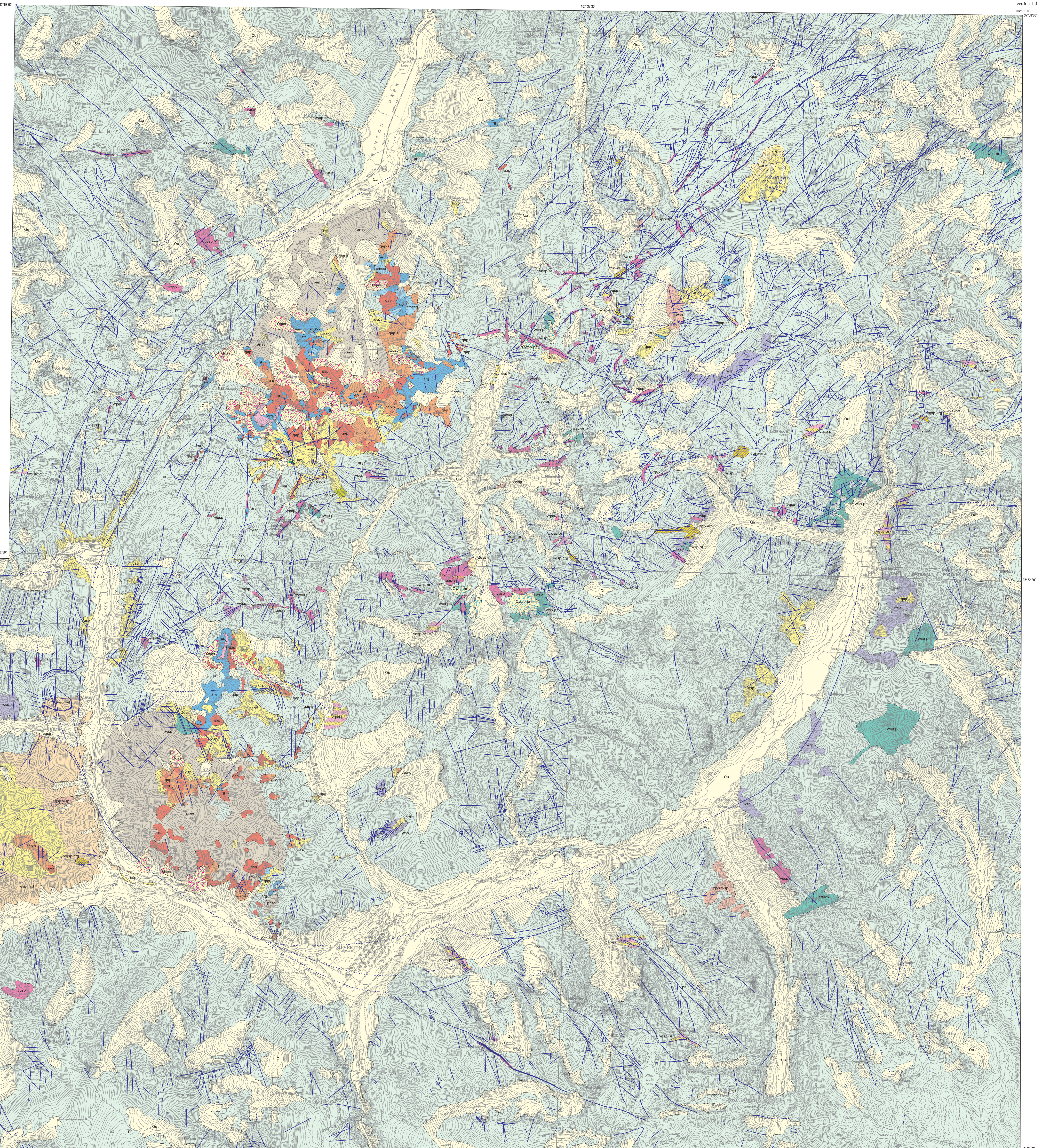


LIST OF ALTERATION UNITS

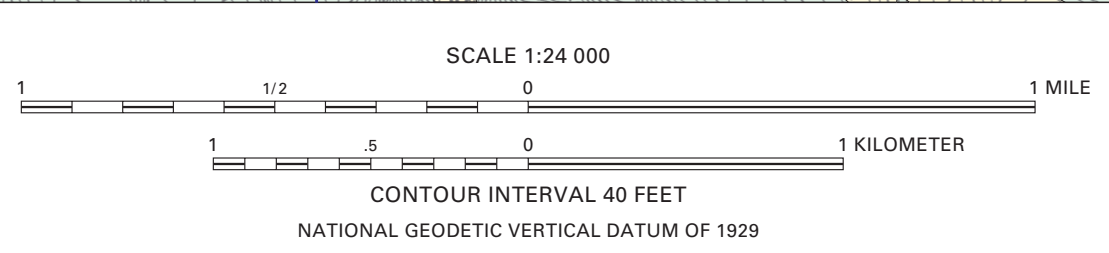
QUATERNARY SURFICIAL DEPOSITS	
Qu	Quaternary units, undivided
Qcas	Coarse talus and landslide deposits with strong spectral signature
Qsp	Predominantly quartz-albite-pyrophyllite (unit Q2) and fewer quartz-sericite-pyrite (unit Q3) altered rocks
Qsp	Chiefly quartz-sericite-pyrite (unit Q3) altered rocks
Qsp-pr	Mix of weak sericite-pyrite (unit wsp) and propylitic (unit pr) altered rocks
BEDROCK	
Vein-related alteration	
vsp	Vein-related zones of quartz-sericite-pyrite (unit Q3) altered rock
vsp-pr	Vein-related zones of quartz-sericite-pyrite (unit Q3) mixed with lesser propylitic (unit pr) altered rock
vsp-pr	Vein-related zones of quartz-sericite-pyrite (unit Q3) mixed or grading into argillite (unit arg) altered zones
vsp-pr	Vein-related zones of weak sericite-pyrite (unit wsp) mixed with propylitic (unit pr) altered rock
vsp-pr	Mixed weak sericite-pyrite (unit wsp) and propylitic (unit pr) altered rock
vsp-pr	Massive pyrite zone
Pervasive alteration	
ws	Weak sericite-pyrite
qs	Quartz-sericite-pyrite
ws-hyd	Mix of weak sericite-pyrite (unit wsp) and hydrothermal propylitic altered rock
qs-wsp	Mix of quartz-sericite-pyrite (unit Q3) and weak sericite-pyrite (unit wsp) altered rocks
qs-pr	Mix of quartz-sericite-pyrite (unit Q3) and propylitic (unit pr) altered rock
Acid sulfate suite	
sl	Sulfidated
qs	Mixed quartz-albite and quartz-albite-pyrophyllite altered rocks
qs-pr	Predominantly mixed quartz-albite and quartz-albite-pyrophyllite altered rocks (unit Q2) mixed with lesser quartz-sericite-pyrite altered rocks (unit Q3)
arg	Argillite
smct	Smectitic
pr	Mixed propylitic (unit pr) and alteration units of acid sulfate suite
pr	Regional propylitic suite
pr	Propylitic
Contact—Long dashed where approximately located, short dashed where concealed or inferred	
Fault or vein—Short dashed where inferred	

BRANTON	HANDELS PEAK
Butbank and Luedke (1964) Bove and others (1994) Lipman (1976)	Luedke and Butbank (1987) Lipman (1976)
SILVERTON	HOWARDSVILLE
Luedke (1984)	Luedke and Butbank (1975a) Lipman (1976)

INDEX MAP TO 7-1/2' TOPOGRAPHIC QUADRANGLES AND MAPPING SOURCES



Base from U.S. Geological Survey, 1965, Handels Peak, Howardsville, Branton, Ophir, and Silverton. Polyconic projection, 1927 North American Datum.



COLORADO
MAP LOCATION

Alteration mapping principally by D.J. Bove 1996-2000, D.B. Yager provided alteration data for parts of Prospect Gulch, Tooke Gulch, and Middle Fork of Mineral Creek subbasins. Manuscript approved for publication June 20, 2007.

ALTERATION MAP SHOWING MAJOR FAULTS AND VEINS AND ASSOCIATED WATER-QUALITY SIGNATURES OF THE ANIMAS RIVER WATERSHED HEADWATERS NEAR SILVERTON, SOUTHWEST COLORADO

By
Dana J. Bove, Douglas B. Yager, M. Alisa Mast, and J. Brad Dalton
2007

Any use of trade names is for descriptive purposes only and does not imply endorsement by the U.S. Government. This map was produced on request, directly from digital files, on an electronic platform. For sale by U.S. Geological Survey Information Services, Box 20888, Federal Center, Denver, CO 80220. 1-888-ASK-USGS. Audio overlays and a PDF for this map are available at <http://pubs.usgs.gov>.