DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

Work done in cooperation with
U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
OFFICE OF POLICY DEVELOPMENT AND RESEARCH

MISCELLANEOUS INVESTIGATIONS SERIES
MAP I-909

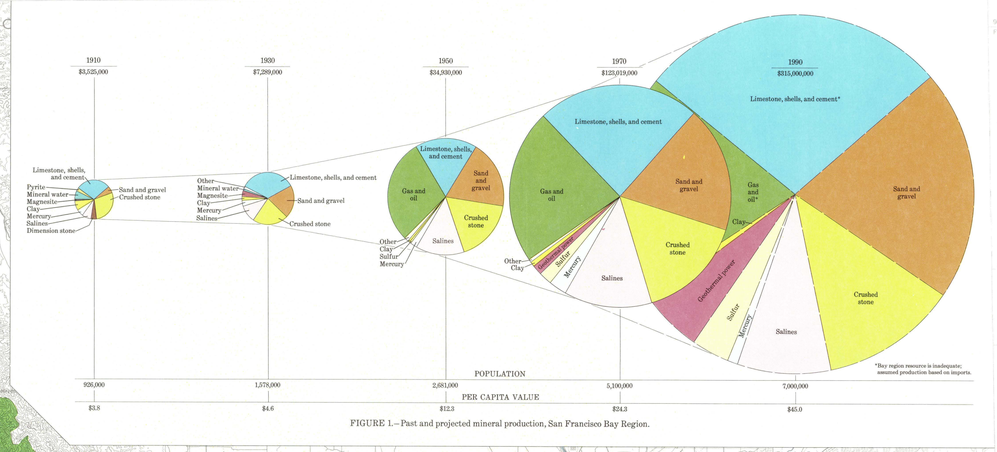

FIGURE 1.–Past and projected mineral production, San Francisco Bay Region.

EXPLANATION

GEOLOGIC UNITS

Mineral resources that occur in each unit are listed in parentheses in order of decreasing economic importance.

- WATER AND DEPOSITS OF SEDIMENTS AND SHELLS PRESENTLY UNDER WATER – (Salines, including salt, magnesium compounds, bromine, and gypsum; shells, sand, and gravel under water are potential resources)
- BAY MUD – Mostly unconsolidated clay and silt-sized particles deposited in San Francisco Bay and surrounding marshlands and in Sacramento-San Joaquin River delta. Includes areas of manmade fill
- GRAVEL, SAND, AND MUD DEPOSITS OF MARINE AND NONMARINE ORIGIN – Generally unconsolidated and flat lying. (Sand and gravel in alluvium; clay, peat, and gemstones in beach sands)
- CONGLOMERATE, SANDSTONE, AND MUDSTONE OF MARINE AND NONMARINE ORIGIN – Moderately to well consolidated, slightly to steeply tilted. (Gas and oil, expansible shale, specialty sand, clay, coal)
- VOLCANIC ROCKS – Includes lava flows, ash-flow tuffs, pumice, tuffs, and some interlayered sedimentary deposits. Mostly form flat-lying cap over older rocks. (Crushed and broken stone, dimension stone, pumice, pumicite, perlite, pyrite, silver, copper, diatomite)
- SANDSTONE AND MUDSTONE WITH MINOR CONGLOMERATE – Well-bedded, generally tilted in broad folds. (Crushed and broken stone, clay, expansible shales, sand and gravel available locally from conglomerates, dimension stone)
- FRANCISCAN ROCKS – Sandstone and shale, minor limestone and conglomerate, chert, and abundant mafic volcanic rocks. Greatly deformed and broken, locally weakly to strongly metamorphosed. (Limestone, crushed and broken stone, geothermal resources, mercury, manganese, gemstones, jasper, copper)
- ULTRAMAFIC ROCKS – Mostly serpentine; small inclusions of metamorphic rocks. (Mercury, chromite, magnesite, asbestos, gemstones, jade)
- GRANITIC ROCKS AND SMALL MASSES OF MARBLE, SCHIST, AND QUARTZITE – (Crushed and broken stone, dimension stone)

Contact between geologic units

Fault – Dashed where approximately located; dotted where concealed

RESOURCE COMMODITIES

ASBESTOS
- Deposit

CHROMITE
- Deposit

CLAY
- Deposit

COAL
- Area of deposits
- Occurrence

COPPER
- Deposit

DIATOMITE
- Area of deposits
- Deposit

EXPANSIBLE SHALE
- Quarry
- Plant
- Quarry and plant

GEMSTONES
- Locality

GEOTHERMAL RESOURCES
- Official boundary of "Known Geothermal Resource Area"
- Steam field
- Geothermal power plant
- Hot spring

LIMESTONE AND SHELLS
- Area of limestone deposits
- Area of shell deposits
- Limestone deposit
- Quarry
- Cement plant

MAGNESITE
- Deposit

MANGANESE
- Deposit

MERCURY
- Deposit

MINERAL WATER
- Spring

OIL AND GAS
- Oil field
- Gas field

PEAT
- Area of deposits

PUMICE AND PERLITE
- Area of volcanic tuff or perlite
- Pumice deposit
- Perlite deposit

PYRITE
- Deposit

SALINES
- Salt concentrating pond
- Salt crystallizing pond
- Bittern salts pond
- Salt washing plant
- Salt refining plant
- Magnesium compounds plant

SAND AND GRAVEL
- Area of major deposits; small deposits of local potential not shown

SAND IN MARINE AREAS
- Area of deposits

SAND, SPECIALTY
- Area of deposits

SILVER
- Deposit

STONE, CRUSHED AND BROKEN
- Quarry – Large potential sources of crushed and broken stone occur within all units of consolidated rock. The areas that have been exploited are shown only by quarry symbol

STONE, DIMENSION AND ORNAMENTAL
- Deposit of granite quarried for dimension stone
- Area of dimension stone resources (sandstone)
- Area of dimension stone resources (volcanic rocks)
- Deposit of volcanic rocks quarried for dimension stone or ornamental stone

REFERENCES CITED

Jennings, C. W., and Burnett, J. L., 1961, Geologic map of California, Olaf P. Jenkins edition, San Francisco sheet: California Div. Mines and Geology, scale 1:250,000.
Jennings, C. W., and Strand, R. G., 1958, Geologic map of California, Olaf P. Jenkins edition, Santa Cruz sheet: California Div. Mines and Geology, scale 1:250,000.
Koenig, J. B., 1963, Geologic map of California, Olaf P. Jenkins edition, Santa Rosa sheet: California Div. Mines and Geology, scale 1:250,000.
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INDEX MAP OF CALIFORNIA

Commodity	Alameda	Contra Costa	Marin	Napa	San Francisco	San Mateo	Santa Clara	Solano	Sonoma
Asbestos	+	○		+					
Chromite	+	○	○	+	○	○	+	○	+
Clay	+	■	■	+	○	○	+	■	+
Coal	○	○							
Copper	○	○	○	○			○		○
Diatomite		■		■					□
Expansible shale	■	■	■	■	○	○	○	○	○
Gemstones	○	○	+	+	+	+	+	○	+
Geothermal resources				+					■
Limestone and shells	✖	□	○	○		✖	✖	○	○
Magnesite	○			○			○		○
Manganese	+	○	○	○			+		○
Mercury	○	+	□	□	○	○	■	+	□
Mineral water		+	+	■		■	■		■
Oil and gas	○	✖	○	○		+	○	✖	○
Peat		■					○	□	
Pumice		+		■	○			+	+
Pyrite	○								
Salines	■		+	■		■	■	■	
Sand and gravel	■	○	○	■	■	○	■	■	■
Sand, specialty	○	■			○	○			
Silver				+					
Stone, crushed and broken	■	■	■	■	○	■	■	■	■
Stone, dimension	○	○	■	■	○	○	○	■	■
Stone, ornamental			+					■	
Sulfur, byproduct		■							

EXPLANATION

- ○ Occurrence, not likely to be used
- + Small resource, or usable only at high price
- □ Significant resource not being used but likely to be used within next 20 years
- ■ Significant resource being used
- ✖ Significant resource being used but likely to be exhausted, seriously depleted, or uneconomic in 20 years

FIGURE 2.–Mineral resources of the San Francisco Bay Region by county.

Commodity	Approximate total value to 1971, in dollars	Approximate value recent year, in dollars	Bay region importance[1]	Statewide or national importance[2]	Availability[3]	Outlook[4]	Kind of operation[5]	Potential environmental effects[6]
Asbestos	600,000	0	–	–	+	–	Q	S, N
Chromite	520,000	0	–	–	±	–	Q	S, N, W
Clay	19,000,000	1,000,000	+	–	+	+	Q	S, W
Coal	16,000,000	0	–	–	±	–	Q	S, W
Copper	60,000	0	–	–	–	–	UM, BP	W
Diatomite	1,000,000	200,000	+	–	+	+	Q	S, N, A
Expansible shale	40,000,000	400,000	+	–	+	+	Q	S, N, A
Gemstones	11,000	(07)	±	–	+	+	C	None
Geothermal resources	5,000,000	1,500,000	+	+	+	+	W	W, A, N
Limestone and shells	500,000,000 (includes cement)	30,000,000 (includes cement)	+	–	+	+	Q, SM	A, S, N
Magnesite	10,000,000	0	–	–	+	–	UM, Q	S, N
Manganese	620,000	0	–	–	+	–	UM, Q	S, A, N
Mercury	110,000,000	3,200,000	+	+	±	±	UM, Q	S, A, N, W
Mineral water	5,000,000(?)	?	–	–	+	±	W	None
Peat	1,000,000(?)	100,000	–	–	+	+	Q, SM	S
Pumice	1,200,000	4,000	–	–	+	–	Q	S, A
Pyrite	2,000,000	0	–	–	±	–	UM	S, A, W
Salines	290,000,000	16,000,000	+	+	+	+	W	S
Sand and gravel	370,000,000	22,500,000	+	–	±	+	Q, SM	S, A, N
Sand, specialty	200,000	53,000	±	–	+	+	Q, SM	S
Silver and gold	1,600,000	0	±	–	±	±	UM	S, N, W
Stone, crushed and broken	273,000,000	18,700,000	+	–	+	+	Q	S, N, A
Stone, dimension	4,600,000	45,000	–	–	+	±	Q	S, N
Stone, ornamental	150,000	?	±	–	±	±	Q	S
Oil and gas	420,000,000	26,500,000	+	+	±	+	W	S, W, A
Sulfur, byproduct	25,000,000	2,500,000	+	–	+	+	BP	None

[1] + Should mine if possible.
± Could import or get along without.
– Unnecessary or unavailable.

[2] + Supply other parts of United States.
– None.

[3] + Widespread or readily available.
± Limited supply, or available only at high price.
– Unavailable.

[4] + Expect continued or greater exploitation.
± Declining or doubtful production.
– Will terminate, or has terminated.

[5] UM Underground mine.
Q Quarry.
SM Submarine mining.
W Well, spring, or pond.
C Collected.
BP Byproduct.

[6] S Surface disturbance, such as quarry or dump.
A Air pollution.
W Water pollution.
N Noise.

FIGURE 3.–Summary of availability and projected availability of mineral resources, San Francisco Bay Region.

Base compiled in 1969 by the U.S. Geological Survey for the Association of Bay Area Governments, Berkeley, California
100,000-foot grids based on California coordinate system, zones 2, 3 and 4

SCALE 1:250 000

CONTOUR INTERVAL 200 FEET
DATUM IS MEAN SEA LEVEL

Interior—Geological Survey, Reston, Va.—1975

Geology simplified from the Geologic map of California, Olaf P. Jenkins edition, Santa Rosa, Sacramento, San Francisco, San Jose, and Santa Cruz sheets (Koenig, 1963; Strand and Koenig, 1965; Jennings and Burnett, 1961; Rogers, 1966; Jennings and Strand, 1958)

Information on mineral resources compiled from data supplied in 1972 by C. C. Bishop, J. L. Burnett, C. W. Chesterman, E. W. Hart, M. C. Stinson, and E. E. Welday of the California Division of Mines and Geology

MAP SHOWING MINERAL RESOURCES OF THE SAN FRANCISCO BAY REGION, CALIFORNIA—PRESENT AVAILABILITY AND PLANNING FOR THE FUTURE

By
Edgar H. Bailey and Deborah R. Harden

1975

For sale by U.S. Geological Survey, Denver, Colo. 80225; and Reston, Va. 22092, price $1.00
Explanatory pamphlet accompanies map