

Geology and Mining History of the Cinder Cone Lava Beds District, San Bernardino County, California

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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 the U.S. Bureau of Land Management website.

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 an 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:

The Cinder Cone Lava Beds District is northeast of the Old Dad Mountains, west of Teutonia Peak, north of the Kelso Mountains, southwest of Shadow Valley, west of the Ivanpah Mountains and south of Solomon's Knob in T.13 to 15N, R.10 to 13E, SBM. The district is in the East Mojave Scenic Area which is managed by the U.S. National Park Service. This district includes much, but not all of the Cima Volcanic Field. Cima Dome is three miles east of my District boundary.

Deposit locations described by legal subdivision and latitude/longitude are provided in Tables 01 and 02. A commodity map for the district is provided in Figure 1 on page 12.

GEOLOGY

A geologic mosaic for the Cinder Cones-Lava Beds District is accessible for viewing and download at:

https://www.academia.edu/54939528/Cinder_Conos_Lava_Beds_District_Geologic_Mosaic_and_Mine_Map

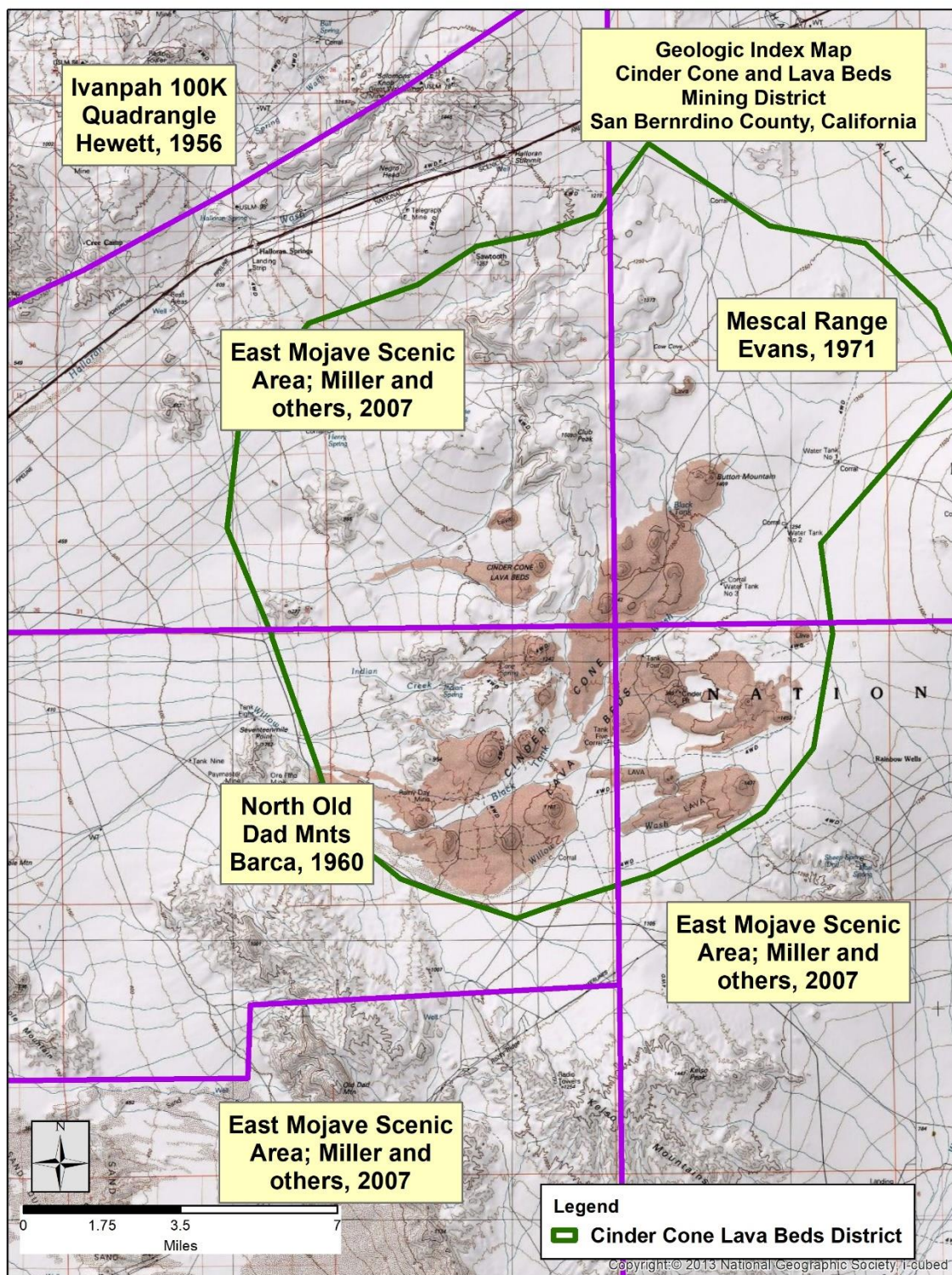
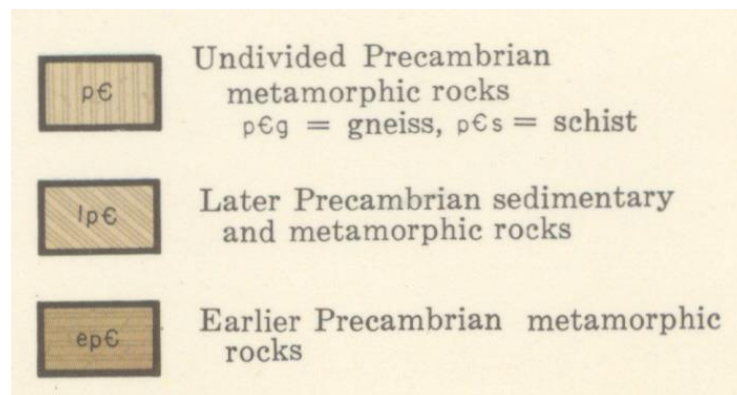
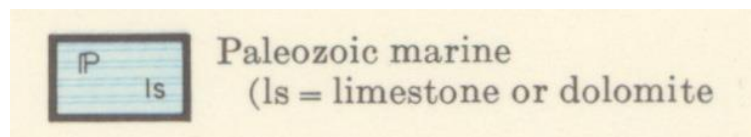
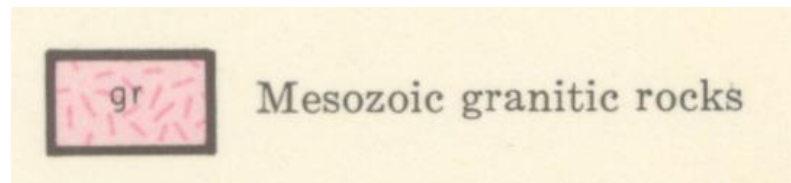
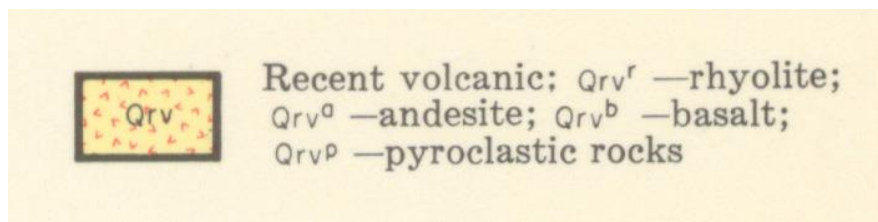
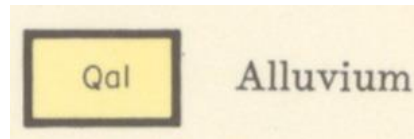


Figure 1. Geologic index map for the Cinder Cones-Lava Beds District for the geologic mosaic

GEOLOGIC MAPPING

1:250,000

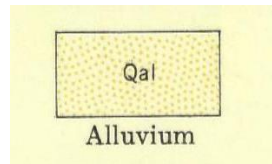
Jennings (1961) mapped the Cinder Cone Lava Beds District as having exposures of early Pre-Cambrian rocks (ep€), Mesozoic granitic rocks (gr), Paleozoic limestone (ls), Quaternary recent pyroclastic rocks (Qrvp), Quaternary recent basalt (Qrvb) and Quaternary alluvium (Qal).



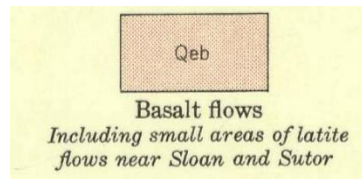
1:125,000: Hewett

Hewett (1956) mapped the Cinder Cone Lava Beds District as having exposures of lower PreCambrian gneiss and granite (p€g), Cretaceous or Early Tertiary Teutonia quartz monzonite (TKg) and Quaternary Basalt (Qeb) with some Quaternary alluvium (Qa).

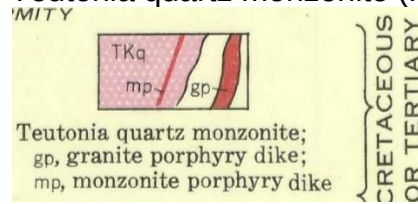
Quaternary Alluvium (Qal):



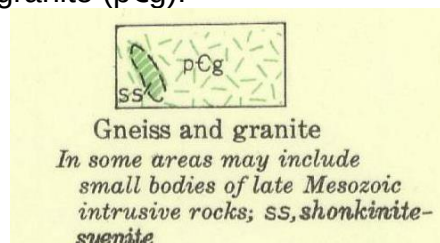
Quaternary Basalt (Qeb):



Cretaceous of Early Tertiary Teutonia quartz monzonite (KTg):



Pre-Cambrian Gneiss and granite (p€g):



1:125,000: Miller and others (2007).

Miller and others (2007), identified the following units in the Cinder Cone-Lava Beds District:

Qaf, Holocene alluvium and alluvial fans

Qaf **Alluvial fan deposits and alluvium (Holocene and Pleistocene)**—Unconsolidated deposits of poorly sorted gravel, sand, and silt. Deposited as alluvial cones at mouths of canyons and gullies, as alluvial floodplains that border streams, and as braided-stream sediments in stream channels. Older deposits form piedmonts that flank mountain ranges, as well as typically underlie raised, paved, and varnished surfaces

QTbc, Pleistocene to late Miocene basalt cinder deposits

QTbl, Pleistocene to late Miocene basalt lava flows

QTbc **Basalt cinder deposits (Pleistocene to late Miocene)**—Unconsolidated deposits of basalt-scoria fragments, consolidated pyroclastic breccia, and tuffaceous conglomerate formed by phreatic eruption during vent opening.

QTbl **Basalt lava flows (Pleistocene to late Miocene)**—Alkaline basalt and hawaiite flows.

Tg, Pliocene and Miocene gravel

Tg **Gravel (Pliocene and Miocene)**—Moderately consolidated, crudely bedded, fluvial boulder to pebble gravel and sand interbedded with coarse to extremely coarse debris-flow deposits, avalanche breccia, and gravity-slide breccia. Sand is siliciclastic and volcanoclastic, locally arkosic. In and east of New York Mountains, typically forms highly incised raised terraces. Intercalated gravity-slide blocks between Cima Dome and Old Dad Mountain consist of breccias of dolomite, limestone, chert, quartzite, and volcanic, metamorphic, and granitoid rocks

Tv2, Miocene older volcanic rocks

Tv₂ **Older volcanic rocks (Miocene)**—Rhyolite lava flows and ash flows, tuffaceous sedimentary rocks, tuff breccia, basalt flows, and andesite flows

Kb, Cretaceous biotite-rich granitoid rocks

Kb **Biotite-rich granitoid rocks (Cretaceous)**—Gray, equigranular to porphyritic (contains small pink alkali-feldspar phenocrysts), biotite-rich granitoid rocks, generally medium or coarse grained. Biotite content 10 volume percent or greater; biotite-rich schlieren widely present, abundant in places. Mapped in Halloran Wash and to south. Considered Cretaceous in age by DeWitt and others (1984)

Kt, Cretaceous Teutonia adamellite

Kt

Teutonia adamellite of Beckerman and others (1982) (Cretaceous)—Informally named unit. White to light-tan, equigranular to porphyritic (contains pink alkali-feldspar phenocrysts) biotite monzogranite, generally medium and coarse grained. Locally varies in composition to syenogranite and quartz monzonite. Minor muscovite present in places. These rocks were called granitic rocks of Kelso Peak by Dunne (1972). Crops out over much of Cima Dome, where it was dated at 97 Ma in age by U–Pb methods on zircon (DeWitt and others, 1984)

Xg, Early Proterozoic younger granitoids

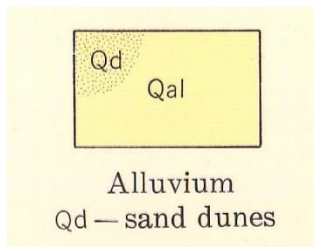
Xg

Gneiss and granitoids (Early Proterozoic)—Undivided migmatite, granitoid gneiss, and granitoids mapped in many poorly known locations across map area. Also includes quartzite and quartzo-feldspathic paragneiss at Old Dad Mountain

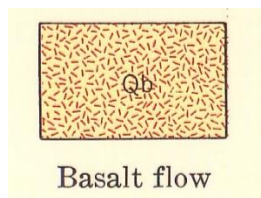
1:62,500: Barca, 1960

Barca's map (1960) of the northern portion of the Old Dad Mountains Quadrangle covers the southwestern quarter of the Cinder Cone Lava Beds District. The units he recognized are: PreCambrian gneiss, schist, and quartzite (p€g); Cretaceous Teutonia quartz monzonite (Ktqm); Cretaceous Teutonia quartz diorite (Ktqd); Quaternary Older alluvium (Qoa); Quaternary Older basalt flow (Qob); Pleistocene Limestone-Dolomite breccia (Qbr); Recent Cinder cone (Qc); Recent basalt flow (Qb); Recent alluvium (Qal):

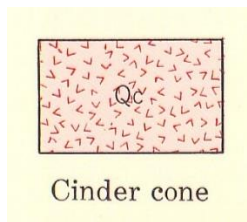
Recent alluvium (Qal):



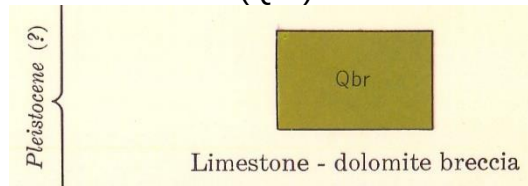
Recent basalt flow (Qb):



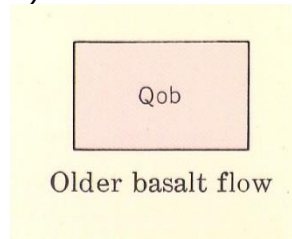
Recent Cinder cone (Qc):



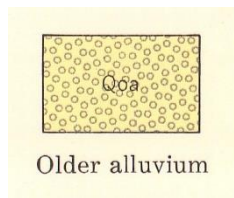
Pleistocene Limestone-Dolomite breccia (Qbr):



Quaternary Older basalt flow (Qob):

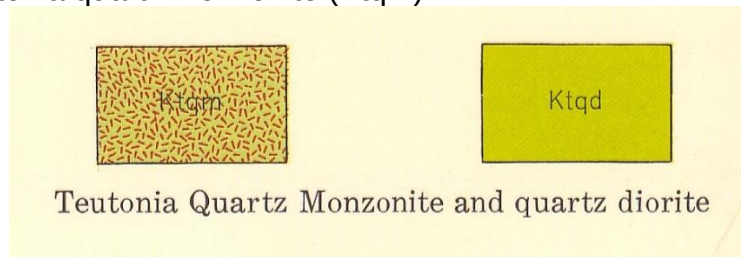


Quaternary Older alluvium (Qoa):

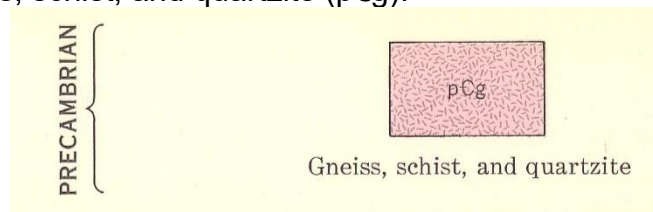


Cretaceous Teutonia quartz diorite (Ktqd)

Cretaceous Teutonia quartz monzonite (Ktqm):



PreCambrian gneiss, schist, and quartzite (pCg):



1:24,000: Wilshire and others, 2002

Wilshire and others (1992a, 1992b, 1992c, 1992d, 2002a, 2002b, 2002c, 2002d) mapped most of the Cinder Cones-Lava Beds District at a scale of 1:24,000. This mapping identified individual vents for the volcanic field and individual flows.

Eruptive rocks of the Cima volcanic field occur almost entirely within six 7.5 minute quadrangles, Indian Spring, Marl Mountains, Granite Spring, Cow Cove, Solomons Knob, and Valley Wells. The following description applies to all six quadrangles (Wilshire and others, 2002a)

The Cima volcanic field is a small (~300 km²) Tertiary-Quaternary alkaline basalt field in the Ivanpah highlands (Hewett, 1956), in east-central Mojave Desert (Fig. 1). The basaltic rocks, which range from late Miocene to Holocene, were erupted from at least 71 vents. The younger vents are well-formed cinder cones, whereas older vents are marked by degraded cinder cones, plugs, and crater-fill lava flows (Wilshire and others, 2002a).

The volcanic rocks were described in a general geologic study by Hewett (1956). The southern part of the field was mapped by Barca (1966), and the northern part by DeWitt (1980). Topical studies of the volcanic field include the geomorphology of pediment domes (Sharp, 1957; Dohrenwend and others, 1984a,b), geomorphic and soil evolution of the lava flows (Wells and others, 1984; McFadden and others, 1984), paleontology and stratigraphy of Tertiary and Quaternary deposits of the Shadow Valley Basin (Reynolds and Nance, 1988), structural studies (Hewett, 1956; Dunne, 1977; Reynolds, 1990; Skirvin and Wells, 1990), polycyclic volcanism (Renault and Wells, 1990), and evolution of the upper mantle and lower crust beneath Cima based on xenoliths in the basalts (Wilshire, 1990; Wilshire and others, 1991).

Mineral resource assessments entailed new geologic mapping in the volcanic field (Greenwood, 1984; Wilshire and others, 1987), and a number of theses have been written on various aspects of the area. The present mapping began as part of a Wilderness Study Area mineral resource assessment, and will be combined with new mapping by R.E. Reynolds in the Solomons Knob and Valley Wells quadrangles, which include the northern part of the Cima volcanic field. Other current studies include isotopic and trace element investigation of the basalts (Farmer and others, 1991), and investigations of detachment faulting (Reynolds, 1990; Davis and others, 1990) (Wilshire and others, 2002a).

Wilderness Study Reports Bureau of Mines

The Cinder Cones Wilderness Study Area mineral report by the U.S. Bureau of Mines (Rumsey and McMahan, 1984) says this about the region:

Cinder cones in the region rest upon olivine basalt flows. A cinder cone in the northeastern part of the WSA (fig. 2), related to an older basalt flow, is heavily

weathered and its cinders are not suitable for commercial use. Volcanic cinders suitable for commercial use occur at two localities inside the WSA (fig. 2, prospects 6 and 7). Placer claims were located on these prospects. The black and rusty-red (oxidized) cinders are medium- to coarse-cellular, have diameters ranging from less than 1/8 in. to 6 in. and are similar to those at the nearby Cima and Aiken Cinder Mines (fig. 2). About 10 million tons and 20 million tons of volcanic cinder are at prospects 6 and 7, respectively. Height of both cones is 280 ft, the radius at the base of the cone at prospect 6 is 1,100 ft and at prospect 7 is 1,450 ft; the radius at the top of the frustum of cone 6 is 240 ft and at prospect 7 is 130 ft (Rumsey and McMahan, 1985, p. 8).

Joseph (1984) gave this general description of volcanic flows in the region:

The volcanic flows located in the western portion of the study area contain olivine basalt and cinder cones. The older flows are weathered and eroded, while the younger ones appear fresh and may have-been extruded in historic times. The flows reach a maximum thickness of about 400 feet and the cinder cones are as much as half a mile in diameter, ranging from 200 to 400 feet in height. The cinders are red to black, coarse- to medium-cellular, and are less than one eighth of an inch to six inches in their longest dimension, but locally are agglutinated to form masses up to 2 to 3 feet across. Volcanic bombs are abundant, especially along bedding planes. The basalt flows are composed of fine- to medium-grained phenocrysts of plagioclase, olivine, and some augite, set in a dense intergrowth of plagioclase laths, interstitial olivine, magnetite, augite and dark glass (Joseph, 1984, p. 30).

Quaternary basaltic flows cover an area of several square miles northeast of the Old Dad Mountains. Included within this field are about 30 cinder cones. Volcanism began about 10 million years ago in this area (Katz, M. and Boetcher, A., 1980) and has episodically continued into recent time. Katz and Boetcher report a carbon age of 330 to 480 years for a piece of charcoal found at the base of one of the flows (Joseph, 1981, p. 25).

Cinder and scoria are formed by the eruption of mafic lavas of sufficient viscosity and gas content to form rock fragments with abundant gas cavities (vesicles). The fragments commonly form cone shaped hills that can reach hundreds of feet in height. By industry convention, "cinders" are those rock fragments less than 1 in. in largest dimension; "scoria" is 1 in. or greater (U.S. BOM, Vol. 2, p. 28)

U.S. Geological Survey

The companion report for the Cinder Cones Wilderness Study Area mineral report by the U.S Geological Suvey (Wilshire and others, 1987) said this of the area:

At the request of the Bureau of Land Management, 44,299 acres of the Cinder Cones Wilderness Study Area (CDCA-239) were studied by the U.S. Geological Survey and the U.S. Bureau of Mines. In this report, the area studied is referred to as "the

wilderness study area", or simply "the study area." The study area is located in the Ivanpah upland near Baker, Calif. Fieldwork for this report was carried out between 1983 and 1985. Two small young cinder cones in the wilderness study area contain an estimated 30 million tons of cinders; however, there are sufficient cinders outside the study area to satisfy demand in the foreseeable future. There are no mines in the wilderness study area, and of several prospects for metallic minerals examined, none contain identified resources. Mineralized areas in mines and prospects surrounding the study area are associated with quartz veins in Cretaceous (see geologic time chart on last page of report) granitic intrusions and with Proterozoic(?) or Paleozoic rocks near such intrusions. Quartz veins are rare in Cretaceous granites within the study area, and the limited exposures of Proterozoic(?) - Cretaceous rock contacts are not strongly altered or mineralized, thus the mineral resource potential for gold, silver, lead, and zinc is low. Areas underlain by Cretaceous granite, Tertiary volcanic and sedimentary rocks, and Quaternary alluvium and volcanic rocks have a low mineral resource potential for gold, silver, lead, zinc, oil, gas, and geothermal energy (Wilshire and others, 1987, p. 1). The mineral potential map is Figure 2 in the Wilshire report. It is reproduced on page 41 of my report.

STRATIGRAPHY

Jennings, 1961	Hewett, 1956	Barca, 1966	Miller and others, 2007
Qal, Recent alluvium	Qal, Quaternary alluvium	Qal, Recent alluvium	Qaf, Holocene alluvium and alluvial fans
Qrv, Recent volcanic -Qrvr: rhyolite -Qrva: andesite -Qrvb: basalt -Qrvp: pyroclastic	Qeb, Quaternary Basalt	Qb, Basalt flow Qc, Recent Cinder cone	QTbc, Pleistocene to late Miocene basalt cinder deposits QTbl, Pleistocene to late Miocene basalt lava flows
		Qbr, Pleistocene limestone breccia	
		Qob, Quaternary Older basalt flow	
		Qoa, Quaternary Older alluvium	Tg, Pliocene and Miocene gravel
			Tv2, Miocene older volcanic rocks
gr. Mesozoic Granite			Kb, Cretaceous biotite-rich granitoid rocks
	KTq, Teutonia Quartz Monzonite	Ktqm, Cretaceous or Early Tertiary Teutonia quartz monzonite	Kt, Cretaceous Teutonia adamellite
	KTq, Teutonia Quartz Monzonite	Ktqd, Cretaceous or Early Tertiary Teutonia quartz diorite	
IP, ls: Paleozoic marine, limestone			
ep€, Early PreCambrian metamorphic rocks	p€g, PreCambrian gneiss and granite	p€g, PreCambrian gneiss, schist and quartzite	Xg, Early Proterozoic younger granitoids

MINERALOGY

The table below summarizes the mineralogy of past producers and deposits of special interest in the Cinder Cone Lava Beds District. Table 01 on page 29 is an expanded table (Tabloid size) with additional information.

MINE NAME	MINERALS	ELEMENTS DETECTED	COMMENTS
Aiken Cinder Mine	Cinders	Si, Fe, K, Na, Ca, Mg, Al, K	Mined 9 million tons of cinders
Bronco Prospect #129	Quartz	No Au or Ag	Bulldozer cut
Carrere Quarry	Stone		Producing in 1981
Cima Cinder Co. Southwest #131	Cinders		See Cima Cinders Northeast
Cima Cinders Northeast #131	Cinders	Si, Fe, K, Na, Ca, Mg, Al, K	12 million tons of reserves
Holladay Gold Prospect #126	Unknown	No Au or Ag detected	Possible skarn
Indian Creek	Quartz, Fe oxides	Au, Ag	Pegmatite. Low metal concentrations
Little Dove & Dove Millsite #128	Quartz, limonite, pyrite	Au, Ag	0.15 oz/T Au, 1.2 oz/T Ag
Mesquite #375	Black sands	Au, Ab, Ce, La, Sa, Pt?	Low metal concentrations
Mhgb Claim Group	Hydrothermal alteration minerals, silica, iron, cinnabar	Au, Ag, W	Low metal concentrations
Rainy Day	Hematite	Au, Ag, Pb	5ft wide hematitic zone with sulfides in fault gouge
Raw Silver Cone No. 1 #125	Clay, Iron, Malachite	Au, Ag, Cu	Low metal concentrations
Squaw T Placers Claims	Iron, Titanium	Fe, Ti	https://mrdata.usgs.gov/mrds/show-mrds.php?dep_id=10237796
Unnamed Cinder Occurrence No. 1	Cinders		Small black and red cinder cone with road access
Unnamed Cinder Occurrence No. 2	Cinders		Small black and red cinder cone with road access
Unnamed Cu Prospect No. 1	Quartz, limonite, pyrite, chalcopyrite, bornite(?), covellite and potassic alteration	Si, Fe, Cu, K	Quartz monzonite dike and pegmatite with potassic alteration

Wmk Builders Products	Lava		Quaternary or Tertiary basalt flow
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COMMODITIES

The table below lists mineral deposits according to commodity. Table 02 on page 20 is an expanded (Tabloid size) table with more data elements.

COMMODITIES	NAME	COMMENTS
Copper	Unnamed Cu Prospect No. 1	Porphyry copper mineralization and alteration, limonite boxworks
Gold	Bronco Prospect	4 inch thick shear zone in bleached, silicified and foliated granite. No Au or Ag detected
	Holladay Gold Prospect	Along contact between Cretaceous granite and Proterozoic schist, no Au or Ag detected
Gold, Ag	Indian Creek	Quartzose pegmatite explored by 3 adits with minor production
	Little Dove & Dove Millsite	Three brecciated quartz veins in foliated granite, vuggy, iron stained, small shafts and pits
	Mesquite	Placer claims in granitic and basaltic alluvium. Black sand concentrates prospected for Au, Ag and Pt. Attempted dry valveless pulse jet for metal recovery,
	Mhgb Claim Group	Hydrothermal alteration in PreCambrian gneiss and quartzite, several pits
	Raw Silver Cone No. 1	Two clayey, brecciated, Fe-stained shear zones. 5 trenches, 1 caved adit, 2 prospect pits
Gold, Pb, Ag	Rainy Day Mine NW	Hematitic zone 5 feet wide in fault gouge with sulfides
Iron, Ti	Squaw T Placers Claims	Possible black sand deposit from weathering of Teutonia adamellite.
Lead, Gold, Silver	Rainy Day SE	Hematitic zone 5 feet wide in fault gouge with sulfides
Pumice	Aiken Cinder Mine	9 million tons mined, 7.8 million tons of reserves. Most used to develop Las Vegas Strip
	Cima Cinder Co. Southwest	See Cima Cinders Northeast
	Cima Cinders Northeast	12 million tons of reserves. Past production 130,000 tons
	Unnamed Cinder Occurrence No. 1	exploration only. 20 million cubic yards of cinder reserves.

	Unnamed Cinder Occurrence No. 2	exploration only. 10 million cubic yards of cinder reserves
	Wmk Builders Products	Associated with Aiken Cinders.
Stone, Crushed/Broken	Carrere Quarry	Operated in 1981

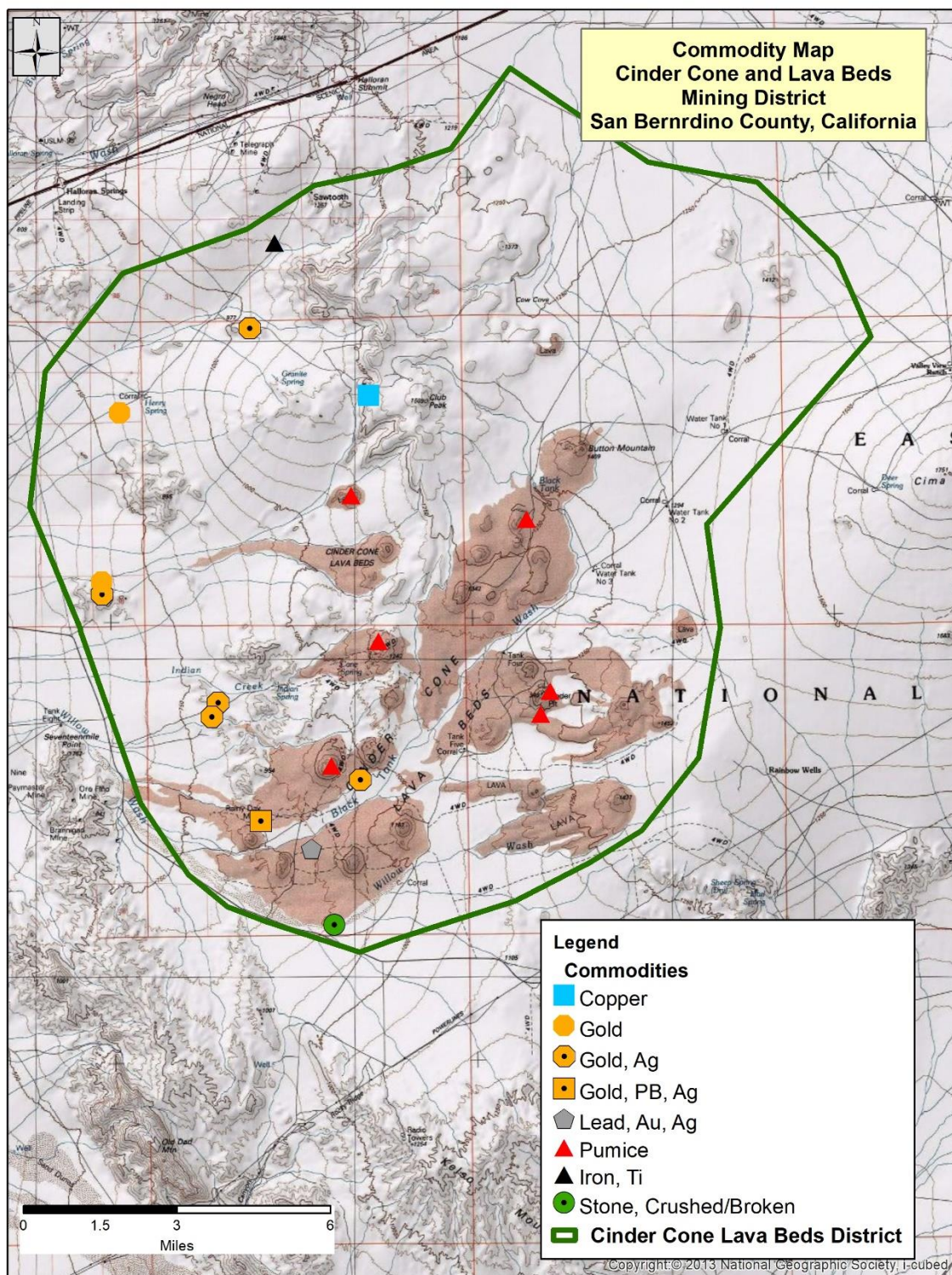


Figure 2. Commodity map of the Cinder Cones-Lava Beds District.

HISTORY AND DEVELOPMENT

The U.S. Geological Survey MRSD database has 18 mines and prospects in the Cinder Cone Lava Beds District:

DEPOSIT NAME	COMMODITIES	STATUS / DATES OF OPERATION	TRS	Latitude	Longitude
Aiken Cinder Mine	Pumice	Producer/ 1954-1990	13N 12E Sec. 08 SBM	35.2289100	- 115.724740
Bronco Prospect	Gold	Prospect/ pre-1985	14N 10E Sec. 36 SBM	35.2614100	- 115.879450
Carrere Quarry	Stone, Crushed/Broken	Past Producer/ 1981	13N 11E Sec. 34 SBM	35.1669100	- 115.800840
Cima Cinder Co. South West	Pumice	Past Producer/ 1965	13N 11E Sec. 15 SBM	35.2086100	- 115.800840
Cima Cinders North East	Pumice	Past Producer/ 1965	14N 12E Sec. 20 SBM	35.2778100	- 115.732240
Holladay Gold Prospect	Gold	Prospect/ dates unknown	14N 10E Sec. 12 SBM	35.3092100	- 115.872550
Indian Creek	Gold, Ag	Prospect/ pre-1990	13N 11E Sec. 08 SBM	35.2267100	- 115.839750
Little Dove & Dove Millsite	Gold, Ag	Prospect	14N 10E Sec. 36 SBM	35.2578100	- 115.879450
Mesquite	Gold, Ag	Occurrence/ pre-1990	13N 11E Sec. 15 SBM	35.2044100	- 115.790840
Mhgb Claim Group	Gold, Ag	Prospect/ pre-1990	13N 11E Sec. 08 SBM	35.2228100	- 115.841950
Rainy Day SE	Lead, Gold, Silver	Occurrence	13N 11E Sec. 27 SBM	35.1850100	- 115.808060
Rainy Day Mine NW	Gold, Pb, Ag	Prospect/ pre-1953	13N 11E Sec. 21 SBM	35.1942100	- 115.824440
Raw Silver Cone No. 1	Gold, Ag	Prospect	14N 11E Sec. 05 SBM	35.3328100	- 115.827250
Squaw T Placers Claims	Iron, Ti	Occurrence	15N 11E Sec. 28 SBM	35.3569100	- 115.818350
Unnamed Cinder Occurrence No. 1	Pumice	Occurrence	14N 11E Sec. 23 SBM	35.2850100	- 115.789140
Unnamed Cinder Occurrence No. 2	Pumice	Occurrence	14N 11E Sec. 35 SBM	35.2500100	- 115.784140
Unnamed Cu Prospect No. 1	Copper	Prospect/ Pre-1984	14N 11E Sec. 11 SBM	35.3131100	- 115.783940

Wmk Builders Products	Pumice	Past Producer/ 1940-1990	13N 12E Sec. 08 SBM	35.2203100	115.726940
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Cinder and scoria have been in extensive use as lightweight building materials in Europe since the time of the Roman Empire. The materials' light weight, inertness, moisture-retention properties, and abrasiveness make cinder and scoria ideal for low-cost construction aggregates. The United States is the world's fourth leading producer and consumer of cinder and scoria behind Italy, Greece, and France (U.S. BOM, Vol 2, p. 23)

MINE REPORTS

Reports for the mines in the Cinder Cone Lava Beds District classified by the U.S. Geological Survey as "Past Producers", or that are of special interest are accessible at the following URL's

MINE OR DEPOSIT NAME	URL
Aiken Cinder Mine	https://www.academia.edu/54667728/Cinder_Cones_Lava_Beds_District_Aiken_Cinder_Quarry
Carrere Quarry	https://www.academia.edu/54731277/Cinder_Cones_Lava_Beds_District_Carrere_Cinder_Quarry
Cima Cinder Co.	https://www.academia.edu/54724542/Cinder_Cones_Lava_Beds_District_Cima_Cinders_Quarries
Indian Creek Prospect	https://www.academia.edu/54881090/Cinder_Cones_Lava_Beds_District_Indian_Creek_Prospect
Little Dove & Dove Millsite	https://www.academia.edu/54883991/Cinder_Cones_Lava_Beds_District_Little_Dove_Mine_and_Dove_Millsite
Mesquite Placers	https://www.academia.edu/54885775/Cinder_Cones_Lava_Beds_District_Mesquite_Placers
Rainy Day Mines	https://www.academia.edu/54898531/Cinder_Cones_Lava_Beds_District_Rainy_Day_Mines
Raw Silver Cone No. 1	https://www.academia.edu/54911466/Cinder_Cones_Lava_Beds_District_Raw_Silver_Cone_Prospect
Unnamed Cinder Occurrence No. 1 and 2	https://www.academia.edu/54493561/Cinder_Cones_Lava_Beds_District_Unnamed_Cinder_Cones_No_1_and_No_2
Unnamed Cu Porphyry Prospect No. 1	https://www.academia.edu/54925175/Cinder_Cones_Lava_Beds_District_Unnamed_Copper_Porphyry_Prospect_No_1
Wmk Builders Products	https://www.academia.edu/54923117/Cinder_Cones_Lava_Beds_District_Wmk_Builders_Products_Quarry

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See Deposit 245, p. 78-79.

TABLES

- 01. Mine table sorted by name
- 02. Mine table sorted by commodity

TABLE 01. MINE SUMMARY SORTED BY NAME

NAME	COMMODITIES	STATUS	REFERENCES	TRS	Latitude	Longitude
Aiken Cinder Mine	Pumice	Producer	CALIF. DIV. MINES AND GEOL. ACTIVE MINES (1991) DATABASE.	13N 12E Sec. 08 SBM	35.2289100	-115.724740
Bronco Prospect	Gold	Prospect	U.S. BUREAU OF MINES OPEN-FILE REPORT MLA 67-85, 1985, NO. 5, TABLE 1, P. 9; FIG. 2, P. 7.	14N 10E Sec. 36 SBM	35.2614100	-115.879450
Carrere Quarry	Stone, Crushed/Broken	Past Producer	CALIF. DIV. MINES AND GEOL. SPECIAL PUBLICATION 58, 1981, P. 48.	13N 11E Sec. 34 SBM	35.1669100	-115.800840
Cima Cinder Co.	Pumice	Past Producer	CALIF. DIV. MINES MAP SHEET 7, 1966, P. 9 (TEXT). BARCA, 1960	13N 11E Sec. 15 SBM	35.2086100	-115.800840
Cima Cinders	Pumice	Past Producer	CALIF. DIV. MINES AND GEOL. OPEN-FILE REPORT 84-2, 1984, NO. 32, PLATES 5 AND 6. U. S. BUREAU OF MINES, 1990, MINERALS IN THE EAST MOJAVE NATIONAL SCENIC AREA, CALIFORNIA: U. S. BUREAU OF MINES OPEN	14N 12E Sec. 20 SBM	35.2778100	-115.732240
Holladay Gold Prospect	Gold	Prospect	U.S. BUREAU OF MINES OPEN-FILE REPORT MLA 67-85, 1985, NO. 3, TABLE 1, P. 9; FIG. 2, P. 7.	14N 10E Sec. 12 SBM	35.3092100	-115.872550
Indian Creek	Gold, Ag	Prospect	U. S. BUREAU OF MINES, 1990, MINERALS IN THE EAST MOJAVE NATIONAL SCENIC AREA, CALIFORNIA: U. S. BUREAU OF MINES OPEN-FILE REPORT MLA 6-90, VOL. I, TABLE 2, NO. 372, P. 141.	13N 11E Sec. 08 SBM	35.2267100	-115.839750
Little Dove & Dove Millsite	Gold, Ag	Prospect	CALIF. DIV. MINES AND GEOL. OPEN-FILE REPORT 84-51, 1984, NO. 1, PLATES 5 AND 6. U. S. BUREAU OF MINES, 1990, MINERALS IN THE EAST MOJAVE NATIONAL SCENIC AREA, CALIFORNIA: U. S. BUREAU OF MINES OPEN	14N 10E Sec. 36 SBM	35.2578100	-115.879450
Mesquite	Gold, Ag	Occurrence	U. S. BUREAU OF MINES, 1990, MINERALS IN THE EAST MOJAVE NATIONAL SCENIC AREA, CALIFORNIA: U. S.	13N 11E Sec. 15 SBM	35.2044100	-115.790840
Mhgb Claim Group	Gold, Ag	Prospect	U. S. BUREAU OF MINES, 1990, MINERALS IN THE EAST MOJAVE NATIONAL SCENIC AREA, CALIFORNIA: U. S. BUREAU OF MINES OPEN-FILE REPORT MLA 6-90, VOL. I, TABLE 2, NO. 373, P. 141.	13N 11E Sec. 08 SBM	35.2228100	-115.841950
Rainy Day	Lead, Gold, Silver	Occurrence	GOODWIN, J. G., 1957 , LEAD AND ZINC IN CALIFORNIA; CALIF. JOUR. MINES AND GEOLOGY, VOL. 53 , NO. 3 & 4 ;	13N 11E Sec. 27 SBM	35.1850100	-115.808060
Rainy Day Mine	Gold, Pb, Ag	Prospect	CALIF. JOUR. MINES AND GEOL., V. 49, 1953, TABULATED LIST, NO. 270, P. 82. CALIF. JOUR. MINES AND GEOL., V. 53, 1957, P. 662. ABOVE REFERENCES REPORT THE MINE IN SEC. 27. U.S. BUREAU OF MINES, 1990,	13N 11E Sec. 21 SBM	35.1942100	-115.824440
Raw Silver Cone No. 1	Gold, Ag	Prospect	CALIF. DIV. MINES AND GEOL. OPEN-FILE REPORT 84-51, 1984, NO. 2, PLATES 5 AND 6. U. S. BUREAU OF MINES,	14N 11E Sec. 05 SBM	35.3328100	-115.827250
Squaw T Placers Claims	Iron, Ti	Occurrence		15N 11E Sec. 28 SBM	35.3569100	-115.818350
Unnamed Cinder Occurrence	Pumice	Occurrence	U.S. BUREAU OF MINES OPEN-FILE REPORT MLA 67-85, 1985, NO. 7,-015; #027-028; AND R #001-. 7.	14N 11E Sec. 23 SBM	35.2850100	-115.789140
Unnamed Cinder Occurrence	Pumice	Occurrence	U.S. BUREAU OF MINES OPEN-FILE REPORT MLA 67-85, 1985, NO. 6, TABLE 1, P. 9; FIG. 2, P. 7.	14N 11E Sec. 35 SBM	35.2500100	-115.784140
Unnamed Prospect	Copper	Prospect	CALIF. DIV. MINES AND GEOL. OPEN-FILE REPORT 84-51, 1984, NO. 16, PLATES 5 AND 6.	14N 11E Sec. 11 SBM	35.3131100	-115.783940
Wmk Builders Products	Pumice	Past Producer	CALIF. DIV. MINES AND GEOL. OPEN-FILE REPORT 84-3, PLATES 3 AND 5, NO. 30. U. S. BUREAU OF MINES, 1990,	13N 12E Sec. 08 SBM	35.2203100	-115.726940

TABLE 02. MINE SUMMARY SORTED BY COMMODITY

NAME	COMMODITIES	STATUS	REFERENCES	TRS	Latitude	Longitude
Unnamed Cu Prospect	Copper	Prospect	CALIF. DIV. MINES AND GEOL. OPEN-FILE REPORT 84-51, 1984,NO. 16, PLATES 5 AND 6.	14N 11E Sec. 11 SBM	35.3131100	-115.783940
Bronco Prospect	Gold	Prospect	U.S. BUREAU OF MINES OPEN-FILE REPORT MLA 67-85, 1985, NO. 5,TABLE 1, P. 9; FIG. 2, P. 7.	14N 10E Sec. 36 SBM	35.2614100	-115.879450
Holladay Gold Prospect	Gold	Prospect	U.S. BUREAU OF MINES OPEN-FILE REPORT MLA 67-85, 1985, NO. 3,TABLE 1, P. 9; FIG. 2, P. 7.	14N 10E Sec. 12 SBM	35.3092100	-115.872550
Mesquite	Gold, Ag	Occurrence	U. S. BUREAU OF MINES, 1990, MINERALS IN THE EAST MOJAVE NATIONAL SCENIC AREA, CALIFORNIA: U. S.	13N 11E Sec. 15 SBM	35.2044100	-115.790840
Indian Creek	Gold, Ag	Prospect	U. S. BUREAU OF MINES, 1990, MINERALS IN THE EAST MOJAVE NATIONAL SCENIC AREA, CALIFORNIA: U. S. BUREAU OF MINES OPEN-FILE REPORT MLA 6-90, VOL. I, TABLE 2, NO. 372, P. 141.	13N 11E Sec. 08 SBM	35.2267100	-115.839750
Little Dove & Dove	Gold, Ag	Prospect	CALIF. DIV. MINES AND GEOL. OPEN-FILE REPORT 84-51, 1984,NO. 1, PLATES 5 AND 6.U. S. BUREAU OF MINES,	14N 10E Sec. 36 SBM	35.2578100	-115.879450
Mhgb Claim Group	Gold, Ag	Prospect	U. S. BUREAU OF MINES, 1990, MINERALS IN THE EAST MOJAVE NATIONAL SCENIC AREA, CALIFORNIA: U. S. BUREAU OF MINES OPEN-FILE REPORT MLA 6-90, VOL. I, TABLE 2, NO. 373, P. 141.	13N 11E Sec. 08 SBM	35.2228100	-115.841950
Raw Silver Cone No. 1	Gold, Ag	Prospect	CALIF. DIV. MINES AND GEOL. OPEN-FILE REPORT 84-51, 1984,NO. 2, PLATES 5 AND 6.U. S. BUREAU OF MINES, 1990, MINERALS IN THE EAST MOJAVE NATIONAL SCENIC AREA, CALIFORNIA: U. S. BUREAU OF MINES OPEN	14N 11E Sec. 05 SBM	35.3328100	-115.827250
Rainy Day Mine NW	Gold, Pb, Ag	Prospect	CALIF. JOUR. MINES AND GEOL., V. 49, 1953, TABULATED LIST,NO. 270, P. 82.CALIF. JOUR. MINES AND GEOL., V.	13N 11E Sec. 21 SBM	35.1942100	-115.824440
Squaw T Placers Claims	Iron, Ti	Occurrence		15N 11E Sec. 28 SBM	35.3569100	-115.818350
Rainy Day SE	Lead, Gold, Silver	Occurrence	GOODWIN, J. G., 1957 , LEAD AND ZINC IN CALIFORNIA; CALIF. JOUR. MINES AND GEOLOGY, VOL. 53 , NO. 3 & 4 ; DIV. OF MINES, P. 66	13N 11E Sec. 27 SBM	35.1850100	-115.808060
Unnamed Cinder Occurrence No. 1	Pumice	Occurrence	U.S. BUREAU OF MINES OPEN-FILE REPORT MLA 67-85, 1985, NO. 7,-015; #027-028; AND R #001-. 7.	14N 11E Sec. 23 SBM	35.2850100	-115.789140
Unnamed Cinder Occurrence No. 2	Pumice	Occurrence	U.S. BUREAU OF MINES OPEN-FILE REPORT MLA 67-85, 1985, NO. 6,TABLE 1, P. 9; FIG. 2, P. 7.	14N 11E Sec. 35 SBM	35.2500100	-115.784140
Cima Cinder Co. SW	Pumice	Past Producer	CALIF. DIV. MINES MAP SHEET 7, 1966, P. 9 (TEXT). BARCA, 1960	13N 11E Sec. 15 SBM	35.2086100	-115.800840
Cima Cinders NE	Pumice	Past Producer	CALIF. DIV. MINES AND GEOL. OPEN-FILE REPORT 84-2, 1984,NO. 32, PLATES 5 AND 6.U. S. BUREAU OF MINES, 1990, MINERALS IN THE EAST MOJAVE NATIONAL SCENIC AREA, CALIFORNIA: U. S. BUREAU OF MINES OPEN	14N 12E Sec. 20 SBM	35.2778100	-115.732240
Wmk Builders Products	Pumice	Past Producer	CALIF. DIV. MINES AND GEOL. OPEN-FILE REPORT 84-3, PLATES 3AND 5, NO. 30.U. S. BUREAU OF MINES, 1990, MINERALS IN THE EAST MOJAVE NATIONAL SCENIC AREA, CALIFORNIA: U. S. BUREAU OF MINES OPEN-FILE	13N 12E Sec. 08 SBM	35.2203100	-115.726940
Aiken Cinder Mine	Pumice	Producer	CALIF. DIV. MINES AND GEOL. ACTIVE MINES (1991) DATABASE.	13N 12E Sec. 08 SBM	35.2289100	-115.724740
Carrere Quarry	Stone, Crushed/Broken	Past Producer	CALIF. DIV. MINES AND GEOL. SPECIAL PUBLICATION 58, 1981,P. 48.	13N 11E Sec. 34 SBM	35.1669100	-115.800840

MAPS

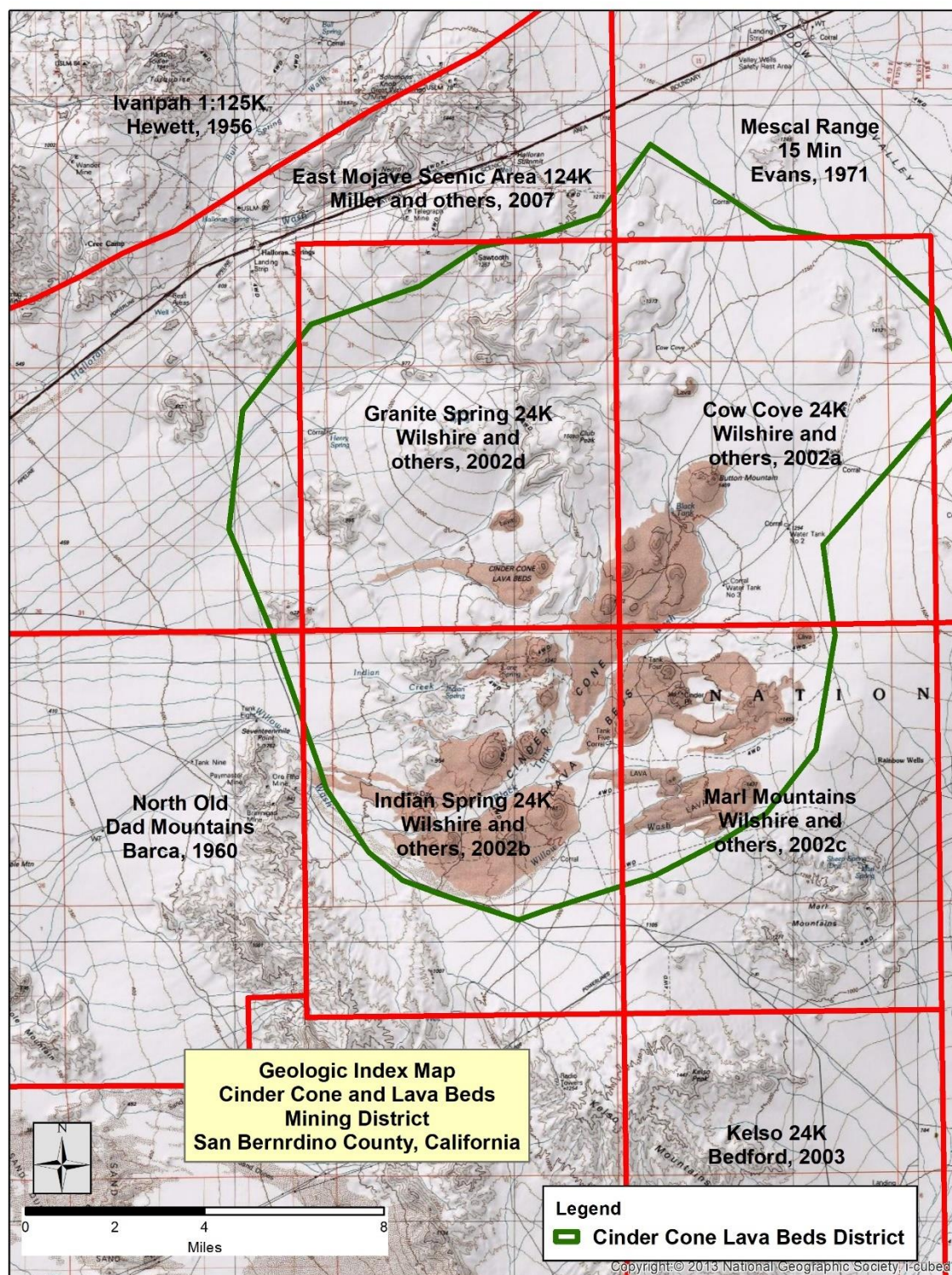
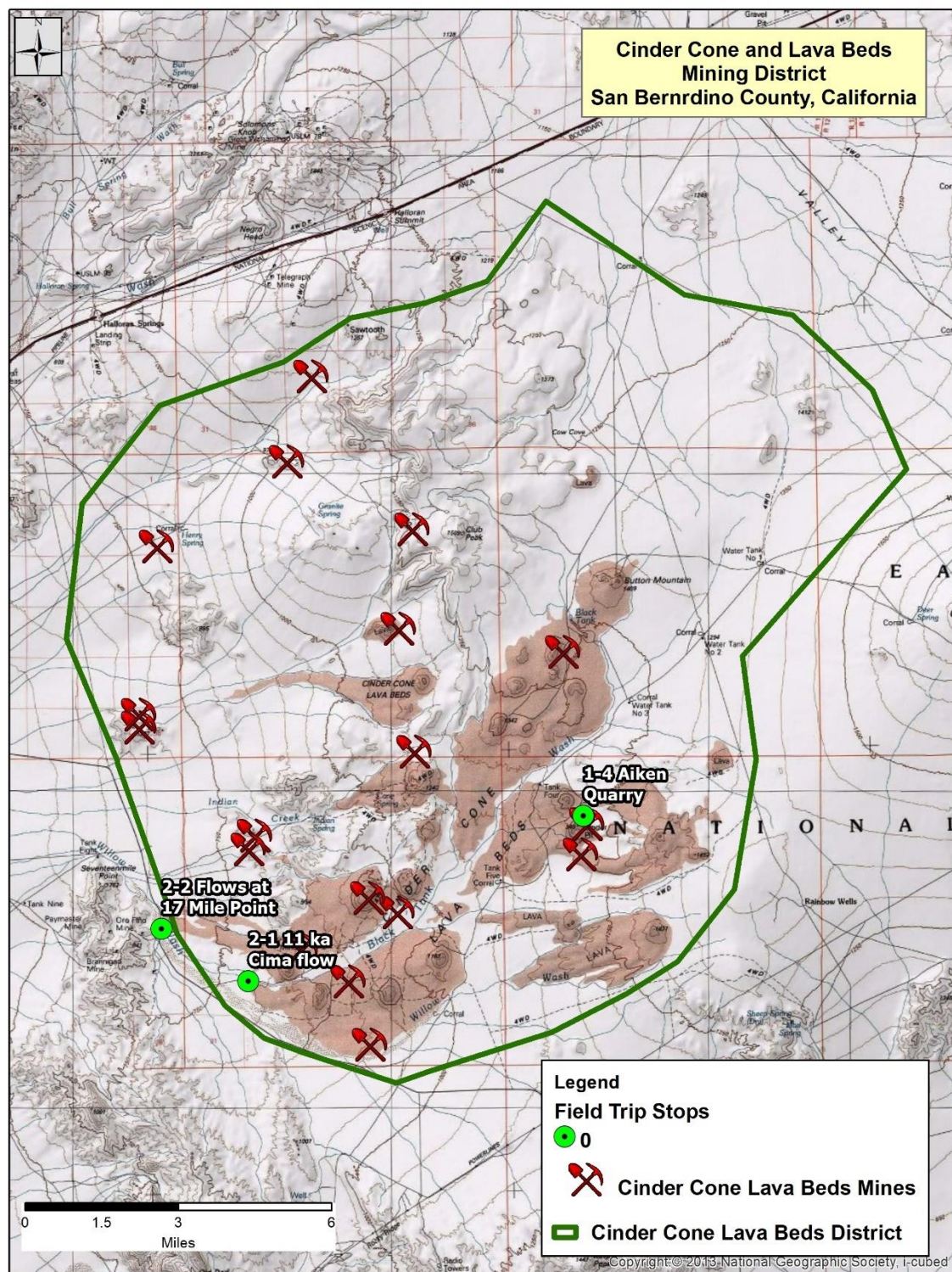


Figure 3. Geologic index map for the Cinder Cones-Lava Beds District.



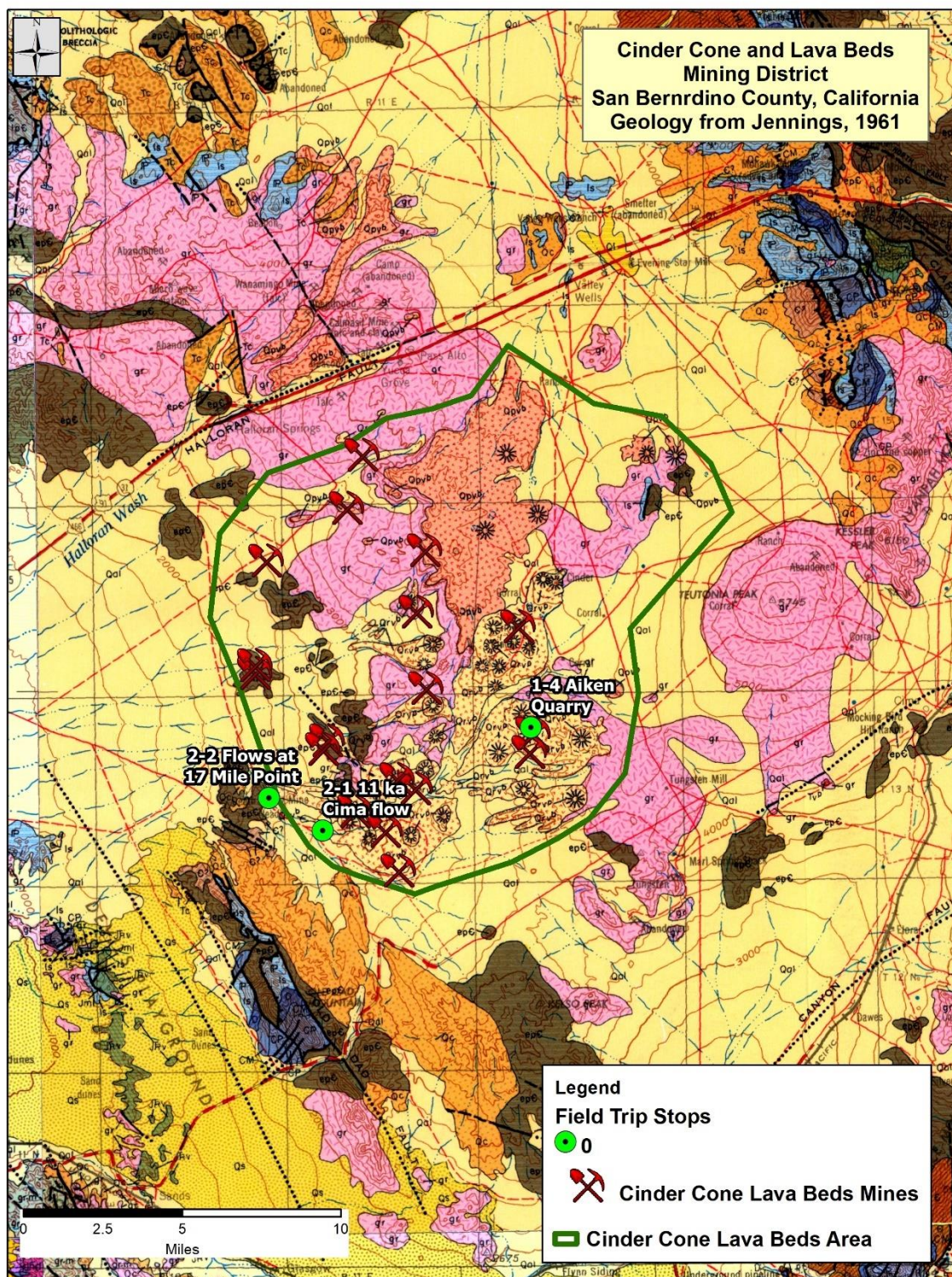


Figure 5. Regional geologic map of the Cinder Cone Lava Beds District

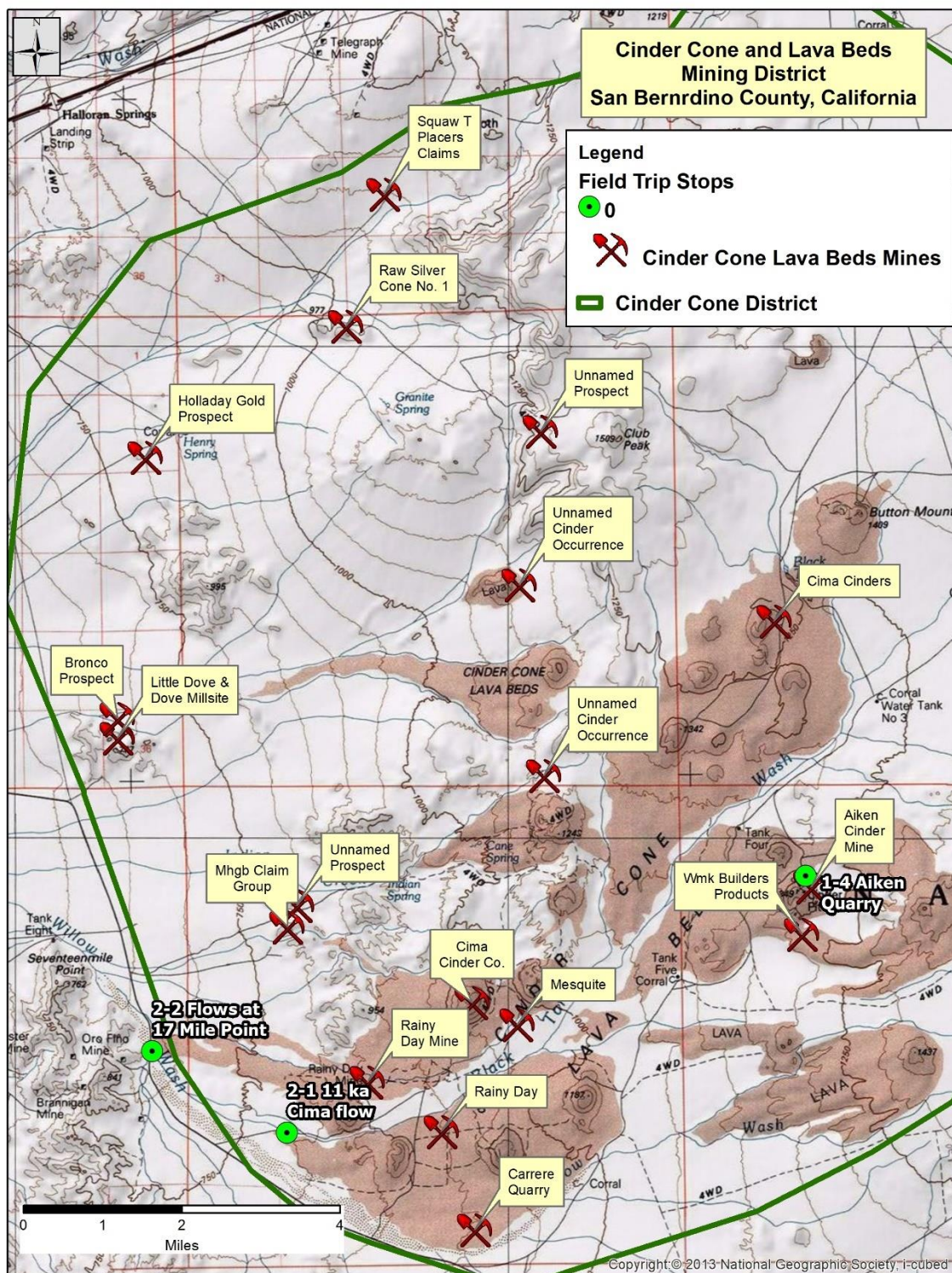


Figure 6. Area topographic map of the Cinder Cones-Lava Beds District with mine names.

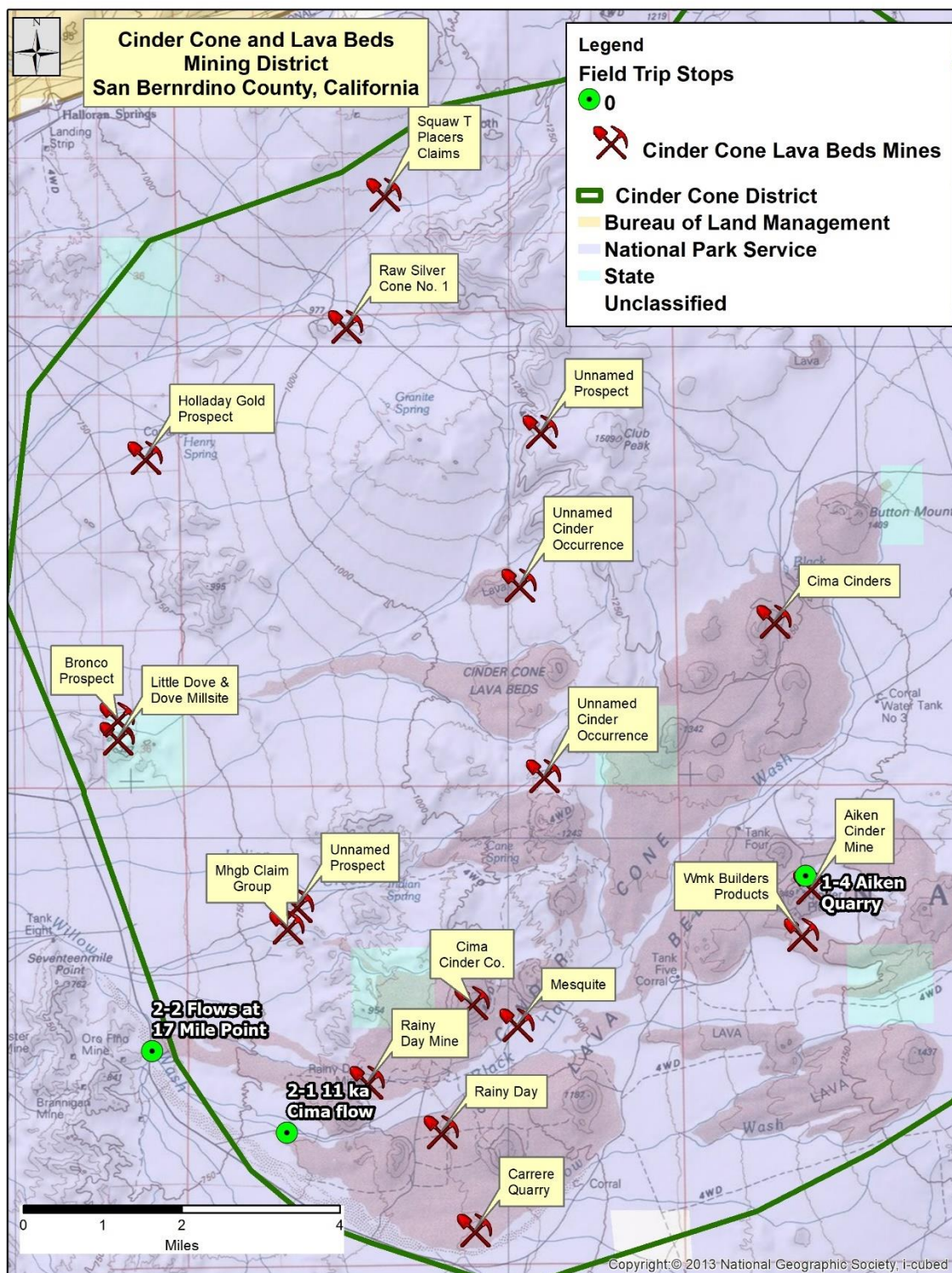


Figure 7. Land status map for the Cinder Cone Lava Beds District.

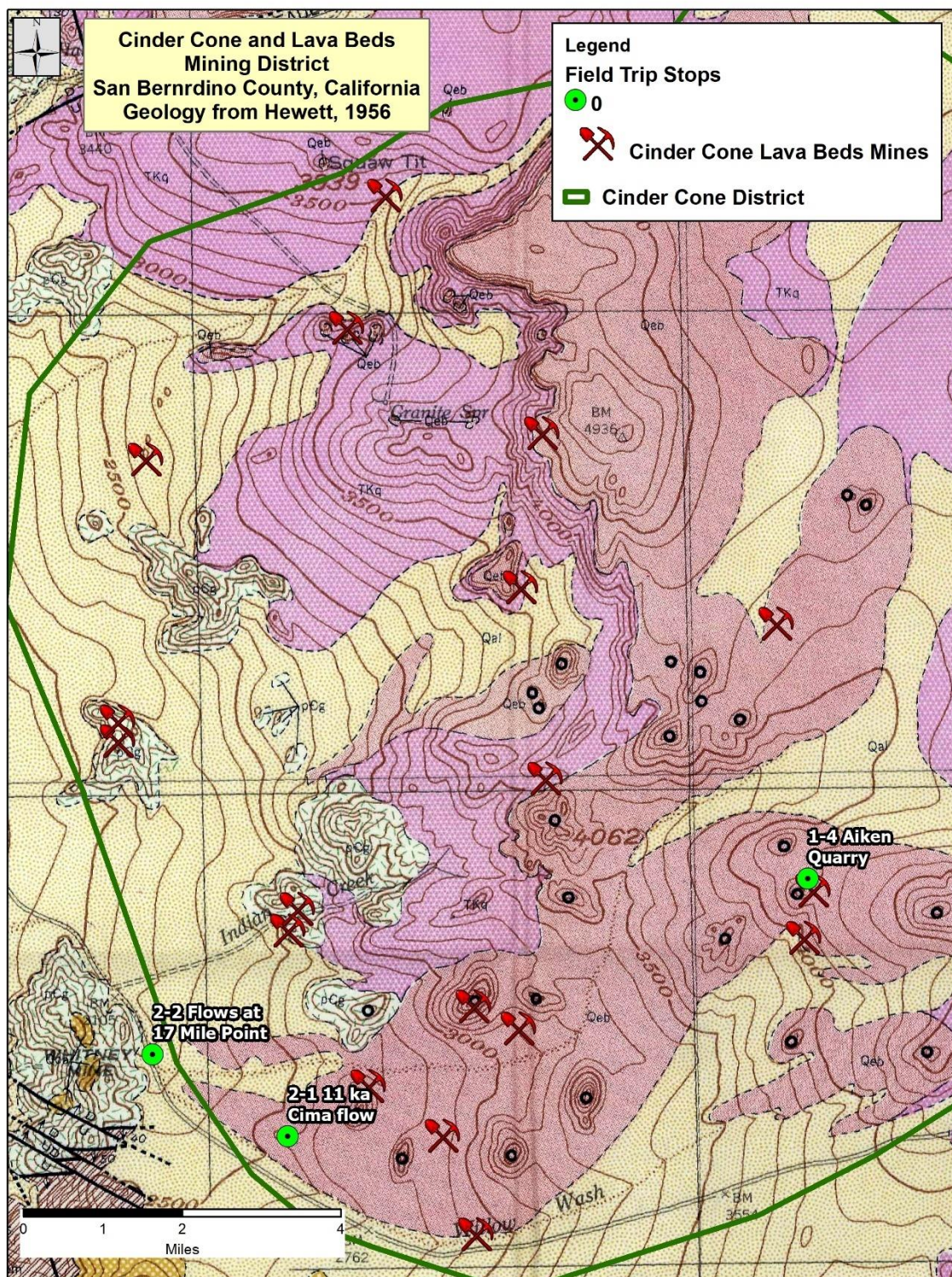


Figure 8. Area Geology of the Cinder Cone Lava Beds District. Scale 1:100:000. From Hewett, 1956.

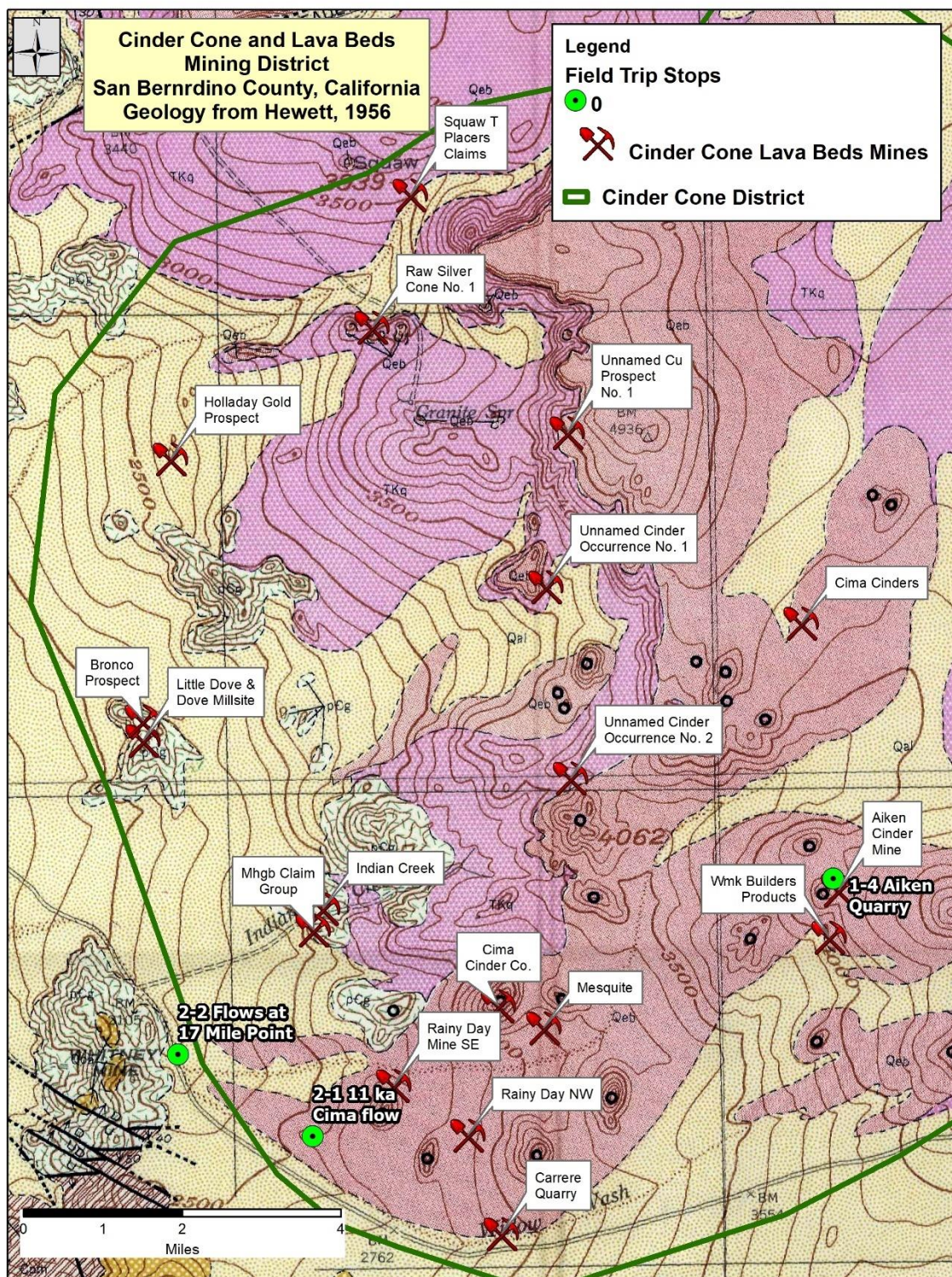


Figure 9. Geologic map of the Cinder Cones-Lava Beds District with mine names.

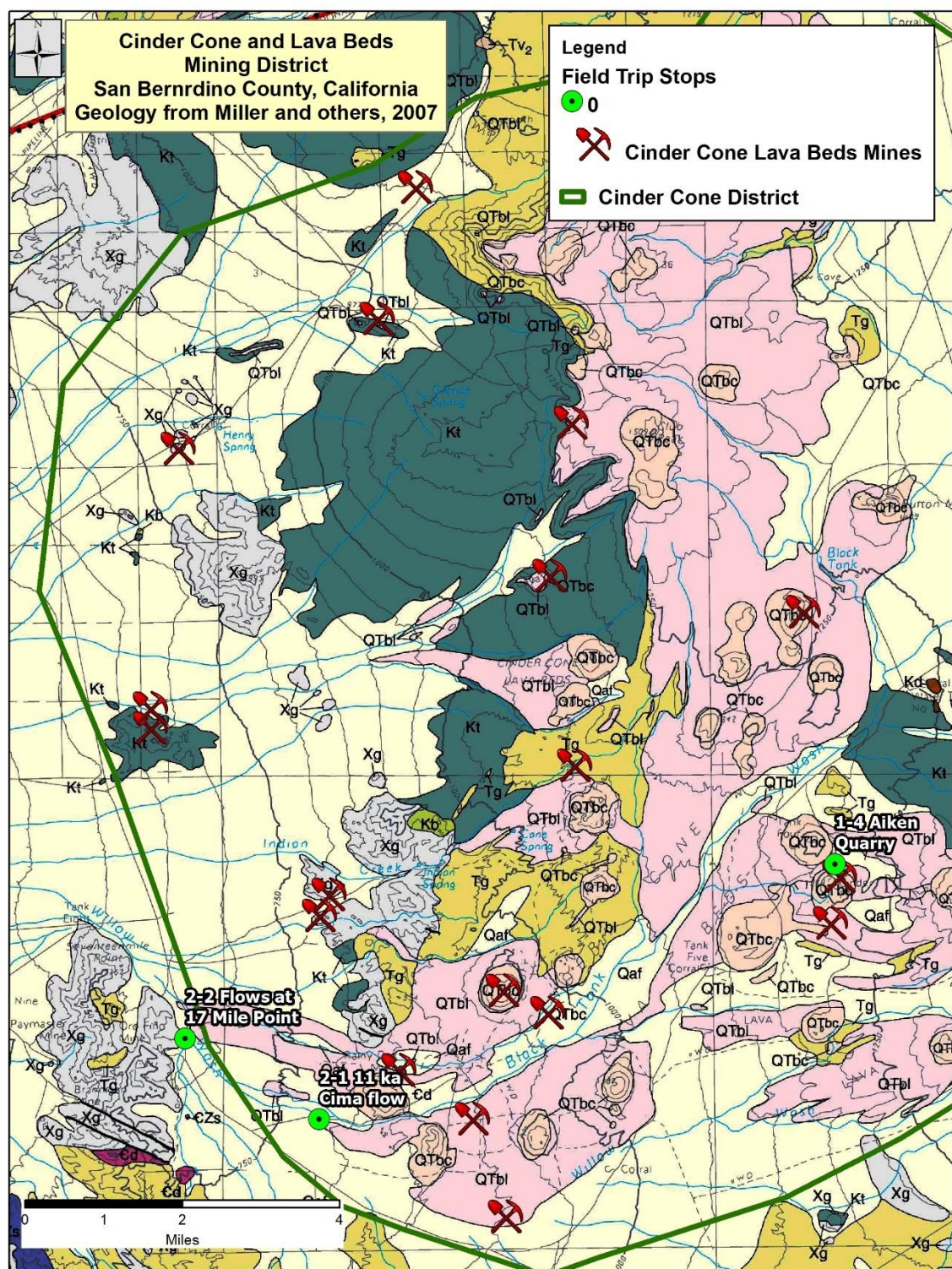


Figure 11. Geologic map of the Cinder Cones-Lava Beds District. Scale 1:100,000. From Miller and others, 2007.

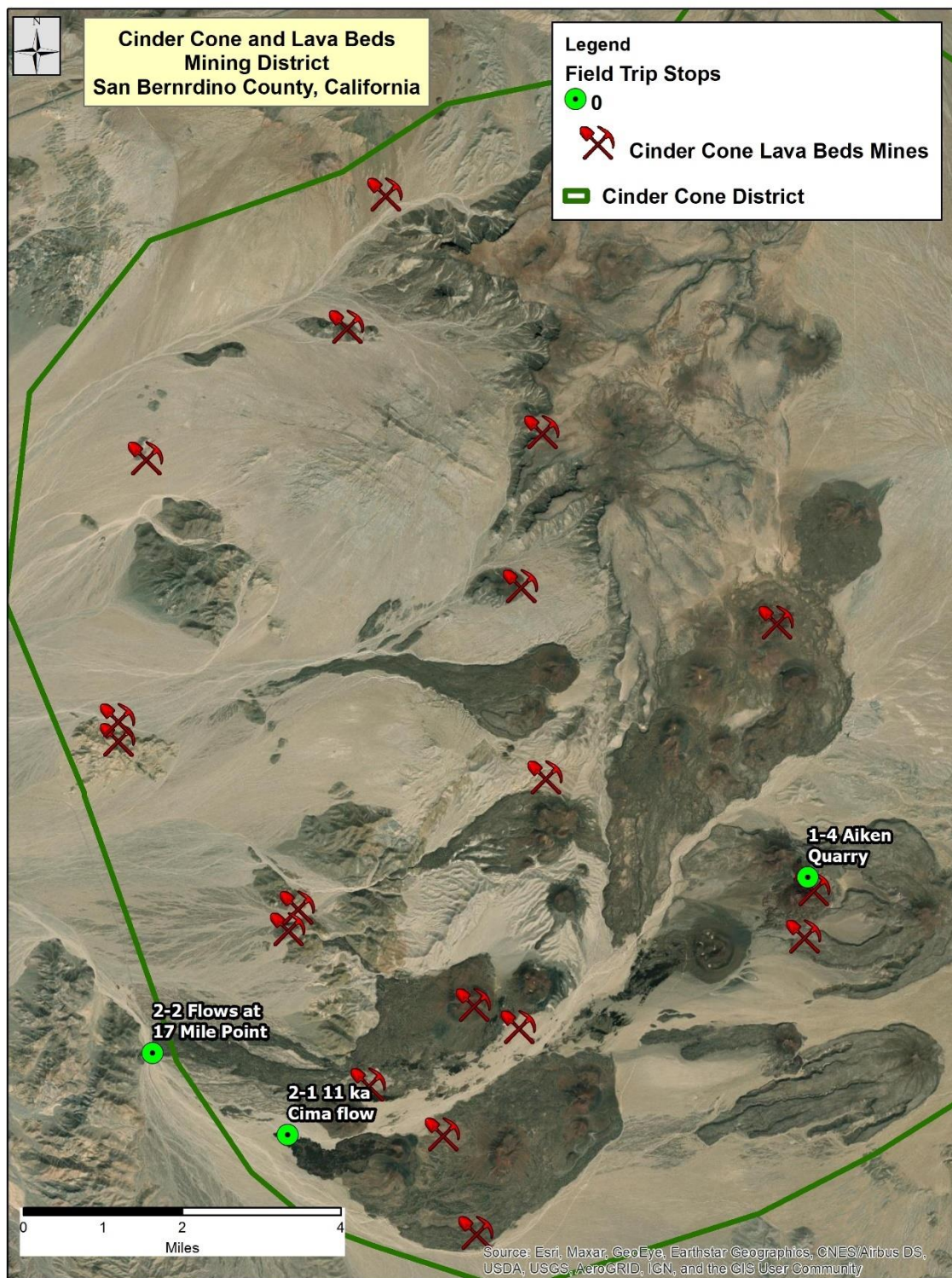


Figure 12. Aerial photograph of the southern Cinder Cone Lava Beds District. From ESRI.

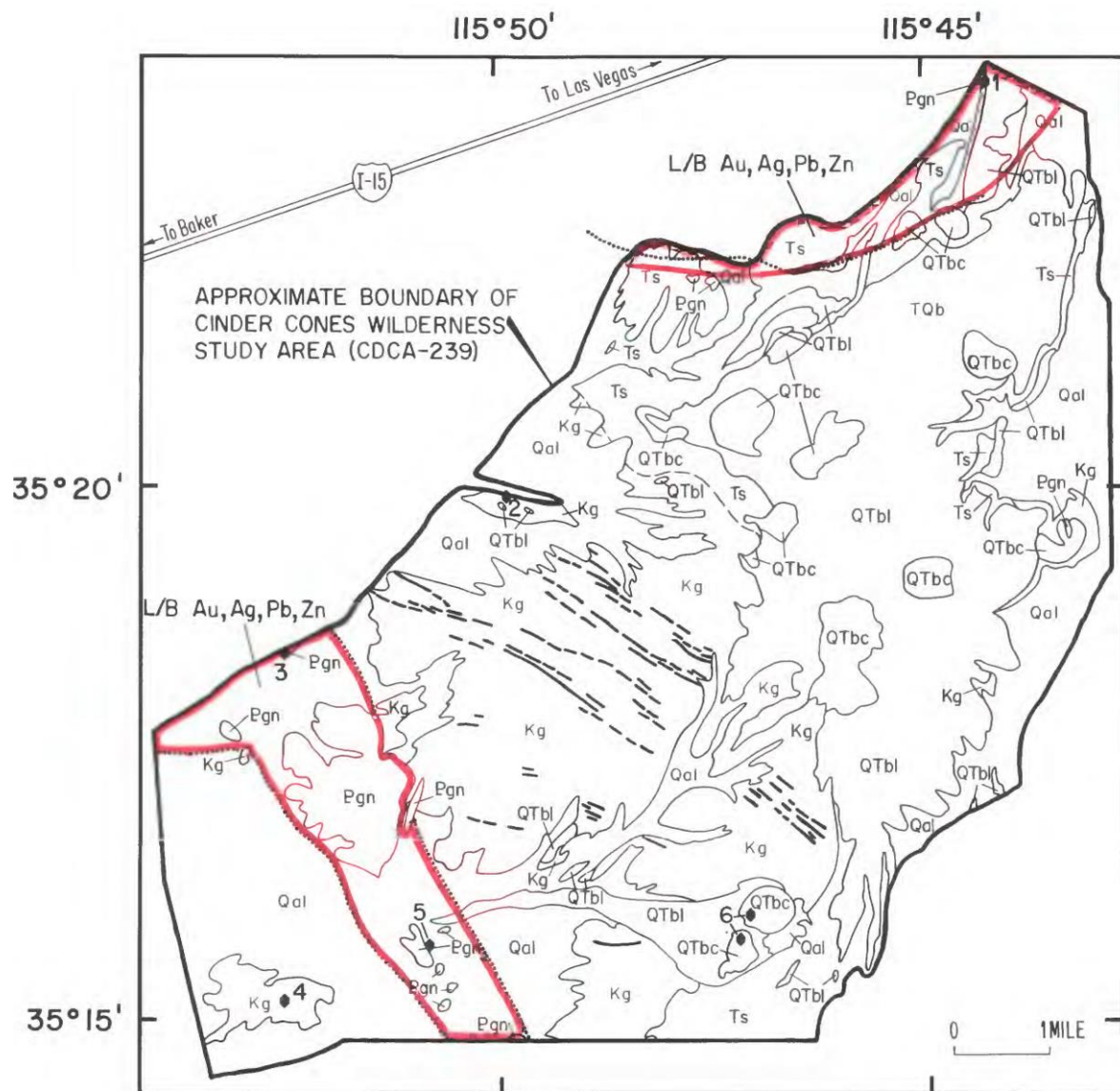


Figure 2. Map showing the geology and mineral resource potential of the Cinder Cones Wilderness Study Area, San Bernardino County, California.

Figure 13. Mineral potential map of Wishire and others, 1987