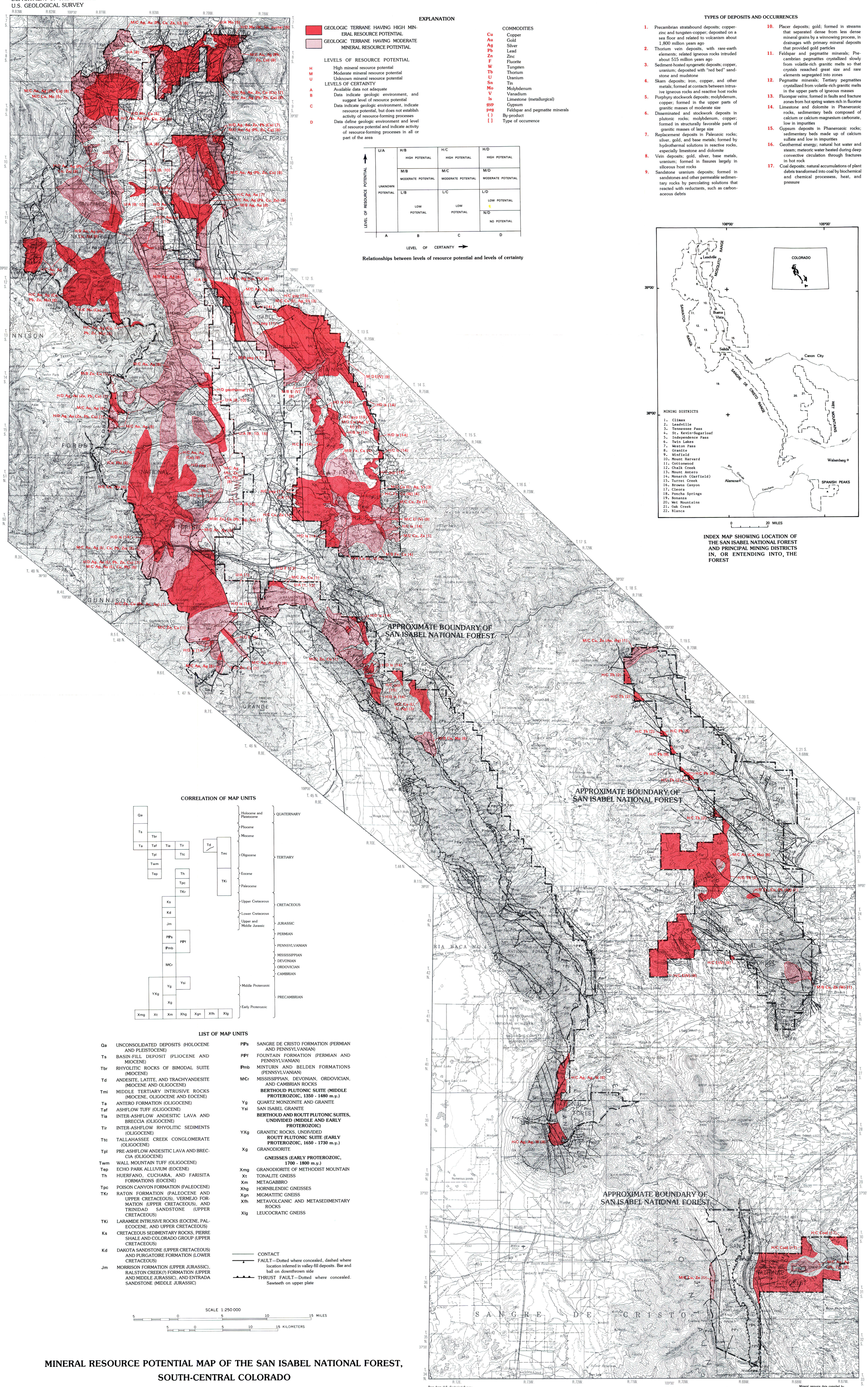

EXPLANATION

GEOLOGIC TERRANE HAVING HIGH MINERAL RESOURCE POTENTIAL

GEOLOGIC TERRANE HAVING MODERATE MINERAL RESOURCE POTENTIAL

LEVELS OF RESOURCE POTENTIAL

- H — High mineral resource potential
- M — Moderate mineral resource potential
- U — Unknown mineral resource potential

LEVELS OF CERTAINTY

- A — Available data not adaquate
- B — Data indicate geologic environment, and suggest level of resource potential
- C — Data indicate geologic environment, indicate resource potential, but does not establish activity of resource-forming processes
- D — Data define geologic environment and level of resource potential and indicate activity of resource-forming processes in all or part of the area

COMMODITIES

- Cu — Copper
- Au — Gold
- Ag — Silver
- Pb — Lead
- Zn — Zinc
- F — Fluorite
- W — Tungsten
- Tb — Thorium
- U — Uranium
- Sn — Tin
- Mo — Molybdenum
- V — Vanadium
- ls — Limestone (metallurgical)
- gyp — Gypsum
- peg — Feldspar and pegmatite minerals
- ( ) — By-product
- [ ] — Type of occurrence

LEVEL OF RESOURCE POTENTIAL	A	B	C	D
	U/A	H/B HIGH POTENTIAL	H/C HIGH POTENTIAL	H/D HIGH POTENTIAL
	UNKNOWN POTENTIAL	M/B MODERATE POTENTIAL	M/C MODERATE POTENTIAL	M/D MODERATE POTENTIAL
		L/B LOW POTENTIAL	L/C LOW POTENTIAL	L/D LOW POTENTIAL
				N/D NO POTENTIAL

LEVEL OF CERTAINTY →

Relationships between levels of resource potential and levels of certainty

TYPES OF DEPOSITS AND OCCURRENCES

1. Precambrian stratabound deposits; copper-zinc and tungsten-copper; deposited on a sea floor and related to volcanism about 1,800 million years ago
2. Thorium vein deposits, with rare-earth elements; related igneous rocks intruded about 515 million years ago
3. Sediment-hosted syngenetic deposits; copper, uranium; deposited with "red bed" sandstone and mudstone
4. Skarn deposits; iron, copper, and other metals; formed at contacts between intrusive igneous rocks and reactive host rocks
5. Porphyry stockwork deposits; molybdenum, copper; formed in the upper parts of granitic masses of moderate size
6. Disseminated and stockwork deposits in plutonic rocks; molybdenum, copper; formed in structurally favorable parts of granitic masses of large size
7. Replacement deposits in Paleozoic rocks; silver, gold, and base metals; formed by hydrothermal solutions in reactive rocks, especially limestone and dolomite
8. Vein deposits; gold, silver, base metals, uranium; formed in fissures largely in siliceous host rocks
9. Sandstone uranium deposits; formed in sandstones and other permeable sedimentary rocks by percolating solutions that reacted with reductants, such as carbonaceous debris
10. Placer deposits; gold; formed in streams that separated dense from less dense mineral grains by a winnowing process, in drainages with primary mineral deposits that provided gold particles
11. Feldspar and pegmatite minerals; Precambrian pegmatites crystallized slowly from volatile-rich granitic melts so that crystals reaached great size and rare elements segregated into zones
12. Pegmatite minerals; Tertiary pegmatites crystallized from volatile-rich granitic melts in the upper parts of igneous masses
13. Fluorspar veins; formed in faults and fracture zones from hot spring waters rich in fluorine
14. Limestone and dolomite in Phanerozoic rocks, sedimentary beds composed of calcium or calcium-magnesium carbonate, low in impurities
15. Gypsum deposits in Phanerozoic rocks; sedimentary beds made up of calcium sulfate and low in impurities
16. Geothermal energy; natural hot water and steam; meteoric water heated during deep convective circulation through fractures in hot rock
17. Coal deposits; natural accumulations of plant debris transformed into coal by biochemical and chemical processess, heat, and pressure

INDEX MAP SHOWING LOCATION OF THE SAN ISABEL NATIONAL FOREST AND PRINCIPAL MINING DISTRICTS IN, OR ENTENDING INTO, THE FOREST

CORRELATION OF MAP UNITS

Unit	Epoch	Period
Qa	Holocene and Pleistocene	QUATERNARY
Ts	Pliocene	QUATERNARY
Tbr, Taf, Tia, Tir, Tpl, Ttc, Twm, Tep, Td, Tmi	Miocene	QUATERNARY
Ta, Tmi	Oligocene	TERTIARY
Th, Tpc, TKr, TKi	Eocene	TERTIARY
TKi	Paleocene	TERTIARY
Ks, Kd, TKi	Upper Cretaceous	CRETACEOUS
Kd	Lower Cretaceous	CRETACEOUS
Jm	Upper and Middle Jurassic	JURASSIC
PPs		PERMIAN
PPf		PENNSYLVANIAN
Pmb		MISSISSIPPIAN
M€r		DEVONIAN, ORDOVICIAN, CAMBRIAN
Ysi, Yg, YXg	Middle Proterozoic	PRECAMBRIAN
Xg, Xmg, Xt, Xm, Xhg, Xgn, Xfh, Xlg	Early Proterozoic	PRECAMBRIAN

LIST OF MAP UNITS

- Qa — UNCONSOLIDATED DEPOSITS (HOLOCENE AND PLEISTOCENE)
- Ts — BASIN-FILL DEPOSIT (PLIOCENE AND MIOCENE)
- Tbr — RHYOLITIC ROCKS OF BIMODAL SUITE (MIOCENE)
- Td — ANDESITE, LATITE, AND TRACHYANDESITE (MIOCENE AND OLIGOCENE)
- Tmi — MIDDLE TERTIARY INTRUSIVE ROCKS (MIOCENE, OLIGOCENE AND EOCENE)
- Ta — ANTERO FORMATION (OLIGOCENE)
- Taf — ASHFLOW TUFF (OLIGOCENE)
- Tia — INTER-ASHFLOW ANDESITIC LAVA AND BRECCIA (OLIGOCENE)
- Tir — INTER-ASHFLOW RHYOLITIC SEDIMENTS (OLIGOCENE)
- Ttc — TALLAHASSEE CREEK CONGLOMERATE (OLIGOCENE)
- Tpl — PRE-ASHFLOW ANDESITIC LAVA AND BRECCIA (OLIGOCENE)
- Twm — WALL MOUNTAIN TUFF (OLIGOCENE)
- Tep — ECHO PARK ALLUVIUM (EOCENE)
- Th — HUERFANO, CUCHARA, AND FARISITA FORMATIONS (EOCENE)
- Tpc — POISON CANYON FORMATION (PALEOCENE)
- TKr — RATON FORMATION (PALEOCENE AND UPPER CRETACEOUS), VERMEJO FORMATION (UPPER CRETACEOUS), AND TRINIDAD SANDSTONE (UPPER CRETACEOUS)
- TKi — LARAMIDE INTRUSIVE ROCKS (EOCENE, PALEOCENE, AND UPPER CRETACEOUS)
- Ks — CRETACEOUS SEDIMENTARY ROCKS, PIERRE SHALE AND COLORADO GROUP (UPPER CRETACEOUS)
- Kd — DAKOTA SANDSTONE (UPPER CRETACEOUS) AND PURGATOIRE FORMATION (LOWER CRETACEOUS)
- Jm — MORRISON FORMATION (UPPER JURASSIC), RALSTON CREEK(?) FORMATION (UPPER AND MIDDLE JURASSIC), AND ENTRADA SANDSTONE (MIDDLE JURASSIC)
- PPs — SANGRE DE CRISTO FORMATION (PERMIAN AND PENNSYLVANIAN)
- PPf — FOUNTAIN FORMATION (PERMIAN AND PENNSYLVANIAN)
- Pmb — MINTURN AND BELDEN FORMATIONS (PENNSYLVANIAN)
- M€r — MISSISSIPPIAN, DEVONIAN, ORDOVICIAN, AND CAMBRIAN ROCKS

BERTHOUD PLUTONIC SUITE (MIDDLE PROTEROZOIC, 1350 - 1480 m.y.)

- Yg — QUARTZ MONZONITE AND GRANITE
- Ysi — SAN ISABEL GRANITE

BERTHOUD AND ROUTT PLUTONIC SUITES, UNDIVIDED (MIDDLE AND EARLY PROTEROZOIC)

- YXg — GRANITIC ROCKS, UNDIVIDED

ROUTT PLUTONIC SUITE (EARLY PROTEROZOIC, 1650 - 1730 m.y.)

- Xg — GRANODIORITE

GNEISSES (EARLY PROTEROZOIC, 1700 - 1800 m.y.)

- Xmg — GRANODIORITE OF METHODIST MOUNTAIN
- Xt — TONALITE GNEISS
- Xm — METAGABBRO
- Xhg — HORNBLENDIC GNEISSES
- Xgn — MIGMATITIC GNEISS
- Xfh — METAVOLCANIC AND METASEDIMENTARY ROCKS
- Xlg — LEUCOCRATIC GNEISS

CONTACT

FAULT—Dotted where concealed, dashed where location inferred in valley-fill deposits. Bar and ball on downthrown side

THRUST FAULT—Dotted where concealed. Sawteeth on upper plate

MINERAL RESOURCE POTENTIAL MAP OF THE SAN ISABEL NATIONAL FOREST, SOUTH-CENTRAL COLORADO

Base from U.S. Geological Survey Leadville, 1962; Montrose, 1977; Pueblo, 1962; and Trinidad, 1962

Mineral resource data compiled by Richard B. Taylor and Sherman P. Marsh, 1984. Geology compiled by Richard B. Taylor and Rebecca J. Stoneman, 1983-1984