Legend

Geologic Map Units

Quaternary Deposits

- d - Anthropogenic deposit (< 100 years)
- Qy - Holocene alluvial deposits (<10 ka)
- Qy1 - Older Holocene alluvial deposits (<10 ka)
- Qly - Holocene and Late Pleistocene alluvial deposits, undivided (<250 ka)
- Ql - Late Pleistocene alluvial deposits (10 to 250 ka)
- Qls - Landslide Deposits - Marcus Landslide (probably Early to Middle Pleistocene)
- Qm - Middle Pleistocene alluvial deposits, undivided (250 to 750 ka)
- Qm1 - Older Middle Pleistocene alluvial deposits (250 to 750 ka)
- Qmo - Older to Middle Pleistocene alluvial deposits (500 ka to 2 Ma)
- Qo - Early Pleistocene alluvial deposits (750 ka to 2 Ma)
- Qc - Colluvium (probably Early to Middle Pleistocene)
- QTc - Older Colluvium (probably Late Tertiasry to Early Pleistocene)

Younger Tertiary Deposits

- Tsy - Younger sedimentary deposits (Late Tertiary)
- Tsp - Pemberton Ranch Formation (Late Tertiary)

Older Tertiary Deposits

- Tb - Basalt, undifferentiated (Middle Tertiary)
- Tta - Fragmental rock, possibly an ash-flow tuff (Middle Tertiary)
- Tb5 - Resistant ridge-capping volcanic flow (Middle Tertiary)
- Tb4 - Basalt with green spherules (Middle Tertiary)
- Tb3 - Olivine basalt (Middle Tertiary)
- Tt - Tuff (Middle Tertiary)
- Tb2 - Basalt (Middle Tertiary)
- Tb1 - Basalt (Middle Tertiary)
- Tm - Mafic volcanic rocks (Middle Tertiary)
- Tcu - Older Conglomerate, tan upper member (Middle Tertiary)
- Tcl - Landslide block (Middle Tertiary)
- Tc - Older Conglomerate, red lower member (Middle Tertiary)

Tertiary Intrusive Rocks

- Tri - Intrusive rhyolite (Middle Tertiary)

Proterozoic Intrusive Rocks

- Yx - Mylonite (Mesoproterozoic, possibly Grenville)
- Ygm - Medium-grained granite (Mesoproterozoic, possibly Grenville)
- Yq - Quartz (Mesoproterozoic)
- Yg - Coarse-grained granite - Carefree Granite (Mesoproterozoic)
- YXg - Coarse-grained granite - Fountain Hills Granite (Mesoproterozoic)
- YXd - Gabbro (Mesoproterozoic)
- Xgm - Mafic granite - Antiguo granite (Mesoproterozoic)
- Xm - Mafic intrusions (Mesoproterozoic)
- Xf - Quartz porphyry (Mesoproterozoic)
- Xa - Amphibolite. Very small outcrop (Mesoproterozoic)
- Xi - Crystal-rich mafic sill in northwest corner of range (Paleoproterozoic or Mesoproterozoic)

Taliesin Tuff (Mesoproterozoic)

- Xtu - Taliesin tuff, major map unit
- Xtul - Taliesin tuff, lithic-rich and flamme-rich unit
- Xtus - Sandstone unit
- Xri - Intrusive rhyolite (Mesoproterozoic)
- Xss - Quartz sandstone (Mesoproterozoic)
- Xb - Metabasalt (mesoproterozoic)
- Xqh - Quartzite within metabasalt (Mesoproterozoic)
- Xst - Sandstone or tuff (Mesoproterozoic)
- Xr - Fine-grained rhyolite
- Xcx - Conglomerate/Breccia (Mesoproterozoic)
- Xtm - Medio tuff (Mesoproterozoic)
- Xvg - Diamictite (Mesoproterozoic)
- Xtr - Resistant light gray ash-flow tuff

Thompson Peak Tuff (Mesoproterozoic)

- Xtt - Thompson Peak Tuff, lithic-rich unit
- Xqt - Thin sandstone or tuff beds east of Thompson Peak
- Xtg - Dark gray lithic-rich tuff

Slivers of rocks along Thompson Peak thrust fault (Mesoproterozoic)

- Xqc - Clean quartzite

Hondo/Mazatzal Group (Mesoproterozoic and Paleoproterozoic)

- Xquf - Thinly bedded quartzite
- Xqu - Upper Pink Quartzite
- Xqm - Middle, blue-gray quartzite
- Xsm - Schist
- Xs - Phyllite and schist
- Xql - Lower, blue-gray quartzite

Vidato Group (Paleoproterozoic)

- Xtor - Older ash-flow tuff, red-colored
- Xto - Older ash-flow tuff

Enclaves within Carefree Granite at Northern Edge of Map (Paleoproterozoic)

- Xq - Clean quartzite
- Xqs - Micaceous quartzite

Wikajasa Sequence (Paleoproterozoic or Mesoproterozoic)

- Xqcw - Clean quartzite, undifferentiated
- Xqcs - Micaceous quartzite, undifferentiated
- Xq12 - Clean quartzite
- Xq11 - Micaceous fissile quartzite
- Xq10 - Quartzite
- Xq9 - Micaceous fissile quartzite
- Xq8 - Quartzite
- Xq7 - Quartzite
- Xq6 - Quartzite
- Xq5 - Fissile quartzite
- Xq4 - Quartzite
- Xq3 - Micaceous tan phyllite and fine-grained quartzite
- Xq2 - Orange quartzite
- Xq1 - Blue-gray quartzite
- Xc4 - Volcaniclastic conglomerate
- Xc3 - Gray slate and phyllite
- Xc2 - Sandstone and conglomerate
- Xc1 - Volcanic conglomerate

Older Volcaniclastic-rich Portion of the Wikajasa Sequence

- Xq7a - Quartzite
- Xq7b - Quartzite

Contacts and Faults

- contact, accurate
- contact, approximate
- landslide, head scarp
- high-angle normal fault, accurate
- high-angle normal fault, approximate
- high-angle normal fault with ball on down-thrown side
- high-angle normal fault, concealed
- thrust fault, accurate
- thrust fault, concealed
- various annotated contact

Orientation Points

- strike and dip of bedding, inclined
- strike and dip of bedding, vertical
- strike and dip of bedding, overturned
- strike and dip of bedding, approximate
- gently inclined bedding, 0-30 degrees
- inclined foliation, showing strike and dip
- vertical foliation, showing strike
- Approximate plunge direction of inclined lineation or linear structure
- Inclined lineation
- Inclined fold hinge of small, minor syncline
- flow foliation in unit T_r, showing strike and dip
- secondary foliation, showing strike and dip
- mylonitic fabric, inclined
- lineation not associated with foliation
- spring
- flow Foliation alignment in feldspar in unit Yg showing strike and dip

Other Geologic Lines

- anticline axis, accurate
- anticline axis, approximate
- anticline axis, concealed
- syncline axis, accurate
- syncline axis, approximate
- syncline axis, concealed
- younger mafic dike
- older mafic dike
- quartz vein
- rhyolite dike
- granite dike
- overturned anticline axis, concealed, no marker
- overturned syncline axis, accurate, no marker
- overturned syncline axis, concealed, no marker
- overturned anticline axis, accurate, no marker

Access Areas and Selected Features

- Access
- Local Streets
- Regional Streets
- City Roofprints
- Geologic Cross Section Line
- Peaks
- McDowell Park Trails
- Preserve Trails
- Fountain Hills Trails

Geologic Map of the McDowell Mountains, Maricopa County, Arizona

Arizona Geological Survey Contributed Map
CM-18-B, version 1.0, Scale 1:12,000

May 2018

By Steven J. Skotnicki

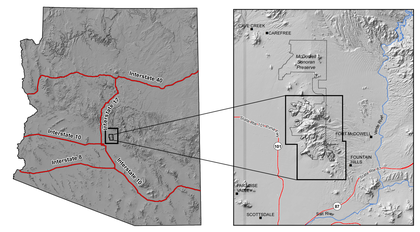
This map was digitized by volunteers with the McDowell Sonoran Conservancy: Bobby Alpert, Con Englehorn, Franco Farina, Jim Frier, Marjorie Gillis, Dan Gruber, Tom Hartley, Ralph Lipfert, John McEnroe, Peggy McNamara, and Brian Munson.

McDowell Sonoran Conservancy

Geologic mapping was funded primarily by the author, with supplementary support by the McDowell Sonoran Conservancy.

The layout for this map was created by Brian F. Gootee, Arizona Geological Survey

Location Maps



1:12,000

1 0.5 0 1 Miles

1,000 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 Feet

1 0.5 0 1 Kilometers

Contour Interval = 20 feet

Magnetic Declination (2017)
At center of sheet

Arizona Geological Survey Contributed Map Series

The Contributed Map Series provides non-AZGS authors with a forum for publishing maps showing Arizona geology. While review comments may have been incorporated, this document does not necessarily conform to AZGS technical, editorial, or policy standards.

The Arizona Geological Survey issues no warranty, expressed or implied, regarding the suit–ability of this product for a particular use.

The author(s) is solely responsible for the map data and ideas expressed herein.

Thompson Peak forms a prominent landmark in this part of the Sonoran Desert. The steep red hills are composed of the upper quartzite unit (Xqu), folded into a north-vergent anticline.

Composed of the oldest rock exposed in the mountain range, McDowell Mountain is made of the older tuff (Xto).

View from the ridge line southeastward toward Fountain Hills.

The McDowell Mountains provide beautiful views of the Phoenix metropolitan area.

The City of Scottsdale surrounds Proterozoic granitic and metamorphic rocks in the McDowell Sonoran Preserve.

Pedestal rocks within the Carefree granite (Yg) north of the Marcus Landslide.

The older tuff (Xto) commonly forms large, platy, foliated blocks at McDowell Mountain.

Aerial view of the Marcus Landslide, looking west. Note the cuspate source area just below the ridge line.

Balanced giant boulder of Yg within the Marcus Landslide.

The Thompson Peak thrust fault follows this valley, thrusting metatuff and quartzite in the distance up over the older tuff (Xto) in the foreground.

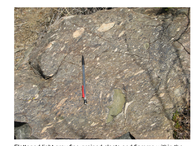
Outcrop of Fountain Hills granite (YXg) south of the Dixie Mine.

The large rounded boulders of the Carefree granite near Pinnacle Peak are prime real estate for homes in the City of Scottsdale.

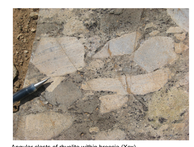
Close-up of the Carefree granite (Yg) showing large K-feldspar crystals.

Strongly foliated mylonite zone within the Antiguo granite (Xgm).

Outcrop of the Antiguo granite showing characteristic dark felty biotite.

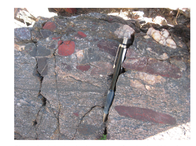


Flattened light gray fine-grained clasts and flamme within the Thompson Peak tuff (Xtt).



Angular clasts of rhyolite within breccia (Xcx).

Quartzite dominates most of the beds of the Wikajasa sequence. This close-up shows large subrounded quartz grains.



Clasts of red chert and vein quartz are found only within a few beds of the Wikajasa sequence in the northwest portion of the mountain range.

Dark flattened flamme and fine-grained clasts within the Taliesin tuff (Xtu).

Close-up of the Fountain Hills granite (YXg).

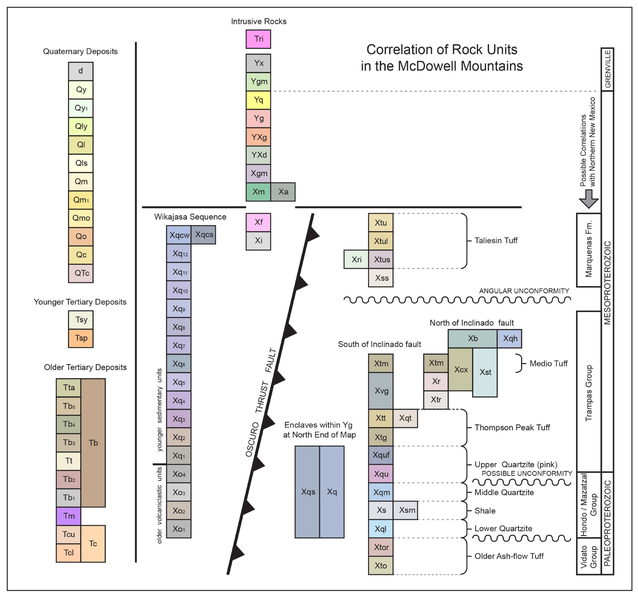
Deformed quartzite clasts within the middle quartzite unit (Xqm).

Outcrop view of red beds (Tcl) containing granitic and metamorphic clasts.

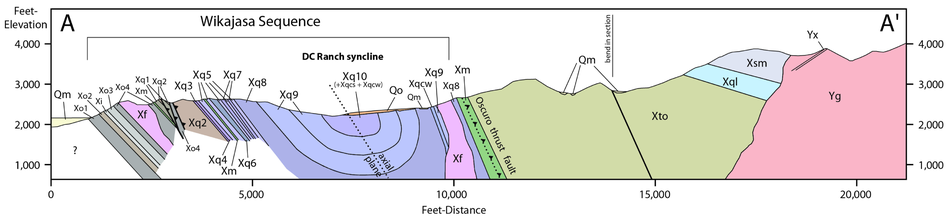
Overturned cross-bedded quartzite within the northeastern limb of the DC Ranch syncline in the Wikajasa sequence.

Panoramic image, looking north, of the road-cut along Shea Blvd showing faulted and tilted Tertiary conglomerate (Tcu).

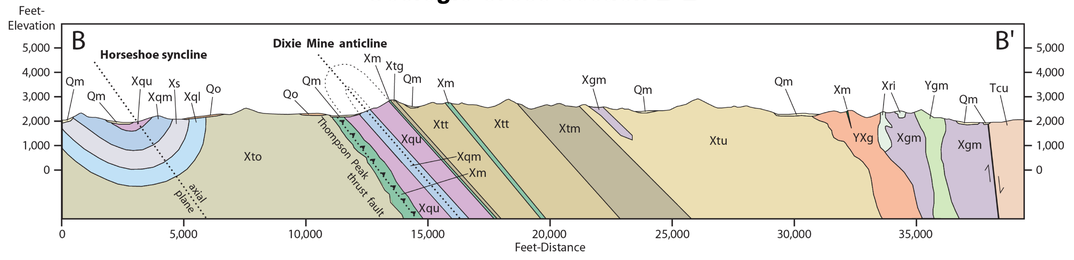
Correlation of Geologic Map Units



Geologic Cross Section A-A'



Geologic Cross Section B-B'



Suggested citation: Skotnicki, S.J., 2018, Geologic Map of the McDowell Mountains, Maricopa County, Arizona. Arizona Geological Survey Contributed Map CM-18-B, version 1.0, scale 1:12,000.

Online access for mobile devices: http://tinyurl.com/GeoMap-McdowellMtns

Arizona Geological Survey
University of Arizona
1955 East Sixth Street, P.O. Box 210284
Tucson, Arizona 85721

Phone (520) 621-2470
Website: azgs.arizona.edu

THE UNIVERSITY OF ARIZONA