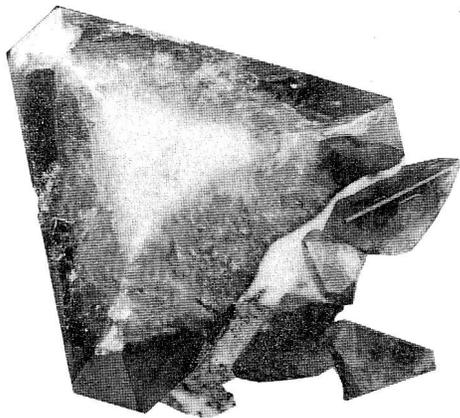
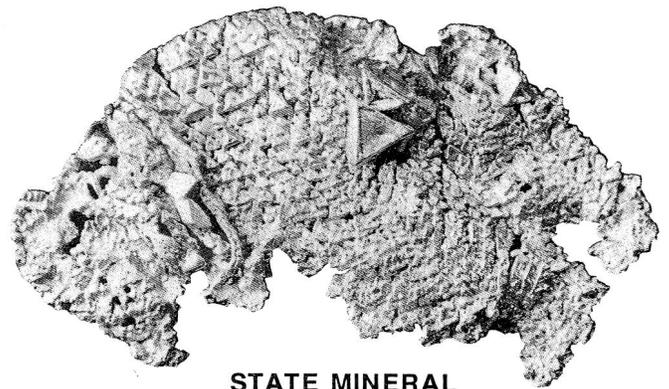


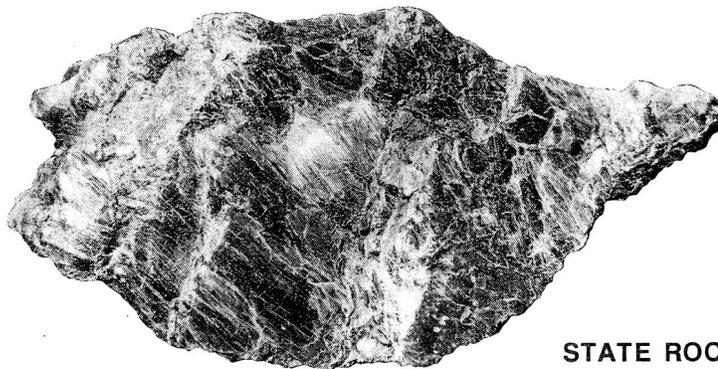
State of California
Department of Conservation
MINING AND GEOLOGY BOARD
ANNUAL REPORT
1986



STATE GEMSTONE
BENITOITE



STATE MINERAL
NATIVE GOLD



STATE ROCK
SERPENTINE

THE RESOURCES AGENCY
GORDON K. VAN VLECK
SECRETARY FOR RESOURCES

STATE OF CALIFORNIA
GEORGE DEUKMEJIAN
GOVERNOR

DEPARTMENT OF CONSERVATION
RANDALL M. WARD
DIRECTOR

State of California

MINING AND GEOLOGY BOARD

**ANNUAL REPORT
1986**

BOARD MEMBERS:

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1416 9th Street, Room 1326-2
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COVER PHOTOS:

Material furnished by the California Federation of Mineralogical Societies.

Photos by Fred Elsnau and Linda Axelson.



ABSTRACT

The State Mining and Geology Board has broad policy responsibilities for earth science, mineral resource conservation, mining, and geologic hazards. The Board also establishes policy that guides the implementation of the Alquist-Priolo Special Studies Zones Act, which addresses the hazards of ground rupture from active faulting, and for the Landslide Hazard Identification Act, which provides for a state-local cooperative mapping program to identify landslide-prone areas in the path of urbanization. During the 1985-86 fiscal year, the Board took a number of actions fulfilling these responsibilities.

The Board co-sponsored, with the Department of Conservation, five Mined Land Reclamation Workshops, and established policy and priorities for the program by Resolution Numbers 86-2 and 86-5.

The Board continued work toward completion of the designation of aggregate resources in seven metropolitan areas in the State, which include the Claremont-Upland, San Bernardino, Saugus-Newhall, Palmdale, North San Francisco Bay, South San Francisco Bay, and Monterey Bay Production-Consumption Regions.

Five classification reports (Fresno-Madera Production-Consumption Region, Ivanpah-Crescent Peak-Searchlight 15' Quadrangles, Mid Hills 15' Quadrangle, W.L. Harvey Clay/Shale Deposit (petition request), Dominguez Clay property (petition request), Greenley Road Extension (petition request Declezville Quarry petition) were reviewed and transmitted to affected lead agencies.

The Board adopted policy resolutions amending interim criteria for mineral resource management policies, and for the reclamation program.

Thirty-two maps of new and revised Special Studies Zones were reviewed and issued pursuant to the provisions of the Alquist-Priolo Special Studies Zones Act.



Part I.

INTRODUCTION

A. State Mining and Geology Board, Organization and Responsibilities

The State Mining and Geology Board is composed of nine members appointed by the Governor for four-year terms. By statute, the Board is comprised of individuals with specified professional backgrounds in geology, mining engineering, environmental protection, chemical engineering, urban planning, landscape architecture, mineral resource conservation, seismology, and one public member.

The Board has broad policy responsibilities under the Surface Mining and Reclamation Act of 1975 for establishing and maintaining State policy for surface mining and reclamation and for the conservation and development of mineral resources.

The Board represents the State's interest in the development of information necessary to the understanding and utilization of the State's terrain, and seismological and geological information pertaining to earthquake and other geological hazards. General policy for the State's geological survey, the Department of Conservation's Division of Mines and Geology, is established by the Board. These responsibilities recognize the impacts that California's complex geology, large amounts of federally managed lands, high mineralization, and potential for geologic hazards have on the State's economy, land use, and public safety.

The Board has policy responsibilities for the Alquist-Priolo Special Studies Zones Act. Under this Act, hazardous fault zones are delineated by the State Geologist. This information is provided to local government to assure that structures for human occupancy are not built across such faults. In addition, the Board establishes guidelines and priorities that enable the Department of Conservation's Division of Mines and Geology to carry out provisions of the Landslide Hazard Identification Program (AB 101, Moore, Statutes of 1983).

To enable the Board to meet its responsibilities, six permanent committees have been established. These include the Policy Committee, the Reclamation Committee, the Classification-Designation Committee, the Education Committee, the Geohazards Committee, and the Legislation, Government and Public Relations Committee. The Board is assisted by a two-person staff.

Part II.
MAJOR BOARD ACTIONS

A. Mined Lands Reclamation and Mineral Resource Conservation

California's Surface Mining and Reclamation Act, or SMARA, is the State's solution to resolve two seemingly contradictory demands--the need for a continuing supply of mineral resources, and the assurance that significant adverse impacts of mining will be mitigated. SMARA created a program that assures the reclamation of mined lands and provides mineral information for local management of mineral resources needed for the future.

1. Summary of Reclamation Planning in California

Within the Department of Conservation's Division of Mines and Geology (DMG), there currently exists a Mined Lands Reclamation Program to carry out many of the Surface Mining and Reclamation Act's (SMARA) reclamation provisions. The Board sets policy for this and other DMG programs, and is the agency responsible for certifying local surface mining and reclamation ordinances as being in compliance with State law.

Cities and counties having active mines within their jurisdiction are designated as lead agencies under SMARA. There are approximately 89 such agencies in California at the present time. Ordinances adopted by city councils and boards of supervisors that have been certified by the State Mining and Geology Board provide the regulatory framework within which mining activities are carried out. These ordinances incorporate the requirements of SMARA and reflect the policies of the Board. They may also contain additional, more restrictive requirements deemed necessary by a lead agency to ensure effective reclamation within its particular jurisdiction.

A mining operator is responsible under SMARA for the preparation and submission of a reclamation plan to the lead agency. Approval of this plan is required before mining can begin. The reclamation plan includes information on the site, the mineral commodity, the mining method, processing requirements, and the specifics of the reclamation program to be undertaken.

Who is subject to SMARA? With the exception of specified exemptions and provisions for vested operations, "...no person shall conduct surface mining operations unless a permit is obtained from, and a reclamation plan has been submitted to, and approved by, the lead agency for such operation..." Lead agencies are defined as cities, counties, and public agencies with permitting jurisdiction over a surface mining operation.

How is the Act implemented? California's approach to reclamation planning is to include the mining operator, local government, and the State as active participants in the process. This stresses a cooperative approach rather than an adversarial one, and resources and knowledge are combined to create cost-effective and environmentally sound reclamation plans. The operator's financial interest and investment are considered as well as community, regional, and statewide interests in mineral resource conservation and land-use planning.

Surface mining and reclamation ordinances adopted by lead agencies that have been certified by the Board provide the regulatory framework within which mining activities are carried out. These ordinances incorporate the requirements of SMARA and reflect the policies of the Board adopted as regulations. Lead agencies may adopt ordinances that contain additional, more restrictive requirements than those provided by SMARA or State policy, to assure effective reclamation within their particular jurisdictions.

What happens if an agency does not have a certified ordinance? In the absence of a certified lead agency surface mining and reclamation ordinance, the Board is empowered with the authority to review and approve reclamation plans to assure that the mined lands reclamation objectives of SMARA are met. Reclamation plans approved by the Board as such are not subject to modification at a later date by the lead agency with permitting jurisdiction, but may be amended by the Board.

What is the role of the mining operator? A mining operator is responsible under SMARA for the preparation and submission of a reclamation plan to the lead agency. Approval of this plan by the lead agency is required before mining can begin. The reclamation plan includes information on the site, the mineral commodity, and the specifics of the reclamation program to be undertaken.

Vested rights. SMARA, Section 2776, exempts operations with vested rights from the requirement to secure a permit pursuant to the provisions of the Act. However, vested operations are required to submit to the lead agency, and receive approval of, "within a reasonable time", a reclamation plan for mining conducted after January 1, 1976. Reclamation plans are not required for mined lands on which surface mining operations were conducted prior to January 1, 1976.

Record Keeping. To ensure statewide consistency for record keeping, the Board established policy requiring lead agencies to forward copies of each permit and approved reclamation plan to DMG. The Mined Land Reclamation Program is responsible for maintaining complete files of these records.

SMARA also requires that lead agencies notify the State Geologist of the filing of an application for a permit to conduct surface mining operations, which provides a mechanism for alerting the Mined Land Reclamation Program that the final reclamation plan will be forthcoming should the project be approved.

Technical Assistance. Finally, Section 2774(c) provides that "...On request of a lead agency, the State Geologist shall furnish technical assistance to assist in the review of reclamation plans." Technical assistance is provided by the State through the Reclamation Program staff, which consists of technical expertise necessary for the review of reclamation plans.

2. Reclamation Workshops

The Board, in March 1986, adopted Resolution #86-2 in recognition that a strong Mined Land Reclamation is necessary to consistent statewide management of mining wastes and reclamation of mining sites for the protection of public health, the environment and local land use planning processes and goals. A strong program is also essential to providing clear guidelines to the mining industry.



"Mined Land Reclamation" courtesy of Janet Smith
This office complex sits on a former site for a sand and gravel processing plant

The resolution further acknowledges Board support of the Program, established policy for the staffing and direction of future activities, and initiated the preparation of a questionnaire on the needs of lead agencies. In addition, the Board directed the commencement of reclamation workshops throughout California. The results of the questionnaire and workshops were to be submitted to the Department, the Legislature, mining industry, and the general public.

During May and June of 1986, five workshops were conducted throughout the state to gather information regarding constituency needs in order to ascertain program staffing needs, and to plan activities for Fiscal Year 1986-87. Representatives from local lead agencies, mine operators and federal and state government agencies participated, as did interested members of the local communities where the workshops were held.

A member of the Board's Reclamation Committee chaired each of the panel discussions, and provided policy guidance on questions relating to the Act and the Board's regulations. Members of the Mined Land Reclamation Program and Department environmental staff participated to provide the varied expertise required for a successful workshop discussion.

Needs identified at these workshops included:

- Wider dissemination of reclamation information and technical services, such as publications on revegetation, hydrology, etc., examples of successful reclamation projects (case studies), and a regular update of current reclamation news and legal and court opinions affecting reclamation planning.
- Continuing workshops on a wide variety of technical subject matters (i.e. end uses) and offering training in reclamation plan preparation and review.

- Technical expertise in areas such as mining engineering, revegetation, hydrology, and geology.

A discussion of the results of these workshops, together with recommendations for program staffing and priorities, was included in a report to the Legislature, and conceptually supported by the Board by Resolution #86-5. In an effort to achieve compliance with SMARA by both mining operators and lead agencies in a consistent manner statewide, the Board determined that an internal review to determine the number of active mines without approved reclamation plans, and the number of lead agencies that require but still are without certified surface mining and reclamation ordinances, be undertaken as a priority project.

3. Summary of classification-designation program

California is one of the nation's leading mining states in terms of both value and diversity of minerals produced--approximately 700 active mines and quarries produce about \$2 billion worth of non-fuel minerals annually.

In the early 1970's, the Department of Conservation's Division of Mines and Geology (DMG) estimated that California would face a \$17 billion loss of mineral resources by the year 2000 if present land uses continued. This projected loss represents almost nine years of the State's current mineral production.

California is faced with increasingly difficult land use decisions. Mining is not compatible with most other land uses--conflicts between homeowners and quarry operators are common at public hearings. In the public view, other land resources such as agricultural lands, timber stands, and sensitive ecological or scenic areas can be more valuable than the underlying mineral deposits. Competition for land use priorities is intense. Unfortunately, many land use decisions are made without considering whether mineral resources are present. Mineral resources thus lost are rarely located or recovered later.

In an effort to remedy this problem, SMARA provides for a mineral lands inventory process termed "classification-designation", which jointly involves State and local government. Information on the location of important mineral deposits is developed by the DMG through the process of mineral land classification. This information is used by the Board in designating those deposits that are of economic significance to a region, the State, or the nation. Local government uses this information in developing mineral resource management policies and in making land-use decisions to assure the conservation and development of these resources.

During the first phase of this program, classification, the State Geologist is responsible for preparing a geologic inventory of selected mineral commodities within a defined study region. Major objectives of a classification report include: (1) identifying the market area of the commodity (a production-consumption region); (2) projecting the future (50-year) needs for the commodity within the study region; and (3) geologically classifying the lands within the region as to the presence or absence of the commodity.

The State Geologist classifies mineral lands solely on the basis of geologic factors. Existing land-use, by statute, is not considered. Classification of an area as a Mineral Resource Zone-2 (MRZ-2) indicates the existence of a deposit that meets certain criteria for value and marketability. The classification report also describes other categories of mineral resource zones -- MRZ-1, 3, and 4. The first two of these categories are used to indicate if an area contains no resources (MRZ-1) or contains potential but presently unproven resources (MRZ-3). Areas where it is not possible to assign any of these categories are classified MRZ-4.

In many regions, large portions of the areas classified as MRZ-2 are already committed to various urban uses, which limit access to the underlying resources. As an aid to local planning agencies, classification reports prepared for metropolitan areas also identify MRZ-2 quality deposits, or portions of these deposits, that have not been preempted by incompatible land uses such as urbanization. These non-urbanized areas, called resource sectors, are important because they contain resources that remain potentially available for future use. The identification of resource sectors also facilitates estimating the volume of aggregate material that is available in the production-consumption (P-C) region. Resource sectors are typically considered for designation by the Board.

Once the classification report has been completed, the Board may choose to proceed with the second step in SMARA's mineral lands identification process -- designation of those deposits that are of regional or statewide significance. In contrast to classification, which inventories mineral deposits without regard to land use, the purpose of designation is to identify those deposits that are of prime importance in meeting the future needs of the study region and that remain available from a land use perspective.

The first mineral commodity selected by the Board for classification by the State Geologist in urban and urbanizing areas was construction aggregate -- sand, gravel, and crushed rock. While its importance is often overlooked, sand and gravel is an essential commodity in society. As a construction material, sand and gravel is a key component in products such as Portland cement concrete, asphaltic concrete, railroad ballast, stucco, road base, and fill. Aggregate normally provides 80 to 100 percent of the material volume in these products. Portland cement concrete, in turn, is used in a number of building materials such as concrete blocks and pipes, foundation pilings, precast concrete beams, and tilt-up concrete walls. In total, aggregate as a basic construction material has ripple effects throughout the economy. The availability of aggregate is essential, for example, to the construction industry. Developers, building and highway contractors, cement manufacturers, asphalt producers, construction workers, and truck drivers are dependent, either directly or indirectly, on a ready supply of reasonably priced construction aggregate. Therefore, the availability of aggregate deposits and their proximity to markets are critical factors in the strength of the State's economy.

With the passage of SB 1300 in 1979, the State also initiated mineral land classification studies in the highly mineralized Sierra Nevada and the California Desert Conservation Area, where focus is on the potential for minerals other than construction aggregate in more rural areas of the State.

Progress of Classification-Designation Program

Index map of California, showing location and status of Aggregate Production-Consumption Region being classified and/or designated in the Urban SMARA Program as of June 30, 1986.

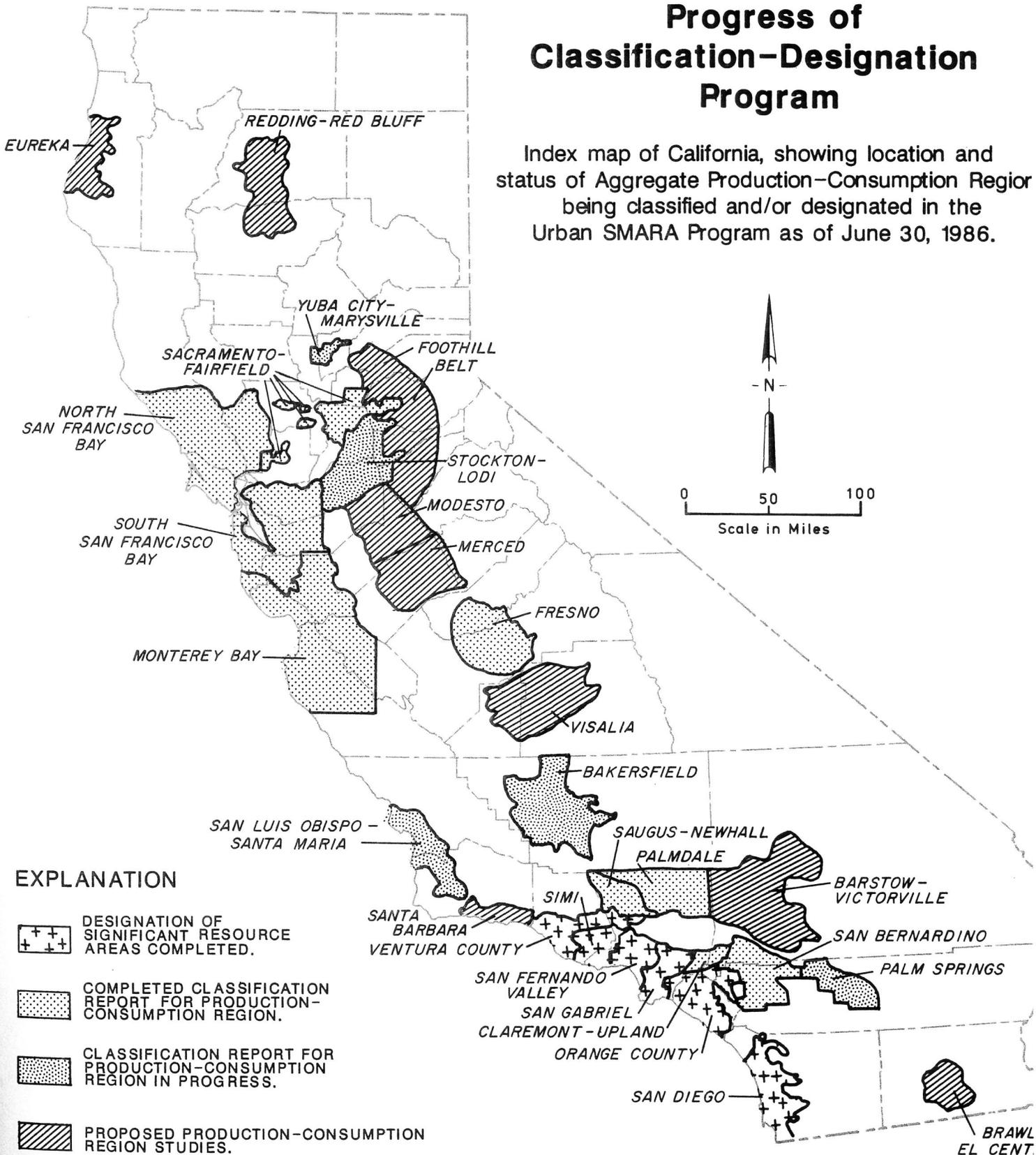


Figure 1. Status of the City SMARA Classification-Designation Program, June 30, 1986.

4. Designation of San Francisco-Monterey Bay Areas; Claremont-Upland and San Bernardino Regions; and Saugus-Newhall and Palmdale Regions

During the 1985-86 fiscal year, the Board continued work on the designation of three major metropolitan areas of the state, seven production-consumption regions, which include the San Francisco-Monterey Bay areas; Claremont-Upland and San Bernardino regions; and the Saugus-Newhall and Palmdale regions. The intent behind this coordinated effort was to bring the Board's mineral inventory procedures in line with the completion of classification reports by DMG statewide -- a major benefit being the completion of designation of rapidly urbanizing areas in a more timely fashion.

Proposed designation regulations were released in October 1985 for public comment. Public hearings were held on November 15, 1985 in Palm Desert and on January 31, 1986 in Santa Rosa to accept testimony and comments on proposed designation regulations for the seven production-consumption regions. Additional public hearings were held on March 18, 1986 in San Jose and March 19, 1986 in Santa Cruz to accept additional testimony on the South San Francisco Bay and Monterey Bay Production-Consumption Regions.

The Classification-Designation Committee met in April 1986, to develop recommendations for the designation of aggregate resources by the full Board for the Claremont-Upland, San Bernardino, Saugus-Newhall, and Palmdale P-C Regions in Southern California, and the North San Francisco Bay P-C Region in Northern California. These recommendations were considered at the July 1986 meeting of the full Board, and the modified proposal resulting from comments received for these regions was distributed for an additional 15-day public comment period in mid-July 1986.

The Classification-Designation Committee met in July 1986 and prepared recommendations for the designation of aggregate resources by the full Board for the South San Francisco Bay and Monterey Bay Production-Consumption regions. The modified proposal for these regions was also sent out for an additional public comment period, following an August Board meeting.

Throughout the designation proceedings, which is a formal rulemaking process, members of the Board, and in particular the Classification-Designation Committee, met with individual homeowner and industry groups, local government and state officials, and responded to citizen inquiries in an attempt to understand the concerns of all interested parties towards development of an informed decision. The designation process for these seven regions will be completed late 1986.

Descriptions of the areas and regions follow:

- a. The San Francisco-Monterey Bay study area consists of three contiguous P-C regions (North San Francisco Bay, South San Francisco Bay, and Monterey Bay) that cover all or portions of 12 northern California counties. These three regions cover a diverse geographical area that ranges from the highly-urbanized communities of the San Francisco Peninsula and East Bay to the predominantly rural, outlying areas of the Alexander Valley in northern Sonoma County and the Salinas Valley in southern Monterey County.

The first of these three study areas is the North San Francisco Bay P-C region. This region covers all of Marin, Napa, and Sonoma Counties and the extreme western portion of Solano County. Communities in this region include such cities as Cloverdale, Healdsburg, Santa Rosa, Petaluma, Sonoma, Napa, Vallejo, and San Rafael. This region has a population of approximately 790,000.

The central portion of the study area is located within the South San Francisco Bay P-C region. This region covers all of Alameda, Contra Costa, San Francisco, and San Mateo Counties and the northern portion of Santa Clara County. Communities in this P-C region include such cities as Oakland, San Francisco, Concord, Antioch, Livermore, Fremont, San Jose, Palo Alto, and Pacifica. This region has a population of approximately 4.4 million.

The southern portion of the project study area is located within the Monterey Bay P-C region. This region covers all of Santa Cruz County, the northern portion of Monterey County, the northwestern portion of San Benito County, and the southern portion of Santa Clara County. The population of this region is approximately 700,000.

Between 1971 and 1980, an average of 34.1 million tons of aggregate per year were produced and consumed in the San Francisco-Monterey Bay area. This amounted to one-fourth of California's average annual production over the same period.

In past years, the population centers of the San Francisco-Monterey Bay area have been served from local deposits of high-quality material from which aggregate could be obtained and utilized at relatively low costs. However, high-quality deposits are rapidly being depleted and many of the potential sources already have been lost to irreversible land uses that are incompatible with mining. Not all of the remaining sand, gravel, and crushed stone sources in the San Francisco-Monterey Bay area can supply materials for use in higher-grade aggregate products such as Portland cement concrete. Some deposits have been subjected to extreme weathering by groundwater, or contain chemically reactive elements that make them unacceptable for this use. Rarely is in-place aggregate raw material, even from the highest-grade deposits, physically or chemically suited for every type of aggregate use.

b. Claremont-Upland and San Bernardino

The Claremont-Upland P-C region is approximately 230 square miles in area and includes the cities and communities of Pomona, Claremont, Upland, Ontario, Rancho Cucamonga, and La Puente. It is bordered on the north by the Angeles National Forest. Other production-consumption regions located adjacent to this region are the San Bernardino P-C Region to the east, the Orange County-Temescal Valley P-C Region to the south, and the San Gabriel Valley P-C Region to the west.

Based upon the projected population increase and the predicted per capita consumption rates, approximately 245 million tons of aggregate will be required to satisfy demand in the Claremont-Upland Production-Consumption Region through the year 2031.

Current reserves (aggregate material believed to be acceptable for commercial use that exist within property owned or leased by an aggregate-producing company and for which permission allowing extraction and processing has been granted by the proper authorities) total approximately 55 million tons, which is less than one-fourth (13-year supply) of the requirements needed for the 50-year period.

The San Bernardino P-C Region is approximately 1,100 square miles in area and includes such population centers as San Bernardino, Riverside, Fontana, Redlands, Banning, Hemet, and Elsinore. It is bordered by two other P-C Regions, the Claremont-Upland region on the northwest, and the Orange County-Temescal Valley region on the southwest.

The total projected aggregate consumption to the year 2032 is estimated to be 476 million tons. Unless additional resources are permitted for mining or alternative resources are utilized, existing reserves will be depleted in 41 years.

c. Saugus-Newhall and Palmdale

The Saugus-Newhall P-C Region includes the communities of Saugus and Newhall, and parts of the Angeles and Los Padres National Forests. The western Ventura County, San Fernando Valley and the Palmdale P-C regions are located adjacent to the study area--western Ventura and San Fernando on the southwest, and Palmdale on the east.

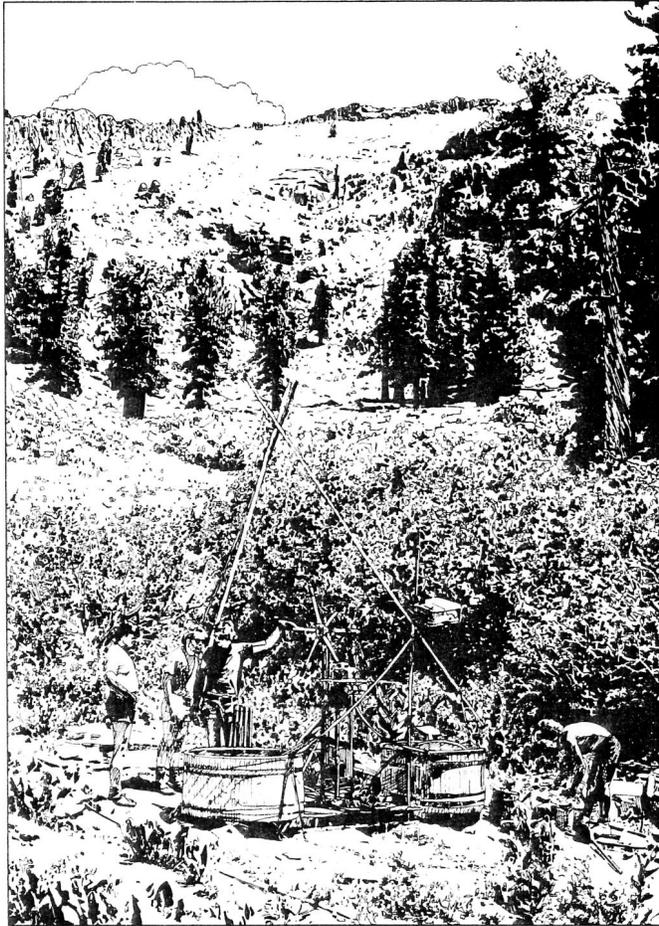
The Saugus-Newhall P-C Region has an average per capita consumption rate of 10 tons of total aggregate per year. Based on this rate and future population projections, approximately 54 million tons of aggregate will be needed to supply this region for the next 50 years (to the year 2032). The estimated amount of material needed to meet the 50-year demand for Portland cement concrete (PCC) quality aggregate is 27 million tons (50 percent of total demand).

Aggregate resources are distributed throughout the region, being found in urbanized areas such as Newhall and Saugus, and in rural areas such as portions of the Antelope Valley and the Angeles National Forest. The resource areas in the Saugus-Newhall P-C Region contain the channel and flood-plain deposits of the Santa Clara River, the well-consolidated non-marine sediments of the Mint Canyon Formation, and the anorthosite and gabbro in the San Gabriel Mountains.

The Palmdale P-C Region population centers include Palmdale and Lancaster. The combined population of the Saugus-Newhall and Palmdale P-C regions is approximately 89,000.

The Palmdale P-C Region has an average per capita consumption rate of 12.2 tons of total aggregate per year. Based on this rate and future population projections, approximately 122 million tons of aggregate will be needed to supply this region for the next 50 years. The estimated amount of material needed to meet the 50-year demand for Portland cement concrete (PCC) quality aggregate is 61 million tons (50 percent of total demand).

The resource areas in the Palmdale P-C Region contain the Little Rock Creek and the Big Rock Creek Alluvial Fans.



"Core Drilling Operation, Alpine County" courtesy of Jim Williams

5. Classification of Regionally Significant Construction Aggregate Resources

During the 1985-86 fiscal year, DMG completed the classification of aggregate resources in the Fresno-Madera P-C Region. The report, "Mineral Land Classification: Aggregate Materials in the Fresno Production-Consumption Region", was accepted and transmitted by the Board in August 1986 to the Cities of Fresno and Madera and the Counties of Fresno and Madera.

A study of sand and gravel production and consumption showed that all aggregate used in the urbanizing portions of Fresno County is produced from the San Joaquin and Kings Rivers. The only other active deposit within Fresno or Madera County is adjacent to Los Gatos Creek, north of Coalinga. It serves an area within a thirty-mile radius of the deposit site, thus does not contribute to the supply of aggregate to the City of Fresno.

It was found that aggregate consumption, though centered on the City of Fresno, reaches outward encircling an area with approximately a twenty mile radius. Thus the Production-Consumption Region was delineated, encompassing: (1) the entire metropolitan area of Fresno, Clovis, and Sanger and surrounding areas anticipated by the Office of Planning and Research and/or the local lead agency to urbanize in the next 10 to 30 years; (2) outlying

towns such as Madera, Selma, and Kingsburg; (3) rural areas not anticipated to urbanize but which are sparsely populated and consume aggregate from the San Joaquin and Kings Rivers; and (4) the two resource areas. The eastern boundary of the area roughly matches the break in slope between the foothills and the Sierra Nevada Mountains, and follows census tract boundaries, to allow use of existing census and other population data for forecasting.

Some conclusions reached in this report are:

- The consumption of aggregate resources in the P-C region through the year 2034 is forecast to be 268.4 million tons, of which approximately 50 percent or 134 million tons must be of PCC quality.
- More than 119 million tons of permitted PCC-grade reserves exist in the P-C region. These permitted PCC-grade aggregate reserves may provide only 44% of the anticipated consumption of all aggregate during the next 50 years.
- The expected longevity of the existing PCC reserves is based upon the assumption that mining of these reserves will continue to be permitted until the reserves are depleted. Unless new resources are permitted for mining, or alternative resources are utilized, existing reserves will be depleted during the year 2010.

The Fresno P-C Region covers an area of 1,400 square miles, of which 39 square miles (3% of the total area) were classified MRZ-2. Only 31 square miles (2% of the total area) have been sectorized as having current land uses which do not preclude mining. Almost 3-1/2 square miles of the sectorized areas are currently under mining permits. In recognition of the region's need for these important resources in the coming years and the rapid urbanization that is occurring throughout the area, the Board, in July 1986, determined that the Fresno P-C Region would be the next priority area for designation action.

6. Completion of Nonurban Classification Reports

The past year reflects significant progress for mineral inventory studies in nonurban areas. The Board has assigned the highest priority for classification in the nonurban program to the Sierra Nevada Foothills and the California Desert Conservation Area (CDCA). This program is focused on these areas because of their known mineral wealth and because both regions are subject to land-use actions that could conflict with the development of important mineral resources -- the Sierra Nevada Foothills because of urbanization, and the CDCA because of on-going federal planning and land use decisions.

a. Ivanpah-Crescent Peak-Searchlight 15' Quadrangles

The Board accepted and formally transmitted, in October 1985, a nonurban classification report for the Ivanpah-Crescent Peak-Searchlight 15' Quadrangles, located in the CDCA. The area of these quadrangles encompass about 405 square miles of land.

The area represented by the Ivanpah-Crescent Peak-Searchlight quadrangles is located near the southern border of the Great Basin in an area referred to as the Mojave Desert.

Land use jurisdiction in this area is the responsibility of the County of San Bernardino and the Bureau of Land Management. Major findings of the report include:

- Overall mineral potential in the Ivanpah-Crescent Peak-Searchlight Quadrangles is highly favorable, especially in terms of gold, clay, limestone, and sericite production.
- One of the most favorable areas for significant measured or indicated mineral reserves is a hydrothermal gold deposit on the eastern slope of the Ivanpah mountains. A west-dipping thrust fault is interpreted to have dammed ore-forming hydrothermal fluids to form a gold deposit in quartz monzonite within the upper plate and has left the underlying quartz monzonite on the lower plate unaltered and unmineralized. There is also the potential for undiscovered resource in this area if this deposit extended either laterally or deeper along the thrust fault.
- Four areas have been classified as containing significant inferred mineral reserves including a hydrothermal gold deposit, a clay deposit, a limestone deposit, and a sericite deposit currently being mined in the New York mountains.
- Specific areas have been classified as representing favorable geologic environments for the occurrence of precious and base-metal hydrothermal mineral deposits, base-metal contact metasomatic mineral deposits, limestone, clay, perlite, magnesite and fluorite deposits suitable for industrial use.

b. Mid Hills 15' Quadrangle

The Board accepted and formally transmitted, in March 1986, another nonurban classification report, for the Mid Hills 15-minute Quadrangle.

The Mid Hills study area is located in the eastern Mojave Desert approximately 50 miles equidistant from the California desert towns of Baker to the west, Ludlow to the southwest and Needles to the southeast, and consists of about 250 square miles of land in the eastern Mojave Desert.

Land use jurisdiction in this area is the responsibility of the County of San Bernardino and the Bureau of Land Management. Major findings of the report include:

- The overall mineral potential of the Mid Hills Quadrangle is favorable for the occurrence of precious metal-bearing lode deposits, porphyry molybdenum deposits, and industrial minerals. Additional exploration work is needed to gain a better understanding of mineral deposits which may be present.
- Two areas have been classified as containing significant inferred mineral reserves. These include: (1) an area containing a fracture-filling hydrothermal silver-gold deposit which carried high silver values suggestive of supergene enrichment; and (2) limestone deposits in Paleozoic rocks on the southeast slope of the New York Mountains.

Land use jurisdiction in this area is the responsibility of the County of San Bernardino and the Bureau of Land Management. Major findings of the report include:

- Overall mineral potential in the Ivanpah-Crescent Peak-Searchlight Quadrangles is highly favorable, especially in terms of gold, clay, limestone, and sericite production.
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The Board accepted and formally transmitted, in March 1986, another nonurban classification report, for the Mid Hills 15-minute Quadrangle.

The Mid Hills study area is located in the eastern Mojave Desert approximately 50 miles equidistant from the California desert towns of Baker to the west, Ludlow to the southwest and Needles to the southeast, and consists of about 250 square miles of land in the eastern Mojave Desert.

Land use jurisdiction in this area is the responsibility of the County of San Bernardino and the Bureau of Land Management. Major findings of the report include:

- The overall mineral potential of the Mid Hills Quadrangle is favorable for the occurrence of precious metal-bearing lode deposits, porphyry molybdenum deposits, and industrial minerals. Additional exploration work is needed to gain a better understanding of mineral deposits which may be present.
- Two areas have been classified as containing significant inferred mineral reserves. These include: (1) an area containing a fracture-filling hydrothermal silver-gold deposit which carried high silver values suggestive of supergene enrichment; and (2) limestone deposits in Paleozoic rocks on the southeast slope of the New York Mountains.

1985 NONFUEL MINERAL PRODUCTION IN CALIFORNIA

(Value in Thousands of Dollars)

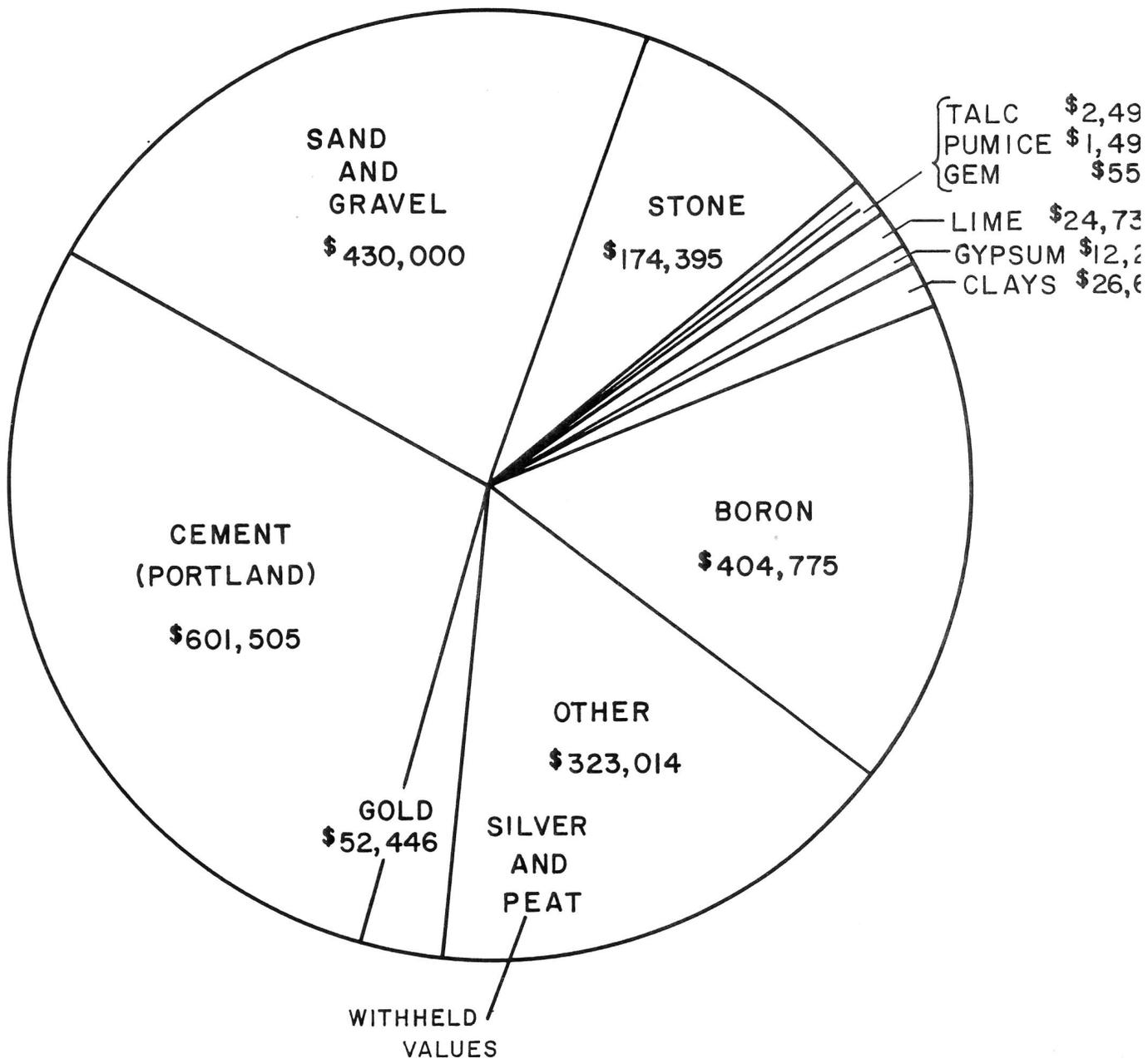


Figure 2. Combined value of asbestos, calcium chloride, cement (masonry), clays (fire clays), copper, diatomite, feldspar, iron ore, lead, magnesium compounds, molybdenum, perlite, potassium salts, rare-earth concentrates, salt, sodium carbonates, sodium sulphate, tungsten ore and concentrate, wollastonite, and withheld values.

Source: U.S. Bureau of Mines Minerals Yearbook 1985, Volume II.

- o Specific areas have been classified as representing favorable environments for occurrences of precious and base-metal hydrothermal deposits, base metal contact metasomatic deposits, carbonate rock, perlite and quartzite.
- o Land use competition in the Mid Hills 15-minute quadrangle has increased dramatically over the last ten to fifteen years. As a result, local government is faced with unexpected land use conflicts, which this report may assist in resolving by providing objective mineral information.

7. Classification Reports Prepared in Response to Petitions

Mineral deposits threatened by incompatible land uses that may prevent mining may be brought to the Board's attention by petition. To qualify for a petition, the subject deposit(s) must meet a certain economic threshold and be faced with an imminent land-use threat related to urbanization.

As with all other classification reports, lead agencies are required by SMARA to incorporate this information into the local general planning process.

During the past year, the Board has accepted two new petitions for classification, the Greenley Road Extension (Tuolumne County) and the Declezville Quarry (San Bernardino County), and transmitted a completed petition classification report for the Harvey Clay/Shale Deposit (Placer County).

a. Harvey Clay/Shale Deposit

The Board accepted a petition from Mr. Willard L. Harvey, of W.L. Harvey and Sons, for the classification of 160 acres of clay/shale deposits near the City of Colfax, Placer County in May 1985. The completed report "Mineral Land Classification of the W.L. Harvey Clay/Shale Deposit, Placer County, California" was accepted and formally transmitted in November 1985. The deposit was threatened by development on the western side of the property, which would create a distinct conflict with mineral extraction.

Land use jurisdiction in this area is the responsibility of the City of Colfax. Major findings of the report include:

- o The petitioned property has not been mined except for the removal of 13,000 tons of material in 1984 which was utilized for testing purposes at the Gladding, McBean and Company clay plant at Lincoln, California.
- o The geomorphology and other physical conditions at the site indicate that the deposit is minable and processable at the present time. Access to major transportation routes is available as both Interstate 80 and Southern Pacific Railroad are located less than two miles from the deposit.
- o Test results have demonstrated that the clay/shale deposit on the Harvey property meets specification for a number of high category manufacturing uses, including sewer pipe, brick, and floor tile. Additionally, the Harvey clay/shale deposit possesses two very unique and desirable physical characteristics, specifically a low-eutectic

firing temperature in conjunction with a high green strength, that can directly impact the operational economics of a sewer pipe plant.

- Sufficient tonnage and grade of clay/shale are available to meet the minimum MRZ-2 threshold value. The petitioner, several processors of clay/shale material, and published information offer strong evidence that the Harvey clay/shale material is suitable for use as a marketable product.

b. United States Tile Company

On August 9, 1985, the Board accepted a petition from United States Tile Company for the classification of the Dominguez Clay Property, Riverside County. The petitioner had requested classification of a clay-rich portion of the Silverado Formation (Dominguez), and cited urban encroachment into the area surrounding the Dominguez Clay/Shale Deposit as the factor prompting the need for a petition classification study.

The central clay-bearing zone of the property was classified as a significant mineral deposit (MRZ-2) because it met the criteria of having a threshold value of at least \$1,000,000 in 1978 equivalent dollars and had been demonstrated to be minable, processable, and marketable under existing conditions. The clay produced at the Dominguez Clay/Shale Deposit is one of the raw materials used in making heavy-clay products such as structural tile and roofing tile. It serves as the tile body, and a flux, and constitutes up to 70% of the clay needed by United States Tile Co. in manufacturing roofing tile. Unmined portions of the zone had been demonstrated to be similar to that presently being utilized.

Some portions of the property were unlikely to contain significant clay deposits and therefore were classified Mineral Resource Zone 1 (MRZ-1). Other portions of the area were classified MRZ-4 because it was unknown whether or not significant clay deposits were present in them.

The State Geologist's report, "Mineral Land Classification of the United States Tile Company Dominguez Clay/Shale Deposit, Corona, Riverside County, California" was accepted by the Board in October 1985, and transmitted to the City of Corona and Riverside County.

c. Greenley Road Extension

In March 1986, the Board accepted a petition from Condor Minerals Management Inc., on behalf of residents of Tuolumne County, for classification of the Bald Mountain Mining District, with respect to lode and placer gold resources, as affected by the proposed Greenley Road Extension in Tuolumne County. The Board accepted and transmitted the classification report, "Mineral Land Classification of the Southern Half of the Bald Mountain/Browns Flat Gold Mining District, Sonora, Tuolumne County", in August 1986.

The area affected by the petition is approximately 320 acres of land located on the northeast side of the City of Sonora. A proposed highway bypass project referred to as the "Greenley Road extension", which

would result in permanent loss of access to lode and placer gold resources contained within the petitioned area, was the land use threat cited by the petitioners.

The approximately 320 acres of land subject to mineral land classification occupies parts of the Sonora, Columbia, Standard, and Columbia SE U.S. Geological Survey 7 1/2-minute quadrangles.

Land use jurisdiction in the area is the responsibility of the City of Sonora and County of Tuolumne. Major findings of the report include:

- The Bald Mountain/Browns Flat gold mining district occupies land in the south central part of a northwest-trending belt of metamorphic rocks exposed along the western slope of the Sierra Nevada.
- The gold-bearing quartz veins and dikes present in the Bald Mountain lode gold district occupy northerly-trending fault and fracture openings in the country rock. Gold mineralization typically occurs where the northerly-trending quartz veins intersect easterly-trending porphyritic dikes.

Pocket mines in the Sonora area are known for their yield of rare, specimen grade, crystalline gold. At least two crystalline gold specimens taken from mines located within the area subject to classification (Sell and Browns Flat mines) are now on display at the Smithsonian Institution in Washington D.C.

- Between the two mines within the petition area are at least seven once productive mines whose working depths are thought not to exceed 200 feet. Based upon the forming system, it is inferred that gold resources likely remain at minable depth that far exceed the minimum threshold value of 500,000 1978 equivalent dollars.
- Historic mining activity in the Bald Mountain/Browns Flat district and current mining activity in similar environments elsewhere in the Sierra Nevada demonstrate the minability and processability of lode and placer gold deposits present here. Also, a strong market for gold continues to exist. Specimen-grade crystalline gold, which can be expected to be encountered in the mines of this district, is more valuable in its unprocessed state.
- The property evaluated in this study is classified MRZ-2b (areas where geologic information indicates that significant inferred gold resources are present). The assignment of MRZ-2b is based on: 1) the continuity of the ore-forming system through the area; 2) past production of gold within and adjacent to the area; and 3) the high likelihood that gold ore persists to greater depths than previously mined.
- Exploration work and development of new concepts in economic geology could result in the reclassification of areas classified MRZ-4 to the MRZ-3 and MRZ-2 categories.

d. Declezville Quarry

In July 1986, the Board accepted a petition from the Match Corporation for classification of the Declezville quarry stone outcrop located near Fontana. The resources of this operating property appear adequate to meet the threshold requirements for MRZ-2 classification. Encroachment of residential development (Southridge Village development), plus the necessary schools and parks, pose a current and ongoing threat to the continued operation of the quarry. These facts justify the property as subject to imminent land-use threats within the intent of SMARA. Land use jurisdiction over this area is by the City of Fontana and the County of San Bernardino.

At its August meeting, the Board accepted the report "Mineral Land Classification of the Match Corporation Declezville Quarry, Fontana, San Bernardino County, California". Major findings in this report include:

- The stone-bearing zone is classified as a significant mineral resource (MRZ-2) because it has met the threshold value (at least \$1,000,000 in 1978 equivalent dollars). The deposit is considered to be minable, processable, and capable of yielding commodities presently marketed and anticipated to be marketed in the future. Unmined portions have been defined by surface sampling, and geologic evaluation. Data demonstrate that the deposit possesses physical and chemical characteristics similar to those presently mined and utilized. Other portions of the property are classified as MRZ-3 (areas which are granite-bearing but of unknown significance) or MRZ-4 (areas within which it is unknown whether or not significant granite is present).
- The Declezville Quarry represents an important and historic resource which supplies large granitic stone for riprap in breakwaters, dam spillways, stream embankments, and railroad ballast. The stone produced from this quarry has been shipped as far north as San Luis Obispo southward to Oceanside and eastward to Palm Springs. This quarry has served as a source of stone for southern California since the latter part of the 19th century. Urban encroachment immediately adjacent to the quarry poses a potential land use conflict which could curtail future production, and as a consequence have a likely disruptive effect upon the local southern California market which requires this natural resource for civic projects.

8. Board Field Trip

In November 1985, the Board participated in a field trip to the Palm Springs P-C Region. This region was identified by the Office of Planning and Research as an area that will undergo significant urban growth in the near future, and is currently being studied by DMG.

The field trip consisted of site visits to several aggregate plants, an overview of the regional geology, and an introduction to the quality and quantity of the aggregate resources and projected needs of the area.

9. Local Agency Use of Classification Reports

Once a classification or designation report has been received by local lead agencies (cities and counties), SMARA requires that these agencies establish mineral resource management policies, to be incorporated into their general plans, that: (1) recognize the mineral information provided by the State; (2) assist in the management of land use that affects areas of statewide or regional significance (designated areas); and (3) emphasize the conservation and development of identified mineral deposits.

While SMARA contains a specific mandate requiring development of mineral resource management policies that will implement the mineral resource conservation objectives of SMARA, it leaves little guidance as to how these policies should be structured. To address this issue, the Board, in May 1985, adopted interim criteria to assist lead agencies in the development of mineral resource management policies.

Resolution #86-1, adopted in January 1986, amended Resolution #85-15 to increase the number of implementation measures that ought to be utilized by lead agencies to effectively carry out the mineral resource conservation provisions of SMARA.

Information available in classification and designation reports is being used with increasing frequency by local agencies in planning studies and permit decisions. For example, during the past year, mineral resource information developed by the classification-designation program was used in at least 24 local agency environmental documents. These documents are monitored carefully by the Department of Conservation to insure that factual information on classified and/or designated areas is brought before local decision-makers.

Information on mineral resources was included for project decisions in the Cities of Anaheim, Oceanside, Folsom, San Diego, Carlsbad, Pleasanton, Livermore, Auburn, Oxnard, and Tustin, as well as in the Counties of Sacramento, Orange, Solano, Nevada, San Diego, and San Bernardino.

10. Legislative Changes to SMARA

Senate Bill 1261, by Senator Seymour, was signed into law by the Governor on May 6, 1986, and chaptered as Chapter 82, Statutes of 1986. SB 1261 added Section 2764, to require city and county lead agencies, on request and upon payment of processing costs, to evaluate the relative significance of a mineral deposit, and to amend their general plans or prepare or amend specific plans for future land uses in the light of the significance of the mineral deposit.

City and county lead agencies, upon request of a mining operator or other interested person, are required to: (1) plan for future land uses in the vicinity of, and access routes serving, the surface mining operation; (2) determine the compatibility of proposed new land uses and access routes with the existing surface mining operation, and if incompatible, state the reasons why they are being permitted; and (3) transmit a copy of the mineral significance evaluation study to the State Geologist and the State Mining and Geology Board. This procedure would not be undertaken in areas designated as an area of statewide or regional significance by the State Mining and Geology Board if mineral

resource management policies have already been established and incorporated in the lead agency's general plan.

Senate Bill 593, by Senator Royce, was signed into law by the Governor on July 30, 1985, and chaptered as Chapter 393, Statutes of 1985. SB 593 raised the annual SMARA funding limit to \$2,000,000, if not less than \$20,000,000 of Federal Mineral Lands Leasing Act (MLLA) funds are disbursed to the state. Also, it deleted the transfer to the General Fund of all SMARA funds that are unappropriated at the end of each fiscal year.

When the original SMARA funding plan and funding limit of \$1,000,000 was established in 1980, no consideration of inflationary costs was included. The SMARA program had progressed to a funding need in excess of the established limits. SB 593 provided corrective action to remedy that initial planning oversight.

B. Geohazards

1. Summary of Board Responsibilities for Geohazards in California

California's propensity for geologic hazards -- earthquakes, landslides, volcanism -- underscores the importance of understanding these phenomena and their potential effects upon our society. In 1973, the Division of Mines and Geology estimated that the cost of these hazards from 1970 to 2000, if current land-use practices continue, would amount to \$38 billion. To foster a better understanding of these hazards, the Board represents the State's interest in developing and disseminating related geologic information through the State's geologic survey -- the Division of Mines and Geology (DMG).

The Board is also charged with more specific responsibilities under such laws as the Alquist-Priolo Special Studies Zones Act and the recently enacted Landslide Hazard Identification Act.

The Board's Geohazards Committee met in June 1986 to discuss progress of all DMG geohazard programs and to make recommendations for improvement of the current programs.

2. The Alquist-Priolo Special Studies Zones Act

The Alquist-Priolo Special Studies Zones Act provides for the mapping of active faults by DMG under policies established by the Board. Maps of these faults -- Special Studies Zones -- are provided to local government for their land-use planning and decision making. The Act prohibits construction of structures for human occupancy, as defined, across the trace of an active fault.

Thirty-two (32) official maps of new and revised Special Studies Zones were issued pursuant to the provisions of the APSSZA July 1, 1986. These maps, which are listed below, had been sent to affected local agencies as well as concerned State agencies by the State Geologist for a 90-day review period beginning in January and ending March 31, 1986.

- | | | |
|-----------------------|-------------------------|----------------------|
| 1. Mustang Peak | 12. Burro Mountain | 23. Santa Paula Peak |
| 2. Crevison Peak | 13. Piedras Blancas | 24. Fillmore |
| 3. Pacheco Pass | 14. San Simeon | *25. Beverly Hills |
| 4. San Luis Dam | *15. Stockdale Mountain | *26. Hollywood |
| 5. Los Banos Valley | *16. Parkfield | *27. Inglewood |
| 6. Ortigalita Peak NW | *17. Cholame Hills | 28. Torrance |
| 7. Ortigalita Peak | *18. Cholame Valley | *29. Long Beach |
| 8. Three Sisters | *19. Cholame | *30. Los Alamitos |
| *9. Tres Pinos | 20. Zaca Creek | *31. Seal Beach |
| *10. Paicines | 21. Matilija | 32. Newport Beach |
| *11. Cherry Peak | 22. Ojai | |

*Revised zone map

Agencies affected by these proposed new or revised Special Studies Zones include the cities of Carson, Compton, Culver City, Gardena, Huntington Beach, Inglewood, Los Angeles, Long Beach, Newport Beach, Seal Beach, and Signal Hill and the Counties of Fresno, Los Angeles, Merced, Monterey, Orange, San Benito, San Luis Obispo, Santa Barbara, Stanislaus, and Ventura.

The Board provided opportunity for public testimony on the preliminary maps at its regular business meeting of March 18, 1986. Following close of the 90-day comment period, the Board transmitted comments and recommendations to the State Geologist for incorporation into the official maps.

3. The Landslide Hazard Identification Act

The Landslide Hazard Identification Act (LHIA) was chaptered in September 1983, becoming effective January 1, 1984 (Chapter 997, Statutes of 1983). This Act formally recognized the problem of unstable slope hazards (landslides, mudslides, debris flows, slumps, soil creep, etc.) that occur throughout much of California. These problems have been underscored by the tragic loss of life and property due to storm-triggered slides over the past few years.

The LHIA provides for a state-local cooperative mapping program to identify landslide-prone areas in the path of urbanization. The Act requires the Director of the Department of Conservation to establish within the Division of Mines and Geology a Landslide Hazard Identification Program that is charged with developing maps of landslide hazards within urban and urbanizing areas of the State. Mapping of these areas by the Division of Mines and Geology is directed by priorities and guidelines established by the State Mining and Geology Board.

According to Section 2685(b) of the LHIA, priorities for the mapping program are to reflect the following factors in order of importance: (1) the severity of the landslide hazard, (2) the willingness of lead agencies and other public agencies to share the cost of mapping within their jurisdictions, (3) the availability of existing information, and (4) the need to supplement information used in existing landslide hazard abatement or prevention programs.



"California Landslide" courtesy of Ed Foster

Five Landslide Hazard Identification Maps, totaling 177 square miles in area, were produced during the first year of the Program. Areas mapped were: the Petaluma "Dairy Belt," Sonoma County (32 sq. mi.); Danville-San Ramon, Sherburne Hills, Contra Costa County (45 sq. mi.); Val Verde, Los Angeles and Ventura Counties (30 sq. mi.); Castaic Valley-W/2 Newhall, Los Angeles County (30 sq. mi.); and Encinitas-Rancho Santa Fe, San Diego County (40 sq. mi.).

Five new project areas were selected from data generated during the first year. These current project areas total 199 square miles, and include the areas of Benicia-Vallejo, Sonoma County (58 sq. mi.); Lafayette-Moraga-Orinda, Contra Costa County (35 sq. mi.); E/2 Newhall Quadrangle, Los Angeles County (30 sq. mi.); Rancho Santa Fe Quadrangle, San Diego County (60 sq. mi.); SE/4 Whittaker Peak Quadrangle, Los Angeles County (16 sq. mi.).

Following a Landslide Hazard Identification workshop coordinated by the Geohazards Committee in Davis on August 8, 1985 to review products of pilot program with governmental representatives and user groups and to develop recommendations for the program, nearly 400 officials (including all planning departments in the State) were solicited in October 1985, providing an opportunity for nomination of landslide mapping areas. As a result, several dozen candidate areas were proposed by jurisdictions in landslide-prone areas of California.

Areas selected for mapping for 1986-87 are: Vallejo-Cordelia, S/2 Solano City (50 (sq. mi.); S/2 Fairfield N. Quadrangle; N/2 Oat Mountain Quadrangle, Los Angeles City (30 sq. mi.); Puento Hills/Chino Hills, San Bernardino City (180-200 sq. mi.); Whitaker Peak (30 sq. mi.).