# USGS Finds Gold in the Silver Bell Mountains

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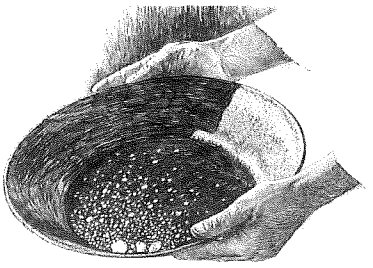
On October 17, 1988, the U.S. Geological Survey (USGS) announced that unusually high concentrations of gold had been discovered in several stream-sediment samples from within or adjacent to the Ragged Top Wilderness Study Area (WSA). The Ragged Top WSA is in the Silver Bell Mountains of Pima County, approximately 35 miles northwest of Tucson. The announcement made newspaper headlines in Arizona and triggered a minor gold rush as prospectors quickly staked unclaimed land in the area. To date, 45 new lode mining claims have been staked as a result; 59 claims had been previously recorded in the area. Although the Silver Bell Mountains contain large base-metal deposits (copper, lead, zinc, and molybdenum), gold production has been negligible.

The USGS mineral-assessment survey was conducted as part of a routine evaluation of a Bureau of Land Management WSA to determine suitability for wilderness designation. Laramide porphyry copper deposits in the Silver Bell Mountains (Richard and Courtright, 1966; Graybeal, 1982) south of the WSA have yielded more than a billion pounds of copper, large amounts of other base metals, and 6 million ounces of silver, but only 2,200 ounces of gold (Keith and others, 1983). Considering the large production of the Silver Bell mineral district and its proximity to the Ragged Top WSA, the occurrence of metallic mineralization in the WSA is not surprising; the high gold concentrations, however, are somewhat surprising.

Gold concentrations above 0.05 parts per million (ppm) are considered anomalous for raw panned-concentrate samples from stream sediments within WSA's, and concentrations greater than 1 ppm are considered highly anomalous. By these criteria, most raw panned-concentrate samples from stream sediments in a several-square-mile area adjacent to Ragged Top Peak are anomalous or highly anomalous (Figure 1). The sample with the highest reported gold concentration (150 ppm) was from a stream that drains an approximately 2-square-mile basin. Reported gold concentrations from several other samples within the basin range from 1 to 10 ppm and are also highly anomalous. Samples from drainages to the north and west are anomalous; a raw panned-concentrate of one sample near the western edge of the area shown in Figure 1 contained 29 ppm gold. Most of the sediments in the samples were derived from Laramide volcanic, volcaniclastic, sedimentary, and intrusive rocks and less abundant Tertiary volcanic and intrusive rhyolite. Anomalous gold concentrations are sufficiently widespread to suggest that gold is widely distributed in the area and is not restricted to any single rock type (Figure 1). Virtually all of the drainages that register high gold concentrations, however, contain Oligocene rhyolitic intrusive rocks, fault veins, or faults.



Variably developed, late Laramide or middle Tertiary brecciation, alteration, and sulfide vein mineralization in the granodiorite and middle Tertiary veins containing quartz, calcite, barite, and fluorite (Joseph, 1982; Kreidler, 1987; McHugh and others, 1988) indicate that one or more mineralizing events occurred after all of the Laramide rocks were deposited or intruded. The anomalous gold concentrations in stream-sediment samples may be a result of this (these) late mineralizing event(s). Sawyer and Nowlan (1988) proposed that mineralization resulted from a hydrothermal system associated with the Oligocene Ragged Top rhyolite and related dikes and that hydrothermal fluids redistributed and concentrated gold, silver, lead, vanadium, and molybdenum from low-grade base- and precious-metal halos surrounding the Laramide porphyry copper deposits. Mid-Tertiary hypogene redistribution (by ascending solutions) of base and precious metals in the halos of porphyry copper deposits may have caused mineralization in other areas of Arizona: for example, the Mammoth-St. Anthony vein deposit near the San Manuel porphyry copper deposit (Sawyer and Nowlan, 1988). Other possible interpretations for the origin of the gold anomalies include simple, mid-Tertiary volcanic-hosted veins or small, polymetallic Laramide veins in the outer periphery of the Silver Bell porphyry copper deposits. Recently recognized anomalous gold concentrations in stream sediments from the area of the Baboquivari Peak WSA in Pima County (Adrian and others, 1988; Nowlan, 1988) also may be the result of mid-Tertiary hypogene mineralization associated with rhyolitic magmatism.

The anomalous gold concentrations in samples from the area of the Ragged Top WSA represent a previously unrecognized precious-metal prospect and may or may not indicate the presence of economic gold deposits. They probably did not warrant the public excitement generated by the popular media. They do, however, suggest the existence of another variant of the many types of mineral deposits in Arizona. A better understanding of such occurrences may help to identify undiscovered, economic gold deposits in the State.

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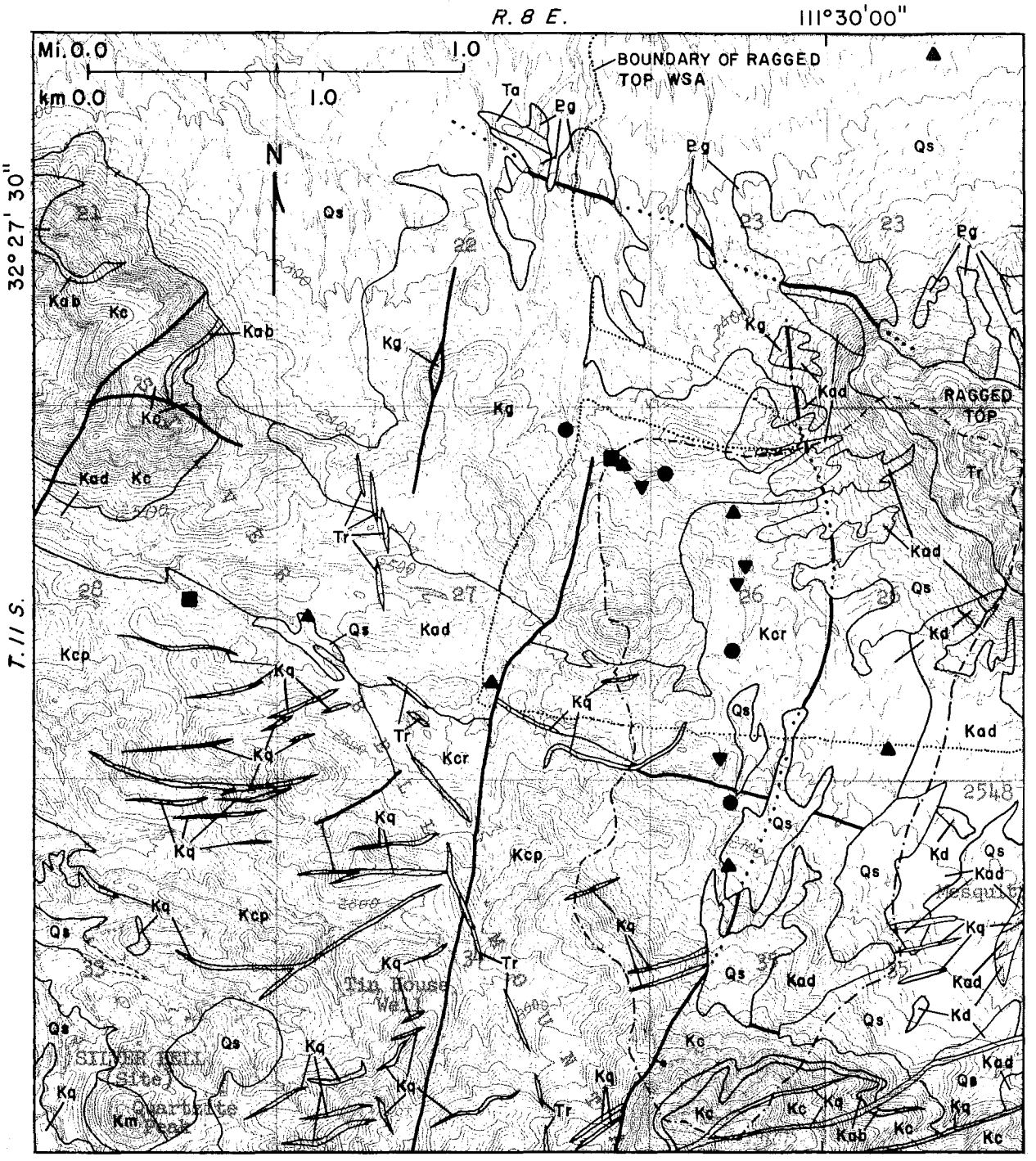


MAP LEGEND

| | | |
|---|---|---|
| Qs | Surficial deposits (Quaternary) | |
| Tr | Ragged Top rhyolite (Tertiary) | |
| Ta | Andesite intrusive (Tertiary) | |
| Kq | Quartz monzonite porphyry | (Cretaceous) |
| Kg | Granodiorite porphyry | (Cretaceous) |
| Kc | Cat Mountain Tuff | (Cretaceous) |
| Kab | Andesite breccia | (Cretaceous) |
| Kad | Silver Bell andesite/dacite | (Cretaceous) |
| Kd | Silver Bell dacite (domes) | (Cretaceous) |
| Kcr | Claflin Ranch formation | (Cretaceous) |
| Kcp | Confidence Peak Tuff | (Cretaceous) |
| Km | Megabreccia | (Cretaceous) |
| Pg | Granite (Proterozoic) | |

| Au (ppm) | |
|---|---|
| ■ | 10 - 150 |
| ▲ | 1.0 - 9.9 |
| ▼ | 0.10 - 0.99 |
| ● | 0.05 - 0.099 |

*Figure 1. Geologic map of the central Silver Bell Mountains (modified from D. Sawyer, 1987, and unpublished map) showing locations and gold concentrations of panned heavy-mineral concentrates (data from McHugh and others, 1988, and D. Sawyer, unpublished). The dash-dot line encloses the drainage basin that is the source for stream sediments at the 150-ppm-gold sample locality. The El Tiro pit is just south of the lower left part of the map area, and some of the area designated Qs in the southwestern corner of the map includes mine-dump material. The northeastern part of the map area is within the Ragged Top WSA.*