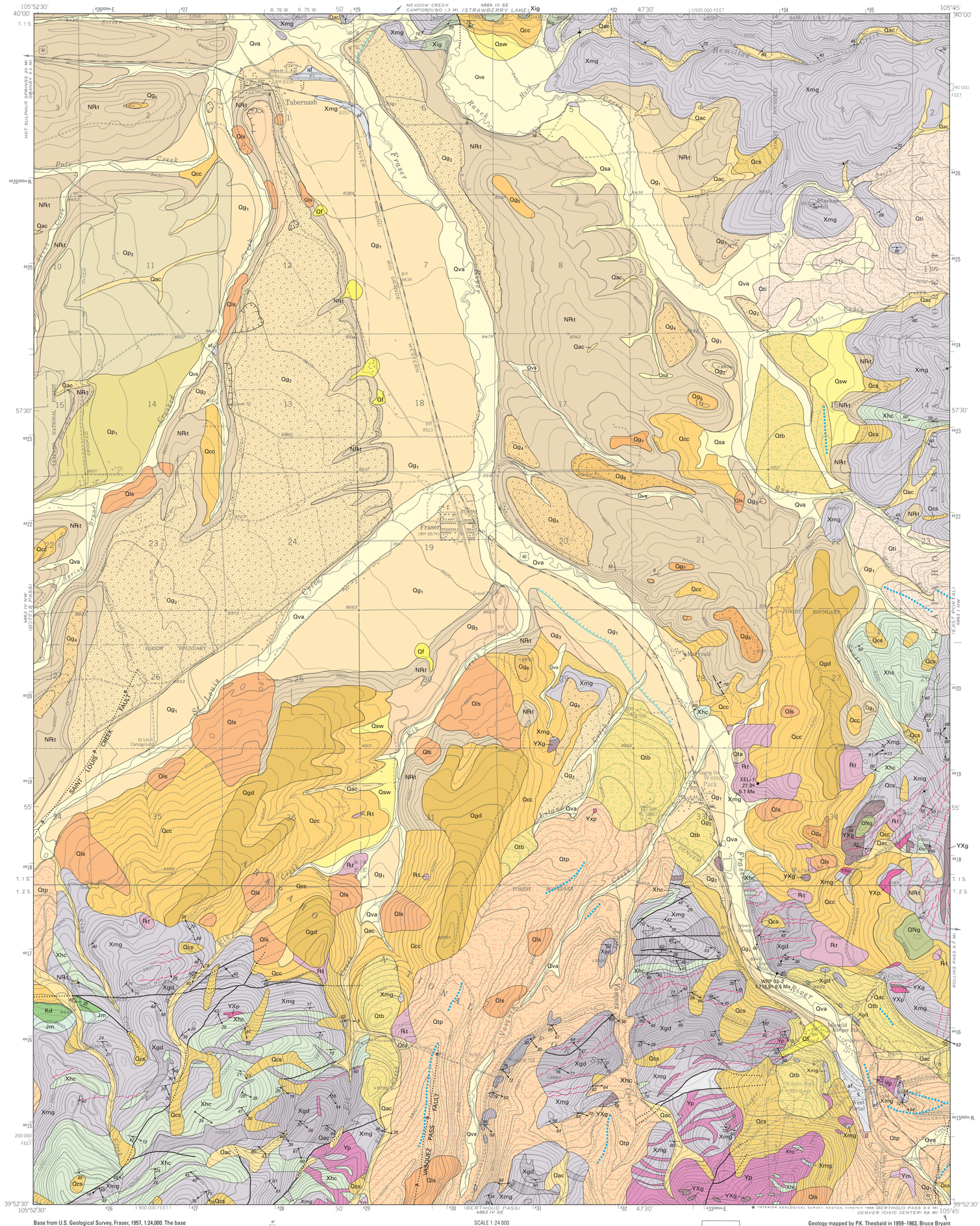
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

SCIENTIFIC INVESTIGATIONS MAP 3130
Version 1.0
*Pamphlet accompanies map*




Base from U.S. Geological Survey, Fraser, 1957, 1:24,000. The base was modified by removing the obsolete name Hideaway Park, and replacing it with Winter Park. The name Winter Park Ski Area was added just to the west of West Portal

Polyconic projection. 1927 North American Datum

10,000-foot grid based on Colorado Coordinate System, north zone

1000-meter Universal Transverse Mercator grid ticks, zone 13

APPROXIMATE MEAN DECLINATION, 2008

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

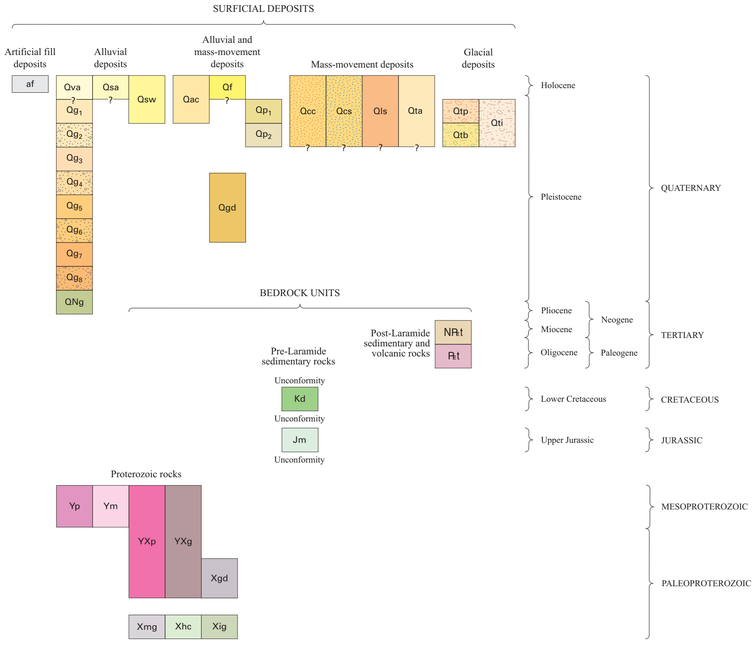
QUADRANGLE LOCATION

Geology mapped by P.K. Theobald in 1959–1963, Bruce Bryant in 1974 and 2005–2006, and R.R. Shroba in 2003 and 2005–2008

T.R. Brandt prepared the digital compilation of the geologic map and the GIS database.

Manuscript approved for publication June 9, 2010

## CORRELATION OF MAP UNITS




## LIST OF MAP UNITS

### SURFICIAL DEPOSITS

Artificial fill deposits

af — **Artificial fill (latest Holocene)**

Alluvial deposits

Qva — **Valley-floor alluvium (Holocene and late Pleistocene?)**

Qsa — **Sheetwash deposits and valley-floor alluvium, undivided (Holocene and late Pleistocene?)**

Qsw — **Sheetwash deposits (Holocene and late Pleistocene)**

**Gravelly stream-terrace alluvium (late to early? Pleistocene)**

$Qg_1$ — **Unit 1 (late Pleistocene)**

$Qg_2$ — **Unit 2 (late and middle Pleistocene)**

$Qg_3$ — **Unit 3 (middle Pleistocene)**

$Qg_4$ — **Unit 4 (middle Pleistocene)**

$Qg_5$ — **Unit 5 (middle Pleistocene)**

$Qg_6$ — **Unit 6 (middle Pleistocene)**

$Qg_7$ — **Unit 7 (middle or early Pleistocene)**

$Qg_8$ — **Unit 8 (middle or early Pleistocene)**

QNg — **Old gravelly stream alluvium (early Pleistocene or Pliocene)**

Alluvial and mass-movement deposits

Qac — **Alluvium and colluvium, undivided (Holocene and late Pleistocene)**

Qf — **Fan deposits (Holocene and late Pleistocene)**

$Qp_1$ — **Lower pediment deposits (late Pleistocene)**

$Qp_2$ — **Higher pediment deposits (late and middle Pleistocene)**

Qgd — **Gravelly stream alluvium and diamicton, undivided (middle Pleistocene)**

Mass-movement deposits

Qcc — **Clayey-silt matrix colluvium (Holocene to middle? Pleistocene)**

Qcs — **Sandy matrix colluvium (Holocene to middle? Pleistocene)**

Qls — **Landslide deposits (Holocene to middle? Pleistocene)**

Qta — **Talus deposits (Holocene to middle? Pleistocene)**

Glacial deposits

Qtp — **Till of Pinedale age (late Pleistocene)**

Qtb — **Till of Bull Lake age (late and middle Pleistocene)**

Qti — **Till of Pinedale age and till of Bull Lake age, undivided (late and middle Pleistocene)**

### BEDROCK UNITS

Post-Laramide sedimentary and volcanic rocks

NRt — **Troublesome Formation (upper Miocene to upper Oligocene)**

Rt — **Rhyolite tuff (Oligocene)**

Pre-Laramide sedimentary rocks

Kd — **Dakota Group (Lower Cretaceous)**

Jm — **Morrison Formation (Upper Jurassic)**

Proterozoic rocks

Yp — **Pegmatite of the Berthoud Plutonic Suite (Mesoproterozoic)**

Ym — **Monzogranite and granite of the Berthoud Plutonic Suite (Mesoproterozoic)**

YXp — **Pegmatite (Mesoproterozoic or Paleoproterozoic)**

YXg — **Granodiorite and monzogranite (Mesoproterozoic or Paleoproterozoic)**

Xgd — **Foliated granodiorite, tonalite, and diorite of the Routt Plutonic Suite (Paleoproterozoic)**

Xmg — **Migmatitic biotite schist and gneiss (Paleoproterozoic)**

Xhc — **Hornblende gneiss and calc-silicate gneiss (Paleoproterozoic)**

Xig — **Interlayered gneiss (Paleoproterozoic)**

## EXPLANATION

**Contact**

**Fault, type unspecified**—Dotted where concealed beneath surficial deposits. The Saint Louis Creek fault and Vasquez Pass fault are inferred beneath and near the floors of relatively straight valleys. The nearest exposures of these faults are about 9 km southwest and south, respectively, of the Fraser quadrangle (Kellogg and others, 2008)

**Normal fault**—Dashed where approximately located; dotted where concealed beneath surficial deposits; bar-and-ball symbol on apparent downthrown side. Tick shows dip value and direction

**Inclined bedding**—Showing strike and dip

**Inclined foliation**—Showing strike and dip

**Vertical or near vertical foliation**—Showing strike

**Lineation**

**Mineral lineation**—Showing bearing and plunge, depicted with an arrowhead

**Crenulation lineation**—Showing bearing and plunge, depicted with a diamond

**Horizontal mineral lineation**—Showing bearing

**Cataclastic rock**—Northeast-trending zone composed of thoroughly brecciated rock and (or) abundant fault gouge near the southeast corner of the map area. Locally may include blocks of ductilely deformed rock. Probably derived from the adjacent migmatitic biotite schist and gneiss (Xmg) and pegmatite of the Berthoud Plutonic Suite (Yp). Formed later than the 1.42-Ga mylonites in the main part of the Saint Louis Lake shear zone in the Byers Peak quadrangle (McCoy and others, 2005). Age uncertain; cataclasis may be have occurred during the Neoproterozoic, later during Laramide compression, and possibly during mid-Tertiary deformation

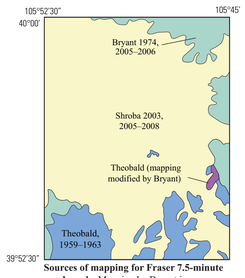
**Ductile deformation fabric in Proterozoic rocks (mylonite and related fabrics)**

EEL–1 27.3± 0.1 Ma — **Location and age of dated rock**—With sample number and $^{40}Ar/^{39}Ar$ age

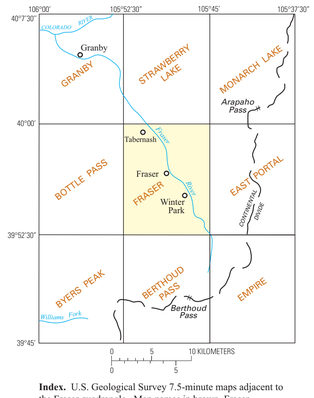
**Crest of moraine**

**Fluvial terrace scarp**—Hachures are on or near riser between lower and higher terrace treads

**Gravel pit**—Approximate boundary




**Sources of mapping for Fraser 7.5-minute quadrangle**. Mapping by Bryant in green, Shroba in yellow, Theobald (modified by Bryant) in purple, and Theobald in blue.




**Index.** U.S. Geological Survey 7.5-minute maps adjacent to the Fraser quadrangle. Map names in brown. Fraser quadrangle in yellow.

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# GEOLOGIC MAP OF THE FRASER 7.5-MINUTE QUADRANGLE, GRAND COUNTY, COLORADO

By

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**2010**