U. S. DEPARTMENT OF THE INTERIOR
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Preliminary geologic map of the New River quadrangle, Maricopa and Yavapai counties, Arizona

by

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[1]Denver, Colorado

DESCRIPTION OF MAP UNITS

a **Artificial Fill**--Boulder to pebble gravel, sand, and silt used as fill beneath highways and in earth-fill dams

Qal **Alluvium (Holocene)**--Gravel, sand,and silt on floodplains of steams and washes. Boulders of basalt as much as 2 m in diameter in Boulder Creek drainage. Thickness 1-5 m

Qtc **Talus and colluvium (Holocene and Pleistocene)**--Angular fragments of rock in various proportions of sand and silt matrix. Deposits derived from basalt contain blocks as large as 8 m in diameter on west side of Wild Burro Mesa. Deposits on New River Mesa Basalt of Gomez (1979) are composed of angular boulders 1-2 m in diameter. Locally cemented by caliche. Grades into pediment gravel downslope Thickness 1-10 m

Ql **Landslide (Pleistocene)**--Blocks of rock in various proportions of silt and sand matrix. Irregular surface topography on more recently active landslides. Landslide 0.7 km north of Gavilin Peak contains angular blocks of latite as much as 1.2 m in diameter cemented by caliche. Thickness 3-10 m

Qpg **Pediment gravel (Holocene and Pleistocene)**--Gravel, sand, and silt mantling surfaces cut on bedrock. Deposits derived from the New River Mesa Basalt of Gomez (1979) contain boulders as much as a meter in diameter. Clasts generally subangular to subrounded but contains rounded to subrounded clasts where derived from Tertiary conglomerate. Surfaces are 5 to 40 m above drainage and are of several ages. Oldest and highest surface in northeast part of quadrangle is graded to the highest terrace (Qtg_3) along the Agua Fria River. Thickness 1-6 m

Qu **Alluvium and pediment gravel (Holocene and Pleistocene)**--East of New River. Thickness 1-3m

Qtg **Terrace gravel (Pleistocene)**--Pebble to boulder gravel, sand, and silt on terraces 5 to 30 m above drainage, mostly along the New and Agua Fria Rivers. Contains rounded to subrounded boulders of basalt as much as 1.5 m in diameter and a variety of other rock types from upvalley. Where terraces of different heights occur in the same area, they are labelled Qtg_1, Qtg_2, and Qtg_3 from lowest to highest. Thickness 1-5 m

Qoa **Older alluvium (Holocene and Pleistocene)**--Boulder, cobble, and pebble gravel, sand and silt along tributary washes. Surface above modern floodplain. Maximum thickness 10 m

Qgm **Sand, gravel and silt (Pleistocene)**--Various proportions of sand, boulder to pebble gravel, and silt at margin of basin in southern part of quadrangle. Boulders of basalt as much as 1.5 m in diameter near north margin of deposit. Clast diameter decreases to south. Corresponds to unit M1 of Demsey (1988) inferred to be of middle to early Pleistocne age. Thickness 5-30 m

Qgo **Sand, gravel, and silt (Pleistocene)**--Various proportions of sand, boulder to pebble matrix supported gravel, and silt at margin of basin in southern part of quadrangle. Caliche cement widespread. Boulders of basalt as much as 1.5 m in diameter near north margin of deposit. Clast diameter decreases to south. Abundant fragments of pedogenic carbonate on surface remnants. Corresponds to unit o of Demsey (1988) inferred to be of early Pleistocene age. Thickness 5-30 m

Qlc **Landslide and colluvium (Pleistocene)**--Boulders, cobbles, and pebbles of basalt containing various proportions of sand and silt matrix. Caps small hills on west slope of Wild Burro Mesa as much as 50 m above slope mantled by Holocene talus and colluvium and conceals tuff and conglomerate unit (Ttc). Includes some younger colluvium derived from this unit. Maximum thickness 10 m

QTg **Boulder gravel, sand, and silt (Pleistocene or Pliocene)**--Gravel containing rounded boulders of basalt, granite, diorite, rhyolite, and vitrophyre as much as 2 m in diameter capping terraces about 60 m above the New and Aqua Fria rivers. Generally cemented by caliche Thickness 3-10 m

Tgy **Boulder gravel (Pliocene or late Miocene)**--Gravel containing rounded boulders of metarhyolite, granite,and basalt as much as 2 m in diameter, as well as a variety of other rock types, capping ridges 120 m above drainage in the northeastern part of the quadrangle west of Interstate Highway I-17. Debris from deposit conceals lower contact and forms colluvial and pediment deposits downslope. In southern part of quadrangle includes highly dissected gravel deposits having a zone of caliche several meters thick near the top (Demsey, 1988). Thickness 3-10 m in the northern part of the quadrangle and at least 20 m thick in the southern part

Tcs **Conglomerate and sandstone (Miocene)**--Gray-weathering, pale gray to brownish gray pebble, cobble, and boulder conglomerate and sandstone in west-central part of quadrangle. Contains boulders as much as 1 m in diameter. Beds typically lenticular and 1-3 m thick. Well-bedded siliceous limestone and calcareous sandstone interbedded with conglomerate near base. Thickness as much as 60 m

Tm **Siltstone and claystone (Miocene)**--Pale brown to pale reddish brown and moderate gray siltstone, claystone, and mudstone containing some beds of silty limestone and a few beds of pebble to cobble conglomerate as much as 0.3 m thick. Marginal lacustrine facies rock and apparently equivalent to upper part of siliceous limestone and limestone (Tl) to the east. Thickness about 30 m

Tl **Siliceous limestone and limestone (Miocene)**--Evenly bedded, very light gray to white siliceous limestone and dolomite and minor calcareous sandstone. Beds 1 cm to 2m thick. Locally contains granules and pebbles of basalt, algal structures, and mudcracks. Gypsiferous or clayey in places. Maximum thickness more than 80 m

Tsc **Sandstone and conglomerate (Miocene)**--Pale brownish gray, gray, pale gray to yellowish gray sandstone, conglomerate, and tuffaceous conglomerate. A few beds of siliceous limestone near the top. Upper part calcareous sandstone and pebble to cobble conglomerate, and mudstone having beds 2-10 cm thick. At the base conglomerate contains boulders of New River Mesa Basalt of Gomez (1979) as much as 1 m in diameter. Some of the basal conglomerate is a sedimentary breccia probably deposited as debris flows. Alluvial facies rock that underlies and is partly equivalent to siliceous limestone and limestone (Tl). Maximum thickness 60 m

Tnb **New River Mesa Basalt of Gomez (1979) (Miocene)**--Dark brownish-gray-weathering, coarse-grained basalt containing plagioclase laths as much as 5 mm long and olivine and pyroxene 0.2-2 mm in diameter. Rock is vuggy and has vesicles in ellipsoidal or pipe-shaped concentrations as much as 1 m long and 0.2 m in diameter. These characteristics are the same as those described by Gomez (1979) and Jagiello (1987) for this unit in areas south and east of the New River quadrangle. Locally has basalt rubble at base. K-Ar whole-rock dates of 14-15 Ma south and east of the New River quadrangle (Scarborough and Wilt (1979). Maximum thickness 70 m

Tb **Basalt (Miocene and Oligocene)**--Olivine, Olivine-pyroxene, and pyroxene basalt, basaltic rubble, and basaltic tuff. Weathers light gray to dark gray. Altered varieties, rubble, and tuff are grayish red to reddish brown. Contains in various proportions in different flows olivine, commonly altered to 'iddingsite', as phenocrysts 1-5 mm in diameter, green to black monoclinic pyroxene as phenocrysts 1-5 mm in diameter, and plagioclase as phenocrysts 0.5-3 mm long. Locally contains quartz xenocrysts. Rare xenoliths of quartzite and greenschist. Some rocks are highly altered and contain calcite-filled amygdules and many calcite veins, and rubble zones have matrix of calcite. In some flows quartz or zeolites fill amygdules. Contains thin interbeds of conglomerate, sandstone, and tuff generally less than 10 m thick and commonly has white tuff at base, which is mapped with the unit where it is thin or poorly exposed. Basalt underlying siliceous limestone (Tl) near Lake Pleasant is cut by moderately dipping to subhorizontal veins of colloform silica, which are locally so numerous that pieces and masses of basalt are inclusions in a siliceous matrix. K-Ar whole-rock dates of 20.5 Ma near the base of the section in the northeastern part of the quadrangle (Eberly and Stanley, 1978) and 26.5 Ma in the northwestern part of the quadrangle (Scarborough, and Wilt, 1979). Maximum thickness 200 m

Ttc **Tuff and conglomerate (Miocene and Oligocene)**--White to very pale gray lithic and crystal-lithic tuff, tuffaceous conglomerate and conglomerate. In western part of quadrangle on the west side of Wild Burro Mesa, on the flanks of Dutch Butte and the mesa to the south, upper part consists of pale reddish brown sandstone, conglomerate, and tuffaceous conglomerate containing clasts of Tertiary felsic volcanic rocks and Precambrian greenschist, metachert, metarhyolite, and quartz. In many places the upper part is underlain by flows of olivine basalt, which are 10 m or less thick and not mapped separately in most places. Lower part is lithic tuff composed mostly of fragments of altered pumice but locally containing fragments of felsic volcanic rock or basalt. In the Indian Mesa-Wild Burro Mesa area basal part of the section is rich in tuff containing fragments of altered basalt. Beds range in thickness from 0.5 cm to 10 m. Unit locally contains one or more unconformities. Deposited on an irregular surface, and, locally, the dips reflect those irregularities. Except for the conglomerate beds, forms a very clay-rich soil. Maximum thickness 200 m

Tc **Conglomerate and sandstone (Miocene)**--Pebbe and cobble conglomerate, sandstone, tuffaceous sandstone, sandy tuff, and tuff in northeast part of quadrangle. Contains lenticular beds of tuffaceous, siliceous, palludal limestone and pale gray to pale brown well-bedded clay. Near top of unit capping the hills near the township line and east of Interstate Highway 17,, pale brownish gray pebble to cobble conglomerate locally containing boulders as much as 0.4 m in diameter in beds 2 cm to 0.5 m thick and containing clasts of Precambrian rhyolite and lesser amounts of Precambrian metavolcanic rock and metachert derived from east of the quadrangle. In lower part conglomeratesare generally finer grained and contain beds of tuff. Sedimentary breccia of angular fragments of latite locally containing some fragments of Precambrian metavolcanic rock occurs in unit where it overlies latite (Tla). In west part of unit near the north edge of the quadrangle contains clasts of granitic rock and gneiss derived from the north or northwest. Western part of the unit contains some basalt cobble to boulder beds. Gradational contacts with predominantly tuff and conglomerate unit (Ttc) underlying and at equivalent stratigraphic level to the northwest. MAximum thickness about 180 m

Tr **Rhyolite (Miocene)**--Fine-grained and siliceous. Composed of sparse phenocrysts of quartz and plagioclase and rare phenocrysts of monoclinic pyroxene and brown hornblende in a matrix of fragments of glassy and cryptocrystalline material. Forms a pipe in basalt (Tb) 60 m in diameter on boundary of Secs. 1 and 2, T. 6 N., R. 1 E. and a dike to the north

Tbt **Basaltic tuff (Miocene and Oligocene)**--In northwestern part of the quadrangle is pale red lithic tuff. Grades upward and to the east and northeast into white tuff containing small proportions of altered basaltic material and larger proportions of altered pumice. In east-central part of the quadrangle east of the New River unit consists of red and grayish red tuff and lapilli tuff that formed part of a cinder cone. Rocks of this unit are soft and form clay-rich soils. Maximum thickness 100 m

Tba **Basaltic vent-facies rock (Miocene and Oligocene)** --Grayish red, pale grayish red to redish-brown altered basalt and crudely bedded agglomerate, cinders and lapilli tuff. Calcite and silica commonly in matrix of agglomerate. Mapped in northwest part of quadrangle. Apparent thickness as much as 50 m but may be thicker

Tla **Latite (Miocene and Oligocene)**-- Pale-orangish gray to yellowish gray-weathering, very pale brownish gray biotite latite containing abundant mafic xenoliths 0.5-6 cm in diameter. Contains sparse phenocrysts of biotite and monoclinic pyroxene in a matrix of plagioclase and pyroxene microlites, glass, and opaque mineral. Mafic xenoliths are biotite-monoclinic pyroxene, garnet-monoclinic pyroxene-amphibole, and monoclinic pyroxene-anorthite-garnet-amphibole. Interpreted to be exogenous volcanic domes partly mantled by and partly underlain by latite breccia (Tlb)

Tlb **Latite breccia (Miocene and Oligocene)**--Flow and tuff breccia composed of angular fragments of biotite latite containing abundant xenoliths. Both overlies and underlies latite unit (Tla). Breccia also occurs in thin, steeply dipping zones along faults and fractures (Mostly not shown on map)

Tlp **Latite plugs (Miocene and Oligocene)**--Hornblende and hornblende-biotite latite underlying Gavilan Peak in southeast corner of quadrangle and also in southwest corner of quadrangle. Contains amphibole phenocrysts 1-5 mm long and rarely as much as 1 cm long, andesine phenocrysts 1-2 mm long, and rare phenocrysts of biotite as much as 1 mm long and of sanidine as much as 1 cm in diameter. Matrix consists of plagioclase, carbonate, opaque minerals and altered amphibole and biotite or glass

Xq **Quartz vein (Early Proterozoic)**--massive white quartz

Xfi **Felsic metaintrusive rock (Early Proterozoic)**-- White to gray, fine- to medium-grained, partly foliated metagranite, metasyenite and metarhyolite. Quartz veins common. Forms sills 1 to 200 m thick parallel with foliation and bedding in the east central part of quadrangle

Xps **Phyllitic slate (Early Proterozoic)**--Gray, dark gray, and purplish gray, very fine-grained phyllite or intensely cleaved slate containing locally graded beds of lithic sandstone and, rarely, pebble conglomerate. Pebbles and sandstone grains are fragments of phyllitic slate. Massive to well-bedded in beds 0.5-8 cm thick; sandstone beds as much as 15 cm thick.

Xmr **Metarhyolite (Early Proterozoic)**--White, fine-grained, quartz-feldspar and sericite-quartz feldspar gneiss probably derived from a crystal-vitric tuff. Euhedral to anhedral phenocrysts of quartz as much as 0.5 mm in diameter in many rocks; euhedral to anhedral phenocrysts of plagioclase as much as 2 mm long and biotite as much as 0.2 mm long in a few rocks. East of the New River locally lacks well-developed foliation. In small area with stippled overprint south of the community of New River metarhyolite has irregular chloritic alteration.

Xgg **Greenschist, greenstone, and phyllite (Early Proterozoic)**--Greenschist, greenstone, biotite-chlorite-sericite phyllite, chlorite-epidote-sericite phyllite. Includes subordinate phyllitic slate, sericite phyllite, thin-bedded greenschist, grayish-brown marble, and rare quartz-feldspar gneiss. Much of the greenstone and greenschist was probably derived from andesitic or basaltic flows. Greenschist having fragmental texture probably has an andesitic or basaltic tuff protolith, and greenschist containing clasts of leucogranite or siliceous metavolcanic or hypabyssal rock probably are derived from tuffaceous conglomerate and conglomeratic tuff. Phyllites probably derived from tuff, tuffaceous shale, and shale. Contains scattered small intrusions of hornblende diorite or gabbro, which are sheared and recrystallized to various degrees. Local lenses of metachert contain various amounts of opaque minerals, and rock adjacent to the lenses commonly is altered to pale brownish gray or pale reddish brown sericite-quartz-feldspar phyllite

Xgd **Greenschist and metadacite (Early Proterozoic)**--Greenschist, greenstone, porphyritic greenstone, biotitic metadacite, chlorite-epidote-albite schist, and biotite-and quartz-bearing schist. Greenstone is locally vesicular containing calcite or chlorite-filled amygdules. Biotite generally 0.1 mm or less in diameter, but locally as much as 0.5 mm. Some rocks have a fragmental texture and may be derived from lithic tuffs and crystal-lithic tuffs

Xbg **Biotite-quartz gneiss (Early Proterozoic)**--Biotite- and muscovite-biotite-quartz gneiss and garnet-biotite-quartz gneiss in northwest corner of quadrangle. Locally has andalusite porphyroblasts as much as 7 mm long that are altered to sericite and minor amounts of chlorite, opaque mineral, garnet, tourmaline, and quartz. Micas formed under synkinematic and postkinematic conditions. Biotite partly chloritized in some rocks and completely chloritized in a few rocks. Grain size is generally 0.2-0.5 mm, except locally garnets are as much as 2 mm in diameter. Protolith probably shaley siltstone and sandstone. Contact with greenschist (Xgs) to the south appears to be gradational.

Xgs **Greenschist (Early Proterozoic)**--Greenish-gray, and green greenschist and greenstone and green, pale greenish gray, and gray phyllite consisting of albite-actinolite-epidote schist, epidote-albite-tremolite phyllite, sericite-epidote-chlorite phyllite, and chlorite-epidote-actinolite schist. Some rocks have fragmental textures. Contains rare layers of metarhyolite 3-4 m thick, pods and lenses of marble and dolomitic marble as much as 2 m thick, and layers of dolomitic sericite phyllite. Protolith probably mostly andesitic or basaltic lava flows and interflow crystal-lithic tuff, calcareous shale, and limestone. In the west-central part of the quadrangle unit includes layers of hornblende gabbro or diorite that are locally metamorphosed to greenschist. These layers are interpreted to be sills, but are not mapped separately because of their small thicknesses, thinly scattered distribution, and indistinct contacts . Unit contains sparse to numerous lenses and layers of metachert 1 cm to 5 m thick having various proportions of opaque minerals and ranging from gray to reddish brown and black and grading to iron formation. Siliceous layers are thicker and longer in the northwestern part of the quadrangle. Thicker layers of metachert or areas containing many thinner layers are mapped separately as the banded iron formation and metachert unit (Xbm)

Xbm **Banded iron formation and metachert (Early Proterozoic)**--White, gray, reddish brown, and black siliceous rock. Largest continuous layers of iron formation and metachert are in northwest part of quadrangle where they are as much as 360 m long and 20 m thick. The larger areas mapped as this unit are in the eastern part of the quadrangle and consist of many lenses and layers of iron formation and metachert intercalated in the country rock, which consists of at least 50% of the rock in the area mapped . Unmapped lenses as much as 2 m thick and 5-10 m long are widespread in mafic and intermediate metavolcanic and metasedimentary rock units (Xgs, Xgg, Xpm)

Xdg **Metadiorite, metagabbro, and greenschist (Early Proterozoic)**--Weakly foliated hornblende diorite or gabbro grading to greenschist and greenstone. The diorite and gabbro contains amphibole as much as 5 mm long altered to tremolite or actinolite, and interstitial sausseritized plagioclase. Locally the coarser grained rock appears to occur as sills in greenschist, but in many places the margins of the coarse grained rock are indistinct due to metamorphism. The metadiorite and metagabbro are more resistant to weathering than the well foliated, finer grained rock and dominate the colluvium on this unit, even though exposures in washes indicate that the coarser-grained rocks make up less than 50% of the unit. Sills of metadiorite and metagabbro occur outside the mapped unit, especially northeast of the northeast end of the unit

Xrm **Metarhyolite and greenschist (Early Proterozoic)**--Sericite-quartz-feldspar phyllite containing layers of greenschist and lenses of metachert in north-central part of quadrangle. Local fragmental texture. Southern part of unit also contains some calcareous phyllite and marble. Probable protolith is rhyolitic tuff and lesser amounts of andesitic volcanic and sedimentary material

Xpm **Phyllite, marble, and greenschist (Early Proterozoic)**--Gray, pale green, and pale greenish gray sericite phyllite, sericite-chlorite phylite, chlorite-sericite-quartz phyllite, chlorite-carbonate-sericite-feldspar-quartz phyllite, calcareous sericite phyllite, calcareous chlorite-sericite phyllite, chlorite-quartz sericite marble, dolomitic sandy marble, marble, quartz-chlorite-plagioclase schist, and greenschist. Some rocks have a fragmental texture or contain anhedral to subhedral plagioclase or quartz and plagioclase grains and are interpreted to be tuffs or tuffaceous sediments. Protoliths of this unit predominantly shale, calcareous shale, tuffaceous shale, and smaller amounts of felsic to mafic tuff, intermediate to mafic flows, and shaly or sandy dolomite and limestone. Contains lenses of metachert as much as 1 m thick containing various amounts of opaque minerals

Contact

High-angle fault--Dashed where inferred; dotted where concealed. Bar and ball on downthrown side. Arrow and number show direction and amount of dip.

Strike and dip of bedding

Inclined

Overturned

Top uncertain

Strike and dip of foliation or cleavage

Inclined

Vertical

Strike and dip of flow foliation

Inclined

Bearing and plunge of mineral lineation--May be combined with foliation and cleavage

Bearing and plunge of fold axis--May be combined with foliation and cleavage

Prospect

Collection site of sample dated by whole-rock K-Ar.--Number is age in millions of years; References: E=Eberley and Stanley, 1978; S= Scarborough and Wilt (1979)

Notes on the Proterozoic Geology

The New River quadrangle and the Daisy Mountain quadrangle to the east are being mapped in order to obtain more detailed information about the significance of the Moore Gulch fault (Maynard, 1986, 1989) at its southwestern limit of exposure. The Moore Gulch fault has been called a major tectonic boundary separating the Yavapai and Mazatzal provinces (Karlstrom and Bowring (1988), a less profound feature separating tectonic blocks (Karlstrom and others, 1987), or a zone of high strain that dies out to the southwest (Anderson, 1989).

The Moore Gulch fault extends from the northern part of the Daisy Mountain quadrangle about 4 km east of the New River quadrangle northeastward for 50 km, and its projection would enter the New River quadrangle at about the middle of its east border. At the north edge of the Daisy Mountain quadrangle, the fault separates a mass of rhyolite and granite on the east, which forms the New River Mountains, from metavolcanics and metasediments on the west that strike into the fault at an angle of 15°. Facing directions of the metavolcanics and metasediments are not known. The rhyolites have been correlated with the 1.7-Ga Red Rock Group (Conway and others, 1987). The rhyolites and granites were called the New River felsic complex and correlated with the Verde River batholith by Anderson (1989). The metavolcanics and metasediments west of the Moore Gulch fault are cut by the 1.72- Ga quartz diorite of Bland (DeWitt, 1991: Bowring and Karlstrom, 1986).

The rocks northwest of the Moore Gulch fault were assigned to the Ash Creek block by Karlstrom and Bowring (1988). In the northern part of the Ash Creek block volcanics in the belt are 1.74 Ga and were deformed before intrusion of the 1.735-Ga Cherry batholith (Karlstrom and Bowring, 1993). Farther south in the Ash Creek block, near the New River quadrangle, no such information is available, and the details of the stratigraphy are too complex to allow correlation between the units dated and the rocks in the New River area. Anderson (1989) called the rocks in this block, except for the northern end, the Black Canyon Creek Group, and he extended that unit into the area of the New River quadrangle northwest of the Moore Gulch fault.

The west edge of the Ash Creek block is formed by the Shylock fault zone. The Shylock fault has been mapped 30 to 80 km north of the New River quadrangle (Anderson and Creasey, 1967; Anderson and Blacet, 1972b), and has a minimum of 8 km of right lateral offset (Anderson and Blacet, 1972a). According to Anderson (1989), stratigraphic markers can be mapped through the highly strained rocks of the Shylock zone and it is a zone of high strain rather than a major discontinuity along a fault. In generalized regional compilations the zone has been extended south and southwest so that it projects through the northwest corner of the New River quadrangle (Karlstrom and others, 1987). Karlstrom and Bowring (1988) interpreted it to be a terrane boundary. Detailed study of the zone about 30 km north of the New River quadrangle revealed that both shortening and left lateral strike-slip motion had occurred along it, but no amounts of offset were given (Darrach and others, 1991). The Shylock zone is within a west-facing stratigraphic sequence composed of bimodal metavolcanic rocks unconformably overlain by discontinuous mafic metavolcanic rocks and by graywacke and pelitic schist (Darrach and others, 1991). The two volcanic rock units are in the Black Canyon Creek Group of Anderson (1989). He placed an unconformity at the base of the metasedimentary rocks, which he named the Cleator Formation.

In the New River quadrangle the garnet-mica gneiss in the northwest corner of the quadrangle may correlate with the metasedimentary rocks in and adjacent to the Shylock zone to the north. However, its contact with greenschist to the southeast appears to be gradational, although exposures are not continuous.

About 20 km WSW from the southwest corner of the New River quadrangle a north- to northwest-facing stratigraphic sequence has metasedimentary rocks overlying iron formation and metavolcanic rocks. A zone of ductile deformation and retrogressive metamorphism is interpreted to be the southwest extension of the Shylock fault zone (Burr, 1991).

On Daisy Mountain 3 km east of the southeastern corner of the New River quadrangle a sequence of metagraywacke and metaandesitic flows dip and face north (Reynolds and DeWitt, 1991). These rocks were called part of the Union Hills Group by Anderson (1989), which he placed stratgraphically between the Black Canyon Group and the younger New River Felsic Complex.

According to Anderson (1989) the Moore Gulch fault zone fingers out into a zone of high strain in the southern part of the New River quadrangle and the succession of rock types there represents a normal stratigraphic section. If the rocks in the northwestern part of the New River quadrangle face west, as extrapolations from areas to the north and southwest suggest, where is the reversal in facing direction needed to form a normal stratigraphic section in the eastern part of the new River quadrangle, assuming that the rhyolite in the southeastern part of the quadrangle is young? All the Proterozoic rocks between the New River in the southeast and map unit Xbg in the northwest corner of the quadrangle are highly strained, as Anderson (1989) observed. There are no persistent lithologic marker horizons that might allow the determination of a major fold and accompanying reversal of facing direction needed to produce a northeast-facing section in the eastern part of the quadrangle. The question of whether the Moore Gulch fault zone dies out in the New River quadrangle depends very much on the interpretation of the stratigraphic relations between the various map units.

Attempts to determine stratigraphic relations by finding primary structures and textures have not yet been successful. In some places where such features have been found in the New River quadrangle, isoclinal folds producing a reversal of facing directions in distances of a meter or two have also been found. Units with well-defined contacts are scarce; many of the units mapped are distinguished entirely by differing proportions of the same rock types. The stratigraphic relations of the Proterozoic units shown on the correlation of map units are based on facing directions obtained in other areas and interpretations of relations between the major groups of rocks by the workers mentioned above. Given the uncertainties inherent in the above criteria, additional structural and/or stratigraphic relations need to be determined in the quadrangle to improve the understanding of the local Early Proterozoic stratigraphic and structural framework.

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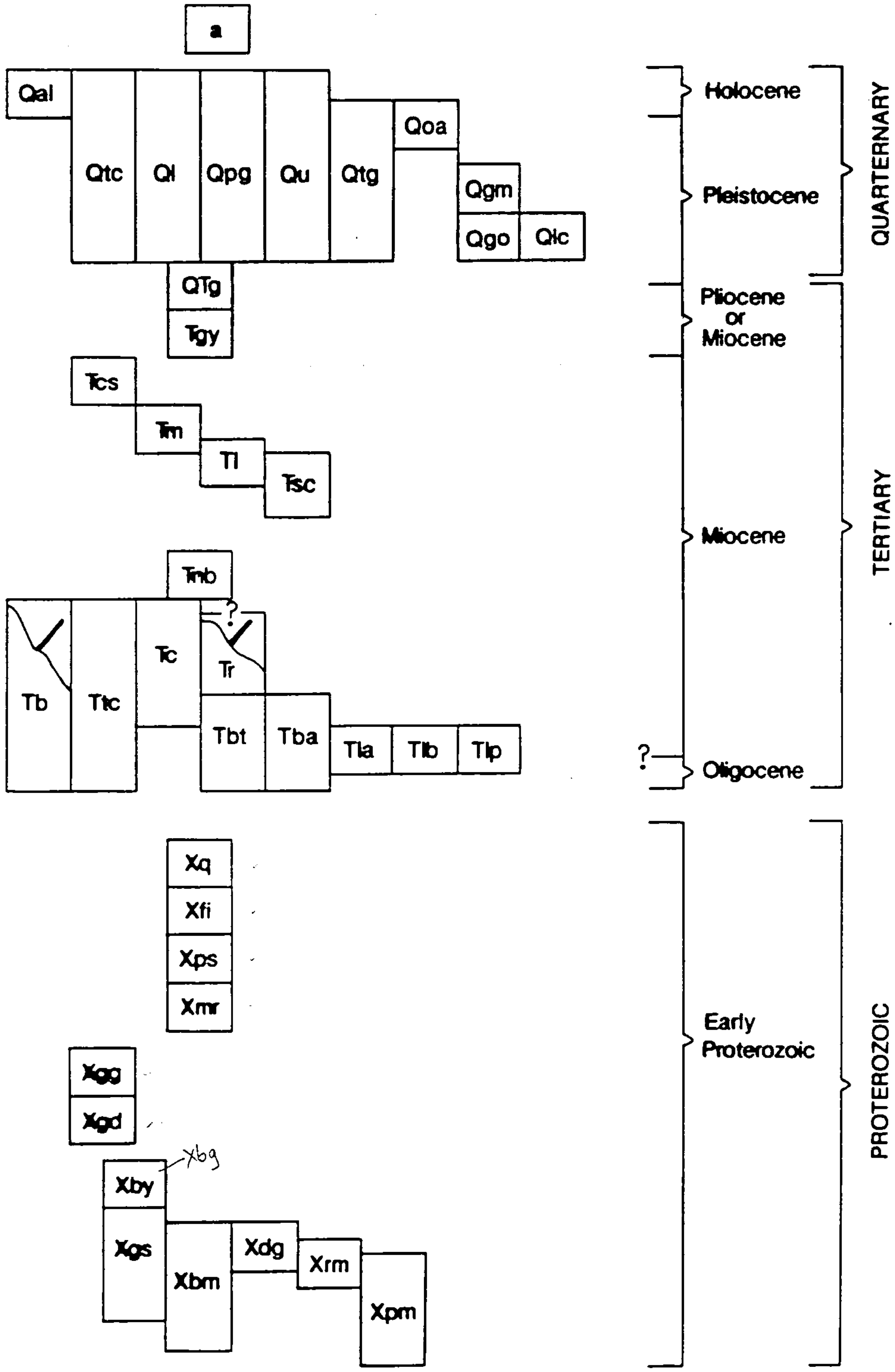
CORRELATION OF MAP UNITS



Note: The stratigraphic relations between the Proterozoic rock units have not been firmly established in the New River Quadrangle. The relations shown here are based on interpretations made elsewhere. See text.

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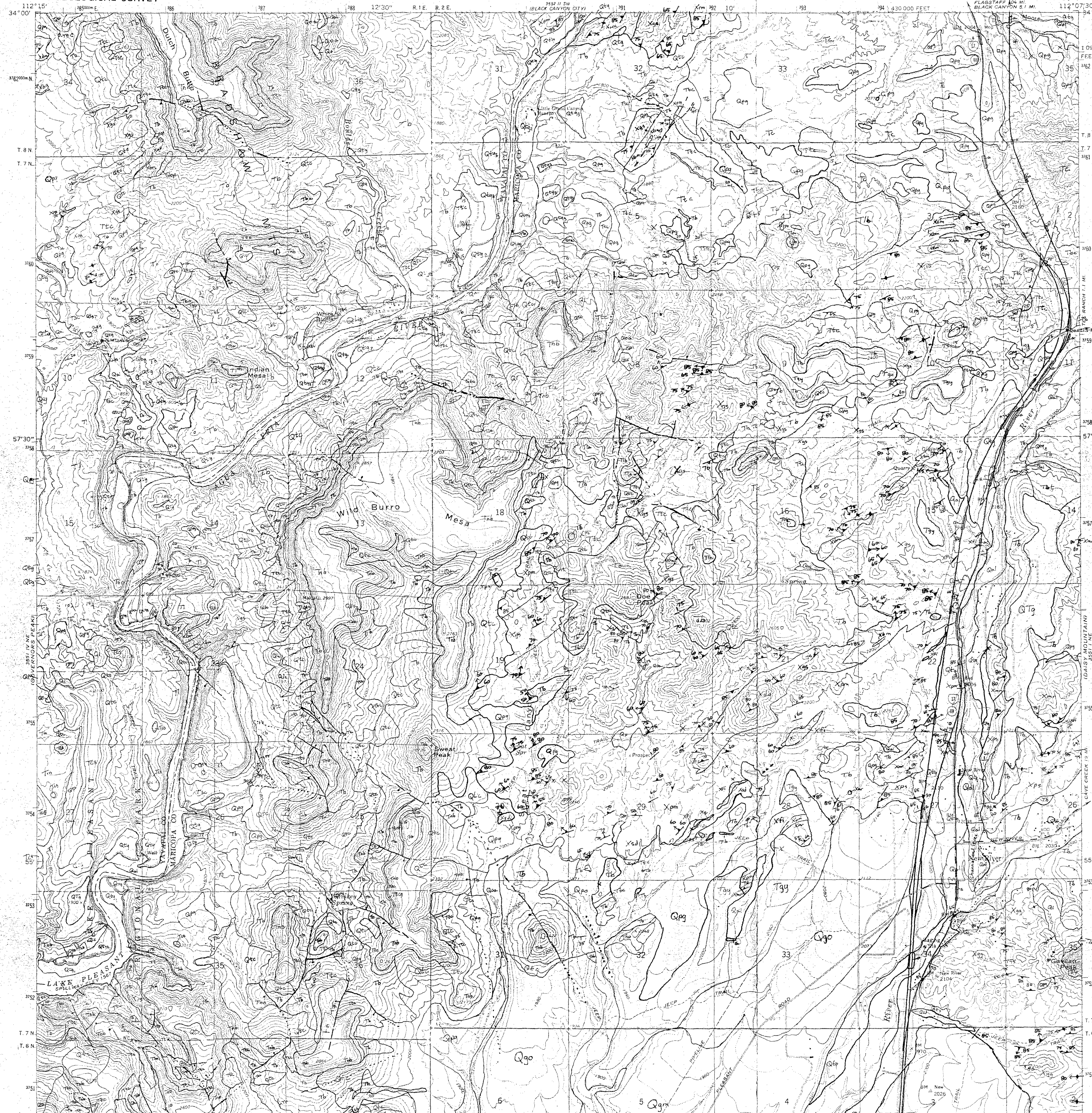

This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American Stratigraphic Code. Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 20-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

ARIZONA
QUADRANGLE LOCATION

Geology mapped 1991-93;
assisted by J.D. Freeman, 1992
and H.N. Hinrichs, 1993

Preliminary Geologic Map of the New River Quadrangle, Maricopa and Yavapai Counties, Arizona

By

Bruce Bryant