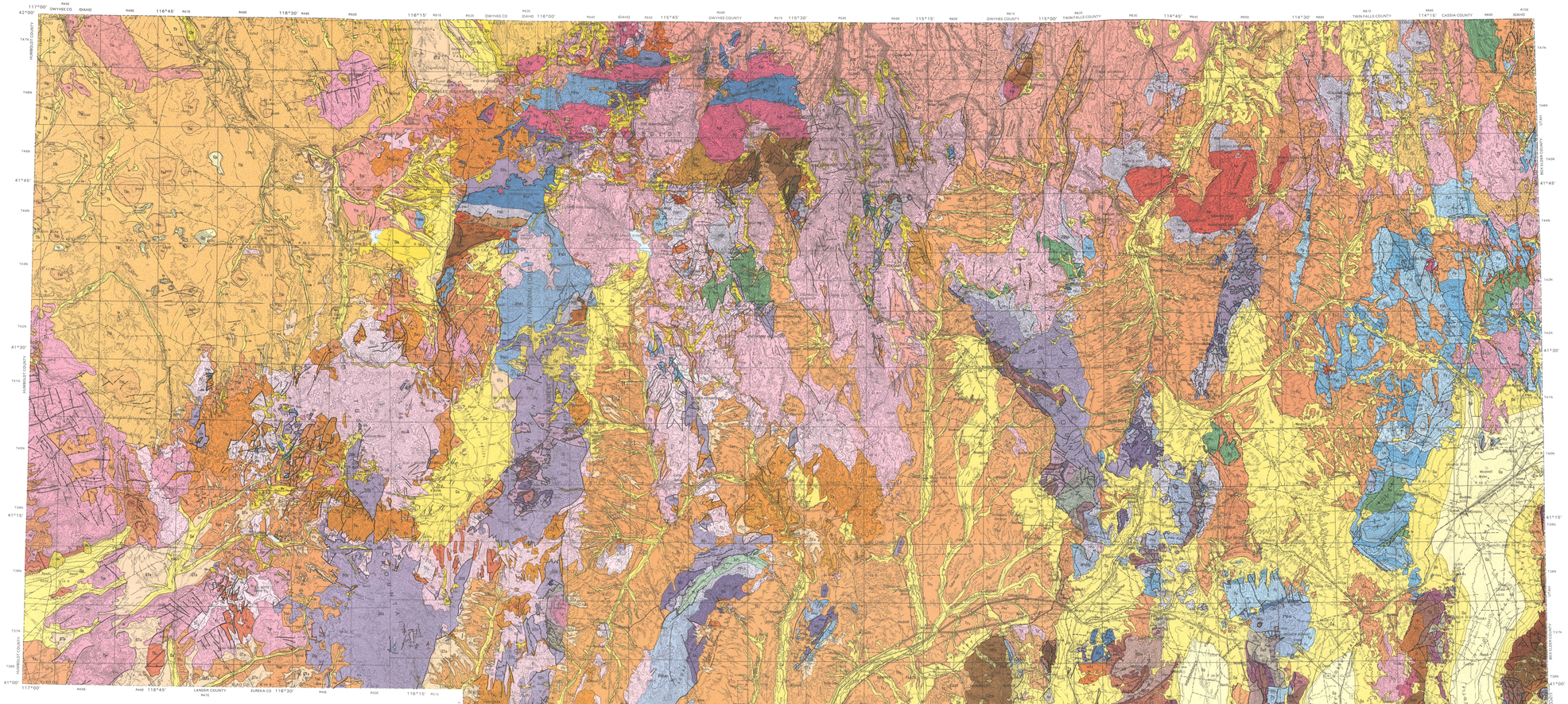
PREPARED IN COOPERATION WITH THE U.S. GEOLOGICAL SURVEY



GEOLOGIC MAP OF ELKO COUNTY, NEVADA

Robert R. Coats

Scale: 1:250,000

0 5 10 15 miles

0 5 10 15 20 25 kilometers

CONTOUR INTERVAL 200 FEET
WITH SUPPLEMENTARY CONTOUR AT 100 FOOT INTERVALS
DATUM IS MEAN SEA LEVEL

Contact

Fault, dashed where approximately located, dotted where concealed, ball on downthrown side

Thrust fault, dashed where approximately located, sawteeth on upper plate

Fold Axes

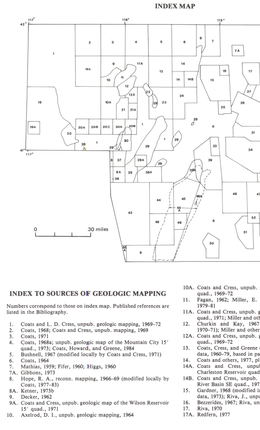
Anticline, showing direction of plunge

Overturned anticline

Syncline, showing direction of plunge

Overturned syncline

INDEX MAP



INDEX TO SOURCES OF GEOLOGIC MAPPING

Numbers correspond to those on index map. Published references are listed in the Bibliography.

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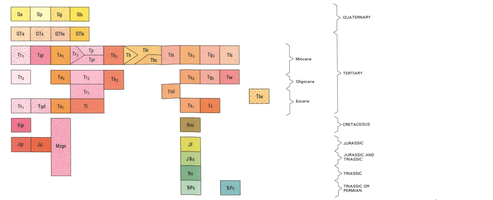

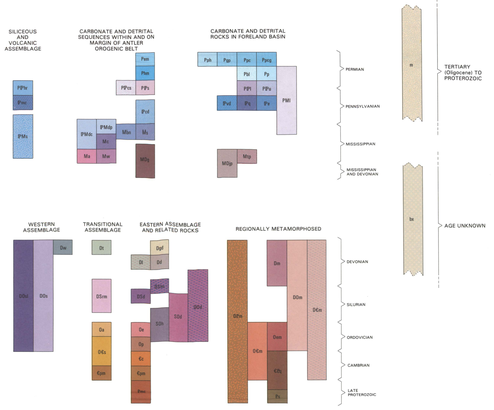

DESCRIPTION OF MAP UNITS

[Numbers in brackets refer to areas on the index map]

Qa ALLUVIUM—Silt, sand, and gravel along present streams. Includes alluvial fans

Qp PLUVIAL LAKE DEPOSITS—Includes beach-and-bar gravel and playa silt

Qg GLACIAL MORAINES AND ROCK GLACIERS

Qls LANDSLIDE DEPOSITS AND COLLUVIUM

Qfa OLDER ALLUVIUM—Boulder gravel and sand deposits on high-level stream terraces

Qfs SEDIMENTARY ROCKS—Tuffaceous limestone, silt, and sand, locally indurated. Includes the Hay Ranch Formation

Qfts HOT-SPRING TRAVERTINE AND SINTER

Qfls LANDSLIDE DEPOSITS AND COLLUVIUM

Tr_2 PYROXENE PHENODACITE IGNIMBRITE—Phenocryst poor; contains oligoclase, sanidine, pigeonite, and augite. Many coarse vitrophyric clasts

Tgr ALASKITIC GRANITE—Extreme range in texture

Tap PYROXENE AND HORNBLENDE PHENGANDESITE AND PHENODACITE AND PHEDONITE PHENOANDESITE—Dark-gray- to dark-brown-weathering [5, 4]. Includes the Gods Pocket Dacite

Tr_1 PHENORHYOLITIC AND PHENODACITIC FLOWS AND DOMES—Sanparic, containing sparse to common, large vitrophyric clasts

Tgr JARBIDGE RHYOLITE—Light-brown-weathering phenocryst-rich lacmagenic rhyolite and minor tuff. Occurs mostly as flows and some domes

Tgr PORPHYRITIC PHENORHYOLITIC AND PHENODACITIC FLOWS AND DOMES—Commonly as domes. Phenocrysts abundant; commonly contains sanidine, quartz, and oligoclase [19]

Tb BASALT—In the Sheep Creek Range [19] and the Dairy Valley quadrangle [8]

Tbi BIG ISLAND FORMATION (Miocene)—Tb; tholeiitic olivine basalt, overlying and underlying gravel, minor amounts of rhyolite tuff directly beneath basalt; Tb, basalt flows; Tbc, basaltic cinder, tuff, and lava cones

Tb

Tbc

Ts_3 IGNIMBRITE, TUFF, AND SEDIMENTARY ROCKS—Includes the Silverada Volcanics and the Cougar Point Welded Tuff

Ts_2 SEDIMENTARY AND VOLCANIC ROCKS—Tuff, vitric ash, tuffaceous siltstone and sandstone, conglomerate, and limestone. Includes the Humboldt Formation and the Young America Gravel and Sheep Creek Tuff

Tsg GRAVEL—Includes the Side Creek Gravel [6] and mudflow deposits of Walker Mountain

Ts_1 LANDSLIDE DEPOSITS—Poorly sorted volcanic debris [14B]

Ti_2 PHENORHYOLITIC TO PHENODACITIC IGNIMBRITE—Locally vitrophyric, commonly contains phenocrysts of biotite, as well as hornblende, quartz, plagioclase, and sanidine. Includes ignimbrite of Willow Creek [1]

Tap PHENANDESITIC AND PHENOLATITIC FLOWS AND PYROCLASTIC ROCKS—Commonly contains phenocrysts of hornblende and pyroxene

Ti_1 PHENORHYOLITIC AND PHENODACITIC TUFF, FLOWS, AND DOMES—Characterized by small sparse crystals of biotite. Relatively fine grained and generally hydrovitrophyric

Tu TUFFACEOUS AND CLASTIC SEDIMENTARY ROCKS—Includes minor amounts of tuff and welded tuff; near Mountain City, contains Arikareean fossils; includes the Danger Point Tuff [6]

Tg GRAVEL—Locally tuffaceous

Tw WELDED TUFF, TUFFACEOUS SEDIMENTARY ROCKS, VITRIC ASH AND TUFF, AND LAVA—Include limestone, tuffaceous limestone, and soil horizons. Include the Indian Wash Formation [6]

Tb_2 BASALT, BASALTIC TUFF, AND TUFF BRECCIA—Alkali olivine basalt, commonly porphyritic, containing sparse to common, large to very large phenocrysts of labradorite; groundmass commonly contains abundant magnetite and olivine. Tuff breccia and tuff horizons are present. Include the Seventy Six Basalt of Gilmpster or Mittenge [6, 8, 14]

Tr_3 RHYOLITIC TO DACITIC FLOWS AND DOMES—Mar Hickey quartz latite. Includes the Grotzenbach Rhyolite and rhyolite of Walker Mountain

Tmd TUFF, SEDIMENTARY ROCKS, AND LAVA—Includes tuff and gravel of Tordjan Creek

Tbr BRECCIA—Volcanic breccia of late Tertiary age; also includes breccia of underlmined age

Tr_1 PHENORHYOLITIC TO PHENODACITIC IGNIMBRITE—Commonly microcrinic; may also contain hornblende, augite, and hypersthene. In many places just high concentrations of phenocrysts, and xenoliths of chert of the Valmy Formation

Tgr GRANODIORITE, QUARTZ MONZONITE, AND GRANODIORITE AND QUARTZ MONZONITE PORPHYRY—Commonly contains biotite and, locally, augite or hornblende

Ta_2 ANDESITE TO LATITIC FLOWS AND PYROCLASTIC ROCKS—Phenocrysts are generally plagioclase, hornblende, pyroxene, locally biotite, or any combination of these mafic minerals. Includes the Cherry Creek [5, 4]

Ta_1 LATITIC ROCKS—Flows and also tinders. Dark-gray to black, holocrystalline to hypocrystalline very fine grained rocks, locally vesicular, containing olivine, hypersthene, labradorite, and pennatum feldspar

Ts SEDIMENTARY ROCKS—Limestone (locally cherty), conglomerate, sandstone, claystone, siltstone, shale (including micaceous shale and oil shale), and tuff. Limestone is gray to tan or white [6]; includes the Elko Formation

Tcs CONGLOMERATE (Eocene and Eocene?)—Fragments, generally chert and quartzite, commonly have siliceous cement and be stained by iron oxide; matrix is TS_2, commonly only a few inches; may contain tuffaceous sandstone and siltstone. Locally contains limestone pebbles; includes the Meadow Peak Formation [6]; includes limestone clast conglomerate [6]

Kgr GRANITE—Commonly biotitic. Includes granodiorite and quartz monzonite that contain biotite or hornblende, or both

Kmc NEWARK CANYON FORMATION (Upper and Lower Cretaceous)—Nonmarine conglomerate, sandstone, siltstone, shale, and limestone. Clastic rocks commonly gray, tan, brown, and red. Clasts may be as large as 1 ft in diameter and include volcanic rock, sandstone, quartzite, chert, limestone, and siliceous limestone. Limestone is dense, silty, and red; has no clastic tan [6]

GN_2 GNEISS—Granodiorite and quartz monzonite gneiss in the Ruby Mountains

Jg GRANITE

Jd DIORITE—Locally includes granite and granodiorite

Jf FRENCHIE CREEK RHYOLITE (Upper Jurassic)—Rhyolite flows and other volcanic rocks; contains some sedimentary rocks [6]

Jhs NONMARINE SEDIMENTARY ROCKS—Possibly correlative with the Chinle Formation and the Aztec Sandstone of southern Nevada and with the Nugget Sandstone of Wyoming

Jhs MARINE SEDIMENTARY ROCKS—Includes the Dinwoody(?) and Thaynes(?) Formations and unnamed Lower Triassic rocks [15, 14]

Ish SEDIMENTARY AND VOLCANIC ROCKS—Silty limestone, shale, and minor greenstone at north end of Adobe Range [29]; Long Canyon and Adobe Range Formation

Ish MARINE CONGLOMERATE—Locally contains limestone cobbles and quartz [14]

SILICEOUS AND VOLCANIC ASSEMBLAGE

PIPw SHAVALLAH AND RESERVATION HILL FORMATIONS—Metagraywacke, fine-grained dolomitic sandstone and siltstone, gray siliceous dolomitic limestone, and minor meta-andesite [1, 4, 14]

PPm MITCHELL CREEK FORM—Limestone and dolomite [1]

PPsc SCHOONOVER FORMATION (Pennsylvanian and Upper Mississippian (Chesterian))—Sandstone, chert, minor limestone, and andesitic lava [11]

CARBONATE AND DETRITAL SEQUENCES WITHIN AND ON THE MARGIN OF THE ANTLER OROGENIC BELT

Pen EDNA MOUNTAIN FORMATION—Coarse-grained, buff-weathering sandstone, typically chert-quartz arenite but can be conglomeratic or very fine grained locally

Pss SANDSTONE AND SILTSTONE OF HORSE MOUNTAIN—Medium-grained, brown-weathering sandstone containing mostly chert fragments, and dark-gray to black siltstone

PIPq CARLIN SEQUENCE (amended)—Includes the Buckskin Mountain, Beacon Flat, Carlin Canyon, and Webb Formations and, locally, the Strathern Formation at its base

PIPy STRATHERN FORMATION (Lower Pennsylvanian and Upper Mississippian)—Limestone, conglomeratic near base; includes the Sunflower Formation [6, 5, 43]

IPsd CARBONATE AND DETRITAL ROCKS (Middle and Lower Pennsylvanian)—Cherty limestone, sandy and silty limestone, and conglomerate. Includes the Moleen and Tomera Formations, undivided

PMds DIAMOND PEAK AND CHAINMAN FORMATIONS, UNDIVIDED (Lower Pennsylvanian and Upper Mississippian)—Conglomerate, sandstone, shale, and minor limestone

PMdp DIAMOND PEAK FORMATION (Lower Pennsylvanian and Mississippian)—Conglomerate, sandstone, shale, and minor limestone

Mbr BANNER AND MILSON FORMATIONS (Mississippian)—Limestone containing quartzite-cobble conglomerate, grading upward through pyrite-to-meta-andesite [5, 4]. Includes the Diamond A Formation

Ms SEDIMENTARY CLASTIC AND LIMY ROCKS (Mississippian)—Conglomerate, sandstone, and limestone

Mc CHAINMAN SHALE (Mississippian)—Shale and sandstone. Includes the Mountain City Formation, consisting of shale and calcareous shale, locally metamorphosed to schist and slate. Also includes slate and phyllite of Silverado Mountain [5, 4]

Mal ARGILLITE OF LEE CANYON (Lower Mississippian)—Black siliceous argillite [43]

Mw WEBB FORMATION (Lower Mississippian)—Mudstone and claystone, minor sandstone and limestone [43]

Mgr GROSSMAN FORMATION (Mississippian?)—Coarse conglomerate, siltstone, sandstone, and phyllite [1, 6]

CARBONATE AND DETRITAL ROCKS IN FORELAND BASIN

Pzp PHOSPHORIA FORMATION—Chert, phosphatic mudstone, siltstone, and limestone. Includes the Meade Peak Phosphatic Shale and Rex Chert Members and a dolomitic member

Pzg GERTSER AND PHOSPHORIA FORMATIONS, UNDIVIDED—Carbonate rock, chert, and phosphorite; includes the Murdock Mountain Formation

Pzc PARK CITY GROUP—Includes the Kaibab Limestone and the Plympton, Grenier, Murdock Mountain, Grandeur, and Phosphoria Formations [46, 50, 51, 54]

Pzrg GRANDEUR FORMATION—Carbonate rocks and chert

Pzl UNNAMED BIOCLASTIC LIMESTONE (Lower Permian)—In the Leach Mountains

Pz PEQUOP FORMATION (Lower Permian)—Fusulinid limestone. As mapped, locally includes the Lower Permian and part of the Arizona Formation in southern part of county

PIPt LIMESTONE AND DOLOMITE (Pennsylvanian and Mississippian)—Includes the Riva (1970) in the HD Range [17] and the Rib Hill Formation, the Ruby Spring Limestone, and the Moorman [46], and the Ferguson Mountain Formation, all Lower Permian, in southeastern part of county

PIPs UNDIVIDED LIMY ROCKS (Lower Permian to Lower Pennsylvanian)—Includes the Strathern, Rib Hill, Ferguson Mountain, and Pequop Formations in the Leppy and Pilot Ranges [36, 42]

PMl LIMESTONE, SHALE, CHERT, ORTHOQUARTZITE, AND QUARTZ SILTITE (Lower Pennsylvanian and Upper Mississippian)—Include the Chelle, Strell, Poorman Peak and Hammond Canyon Formations [8, 13, 14]

Pvd VAN DUZER LIMESTONE (Middle Pennsylvanian)—Limestone and shaly limestone [1, 4, 5, 9]. Contains Desmoinesian marine fossils

Pq QUIJICI FORMATION (Middle Pennsylvanian)—Limestone, siltstone, sandstones, and chert conglomerate of Desmoinesian age

Pe ELY LIMESTONE (Middle and Lower Pennsylvanian)—Limestone, cherty bioclastic. Includes the Hogan Formation [40]

Mtp TRIPON PASS LIMESTONE (Lower Mississippian)—Clastic limestone, argillite, quartz siltstone and quartz arenite, and quartz-chert arenite [36]. Also includes an unnamed Kinderhookian limestone in the Poka Hills, and the Camp Creek sequence in the Swales Mountain area (Ketner, 1975b)

Mdsu DIANA LIMESTONE AND PILOT SHALE, UNDIVIDED (Lower Mississippian and Upper Devonian)—Limestone and argillaceous limestone and carbonaceous shale

WESTERN ASSEMBLAGE

Dw WOODRUFF FORMATION (Devonian)—Dark siliceous mudstone, shale, chert, siltstone, and dolomite; contains some limestone, sandy limestone, and calcareous sandstone [43]

DSs SILTSTONE, SHALE, CHERT, SILTSTONE, GRAY QUARTZITE, GREENSTONE, AND MINOR LIMESTONE (Devonian, Silurian, and Ordovician)—Includes the Valmy, Vinini, Roberts Mountain, Ione, Antelope Valley, Ian Tree Limestone, and the Fourth Fork sequence of Ketner (1975)

Ol LIMESTONE (Devonian and Ordovician)—Bioclastic and bioformal limestone, sandy limestone, dolomitic siltstone, and dolomite. Includes the Tiner Limestone

TRANSITIONAL ASSEMBLAGE

St PLATY SILTSTONE, LIMESTONE, AND SHALE (Devonian) [13, 30]

DSm ROBERTS MOUNTAINS FORMATION (Lower Devonian to Lower Silurian)—Platy siltstone and dolomite [1, 21, 30]

Oa AURA FORMATION—Brown to black phyllite, partly calcareous, also contains chert and quartzite [9]

Sd SHALE, PHYLLITE, AND LIMESTONE (Ordovician and Cambrian)—Includes the Tonnesse Mountain Formation [5] and an unnamed shale in the Snake Mountains [23, 25]

Pm PROSPECT MOUNTAIN QUARTZITE (Lower Cambrian)—Quartzite with phyllite interbeds

EASTERN ASSEMBLAGE AND RELATED ROCKS

DgF GUILMETTE AND DEVILS GATE FORMATIONS (Upper and Middle Devonian)—Dolomite

Dl LIMESTONE (Devonian)—[15, 21, 30, 37]

Sv SEVY, SIMMONS, AND NEVADA FORMATIONS (Middle and Lower Devonian)—Light- to dark-gray limestone and dolomite

SDd LONE MOUNTAIN DOLOMITE (Devonian and Silurian)—Includes some Devonian rocks in the Sulphur Spring Range

Sd DOLOMITIC LIMESTONE AND DOLOMITE (Lower Devonian and Silurian)—Includes the Lone Mountain and Lakeview Dolomites

SDd DOLOMITIC ROCKS (Devonian, Silurian, and Ordovician)—Mainly dolomite with minor limestone and chert. Includes the Lakeview, Fish Haven, and Sevy Dolomites

Ou PREDOMINANTLY DOLOMITIC ROCKS (Upper and Lower Ordovician)—Nonmarine conglomerate, sandstone, siltstone, shale, and limestone. Clastic rocks commonly gray, tan, brown, and red. Clasts may be as large as 1 ft in diameter and include volcanic rock, sandstone, quartzite, chert, limestone, and siliceous limestone. Limestone is dense, silty, gray and tan to creamy tan [43]

Ou HANSON CREEK FORMATION (Lower Silurian and Upper and Middle Ordovician)—Limestone and dolomite

Ou EUREKA QUARTZITE (Middle Ordovician)—White, brown-weathering orthoquartzite

Ou POGONIP GROUP (Middle and Lower Ordovician)—Includes the Antelope Valley and Goodwin Limestones, the Ninemile, Juno Hill, and Ely Springs Dolomites, the Kanosh Shale, the Swan Peak Quartzite, and the Crystal Peak Dolomite

Ꞓc CARBONATE ROCKS AND MINOR QUARTZITE (Cambrian)—Includes the Pioche, Secret Canyon, and Dunderberg Shale; the Eldorado and Hamburg Dolomites; the Geddes Limestone; and the Windfall Formation

Ꞓm PROSPECT MOUNTAIN QUARTZITE (Lower Cambrian)—Quartzite with phyllite interbeds

Ꞓm McCOY CREEK GROUP (M)—Quartzite and phyllite. Includes other unnamed Proterozoic rocks [6, 13]

REGIONALLY METAMORPHOSED ROCKS

Gm METAMORPHIC ROCKS (Devonian? to Proterozoic?)—Granitic to dioritic gneiss, and biotite and muscovite schist, locally containing silimanite; quartzitic schist, quartzite, calc-silicate rocks, and marble. Includes some younger granitic rocks

Gg GRAPHITIC MARBLE—Metamorphosed Guilmette(?) Formation and Devils Gate(?) Limestone

DOm DOLOMITE MARBLE (Devonian?, Silurian?, and Ordovician?)

CMz CALCITE MARBLE AND DOLOMITIC MARBLE (Devonian?, Silurian?, Ordovician?, and Cambrian?)—In the Pequop Mountains

CMz CALCITE MARBLE—Metamorphosed Pogonip(?) Group and undifferentiated Cambrian rocks

Ꞓq METAQUARTZITE—Possibly metamorphosed Eureka Quartzite

Ꞓq FOLIATED METAQUARTZITE—Prospect Mountain(?) Quartzite in part. May include some Proterozoic schist

Ꞓs SCHIST (Late Proterozoic)—Sillimanite-biotite schist and quartzitic schist

OTHER ROCKS

m MIGMATITE—Contains granodiorite of Oligocene age, granite of Jurassic and Cretaceous age, and quartzite relict of Precambrian and Cambrian age in the Ruby Mountains; includes the Harrison Pass Granodiorite

br BRECCIA—Mostly fault breccia (age unknown)

Base from U.S.G.S. 1:250,000 topo series: Elko, 1972; McDermitt, 1971; Wells, 1970; Winnemucca, 1971