THE GEOLOGY OF, AND KNOWN MINERAL OCCURRENCES WITHIN, WILDERNESS STUDY AREAS 4-14 AND 4-16 FISHHOOK - DAY MINE

by
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This report is preliminary and has not been edited or reviewed for conformity with Arizona Geological Survey standards.
Brief summary of geological features and known mineral occurrences

Wilderness Study Areas 4-14, 4-16
Fishhook - Day Mine

1) The Fishhook - Day Mine areas are underlain by middle- to - upper Tertiary age volcanic flows, breccias, and tuffs, and by late Tertiary-Quaternary basin-fill deposits, primarily of alluvial and lacustrine origin (sands, gravels, etc.);

2) The WSA's do not contain any known base or precious metal occurrences;

3) Secondary copper mineral deposits have been reported from fissure veins in middle Tertiary volcanic rocks along the western and southern borders of the WSA's. Other copper deposits are located several miles to the south of WSA 4-16. No production has been recorded from exploration prospects in these areas;

4) Minor occurrences of gold, silver, lead, zinc, and molybdenum are associated with the copper deposits. Mining claim reports indicate that mineral amounts are insufficient to be of economic value;

5) One known occurrence of manganese is located to the south of WSA 4-16 in middle Tertiary volcanic rocks. There are no reports of production;

6) Information concerning mineral types, claim development, and ore production is unavailable for other prospects in this region;

7) The Safford - Lone Star Mining District, to the south of the WSA's, has been actively mined and prospected since the late 1800's. Porphyry copper and related vein deposits of the Safford region are associated with granodiorite plutons (Late Cretaceous-early Tertiary; 67-52 m.y.), located in ENE-trending shear zones that transect Cretaceous-

Tertiary volcanic flows and breccias. Data on mining activity and production are largely non-existent for the many small mines that operated between 1900 and the late 1940's.

For additional discussions of the mineral potential of the Gila Mountains and vicinity, see Bromfield and Shride (1956) and Robinson and Cook (1966).
MINERAL OCCURRENCES IN THE FISHHOOK-DAV MINE AREA
GILA MOUNTAINS
(4-14/4-16)

EXPLANATION
Known mineral occurrences are located by map number, followed by type of mineral deposit. See accompanying table of mineral occurrences.

$X^\text{Cu}$ copper

$X^\text{Mn}$ manganese, psilomelane, manganite

$X^\text{G}$ gravel and sand

$X^? \text{ unknown}$
KNOWN MINERAL OCCURRENCES

FISHHOOKS / DAY MINE AREA (4-14 / 4-16)

Copper and Manganese Deposits

The Gila Mountains are composed of middle-to-upper Tertiary age volcanic flows, breccias, and tuffs. Pyroclastic rocks, including basalts, rhyolites, andesites, and rhyolitic tuffs and breccias of middle Tertiary age are separated from late Tertiary-Quaternary vesicular basalt flows by a structural unconformity. About 1000 feet of these older flows and tuffs overlie exposed Paleozoic rocks in the Gila Range. Well-indurated conglomerate, fanglomerate, breccia, and coarse gravel cover terraces and low ridges sloping down to the Gila Valley on the southwest and the alluvium-filled Ash Flat - Bonita Creek basin on the east.

Secondary copper minerals are contained in fissure vein systems cutting andesitic and basaltic flows (map numbers 6, 16, 16). To the north of the Gila Range, copper sulfides and carbonates occur in a fissure vein transecting Paleozoic sedimentary rocks (map number 2). Minor amount of gold, silver, lead, zinc, and molybdenum have been reported from these vein deposits.

Map number 12 contains a manganese deposit. Psilomelane and manganite occur in irregular veins in sheared andesite (middle Tertiary). There are no records of production from these deposits.

Map numbers 1-5, 7, 9-11, and 13-15 represent exploration prospects with unknown mineral types. Information concerning development and production is unavailable.

MAP NO. 4-14/16 - 1

Mine Borrow Pit

Location T.OIS Sec. 18 Lat. 33-19-16N
Elev. 5100 ft.

Geology Prospect located in middle-upper Tertiary basalt flows interbedded with, and overlaying, Gila-Conglomerate - type sedimentary deposits. Near contact between basalt flow to west and Quaternary alluvium of Ash Flat to east. Basalt flows in region are generally flat-lying and have been little disturbed.

Mineral Products Unknown.

Development and Production Surface exploration, extent of development unknown.

References USBM Files, Borrow Pit
USGS Tule Tubs Quad (1:24000)
Wilson and Moore, 1958
Bromfield and Shride, 1956, p. 627-628
Mine Tribal Claim

Location T.02S  Sec. 33  Lat. 33-13-00N
R.22E  Cen.  Long. 110-05-45W
   Elev. 3200 ft.

Geology Secondary copper minerals in weakly metallized vein paralleling fault that separates Cambrian quartzite to south. From Devonian-Carboniferous limestone to north. Fault strikes N75W and dips 75°NE; vein exposed along fault for distance of about 200 ft. Malachite associated with calcite, specular hematite, and minor amounts of fine-grained pyrite.

Mineral Products Copper sulfides and carbonates: malachite, chalocite, azurite; gold, silver


References
USBM Files, Tribal Claim
USAEC, 1954, A-P-381
Bronfield and Shride, 1956, p. 636
USGS Crib Data, 1979
USGS Bylas Quad (1:62500)

Mine Shaft

Location T.03S  Sec. 18  Lat. 33-10-25N
R.23E  Cen, W½  Long. 110-02-05W
   Elev. 3280 ft.

Geology Workings located in Carboniferous - Devonian limestone exposed between main andesitic flows of Gila Mountains and alluvial terraces of Gila River. Gray, thin - to - thick-bedded, fine-grained fossiliferous limestone of either the Horquilla Limestone (Pennsylvanian) or Escabrosa Limestone (Devonian-Mississippian) formations. Similar limestone deposits to NW (see: Tribal Claims) contain secondary copper minerals in fissure vein systems.

Mineral Products Unknown.

Development and Production Underground exploration prospect; extent of development unknown.

References
USBM Files, Shaft
Simons, 1964, p. 26, 31
Wilson and Moore, 1958
USGS Bylas Quad (1:62500)
MAP NO. 4-14/16 - 4

Mine Shaft

Location  T.03S  Sec. 17  Lat. 33-09-57N  
           R.23E  SW  Long. 110-00-48W  
           Elev. 3520 ft.

Geology Workings located in Carboniferous-Devonian limestone; see map No. 3 for geologic information.

Mineral Products Unknown.

Development and Production Underground exploration prospect; extent of development unknown.

Reference
USBM Files, Shaft
USGS Bylas Quad (1:62500)
Wilson and Moore, 1958
Simons, 1964, p. 26,31

MAP NO. 3-14/16 - 5

Mine Natural and Unnatural Claims

Location  T.03S  Sec. 22  Lat. 33-09-25N  
           R.23E  Elev. 4000 ft.

Geology Claims situated on faulted, middle Tertiary volcanic flows. Pyroclastic rocks in region include basalts, rhyolites, andesites, and rhyolitic tuffs and breccias. Copper, lead, zinc, and molybdenum minerals occur in andesitic flows on adjacent HWR Claim Property.

Mineral Products Unknown.

Development and Production Exploration prospects; extend of development unknown. Claims extend into Sec. 14, 15, 21, 23, 26, 27, 34, and 35, (T.035S, R.23E); adjacent to HWR Claim Group and Carrasco Claims.

References
USBM Files, Natural and Unnatural Claims
BLM Mining Claims Lead File 74063, July 1980
USGS Ft. Thomas Quad (1:62500)
Wilson and Moore, 1958

MAP NO. 4-14/16-6

Mine HWR Claim Group

Location  T.03S  Sec. 25  Lat. 33-08-35N  
           R.23E  Elev. 4200 ft.
           Long. 109-56-17W
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<th>Location</th>
<th>T.035</th>
<th>Sec. 35</th>
<th>Lat. 33-07-00N</th>
<th>Long. 109-57-15W</th>
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<tbody>
<tr>
<td>Location</td>
<td>T.035</td>
<td>Sec. 29</td>
<td>Lat. 33-09-22W</td>
<td>Long. 109-36-04W</td>
<td>Elev. 5360 ft.</td>
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**Geology**  
Mineral deposits in fissure veins in middle Tertiary andesite flow and porphyritic andesite rocks.

**Mineral Products**  
Copper  
Lead  
Zinc  
Molybdenum

**Development and Production**  
Exploration prospect; extent of development unknown. Claims extend into Sections 24, 26, 35, 36 (T.03S, R.23E) and Sections 19, 30, 31 (T.03S, R.24E).

**References**  
USBM Files, HWR Claim Group  
ADMR HWR Claim Group File  
BLM Unpatented Claims Lead File 44315, July 1980  
Wilson and Moore, 1958  
USGS Ft. Thomas Quad (1:62500)

**Mine**  
Carrasco Claims  
(Unpatented Claims—Loma Linda, High Noon)

**Location**

<table>
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<tr>
<th>T.035</th>
<th>Sec. 35</th>
<th>Lat. 33-07-00N</th>
<th>Long. 109-57-15W</th>
<th>Elev. 4000 ft.</th>
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</thead>
<tbody>
<tr>
<td>R.23E</td>
<td>E½</td>
<td></td>
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</table>

**Geology**  
Claims located on fissure veins in middle Tertiary andesite flow and porphyritic andesite rocks. Near contact between Tertiary volcanics and well-indurated Quaternary sediments which include conglomerate, fanglomerate, and breccia in shallowly dipping to flat-lying beds. Copper, lead, zinc, and molybdenum minerals found to north on HWR Claims.

**Mineral Products**  
Unknown.

**Development and Production**  
Exploration prospect; extent of development unknown. Claims extend into Sections 26 and 35, W½ (T.03S, R.23E).

**References**  
USBM Files Carrasco Claims  
BLM Unpatented Claims Lead File 90007, July 1980  
USGS Ft. Thomas Quad (1:62500)  
Wilson and Moore, 1958

**Mine**  
Gravel Pit

**Location**

<table>
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<th>T.03S</th>
<th>Sec. 29</th>
<th>Lat. 33-09-22W</th>
<th>Long. 109-36-04W</th>
<th>Elev. 5360 ft.</th>
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<tbody>
<tr>
<td>R.27E</td>
<td>W½</td>
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</table>
Geology  Weakly to well-indurated conglomerate, fanglomerate, breccia, and coarse gravel in shallowly dipping to flat-lying beds, in SE portion of Ash Flat. Near contact between Quarternary alluvium and exposed basaltic flow to south of workings; separated by an erosional unconformity.

Mineral Products  Gravel

Development and Production  Surface workings; recent producer.

References  USBM Files, Gravel, Pit
USGS Bryce Mountain Quad (1:625000)
Wilson and Moore, 1958

MAP NO. 4-14/16 - 9

Mine  Prospect
Location  T.04S  Sec. 02  Lat. 33-07-07N
R.23E  NE  Long. 109-57-09W
Elev. 3900 ft.

Geology  Prospect located in faulted middle Tertiary andesitic flow. Copper prospects in vicinity.

Mineral Products  Unknown.

Development and Production  Exploration prospect.

References  USBM Files, Prospect
USGS Ft. Thomas Quad (1:62500)
Wilson and Moore, 1958

MAP NO. 4-14/16 - 10

Mine  Prospect
Location  T.04S  Sec. 18  Lat. 33-05-31N
R.23E  Cen, N3  Long. 109-55-28W
Elev. 2640 ft.

Geology  Prospect located in Quaternary - Recent alluvium of the Gila River drainage. Unconsolidated silt, sand, and gravel forms low-lying terraces, overflow channels, and lowland plain supporting the Gila River.

Mineral Products  Unknown

Development and Production  Exploration prospect.

References  USBM Files Prospect
USGS Bylas Quad (1:62500)
Wilson and Moore, 1958
Knechtel, 1938, p. 200
MAP NO. 4-14/16 - 11

Mine Poteet Claims (Marla L., Rams, unpatented claims - Farout, Big Square, Osolomio)

Location T. 04S Sec. 26 Lat. 33-03-01N
R. 24E E2 Long. 109-51-00W
Elev. 3600 ft.

Geology Secondary copper minerals occur in middle Tertiary andesitic flow and porphyritic andesite rocks. Andesite beds generally trend NE; mineral deposits found in fault and fissure vein systems. Claims extended to south and east, into Quaternary-Recent, unconsolidated to well-indurated fanglomerates and gravels, capping low-lying ridges and terrace of the Gila River Valley.

Mineral Products Copper

Development and Production Exploration; no record of production. Claims extend into Sec. 25, 33, 34, 35 (T.04S, R.24E); Sec. 1, 12, 13 (T.05S, R.24E); Sec. 26, 27, 30, 31, 35, 36 (T.04S, R.25E); Sec. 19, 20, 21, 28, 29, 30, 33 (T.05S, R.25E). 

References
USBM Files Poteet Claims
BLM Mining Claims Lead File 50456, 50528, 76551, 34486; July 1980
UGSG Ft. Thomas Quad (1:62500)
USGS Thatcher Quad (1:62500)
USGS Bryce Mountain Quad (1:62500)
Wilson and Moore, 1958

MAP NO. 4-14/16 -12

Mine Voelckel Claims

Location T.04S Sec. 30 Lat. 33-03-47N
R.24E NE of NE Long. 109-55-00W
Elev. 3800 ft.

Geology Small, low-grade manganese deposit in porphyritic andesite (middle Tertiary) within faulted, steeply dipping volcanic rocks composed primarily of rhyolite, andesite, obsidian and interbedded yellow tuffs. Deposit consists of narrow and irregular veins striking NE through sheared andesite and seams that cement andesite breccia. Maximum vein length is 30 ft. Manganese oxides associated with calcite.

Mineral Products Manganese: psilomelane, manganite

Development and Production Exploration prospects; no known production. Claims located in 1914 by Louis Voelckel; development included one 30-ft. tunnel. Assay values (early 1900's) averaged 18-20% MN.

References
ADMR Voelckel Claims File
USBM Files, Voelckel Claims
Jones and Ransome, 1920, p. 129-130
USGS CRIB Data, 1979
USGS Ft. Thomas Quad (1:62500)
MAP NO. 4-14/16 - 13

Mine Bryce Brothers Claims

Location T.04S Sec. 21 Lat. 33-03-52N
R. 25E SW Long. 109-47-06W
Elev. 4400 ft.

Geology Prospect located at or near contact between middle Tertiary andesite flow and middle-late Tertiary porphyritic basalt. Copper prospects in vicinity.

Mineral Products Unknown.

Development and Production Exploration prospect.

References USBM Files, Bryce Bros. Claims
BLM Mining Claims Lead File 40072, July 1980
USGS Ft. Thomas Quad (1:62500)
Wilson and Moore, 1958

MAP NO. 4-14/16 - 14

Mine Robin Claims
(Orbit, Orbitter)

Location T.04S Sec. 25 Lat. 33-03-15N
R.25E W\text{\textsubscript{2}} Long. 109-44-20W
Elev. 4800 ft.

Geology Claims located on faulted, middle Tertiary andesitic flow and porphyritic andesite rocks. Adjacent Poteet Claims to north and south report copper deposits.

Mineral Products Unknown.

Development and Production Exploration prospect; extent of development unknown. Property borders Poteet Claim Group.

References USBM Files, Robin Claims
BLM Mining Claims Lead File 76436, July 1980
USGS Bryce Mountain Quad (1:62500)
Wilson and Moore, 1958

MAP NO. 4-14/16 - 15

Mine Quarry

Location T.05S Sec. 12 Lat. 33-00-45N
R.25E Cen., E\text{\textsubscript{1}} Long. 109-43-38W
Elev. 4360 ft.
Geology  Quarry located on or near contact between middle Tertiary andesitic flow and north and middle-late Tertiary porphyritic basalt to south. Andesite beds regionally trend NE and dip fairly steeply, while basaltic flows and interbedded sedimentary rocks are generally flat-lying.

Mineral Products  Unknown.

Development and Production  Surface workings; extent of development unknown.

References
  USBM Files Quarry
  USGS Bryce Mountain Quad (1:62500)
  Bromfield and Shride, 1956, p. 626-630
  Wilson and Moore, 1958

  MAP NO. 4-14/16 - 16

Mine  Peck Claims

Location  T.05S  Sec. 23  Lat. 32-59-00N

Geology  Secondary copper minerals occur along fault zones in middle-late Tertiary basaltic flows interbedded with, and overlying, Gila Conglomerate-type sedimentary rocks (Pliocene-Pleistocene).

Mineral Products  Copper

Development and Production  Exploration prospect. Unpatented claims extend into Sec. 13, 14, 26, 27 (T.05S, R.25E).

References
  USBM Files, Peck Claims
  BLM Mining Claims Lead File 1705, July 1980
  USGS Thatcher Quad (1:62500)
  Wilson and Moore, 1958

  MAP NO. 4-14/16 - 17

Mine  Mardi Gras Claims

Location  T.05S  Sec. 35  Lat. 32-57-30N

Geology  Copper minerals occur along fault zones in middle-late Tertiary basaltic flows interbedded with, and overlying, sedimentary rocks similar to Gila Conglomerate Formation (Pliocene-Pleistocene).

Mineral Products  Copper
Development and Production Underground exploration prospect; extent of development unknown. Unpatented claims extend into Sec. 13, 23, 24, 25, 26 and 36 (T.05S, R.25E)

References
USBM Files, Mardi Grae Claims
BLM Mining Claims Lead File 4107, July 1980
USGS Thatcher Quad (1:62500)
USGS Safford Quad (1:62500)
Wilson and Moore, 1958
REFERENCES CITED

(references used in compiling information on WSA's 4-1A, 4-8, 4-14, 4-16, 4-22/23/24 A and B, 4-48, 4-60, 4-65, and the appealed area east of Turtle Mountain)

Allen, M.A. and G.M. Butler, 1921,

ABGMT Clippings
Arizona Bureau of Geology and Mineral Technology newspaper clippings file, Tucson

ABGMT CRIB Data

ABGMT - USBM File Data
Unpublished data of Arizona Bureau of Geology and Mineral Technology, and U.S. Bureau of Mines; production data

ABN, 1959,
Arizona Bureau of Mines; Geologic Map of Cochise County, Arizona

ADMR
Arizona Department of Mineral Resources File Data; Inactive Mines File

ADMR (Eyde), 1978,
Arizona Department of Mineral Resources (Eyde, Ted H.), 1978,
Arizona Zeolites, Mineral Report No.-1

ADMR MAS
Arizona Department of Mineral Resources, 1976,
Minerals Availability System, Arizona Fluorspar

Bennett, K.C., 1975,

Blacet, Philip M. and Susan T. Miller, 1978,
Reconnaissance Geologic Map of the Jackson Mountain Quadrangle, Graham County, Arizona (1:62500); Map MF-939

Bromfield, Calvin S. and Andrew F. Shride, 1956,
Mineral Resources of the San Carlos Indian Reservation, Arizona; U.S. Geological Survey Bulletin 1027-N

Burchard, E.F., 1914,

BLM
Bureau of Land Management Mining Claims Lead File, July 1980
Campbell, Marius R., 1904,
The Deer Creek Coal Field, Arizona IN Contributions to Economic Geology, 1903 (S.F. Emmons and C.W. Hayes, eds.); U.S. Geological Survey Bulletin 225, p. 248-251

Cooper, J.R., 1960,
Reconnaissance Map of the Willcox, Fisher Hills, Cochise, and Dos Cabezas Quadrangles, Cochise and Graham Counties, Arizona; U.S. Geological Survey Map MF-231

Copper Handbook, 1911,

Copper Handbook, 1912-1913,


Eastlick, John, T., 1958,
New Development at the Christmas Mine, Gila County, Arizona IN Arizona Geological Society Digest, Vol. 1

Elevatorski, E.A., 1971,
Arizona Fluorspar; Arizona Department of Mineral Resources

Elevatorski, E.A., 1978,
Arizona Industrial Minerals; Arizona Department of Mineral Resources MR No.-2

Elsing, M.J. and R.E.S. Heinman, 1936,
Arizona Metal Production; Arizona Bureau of Mines Economic Series 19, Bulletin 140

Manganese Deposits of Eastern Arizona; U.S. Bureau of Mines Information Circular 7990

Harrer, C.M., 1964,
Reconnaissance of Iron Resources in Arizona, U.S. Bureau of Mines Information Circular 8235

Johnson, Maureen G., 1972,

Jones, E.L. and F.L. Ransome, 1920,
Deposits of Manganese Ore in Arizona; U.S. Geological Survey Bulletin 710-D

Keith, Stanton, B., 1973,
Index of Mining Properties in Cochise County, Arizona; Arizona Bureau of Mines Bulletin 187
Knechtel, Maxwell M., 1938,
Geology and Ground-water Resources of the Valley of Gila River and
San Simon Creek, Graham County, Arizona; U.S. Geological Survey
Water-Supply Paper 796-F

Langton, J.M., 1973,
Ore Genesis in the Morenci-Metcalf District IN American Institute
of Mining, Metallurgical, and Petroleum Engineers: Transactions,
Vol. 254, p. 247-257

Lindgren, Waldemar, 1905,
The Copper Deposits of the Clifton-Morenci District, Arizona; U.S.
Geological Survey Professional Paper 43

Meeves, H.C., 1966,
Nonpegmatitic Beryllium Occurrences in Arizona, Colorado, New Mexico,
Utah, and Four Adjacent States; U.S. Bureau of Mines Report of Investi-
gations 6828

Mines Handbook, 1916,
Vol. XII, compiled by W.H. Weed (The Stevens Copper Handbook Co.,
New York)

Mines Handbook, 1918,
Vol. XIII, compiled by W.H. Weed (The Stevens Copper Handbook Co.,
New York)

Mines Handbook, 1926,
Vol. XVII, compiled by W.G. Neale (The Mines Handbook Co., Inc,
New York)

Mining World, 1963,
(untitled article), Vol. 25, No. 6, p. 38; Gila Valley Block Co.

Mining World, 1953,
(untitled article), Vol. 15, No. 6, p. 91

Moore, R.T., 1969,
Beryllium IN Mineral and Water Resources of Arizona; Arizona Bureau
of Mines Bulletin 180

Moore, R.T. and G.H. Roseveare, 1969,
Silver IN Mineral and Water Resources of Arizona; Arizona Bureau
of Mines Bulletin 180, p. 251-270

Paige, S., 1909,
Marble Prospects in the Chiricahua Mountains, Arizona; U.S. Geological
Survey Bulletin 380, p. 299-311

Peirce, H. Wesley and Jan Carol Wilt, 1970,
Coal IN Coal, Oil, Natural Gas, Helium, and Uranium in Arizona;
Arizona Bureau of Mines Bulletin 182
Peterson, Nels P. and Roger W. Swanson, 1956, 
Geology of the Christmas Copper Mine, Gila County, Arizona; U.S. 

Regis, A.J. and L.B. Sand, 1967, 
Lateral Gradation of Chabazite to Herschelite in the San Simon Basin 
(abs.), IN Bailey, S.W., ed., Clays and Clay Minerals, Vol. 27: 
p. 193

Renner, J.L., White, D.E., and D.L. Williams, 1975, 
Hydrothermal Convection Systems IN Assessment of Geothermal Resources 
of the United States; U.S. Geological Survey Circular 726

Richter, D.H. and V.A. Lawrence, 1981, 
Geologic Map of the Gila - San Francisco Wilderness Study Area, 
Graham and Greenlee Counties, Arizona; U.S. Geological Survey Map 
MF-1315-A

Richter, D.H., Shafiqullah, M., and V.A. Lawrence, 1981, 
Geologic Map of the Whitlock Mountains and Vicinity, Graham County, 
Arizona; U.S. Geological Survey Map I-1302

Robinson, R.F., and Annan Cook, 1966, 
The Safford Copper Deposits, Lone Star Mining District, Graham County, 
Arizona IN Geology of the Porphyry Copper Deposits, Southwestern 
North America; Spencer R. Titley and Carol L. Hicks, eds. (The 
University of Arizona Press), p. 251-266

Ross, Clyde P., 1925, 
Geology and Ore Deposits of the Aravaipa and Stanley Mining Districts, 

Ross, Clyde P., 1925 (H), 
Ore Deposits of the Saddle Mountain and Banner Mining Districts, 

Sand, L.B., and A.J. Regis, 1966, 
An Unusual Zeolite Assemblage, Bowie, Arizona (abs.), IN Abstracts 
for 1965: Geological Society of America Special Paper 87, pp. 145-146

Scarborough, Robert B., 1981, 
Radioactive Occurrences and Uranium Production in Arizona; Arizona 
Bureau of Geology and Mineral Technology Open File Report 81-1

Sheppard, Richard A., 1969, 
Zeolites IN Mineral and Water Resources of Arizona; Arizona Bureau 
of Mines Bulletin 180, pp. 464-467

Shields, J.C., Jr., 1940, 
Geology and Ore Deposits of the Dives and Gold Ridge Groups, Dos 
Cabezas; M.S. Thesis, University of Arizona
Simons, Frank S., 1964, 
Geology of the Klondyke Quadrangle, Graham and Pinal Counties, Arizona; 

Stewart, L.A., 1955, 
Chrysotile - Asbestos Deposits of Arizona; U.S. Bureau of Mines Information Circular 7706

Stewart, L.A. and A.J. Pfister, 1960, 
Barite Deposits of Arizona; U.S. Bureau of Mines Report of Investigations 5651

Tenney, James B., 1927-1929, 
History of Mining in Arizona; Arizona Bureau of Mines, p. 226-227

USAEC, 1954, 
(Arizona Bureau of Geology and Mineral Technology Microfiche)

USAEC, 1970, 

USBM, 1965, 
U.S. Bureau of Mines Information Circular 8252; Mercury Potential of the United States

USBM Files 

USGS CRIB Data 

Van Alstine, R.E. and R.T. Moore, 1969, 
Fluorspar in Mineral and Water Resources of Arizona; Arizona Bureau of Mines Bulletin 180, pp. 348-357

Willden, Ronald, 1964, 
Geology of the Christmas Quadrangle, Gila and Pinal Counties, Arizona; 

Wilson, E.D., 1961, 
Gold Placers and Placering in Arizona; Arizona Bureau of Mines Bulletin 168

Wilson, E.D., Cunningham, J.B., and C.M. Butler, 1934 (Revised 1967), 
Arizona Lode Gold Mines and Gold Mining; Arizona Bureau of Mines Bulletin 137

Wilson E.D. and R.T. Moore, 1958, 
Geologic Map of Graham and Greenlee Counties, Arizona; Arizona Bureau of Mines
Wilson E.D. and R.T. Moore, 1959, 
Geologic Map of Pinal County, Arizona; Arizona Bureau of Mines

Wilson, E.D., Moore, R.T., and H.W. Peirce, 1959, 
Geologic Map of Gila County, Arizona; Arizona Bureau of Mines

Wilson, E.D., Moore, R.T., and J.R. Cooper, 1969, 

Wilson, E.D. and G.H. Roseveare, 1949, 
Arizona Nonmetallics; Arizona Bureau of Mines Bulletin 155 (2nd. edition; revised)

Wynn, Jeffrey C., 1981, 
Complete Bouguer Gravity Anomaly Map of the Silver City 1°X 2° Quadrangle, New Mexico - Arizona; U.S. Geological Survey Map I-1310-A
AZ-4-14
Fishhooks

This sheet
Deed
Redwood
EXPLANATION

O A. younger alluvium: unconsolidated, silt, sand, and gravel on flood plains and in stream channels.

O AB. Basalt flows interbedded with and overlying Gila Conglomerate type bedded rocks.

O AC. Basaltic dikes and plugs.

O AD. Lava-derived, silt, sand, and gravel sediments.

O AE. Older alluvium and colluvium, coarse gravel sink site of older valley fill.

O AF. Rhyolite, welded sub-flow tuff and coarse-grained porphyritic andesite flows.

O AG. Rhyolite and basaltic andesite flows and pyroclastic deposits.

O AH. Intrusive rocks, including granitic, porphyritic, and pyroclastic dikes and plugs.

O AJ. Flow tuffs, breccias, and volcanic conglomerates: andesite, to rhyolitic composition.

O AK. Fine-grained fissile/lithic breccia, hematite, and pyroclastics.

O AL. Basaltic, orthoquartzite, and grit with bas conglomeratic unit.

O AM. Coarse-grained porphyritic quartz monzonite, local chloritized, and halved.

Sources of information include:

EXPLANATION

Ga. Upper alluvium, unconsolidated, silty, clay, and gravel or tilable plains and in stream channels.
Gb. Stratified clays, interbedded, with and overlying, gisap-type, aphyric, sedimentary rocks.
Gc. Geologic dikes and plugs.
Dw. Lateral and well-intruded, conglomerate, fanglomerate, breccia, capping, low terraces and ridges.
Dw. Lake-deposited, silt, sand, and loamy sediments.
Dz. Older alluvium and colluvium, coarse gravel, sand, silt, or older valley fill.
Tr. Rhyolite, welded obsidian, tuff, and coarse-grained, porphyritic, andesite.
Tb. Blast and basaltic andesite, flows, and pyroclastic deposits.
R. Intrusive rocks, including granitic plutons and porphyritic, diorite, andesites.
I. Basal unit, obsidian, andesite. flowed obsidian, and volcanic conglomerates and andesite.
P. Fine-grained, fossiliferous limestone; agglomerates and basaltic breccias.
Ca. Basaltic quartzite, orthoquartzite, and grit with basaltic conglomerate.
C. Coarse-grained, porphyritic, quartz monzonite, locally chertized, and talcized.

Contact: Fault

Sources of information include:
GEOLOGY OF THE FISHHOOK - DAY MINE AREA
BYLA MOUNTAINS
(4-19-46)

EXPLANATION

- Larger: Alluvium, unconsolidated, silt, sand, and gravel or flood plains and in stream channels.
- Qa: Basalt flows interbedded with, and overlying, Glacial-type sediments.
- Qc: Basaltic dikes and plugs.
- Qd: Weakly to well-indurated, conglomerate, fanglomerate, breccias capping low terraces and ridges.
- Qt: Delta-deposited, silt, sand, and limy sediments.
- Cd: Delta alluvium and colluvium, coarse gravel, or silt of older valley fill.
- Tm: Rhyolitic welded tuff, tuffs, and coarse-grained porphyritic andesite flows.
- Td: Basalt and basaltic andesite flows and pyroclastic deposits.
- Qm: Intensive rocks, including pyroclastic deposits, and tuff flows, tuffs, breccias, and volcanic, conglomerates andesite in rhyolitic composition.
- Qf: Fine-grained, tuffaceous limestone; Hornsbyia & Folsomia formations.
- Fm: Meseta quartzite, orthoquartzite, and grit with bi-conglomerate unit.

Sources of information include:
- Weber, E.D., and C.S. More, 1918

contact

Fault
GEOLoGY OF THE FISHHOOK-DAY MINE AREA
GILA MOUNTAINS
(4-4/16)