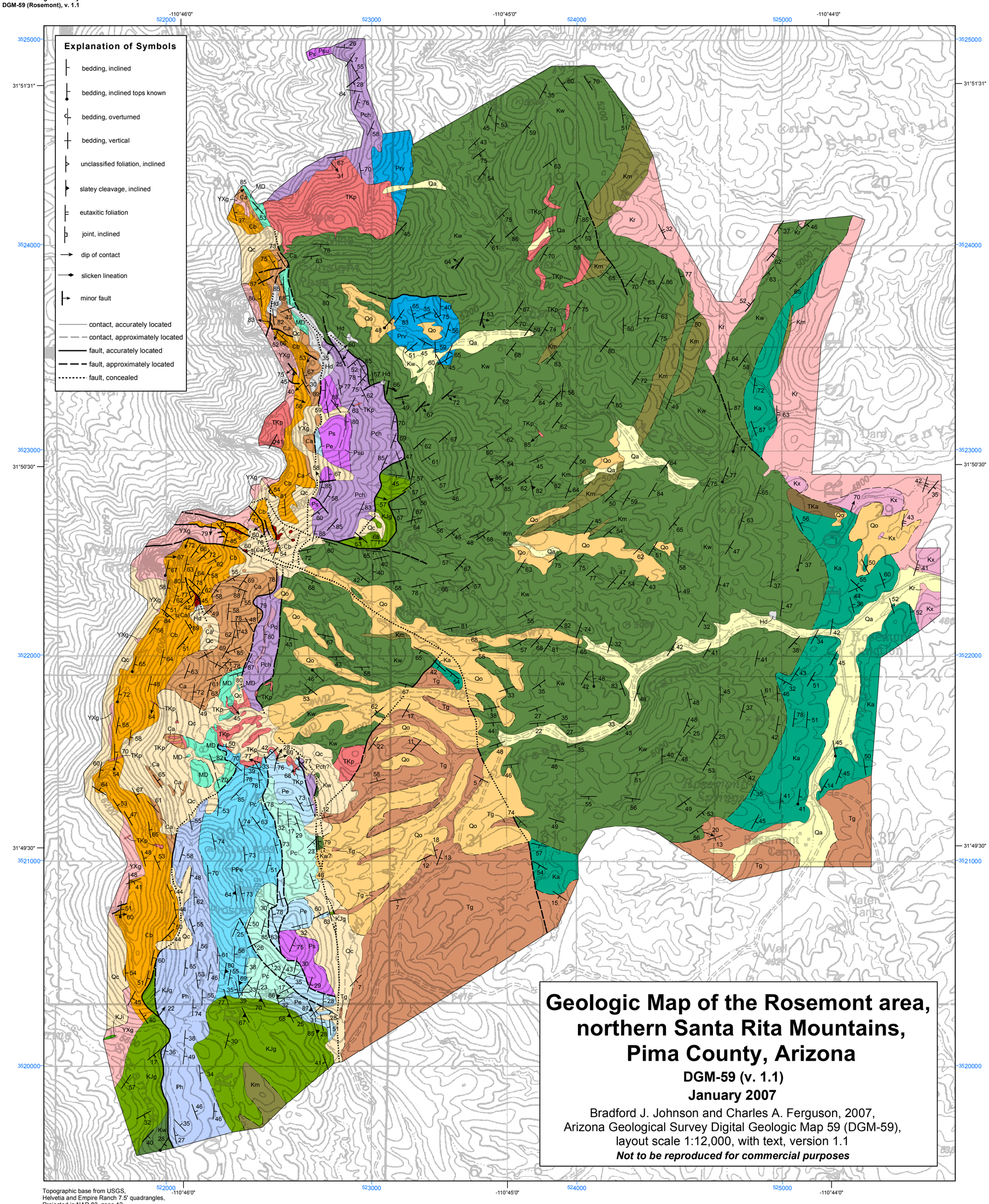
Arizona Geological Survey
DGM-59 (Rosemont), v. 1.1



Geologic Map of the Rosemont area, northern Santa Rita Mountains, Pima County, Arizona

DGM-59 (v. 1.1)

January 2007

Bradford J. Johnson and Charles A. Ferguson, 2007,

Arizona Geological Survey Digital Geologic Map 59 (DGM-59),
layout scale 1:12,000, with text, version 1.1

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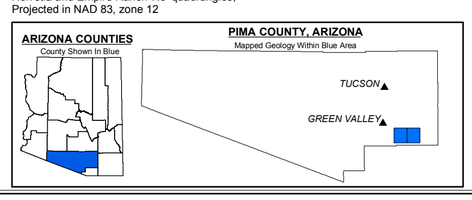
Topographic base from USGS,
Helvetia and Empire Ranch 7.5' quadrangles,
Projected in NAD 83, zone 12

ARIZONA COUNTIES
County Shown In Blue

PIMA COUNTY, ARIZONA
Mapped Geology Within Blue Area



Scale 1:12,000

1 0.5 0 Miles

1,000 500 0 1,000 2,000 3,000 4,000 5,000 Feet

1 0.5 0 1 Kilometers

CONTOUR INTERVAL 40 FEET

N

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Description of Map Units

Hd — **Disturbed areas (Holocene)** – Mine dumps, road ballast, and slag deposits. The unit is mainly represented by a set of heavily vegetated dumps downslope from the Naraganset Mine. A slag deposit in the southwest ¼ of section 29 is also included.

Qa — **Younger alluvium (Holocene – late Pleistocene)** – Alluvium along active streams and washes, locally heavily vegetated. In general the unit includes all alluvium deposits and associated flood-plains incised less than 3 m.

Qc — **Colluvium and talus (Holocene – late Pleistocene)** – Colluvium and talus consisting of subangular to angular pebbles, cobbles, and boulders derived from nearby upslope bedrock units. The unit is shown only in areas where deposits are extensive or where important bedrock contact relationships are buried.

Qo — **Older alluvium (late Pleistocene?)** – Weakly consolidated gravel forming terraces and flat-topped interfluves. Deposits consist of medium- to thick-bedded, sandy, pebble-cobble gravel with rare boulders, ranging from clast-supported to matrix-supported, containing clasts derived from nearby upslope bedrock units. The deposits are generally incised between 4-12 m and locally form cliffs and ledges up to 3 m high. The highest terraces show little evidence of calcic soil development.

Tg — **Gila Conglomerate (Pliocene? – Miocene)** – Light brown, generally medium- to thick-bedded, clast-supported to matrix-supported conglomerate, pebbly sandstone, and sandstone. Clasts range from rounded to subangular and consist of quartz sandstone, carbonate, argillite, hornfels, marble, granitic rock, quartz-feldspar porphyry, and quartz-feldspar phenocryst-rich, welded ash-flow tuff. The clasts reflect the composition of nearby bedrock units, including Paleozoic sedimentary rocks, felsic porphyry (TKp), ash-flow tuff (Kr), and Proterozoic quartz monzonite (YXg). In the southern part of the map area, intervals containing up to 70% subangular to subrounded clasts of potassium feldspar-megacrystic quartz monzonite (YXg) are common. These granitoid clasts are not present in the older alluvial terraces (Qo) and are an important diagnostic characteristic of the Gila Conglomerate along the mountain front. >200m thick.

s — **Skarn (Paleogene – late Cretaceous?)** – Skarn and vuggy, calcsilicate hornfels, characterized by intense iron-oxide and local clay alteration and strong oxide-copper mineralization. Iron oxide (typically hematite) forms dark brown lenses and layers that locally are crudely laminated. In some places, designated as sCa on the map, skarn occurs along the contact between the Bolsa Quartzite (Cb) and the Abrigo Limestone (Ca) and was clearly derived from the latter. In other places the protolith is uncertain, possibilities including the Abrigo Limestone, Bolsa Quartzite, and Willow Canyon Formation (Kw).

TKp — **Quartz-feldspar porphyry (Paleogene – late Cretaceous)** – Light gray to pink felsic porphyry containing 8-15% phenocrysts of anhedral to subhedral quartz (1-5 mm), up to 25% subhedral to euhedral feldspar (3-5 mm, white to pink), and 1-2% biotite. The biotite forms thin 1-2 mm flakes that commonly weather out of the rock. The groundmass ranges from aphanitic to aplitic, is commonly silicified near intrusive contacts, and locally exhibits graphic intergrowths of quartz and cryptocrystalline feldspar. The porphyry forms dikes and small stocks.

TKa — **Andesite porphyry (Paleogene – Upper Cretaceous)** – Strongly altered, fragmental, fine-grained, plagioclase-porphyritic andesite or intermediate intrusive porphyry with up to 10% green crystalline lapilli inclusions. The unit forms an elliptical outcrop belt located along the margin of the Mt Fagan caldera. The age of the unit relative to the Mt Fagan Rhyolite is poorly constrained. The Mt Fagan Rhyolite contains andesitic lithic clasts that may be derived from this unit, but it is possible that the clasts were derived from andesitic lavas within the Bisbee Group (Km) or other andesitic volcanic rocks that are known to underlie the Mt Fagan Rhyolite elsewhere.

Kr — **Mt. Fagan Rhyolite (Upper Cretaceous)** – Phenocryst-rich ash-flow tuff containing up to 40% 1-4mm phenocrysts of quartz, feldspar, and biotite and 1-5% lithic lapilli in a welded to nonwelded, light-colored matrix. The lithic lapilli consist chiefly of feldspathic sandstone and argillite, derived from the Bisbee Group, and fine-grained andesite lava. Other clasts include limestone, and phenocryst-rich rhyolite ash-flow tuff that may have been derived from slightly older deposits of the Mt Fagan Rhyolite. >1,000m thick.

Kx — **Mt. Fagan Rhyolite megabreccia (Upper Cretaceous)** – Zones of the Mt Fagan Rhyolite containing more than 30% lithic blocks larger than 1 m. Lithic clasts consist mostly of feldspathic sandstone and argillite of the Bisbee Group, with subordinate fine-grained andesite. The megabreccia grades over a short distance into zones of clast-supported breccia without ash-flow tuff matrix, then into Mt Fagan Rhyolite (Kr) with sparse lithic clasts.

Ka — **Apache Canyon Formation, Bisbee Group (Lower Cretaceous)** – Medium- to thick-bedded sequences of shale and laminated silty mudstone with subordinate interbeds of dark gray, laminated to thin-bedded, micritic limestone and thin- to thick-bedded feldspathic sandstone. The limestone, which defines the formation, is typically fetid and commonly displays slump-folded laminations and beds. The sandstone is typically thin- to medium-bedded, fine- to medium-grained, and feldspathic. Many of the sandstone beds are plane-bedded with ripple-laminated tops, suggestive of turbidites. The base of the Apache Canyon Formation is defined as the lowest appearance of limestone in the Bisbee Group. >400m thick.

Kw — **Willow Canyon Formation, Bisbee Group (Lower Cretaceous)** – A monotonous succession of medium- to coarse-grained, locally granular to pebbly, feldspathic sandstone and argillaceous sandstone with equal to subordinate amounts of vuggy, silty mudstone. A distinctive interval of volcaniclastic pebble-cobble conglomerate is present near the middle of the unit, below a sequence of mafic lava flows. The conglomerate (identified in the database with the symbol Kwc but not mapped separately) contains up to 70% mafic and intermediate porphyritic igneous clasts along with clasts of chert and quartzose sandstone. Sandstone throughout the formation is feldspathic (typically arkosic arenite) and is cross-stratified to plane-bedded. The sandstone is typically medium- to thick-bedded, but also forms amalgamated tabular sets. ~2,200 m thick.

Km — **Mafic lava, Bisbee Group (Lower Cretaceous)** – A series of at least three mafic lava flows within the Willow Canyon Formation in the northern part of the map area, and within the Glance Conglomerate in the south. The flows are massive to amygdaloidal (calcite and quartz) and typically very fine-grained with sparse mafic phenocrysts up to 2 mm. The matrix consists of fine-grained microlites of plagioclase. Individual flows 10-100m thick.

KJg — **Glance Conglomerate, Bisbee Group (Upper Jurassic and/or Lower Cretaceous)** –Massive to very thick-bedded, clast-supported conglomerate containing pebbles, cobbles, and locally boulders that reflect the composition of underlying Proterozoic through Permian rocks. The basal contact is an angular unconformity that climbs up-section to the east.

KJi — **Glance Conglomerate clastic dike (Upper Jurassic and/or Lower Cretaceous)** – Clast-supported conglomerate composed of pebbles and cobbles of quartz sandstone and granitoid rock, forming a narrow, elongate outcrop approximately 40 m long in the southwest corner of the map area, surrounded by quartz monzonite of unit YXg, tentatively interpreted as a clastic dike.

Prv — **Rain Valley Formation, Naco Group (Permian)** – Gray, medium- to thick-bedded limestone, intercalated with subordinate thin-bedded to laminated, locally ripple-laminated, fine-grained sandstone and siltstone. The unit includes intervals of light gray, fine- to very fine-grained, thick-bedded quartz sandstone in the lower part. 100m thick.

Pch — **Concha Limestone, Naco Group (Permian)** – Light to medium gray, medium- to thick-bedded, massive to planar-laminated, amalgamated, cherty limestone. Chert nodules are characteristically wispy and poorly formed, but locally form lenses several m long. Locally dolomitic, the limestone is mostly micritic but includes skeletal wackestone and possible packstone, which locally contain spiculite beds and brachiopod fragments. 200-250m thick.

Pq — **Quartz sandstone, Naco Group (Permian)** – Fine- to very fine-grained, white to light gray, thick- to medium-bedded quartz arenite, intercalated with carbonate tentatively identified as the Concha Limestone. 0-20m thick.

Psu / Ps — **Scherrer Formation, Naco Group (Permian)** – A unit dominated by light gray to pink, fine-grained, massive, quartzose sandstone. Laminations are rarely preserved. A transitional interval at the top of the unit, locally differentiated as the upper Sherrer (Psu), consists of distinctive, cream-colored, medium-bedded, dolomicrite, poorly preserved siltstone, and argillaceous carbonate rocks. 100-150m thick.

Pe — **Epitaph Formation, Naco Group (Permian)** – A mixed siliciclastic-carbonate unit consisting of purple to reddish, thin- to medium-bedded siltstone and silty mudstone, fine-grained, ripple-laminated sandstone, and light gray to pink, massive to laminated, medium- to thick-bedded, micritic carbonate. The siliciclastic components are commonly metamorphosed to light orange-pink or greenish hornfels, in which bedding is defined by recessive lenticular pits up to several cm long or by alternate resistant and recessive laminations. 75-120m thick.

Pc — **Colina Limestone, Naco Group (Permian)** – Light gray to white, medium- to thick-bedded, amalgamated, micritic carbonate and skeletal wackestone, commonly dolomitic. 50-80m thick.

PPe — **Earp Formation, Naco Group (Permian – Pennsylvanian)** – A mixed siliciclastic-carbonate unit consisting of light reddish brown to light green, thin- to medium-bedded, planar-laminated siltstone, silty mudstone, and very fine-grained sandstone, intercalated with light gray to pinkish gray, thick-bedded, micritic limestone and skeletal wackestone. The siliciclastic components are commonly metamorphosed to light green or orange-pink hornfels. 150-200m thick.

Ph — **Horquilla Limestone, Naco Group (Pennsylvanian)** – Light gray, thin- to thick-bedded, cherty limestone with interbeds of dark gray to green silty mudstone and shale that become more abundant up-section. 200-300m thick.

MD — **Escabrosa Limestone – Martin Formation undifferentiated (Mississippian – Devonian)** – Light gray, medium- to thick-bedded, amalgamated, massive, locally cherty, recrystallized limestone. Massive dolostone or dolomitic limestone is present in the lower portion locally. Although an unconformity is present between the Martin Formation and the Escabrosa Limestone, these units are not preserved well enough in this area to distinguish them from one another. 70-170m thick.

Ca — **Abrigo Formation (Cambrian)** – A sequence of thin- to medium-bedded limestone with siliceous laminations. The lower part contains intercalated fine-grained, parallel-laminated to ripple-laminated, fine-grained sandstone, siltstone, silty mudstone and shale. In much of the map area, the unit has in part been metamorphosed to light pinkish gray to greenish yellow calcsilicate hornfels, which forms resistant outcrops with recessive thin beds, lenses, and laminations. 100-200m thick.

Cb — **Bolsa Quartzite (Cambrian)** – Light gray, medium- to fine-grained, thick- to medium-bedded, quartzose sandstone that forms cliffs and ledges. The lower part is cross-stratified, commonly coarse-grained, and locally feldspathic, with composition apparently ranging from quartz arenite to subarkosic arenite. Pebbly to granular beds occur near the base of the unit, which unconformably overlies quartz monzonite of unit YXg. The upper part of the Bolsa Quartzite is medium gray, fine-grained, commonly bioturbated with *planolites* ichnofossils, and includes up to 30% silty mudstone and shale near the gradational contact with the overlying Abrigo Formation. 80-175m thick.

YXg — **Quartz monzonite (Early or Middle Proterozoic)** – Medium-grained quartz monzonite containing 20-35% megacrysts of potassium feldspar up to 5 cm long, 30-40% plagioclase, 10-15% quartz, and 15-20% altered mafic minerals (epidotized hornblende?).

NOTE: See accompanying text for a more complete map description.