldsmith and others (in press).

Since on Map C as possible aids in exploration, but not used as a basis for measuring resource potential are 1) locations of pan concentrates which have anomalous lead values not associated with anomalous zinc; 2) locations of concentrates containing zinc-rich spines or "blebs" and 3) areas where anomalous concentrations of zinc were found in minus 100-mesh stream sediment sampled during the National Uranium Resource Evaluation (NURE) (Ferguson, 1979).

On the map, the boundaries of geologically favorable areas coincide, in most places, with the mapped contacts of formations. In other places, the boundaries are arbitrarily drawn across contacts or within a mapped formation in order to limit the projection of a favorable area to distances of not more than about 1/2 km along the trend of a formation from a data site and a few kilometers across the trend.

Areas of high, moderate, and low potential for zinc resources are designated on the map. Areas of high potential are areas of favorable geology which contain zinc mineralization represented either by the presence of sphalerite in concentrates of stream sediments or zinc deposits that have been explicitly favorable geochemical values for zinc (Griffiths, Whitlow, Dattwiler, Sims, and Wick, 1985) may or may not be present. These areas which have high resource potential and do have high anomalous values for zinc also have anomalous values for lead. They include the Gold Hill district, the Silver Valley deposit, and a broad area in the northeast corner of the quadrangle where sphalerite has been found in pan concentrates of stream sediments.

Areas of moderate potential are areas of favorable geochemical values for zinc, but no known zinc mineralization.

Areas of low resource potential are marked by only one type of favorable data, which might be either projected parts of a favorable mapped rock unit where there is no supporting geochemical or mineral-occurrence data, or isolated occurrences of anomalous zinc (mineral or geochemical) without an identified favorable rock unit.

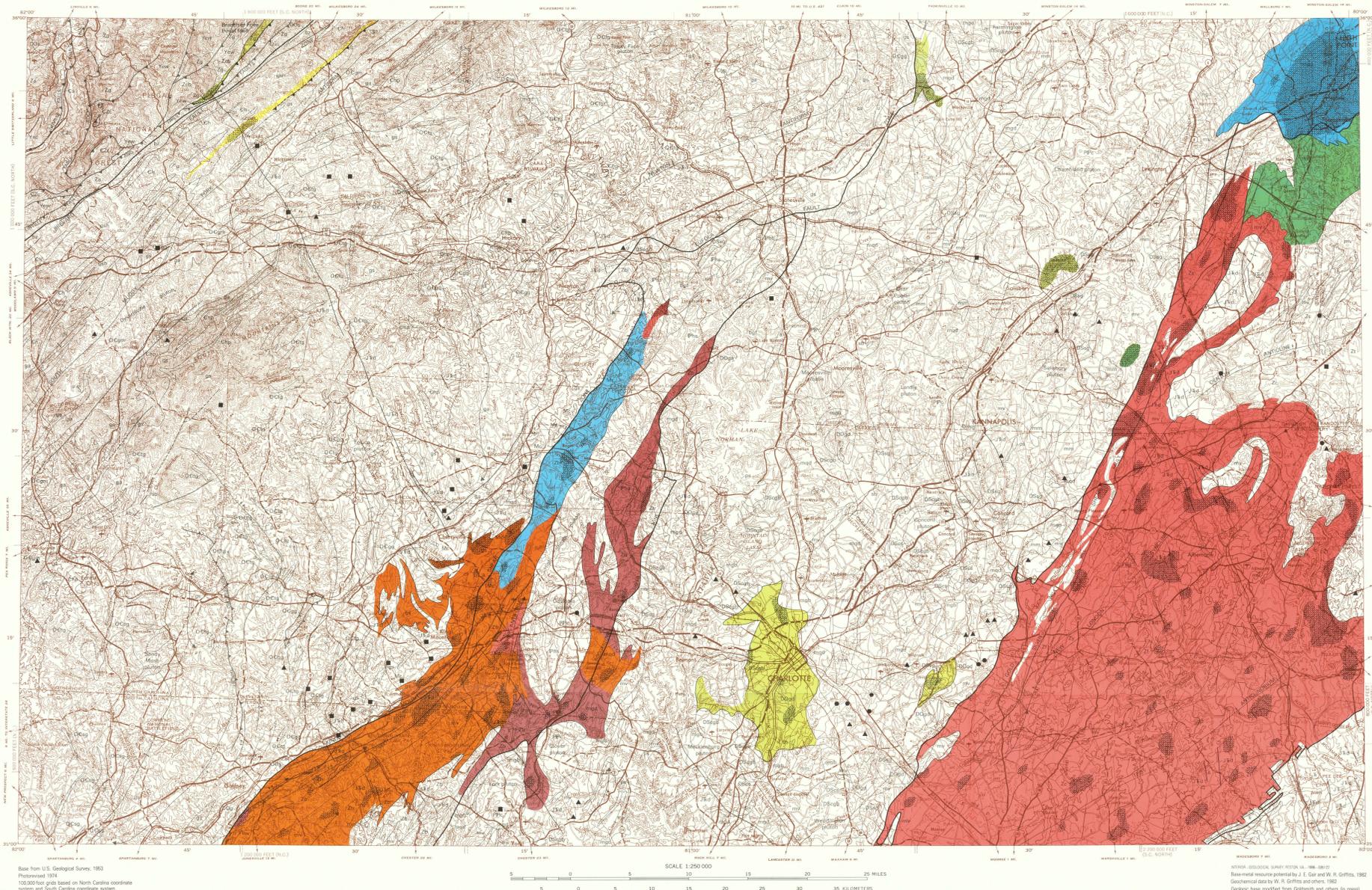
The reported production within the quadrangle (1912-1913) was about 138 tons of zinc metal (DeYoung and others, in press). All of it comes from the Silver Hill and Silver Valley mines in the Carolina slate belt. Although most of the zinc belt is of low resource potential, it is locally upgraded to high where there is specific evidence of zinc mineralization, and to moderate potential where there is geochemical evidence of anomalous zinc without evidence of any zinc mineralization. The deposits consist of established historical fields. The host rocks are 1) argillite, 2) quartz veins that are probably associated with host rocks, 3) high and other altered beds, and 4) argillite and other argillite and other altered beds.

Minor amounts of by-product zinc were produced at a low zinc mine in the Carolina slate belt, as well as at the Long Creek gold and sulfide mine in the King Mountain belt (Nixon and Hanna, 1966, p. 149) but the production was in the Bureau of Mines records studied by DeYoung and others, (in press). Very high levels of zinc were detected geochemically over a substantial part of the King Mountain belt and the adjacent Cherokee Granite pluton of the inner Piedmont belt (Griffiths, Whitlow, Dattwiler, Sims, and Wick, 1984). Such geochemical data alone suggest low resource potential, areas where the data are associated with possibly favorable host rocks (in the King Mountain belt and above the Cherokee Granite) are considered to have moderate resource potential. The only spot in these two areas where there is definite zinc mineralization is at the Long Creek mine.

* Data are commonly in zinc, but, although most samples from the locations shown were not analyzed for zinc.

EXPLANATION FOR MAP C

- Areas of resource potential—Areas of potential occur both within identified geologically favorable formations and at isolated sites where anomalous geochemical values of known mineral occurrences are not associated with specific geologic formations
- High
 - Moderate
 - Low
- Areas of anomalous zinc—Detected in minus 100-mesh fraction of stream-sediment sample collected during National Uranium Resource Evaluation (NURE) (Ferguson, 1979)
- 40-59 ppm zinc
 - 60-89 ppm zinc
 - ≥90 ppm zinc
- Boundary of major lithotectonic belt
- Location points
- Past producer of zinc
 - Zinc >1500 ppm in magnetic fraction of pan concentrate (at 1 ampere setting of magnetic separator)
 - Zinc >1000 ppm in nonmagnetic fraction of pan concentrate
 - Lead >500 ppm in nonmagnetic fraction of pan concentrate
 - Zinc >1500 ppm, lead >1000 ppm in magnetic fraction of pan concentrate (at 1 ampere setting of magnetic separator)
 - Zinc >1000 ppm, lead >500 ppm in magnetic fraction of pan concentrate (at 1 ampere setting of magnetic separator)
 - Streambed-analyzed sample commonly zinc-rich, staurolite-rich areas may have potential for zinc resources
 - ▲ Zinc >1500 ppm in magnetic fraction (1 ampere setting of magnetic separator) staurolite present in pan concentrate
 - ◆ Zinc >1000 ppm in nonmagnetic fraction, staurolite present in pan concentrate



Map D—Base-metal resource potential

MAP D—BASE-METAL RESOURCE POTENTIAL

Map D combines data from the resource potential maps for copper, lead, and zinc. The data are presented as an aid in the identification of broad areas which have potential for combined base metal deposits. In addition, smaller areas delineated where potential appears to be restricted to one of the base metals. Although the separate maps for copper, lead, and zinc delineate certain areas which have high and moderate potential, this composite map shows the resource potential as either low or moderate to high.

Formations or groups of formations (as mapped by Goldsmith and others, in press) which contain most of the anomalous mineral occurrences and geochemical values relating to base metals are the basis for delineating areas of resource potential. Such formations are assigned to high potential for base metals in the vicinity of anomalous mineral occurrences or geochemical values, and a low potential everywhere else in the formation. The areas of resource potential are principally in the volcanic sedimentary rocks of the Carolina slate belt and the metasedimentary and metamorphic schists of the King Mountain belt. No attempt is made on the map to distinguish moderate from high potential basins, within any given area, geochemical evidence might indicate moderate potential for one of the base metals (as in the individual resource potential maps for copper, lead, and zinc), but the distribution of mineral deposits might suggest high potential for another of the base metals.

The resource potential for base metals is related either to the major lithotectonic belts or to certain formations within those belts. Copper-lead-zinc deposits of the volcanogenic type are associated with the Carolina slate belt. Vanadate, copper-lead deposits are associated with certain plutons and other igneous rock bodies in the Charlotte belt and with a zone along a branch of the Fincastle fault in the northeast part of the quadrangle. Lead-zinc resource potential near the northeast corner of the quadrangle is associated with a body of metamorphosed gneissoid and is deduced from the presence of sphalerite and anomalous lead and zinc values in pan concentrates from that area (Griffiths and other workers, 1984). Lead-zinc potential in a chert unit in the northern part of the King Mountain belt is suggested by two former gold mines where lead and zinc were by products, and by anomalous amounts of lead or zinc in pan concentrates. Copper-zinc potential in the southern part of the King Mountain belt and in adjacent granitic-granoblastic bodies of the lower Piedmont and Charlotte belts is indicated by copper-bearing vein deposits that have been mined and by copper and zinc anomalies in pan concentrates. The map also shows isolated areas which have base metal potential and sites of scattered high geochemical values for the base metals which do not have a resource potential assigned to them.

The volcanogenic, evenly distributed and syngenetic sulfide deposits of the Carolina slate belt have been the major sources of base metals in the quadrangle. Ninety-five percent or more of all past production has come from these deposits, but, compared to national production, the amount of metal which was produced has been low: about 1,200 tons of copper, 138 tons of zinc, and 98 tons of lead (DeYoung and others, in press). The Carolina slate belt has the greatest potential in the quadrangle for additional deposits of base metals, small areas of moderate potential, however, are widely distributed in the metasedimentary and metamorphic schists of the King Mountain belt, despite the insignificant production of base metals from this belt.

EXPLANATION FOR MAP D

- Areas of resource potential—Patterned areas indicate moderate to high potential. Absence of pattern indicates low potential
- Copper
 - Lead
 - Zinc
 - Copper and lead
 - Copper and zinc
 - Lead and zinc
 - Copper, lead, and zinc
- Boundary of major lithotectonic belt
- Single samples with high base-metal content
- ▲ Copper
 - Lead
 - ◆ Zinc

MINERAL RESOURCE POTENTIAL FOR COPPER, LEAD, ZINC AND COMBINED BASE METALS
IN THE CHARLOTTE 1° x 2° QUADRANGLE, NORTH CAROLINA AND SOUTH CAROLINA

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Base from U.S. Geological Survey, 1963. Photorevised 1974. 1:250,000 topographic maps based on North Carolina coordinate system and South Carolina coordinate system, north pole.

SCALE 1:250,000

CONTOUR INTERVAL 100 FEET WITH SUPPLEMENTARY CONTOURS AT 50 FOOT INTERVALS NATIONAL GEOGRAPHIC VERTICAL DATUM OF 1983

MINERAL-RESOURCE POTENTIAL MAP I-1251-G (SHEET 2 OF 2) GEOLOGICAL DATA BY W. R. GRIFFITHS AND OTHERS, 1982. GEOLOGIC BASE MODIFIED FROM GOLDSMITH AND OTHERS (IN PRESS)