

Five Star Lead Mine, Spring Mountains, Clark County Nevada

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Acknowledgement and Disclaimer

The information in this paper is taken largely from published and public sources. I have reproduced this material and present it pretty much as we found it, not trying to harmonize discrepancies in mine or geologic descriptions. I have changed verb tenses for readability and have used some paraphrase. I have expanded abbreviations or special characters with full text (e.g. feet instead of ft., inches instead of ") Italics indicate quotations. Authors of the original information are indicated at the end of each paragraph. Paragraphs without a citation are our own materials. The maps in this report have been compiled and rectified from digital and paper copies of original sources that were made at different scales and in different geographic projections. Therefore, many of the maps had to be adjusted or stretched. They do not fit perfectly. Most are accurate to within 100 feet, but reproduction and projection errors can be as much as 300 feet for some maps. PLSS means Public Land Survey System. That survey data was obtained from U.S. Bureau of Land Management websites.

MRDS, 2011, Mineral Resources Data System, U.S. Geological Survey, <https://mrdata.usgs.gov/mrds/>. This database relies on records that, in many cases, are inaccurate or imprecise. For example, if a report describes a mine as being in "Section 9", with no other information, MRDS plots the mine location in the center of the section. If a mine is reported in "SW ¼" of a section, MRDS plots the mine in the center of that SW quarter-section. Where I could confidently adjust a MRDS location of a mineral deposit to features identifiable in aerial photographs or topographic maps, I did so.

Help me make this report better. If you have any photographs, memories or reports for this mine that you can share, please send them to yosoygeologo@gmail.com so that I can incorporate that information and material into this paper.

LOCATION (MRDS, 2011)

T.19S R.55E Sec 07	36.31387	-115.8433 (Five Star Lead Property)
T.19S R.55E Sec 07	36.31218	-115.8366 (Five Star Mine)

PREVIOUS NAMES

El Lobo Claims, Five Star Mine, Holmes Prospect, Apex Claims. Five Star Prospect, Five Star Project.

HISTORY AND OWNERSHIP

The Five Star Lead Mine is in the Emerald District and was reached by partly improved dirt road from Pahrump in 1972. The mine was located in 1905 and produced some ore in 1939 (Ivosevic, 1972:1). An open pit mining operation was proposed in 1993 (Nevada Bureau of Mines and Geology).

REGIONAL GEOLOGY

The regional geology of the central Spring Mountains is described in the overview paper for this report series. It can be accessed at

http://www.greggwilkerson.com/uploads/1/0/6/5/106585235/geology_and_mining_history_of_the_central_spring_mountains.pdf

STRATIGRAPHY

Host rocks for the Five Star Lead Mine include:

Permian-Mississippian Bird Springs Formation (PMb).
Cambrian Tapeats Sandstone (Ct),
Cambrian Pioche Shale, Lyndon Limestone, Chisholm Shale
Cambria Carrara Formation (Cc)
Cambrian Bonanza King Formation (Cbk)
Cambrian Wood Canyon Formation (CZw)

MINE GEOLOGY

In 1972 the U.S. Bureau of Land Management investigated the Five Star Lead Mine (Ivosevic, 1972). Ivosevic's report, map, legend, and cross section are reproduced in Appendix A. His underground map of the Five Star Mine is reproduced in Appendix B.

The Five Star vein is localized in the footwall of an arcuate east-trending fault which lies between the Wheeler Pass thrust fault and an ancillary back limb thrust fault. The Wheeler Pass thrust is a major structural feature of Laramide age which transects the Spring Mountains and thrusts upper Pre-Cambrian through middle Cambrian clastic sedimentary rocks southward across the Bird Spring formation, an upper Mississippian through lower Permian limestone sequence containing some interbedded clastic rocks (Ivosevic, 1972:1)

The Five Star vein is exposed in three places along a 70 foot interval of the Cross Fault. These are, from west to east, the Hughes incline, a shallow pit, and an old incline, which is a approximately 20 feet deep. Mr. Hughes reports that the Hughes incline followed four to ten foot thick ore body for forty feet down its 45° dip before sloughing of the red phyllonite in the hanging wall forced abandonment of the working. The Hughes

adit (see accompanying map of underground geology) is presently being driven for the purpose of intercepting this ore body and to explore west of the Back Limb thrust fault, with the latter objective receiving priority (Ivosevic, 1972:3).

The vein terminates westward at the Hughes incline in a flexure in the Cross Fault and against a small shear in the Old Incline to the east. The continuity of the vein within these bounds is not demonstrable at present (Ivosevic, 1972:3).

The principle ore mineral throughout the vein is galena. The presence of minor quantities of malachite and azurite throughout the ore as well as blebs of limonite within the galena indicate that small amounts of chalcopyrite and perhaps pyrite were present in the ore before supergene leaching occurred. The gangue is composed of moderate quantities of barite, some glassy vein quartz, and, locally, minor amounts of calcite (Ivosevic, 1972:3).

The assay of a composite sample of slightly weathered ore devoid of obvious secondary copper minerals from the Hughes incline stockpiled at the surface gave [the following results]: (Ivosevic, 1972:3);

<i>Lead:</i>	<i>21.9 percent</i>
<i>Copper:</i>	<i>0.09 percent</i>
<i>Silver</i>	<i>0.22 oz/ton</i>
<i>Gold and Zinc</i>	<i>none</i>

The host rock of the well mineralized ore is coarse grained white quartzite with an aphanitic white matrix. The ore minerals apparently fill open spaces between breccia fragments and coat thin fractures within the fault zone. To a lesser extent, the ore minerals also replace the matrix of the breccia fragments and of the fractured quartzite walls of the fault zone. The only macroscopic alteration product is in the matrix of the quartzite and consists of a soft, apple green material containing silvery flakes of sericitic mica (Ivosevic, 1972:4).

A one foot thick gossan of massive-limonite after galena is found at the Old Incline. The vein is not exposed in the pit between here and the Hughes incline, but the dump of the pit contains barite fragments and fragments of quartzite with coatings of black secondary lead minerals (Ivosevic, 1972:4).

Black speckles with pebbly colloform surfaces evident under 40X magnification which dot fragments of host rock above and below ground- are probably manganean limonite of supergene origin, An assay for manganese 0.4 percent for a piece of this material from the east drift of the Five Star adit partially confirms this identification (Ivosevic, 1972:4).

The two drifts of the Five Star adit abut the westward extension of the cross fault beyond the Hughes incline. Veinlets and one inch clots of the brown and black limonitic residue of leached _sulfides are moderately abundant in a gougy phyllitic green

quartzite in the north rib of the east drift of the Five Star adit. A sample of this leached gouge contained 0.08 percent lead. Small crystals of gypsum occur here and in a similar rock near the face of the north drift (Ivosevic, 1972:4).

Several one inch quartz veinlets lie along bedding planes and fractures throughout the quartzite unit (Cw1) south of the Cross Fault. These contain sparse siliceous galena boxworks and leached casts of possibly other sulfide minerals (Ivosevic, 1972:4). [In the Johnnie District] The gold occurs in prominent and persistent quartz veins along faults in sandstone, shale, and limestone of the Wood Canyon and Carrara Formations. The largest ore shoots are in the Johnnie mine, where the vein follows a fault between the two formations (Corwall, 1972:38).

Mapping by Workman and others (2002, Figure 17 this report) shows the Johnnie, Overfield north and Overfield south mines as lying along a fault that marks a bedding plane between the Cambrian Bonanza King Formation (Cb) and Proterozoic and Lower Cambrian Woods Canyon Formation (CZw).

MAPPING

1:250,000

Longwell and others (1965) mapped the area of the Five Star Lead mine as being in a band of Upper Cambrian quartzite, shale and limestone of the Tapeats Sandstone, Wood Canyon Formation, Pioche Shale, Lyndon Limestone, Chisholm Shale and Carrara Formation (Cu). These units are in the upper plate of a thrust fault. These upper Cambrian beds dip to the northwest into Middle Cambrian dolomite and limestone (Cdl). Below this thrust is the Permian-Mississippian Bird Springs Formation (PiPmb).

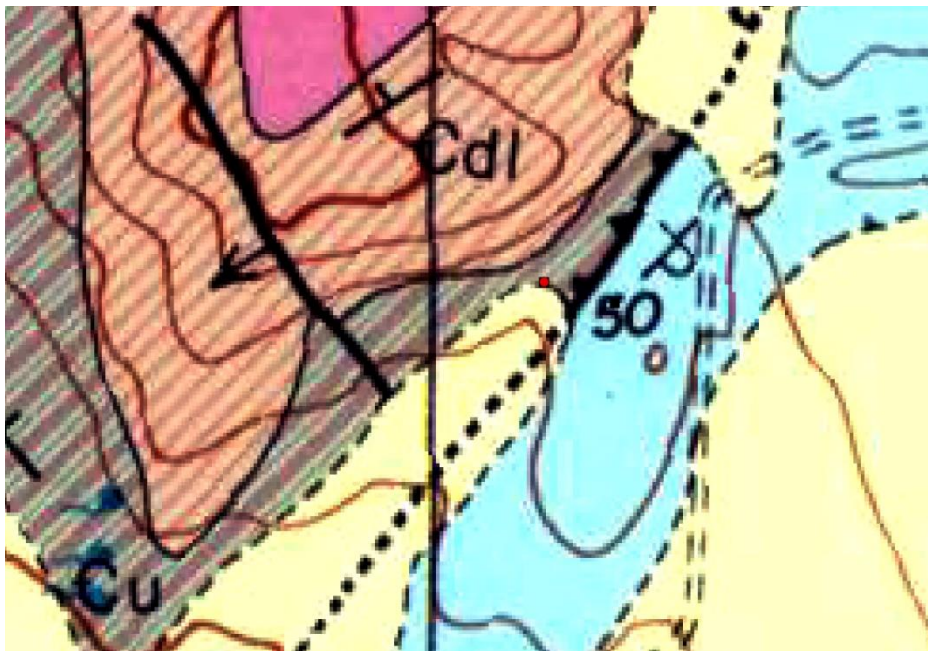
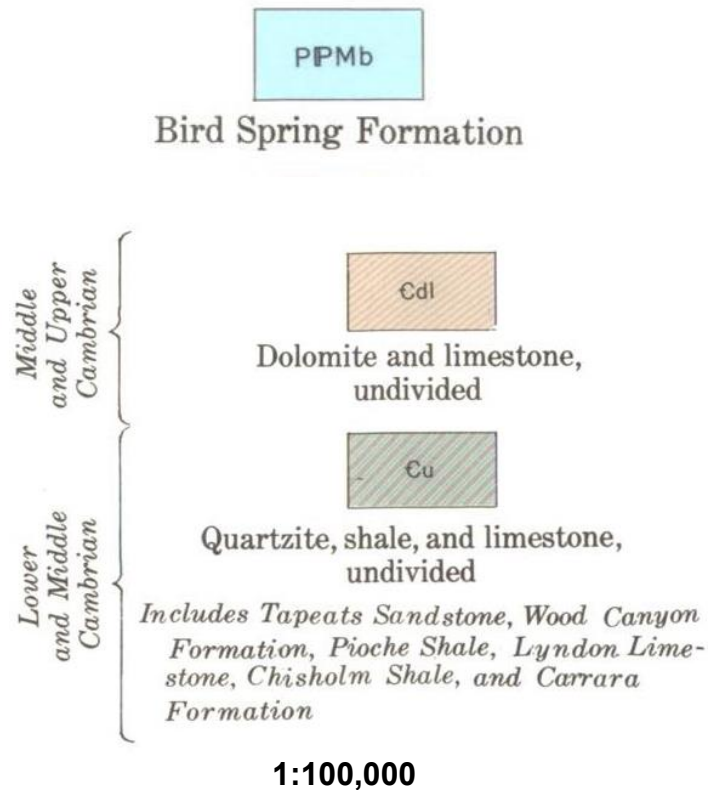


Figure 1. Clip of the area of the Five Star Mine. From Longwell and others, 1965. Mine location is the red dot inside a black square. Open source for educational purpose, no copyright.



Page and others (2005) mapped the area of the Five Star Lead Property as being in a zone of Cambrian Carrara Formation (C_c) at a southwest-northeast trending thrust fault 720 meters northwest of the Wheeler Pass Thrust. The Carrara is between Cambrian Bonanza King Formation (C_{bk}) to the northwest and Cambrian Wood Canyon Formation (C_{Zw}) to the southeast. The Woods Canyon and Carrara formations are on the upper plate of the Wheeler Pass Thrust. Below this thrust is Permian-Mississippian Bird Springs Formation (P_{Mb}). The Five Star Mine lies on the southeastern part of the Wheeler Pass Thrust fault.

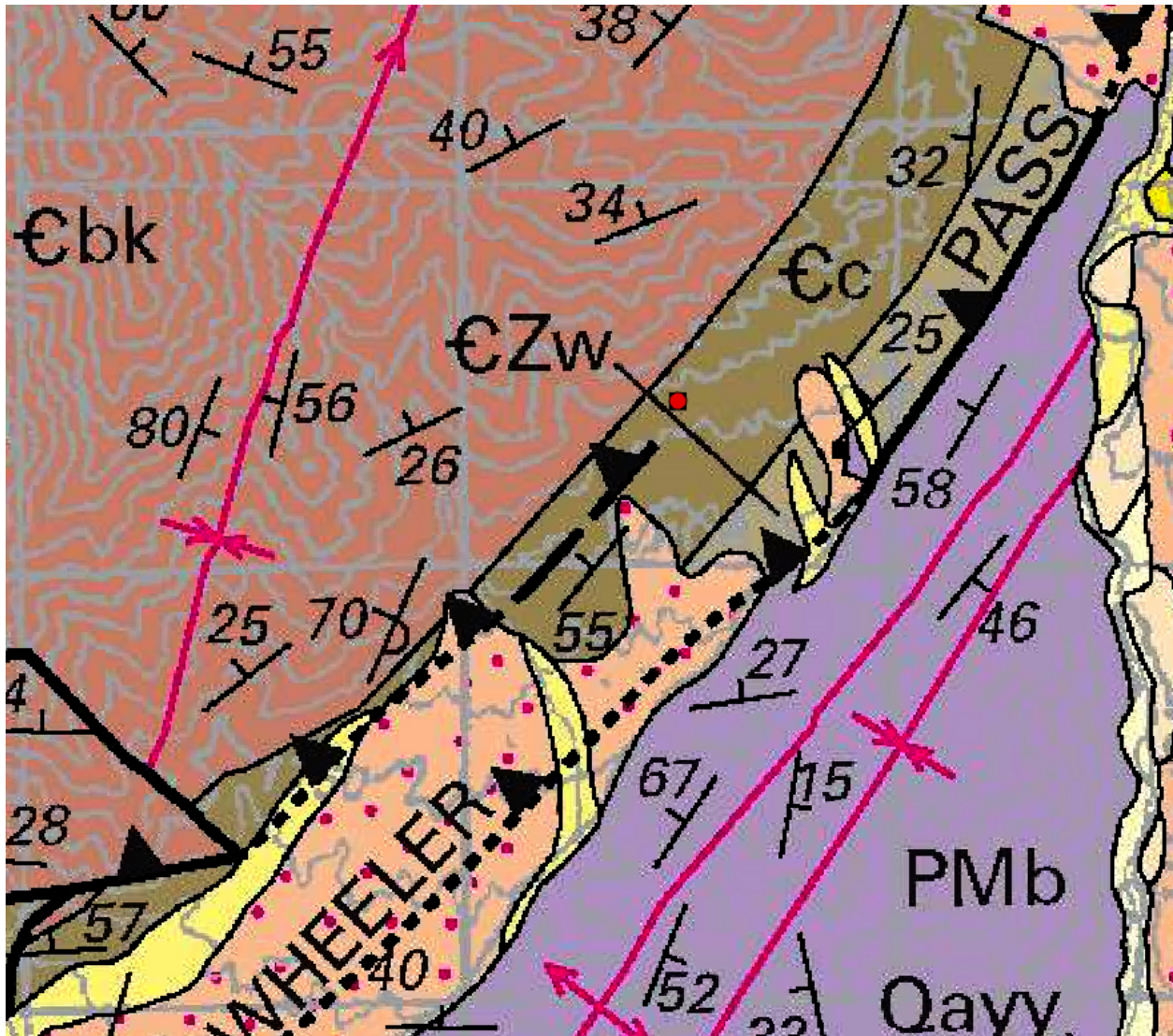


Figure 2.. Mine location is the red dot inside a black square. Open source for educational purpose, no copyright.

- PMb Bird Spring Formation, undivided (Lower Permian to Upper Mississippian)

- €bk Bonanza King Formation (Upper and Middle Cambrian)

- €c Carrara Formation (Middle and Lower Cambrian)

- €Zw Wood Canyon Formation (Lower Cambrian and Late Proterozoic)

1:62,500

Burchfiel and others (1974) mapped the area of the Five Star Lead Property as occurring in Cambrian Carrara Formation (Cc) within the Wheeler Pass Thrust Zone and southeast of the Wheeler Syncline. The Five Star Lead Mine is along the southeastern edge of the Wheeler Pass Thrust Zone in rocks of the Cambrian Woods Canyon Formation (Cwc).

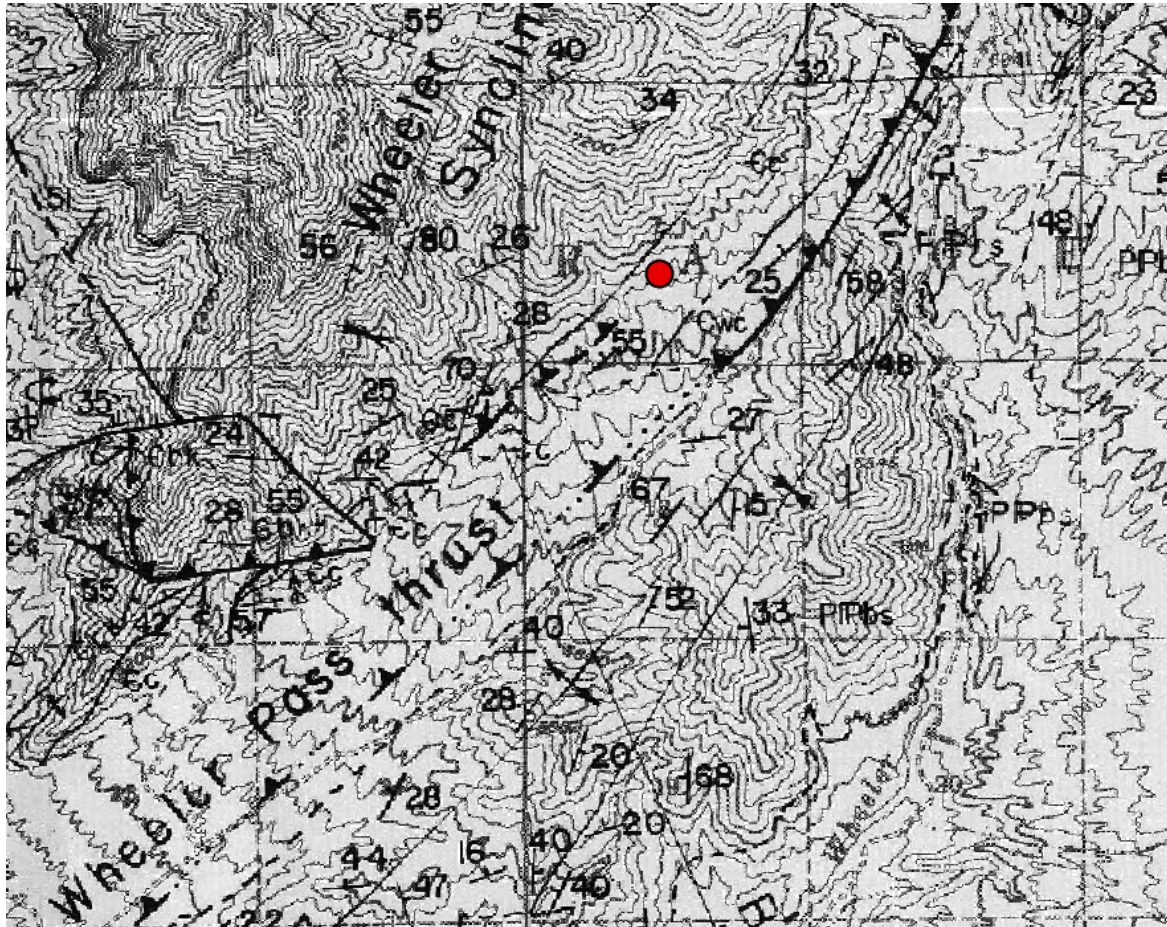


Figure 3. Clip of Five Star Property from Burchfiel and others, 1974. Open source for educational purpose, no copyright.

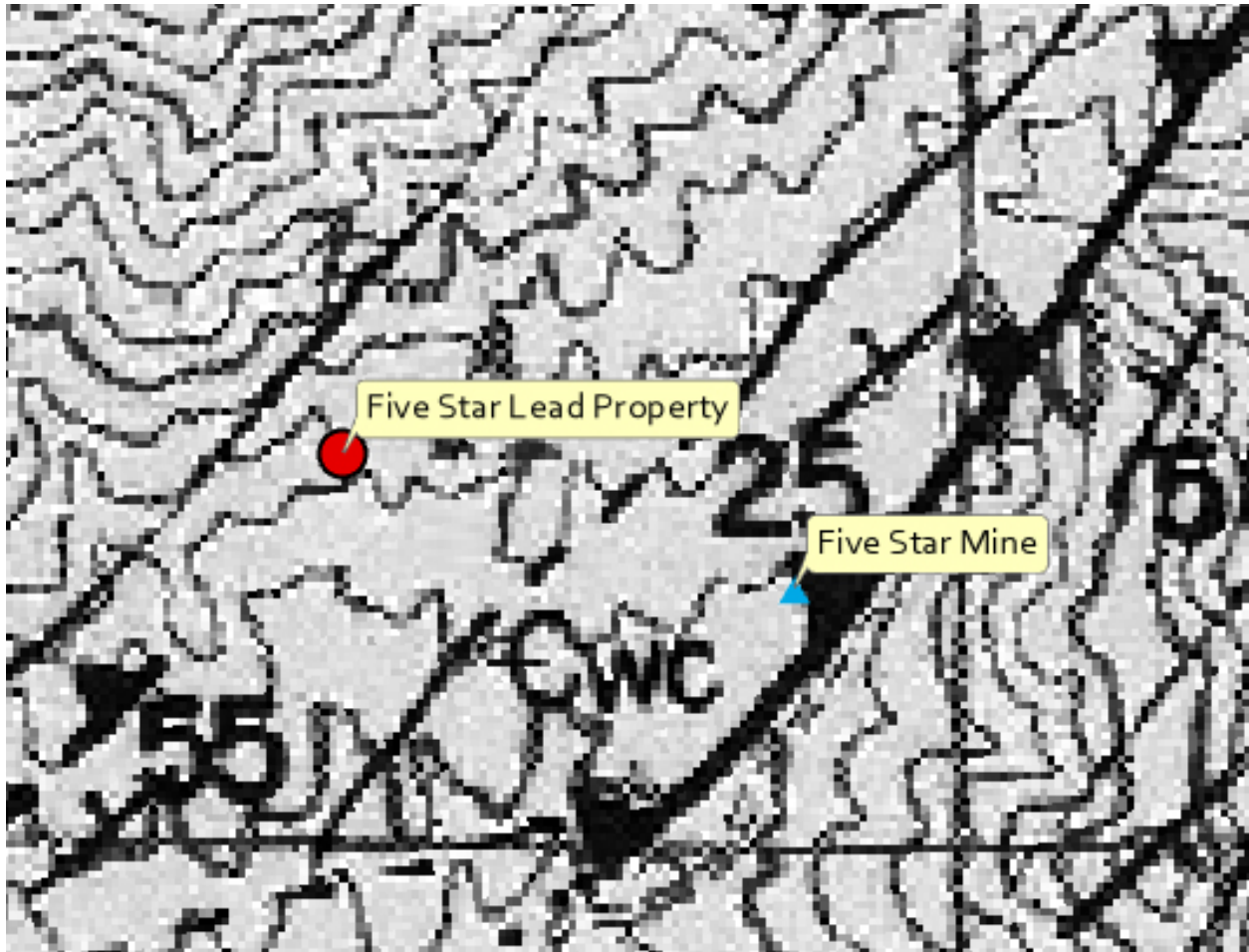


Figure 4. Clip of Five Star Lead Property and Five Star Mine from Burchfiel and others, 1974. Open source for educational purpose, no copyright.

ϵc
Carrara Formation

ϵwc
Wood Canyon Formation

1 inch = 150 feet

Ivosevec, 1972 produced several detailed maps and cross sections for the mines of the Johnnie District.

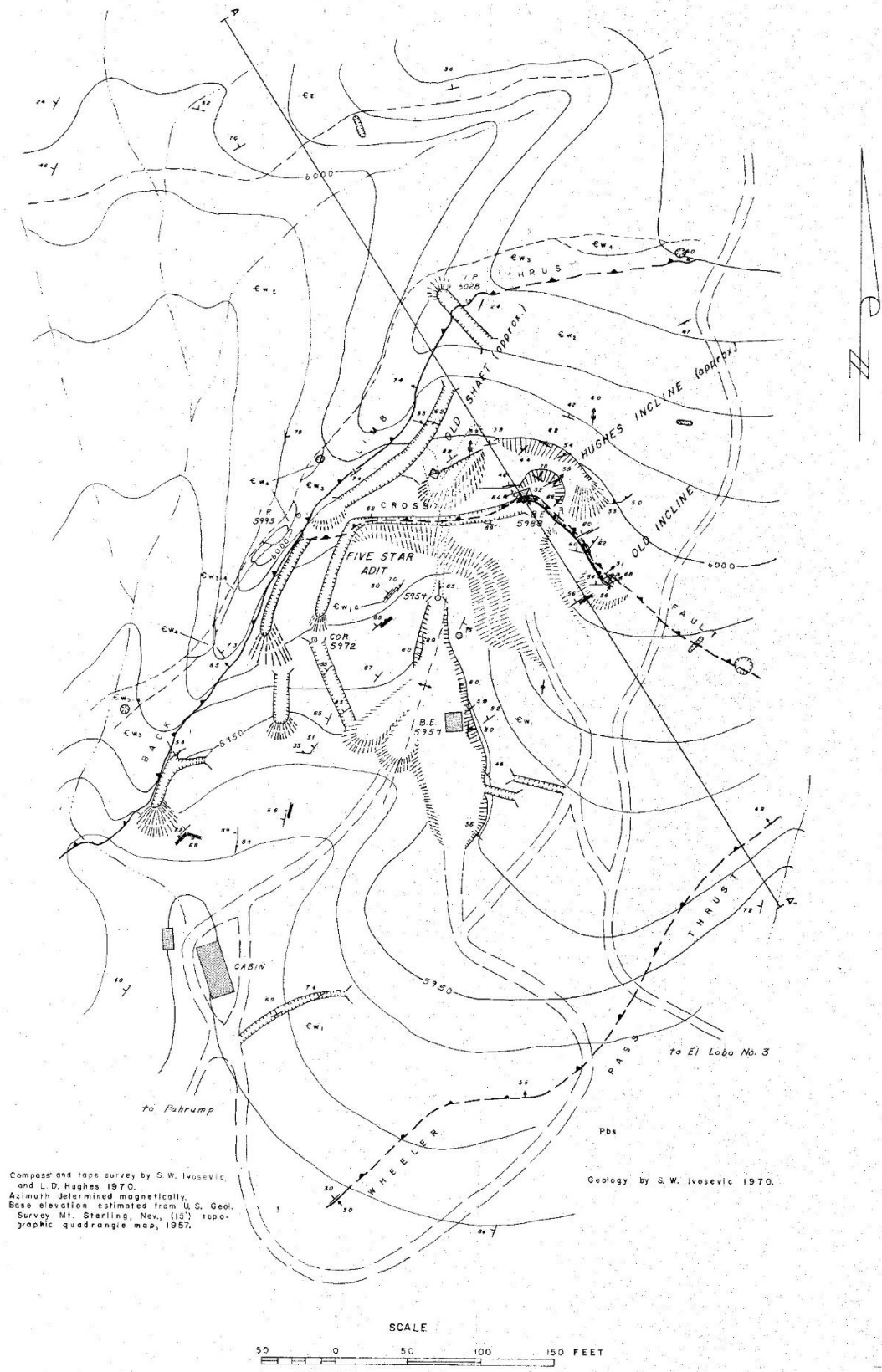


Figure 5. Geologic map of the Five Star Mine. From Ivosevic, 1972. Open source for educational purpose, no copyright.

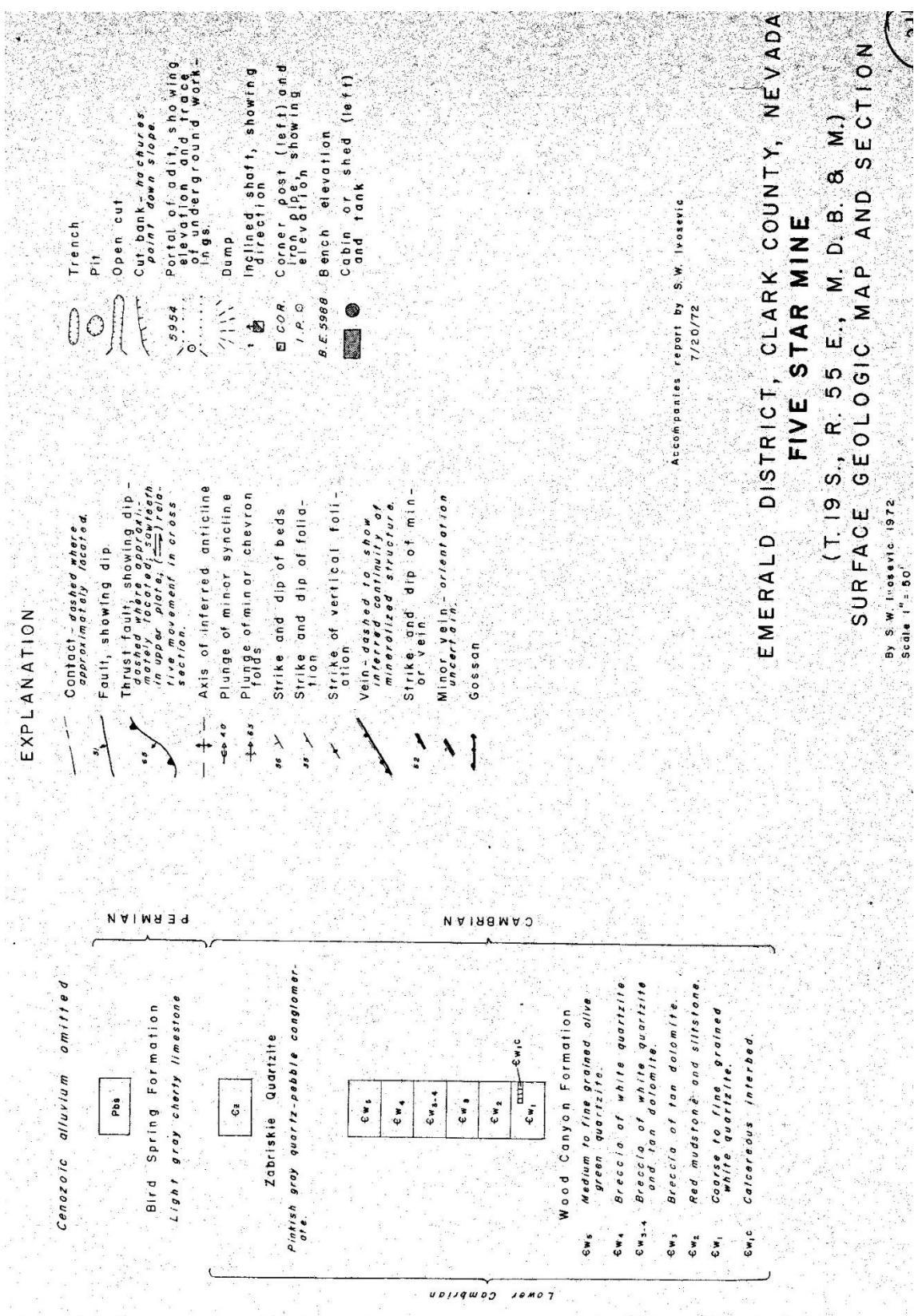


Figure 6. Legend to geologic map. From Ivosevic, 1972. Open source for educational purpose, no copyright.

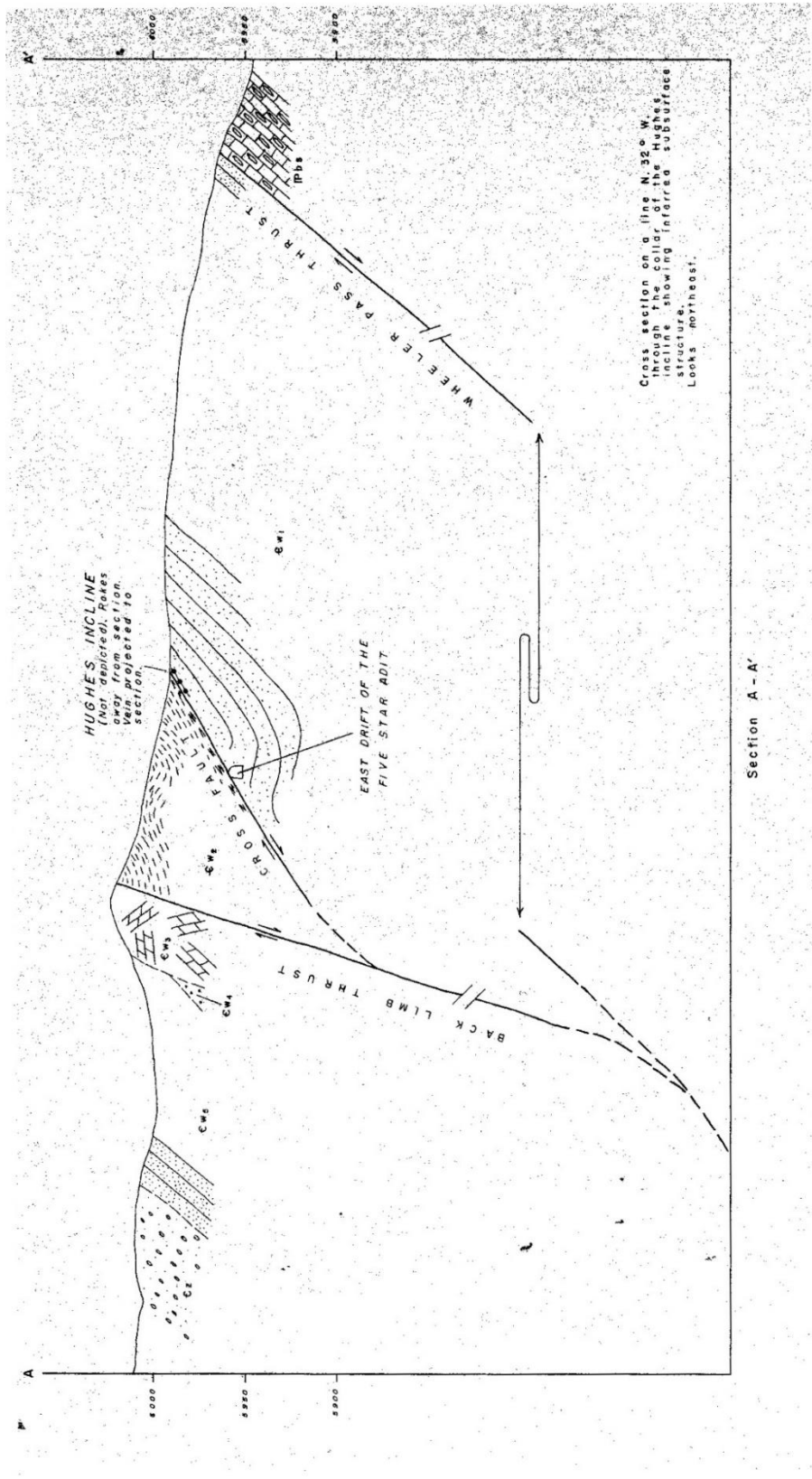


Figure 7. Geologic cross section of the Five Star Project. From Ivosevic, 1972. Open source for educational purpose, no copyright.

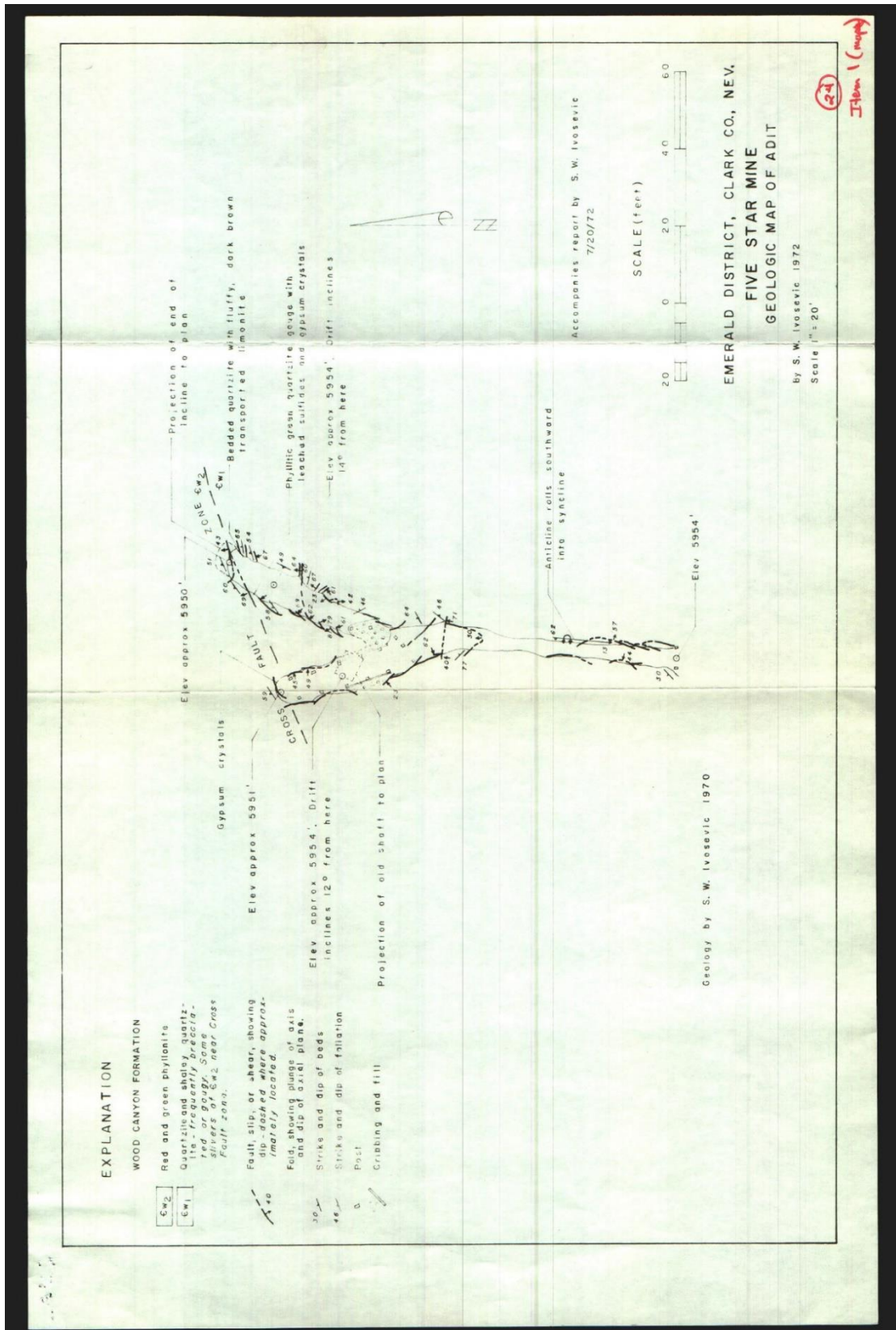


Figure 8. Underground geologic map of the Five Star Lead Mine. From Ivosevic, 1972. Open source for educational purpose, no copyright.

STRUCTURE

The Five Star Mine follows the Cross Fault near a contact between the Cambrian - Proterozoic Woods Canyon Formation and the Cambrian Carrara Formation. It is hosted by the Cambrian Carrara Formation within the Wheeler Pass Thrust.

MINERALOGY

Ivosevic (1972) mentions the following minerals and rock textures at the Five Star Mine:

- Argillite
- Sericite
- Galena'
- Breccia
- Phyllitic foliation
- Phyllitic alteration
- Malachite
- Azurite
- Barite
- Calcite
- Copper Minerals
- Iron minerals
- Sulfide minerals
- Green material with silvery flakes (sericitic mica)
- Limonite
- Black secondary minerals
- Magnesite
- Magnesian limonite
- Gypsum
- Siliceous galena boxworks
- Chalcopyrite
- Native copper

DEVELOPMENT

There was some minor production from the Five Star Mine in 1939 (Ivosevic, 1972:1).

NBMG records indicate that an open pit mine was proposed for the Five Star Project in 1994.

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MAPS

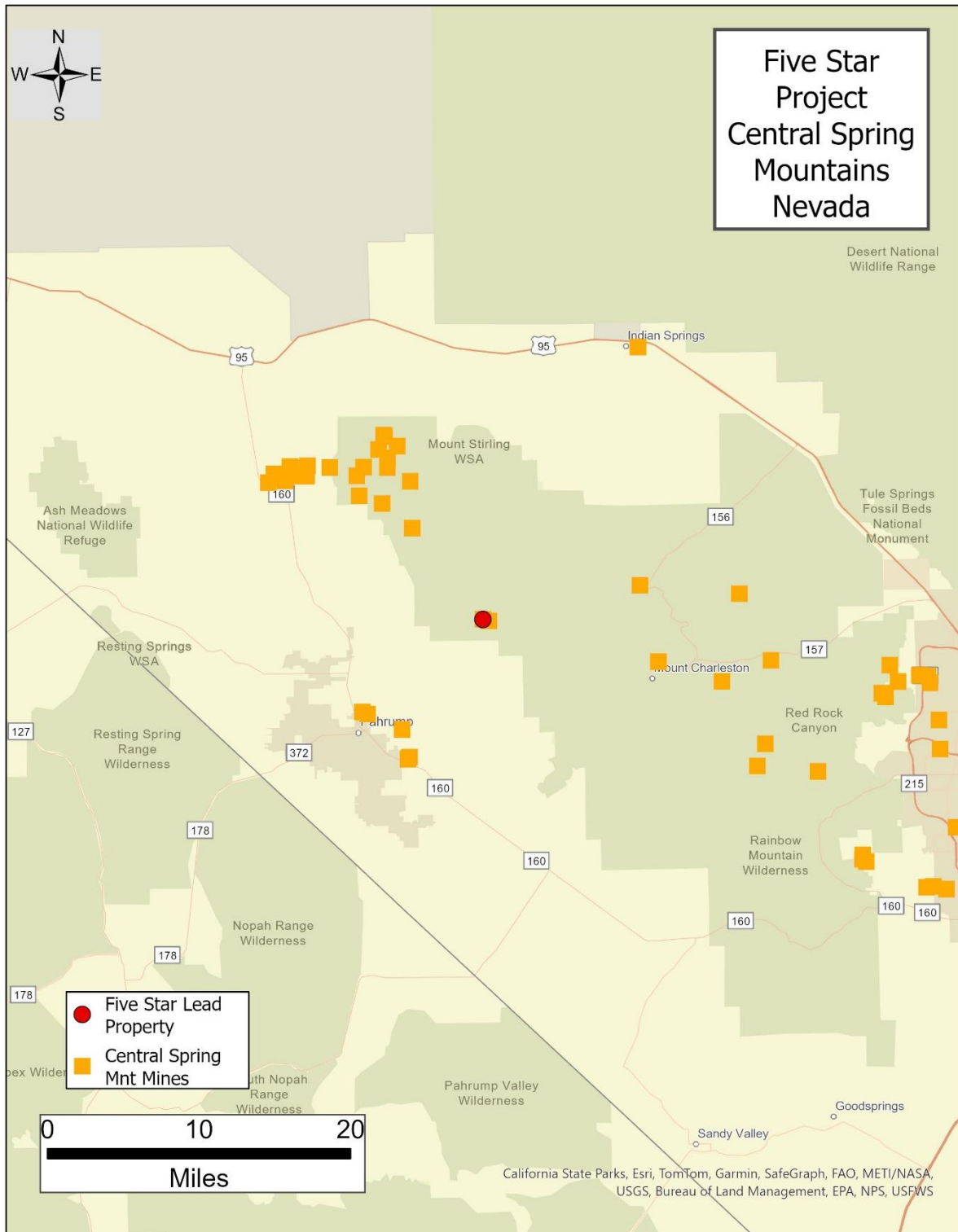


Figure 9. Location map for the Five Star Mine. Open source for educational purpose, no copyright.

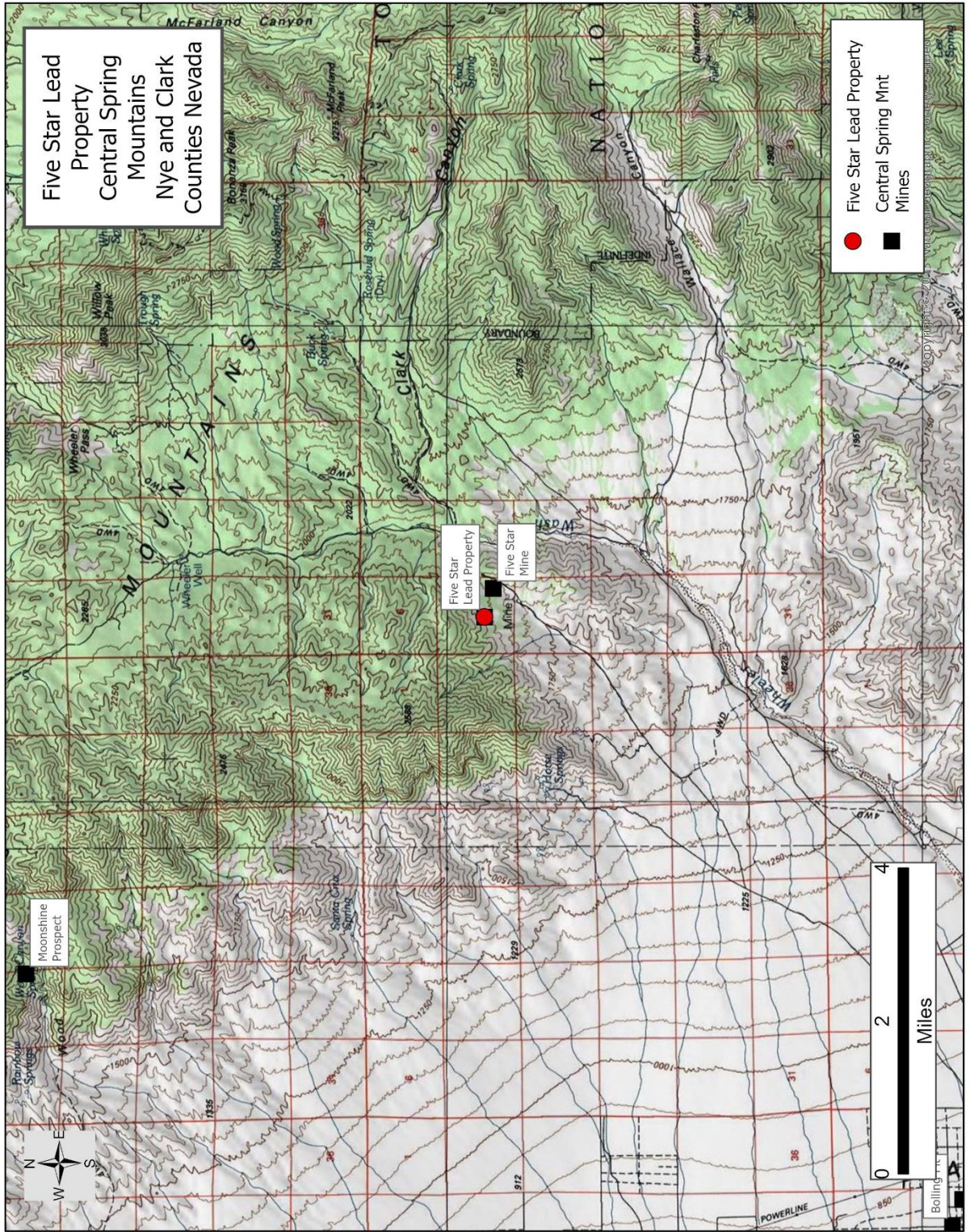


Figure 10. Regional topographic map of the Five Star Lead Mine. Open source for educational purpose, no copyright.

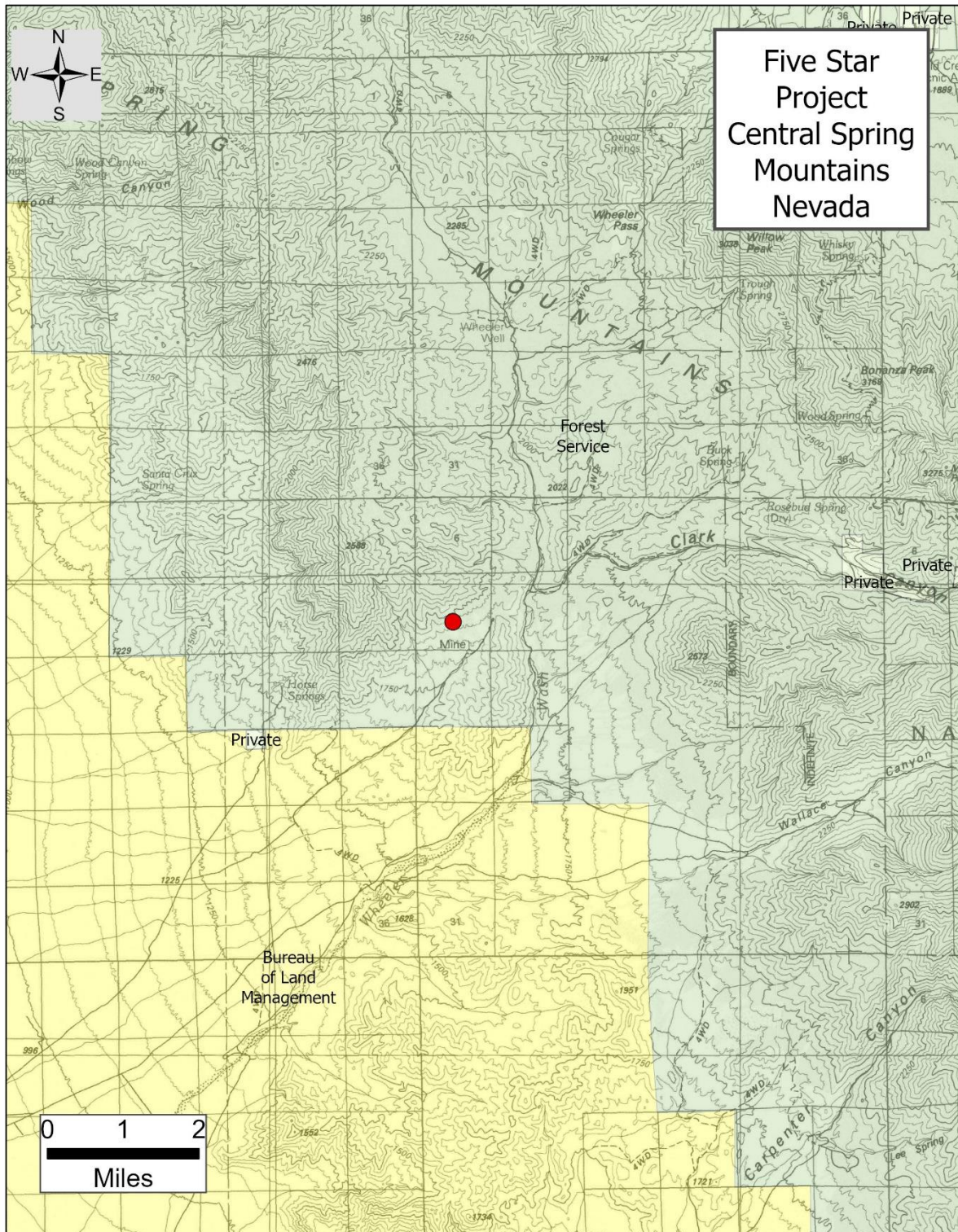


Figure 11. Land status map of the Five Star Lead Mine. Open source for educational purpose, no copyright.

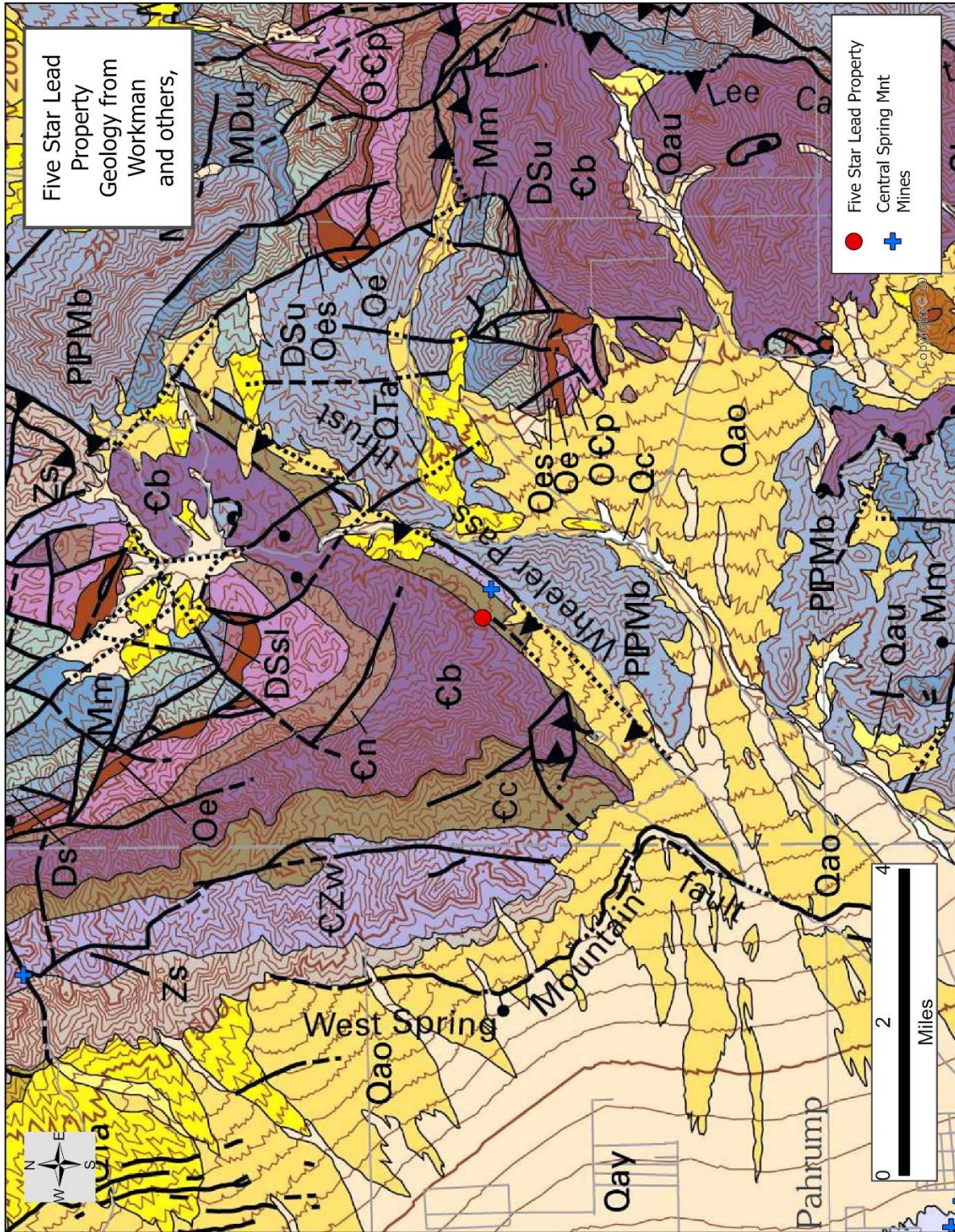


Figure 12. Regional geologic map of the Five Star Lead Mine. Open source for educational purpose, no copyright.

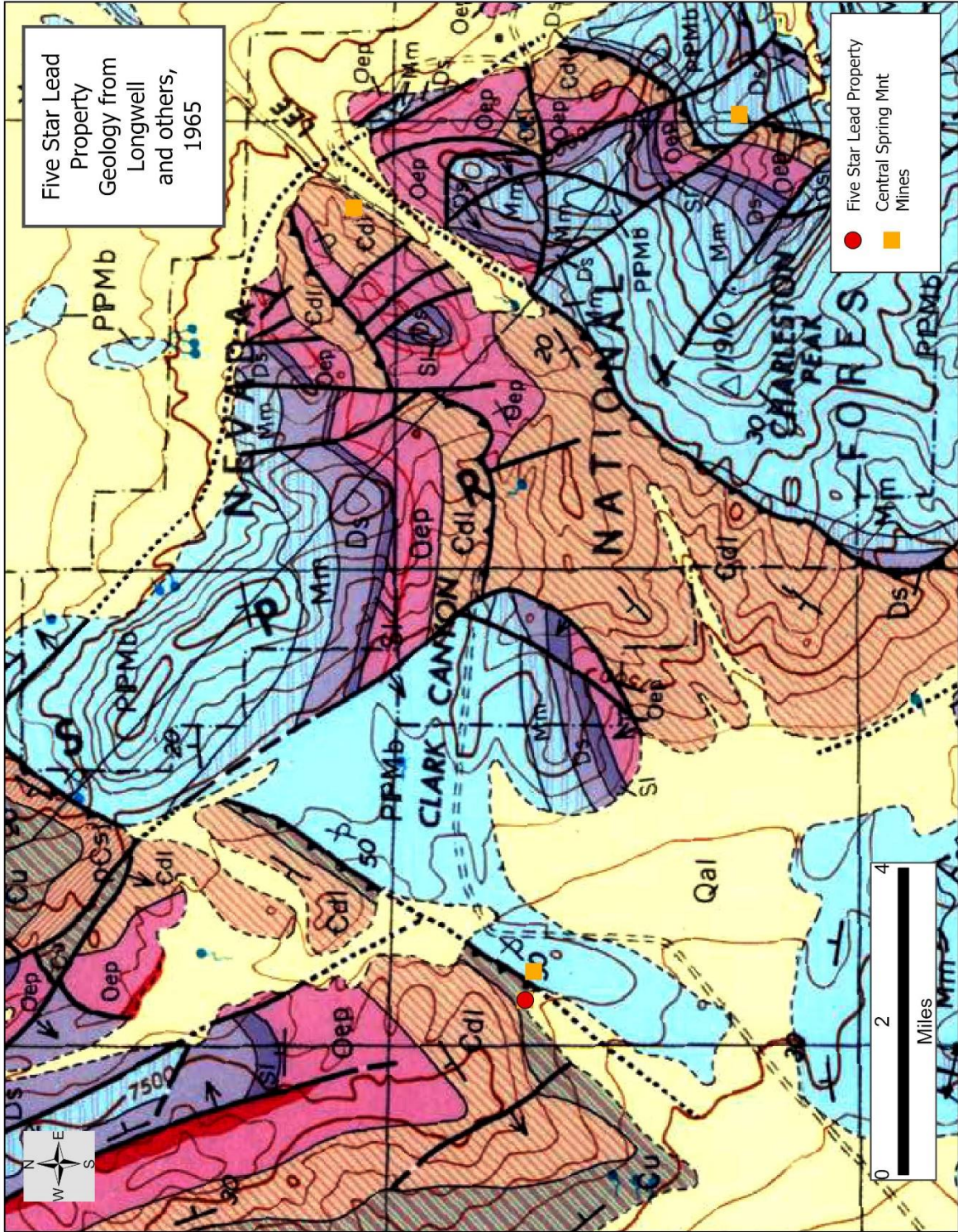


Figure 13. Regional geologic map of the Five Star Lead Mine. Open source for educational purpose, no copyright.

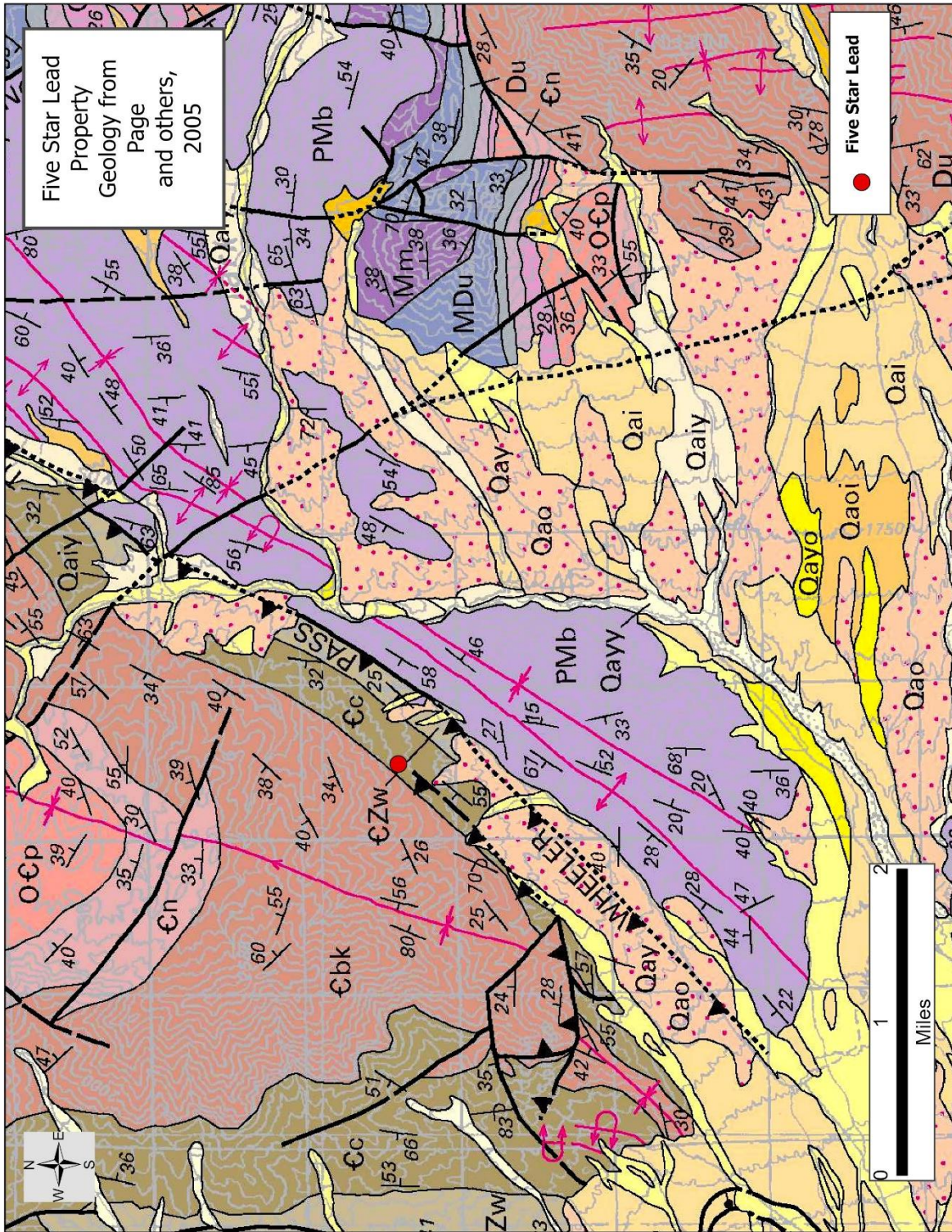


Figure 14. Regional geologic map of the Five Star Lead Mine. Open source for educational purpose, no copyright.

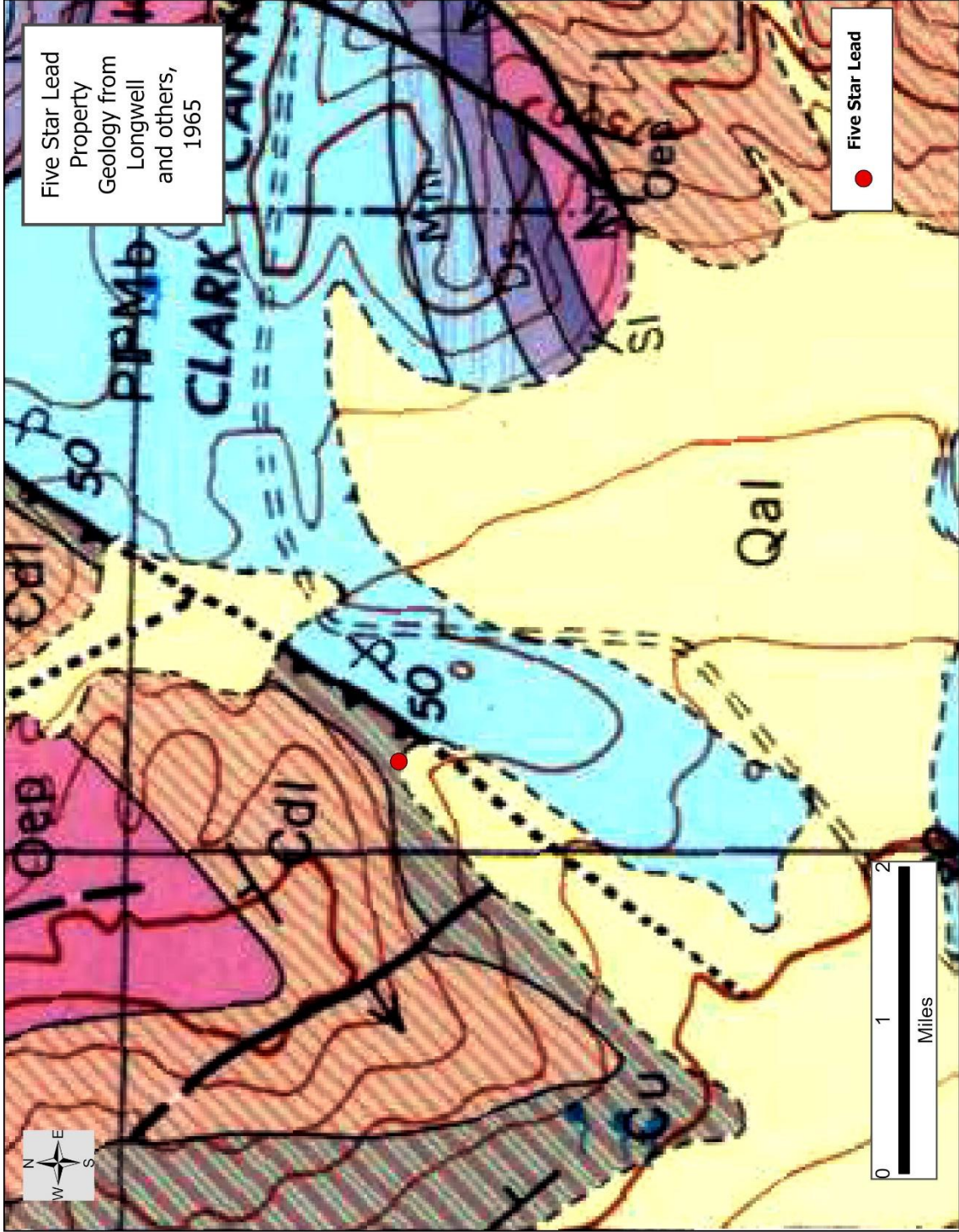


Figure 15. Area geologic map of the Five Star Lead Mine. Open source for educational purpose, no copyright.

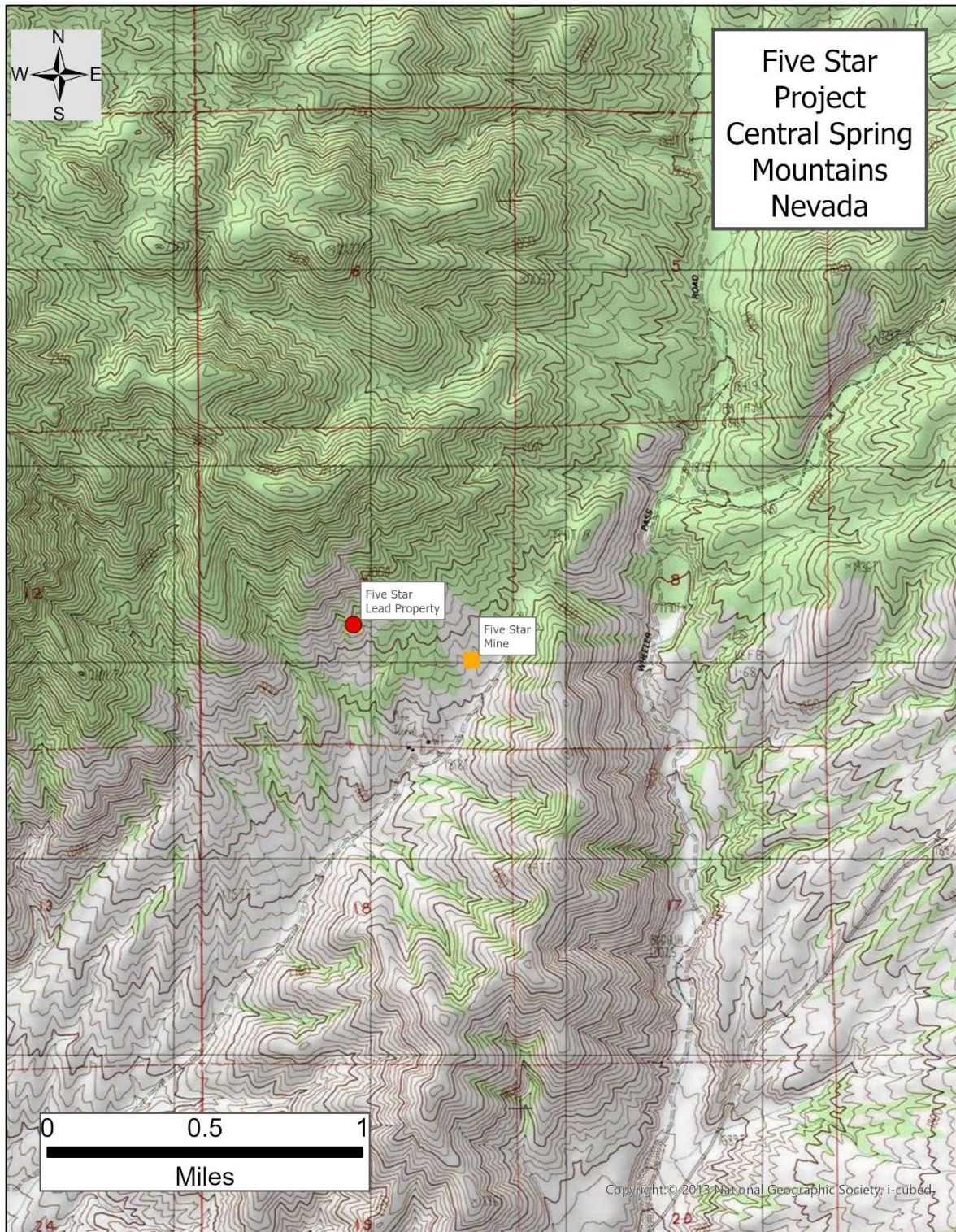


Figure 16. Area topographic map of the Five Star Lead Mine. Open source for educational purpose, no copyright.

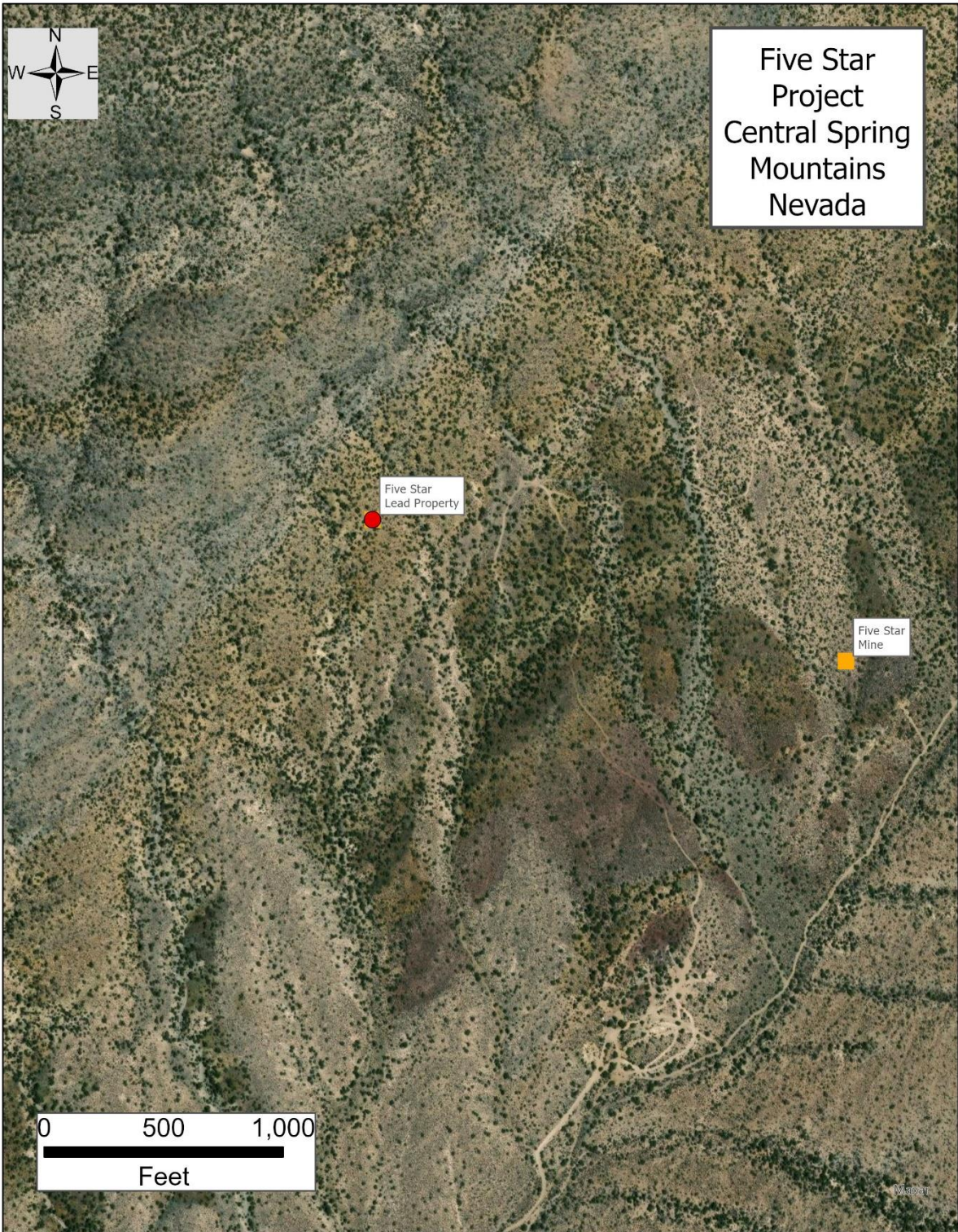


Figure 17. Aerial photograph of the Five Star Lead Mine. Open source for educational purpose, no copyright.