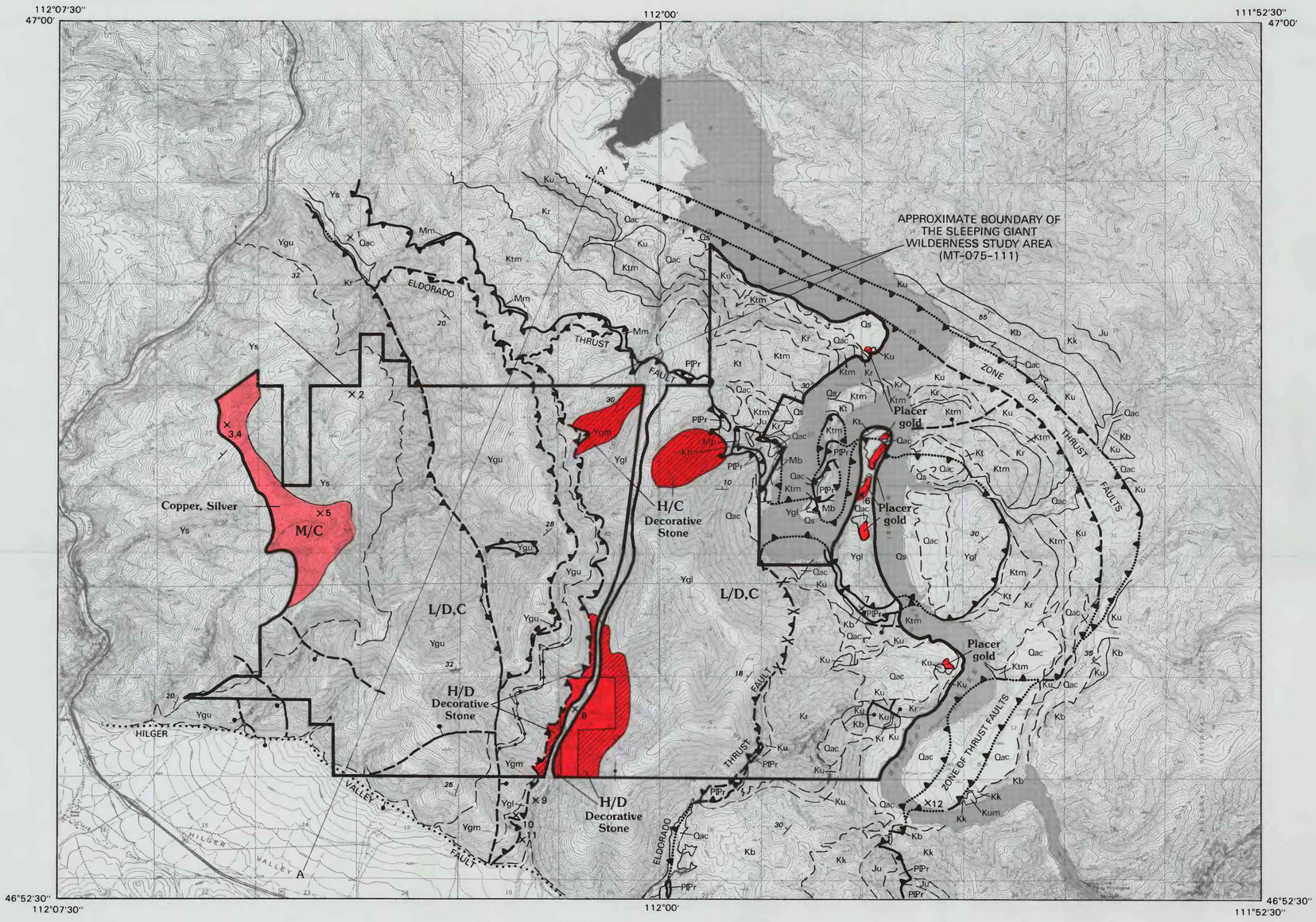
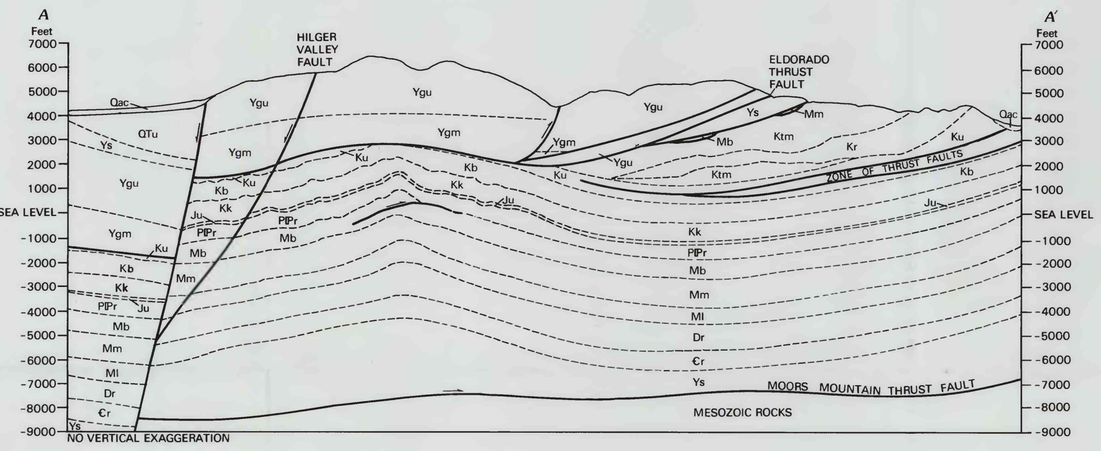
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

BULLETIN 1724-E
PLATE 1





Geologic map, cross section, area of mineral resource potential, mines, prospects, and mineral occurrences in the Sleeping Giant Wilderness Study Area

EXPLANATION

Area of identified resources of decorative stone and placer gold

H/D,C **Geologic terrane having high resource potential for decorative stone (slate) of the Greyson Formation, at certainty levels D and C, as shown**

M/C **Geologic terrane having moderate resource potential for copper and silver in strata-bound deposits of green beds and limestone in Spokane Formation, at certainty level C**

L/D,C **Geologic terrane having low resource potential**—For entire area: phosphate in Spokane Formation, at certainty level D; sapphires in placer deposits, at certainty level D; diatomite, at certainty level D; uranium, at certainty level C; oil and gas, at certainty level C; geothermal resources, at certainty level C; AND, except as shown above, gold in placer deposits, at certainty level D; copper and silver in strata-bound deposits of green beds and limestone in Spokane Formation, at certainty level C; decorative stone (slate), at certainty level C

N/D **Geologic terrane having no resource potential: Not labeled on map**—For entire area: phosphate in Phosphoria Formation, at certainty level D; AND, except as shown above, copper and silver in strata-bound deposits of green beds and limestone, at certainty level D

U/A **Resource ratings for concealed mineral resources: Not labeled on map**—For decorative stone (slate) of the Greyson Formation concealed beneath other strata, at certainty level A

CORRELATION OF MAP UNITS

Qac	Holocene	QUATERNARY
Qs	Pleistocene	
Unconformity		
QTu		TERTIARY
Unconformity		
Kum	Upper Cretaceous	CRETACEOUS
Kt		
Kr		
Ktm		
Ku		
Kb	Lower Cretaceous	
Unconformity		
Kk		
Unconformity		
Ju	Upper and Middle Jurassic	JURASSIC
Unconformity		
PlPr		PERMIAN AND PENNSYLVANIAN
Unconformity		
Mb	Upper Mississippian	MISSISSIPPIAN
Mm		
Ml	Lower Mississippian	
Dr	Upper Devonian	DEVONIAN
Unconformity		
Cr	Upper and Middle Cambrian	CAMBRIAN
Unconformity		
—•—		LATE PROTEROZOIC
Ys		
Ygu		MIDDLE PROTEROZOIC
Ygm		
Ygl		

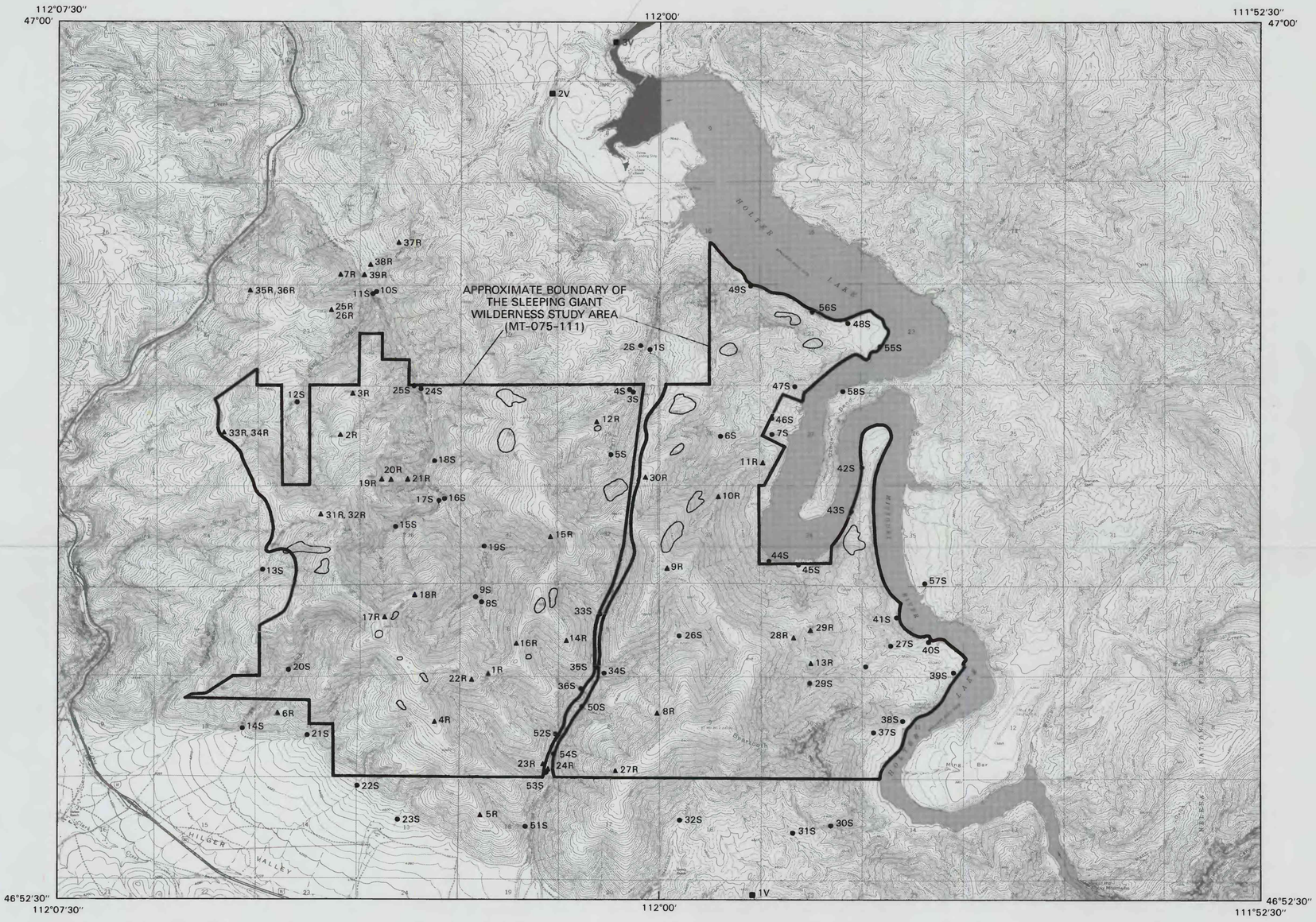
LIST OF MAP UNITS

Qac Surficial deposits (Holocene)
Qs Lake sediments (Pleistocene)
Qtu Basin deposits (Quaternary and Tertiary)
Kum Ultramafic rocks (Late Cretaceous?)
Kt Trachybasalt and syenograbbro (Late Cretaceous)
Kr Rhyodacite (Late Cretaceous)
Ktm Two Medicine Formation (Upper Cretaceous)
Ku Virgelle Sandstone, Telegraph Creek Formation, and Marias River Shale, undivided (Upper Cretaceous)
Kb Blackleaf Formation (Upper and Lower Cretaceous)
Kk Kootenai Formation (Lower Cretaceous)
Ju Morrison Formation (Upper Jurassic) and Ellis Group (Upper and Middle Jurassic), undivided
PlPr Phosphoria Formation (Lower Permian), Quadrant Sandstone, and Amsden Formation (Pennsylvanian), undivided
Mb Big Snowy Group (Upper Mississippian)
Mm Mission Canyon Limestone (Upper and Lower Mississippian)
Ml Lodgepole Limestone (Lower Mississippian)
Dr Three Forks and Jefferson Formations (Upper Devonian), undivided
Cr Pilgrim Limestone (Upper Cambrian), Park Shale (Upper and Middle Cambrian), and Meagher Limestone, Wolsey Shale, and Flathead Sandstone (Middle Cambrian), undivided
—•— Diorite sill (Late Proterozoic)
Ys Spokane Formation (Middle Proterozoic)
Ygu Greyson Formation, upper part (Middle Proterozoic)
Ygm Greyson Formation, middle part (Middle Proterozoic)
Ygl Greyson Formation, lower part (Middle Proterozoic)

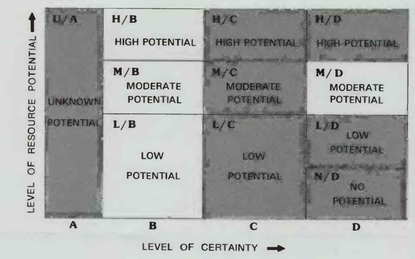
Contact—Dashed where approximately located; dotted where concealed
Fault—Dashed where approximately located; dotted where concealed. Bar and ball on downthrown side
Thrust fault—Dotted where concealed; queried where uncertain. Sawteeth on upper plate
Thrust fault intruded by igneous rocks—Dashed where approximately located. Sawteeth on upper plate
Strike and dip of beds—Inclined
×3 **Prospect, mine, or mineral occurrence**—Locality number corresponds with entry on table 2 and discussion in text

Geochemical sample locality
●2S **Stream-sediment and (or) heavy-mineral concentrate**—Numbers correspond with entries in Malcolm and Carlson (1990)
▲4R **Rock**—Numbers correspond with entries in table 3
■3V **Shale**—Numbers correspond with entries in table 4

Landsat imagery
Area of anomalous limonite. Applies only to sample map



Map showing collection sites for stream-sediment, heavy-mineral concentrate, and rock samples for geochemical analysis; collection sites of samples for vitrinite reflectance analysis; and areas of limonitic alteration detected from satellite imagery



LEVELS OF RESOURCE POTENTIAL

H High mineral resource potential
M Moderate mineral resource potential
L Low mineral resource potential
U Unknown mineral resource potential
N No known mineral resource potential

LEVELS OF CERTAINTY

A Available data not adequate
B Data indicate geologic environment and suggest level of resource potential
C Data indicate geologic environment, give good indication of level of resource potential, but do not establish activity of resource-forming processes
D Data clearly define geologic environment and level of resource potential and indicate activity of resource-forming processes in all or part of the area

Diagram showing relationships between levels of mineral resource potential and levels of certainty. Shading shows levels that apply to this study area

Base from U.S. Geological Survey 1:24,000
Beartooth Mountain and Sheep Creek, 1962

Geology mapped by G.D. Robinson and M.E. McCallum, 1966, and M.W. Reynolds and R.G. Tysdal, 1987

SCALE 1:50 000
1 ½ 0 1 2 3 MILES
1 .5 0 1 2 3 KILOMETERS
CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

MAPS SHOWING THE MINERAL RESOURCE POTENTIAL, GEOLOGY, SAMPLE LOCALITIES, AND LIMONITIC ALTERATION OF THE SLEEPING GIANT WILDERNESS STUDY AREA, LEWIS AND CLARK COUNTY, MONTANA