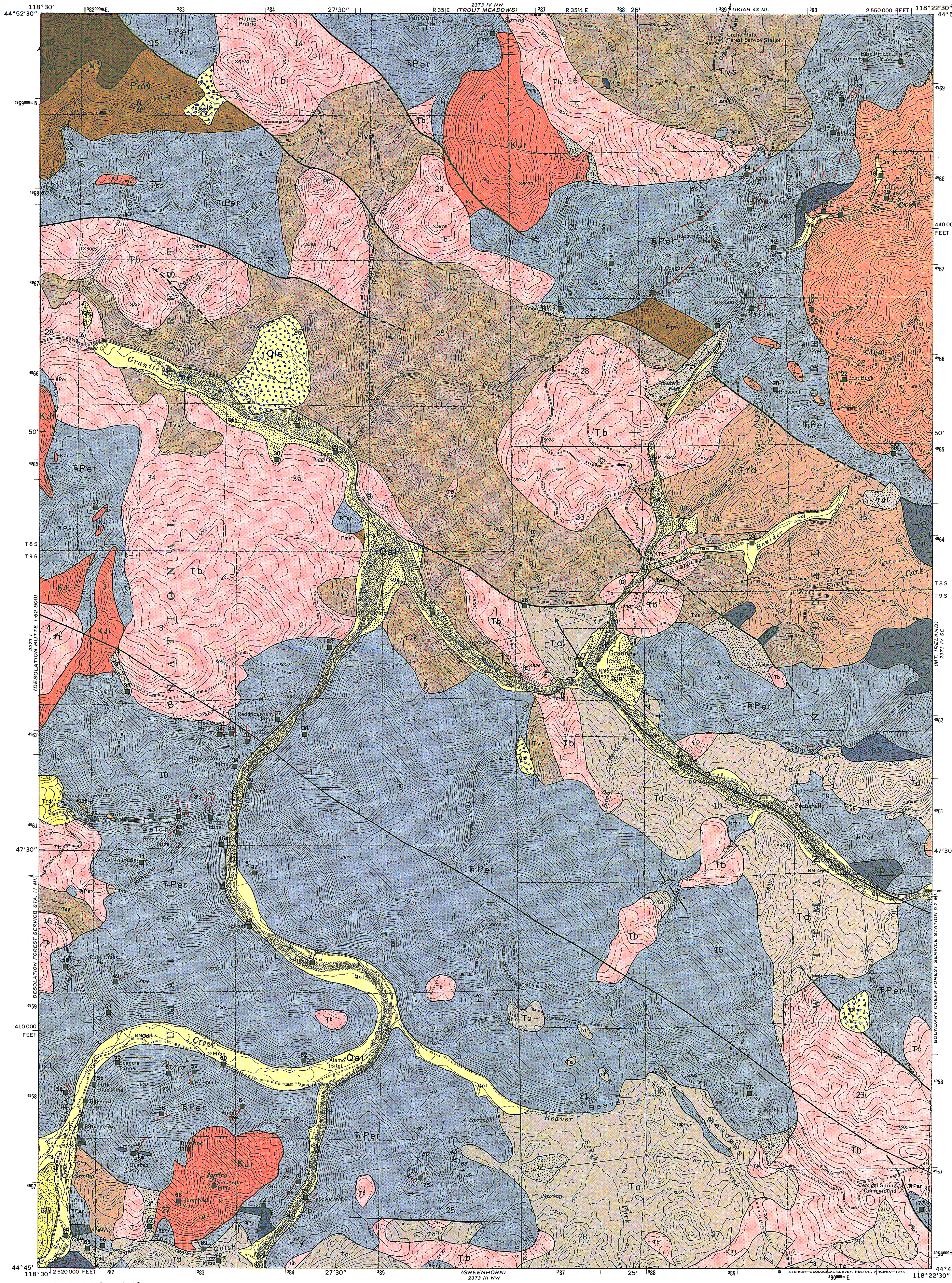
# GEOLOGY AND GOLD DEPOSITS MAP OF THE GRANITE QUADRANGLE, GRANT COUNTY, OREGON 1982

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
DONALD A. HULL, STATE GEOLOGIST

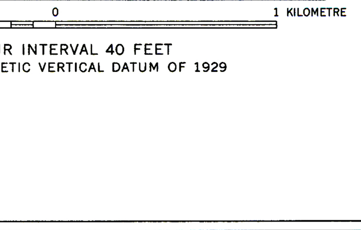



Base Map by U. S. Geological Survey

Control by USGS and NOS/NOAA

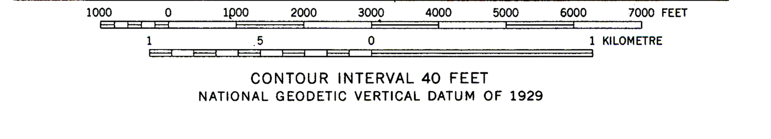
Topography by photogrammetric methods from aerial photographs taken 1971. Field checked 1972

Projection and 10,000-foot grid ticks: Oregon coordinate system, north zone (Lambert conformal conic)
1000-metre Universal Transverse Mercator grid ticks, zone 11, shown in blue. 1927 North American datum

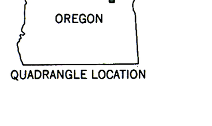



UTM GRID AND 1972 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

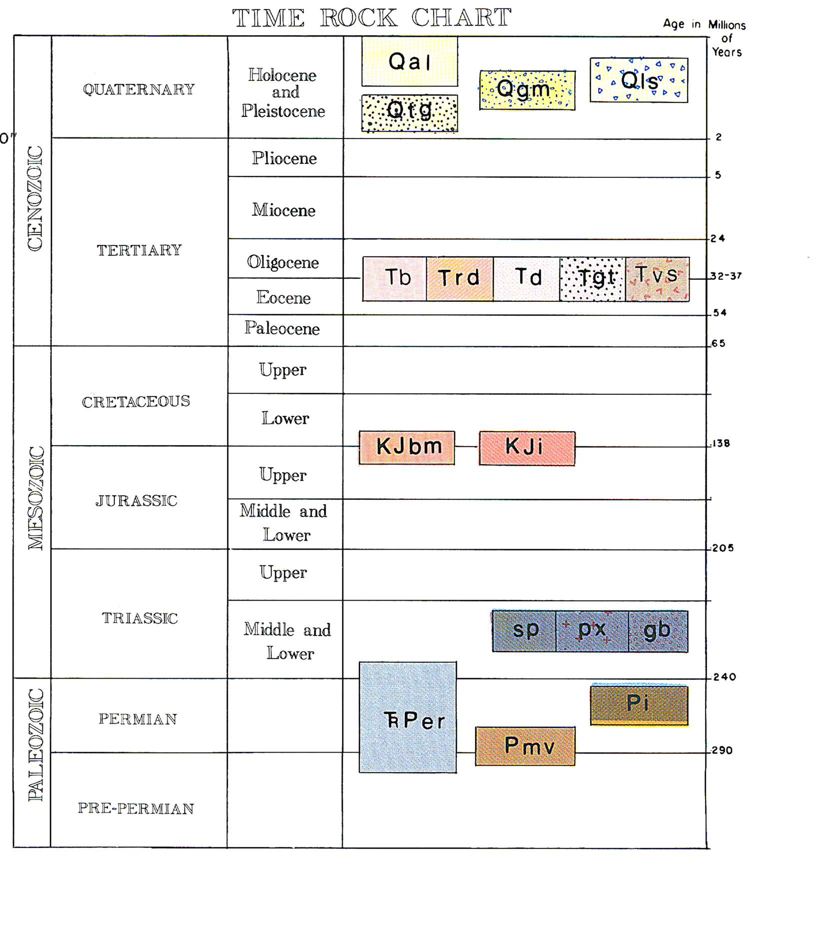



CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929




QUADRANGLE LOCATION

Field work completed in 1981
Geology by H.C. Brooks,
M.L. Ferns, and E.D. Mullen




## EXPLANATION

**Qal** — **Alluvium** (Holocene and Pleistocene): *Unconsolidated, poorly sorted fluviatile deposits consisting of gravel, sand, and silt in channels and flood plains of the present drainage system*

**Qls** — **Landslide debris** (Holocene and Pleistocene): *Unstratified, heterogeneous mixtures of soil and angular rock fragments resulting from bedrock failure on oversteepened slopes; typified by hummocky topography*

**Qgm** — **Glacial deposits** (Holocene and Pleistocene): *Unconsolidated, unsorted accumulations of boulders, cobbles, sand, and silt deposited by glaciers. Recognized only in the southwest corner of the quadrangle*

**Qtg** — **Terrace gravel** (Holocene and Pleistocene): *Unconsolidated to weakly consolidated, poorly sorted fluviatile deposits of gravel, sand, and silt situated at higher levels than the flood plains of present streams*

**Tb** — **Basalt** (Oligocene-Eocene): *Dark-gray, reddish-brown-weathering, fine-grained, locally porphyritic, generally holocrystalline basalt flows which in many places are separated by poorly indurated, light-colored tuff and tuffaceous sedimentary deposits including gravel. Most of the rocks contain olivine. Chemical analyses (samples A through G, Table 2) indicate the presence of several different flows which may or may not be of significantly different age. The basalts probably represent local-vent eruptions*

**Trd** — **Silicic flows and tuff** (Oligocene-Eocene): *Pink and light-gray porphyritic and nonporphyritic, hornblende-bearing flows and crystal-vitric tuff of rhyodacitic composition. Samples H and I in Table 2 are from this unit. Porphyritic varieties contain relict plagioclase and crudely aligned euhedral hornblende phenocrysts in a glassy matrix which contains resorbed crystals of feldspar and quartz*

**Td** — **Silicic flows** (Oligocene-Eocene): *Light- and medium-gray porphyritic dacite, silicic andesite, and rhyodacite flows. Includes silicic tuffs and tuff breccias locally. Predominantly dacite containing phenocrysts of plagioclase, hornblende, quartz, and biotite in an aphanitic groundmass. Samples J and K in Table 2 are of porphyritic dacite from this unit. A potassium-argon date of 33.7 ± 3.1 m.y. B.P. was obtained by Stanley Evans, University of Utah Research Institute, on hornblende from dacite in NE¼NW¼ sec. 13, T. 9 S., R. 35½ E. in the Mt. Ireland quadrangle*

**Tgt** — **Gravel, tuff, and tuffaceous sediments** (Oligocene-Eocene): *Unconsolidated to weakly consolidated interlayered deposits of gravel and pale-brown, gray, and green water-laid silicic and andesitic tuff and tuffaceous sand and silt. The gravels consist mainly of stream-rounded pebbles, cobbles, and boulders of chert, argillite, greenstone, and granitic rocks with generally smaller amounts of fragments representing one or more of the Tertiary volcanic units in a matrix of volcanic ash, sand, and silt. Locally, the deposits have been mined for placer gold, especially where the gravels have been reworked by modern streams*

**Tvs** — **Volcaniclastic rocks** (Oligocene-Eocene): *Mostly volcanic mudflow (lahar) deposits with irregularly intercalated bouldery tuffaceous conglomerate, bedded tuff, and tuffaceous sandstone and siltstone. Also includes andesitic lava flows locally. The volcaniclastic deposits typically are poorly consolidated and consist of poorly sorted, subrounded to subangular volcanic rock fragments up to 3 ft or more in diameter in a matrix of felsic volcanic ash, sand, and silt. Rock fragments are predominantly porphyritic dark-gray, light-gray, and brownish-red pyroxene and hornblende andesites with smaller amounts of dacite and rhyodacite. Basalt fragments are present locally. Exposures in the central part of the quadrangle appear to indicate a local thickness of at least 700 ft. The following fossil leaves from tuffaceous beds interlayered in mudflow deposits in the SW¼ sec. 25, T. 8 S., R. 35 E., were identified by C.J. Smiley, University of Idaho (written communication, April 8, 1982):*

*Palm:* *Sabalites, cf.* S. rhapifolius *Potbury*
*Dicots:* Cinnamomum dilleri *Knowlton*
Persea pseudocarolinensis *Lesquereux*
Magnolia *sp.*
*Fagaceae (?*Quercus *sp.).*

*Smiley comments: "In summary, the flora is of Eocene type and climatic implications and appears to be Clarno equivalent or (possibly) slightly older. It is representative of a humid and frost-free climate in northeast Oregon at that time."*

**KJbm** — **Bald Mountain Batholith** (Lower Cretaceous-Upper Jurassic): *Dominantly tonalite and granodiorite with small amounts of norite and quartz monzonite (Taubeneck, 1957). Dikes and sills of similar compositions occur along the borders of the batholith. Rb-Sr and K-Ar dates for the batholith range from 131 m.y. to 158 m.y. B.P. (Armstrong and others, 1977)*

**KJi** — **Intrusive rocks** (Lower Cretaceous-Upper Jurassic): *Small stocks composed mainly of tonalite and granodiorite with some diorite and norite. Most of the Quebec Hill body is tonalite and norite (Mullen, 1979). Some of the rocks are porphyritic; some are fine grained. The rocks of these intrusive bodies are similar in character to those of the Bald Mountain Batholith and are therefore assumed to be about the same age*

**sp px gb** — **Ultramafic and mafic rocks:** *Rocks equivalent to units* **sp**, **px**, *and* **gb** *are included in the "mixed rock terranes" unit mapped by Ferns and others (1982) and Brooks and others (1982) in the Mt. Ireland and Bourne quadrangles to the east. There ultramafic and mafic rocks are in structurally chaotic juxtaposition with a wide variety of other rocks, including diorite, quartz diorite, basalt, argillite, chert, volcaniclastic rocks, and limestone, all metamorphosed to the greenschist facies. Tectonism responsible for the terranes probably occurred in Early to Middle Triassic time. This conclusion is based on the assumption that the included argillite, chert, and limestone blocks are correlative with similar rocks in the Elkhorn Ridge Argillite and the fact that similar terranes near John Day are overlain unconformably by Upper Triassic sedimentary rocks*

- *sp* Mainly serpentinite *and* metaserpentinite derived from peridotite. *In places the serpentinite is altered to rocks in which talc plus carbonate minerals, chlorite, and, locally, tremolite are major components*
- *px* Mainly pyroxenite, partly altered to talc, tremolite, and serpentine minerals
- *gb* Mainly gabbro and diorite metamorphosed to the greenschist facies

**Pi** — **Metamorphosed intrusive rocks** (Upper Permian): *Metamorphosed quartz diorite and diorite with small amounts of metagabbro and fine-grained metadiorite or meta-andesite. Locally strongly sheared and foliated. Metamorphic minerals include chlorite, actinolite, and epidote. Sample L in Table 2 is from this unit. A U-Pb date of 243 m.y. B.P. was obtained by N.W. Walker (written communication, 1982) on zircon from quartz diorite in SE¼ sec. 16, T. 8 S., R. 35 E.*

**Pmv** — **Metavolcanic and related sedimentary rocks** (Permian?): *Dominantly andesitic to rhyolitic flows and tuffs that have been metamorphosed to the greenschist facies (samples M through P in Table 2). Associated rocks include tuffaceous sandstone, breccia, and chert-pebble conglomerate, argillite, and chert. Rocks of this unit in the northwest corner of the map are intercalated with argillite and chert of the Elkhorn Ridge Argillite and appear to have been intruded by, and therefore are assumed to be older than, rocks of unit* **Pi**

**TRPer** — **Elkhorn Ridge Argillite** (Triassic, Permian, Pennsylvanian): *Mainly dark-colored argillite, siliceous argillite, and chert with small amounts of fine-grained felsic tuff, sandstone, and conglomerate. Some argillites are nearly black due to high carbon content. Argillite and siliceous argillite generally are the most abundant rock types except in the southwestern part of the quadrangle, where siliceous argillite and chert are predominant. Some exposures consist of alternating siliceous and argillaceous layers ranging from a fraction of an inch to several feet thick. Tuffs are generally aphanitic, flinty-textured rocks with occasionally discernible quartz and feldspar phenocrysts. Rare pebble conglomerate beds consist of felsic and mafic volcanic rocks, chert, and argillite in a matrix of similar composition. The rocks underwent complex deformation prior to emplacement of the Late Jurassic-Early Cretaceous intrusive bodies. The most prominent structural features include a penetrative shear cleavage in the more argillaceous rocks and widespread brecciation of the cherts and siliceous argillites. Rocks within the thermal aureoles of the intrusives have been hornfelsed.*

*Fossils of Pennsylvanian, Permian, and Triassic age have been found in limestone pods in Elkhorn Ridge Argillite ouside of the Granite quadrangle. The diverse age and structural complexity show that the Elkhorn Ridge Argillite is not a simple stratigraphic unit*

### GEOLOGIC MAP SYMBOLS

Contact—approximately located. Queried where location is questionable

Fault—ball and bar on downthrown side. Dashed where inferred or concealed

Strike and dip of beds or lava flows

Strike of vertical bed

Strike and dip of foliation

Strike of vertical foliation

Crest line of Tertiary anticline

Trough line of Tertiary syncline showing direction of plunge

Quartz veins and mineralized fault zones—dashed where approximately located

28 Mine and prospect locations—numbers correspond to map numbers in Table 1

Source of rock sample for which chemical data are presented in Table 2

## Table 1. MINES AND PROSPECTS IN THE GRANITE QUADRANGLE

| Map number | Mine or prospect name | Location: ¼ sec. | Sec. | T. (S.) | R. (E.) | Elev. (ft) | Geologic formation | Geologic description | Surface and/or underground workings | Past production | References |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Big Four | NE | 13 | 8 | 35 | 5,600 | TRPer | Vein composed of quartz-argillite breccia with quartz veinlets in hornfelsed argillite | About 600 ft of workings | Unknown | 11 (5-3-02) |
| 2. | Buffalo | SW | 14 | 8 | 35½ | 6,050 | TRPer, KJbm | Four productive composite quartz veins 1 to 6 ft wide strike N. 25° E., dip 75°W. Ore minerals include pyrite, arsenopyrite, chalcopyrite, galena, sphalerite, tetrahedrite, pyrargyrite, and free gold | Over 10,000 ft of workings on four adit levels | 33,142 oz of gold and 252,893 oz of silver from 42,246 tons of ore (1903-1965) | 1,2,3,4,5,6,7,8,9 |
| 3. | Cox Tunnels | NE | 14 | 8 | 35½ | 6,150 | TRPer | Carbonaceous argillite with quartz and pyrite stringers | Two short adits | Unknown | 8 |
| 4. | Blue Ribbon | NE | 14 | 8 | 35½ | 6,250 | TRPer | Vein composed of quartz-argillite breccia with quartz veinlets in hornfelsed argillite | About 2,000 ft of workings from three adits | Small | 1,3,4,5,6,7,8 |
| 5. | Boston Tunnel (Buffalo Group) | SW | 14 | 8 | 35½ | 5,840 | TRPer | Narrow shear zone with quartz veinlets in hornfelsed argillite | Short adit | Unknown | 8 |
| 6. | Ten Cent placer | NW | 28 | 8 | 35½ | 4,900 | Qal, Tgt | Channel gravels derived from older gravel underlying basalt flows | Several acres mined | Small | — |
| 7. | Name unknown (Scorpion?) | SE | 21 | 8 | 35½ | 5,520 | TRPer | Pyrite stringers in sheared and silicified carbonaceous argillite | Short adit | Unknown | 11 (5-3-02) |
| 8. | Cougar | SW | 22 | 8 | 35½ | 5,300 | TRPer | Mineralized shear zone a few inches to 9 ft wide composed of crushed argillite partly recemented by quartz and locally dolomite. Ore minerals include pyrite, arsenopyrite, and chalcopyrite | Over 9,000 ft of workings; six levels from four adits, an inside shaft and a decline | Total unknown; 19,138 oz of gold and 11,016 oz of silver from 51,500 tons of ore in 1938-1942 and 1950 | 1,2,3,4,5,6,7,8,9 |
| 9. | Independence | NW | 22 | 8 | 35½ | 5,600 | TRPer | Shear zone 3 to 6 ft thick composed of argillite breccia and gouge partly cemented locally by dolomite and quartz. Ore minerals include pyrite, arsenopyrite, chalcopyrite, sphalerite, tetrahedrite, pyrargyrite, and proustite | 1,200-ft crosscut and 2,500 ft of drifts on three levels | Sporadic output, 1907-1940; total 3,202 oz of gold and 14,582 oz of silver from 9,500 tons of ore | 2,3,4,5,6,7,8,9 |
| 10. | Name unknown | N | 27 | 8 | 35½ | 5,000 | TRPer, Pmv | Northwest-trending shear zone along argillite-greenstone contact | Short adit | Unknown | — |
| 11. | New York | NE | 27 | 8 | 35½ | 5,100 | TRPer | Two veins of partly silicified argillite breccia and gouge 3 to 7 ft wide. Ore minerals are pyrite, arsenopyrite, chalcopyrite, and free gold | 2,300 ft in six adits | Est. $8,000 from 1,000 tons of ore in 1937-1941 | 6,7,8,9 |
| 12. | Name unknown | SE | 22 | 8 | 35½ | 5,100 | TRPer | Shear zone in argillite | Two short adits | Unknown | — |
| 13. | Ajax | NE | 22 | 8 | 35½ | 5,300 | TRPer | Two shear zones 1 in. to 5 ft thick composed of brecciated argillite cut by thin seams of quartz and calcite | Over 1,500 ft of workings on three levels | $40,000 in 1905-1906 | 7,8,9 |
| 14. | Magnolia | NE | 22 | 8 | 35½ | 5,300 | TRPer | Vein, 4½-ft average width, of crushed argillite; silificed locally; some vein quartz locally. Sulfides include pyrite, arsenopyrite, and marcasite. Gold 15 to 20 percent free | Over 1,050 ft in three adits | Small | 1,2,3,4,5,6,7,8 |
| 15. | Central | NW | 23 | 8 | 35½ | 5,200 | TRPer, gb | Two parallel shear zones 90 ft apart in argillite and hornfelsed metagabbro | Over 500 ft in three adits | Small | 6 |
| 16. | Eddy Group | NW | 23 | 8 | 35½ | 5,200 | TRPer, gb, KJbm | Two parallel shear zones with quartz lenses and pyrite stringers in argillite, metagabbro, and quartz diorite | Five short adits | Unknown | — |
| 17. | Name unknown | NW | 23 | 8 | 35½ | 5,200 | KJbm | Shear zone with quartz stringers and gouge | Short adit | Unknown | — |
| 18. | Name unknown | NE | 23 | 8 | 35½ | 5,500 | Qal | Placer. Gravel in steep narrow gulch | Small area mined | Unknown | — |
| 19. | Tillicum | NE | 23 | 8 | 35½ | 5,300 | KJbm | Several narrow shear zones with quartz veinlets. Gold largely free | Over 400 ft in five or more adits | Small | 6,7,8 |
| 20. | Name unknown (Last Chance?) | SE | 27 | 8 | 35½ | 5,200 | TRPer | Two-ft-wide limonitic breccia zone in hornfelsed argillite | Short adit | None | — |
| 21. | Name unknown | NW | 26 | 8 | 35½ | 5,580 | KJbm | Narrow limonitic breccia zone with quartz stringers, sericite, and fuchsite(?) | Shallow pit and trenches | None | — |
| 22. | Lost Buck | SW | 26 | 8 | 35½ | 5,500 | KJbm | Shear zone with quartz lenses | Two short adits | None(?) | — |
| 23. | Name unknown | NE | 35 | 8 | 35½ | 4,950 | Qal | Placer. Channel gravel partly derived from older Tertiary gravel | Two(?) acres mined | Small | — |
| 24. | Boulder Creek placer | SE | 34 | 8 | 35½ | 4,780 | Qal | Channel gravel | Small acreage mined | Small | — |
| 25. | Granite placer | C | 4 | 9 | 35½ | 4,560 | Qtg | Terrace gravel | Small acreage mined | Unknown | — |
| 26. | Name unknown | NW | 4 | 9 | 35½ | 4,700 | Tgt | Placer. Small patch of Tertiary gravel | About 1 acre mined | Unknown | — |
| 27. | Porter Brothers dredge placer | — | — | 8,9 | 35, 35½ | — | Qal | Channel gravels of Bull Run, Granite, Clear, and Olive Creeks | About 13 mi of stream channels mined by bucket-line dredge (1938-1950) | Records not available (see text) | — |
| 28. | Oro Plata placer | NE | 2 | 9 | 35 | 4,450 | Qal, Qtg | Channel of Granite Creek and adjacent terrace gravels | About 2 mi of creek channel mined by dragline dredge (1938-1941) | Records not available (see text) | 6 |
| 29. | Tabor Diggings | NE | 35 | 8 | 35 | 4,480 | Qtg | Terrace gravels | Small acreage mined | Unknown | — |
| 30. | Name unknown | NW | 35 | 8 | 35 | 4,600 | Qtg | Placer. Terrace gravel; basalt bed rock | Small area mined | Small(?) | — |
| 31. | Name unknown | SW | 34 | 8 | 35 | 5,000 | TRPer, KJi | Limonitic quartz stringers in a quartz diorite dike in hornfelsed argillite | Short adit | Unknown | — |
| 32. | Name unknown | SE | 2 | 9 | 35 | 4,600 | Tgt, TRPer | Placer. Small patch of Tertiary gravel | Short adit in argillite | None | — |
| 33. | Name unknown | SW | 3 | 9 | 35 | 5,200 | Tgt, TRPer | Placer. Tertiary gravel between argillite and basalt | Small area placered; short adit in argillite | Small | — |
| 34. | May Queen | NE | 10 | 9 | 35 | 4,800 | TRPer | Limonitic shear zone in chert and argillite | Over 800 ft of workings | Unknown | 1, 11 (4-26-02) |
| 35. | Jay Bird (part of May Queen) | NE | 10 | 9 | 35 | 4,800 | TRPer | Limonitic shear zone with quartz veinlets in chert and argillite | Over 800 ft of workings | Unknown | 11 (4-26-02) |
| 36. | Poor Boy | NW | 11 | 9 | 35 | 4,700 | TRPer | One-ft-wide vein consisting of silicified chert breccia with quartz veinlets | Short adit | Unknown | — |
| 37. | Red Mountain | NW | 11 | 9 | 35 | 4,640 | TRPer | One-ft-wide vein consisting of a limonitic silicified argillite breccia with quartz veinlets | Short adit | Unknown | 11 (4-26-02) |
| 38. | Silent Friend | NW | 11 | 9 | 35 | 4,720 | TRPer | Shear zone | Short adit | Unknown | 11 (4-26-02) |
| 39. | Mineral Wonder | E | 10 | 9 | 35 | 4,700 | TRPer | Limonitic argillite breccia zone | Short crosscut adit | None | — |
| 40. | Bluebird | SW | 11 | 9 | 35 | 4,700 | TRPer | Argillite breccia zones with comb quartz and minor amounts of pyrite and arsenopyrite | 2,500-ft crosscut with short drifts | Est. 250 oz of gold from 1,500 tons of ore | 4,5,6,11 (11-5-02, 1-2-04) |
| 41. | Red Boy | SE | 10 | 9 | 35 | 4,800 | TRPer | Two veins 3 to 15 ft wide, composed of argillite breccia and quartz. Strike N. and N.30°E. Some felsic dikes. Ore minerals include free gold, pyrite, arsenopyrite, and chalcopyrite | About 5,000 ft of workings from 300-ft shaft and three adits | Between $0.8 and $1 million in 1890-1914 (see text) | 1,2,3,4,5,6,8,9,11 (10-26-02) |
| 42. | Concord (Red Boy Group) | SE | 10 | 9 | 35 | 4,800 | TRPer | Two veins of limonitic breccia with stringers of quartz and pyrite | Several thousand feet of workings connected to Red Boy workings | Unknown | 2,9 |
| 43. | Pride of Oregon | SW | 10 | 9 | 35 | 4,800 | TRPer | Limonitic siliceous argillite breccia | 1,200 ft of workings | Unknown | 6 |
| 44. | Blue Mountain | NW | 15 | 9 | 35 | 4,900 | TRPer | Limonitic shear zone | Short adit | None | 11 (6-23-03) |
| 45. | Gray Eagle | SE | 10 | 9 | 35 | 4,800 | TRPer | Limonitic shear zone in chert and siliceous argillite | Short adits | Unknown | 11 (6-23-03) |
| 46. | Oregon Monarch | NE | 15 | 9 | 35 | 4,700 | TRPer | Limonitic shear zones in argillite | About 1,000 ft of workings | None | 11 (1-26-02) |
| 47. | Yellow Daisy | NW | 14 | 9 | 35 | 4,800 | TRPer | Shear zone in siliceous argillite and chert | Short adit | None | 11 (1-2-04) |
| 48. | Blackjack | SW | 14 | 9 | 35 | 4,800 | TRPer | Limonitic silicified shear zones in chert and argillite | Over 3,000 ft of workings | None | 5,6,9,11 (3-3-06, 12-8-06) |
| 49. | Aurelia | SW | 15 | 9 | 35 | 5,500 | TRPer | Limonitic silicified breccia zone 2 ft wide in chert | Many trenches and pits and three short adits | Unknown | — |
| 50. | Cat | SE | 16 | 9 | 35 | 5,200 | TRPer | Limonitic silicified breccia zone in argillite | Short adits and prospect pits | Unknown | — |
| 51. | Ruby Creek Mines | NW | 22 | 9 | 35 | 5,100 | TRPer | Limonitic silicified breccia zone in chert | Two short adits | About 200 oz of gold (1932-1936) | 6,8 |
| 52. | Iowa Claim | SE | 21 | 9 | 35 | 5,200 | TRPer | Limonitic silicified chert breccia zone | Three short adits | Unknown | — |
| 53. | Butcher Boy | SE | 21 | 9 | 35 | 5,300 | TRPer | Limonitic silicified chert breccia zone with quartz stringers | Short adit | Unknown | — |
| 54. | Bluebird | SE | 21 | 9 | 35 | 5,240 | TRPer | Banded cherts | Short adit | None | — |
| 55. | Little Blue | SW | 22 | 9 | 35 | 5,200 | TRPer | Limonitic shear zone with quartz, calcite, and pyrite stringers in argillite | Short adit | Unknown | — |
| 56. | Scandia Tunnel | SW | 22 | 9 | 35 | 5,240 | TRPer | Shear zones in chert and argillite | Over 2,700 ft in crosscut tunnel | None | 1,11 (9-14-01, 3-26-04) |
| 57. | Name unknown | SE | 22 | 9 | 35 | 5,360 | TRPer | One-ft-wide limonitic breccia zone with quartz veinlets in chert and argillite | Short adit | Unknown | — |
| 58. | Name unknown | SW | 22 | 9 | 35 | 6,000 | TRPer | Quartz stringers in a 2-ft-wide zone of sheared hornfelsed argillite | Two short adits | Unknown | — |
| 59. | Name unknown | SE | 22 | 9 | 35 | 5,280 | TRPer | Limonitic shear zones in chert | Two short adits | Unknown | — |
| 60. | St. Anthony | SE | 22 | 9 | 35 | 5,000 | TRPer | Silicified shear zones in argillite | 600-ft adit | None | 1,11 (9-14-01, 7-4-03) |
| 61. | Alamo | SW | 23 | 9 | 35 | 5,400 | TRPer | Vein up to 20 ft in width of crushed chert and argillite with quartz and sulfides | Over 1,600 ft of workings on three levels | Small | 1,11 (3-15-02, 2-6-04) |
| 62. | Name unknown | SW | 23 | 9 | 35 | 4,950 | TRPer | Limonitic zones in carbonaceous argillite | Short adit | Unknown | — |
| 63. | Quebec | NW | 27 | 9 | 35 | 5,720 | TRPer | Ten-ft-wide vein of argillite breccia with quartz, pyrite, fuchsite, and free gold | About 4,000 ft of workings in three adit levels | Small; 10-stamp mill was in operation for about 1½ years | 1,11 (7-13-01, 9-14-01, 7-4-03) |
| 64. | Lightning Creek placer | SE | 28 | 9 | 35 | 5,320 | Qal | Reworked Tertiary gravels in Lightning Creek channel | Small acreage mined | Unknown | 1 |
| 65. | Name unknown | SE | 28 | 9 | 35 | 5,440 | Tgt | Semiconsolidated Tertiary gravels | Small acreage mined | Unknown | — |
| 66. | Name unknown | SW | 27 | 9 | 35 | 5,520 | TRPer | Silicified chert with pyrite | Shallow shaft | Unknown | — |
| 67. | Name unknown | SW | 27 | 9 | 35 | 5,400 | KJi | Limonitic shear zone | Short adit | Unknown | — |
| 68. | Humpback | NE | 27 | 9 | 35 | 5,800 | KJi | Limonitic shear zone | Shallow shaft and short adits | Unknown | — |
| 69. | Name unknown | SE | 27 | 9 | 35 | 5,200 | TRPer | Sheared argillite | Short adit | None | — |
| 70. | Oro Fino | SE | 27 | 9 | 35 | 5,200 | Td | Disseminated pyrite in hydrothermally altered felsic volcanic rocks of Tertiary age | Open cut several hundred feet across | Small | 11 (7-20-01, 9-10-04) |
| 71. | Van Anda | NE | 27 | 9 | 35 | 5,700 | KJi | Limonitic shear zone | Short adit and trenches | Unknown | 1,11 (9-14-01) |
| 72. | Last Loaf | NW | 26 | 9 | 35 | 5,280 | TRPer, Sp | Sheared contact between argillite and talcose ultramafic rocks | Short adit | Unknown | 11 (9-14-01) |
| 73. | Strasburg | NW | 26 | 9 | 35 | 5,080 | TRPer | Two veins of quartz with argillite fragments in decomposed argillite and felsic dikes | Over 1,000 ft in three adits | Unknown | 1,11 (9-14-01, 2-28-03) |
| 74. | Yellowstone | NE | 26 | 9 | 35 | 5,080 | TRPer | Two shear zones in silicified argillite | About 800 ft of workings in two adits | Unknown | 1,11 (9-14-01) |
| 75. | Name unknown | NW | 25 | 9 | 35 | 5,240 | TRPer | One-ft-wide limonitic breccia zone with quartz stringers in chert and argillite | Two short adits | Unknown | — |
| 76. | Name unknown | SE | 22 | 9 | 35½ | 5,520 | TRPer | Four-ft-wide limonitic breccia zone with quartz stringers in broken chert and argillite | 300-ft trench and three short adits | Unknown | — |
| 77. | Name unknown | NE | 26 | 9 | 35½ | 5,680 | TRPer | Shear zone in argillite | Short adit | Unknown | — |

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## Table 2. CHEMICAL ANALYSES OF ROCK SAMPLES FROM THE GRANITE AND MT. IRELAND QUADRANGLES*

| Map no. | $SiO_2$ | $Al_2O_3$ | $TiO_2$ | $Fe_2O_3$ | FeO | MnO | CaO | MgO | $K_2O$ | $Na_2O$ | $P_2O_5$ | Location: ¼ sec. | Sec. | T (S.) | R. (E.) | Rock type | Map unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A. | 51.77 | 13.47 | 1.20 | 4.22 | 4.83 | 0.14 | 8.74 | 10.97 | 0.79 | 3.51 | 0.35 | SE | 28 | 8 | 35 | Olivine basalt | Tb |
| B. | 50.10 | 18.57 | 1.37 | 4.46 | 5.11 | 0.13 | 10.58 | 7.33 | 0.09 | 2.09 | 0.17 | SE | 35 | 8 | 35 | Olivine basalt | Tb |
| C. | 48.39 | 18.57 | 2.04 | 5.85 | 6.70 | 0.20 | 10.02 | 4.53 | 0.67 | 2.68 | 0.34 | NE | 33 | 8 | 35½ | Olivine basalt | Tb |
| D. | 51.60 | 17.05 | 1.43 | 4.10 | 4.70 | 0.15 | 9.73 | 5.69 | 0.77 | 4.44 | 0.34 | SE | 33 | 8 | 35½ | Olivine basalt | Tb |
| E. | 51.15 | 14.82 | 2.84 | 5.95 | 6.81 | 0.20 | 7.51 | 3.78 | 1.81 | 4.28 | 0.83 | SW | 4 | 9 | 35½ | Olivine basalt | Tb |
| F. | 47.63 | 16.64 | 2.11 | 5.60 | 6.42 | 0.18 | 9.21 | 6.94 | 0.75 | 4.19 | 0.32 | SW | 4 | 9 | 35½ | Olivine basalt | Tb |
| G.** | 49.93 | 16.63 | 1.36 | 4.71 | 5.40 | 0.17 | 9.82 | 9.29 | 0.32 | 2.10 | 0.27 | SW | 24 | 9 | 35½ | Olivine basalt | Tb |
| H. | 70.59 | 17.47 | 0.33 | 1.22 | 1.40 | 0.01 | 3.73 | 0.88 | 1.31 | 2.97 | 0.08 | NW | 34 | 8 | 35½ | Hornblende rhyodacite | Trd |
| I. | 71.24 | 16.61 | 0.34 | 1.25 | 1.44 | 0.02 | 3.94 | 0.96 | 1.38 | 2.71 | 0.10 | SW | 35 | 8 | 35½ | Hornblende rhyodacite | Trd |
| J. | 69.83 | 17.57 | 0.35 | 1.15 | 1.32 | 0.04 | 3.48 | 0.94 | 2.10 | 3.11 | 0.10 | NW | 22 | 9 | 35½ | Porphyritic dacite | Td |
| K.** | 66.27 | 16.84 | 0.67 | 2.20 | 2.52 | 0.06 | 4.54 | 1.88 | 1.76 | 2.98 | 0.27 | NE | 25 | 9 | 35½ | Porphyritic dacite | Td |
| L. | 64.29 | 16.57 | 0.67 | 2.92 | 3.34 | 0.13 | 6.50 | 2.23 | 0.03 | 3.21 | 0.10 | SE | 16 | 8 | 35 | Meta-quartz diorite | Pi |
| M. | 75.56 | 14.13 | 0.43 | 1.10 | 1.26 | 0.05 | 0.15 | 1.53 | 3.52 | 2.23 | 0.03 | SW | 15 | 8 | 35 | Silicic greenstone | Pmv |
| N. | 57.98 | 18.24 | 1.26 | 5.22 | 5.98 | 0.06 | 2.32 | 5.70 | 0.27 | 2.79 | 0.17 | SW | 15 | 8 | 35 | Meta-andesite | Pmv |
| O. | 61.96 | 15.58 | 0.93 | 4.42 | 5.06 | 0.06 | 4.70 | 4.18 | 0.15 | 2.69 | 0.26 | SW | 15 | 8 | 35 | Meta-andesite | Pmv |
| P. | 73.98 | 14.73 | 0.36 | 1.20 | 1.38 | 0.04 | 2.22 | 1.35 | 1.19 | 3.47 | 0.08 | NW | 22 | 8 | 35 | Silicic greenstone | Pmv |

* All analyses by X-ray fluorescence at Washington State University, Pullman, Washington, under the direction of Peter Hooper. Analyses are normalized on a volatile-free basis, and total Fe is expressed as $Fe_2O_3$/FeO at an arbitrarily fixed ratio.

** Analysed sample from the adjacent Mt. Ireland quadrangle.

# GMS - 25

Geology and Gold Deposits Map of the
Granite Quadrangle, Grant County, Oregon
1982
Brooks and Others

Funded in part by U.S. Department of Agriculture - U.S. Forest Service

## MINERAL DEPOSITS

Gold and silver have been the main mineral products of the quadrangle. Small amounts of copper, lead, and zinc have been recovered as byproducts from some of the gold mines. The total value of the gold and silver produced has been about $5.8 million, of which about $2.8 million was from placers and $3 million from lode mines. Dollar values of production presented here and in Table 1 are based on metal prices at the time of mining.

Known mines and prospects are located on the map by numbers that correspond to those in Table 1. Because of time constraints, mapping traverses were as much as half a mile apart, and it is likely that many small veins and prospect excavations were not observed. The historical information and data on individual mines in the following paragraphs are largely from Lindgren (1901), Pardee and Hewett (1914), Swartley (1914), Hewett (1931), Koch (1959), and Brooks and Ramp (1968).

### Lode Deposits

The lode gold and silver production has been from narrow, steeply dipping veins and mineralized shear zones developed mainly by underground workings. Most of the deposits are in argillite and chert of the Elkhorn Ridge Argillite (**TRPer**). Some are in granitic rocks of units **KJbm** and **KJi.** A very few cut greenstone (**Pmv**), gabbro (**gb**), and serpentinite (**sp**).

The deposits north of Granite are in the southwestern part of the Granite gold mining district, which encompasses a northeast-trending system of veins and mineralized shear zones about 1 mi wide and 5 mi long near the southwestern margin of the Bald Mountain Batholith (**KJbm**). The more productive mines in this part of the district are the Buffalo (2), Cougar (8), and Independence (9) Mines.

The Buffalo was discovered about 1870, but there was little development prior to 1903. The mine was active during 42 of the years between 1903 and 1965. Recorded output is 33,142 oz of gold and 252,893 oz of silver from 42,246 tons of ore. A very small production was made in 1980-1982. The Buffalo Mine develops four roughly parallel productive veins which are from 80 to 220 ft apart in hornfelsed argillite and granodiorite. These composite veins are an average of about 20 in. wide and were formed partly by open-space filling and partly by replacement. They contain pyrite, with minor amounts of arsenopyrite, chalcopyrite, galena, sphalerite, and tetrahedrite in a gangue of quartz, calcite, and incompletely replaced fragments and streaks of wall rock. About 20 percent of the gold is free; the remainder is finely divided in the sulfide minerals. In the later years of production, the ore was treated in a 35-tons-per-day flotation mill. About 1 ton of bulk sulfide concentrate was produced from 10 tons of ore.

The Cougar Mine produced 19,138 oz of gold, 11,016 oz of silver and 140 lbs of copper from 51,500 tons of ore during 1938-1942 and 1950. Pre-1938 production is unknown, although the deposit was discovered prior to 1900. Considerable underground exploration work has been done in recent years. Sporadic production from the Independence during four or more short periods of operation between 1907 and 1940 totals 3,202 oz of gold, 14,582 oz of silver and 4,724 lbs of copper from 9,500 tons of ore.

The Cougar and Independence veins are roughly parallel, striking about N. 50° E. and dipping 65° SE. Both are mineralized shear zones composed mainly of brecciated argillite which locally is cemented by quartz and dolomite. Gouge layers are common. Sulfide minerals comprise a very small percentage of the vein material but contain nearly all of the gold and silver. Pyrite is most abundant. Both veins contain arsenopyrite and a little chalcopyrite. Sphalerite, tetrahedrite, pyrargyrite, and proustite occur in the Independence vein. The Cougar ore shoots were small and erratically distributed within the shear zone. One of the largest was 475 ft long and 3 to 4.5 ft thick and was worked to a depth of about 450 ft.

The gold and silver deposits in the southwestern part of the map area are included in the Greenhorn district by some authors and in the Granite or Alamo district by others.

Most of the veins and mineralized shear zones are genetically related to the intrusion of granitic rocks of unit **KJi.** Structural trends range from N. 40° E. to N. 10° W. Granodiorite porphyry and aplite dikes are common in the mineralized areas. The recorded lode mine production from the area is mainly that of the Red Boy Mine (41), which produced between $0.8 and $1 million in gold and silver during 1890-1914 and has been idle since that time.

The Red Boy explored two productive veins, the Red Boy and Monarch, and at least three other veins from which there was little or no production. The Red Boy vein strikes N. and dips 80° W.; the Monarch vein strikes N. 30° E. and dips 50°-55° W. They join and are cut off in a broad fault zone in the southern part of the mine. Both veins were stoped for horizontal distances of about 800 ft and to depths of about 300 ft. No mineable-grade ore was found below that depth. The two veins consist of crushed argillite in fault zones 3 to 15 ft wide, in which the broken rock is cemented by a great number of quartz seams which rarely are over 4 in. wide but in a few places attain widths of 5 to 6 ft. The quartz seams usually show comb structure. The ore contained about 5 percent sulfides, mostly pyrite, and very little chalcopyrite and arsenopyrite. Cinnabar, native mercury, and native copper were found locally. The gold was 75 to 85 percent free and largely contained in the quartz seams. Bullion fineness averaged 520 gold and 450 silver. Production prior to January 1, 1902, was $666,322.10 from 83,000 tons of ore; stope widths averaged 28 in.

In the vicinity of the Red Boy Mine and on the slopes of Quebec Hill, Clear Creek, and Olive Creek to the south, there are a large number of small veins and shear zones, many of which have been prospected. There is no record of production or the extent of development for most of these prospects. Some are briefly described in published reports (see Table 1). A few have produced small amounts of gold and silver. Brecciation of the chert and silicious argillite of unit **TRPer** is especially notable in secs. 11, 12, 13, and 14, T. 9 S., R. 35½ E. In places, the brecciated rocks are silicified and iron-oxide stained.

At the Oro Fino Mine (70) in the southwest corner of the map, hydrothermal alteration and mineralization occur in felsic volcanic rocks of Tertiary age. Two different alteration assemblages were noted: (1) quartz-clay minerals-pyrite, and (2) clay minerals-sericite-quartz-chlorite-calcite-pyrite.

### Placer Deposits

Most of the placer gold produced in the Granite quadrangle was recovered from gravel in the beds (**Qal**) and adjacent terraces (**Qtg**) of Granite Creek, Bull Run Creek, Clear Creek, and Olive Creek. Pardee and Hewett (1914, p. 10) computed the minimum yield to 1914 at $1.033 million. Incomplete records indicate that subsequent output has been about 51,000 oz of gold and 11,500 oz of silver, mostly from dredge mining during 1938-1950. The dredges worked approximately 15 mi of creek channel.

Parts of some of the smaller creeks and gulches, including Boulder Creek, Ten Cent Creek, and Lightning Creek, have been mined for placer gold. Several small placer mines and prospects are in gravel deposits of unit **Tgt**, particularly where the older gravel has been reworked.

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## Geologic Cross Sections