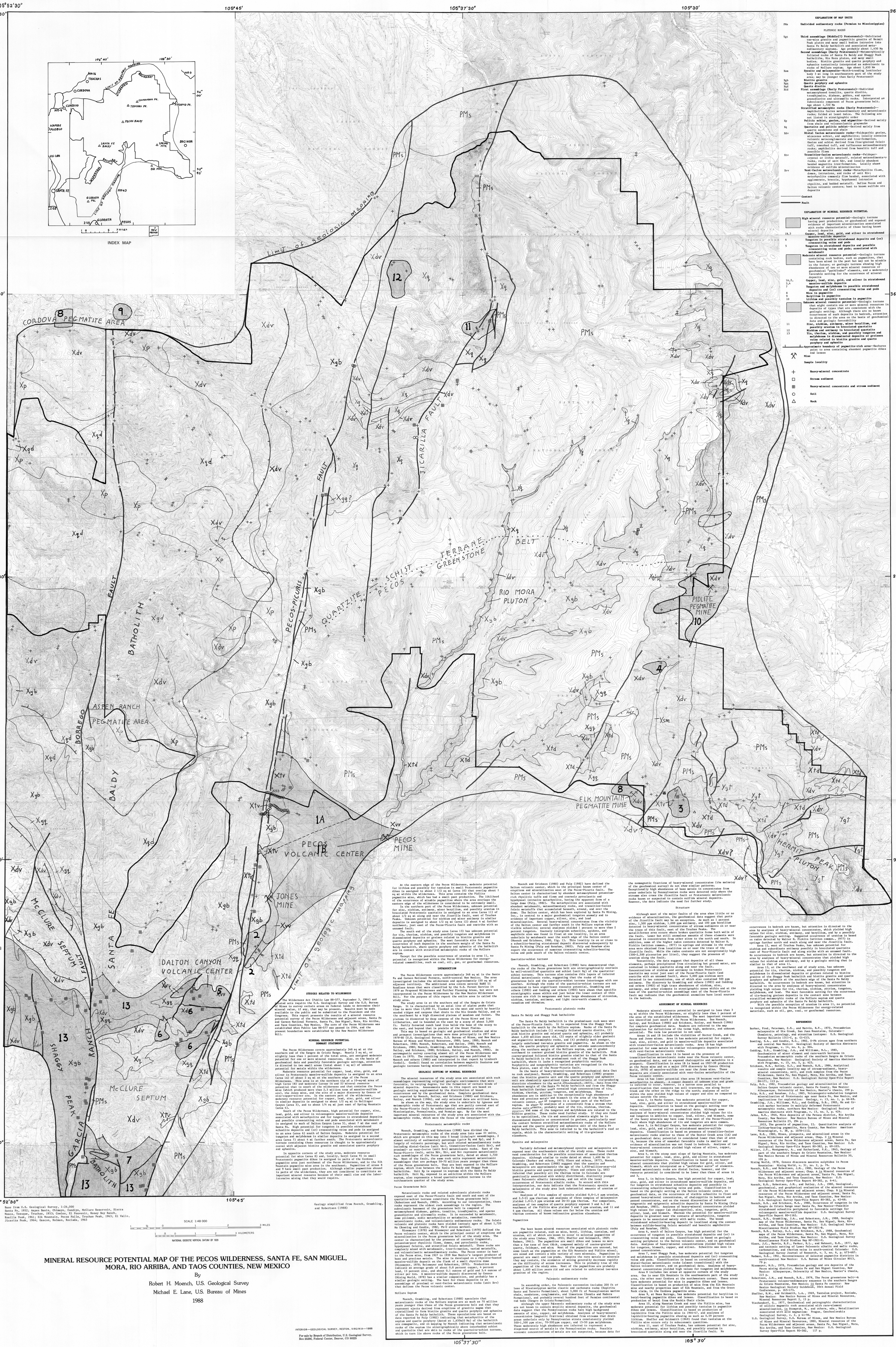

EXPLANATION OF MAP UNITS

PMs **Undivided sedimentary rocks (Permian to Mississippian)**

PLUTONIC ROCKS

Ygt **Third assemblage (Middle(?) Proterozoic)**—Unfoliated two-mica granite and pegmatitic granite of Hermit Peak pluton and many small bodies intrusive into Santa Fe Baldy batholith and associated metasedimentary septums. Age probably about 1,450 Ma

Second assemblage (Early Proterozoic)—Metamorphically foliated rocks of Santa Fe Baldy and Shaggy Peak batholiths, Rio Mora pluton, and many small bodies. Biotite granite and quartz porphyry and aphanite tentatively interpreted as subvolcanic to rocks of McClure septum. Age about 1,650 Ma

Xsm **Syenite and melasyenite**—North-trending lenticular body 3 mi long in southeastern part of the study area; may be younger than Early Proterozoic

Xgb **Biotite granite**

Xgq **Quartz porphyry and aphanite**

Xqd **Quartz diorite**

Xtd **First assemblage (Early Proterozoic)**—Undivided metamorphosed tonalite, quartz diorite, trondhjemite, diabase, gabbro, and sparse granodiorite and ultramafic rocks. Interpreted as subvolcanic component of Pecos greenstone belt. Age about 1,720 Ma

Stratified metamorphic rocks (Early Proterozoic)—Amphibolite facies metasedimentary and metavolcanic rocks; folded at least twice. The following are not listed in stratigraphic order

Xp **Pelitic schist, gneiss, and migmatite**—Derived mainly from shale and volcanoclastic graywacke

Xq **Quartzite and pelitic schist**—Derived mainly from quartz sandstone and shale

Xdv **Distal facies metavolcanic rocks**—Feldspathic gneiss, micaceous schist, and amphibolite; locally contains volcanic metaconglomerate and iron-formation. Gneiss and schist derived from fine-grained felsic tuff, reworked tuff, and tuffaceous metasedimentary rocks; amphibolite derived from basaltic tuff and possible flows

Xtv **Transition-facies metavolcanic rocks**—Feldspar-crystal or lithic metatuff, related metasedimentary rocks, rocks of unit Xdv, and locally abundant banded magnetite iron-formation. Locally shows evidence of sulfide mineralization

Xvv **Vent-facies metavolcanic rocks**—Metarhyolite flows, domes, intrusions, and rocks of unit Xtv; metarhyolite commonly flow banded, associated with agglomerate, breccia, hypabyssal intrusive rhyolite, and bedded metatuff. Define Pecos and Dalton volcanic centers; host to known sulfide ore deposits

Contact

Fault

EXPLANATION OF MINERAL RESOURCE POTENTIAL

High mineral resource potential—Geologic terrane having past production, or geochemical and exposed evidence of important mineralization associated with rocks characteristic of those having known mineral deposits

1B,5 **Copper, lead, zinc, gold, and silver in stratabound massive-sulfide deposits**

6 **Tungsten in possible stratabound deposits and (or) crosscutting veins and pods**

5 **Tungsten in stratabound deposits and possible crosscutting veins and pods; associated with metabasalt**

Moderate mineral resource potential—Geologic terrane containing rock bodies, such as pegmatites, that have been mined in the past but may not be minable in the future; or geologic terrane showing high abundances of two or more mineral resources or geochemical "pathfinder" elements, and a moderately favorable setting for the occurrence of mineral deposits

1A,2, 3,4 **Copper, lead, zinc, gold, and silver in stratabound massive-sulfide deposits**

7 **Tungsten and molybdenum in possible stratabound deposits and (or) crosscutting veins and pods**

8 **Mica in pegmatite**

9 **Beryllium in pegmatite**

10 **Lithium and possibly tantalum in pegmatite**

Unknown mineral resource potential—Geologic terrane that might contain one or more mineral resources in deposits of types that are consistent with the geologic setting. Although there are no known occurrences of such deposits in bedrock, attention is directed to the area on the basis of geochemical data and geologic favorability

11 **Zinc, niobium, antimony, minor beryllium, and possibly uranium in brecciated quartzite**

12 **Niobium and antimony in brecciated quartzite**

13 **Tin, thorium, niobium, and possibly tungsten and molybdenum in disseminated deposits or greisen veins related to biotite granite and quartz porphyry and aphanite**

Approximate boundary of pegmatite-rich area—Hachures point to area containing abundant pegmatite dikes and lenses

Mine

Sample locality

Heavy-mineral concentrate

Stream sediment

Heavy-mineral concentrate and stream sediment

Soil

Rock

MINERAL RESOURCE POTENTIAL MAP OF THE PECOS WILDERNESS, SANTA FE, SAN MIGUEL, MORA, RIO ARRIBA, AND TAOS COUNTIES, NEW MEXICO

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1988

At the eastern edge of the Pecos Wilderness, moderate potential for lithium and possibly for tantalum in small Proterozoic pegmatite dikes is assigned to about 2 1/2 sq mi (area 10) that overlap about 1 sq mi within the wilderness. This area contains the Pidlite pegmatite mine, which has had a small past production. The likelihood of the occurrence of minable pegmatites where the area overlaps the eastern edge of the wilderness is considered to be extremely small.

In the northern part of the Pecos Wilderness, unknown potential for zinc, niobium, antimony, minor beryllium, and possibly uranium in brecciated Proterozoic quartzite is assigned to an area (area 11) of about 1/2 sq mi along and near the Jicarilla fault, east of Truchas Peaks. Unknown potential for niobium and minor antimony in similar deposits is assigned to about 1/2 sq mi (area 12) about 4 mi farther northwest, just east of the Pecos-Picuris fault and omstrike with an unnamed fault.

The south end of the study area (area 13) has unknown potential for tin, thorium, niobium, and possibly tungsten and molybdenum in disseminated deposits or greisen related to biotite granite and quartz porphyry and aphanite. The most favorable site for the occurrence of such deposits is the southern margin of the Santa Fe Baldy batholith, where quartz porphyry and aphanite of the batholith are in contact with stratified metamorphic rocks of the McClure septum.

Except for the possible occurrence of uranium in area 11, no potential is recognized within the Pecos Wilderness for energy-related commodities, such as coal, oil, gas, or geothermal resources.

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 value, if any, that may be present. 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 Pecos Wilderness and adjacent areas, Santa Fe and Carson National Forests, Santa Fe, San Miguel, Mora, Rio Arriba, and Taos Counties, New Mexico. The core of the Pecos Wilderness was established when Public Law 88-577 was passed in 1964, and the present boundaries were established by the New Mexico Wilderness Bill.

MINERAL RESOURCE POTENTIAL SUMMARY STATEMENT

The Pecos Wilderness covers approximately 348 sq mi at the southern end of the Sangre de Cristo Range. Nearly 3 sq mi, or slightly less than 1 percent of the total area, are assigned moderate potential for one or more mineral resources. Also, on the basis of geochemical data and possibly favorable geologic settings, attention is directed to two small areas (total about 1 sq mi) of unknown potential for metals within the wilderness.

Moderate resource potential for copper, lead, zinc, gold, and silver in Proterozoic massive-sulfide deposits is assigned to an area (area 1A) of about 2 sq mi at the southern edge of the Pecos Wilderness. This area is at the northern tip of a 10-sq-mi area of high (area 1B) and moderate (areas 1A and 2) mineral resource potential that is south of the wilderness and that contains the Pecos mine (with more than 2.3 million tons of massive-sulfide ore), the Jones mine, and the site of a major discovery by Conoco of zinc-copper-silver ore. In the eastern part of the wilderness, moderate resource potential for copper, lead, zinc, gold, and silver in similar deposits is assigned to about 1/2 sq mi in Hollinger Canyon (area 3), and to about 1/4 sq mi just east of Spring Mountain (area 4).

South of the Pecos Wilderness, high potential for copper, zinc, lead, gold, and silver in volcanogenic massive-sulfide deposits associated with metarhyolite and for tungsten in stratabound deposits and possible crosscutting veins and pods associated with metabasalt is assigned to much of Dalton Canyon (area 5), about 7 mi due east of Santa Fe. High potential for tungsten in possible stratabound scheelite deposits and (or) crosscutting veins and pods is assigned to an area (area 6) south of Dalton Canyon. Moderate potential for tungsten and molybdenum in similar deposits is assigned to a second area (area 7) about 4 mi farther south. The Proterozoic metavolcanic terrane continuing these resources is thought to be approximately coeval with adjacent biotite granite and associated quartz porphyry and aphanite.

In opposite corners of the study area, moderate resource potential for mica (area 8) and, locally, beryl (area 9) in small Proterozoic pegmatite dikes is assigned to parts of the Cordova pegmatite area just northwest of the Pecos Wilderness, and to the Elk Mountain pegmatite mine area in the southeast. Pegmatites of areas 8 and 9 have small past production. Although pegmatites abound in parts of the wilderness, they are not considered to constitute an important mineral resource because of their small size and the labor-intensive mining that they would require.

Moench and Erickson (1980) and Fulp (1982) have defined the Dalton volcanic center, which is the principal known center of eruptions and mineralization west of the Pecos-Picuris fault. The Dalton center is characterized by abundant metamorphosed potassium-rich rhyolitic tuffs and flows and coarsely pyroclastic and hypabyssal intrusive metarhyolite, having the apparent form of a large dome (Fulp, 1982). The metarhyolites are associated with abundant metabasalt, metasedimentary rocks, and transition-facies felsic metatuffs that accumulated beneath, around, and over the dome. The Dalton center, which has been explored by Santa Fe Mining, Inc., is central to a major geochemical tungsten anomaly and to evidence of important copper, silver, zinc, and lead mineralization. Several heavy-mineral concentrates from the vicinity of the Dalton center and farther south in the McClure septum show visible scheelite; several analyses yielded 1 percent to more than 2 percent tungsten. Coarsely intergrown scheelite, epidote, and amphibole also was found in float at one locality, in an area underlain by metabasalt near the south edge of the Dalton center (Moench and Erickson, 1980, fig. 1). This locality is on or close to a scheelite-bearing stratabound deposit discovered subsequently by Santa Fe Mining (Fulp and Renshaw, 1985). Fulp and Renshaw also report the occurrence of numerous crosscutting scheelite-bearing veins and pods south of the Dalton volcanic center.

Quartzite-schist terrane

Moench, Grambling, and Robertson (1988) have demonstrated that the rocks of the Pecos greenstone belt are stratigraphically overlain by well-stratified quartzite and schist (unit Xq) of the quartzite-schist terrane. This terrane also contains layers of inferred distal metavolcanic rocks, suggesting that the rocks of the greenstone belt and the quartzite-schist terrane intertongue with one another. Although the rocks of the quartzite-schist terrane are not considered to have significant resource potential, Grambling and others (1983) and Codding and others (1983) have shown that specific stratigraphic zones within and just below the lower contact of this terrane are rich in manganese and have large abundances of zirconium, niobium, tantalum, antimony, and light rare-earth elements, or vanadium and chromium.

Proterozoic plutonic rocks

Santa Fe Baldy and Shaggy Peak batholiths

The Santa Fe Baldy batholith is the predominant rock mass west of the Pecos-Picuris fault. It is separated from the Shaggy Peak batholith to the south by the McClure septum. Rocks of the Santa Fe Baldy batholith include (1) strongly foliated quartz diorite, (2) pink biotite granite and related quartz and aphanite, all probably about 1,650 million years old, (3) septa of slightly older gneissic and migmatitic metamorphic rocks, and (4) probably much younger, largely undeformed biotite granite and pegmatite. As shown on the map, the quartz porphyry and aphanite unit extends semiconcordantly along the northern margin of the McClure septum, and it grades northward to coarser grained biotite granite of the batholith. Pink coarse-grained foliated biotite granite similar to that of the Santa Fe Baldy batholith is the predominant rock exposed in the Shaggy Peak batholith. Pink to white, fine-grained, nonporphyritic varieties are recognized in the Rio Mora pluton, east of the Pecos-Picuris fault.

On the basis of heavy-mineral-concentrate geochemical data (but no rock analyses), Moench, Grambling, and Robertson (1988) propose that the biotite granite unit and the quartz porphyry and aphanite unit are chemically specialized types characteristic of tin-producing districts elsewhere in the world (Taubeneck, 1972). Data from the southern margin of the Santa Fe Baldy batholith and from the Shaggy Peak batholith further suggest relatively high concentrations of tin, niobium, thorium, yttrium, tungsten, and molybdenum. These abundances are in addition to the previously noted high abundances of base and precious metals and bismuth in the area of the Dalton volcanic center, and of tungsten in a larger part of the McClure septum. As shown by analyses of a concentrate from a stream that drains only rocks of the Santa Fe Baldy batholith, probably most of the tin, niobium, thorium, yttrium, and some of the tungsten and molybdenum are related to the biotite granite. These rocks need further study. If they are found to be specialized, the tin and associated elements might be in disseminated deposits or concentrated in greisen, particularly near the contact between stratified metasedimentary rocks of the McClure septum and the quartz porphyry and aphanite unit of the Santa Fe Baldy batholith. This zone is inferred to be the batholith's roof or cupola, which is the characteristic setting of tin-greisens elsewhere.

Syenite and melasyenite

Variably deformed and metamorphosed syenite and melasyenite are exposed near the southeastern side of the study area. These rocks have been considered to be part of a complex of associated thorium deposits. Although similar to rocks dated at about 1,400 Ma in Colorado (Barker and others, 1970; Olson and others, 1977), Moench, Grambling, and Robertson (1988) suggest that the syenite and melasyenite are approximately the age of the 1,650-million-year-old biotite granite and quartz porphyry and aphanite and others (p. 685) inferred that possibly all the thorium veins in Colorado are genetically associated with widely distributed, distinctly younger Lower Paleozoic alkalic intrusions, and not with the local occurrences of Proterozoic alkalic rocks. In accord with this interpretation, our data indicate that the Proterozoic syenite and melasyenite of the study area lack substantial amounts of uranium or thorium.

Analyses of five samples of syenite yielded 0.8-1.4 ppm uranium, and 2.5-21 ppm thorium; and analyses of three samples of melasyenite yielded 1.0-2.3 ppm uranium and 24-33 ppm thorium. For comparison, analyses of two samples of quartz porphyry exposed 3 and 4.5 mi southwest of the Pidlite mine yielded 3 and 3 ppm uranium, and 11 and 4 ppm thorium. All these values are far below the uranium and thorium contents of known radioactive granites elsewhere.

Pegmatites

The best known mineral resources associated with plutonic rocks are pegmatites related, such as mica, beryl, lithium, and tantalum, and uranium, all of which are known to occur in selected pegmatites of the study area (Lahee, 1961, 1953; Sheffer and Goldsmith, 1969; Redmon, 1961). The pegmatites are small dikes and lenses no more than a few tens of feet thick, composed mainly of coarse-grained quartz, feldspar, and mica. Most of the pegmatites are unzoned, but some (such as the pegmatites at the Elk Mountain and Pidlite mines), are zoned and contain a wide variety of rare minerals. Pegmatites in general are small and low grade. Despite the rare metals or minerals they may contain, the economics of mining generally decrease rapidly as the difficulty of extraction and process increases. This is probably true of the pegmatites of the study area. Most of the pegmatites are probably about 1,400 million years old and are related to unfoliated two-mica granites of the region.

Paleozoic sedimentary rocks

In ascending order, the Paleozoic succession includes 200 ft or less of Mississippian marine clastic and carbonate rocks (Espiritu Santo and Tererro Formations), about 3,000 ft of Pennsylvanian marine shale, sandstone, conglomerate, and limestone (Sangre de Cristo Formation), and probably several hundred feet of Permian continental red beds (Sangre de Cristo Formation).

Although the upper Paleozoic sedimentary rocks of the study area are not known to contain metallic mineral deposits, the geochemical data suggest that the Pennsylvanian rocks have high background amounts of zinc, copper, and molybdenum. Analyses of heavy-mineral concentrates (magnetic fractions) obtained from streams that drain areas underlain only by Pennsylvanian strata consistently yielded 500-1,500 ppm zinc, 70-300 ppm copper, and 15-50 ppm molybdenum. These moderately high abundances are inferred to represent a dispersed source of metals in the Pennsylvanian rocks. Possible economic concentrations of metals are not suspected, because data for the nonmagnetic fractions of heavy-mineral concentrates (the mainstay of the geochemical survey) do not show similar patterns. Exceptionally high abundances of base metals in concentrates from areas underlain by Pennsylvanian rocks were detected only where the streams also cross the Jicarilla fault or Proterozoic metavolcanic rocks known or suspected to contain sulfide mineral deposits. However, the data indicate the need for further study.

Structure

Although most of the major faults of the area show little or no evidence of mineralization, the geochemical data suggest that parts of the Jicarilla fault may be an exception. As much as 1 percent zinc, 1,500 ppm niobium, 1,000 ppm antimony, and 100 ppm beryllium detected in heavy-mineral concentrates of stream sediments on or near the trace of this fault, east of the Truchas Peaks. The metalliferous area occurs where broken quartzite forms both walls of the fault. Lower but still anomalous amounts of these elements were detected in concentrates from other sites to the north and south. In addition, some of the higher radon contents detected by Walter H. Ficklin (written commun., 1977) in springs and streams in the study area were obtained from localities on or near the trace of the Jicarilla fault. While the radon contents are not exceptionally high (500-2,500 picocuries per liter), they suggest the presence of uranium along the fault.

Tentatively, the data suggest that deposits of all these elements, perhaps precipitated from circulating hot ground water, are contained in broken quartzite along and near the fault. Concentrations of niobium and antimony in broken Proterozoic quartzite may occur just east of the Pecos-Picuris fault (and omstrike with an unnamed fault), where 5,000 ppm niobium were detected in two concentrates, one of which also contained 500 ppm antimony. The discovery by Grambling and others (1983) and Codding and others (1983) of high trace abundances of niobium, zinc, antimony, and other elements in stratigraphic zones within and at the base of the quartzite-schist assemblage east of the Pecos-Picuris fault may indicate that the geochemical anomalies have local sources in the bedrock.

ASSESSMENT OF MINERAL RESOURCES

Moderate mineral resource potential is assigned to less than 3 sq mi within the Pecos Wilderness, or slightly less than 1 percent of the area of the established wilderness. The most important resources are identified just south of the Pecos Wilderness. See Moench, Sutley, and Erickson (1988) and Erickson, Sutley, and Moench (1986) for complete geochemical data. Readers are referred to the map explanation for definitions of the terms high, moderate, and unknown potential. The term low potential is not used.

Areas 1A and 1B include the vicinities of Doctor Creek, and the Pecos and Jones mines. Area 1A has moderate potential for copper, lead, zinc, silver, and gold in massive-sulfide deposits associated with transition-facies metavolcanic rocks. Area 1B has high potential for same metals in similar volcanogenic deposits associated with vent-facies metavolcanic rocks.

Classification in area 1A is based on the presence of transition-facies metavolcanic rocks near the Pecos volcanic center, on geochemical data, and on exposed chalcopyrite and malachite in a prospect. Classification in area 1B is based on 1927-39 production at the Pecos mine and on a major 1978 discovery by Conoco (Mining World, 1978) of massive-sulfide ore near the Jones mine. These deposits are closely associated with vent-facies metarhyolite of the Pecos volcanic center.

Area 1A has lower potential than area 1B because vent-facies metarhyolite is absent. A copper deposit of unknown size and grade is inferred to occur, however, in a narrow zone parallel to stratification that connects two soil traverses, one along Doctor Creek and the other on the ridge to the north; analyses of soils within the zone yielded high values of copper and zinc as compared to values outside the area.

Area 2, in Macho Canyon, has moderate potential for copper, lead, zinc, gold, and silver in stratabound massive-sulfide deposits. Classification is based on presence near the Pecos volcanic center and on geochemical data. Although some analyses of heavy-mineral concentrates yielded high values for tin and tungsten in addition to copper, lead, silver, and bismuth, some of the heavy minerals may have come from west of the Pecos-Picuris fault where high abundances of tin and tungsten are more common.

Area 3, in Hollinger Canyon, has moderate potential for copper, lead, zinc, gold, and silver in stratabound massive-sulfide deposits. Classification is based on presence of transition-facies metavolcanic rocks similar to those of the Doctor Creek area (1A) and on geochemical data; potential is considered lower than that of area 1A, because the area of somewhat favorable rocks is smaller and evidence of mineralization was not found in bedrock. Analyses of two heavy-mineral concentrates yielded high values of silver, copper, zinc, and bismuth.

Area 4, on the steep east slope of Spring Mountain, has moderate potential for copper, lead, zinc, gold, and silver in stratabound massive-sulfide deposits. Classification is based on one heavy-mineral concentrate that yielded high values for gold, silver, and bismuth, which are interpreted as a "pathfinder suite" of elements. Exposed metavolcanic rocks are distal facies, however, and the resource potential is considered to be lower than those of areas 1A and 3.

Area 5, in Dalton Canyon, has high potential for copper, lead, zinc, gold, and silver in stratabound massive-sulfide deposits, and for tungsten in stratabound scheelite deposits and possibly in crosscutting scheelite-bearing veins and pods. Classification is based on the geologic setting at the Dalton volcanic center, on geochemical data, on the occurrence of visible scheelite in float and panned heavy-mineral concentrates, of chalcopyrite in bedrock and panned concentrates, and on the recent discovery of stratabound syngenetic and epigenetic scheelite deposits by Santa Fe Mining (Fulp and Renshaw, 1985). Analyses of heavy-mineral concentrates yielded high values for copper (as chalcopyrite), zinc, tungsten, gold, silver, lead, and bismuth. Whereas the potential for massive-sulfide deposits is greatest near the contacts of metavolcanic rocks, it appears to be associated mainly with mafic rocks. The known stratabound scheelite-bearing deposit is located along the contact between sulfide-bearing felsic metatuff and basaltic amphibolite (Fulp and Renshaw, 1985).

Area 6, south of Dalton Canyon, has high potential for the occurrence of tungsten in possible stratabound deposits and (or) in crosscutting veins and pods. Classification is based on geologic setting peripheral to the Dalton volcanic center, and on geochemical data. Analyses of heavy-mineral concentrations yielded high values for tungsten, bismuth, copper, and silver. Scheelite was seen in panned concentrates.

Area 7, near Shaggy Peak, has moderate potential for tungsten and molybdenum in possible stratabound deposits and (or) crosscutting veins and pods. Classification is based on proximity to the distal-facies metavolcanic rocks (almost transitional) with the Dalton volcanic center, and on geochemical data. Analyses of heavy-mineral concentrates yielded high values for tungsten and molybdenum.

Area 8 includes two areas at opposite corners of the study area. One is near Elk Mountain in the southeastern part of the study area, the other near Cordova at the northwestern corner. These areas have moderate potential for mica in pegmatite dikes and lenses. Classification is based on production of mica from the Elk Mountain mine and nearby properties east of Elk Mountain, and from the Green Rock claim, in the Cordova pegmatite area.

Area 9, at Mesa Borrego, has moderate potential for beryllium in beryl-bearing pegmatite dikes and lenses. Classification is based on production of beryl from the Rock-in Chair claim.

Area 10, along Maestas Creek and near the Pidlite mine, has moderate potential for lithium and possibly tantalum in pegmatite dikes and lenses. Classification is based on production of lepidolite from the Pidlite mine in 1946-47, and analyses of lepidolite-bearing pegmatite showing as much as 0.59 percent lithium. Sheffer and Goldsmith (1969) found that tantalum at the Pidlite mine occurs only in subeconomic quantites.

Area 11, east of Truchas Peaks, has unknown potential for zinc, niobium, antimony, minor beryllium, and possibly uranium in brecciated quartzite along and near the Jicarilla fault. No occurrences in bedrock are known, but attention is directed to the area by analyses of heavy-mineral concentrates, which yielded high values for zinc, niobium, antimony, and beryllium, and by a possibly favorable geologic setting. Suggested occurrence of uranium is based on radon detected by Walter H. Ficklin (written commun., 1977) in springs farther north and south along and near the Jicarilla fault.

Area 12, west of Truchas Peaks, has unknown potential for niobium and subordinate antimony possibly in brecciated quartzite east of Peco-Picuris fault and along strike with an unnamed fault. No occurrences in bedrock are known, but attention is directed to the area by analyses of heavy-mineral concentrates that yielded high values for niobium and antimony, and by a geologic setting that is similar to that of area 11.

Area 13, at the southwest end of study area, has unknown potential for tin, thorium, niobium, and possibly tungsten and molybdenum in disseminated deposits or greisen related to biotite granite of the Shaggy Peak batholith and biotite granite and quartz porphyry and aphanite at the southern edge of the Santa Fe Baldy batholith. No occurrences in bedrock are known, but attention is directed to the area by analyses of heavy-mineral concentrates yielding high values for tin, thorium, niobium, yttrium, tungsten, molybdenum, and lead. The most favorable setting for the occurrence of tin-bearing greisen deposits is the contact zone between stratified metamorphic rocks of the McClure septum and quartz porphyry and aphanite of the Santa Fe Baldy batholith.

With the possible exception of uranium in area 11, no potential is recognized within the Pecos Wilderness for energy-related materials, such as oil, gas, coal, or geothermal resources.

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INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1988

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