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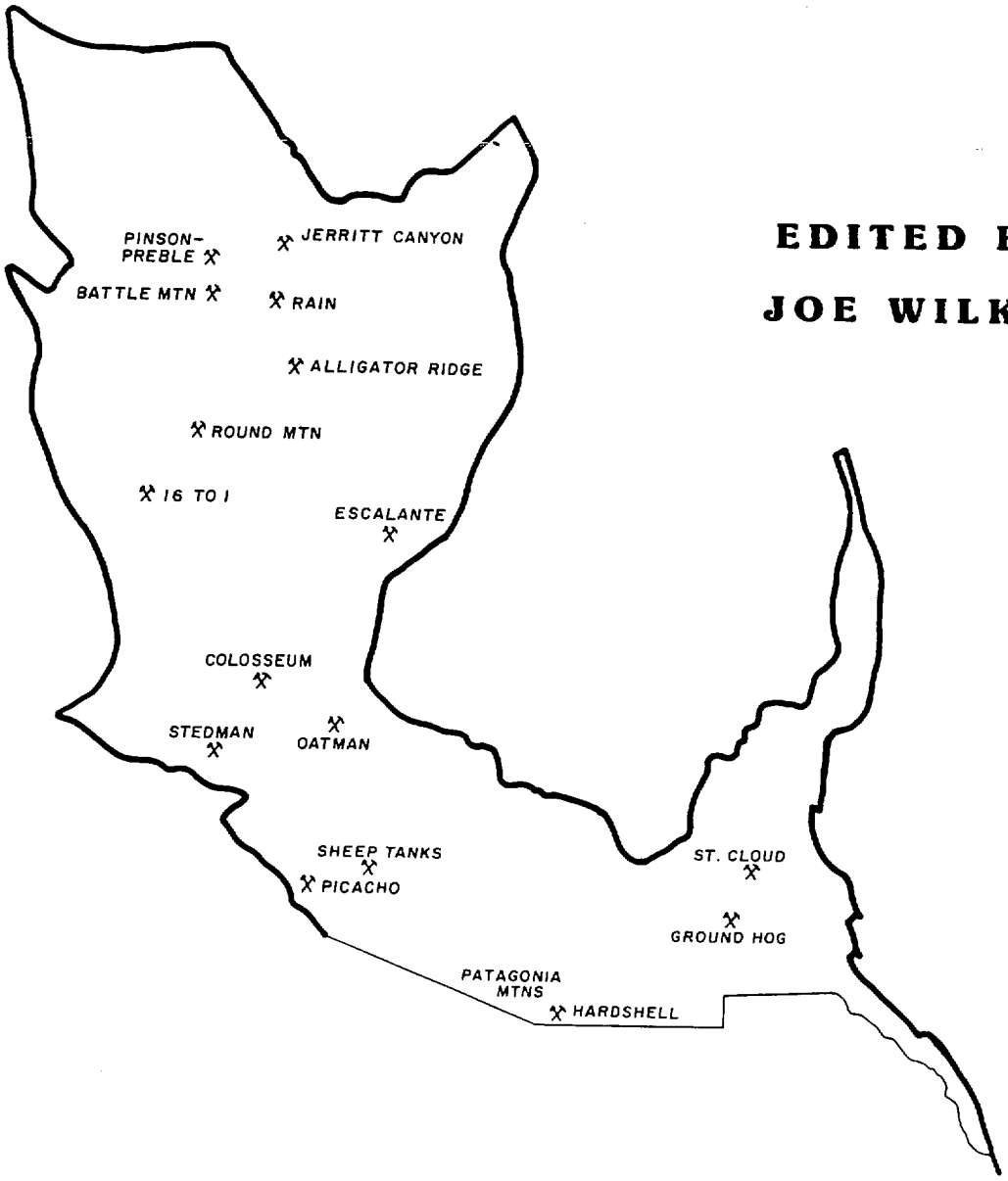
V-1

GOLD AND SILVER DEPOSITS OF THE BASIN AND RANGE PROVINCE WESTERN U.S.A.



EDITED BY

JOE WILKINS JR.

ARIZONA GEOLOGICAL SOCIETY DIGEST

VOLUME XV

TUCSON, ARIZONA 1984

ARIZONA
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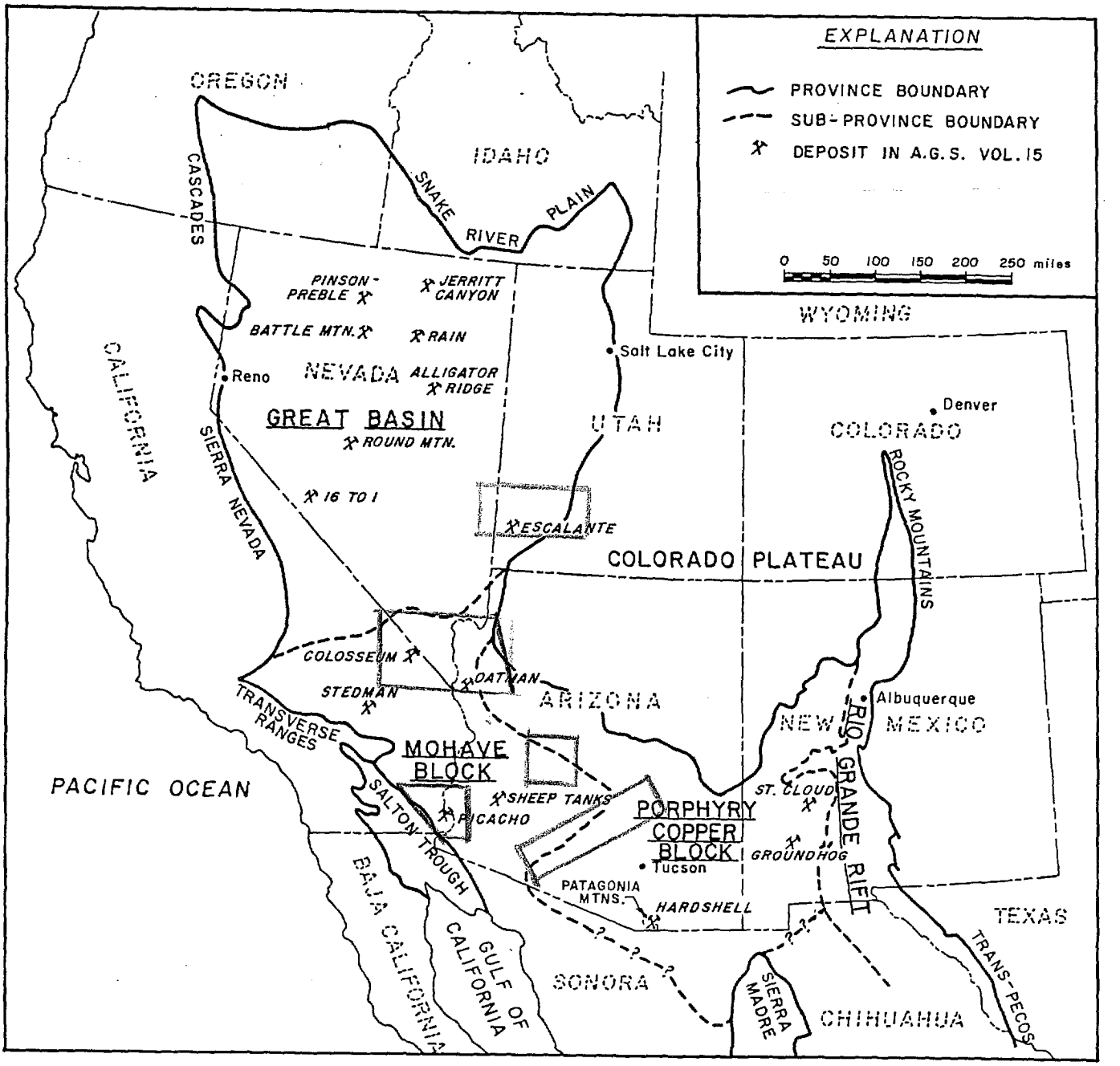


Figure 1. Location map of the Basin and Range province showing major subdivisions and adjacent provinces. -- Modified from Brooks and Raup (1968), Clark (1970), Garner (1978), Hawley (1978), Pansze (1975), Stokes (1976), and Wilson (1962).

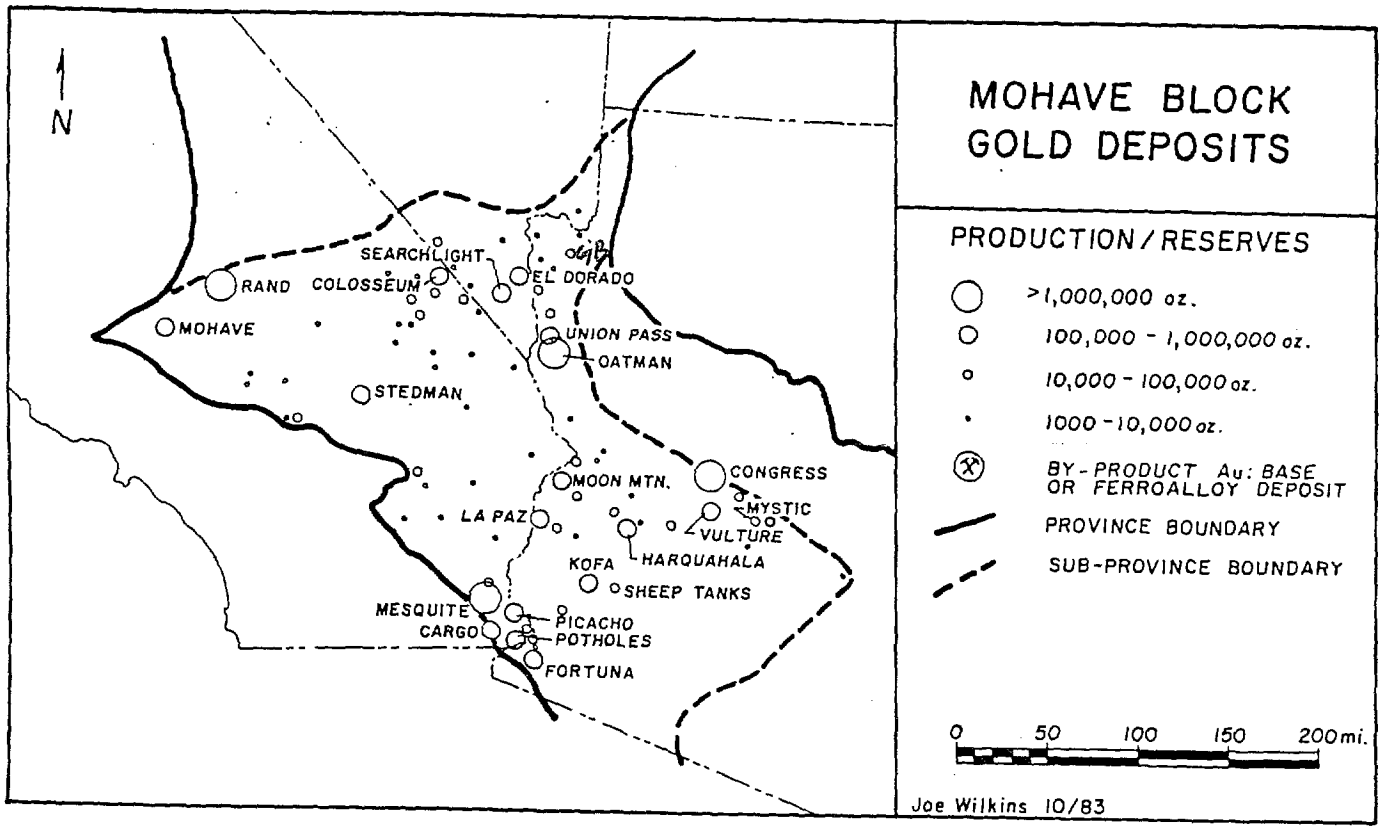


Figure 4. Distribution of gold and gold-bearing deposits in the Mohave block of the Basin and Range province. -- After Bergendahl (1964), Clark (1970), and Moore (1969).

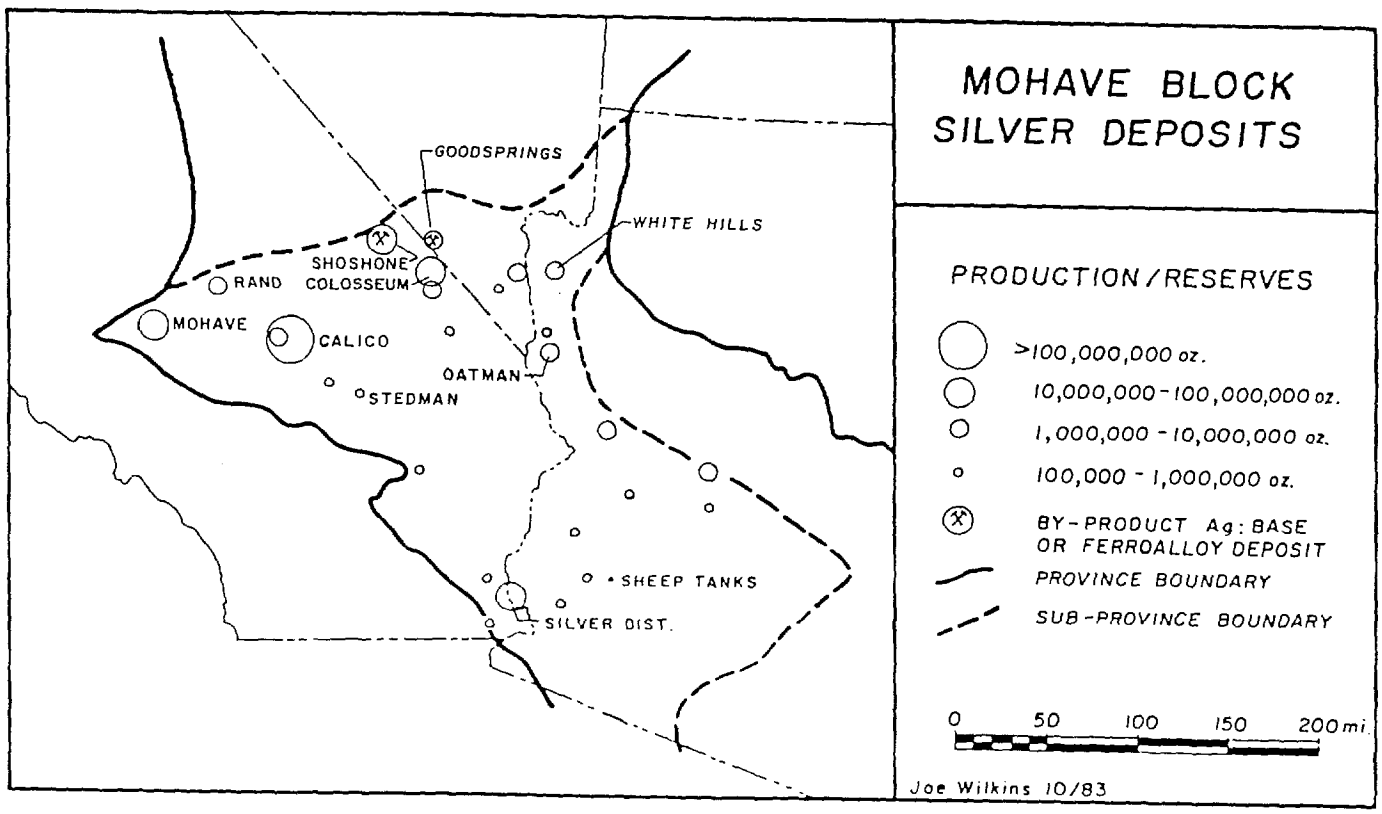


Figure 5. Distribution of silver and silver-bearing deposits in the Mohave block of the Basin and Range province. -- After Kleinhampl (1964), Moore and Roseveare (1969), and Stager (1966).

Table 2. Gold- and silver-bearing deposits in the Mohave block of the Basin and Range province

Deposit or District	State	Production (000)				Estimated Reserves (000)			Totals (000)		Deposit Type	Age, m.y.
		Placer	Tons	Au, oz	Ag. oz	Tons	Au. oz	Ag. oz	Au, oz	Ag,oz		
Mesquite	CA	1	16	2	2	41,000	2,255		2,258		Detachment	Miocene
Oatman	AZ		3,800	2,200	800				2,200	800	Vein	14-18
Congress-Octave	AZ	100	1,602	692	923	1,400	273	400	1,065	1,323	Vein	Precambrian
Rand	CA		4,600	837	5,700				837	5,700	Detachment	18?
Colesseum	CA			9	3,410	13,000	611		620	3,410	Breccia	100
Cargo Muchacho	CA		570	195	86	6,000	400	120	594	206	Detachment	Miocene
Mohave-Rosamond	CA		1,558	523	15,326				523	15,326	Vein, breccia	Pliocene
Picacho	CA		670	97		10,000	350		447		Detachment	Miocene
Moon Mountain	AZ					10,000	400		400		Detachment	15-18
Vulture	AZ	50	200	366	400				416	400	Vein	Precambrian?
Stedman	CA		270	252	180				252	180	Detachment, breccia	20
Search Light	NV		581	247	358				247	353	Vein	13-15
Kofa	AZ		779	229	104				229	104	Vein	20-23
Harquahala	AZ		159	143	90				143	90	Detachment	Miocene
Fortuna	AZ		153	131	14				131	14	Vein	?
Union Pass	AZ		704	128	303				128	303	Vein	Miocene
El Dorado	NV		580	100	2,359				100	2,359	Vein, listric normal fault	10-15
La Paz	AZ	100			26				100	26	Placer	
Potholes	AZ-CA	100							100		Placer	
Sheep Tanks	AZ		17	21	40	145	32	250	53	290	Detachment	Miocene
Calico	CA			14	17,500	45,000		117,000	15	134,500	Sedimentary-hosted	Pliocene
Silver district	AZ		52	2	1,559	7,000		31,500	2	33,059	Detachment	20-25
Shoshone	CA		410	41	22,200				41	22,200	Pb-Zn skarn	?
Good Springs	NV		759	91	2,102				91	2,201	Pb-Zn skarn	?
TOTALS		352	17,480	6,320	73,477	133,545	4,321	149,270	10,993	222,747	TOTALS	

V-5

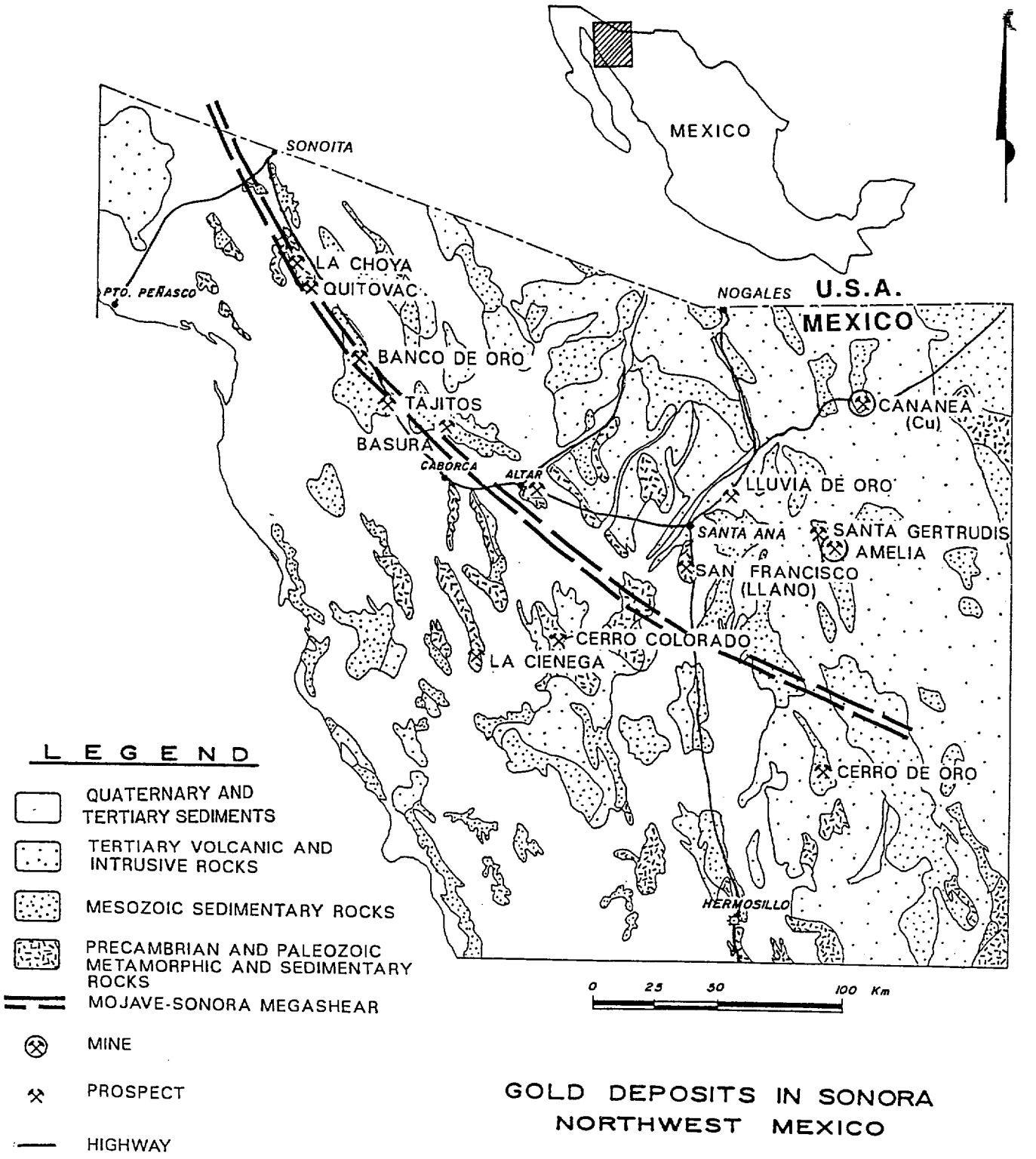


Figure 1 (Silberman and others). Gold mines and prospects and generalized geology of northern Sonora, Mexico. Modified from Silberman and others (1988).

Joe Wilkins Jr.

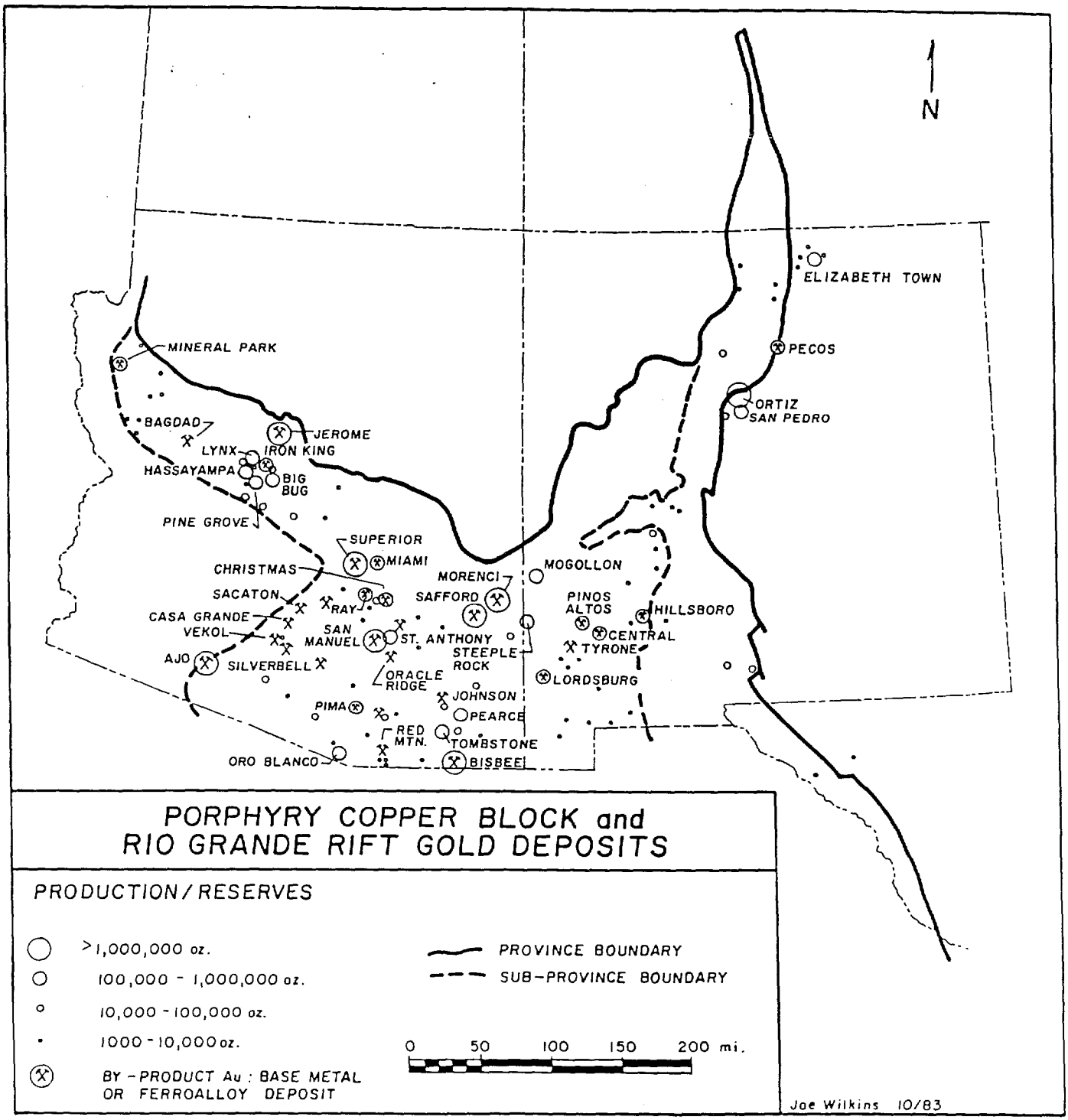


Figure 6. Distribution of gold and gold-bearing deposits in the Porphyry Copper block and Rio Grande rift of the Basin and Range province. -- After Bergendahl (1965), McAnulty (1970), and Moore (1969).

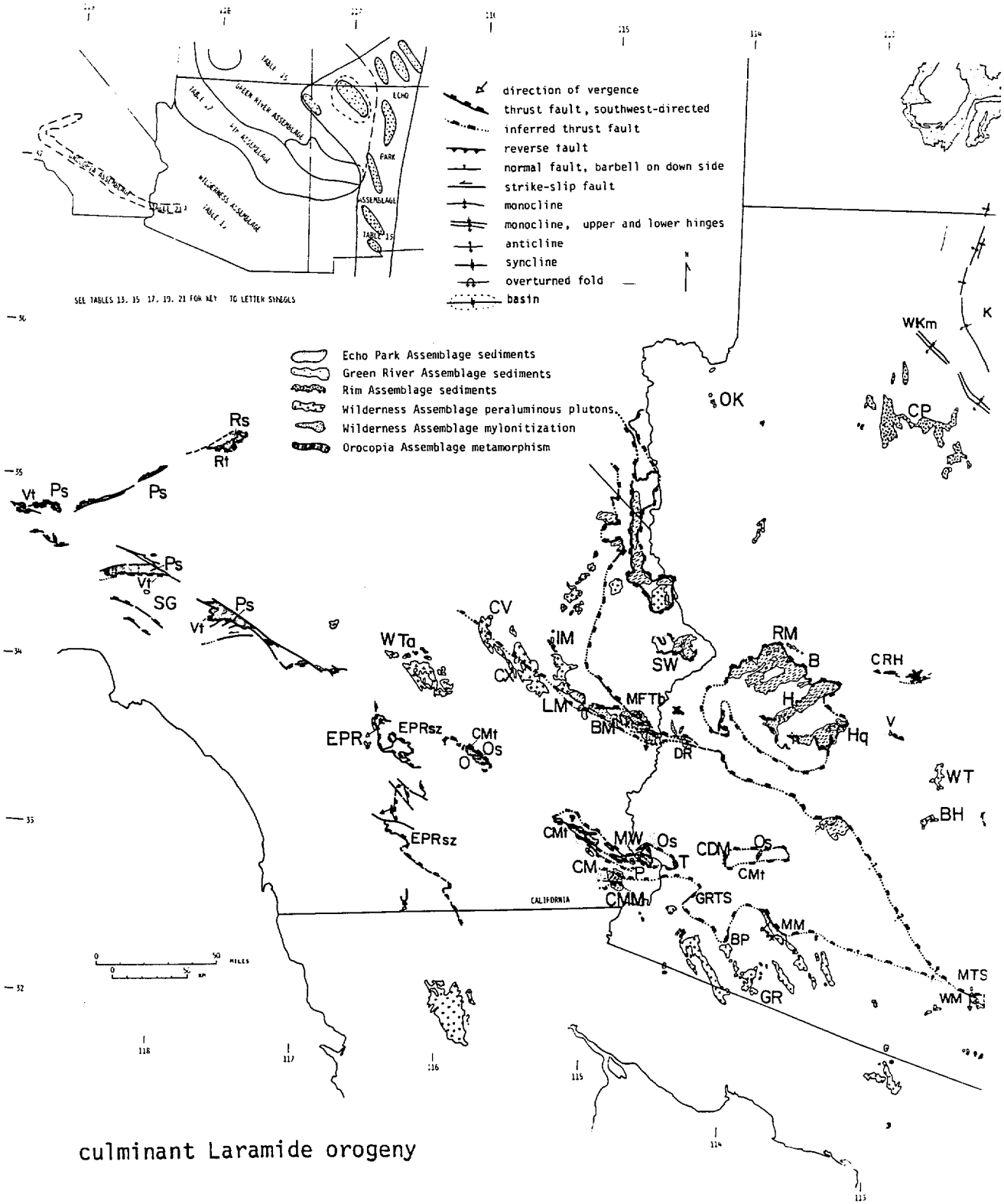
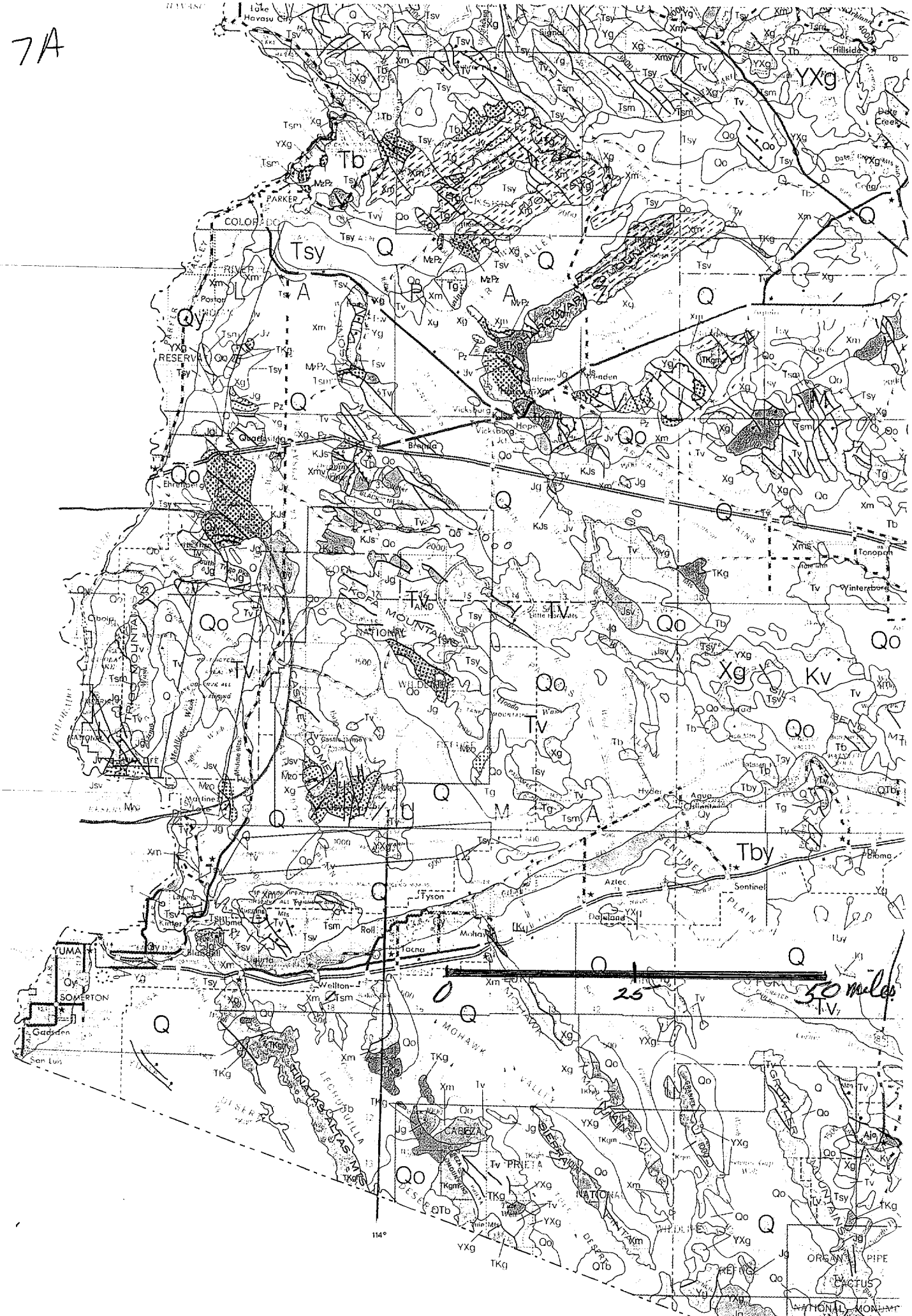
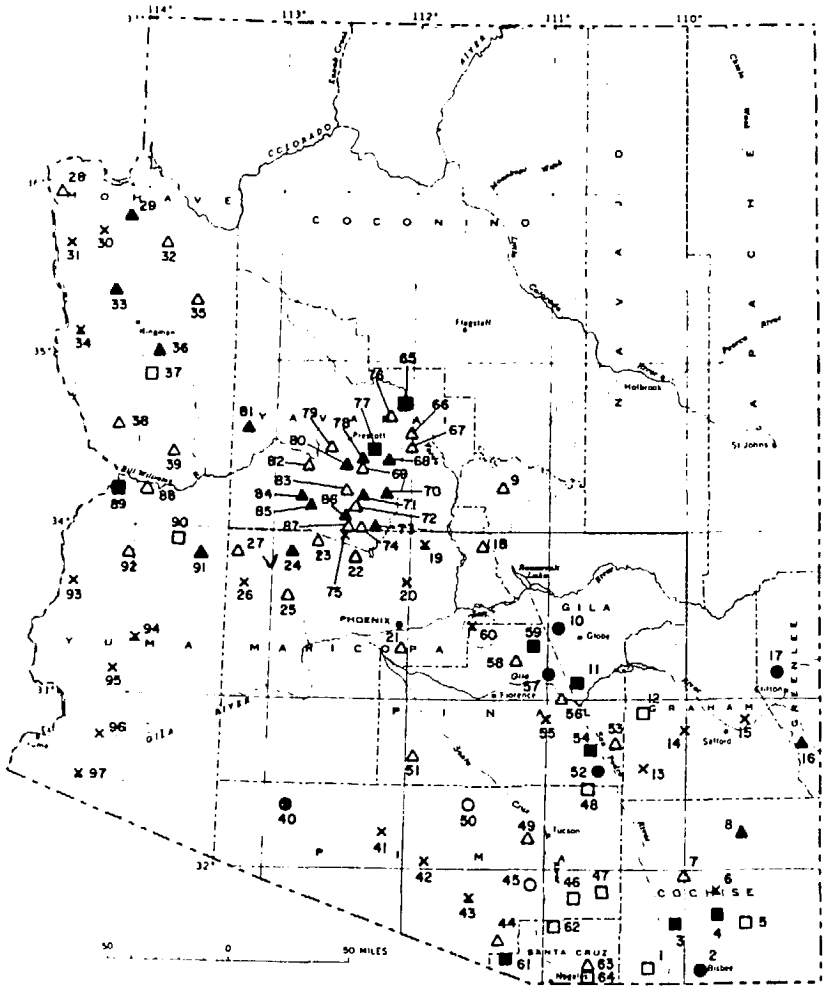


Figure 7. Map of Echo Park, Green River, Rim, Wilderness and Orocopia Assemblages of the culminant Laramide

7A



Lake Havasu City
Hillside
Date Creek
PARKER
COLORADO
RIVER
INDIAN
RESERVATION
Poston
Quartzsite
Ehrenberg
Cibola
Vicksburg
Hope
Brenda
Salome
Wenden
Tonopah
Wintersburg
KOFA MOUNTAINS
NATIONAL
WILDLIFE
Castle Dome
Hyder
Agua Caliente
Aztec
Sentinel
Dateland
Tyson
Roll
Tacna
Mohawk
Wellton
Martinez Lake
YUMA
SOMERTON
Gadsden
San Luis
Kinter
Blaisdell
Laguna
Dome
Mts
TINAJAS ALTAS MTS
CABEZA
PRIETA
NATIONAL
WILDLIFE
REFUGE
ORGAN PIPE
CACTUS
NATIONAL MONUMENT
MOHAWK VALLEY
SENTINEL PLAIN
GROWLER MOUNTAINS
0
25
50 miles
34
33
114°



EXPLANATION

Types of deposits and total production in troy ounces

More than 10,000	Less than 10,000
●40	○50

Disseminated copper

■4 □5

Base-metal sulfide replacement

▲71 △9

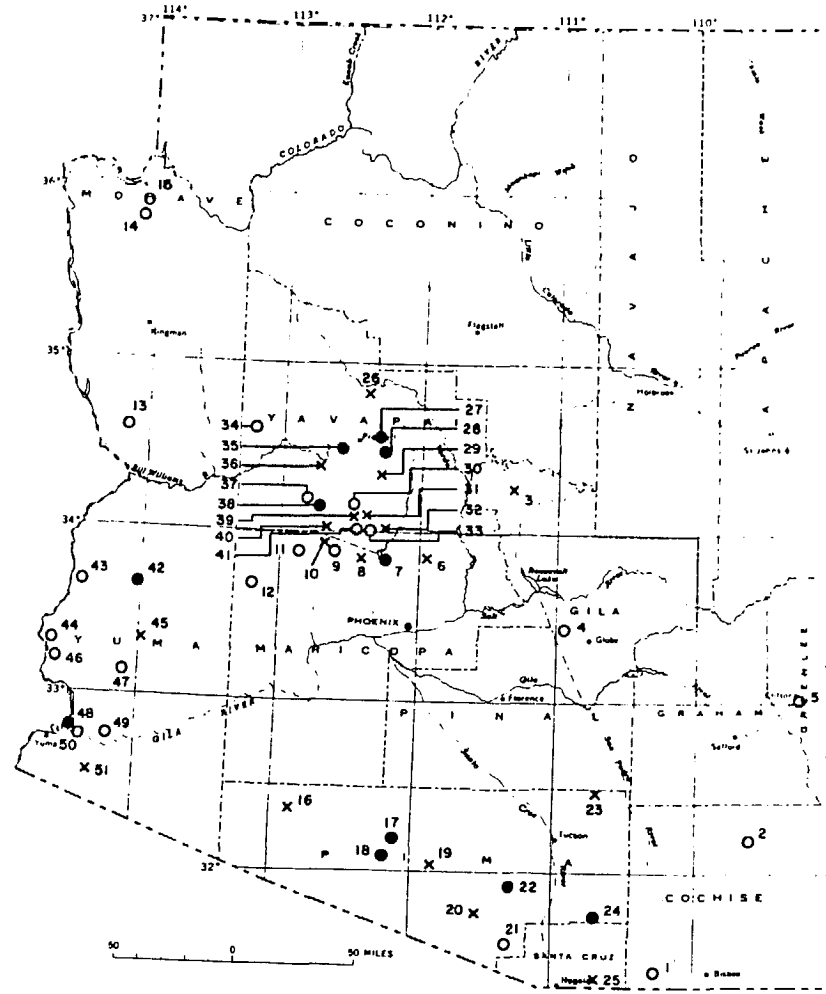
Siliceous base-metal vein

×19 ×14

Gold-quartz vein

(Numbers refer to districts listed in table 14 and mentioned in text)

-Lode gold in Arizona.



EXPLANATION

●7

Production more than 1,000 troy ounces

○4

Production 100 - 1,000 troy ounces

×6

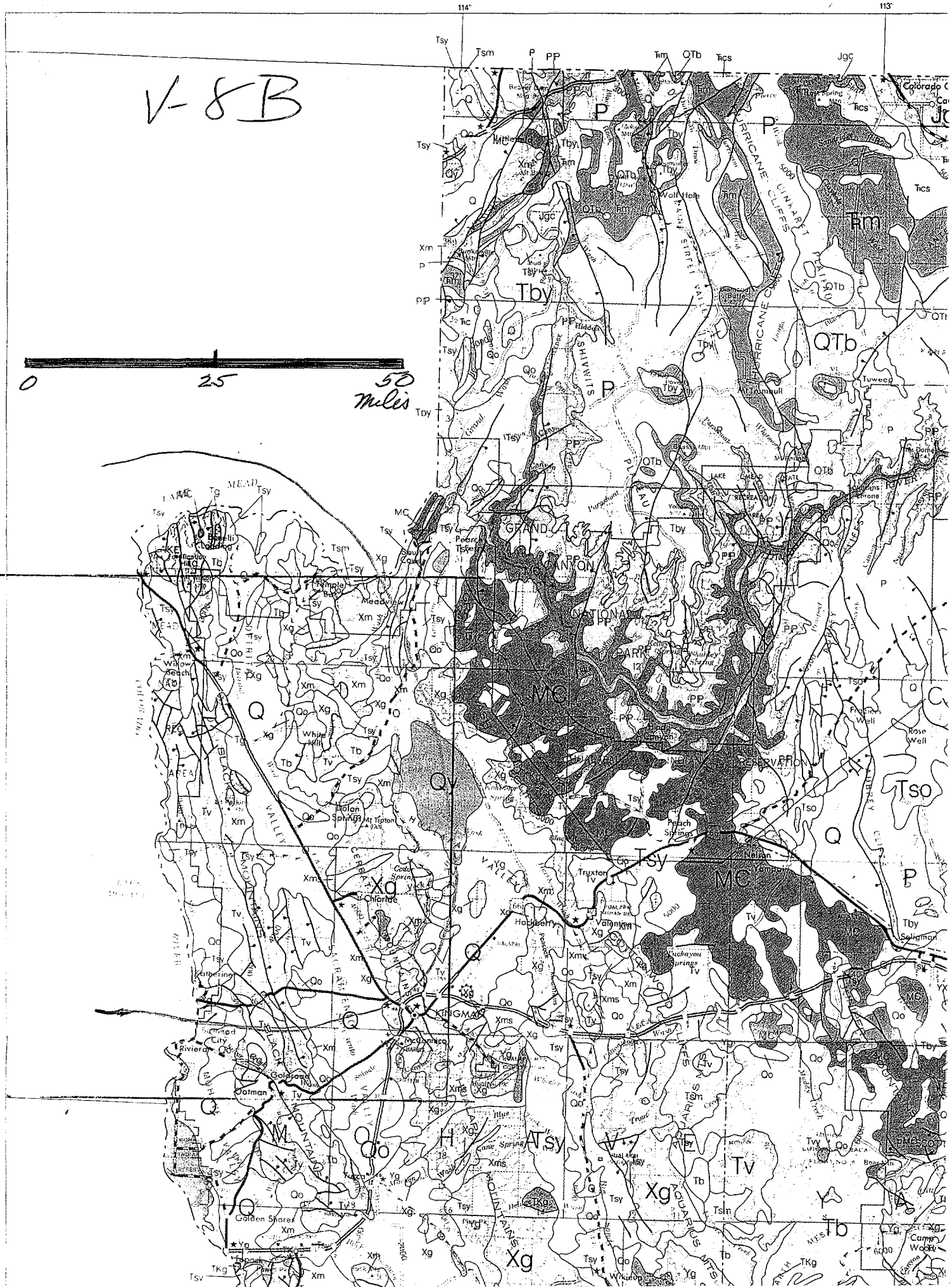
Production less than 100 troy ounces

(Numbers refer to districts listed in table 13 and mentioned in text)

-Placer gold in Arizona.

V-8H
25
50 miles
PRESCOTT
PHOENIX
GLENDALE
TOLLESON
GOODYEAR
AVONDALE
BUCKEYE
TEMPE
MESA
SCOTTSDALE
CHANDLER
SURPRISE
EL MIRAGE
YOUNGTOWN
PEORIA
Wickenburg
Congress
Aguila
Circle City
Wittmann
Tonopah
Arlington
Palo Verde
Buckeye
Cotton Center
Tolleson
Litchfield Park
Perryville
Cashion
Guadalupe
Laveen
Gila Bend
Sentinel
Dateland
Stanfield
Casa Grande
Francisco Grande
Coolidge
Florence
Superior
Miami
Globe
Cottonwood
Jerome
Clarkdale
Camp Verde
Cordes Junction
Chino Valley
Prescott Valley
Dewey
Humboldt
Mayer
Kirkland
Skull Valley
Hillside
Yarnell
Wickenburg
Congress
Aguila
Tonopah
Arlington
Palo Verde
Buckeye
Tolleson
Litchfield Park
Perryville
Cashion
Avondale

V-8B


114°
113°
37
36
35
0
25
50
miles
LAKE MEAD
GRAND CANYON NATIONAL PARK
KINGMAN
Oatman
Golden Shores
Chloride
Hackberry
Truxton
Peach Springs
Valentine
Yucca
Rose Well
Meadview
Pierce Ferry
Colorado C
Tsy
Tsm
P
PP
Tim
QTb
Tics
Jgc
Tby
Tm
Xm
Xg
Qy
Qo
Q
MC
Tso
Tv
Tb
TKg
Xms
H
W
E
A
V
T
Tsy
Xg
Tb
Tv
Qo
Q
P
QTb
Tby
Tm
Tics
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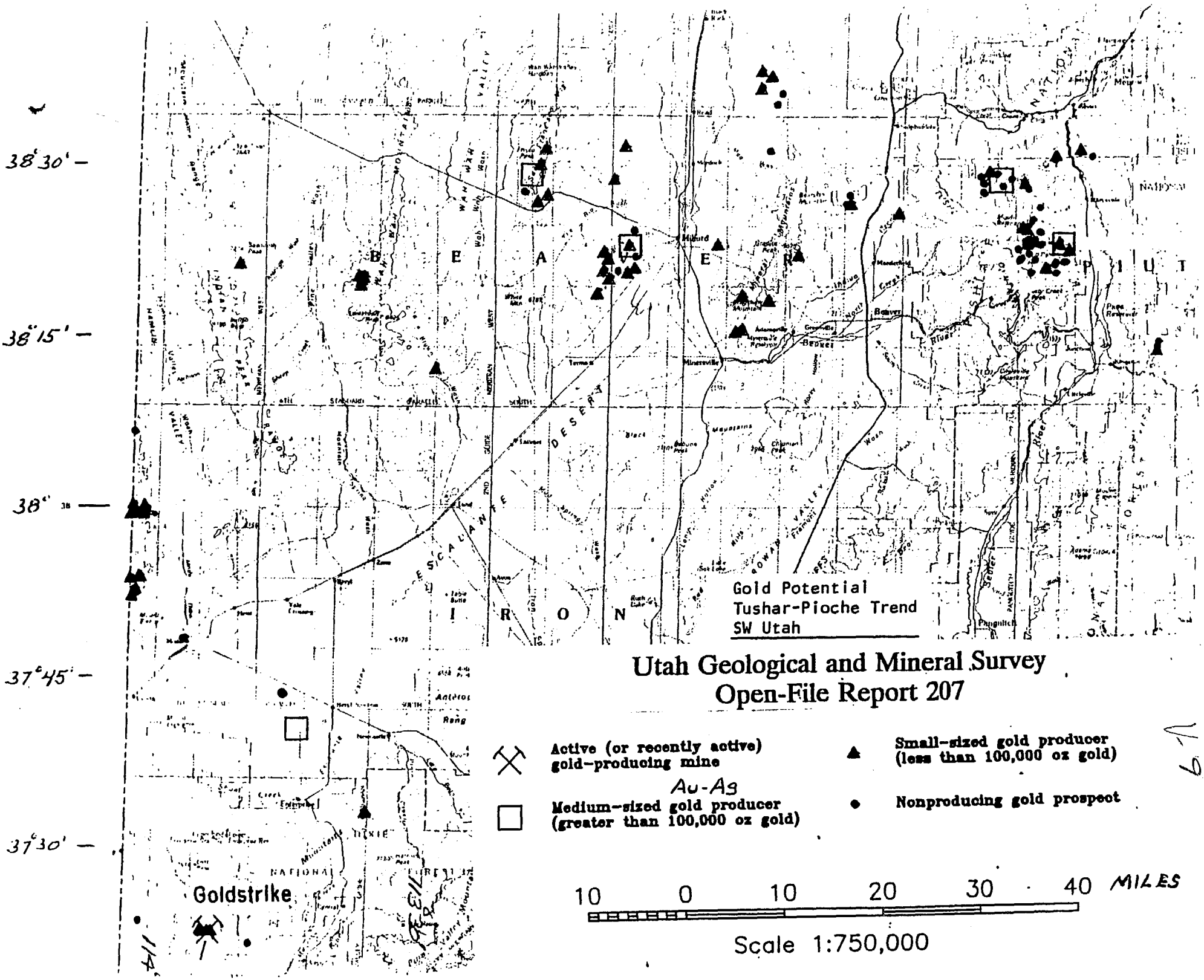
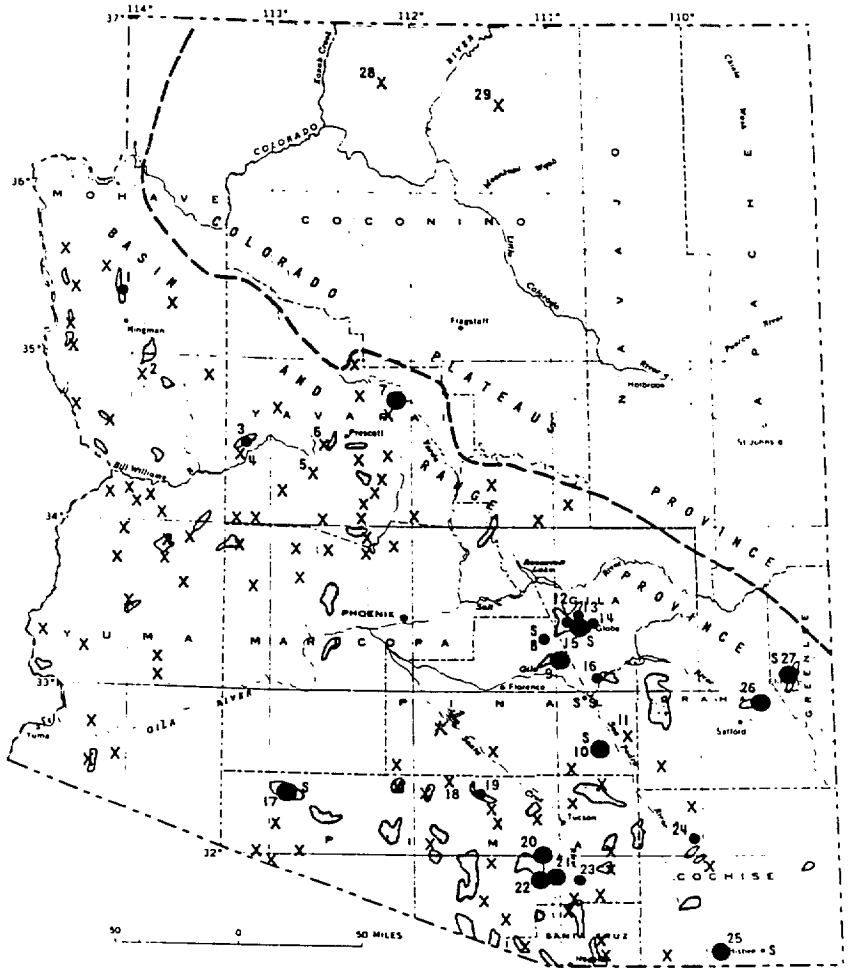
Tsy
Tsy



38°30'
38°15'
38°
37°45'
37°30'
B E A V E R
P I U T
I R O N
Goldstrike
Gold Potential
Tushar-Pioche Trend
SW Utah
Utah Geological and Mineral Survey
Open-File Report 207
Active (or recently active) gold-producing mine
Au-Ag
Medium-sized gold producer (greater than 100,000 oz gold)
Small-sized gold producer (less than 100,000 oz gold)
Nonproducing gold prospect
10 0 10 20 30 40 MILES
Scale 1:750,000



EXPLANATION

Intrusive igneous rock of Late Cretaceous to early Tertiary age

Copper-producing districts, mines, or properties, showing relative amount of production plus estimated potential in tons of copper. Number refers to locality listed in Table 12 and referred to in text

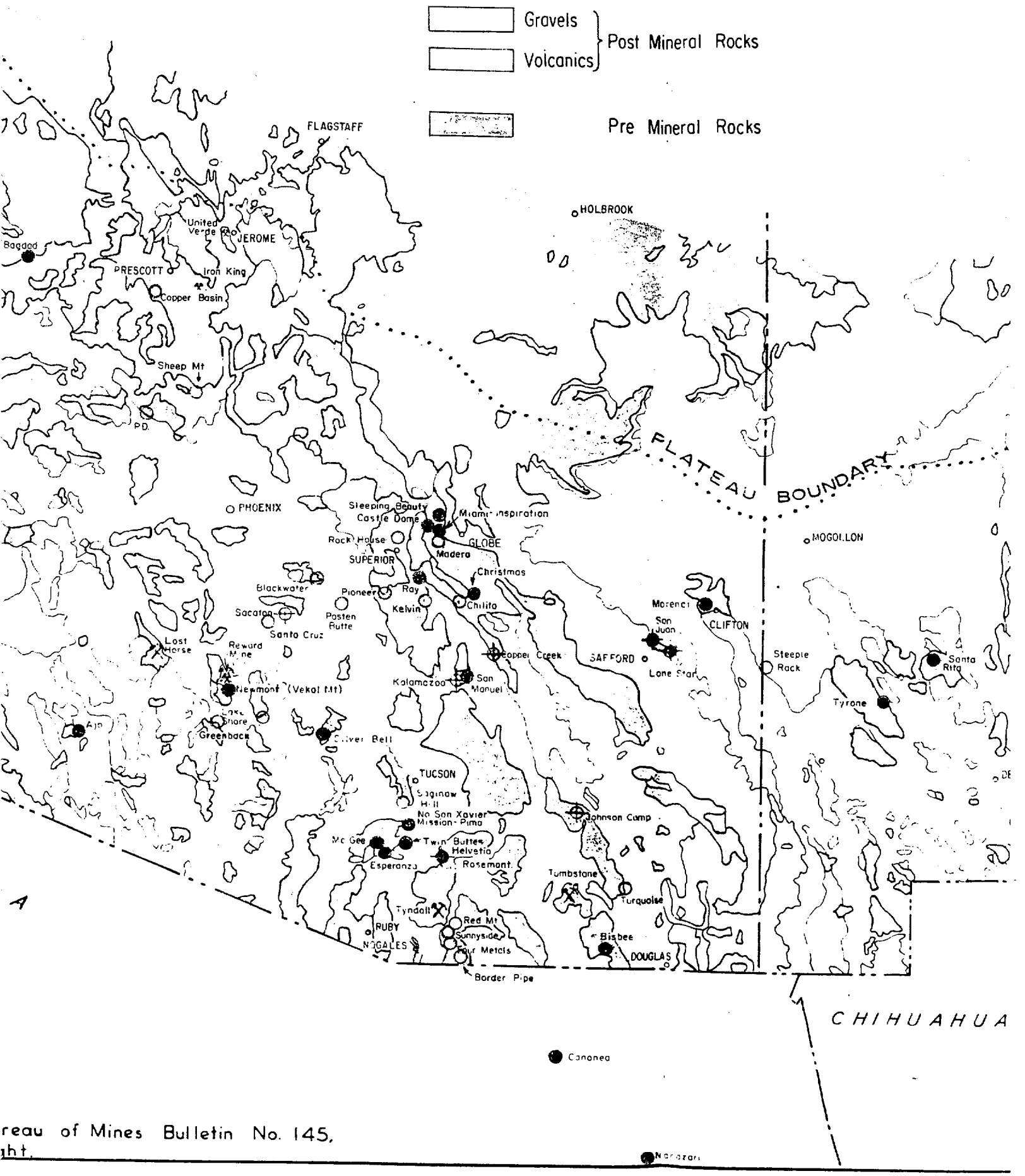
More than 1,000,000 — 50,000-1,000,000 — 10-50,000

S
Smelter

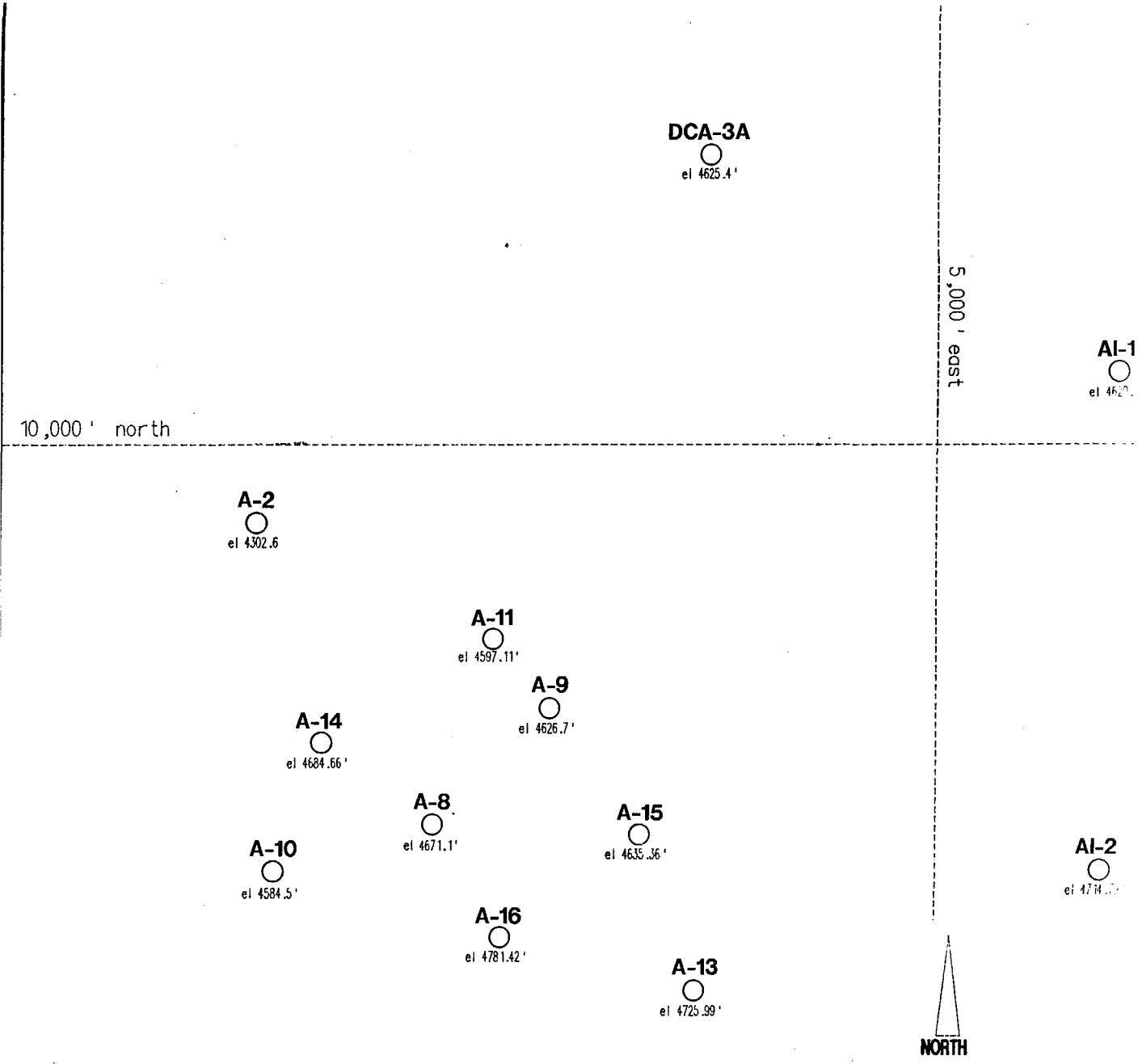
Copper in Arizona.

V-11

EXPLA.



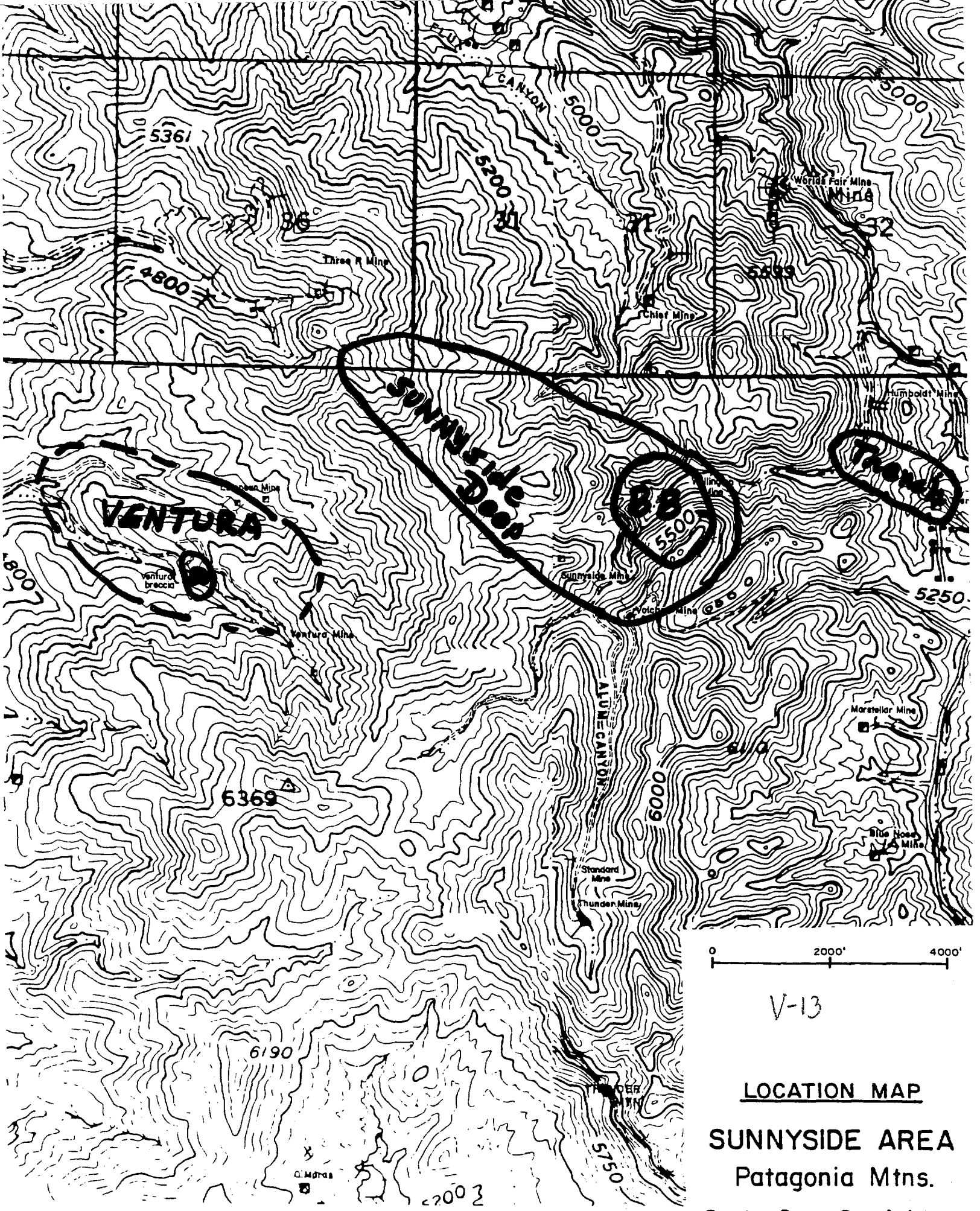
reau of Mines Bulletin No. 145,
ght.



ASARCO Incorporated

SUPERIOR EAST PROJECT
DRILL HOLE SURVEY
PINAL COUNTY, ARIZONA

V-12



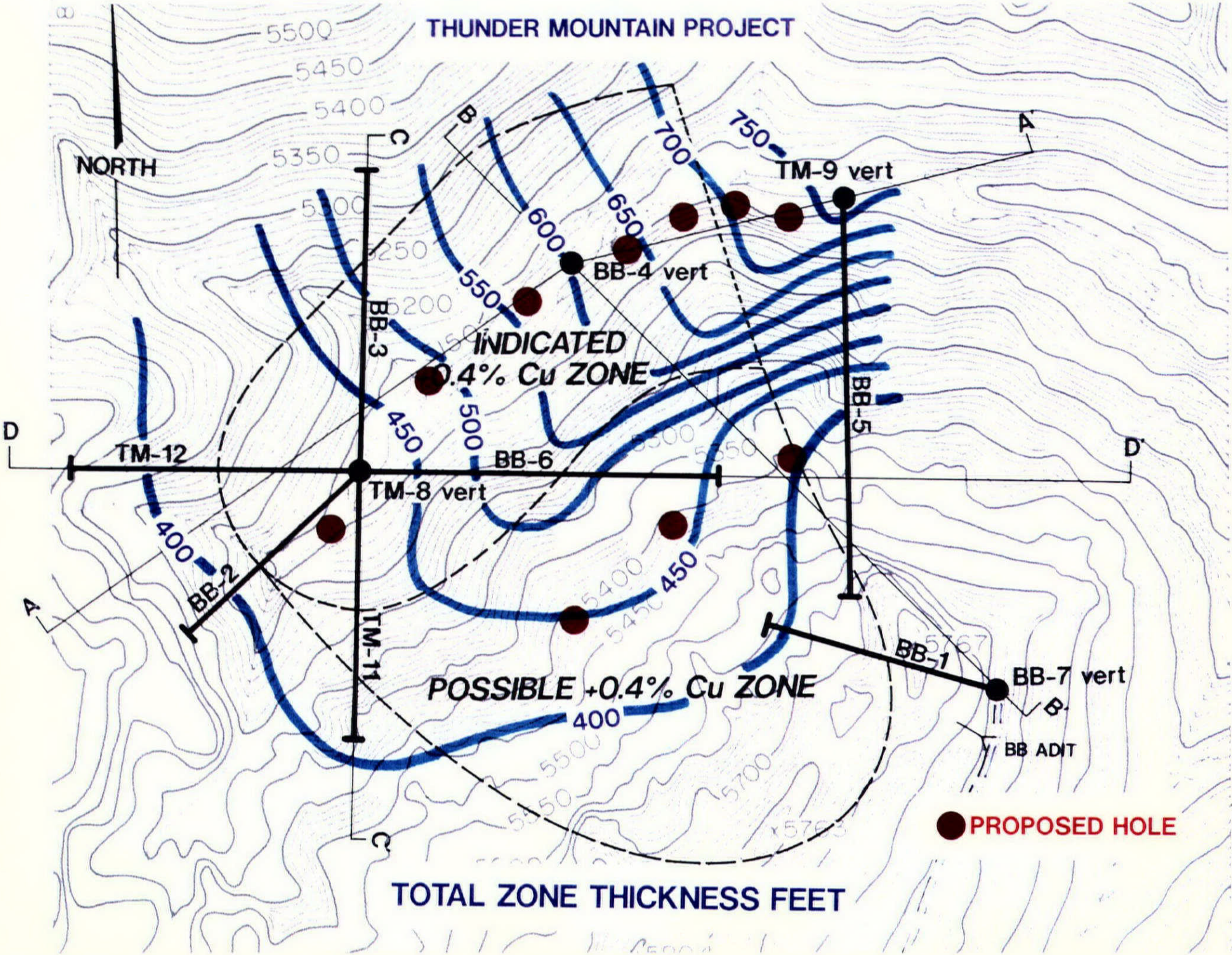
V-13

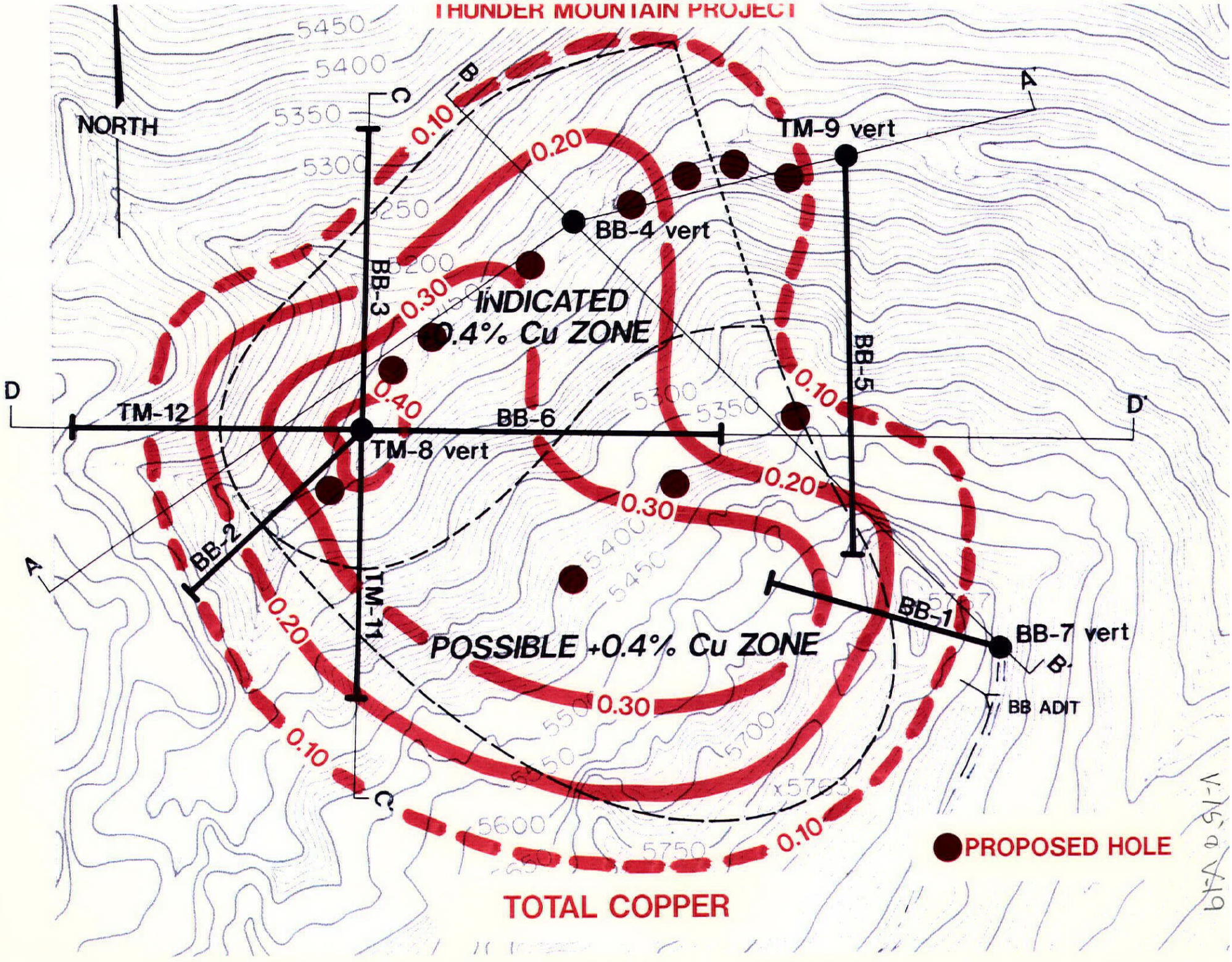
LOCATION MAP

SUNNYSIDE AREA

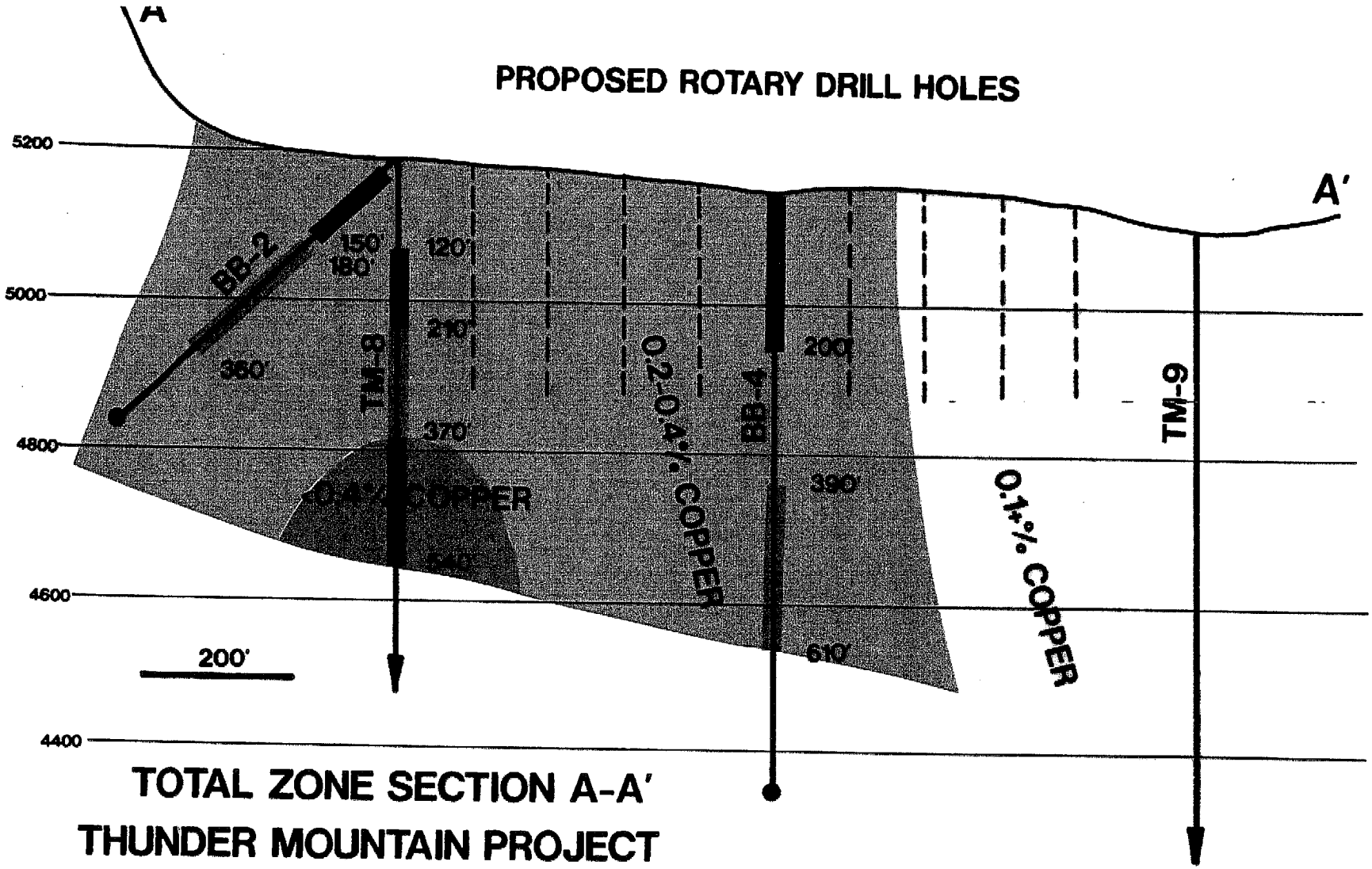
Patagonia Mtns.

Santa Cruz Co., Arizona


THUNDER MOUNTAIN PROJECT
NORTH
5500
5450
5400
5350
5300
5250
5200
A
A'
B
B'
C
C'
D
D'
TM-9 vert
BB-4 vert
BB-3
BB-5
BB-6
TM-12
TM-8 vert
BB-2
TM-11
BB-1
BB-7 vert
BB ADIT
INDICATED
+0.4% Cu ZONE
POSSIBLE +0.4% Cu ZONE
750
700
650
600
550
500
450
400
PROPOSED HOLE
TOTAL ZONE THICKNESS FEET

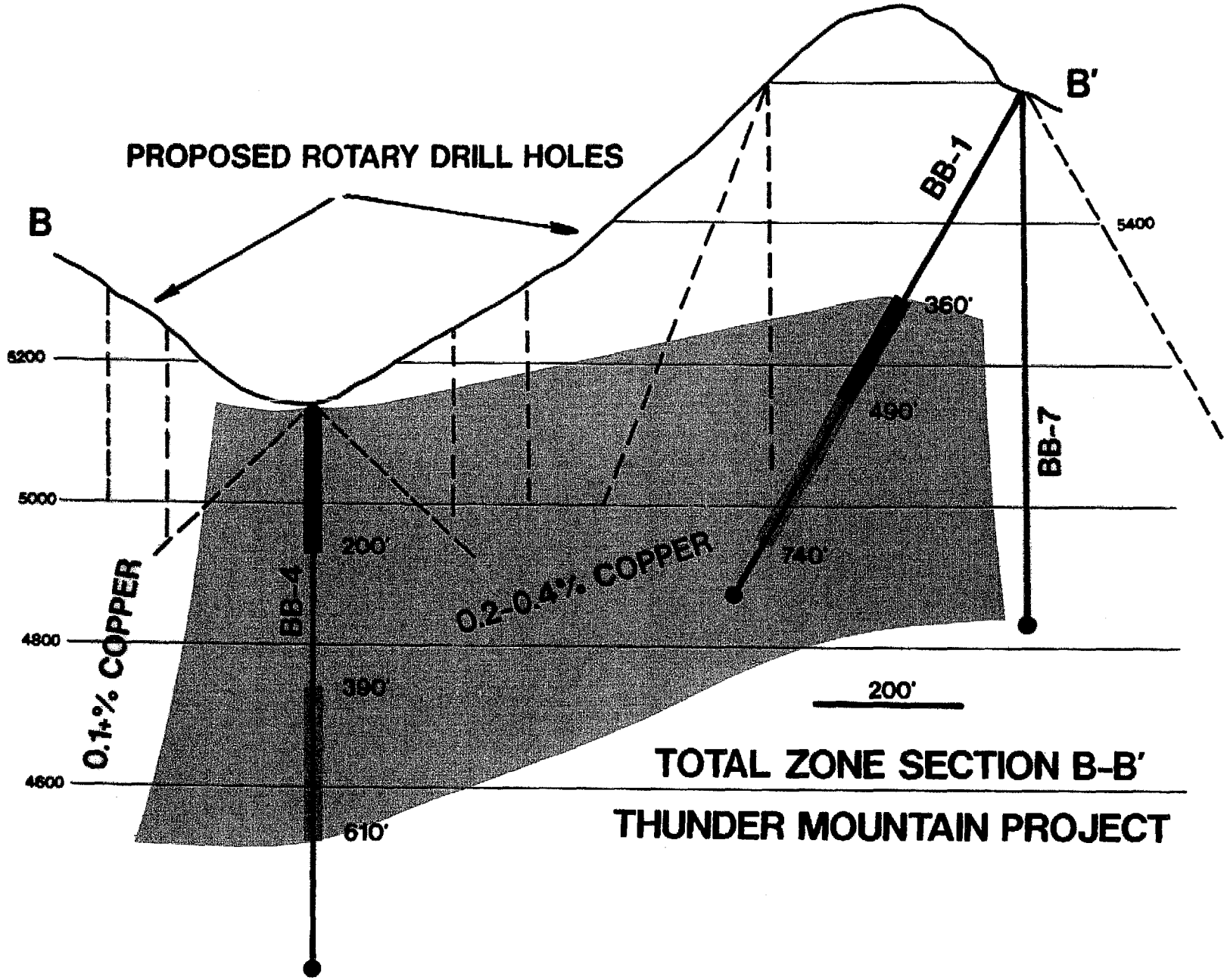

THUNDER MOUNTAIN PROJECT
NORTH
TM-9 vert
BB-4 vert
INDICATED
0.4% Cu ZONE
BB-3
BB-5
TM-12
BB-6
TM-8 vert
BB-2
TM-11
BB-1
BB-7 vert
POSSIBLE +0.4% Cu ZONE
BB ADIT
0.10
0.20
0.30
0.40
A
A'
B
B'
C
C'
D
D'
PROPOSED HOLE
TOTAL COPPER

V-15 a V-19



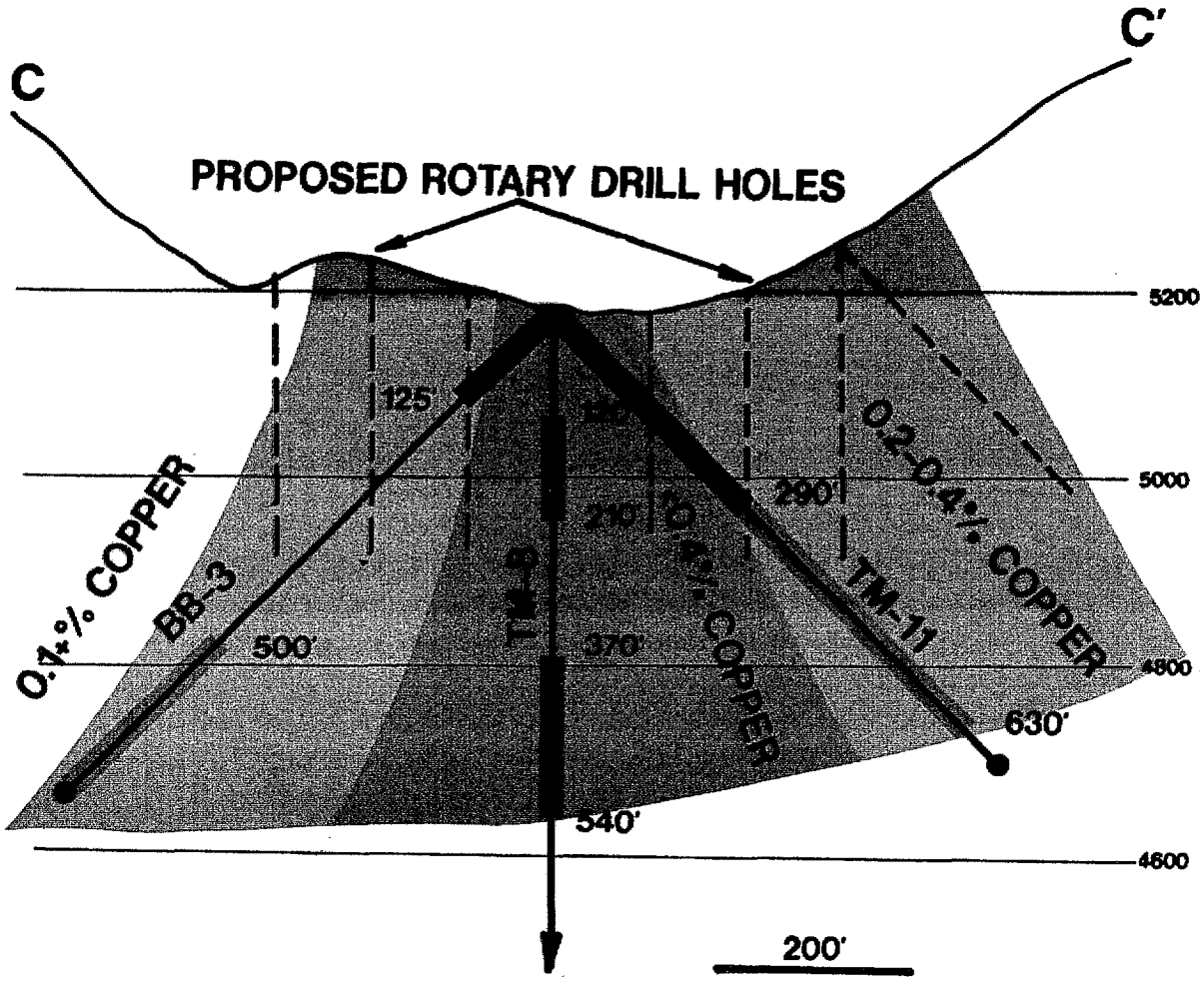
TOTAL ZONE SECTION A-A'
THUNDER MOUNTAIN PROJECT

V-16



TOTAL ZONE SECTION B-B'

THUNDER MOUNTAIN PROJECT



TOTAL ZONE SECTION C-C'

THUNDER MOUNTAIN PROJECT

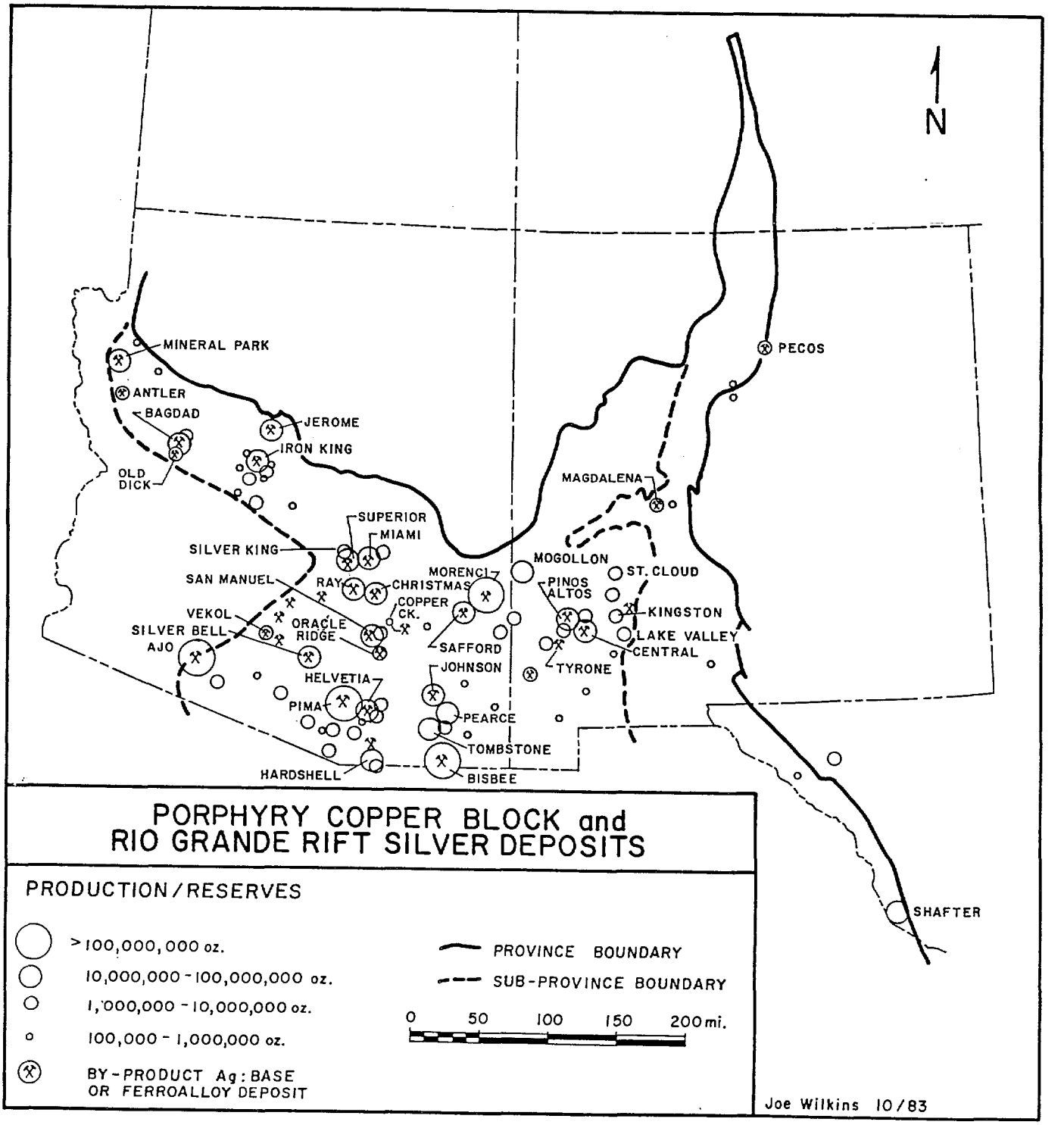


Figure 7. Distribution of silver and silver-bearing deposits in the Porphyry Copper block and Rio Grande rift of the Basin and Range province. -- After McAnulty (1970), Moore and Roseveare (1969), and Thompson (1965).

Table 3. Gold- and silver-bearing deposits in the Porphyry Copper block of the Basin and Range province

Deposit or District	State	Production (000)				Estimated Reserves (000)			Totals (000)		Deposit Type	Age, m.y.
		Placer	Tons	Au, oz	Ag. oz	Tons	Au. oz	Ag. oz	Au, oz	Ag,oz		
Dos Pobres-Safford	AZ					400,000	4,000	48,000	4,000	48,000	Porphyry copper	47-52
Bisbee	AZ		167,242	2,792	102,215	120,000			2,792	102,215	Cu skarn-porphyry	163-178
San Manuel-Kalamazoo	AZ		383,824	486	9,261	957,000	1,244	23,090	1,730	32,351	Porphyry copper	67
Jerome	AZ		26,399	1,565	57,000	53,601			1,565	57,000	Massive sulfide	Precambrian
Ajo	AZ		430,038	1,558	19,672				1,558	19,672	Porphyry copper	63
Morenci-Metcalf	AZ	3	729,118	504	25,690	900,000	621	77,400	1,128	103,090	Porphyry copper	55
Ortiz	NM	99				20,000	1,000		1,099		Breccia	24
Magma	AZ		13,808	479	25,448	12,500	434	22,875	913	48,323	Cu manto	Laramide
Iron King	AZ		5,007	617	18,495				617	18,495	Massive sulfide	Precambrian
St. Anthony	AZ		1,989	400	984				400	984	Vein	28
Mogollon	NM	50	2,000	362	18,000				412	18,000	Vein	17-18
Elizabeth Town	NM	147		221					368		Vein	23
Miami-Globe	AZ		771,609	243	17,621	400,000	72	4,900	316	22,521	Porphyry copper	57-68
Big Bug	AZ	50	1,060	267	2,784				317	2,784	Massive sulfide	Precambrian
Continental-Central	NM		9,334	53	1,095	37,600	211	4,399	264	5,494	Cu skarn	59?
Christmas-Banner	AZ		22,093	58	2,438	95,800	210	8,240	268	10,678	Cu skarn	62
Tombstone	AZ		1,500	240	30,000				240	30,000	Pb-Zn manto	72
Lordsburg	NM		1,600	224	6,000				224	6,000	Vein	58
Johnson-Strong & Harris	AZ		1,640		734	53,165	200	11,696	200	12,430	Cu skarn	53
Pecos	NM		2,299	178	7,749				178	7,748	Massive sulfide	Precambrian
Pima	AZ	13	692,250	54	36,500	1,384,500	110	78,482	177	114,982	Porphyry copper	56-62
Ray	AZ		327,507	58	8,789	606,144	109	16,245	167	25,034	Porphyry copper	65
Mineral Park-Wallapai	AZ		96,920	151	11,535	50,000		2,500	151	14,035	Porphyry copper	71
Hillsboro	NM	98		51		70,000			149		Porphyry copper	73
Pinos Altos	NM	43		105	800				148	800	Cu skarn	68-72
Central	NM			140	6,500	500,000			140	6,500	Cu skarn-porphyry	59
Lynx-Walker	AZ	97	60	43	148				140	148	Vein	64
Pearce	AZ		1,341	138	12,020				138	12,020	Vein	24?
Steeple Rock	NM		300	135	3,000				135	3,000	Vein	18
Pine Grove	AZ			130	632				130	632	Vein	Precambrian
Hassayampa	AZ	19	45	108	246				127	245	Vein	Laramide?
San Pedro	NM	100		16					116		Cu skarn	24
Oro Blanco	AZ	2	1,000	100	4,010				102	4,010	Vein	Laramide
Shafter	TX		2,250		30,000	10,000		65,000		95,000	Pb-Zn manto	31
Hardshell	AZ			4	9,199	6,000	39	30,000	43	39,199	Sedimentary-hosted	59
Helvetia	AZ		865	3	726	363,000		30,129	3	30,855	Cu skarn	59
Bagdad	AZ	1	11,760		235	814,000		17,908	1	18,143	Porphyry copper	71
Silver Bell	AZ		90,351	2	5,843	100,000	2	7,000	4	12,843	Porphyry copper	67
Silver King	AZ		112		6,176					6,176	Breccia	Laramide
Magdalena	NM				6,000					6,000	Pb-Zn skarn	28
Kingston	NM				6,000					6,000	Pb-Zn manto	33?
Lake Valley	NM				5,776					5,775	Pb-Zn manto	33?
St. Cloud	NM		79	3	1,000	375	34	3,333	37	4,333	Vein	Tertiary
Antler (Hualapai)	AZ		161		99	5,180	22	3,185	22	3,284	Massive sulfide	Precambrian
Oracle Ridge	AZ		136		1,181	1,100		1,000		2,181	Cu skarn	27-35
TOTALS		723	3,795,697	11,488	501,600	6,959,965	8,308	455,382	19,796	956,982	TOTALS	

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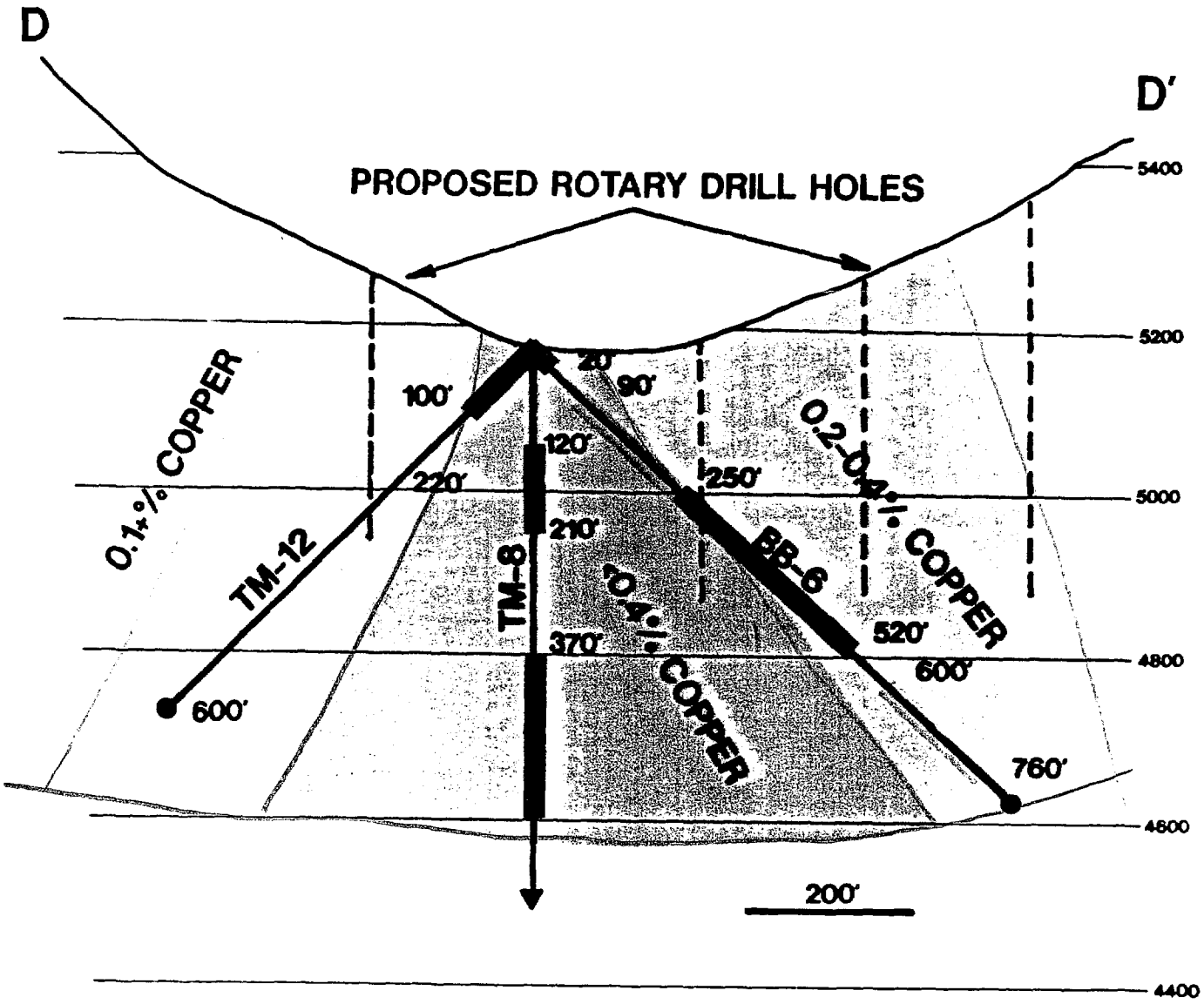
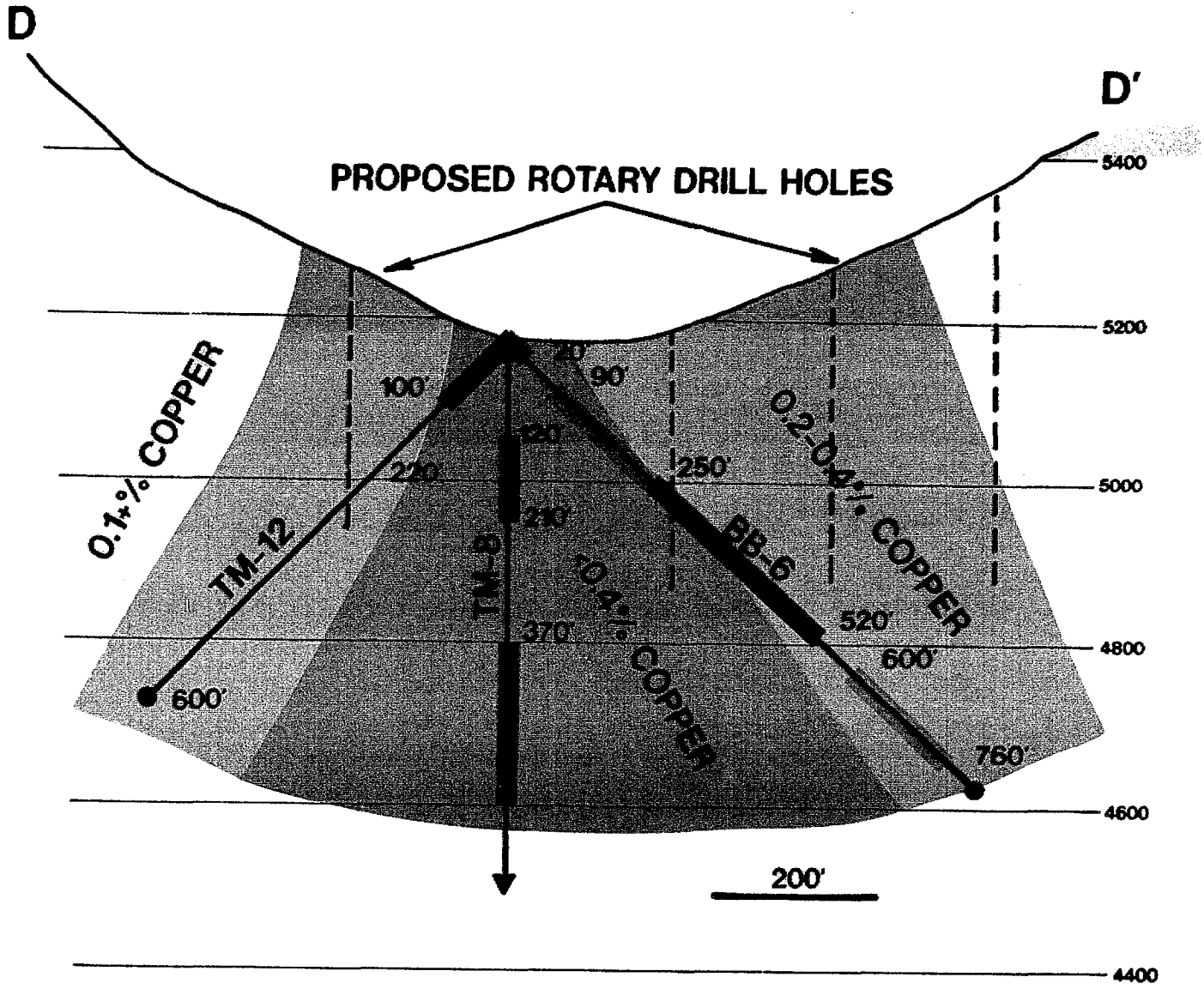


TOTAL ZONE SECTION D-D'

THUNDER MOUNTAIN PROJECT



TOTAL ZONE SECTION D-D'

THUNDER MOUNTAIN PROJECT

Table 4. Distribution of gold and silver production and reserves by subprovince, Basin and Range province

	Gold[a]		Silver[a]	
	ounces	%	ounces	%
Great Basin Block				
Placer	1,489,000	58.0		
Production	50,167,000	76.0	1,471,814,000	72.0
Reserves	54,248,000	81.1	677,299,000	52.8
Total	105,904,000	77	2,149,113,000	64
Mohave Block				
Placer	352,000	14.0		
Production	6,320,000	9.0	73,477,000	4.0
Reserves	4,321,000	6.5	149,270,000	11.6
Total	10,993,000	8	222,747,000	7
Porphyry Copper-Rio Grande Rift Blocks				
Placer	723,000	28.0		
Production	11,488,000	17.0	501,600,000	24.0
Reserves	8,308,000	12.4	455,382,000	35.6
Total	20,519,000	15	956,982,000	29
Totals for All Blocks				
Placer	2,564,000			
Production	67,975,000		2,046,891,000	
Reserves	66,877,000		1,281,951,000	
Total	137,416,000		3,328,842,000	

a. Categorical distribution of total gold and silver by subprovince in ounces and corresponding percentile (%) contribution to the total Basin and Range budget.