SPECIAL PUBLICATION 32

The Colorado Geological Survey

An Evaluation and Report

Prepared by
The Governor's Task Force

February, 1988

COLORADO GEOLOGICAL SURVEY
DEPARTMENT OF NATURAL RESOURCES
DENVER, COLORADO / 1988

THE COLORADO GEOLOGICAL SURVEY
An Evaluation and Report

Prepared by
The Governor's Task Force

February 1988

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Stanley Dempsey
President

ROYALGOLD, INC

February 22, 1988

The Honorable Roy Romer
136 State Capital Building
Denver, Colorado 80203

Dear Governor Romer:

Transmitted herewith is the report of the Task Force that you created to assist the Department of Natural Resources ("DNR") in a comprehensive evaluation of the State's Geological Survey.

Task Force members spent many hours reviewing Survey operations, and in an preparing this report. We received excellent cooperation from the Survey's Director, John Rold, and from everyone on his staff. We also wish to express our appreciation for the support we received from the Department of Natural Resources during our deliberations.

We sincerely hope that this report will be useful to you, the DNR, and the State of Colorado.

With kind regards.

Sincerely,

Stanley Dempsey

SPECIAL PUBLICATION 32

Numerous requests for reports from people with interests in and concerns for the Colorado Geological Survey have required reprinting of this Task Force Report. In order to provide a permanent distribution mechanism and to defray the printing costs, it was decided to include the report in our Special Publication series.

I would like to publicly acknowledge and express my appreciation to the many people whose efforts resulted in the report:

Dennis Donald, the then Acting Director of the Department of Natural Resources who carried the idea to the Governor's office;

Governor Roy Romer, who was concerned enough about the future of the Survey to convene the Task Force;

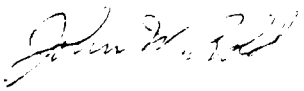
The Task Force members (listed in Appendix D) for their thoughts and countless hours of effort, and particularly Stan Dempsey who chaired the group;

Christi Campbell of CH2M HILL for technical writing and editting;

Lisa Largent for providing early clerical and technical support; and

The Colorado Geological Survey staff for everything from insuring quick response to Task Force requests to stapling, stuffing and mailing reports.

The Colorado Survey has already begun to carry out those Task Force recommendations which are within its control and capability.



John W. Rold
State Geologist and Director

PREFACE

In October 1987, Colorado Governor Roy Romer invited 16 representatives of the state's mineral resource, business, academic, local government, legislative and public communities to serve on a task force. The mission of this group was to assist the Department of Natural Resources in examining, evaluating and strengthening the Colorado Geological Survey (CGS). The Governor's letter is included as Appendix A.

In addressing the overall question "How can the Survey be improved and strengthened to be of greater value to the state?" Governor Romer directed the task force to examine the following issues:

- -- Does the CGS have an appropriate mission?
- -- Is the organizational structure appropriate to accomplish this mission?
- -- Are the personnel and financial resources adequate for the tasks necessary to accomplish this mission?
- -- How do the Survey's services relate to the U.S. Geological Survey, other state agencies and political subdivisions, and the private sector?
- -- What legislative action, if any, should be pursued to strengthen the Survey?
- -- What are potential sources for funding the Survey's activities, and to what extent should General Fund support be provided?

In addition to meeting for five separate three-hour sessions, the committee interviewed past and present CGS employees, constituents and observers. Task Force members also spent additional time examining the Survey's budgetary and staffing history, studying statutes and past performance records and preparing this report.

The Governor's Task Force consisted of:

OIL, GAS AND GENERAL GEOLOGY
David B. Mackenzie; Harms & Brady
John M. Parker; Consulting Geologist

COAL
Charles W. Margolf; W.R. Grace and Co.

MINING
Stanley Dempsey (Task Force Chairman); Royal Gold, Inc.
Geoffrey Snow; Consulting Geologist

CONSULTING ENGINEERS
William Y. Klett, Jr.; CH2M HILL
Ken Wright; Wright Water Engineers

LOCAL GOVERNMENTS
Roy "Andy" Anderson; Mesa County Building Department
Standish R. "Stan" Broome; Region 10 Planning Commission

ACADEMIA
Dr. Robert J. Weimer; Professor Emeritus, Colorado School of Mines

BUSINESS
Jerry Kempf; Colorado-Ute Electric Association

PUBLIC
Jane Gnojek; League of Women Voters

FEDERAL AGENCIES
Robert Fleming; U.S. Geological Survey
Jane P. Ohl; U.S. Bureau of Mines

LEGISLATORS
Sen. Harold McCormick; District 4, Republican
Rep. Dick Mutzebaugh; District 28, Republican

Biographical sketches of the Task Force members are included as the last appendix of this document.

CONTENTS

EXECUTIVE SUMMARY

The Governor's Geological Survey Task Force Report

After lapsing for several decades owing to lack of funds, the Colorado Geological Survey (CGS or Survey), was reestablished in 1967 by legislative action, following recommendations by geologists and legislators. The newly formed Survey was to encourage resource development while mitigating geologic hazards and environmental concerns. Less than a decade ago, the CGS was among the country's top state geological surveys and served as a role model for the surveys of other states. The CGS produced important documents in mineral and energy resources and aided the legislature in formulating some of the most innovative and effective land use legislation anywhere.

Currently, however, the CGS is unable to meet Colorado's geological services needs. In 1983, responding to a directive to cut direct state government spending, the legislature reduced general fund support to many agencies, including the CGS. The legislature also provided for more reliance on cash funding of agency projects. Since then, a majority of the Survey's operating expenses have been derived from fees it charges for its services.

Although the Survey has done well at developing its cash funded program, the overall change in funding has had a dramatic effect on the Survey staff. From 1975 until 1983, the CGS received an allotment for 16 full-time professionals. The average general funded staff for the past five years has been four. Moreover, because only four people remain of that nationally recognized core, the leadership of a few years ago has been diminished.

The Survey's focus has shifted as well. The organizational structure is decidedly weighted toward short-term responses. This arrangement also allows the users to dictate the priorities and focus of the CGS. The majority of the Survey's current workload is geared toward engineering and environmental services and away from encouraging economic development of mineral resources and mineral fuels, industries experiencing a cyclical slump.

Another effect of reduced general fund support has been that the CGS no longer has the resources to initiate joint, mutually beneficial projects with federal agencies.

Similarly, the funding negotiation process has made working for other state agencies difficult, and in turn, caused other agencies to staff their own geoscientists.

Regardless of the reasons for the current situation, the mission and responsibilities of the CGS to the economic, environmental and social well being of Colorado are too important to neglect. The Task Force makes the following recommendations to improve the value and viability of the Survey.

1. No changes are needed in the CGS's enabling legislation.

2. The Governor should create a permanent CGS advisory board that would aid in long range planning, aid in setting state geological priorities and provide continuity of direction and planning.

3. The CGS with assistance from the recommended Advisory Committee should establish a clearly defined research program involving the CGS, local universities and federal projects.

4. The CGS, to best promote the economic development of the state and its mineral resources, should step up the development, production and distribution of maps, publications and presentations for the economic geology community.

5. The CGS should collect, store and make available to the public basic geological, geophysical and geochemical data and physical specimens of geologic value such as significant drill cores and cuttings.

6. The CGS should resume sponsorship of educational and technical programs, conferences and workshops on geological and mineral resource topics of significance to Colorado.

7. The CGS should be general funded to the necessary level to provide services to other Colorado agencies.

8. The CGS should be general funded to the necessary level to provide emergency response and short-term consultation services to local governments.

9. The CGS should be allotted general funds to support a cadre of personnel sufficient to meet its statutory responsibilities and the activities recommended in this report.

10. The CGS should continue to seek cash funding to the extent that it meets the intent of the agency's mission and does not infringe on private consultants.

11. The USGS and CGS should continue their cooperative efforts and intensify their goal of setting mutual priorities on geological mapping and research.

12. The CGS should continue to cooperate with and seek funding from other federal agencies that have missions consistent with CGS efforts.

STATUS OF THE COLORADO GEOLOGICAL SURVEY

In 1872, the Territorial Legislature established the office of Territorial Geologist, Colorado's first attempt at creating a geological agency. Upon statehood in 1876, that title was changed to State Geologist. Seven men successively occupied this honorary, non-paid position until 1907 legislation created the Colorado State Geological Survey.

Sometime in the late 1920s or early 1930s, financial support for the Survey dwindled to the point that the Survey ceased activity. Although the statute remained on the books, the organization died.

In 1967, the Colorado Geological Survey (CGS or Survey) was reestablished as a division of the Department of Natural Resources. The statute was originally drafted by an appointed committee of geologists and legislators. The intent of the short but broadly directed statute was to create an agency to address the then-current and long-term geological and mineral resource problems of Colorado. That statute as amended is attached as Appendix B. Critical portions follow:

> "The purpose of the survey is to coordinate and encourage by use of appropriate means the full development of the state's natural resources. The Colorado Geological Survey shall function to provide assistance to and cooperate with the general public, industries and agencies of state government, including institutions of higher education, in pursuit of the following objectives, the priorities of which shall be determined by mutual consent of the State Geologist and the Executive Director of the Department of Natural Resources":
>
> (a) To assist, consult with, and advise existing state and local governmental agencies on geologic problems
>
> (b) To promote economic development of mineral resources;
>
> (c) To conduct studies to develop geological information;
>
> (d) To inventory and analyze the state's mineral resources as to quantity, chemical composition, physical properties, location and possible use;
>
> (e) To collect and preserve geologic information;
>
> (f) To advise the state and act as liaison agency on transactions dealing with natural resources between state agencies and with other state and federal governments...;
>
> (g) To evaluate the physical features of Colorado with reference to present and potential human and animal use;
>
> (h) To prepare, publish, and distribute reports, maps, and bulletins...; and

(i) To determine areas of natural geologic hazards that could affect the safety of or cause economic loss to the citizens of Colorado.

Later statutes required that the Survey review proposed subdivisions in unincorporated areas, determine the geologic suitability of proposed school sites and school construction, review major activity notices to determine whether the proposed activity would interfere with the extraction of "commercial mineral deposits," and make recommendations on the geological suitability of proposed hazardous waste disposal sites.

From these legislative guidelines, CGS wrote a mission statement to define its activities:

> "The Colorado Geological Survey's mission is to provide objective, reliable, scientific opinions and data for decision making by state, local and federal governments, industry and the public. In order to provide this, the Survey must collect available information or develop new geologic information for use in economic development, addressing natural hazards and assuring environmental protection."

INITIAL SUCCESSES

Prior to the reduction in general funding, the CGS fulfilled part of its mission by producing technically sound and objective reports and counsel on many topics. As far as they've been carried out, these studies have had a significant impact on resource development in Colorado. A partial list follows:

* Coal resource investigations resulted in 30 publications and 17 open file reports that documented the location, quantity and quality of the state's coal resources. These investigations provided basic data leading to coal exploration and development decisions. As a result of these decisions, Colorado's coal production increased from 4 million tons in 1970 to nearly 20 million tons in the early 1980s.

* Eleven reports on investigations of coalbed methane resources resulted in a reported $35 million in research, exploration and development expenditures in western Colorado.

* Geologic hazard mapping ahead of development along the Front Range urban corridor and potential mountain recreational development areas has effectively guided development and public and private decision making.

* More than 36,000 copies of the CGS-published "Home Landscaping and Maintenance on Swelling Soil" were sold to homeowners and builders.

* Results of the Survey's investigation of geologic hazards and their impact on land use following the Big Thompson Flood were published within the county's six-month construction moratorium and allowed for safe and effective redevelopment of the canyon area.

* "Inventory of Radioactive Mineral Occurrences in Colorado," which the CGS compiled and published in 1978 during the uranium boom, provided numerous exploration leads at the time and now serves as a data base for radon evaluations in homes.

* A CGS investigation of a landslide on one proposed Eagle County school site saved the district $3.5 million, according to the Eagle County School Superintendent.

In the early 1970s, the Survey provided technical information and recommendations to the Legislature, which in turn incorporated geologic factors in its land use legislation. Colorado's statewide consideration of geology issues in land use statutes, regulations and decision making is considered among the country's best. The state pioneered requirements that the Survey conduct geologic evaluations and reviews of subdivisions in all unincorporated areas and that school districts consult the CGS regarding the geologic suitability of sites prior to acquisition or construction.

As evidence of its success, the Survey generated a wide range of constituents hailing from the private sector, academia, government agencies and the public. Interests served include mineral resource exploration and development; construction, transportation, land or water development; environmental protection; and education. While few of the constituents are aware of the range and variety of the Survey's services to the other users, most maintain that Survey publications, data or recommendations in their spheres of interest have been objective, credible and valuable.

Among the CGS users are, by statute, other state agencies. In the past, these have included the Department of Highways, Division of Wildlife, Board of Land Commissioners, Governor's Office, Colorado Advanced Technology Institute, Department of Natural Resources, Mined Land Reclamation Division, Oil and Gas Conservation Commission, Water Resources Division, Division of Disaster Emergency Services, Department of Local Affairs, State Buildings Division, Attorney General's Office and the Health Department.

By statute and by policy choice, the Survey has built a long and positive record of service to local governments throughout the state. That service includes subdivision

review, hazard identification and mitigation, major construction plan and project review, disaster response and mineral resource investigations.

CGS has developed close working relationships with a number of federal agencies. Examples include research into coal resource, geothermal, radioactive mineral occurrence and coalbed methane conducted for the Department of Energy. CGS has worked with the Forest Service on ski area development problems and the Dowds Junction landslides. The Bureau of Mines involved CGS in studies on land withdrawal impacts, and the two agencies have a cooperative agreement for gathering and compiling mineral production statistics. The Environmental Protection Agency funded (through the Colorado Health Department) a state ground-water quality atlas, and the Federal Emergency Management Agency funded the CGS to develop a prototype state landslide mitigation plan.

Perhaps strongest of the Survey's intergovernmental relationships, however, is the one it enjoys with the United States Geological Survey (USGS). The agencies have a long history of close cooperation in carrying out their different missions. The USGS has, on numerous occasions, funded CGS activities on local problems of national significance. Examples include catastrophic landslides, seismic hazard potential, swelling soil and data acquisition for the National Coal Resource Data System.

The CGS has sponsored USGS activities in the state when the federal Survey's expertise and scientific equipment were needed. Some examples are rock mechanics testing at the Supercollider site, water analyses, carbon isotope studies of natural gas and age dating of igneous intrusions.

Despite the amount of work that the Survey has conducted in conjunction with other agencies, however, its mission and efforts do not duplicate those of other state or federal bodies.

CURRENT PROBLEMS

SURVEY OPERATIONS

Less than a decade ago, the CGS was among the top state geological surveys in the country and served as a role model for the geological surveys in other states. In 1983, responding to a need to reduce direct government spending, the legislature reduced general fund support to many agencies, including the CGS. To replace those

funds, the Survey was authorized to enter into agreements with the general public, industries, and units of state and local government. The CGS was to collect fees to recover the direct costs of those services. While prohibiting the Survey from competing directly with consultants, this action implemented "cash funding" support for many CGS activities.

At the same time, the legislature stated its intent "to provide sufficient funds to cover the direct costs of a base staff and their operating expenses to assure functional continuity of the Survey." From 1975 until 1983, the CGS was funded for 16 FTE professional and support staff. Current general funding provides for a director, 1 FTE clerical worker, 0.2 FTE for each of three section chiefs and 0.2 FTE for library technician.

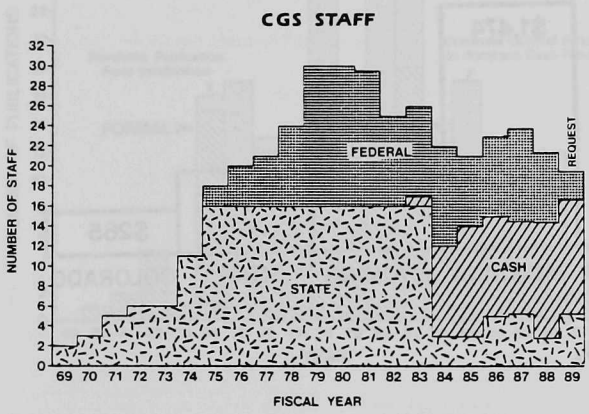


Figure 1. Historical staffing pattern.

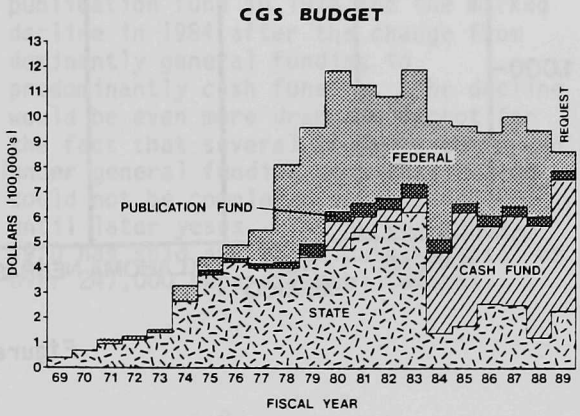


Figure 2. Historical funding.

The average staff FTE for the past five years has been four. Forty-six states provide an average of 10 times more FTEs than Colorado (See Appendix C). Perhaps more revealing is the fact that nearly 90 percent of the Survey's current budget is made up of federal monies and cash funding.

This change in CGS' funding pattern has had a significant impact on Survey activities. First, the complexion of the staff has changed dramatically. In the 1970s, the CGS was staffed by exceptionally well-qualified scientists with a broad range of skills. Only four people from that nationally recognized staff remain. The current staff is energetic and eager to perform the duties of the CGS as it exists today, but the national leadership of a few years ago is diminished. In the

STATE GENERAL FUND APPROPRIATIONS TO THEIR GEOLOGICAL SURVEYS, 1985

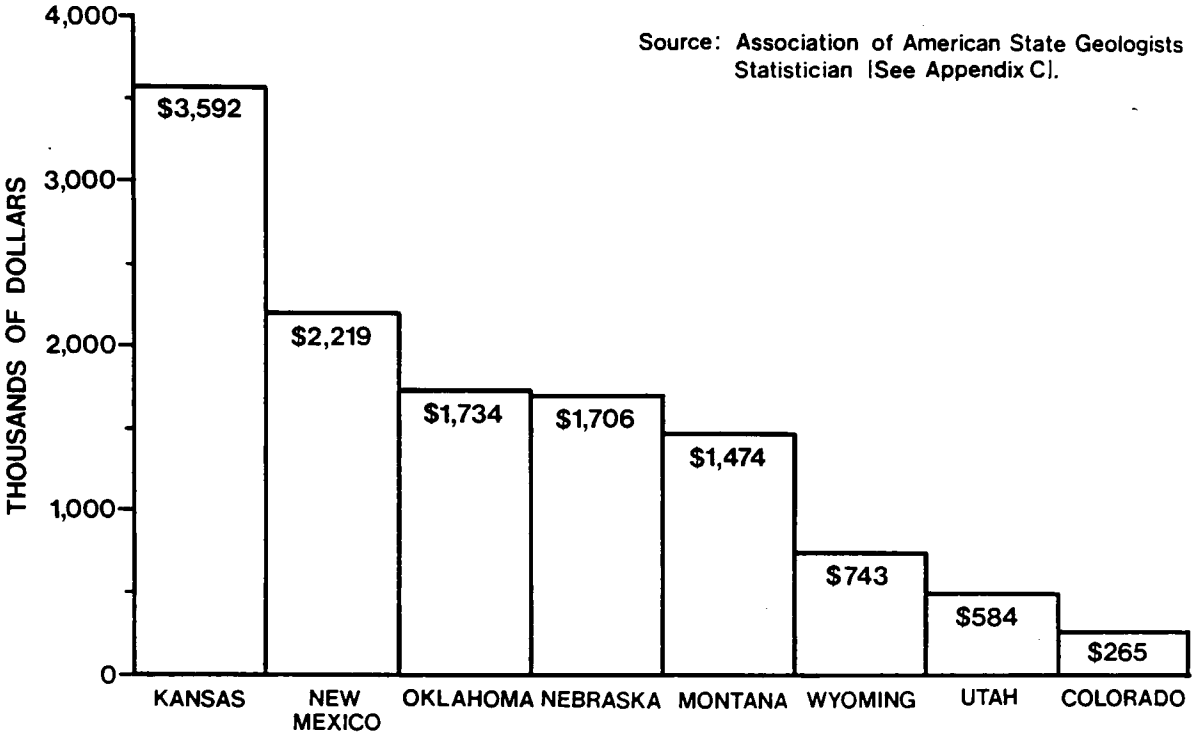


Figure 3.

absence of adequate general funding, the director's attention -- in an effort to keep the Survey viable -- is now focused on fundraising. Thus, his technical qualifications are not being used fully to evaluate needs and plan long-range programs.

In earlier years, the CGS was able to effectively utilize federal funds derived from joint projects to address some of its own objectives. However, many of the contracts and grants were acquired when general funded positions were adequate to allow for research and laying of groundwork for the projects. Recent state funding cuts make this more difficult.

Perhaps the most noticeable effect of the funding change has been the shift it has dictated in the Survey's organizational structure and focus of services. Because the agency's services are driven by demand -- the constituents who have funds -- the

CGS is heavily weighted toward Engineering/Environmental issues. Consequently, the Survey tends to focus on short-term responses rather than long-term research programs.

As evidence to this argument, the current staff of 22 people contains 15.6 positions in the Engineering/Environmental sections and fewer than four in the combined Mineral Fuels and Mineral Resources sections. The mineral and energy industries are not adequately represented in the CGS programs, at precisely the time they should be receiving vigorous support. The mineral and energy industries will rebound most efficiently from their slump in those states where an active research program exists.

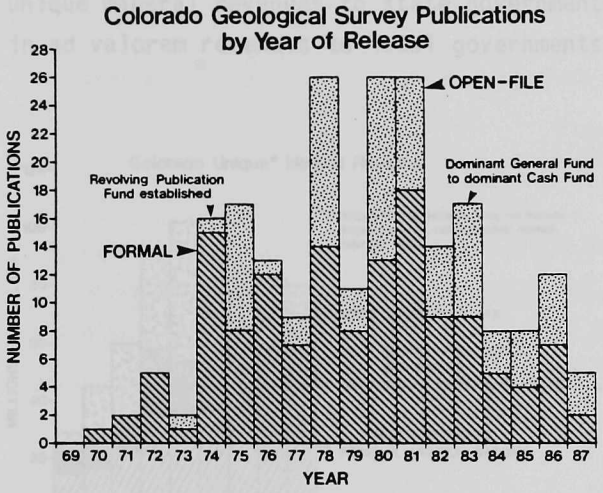


Figure 4. Shows the dramatic increase in formal publications when the Joint Budget Committee initiated a revolving publication fund in 1974 and the marked decline in 1984 after the change from dominantly general funding to predominantly cash funding. The decline would be even more dramatic except for the fact that several projects commenced under general funding were stalled and could not be completed and published until later years. The Survey since 1970 has sold and distributed a total of over 247,000 separate publications.

Since cash funding commenced in 1983, few reports or statistics have been published by CGS. Moreover, basic geologic mapping as a foundation for identifying energy and mineral resources or geologic hazards has been minimal since the 1920s. Nearly 30 percent of the state's lands have never been mapped at a detailed scale (1 inch equals 2,000 feet). Much of this inadequately mapped land is in the Front Range development corridor from Wyoming to New Mexico or mineral prospective areas on the Western Slope. Most is in areas of future growth.

INTERGOVERNMENTAL RELATIONSHIPS

By statute, the CGS is to provide "advice and counsel" to other state agencies. In the past it frequently worked with a number of them, as discussed earlier. Prior to the funding reductions, interactions were governed by the availability of general funded personnel and the urgency of the other agencies' needs. If a geologist's expertise were needed on a state project, the CGS was the recognized authority.

Because of the current prevalence of cash funding, however, interactions are now governed largely by the availability of funds within the other agencies. Funding agreements are time consuming with proposals ranging from verbal requests to multi-page contracts requiring approval by both agencies' budget directors, accounting staffs and attorneys. Other agencies hire the CGS only when the assignment warrants the time, effort and money to negotiate a funding agreement.

Regardless of the reasons for the current situation, the mission and responsibilities of the CGS to the economic, environmental and social well being of Colorado are too important to neglect. Much of the Survey's enabling legislation focuses on the economic benefits of developing Colorado's mineral and energy resources, and the reasons are the same today as in 1967.

In 1986, despite an economic slump, these industries in Colorado produced $1.2 billion in mineral commodities, provided 30,000 jobs, contributed $80 million in unique mineral revenues to state government and generated an additional $80 million in ad valorem revenues to local governments.

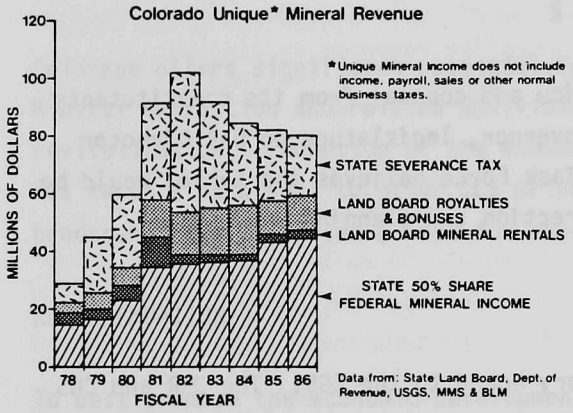


Figure 5. State mineral revenues even in the depressed energy and mineral economy contributed over $80 million in state revenues. Not shown are the additional $80 million of local government revenues from ad valorem taxes on energy and mineral production.

Continued health and property protection is another statewide concern with economic implications. Such issues as water contamination from landfills, leakage from underground pipes and storage tanks, inclusion of former industrial or mining sites on the National Priorities List (Superfund) and high radon exposures affect our state's attractiveness to potential business. Adverse geological processes cost the state money. The more than $2.5 million damage caused by the Telluride Airport mudflow is just one example.

The Survey's work in site selection and evaluation for the Supercollider as well as site reviews for other substantial development proposals ranging from ski areas to major dams has contributed to the state's development. The CGS could and should be a vital tool in the further development of Colorado's prosperity.

In order to improve the Survey's performance and efficiency, the Task Force has identified certain key concerns that bear on the performance of the CGS. These are listed below, and each is followed by the committee's recommendation.

FINDING 1

The Task Force found that the purpose and objectives specified in the enabling legislation for the CGS are sufficient to meet the needs and assist in solving the geological problems in Colorado.

RECOMMENDATION

No rewriting of the enabling legislation or current Survey statutes is recommended.

FINDING 2

The CGS has not had the benefit of formal advice and counsel from its constitutents concerning strategic planning. Nor has the Governor, legislature or DNR Director clearly defined the role of the Survey. The Task Force believes the Survey would be strengthened and improved by continuity of direction and planning.

RECOMMENDATION

The Governor should appoint a permanent advisory board to the CGS. The DNR and CGS would be encouraged to follow the counsel of the board, whose activities would include, but not be limited to, the following tasks:

(a) Assist the CGS in developing long-range goals and strategies by identifying future state needs;

(b) Assist the Survey in determining the state's research needs and priorities to maximize benefits relative to cost.

FINDING 3

A critical need exists for integrated applied research; that is, the advancement and acquisition of new geoscientific knowledge to better solve many of the state's economic and environmental problems. An Advisory Committee could aid the Survey in analyzing the state's needs and priorities.

RECOMMENDATION

CGS should take the lead in anticipating and helping alleviate future geologic and mineral resource research needs by:

(a) implementing geoscientific research on its own,

(b) coordinating and encouraging federal geoscience research and support, and

(c) fostering applied university research.

CGS should develop closer cooperative arrangements with the geology departments of Colorado's universities. To achieve and maintain competence, it is also essential that some CGS staff members participate in ongoing research.

FINDING 4

Colorado offers significant potential for future mineral discovery and production. Mineral extraction and related activities can contribute much to the state's economic revitalization. Promotion of the economic development of these resources, however, has taken a back seat to other CGS priorities in recent years. Explorationists and producers have expressed a need for maps and reports of current economic interest.

RECOMMENDATION

To best promote the economic development of Colorado's mineral resources, the CGS should step up the development, production and distribution of publications and presentations for the economic geology community. Among elements that should be included are:

* Reports on the state's mineral and energy resources,
* Updated compilation of university sponsored mapping and research,
* Reports concerning mineral production
* Bimonthly or quarterly newsletter, and
* Workshops and conferences on subjects of current interest.

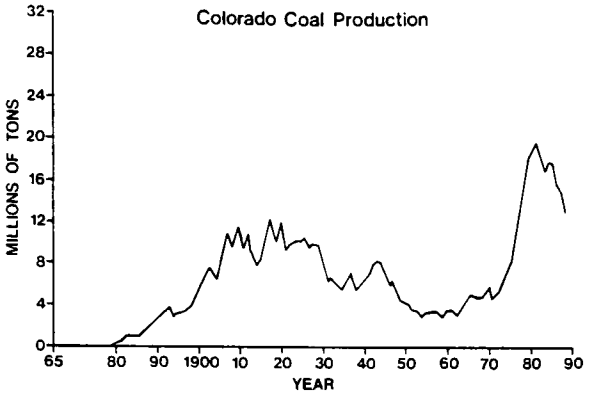


Figure 6. Colorado's coal production though down from 1980 is still above historical rates.

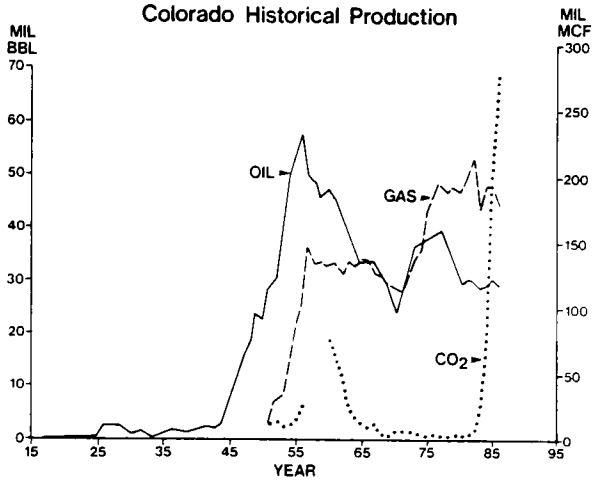


Figure 7. This historical graph shows production response to exploration, development, field declines and the effects of pricing.

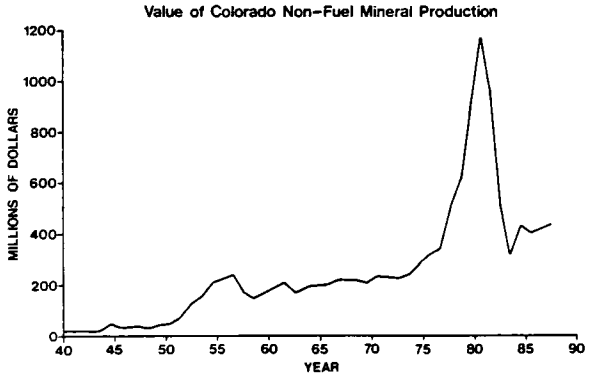


Figure 8. Except for a dramatic peak at 1980 due to high molydenum production and prices, the curve shows a steady increase in total non-fuel mineral production value.

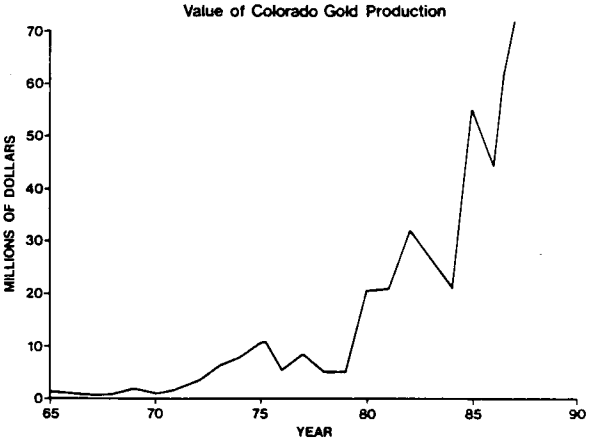


Figure 9. The dramatic increase in gold production may be doubled by current exploration and proposed development projects.

FINDING 5

The objectives stated in the CGS statute include collection and preservation of geological information. The Task Force finds that the CGS has partially succeeded in meeting this objective with respect to geological maps and reports, but that it has not undertaken an effort to preserve extensive collections of geological, geophysical or geochemical data or physical specimens of geological interest such as drill cuttings and core.

RECOMMENDATION

The CGS should provide for collection and storage of selected basic geological, geophysical and geochemical data and physical specimens from within the state as well as donations from private industry and universities. Submissions should be on a voluntary, cooperative basis, and public access to the information should be provided.

FINDING 6

Public information and education programs are referred to in the CGS statutes. Past Survey efforts in such technology transfer and educational endeavors as the Governor's Conferences on Environmental Geology, the Rocky Mountain Groundwater Conferences, the Rocky Mountain Coal Symposia, and workshops and field trips for citizens and local government staff and officials were beneficial to the state.

RECOMMENDATION

The CGS should resume sponsorship of educational conferences and workshop programs on geological and mineral resource topics of significance to Colorado.

FINDING 7

The CGS serves a wide constituent base, but personnel and funding restrictions have prevented the CGS from meeting the needs of all its users since the early 1980s. The Task Force believes that the intent of the statutory objectives, with the exception of "assist and advise," is best met by publishing maps, bulletins and reports and implementing research programs. These activities cannot generally be carried out under a dominantly cash funded program (refer to Figure 4).

Heavy reliance on the Cash Funding system has diverted the CGS staff's efforts from identifying and addressing priority problems to finding projects that can be funded. Many projects are not being implemented because funds are not available within the CGS or other state agencies. Departments are hiring their own staff rather than the CGS. Not only does this duplicate the State's available services, it diminishes the expertise of a strong Survey.

RECOMMENDATION

The CGS should be general funded to a level sufficient to provide geological support to other state agencies. This arrangement would better coordinate geologic-related activities; encourage a stronger state geology program; and eliminate possible duplication of administrative and geoscientific work and equipment. Line item budgets for geologic services could be allocated to appropriate state agencies in much the same way as legal services are currently handled.

FINDING 8

Numerous requests by local governments for CGS advice and counsel have not been filled as the governments cannot afford to hire the Survey. The costs of not evaluating geologic problems can be substantial.

RECOMMENDATION

The CGS should be general funded to a level sufficient to provide emergency response and short-term consultations to local governments in regard to urgent geological problems. The types of services available from CGS through cash funding and the benefits thereof, should be more completely advertised and promoted to local governments.

FINDING 9

Nearly 90 percent of the Survey's current budget is made up of federal monies and cash funding. This dominance of cash funding has resulted in the CGS being too strongly focused on soliciting funds and responding to outside requests for short-term help. The critical needs for long-term planning and research have been neglected. Inadequate general funding inhibits staff development.

RECOMMENDATION

The CGS should be funded by the General Fund at a level that will support and maintain a cadre of technical/scientific personnel, with adequate clerical and support personnel, sufficient to meet its legislated responsibilities and develop the research programs and other activities recommended in this report. A constant level of operating dollars from the general fund is vital.

FINDING 10

Cash funding does provide flexibility for the CGS to work on projects unforeseen at the time of budgeting, and is a viable supplemental revenue source.

RECOMMENDATION

The CGS should continue to seek cash funding to the extent that it: 1) is appropriate to the Survey's mission, 2) comes from projects of mutual benefit to the state and the other involved party, and 3) does not infringe on the rights or operations of private consultants.

FINDING 11

In the past, members of the state legislature have expressed the view that the USGS should conduct all the basic geoscience research needed in Colorado. It is the Task Force's finding that the USGS, particularly the Geologic and National Mapping Divisions, and the CGS have had a productive, cooperative and synergistic relationship. Although the Surveys conduct joint planning of scope, content and schedule for geoscience programs, little or no duplication of effort is noted. At the time when USGS mapping and research priorities are set, CGS input is particularly important and beneficial to the state.

RECOMMENDATION

The USGS and the CGS should continue their cooperative effort and intensify their goal to set mutual priorities on geologic mapping and research.

FINDING 12

The CGS has also had a long-standing involvement with a number of other federal agencies such as the Bureau of Land Management, the Forest Service, the Bureau of Mines and the Department of Energy. Past relationships with these agencies have been mutually beneficial to the state and federal governments. Future funding through the federal agencies would allow the CGS to further pursue solutions to resource, environmental and development problems in Colorado.

RECOMMENDATION

The Survey should continue to cooperate with and seek expanded funding from those federal agencies on projects where both can benefit.

STATE OF COLORADO

EXECUTIVE CHAMBERS
136 State Capitol
Denver, Colorado 80203-1792
Phone (303) 866-2471

Roy Romer
Governor

October 21, 1987

Dear:

Since its inception, the Colorado Geological Survey has played a key role in promoting mineral development, analyzing our state's mineral and energy resources, identifying natural geologic hazards and advising state and local governmental agencies. Now the Survey is at a critical crossroad and we need your help.

For a state with such a strong mineral tradition, it seems appropriate that Colorado have an equally strong heritage in its Geological Survey. We are asking a select group of knowledgeable individuals to assist the Department of Natural Resources in a comprehensive evaluation of the State's Geological Survey. Assuming that the CGS, like most organizations, is found to be a mixture of strengths and weaknesses, we are seeking advice on how to build on existing strengths and improve on any shortcomings. In this process, we would hope to find answers to some specific questions, such as:

- Does the CGS have an appropriate mission? Should it be more focused and clearly-defined?
- Is the organizational structure appropriate to accomplish this mission?
- Are the personnel and financial resources adequate to perform the tasks necessary to accomplish the mission?
- How do its services relate to the U.S. Geological Survey, existing capabilities of other state agencies and political subdivisions and the private sector?
- How can the Survey be improved and strengthened to be of greater value to the State?

- What legislative action, if any, should be pursued to strenghten the Survey?

- What are potential sources of funding for the Survey's activities? To what extent should general fund support be provided?

This Task Force can provide vital guidance to the Department of Natural Resources and the Survey. I am very pleased that Mr. Stan Dempsey has agreed to chair this Task Force. I ask that you serve on the Task Force as well. The Executive Director's Office of the Department of Natural Resources will staff this effort; Lisa Largent from Dennis Donald's office will call you during the coming week to confirm your willingness to assist us in this challenge. I am asking that the Task Force have its findings and recommendations available by mid-December.

The first meeting of the Task Force is tentatively scheduled for November 6, 1987 at 9:00 a.m. I thank you in advance for your interest and support in this important endeavor.

Sincerely,

Roy Romer
Governor

COLORADO REVISED STATUTES
1984 Replacement
Volume 14

PART 1

COLORADO GEOLOGICAL SURVEY

Editor's note: The substantive provisions of this part 1, formerly article 1 of chapter 64, C.R.S. 1963, were repealed and reenacted in 1967, causing some addition, relocation, and elimination of sections as well as subject matter. (Compare historical record prior to 1967 of article 1 of chapter 64, C.R.S. 1963, as amended through L. 66.)

34-1-101. Geological survey created - purpose. There is hereby established the Colorado geological survey, which is a division of the department of natural resources. The purpose of the survey is to coordinate and encourage by use of appropriate means the full development of the state's natural resources, as the same are related to the geological processes that affect realistic development of human and mineral utilization and conservation practices and needs in the state of Colorado, all of which are designed to result in an ultimate benefit to the citizens of the state.

Source: R & RE, L. 67, p. 837, § 1; C.R.S. 1963, § 64-1-1; L. 68, p. 130, § 147.

34-1-102. State geologist - appointment - qualifications. The executive director of the department of natural resources shall appoint a state geologist, subject to the state constitution and the state personnel system laws. The state geologist shall be the director of the Colorado geological survey. He shall be a graduate of a recognized college or university with a degree in geology or geological engineering and shall have had a sufficient number of years of practical experience and knowledge in the use of geology and the earth sciences to qualify for the direction of the purposes of this part 1. The office of the state geologist shall be located and headquartered close to or as near as possible to the offices and headquarters of the other agencies and divisions under the executive director of the department of natural resources.

Source: R & RE, L. 67, p. 837, § 1; C.R.S. 1963, § 64-1-2.

34-1-103. Objectives of survey - duties of state geologist. (1) The Colorado geological survey shall function to provide assistance to and cooperate with the general public, industries, and agencies of state government, including institutions of higher education, in pursuit of the following objectives, the priorities of which shall be determined by mutual consent of the state geologist and the executive director of the department of natural resources:

(a) To assist, consult with, and advise existing state and local governmental agencies on geologic problems;

(b) To promote economic development of mineral resources;

(c) To conduct studies to develop geological information;

(d) To inventory and analyze the state's mineral resources as to quantity, chemical composition, physical properties, location, and possible use;

(e) To collect and preserve geologic information;

(f) To advise the state and act as liaison agency on transactions dealing with natural resources between state agencies and with other states and the federal government on common problems and studies;

(g) To evaluate the physical features of Colorado with reference to present and potential human and animal use;

(h) To prepare, publish, and distribute reports, maps, and bulletins when necessary to achieve the purposes of this part 1, but in accordance with section 24-1-136, C.R.S.;

(i) To determine areas of natural geologic hazards that could affect the safety of or economic loss to the citizens of Colorado;

(j) To advise the state engineer in the promulgation of rules and regulations pursuant to article 90.5 of title 37, C.R.S., and to provide other governmental agencies with technical assistance regarding geothermal resources as needed.

(2) The duties of the state geologist shall be to fulfill the objectives of this part 1 and, together with the employees of the survey, work for the maximum beneficial and most efficient use of the geologic processes for the protection of and economic benefit to the citizens of Colorado.

(3) The state geologist shall conduct a study and prepare a map or maps as provided in section 34-1-303.

(4) The state geologist shall, upon receiving a preliminary plan pursuant to section 30-28-136 (1) (i), C.R.S., or a major activity notice pursuant to section 31-23-225, C.R.S., review such plan or notice to determine whether the development or activity which is the subject of such plan or notice will interfere with the extraction of commercial mineral deposits as defined in section 34-1-302. If the state geologist determines that a potential for such interference exists, he shall, within twenty-four days after mailing such plan or notice, notify the appropriate board of county commissioners or governing body of a municipality of the existence of such potential interference.

(5) The state geologist shall administer the provisions of section 25-15-202 (4) (b), C.R.S., requiring the Colorado geological survey to make a recommendation on the geological suitability of proposed hazardous waste disposal sites for land disposal of hazardous waste and the provisions of section 25-15-216 requiring the Colorado geological survey to conduct a study of the geological suitability of areas of the state for hazardous waste disposal sites.

Source: R & RE, L. 67, p. 837, § 1; C.R.S. 1963, § 64-1-3; L. 73, p. 1053, § 16; L. 74, p. 315, § 7; L. 75, p. 1272, § 10; L. 83, pp. 841, 1105, 1424, § § 66, 27, 3.

Law reviews. For article, "1974 Land Use Legislation in Colorado", see 51 Den. L. J. 467 (1974).

34-1-104. Employees. The state geologist shall employ such assistants and personnel as may be deemed necessary to carry out the purposes of this part 1, subject to the state constitution and the state personnel system laws. Such personnel should include, but shall not be limited to, qualified professional geologists or geological engineers to cover at least four categories of specialties in mineral deposits, water and hydrology, petroleum and mineral fuels, and engineering geology.

Source: R & RE, L. 67, p. 838, § 1; C.R.S. 1963, § 64-1-4.

Cross reference: For the appointment of officers, assistants, and employees, see § § 24-1-108 and 24-2-102.

Cross references. As to state personnel system, see § 13 of art. XII, Colo. Const.

34-1-104.5. Legislative declaration. It is the intent of the general assembly that sufficient funds be provided to cover the direct costs of a base staff and their operating expenses to assure functional continuity of the survey as provided by statute. The survey shall make appropriate charges for preparation and reproduction of reports, maps, and publications; except that the survey shall not directly compete with consultants by entering into contracts with the general public and industries for providing geological and related services.

Source: L. 83, p. 1304, § 1.

34-1-105. Fees - fee adjustments - geological survey cash fund - created. (1) (a) The Colorado geological survey is authorized to enter into agreements to provide services to the general public, industries, and units of local government and to establish and collect fees to recover direct costs of providing said services pursuant to sections 24-65.1-302 and 30-28-136, C.R.S., and section 34-1-103 or pursuant to agreement; except that this provision shall apply only to those services rendered upon items which a unit of local government is required by statute to submit for review or for such other services as are requested pursuant to an agreement.

(b) The Colorado geological survey is authorized to establish and collect fees to recover direct costs of providing services to other agencies of state government pursuant to section 34-1-103.

(2) (a) The Colorado geological survey shall propose, as part of its annual budget request, an adjustment in the amount of each fee which it is authorized to collect pursuant to this section.

(b) Based upon the appropriation made in the general appropriation bill and subject to the executive director of the department of natural resources, the Colorado geological survey shall adjust its fees so that the revenue generated from said fees approximates its direct costs. Such fees shall remain in effect for the fiscal year for which the budget request applies. All fees collected by the Colorado geological survey shall be transmitted to the state treasurer, who shall credit the same to the geological survey cash fund, which fund is hereby created. All moneys credited to the geological survey cash fund shall be used as provided in this section and shall not be deposited in or transferred to the general fund of this state or any other fund. The moneys credited to the geological survey cash fund shall be available for appropriation by the general assembly to the Colorado geological survey in the general appropriation bill.

(c) Beginning July 1, 1984, and each July 1 thereafter, whenever moneys appropriated to the Colorado geological survey during the prior fiscal year are unexpended, said moneys shall be made a part of the appropriation to the Colorado geological survey for the next fiscal year, and such amount shall not be raised from fees collected by the Colorado geological survey. If a supplemental appropriation is made to the Colorado geological survey

for its activities, the fees of the Colorado geological survey, when adjusted for the fiscal year next following that in which the supplemental appropriation was made, shall be adjusted by an additional amount which is sufficient to compensate for such supplemental appropriation. Funds appropriated to the Colorado geological survey in the general appropriation bill for the services specified in this section shall be designated as cash funds and shall not exceed the amount anticipated to be raised from fees collected pursuant to this section.

Source: L. 83, p. 1304, § 1.

PART 2

GEOLOGY

34-1-201. Definitions. As used in this part 2, unless the context otherwise requires:

(1) "Geologist" means a person engaged in the practice of geology.

(2) "Geology" means the science which treats of the earth in general; the earth's processes and its history; investigation of the earth's crust and the rocks and other materials which compose it; and the applied science of utilizing knowledge of the earth's history, processes, constituent rocks, minerals, liquids, gasses, and other materials for the use of mankind.

(3) "Professional geologist" is a person who is a graduate of an institution of higher education which is accredited by a regional or national accrediting agency, with a minimum of thirty semester (forty-five quarter) hours of undergraduate or graduate work in a field of geology and whose postbaccalaureate training has been in the field of geology with a specific record of an additional five years of geological experience to include no more than two years of graduate work.

Source: L. 73, p. 610, § 1; C.R.S. 1963, § 51-3-1.

34-1-202. Reports containing geologic information. Any report required by law or by rule and regulation, and prepared as a result of or based on a geologic study or on geologic data, or which contains information relating to geology, as defined in section 34-1-201 (2), and which is to be presented to or is prepared for any state agency, political subdivision of the state, or recognized state or local board or commission, shall be prepared or approved by a professional geologist, as defined in section 34-1-201 (3).

Source: L. 73, p. 610, § 1; C.R.S. 1963, § 51-3-2.

PART 3

PRESERVATION OF COMMERCIAL MINERAL DEPOSITS

34-1-301: Legislative declaration. (1) The general assembly hereby declares that:

(a) The state's commercial mineral deposits are essential to the state's economy.

(b) The populous counties of the state face a critical shortage of such deposits.

(c) Such deposits should be extracted according to a rational plan, calculated to avoid waste of such deposits and cause the least practicable disruption of the ecology and quality of life of the citizens of the populous counties of the state.

(2) The general assembly further declares that, for the reasons stated in subsection (1) of this section, the regulation of commercial mineral deposits, the preservation of access to and extraction of such deposits, and the development of a rational plan for extraction of such deposits are matters of concern in the populous counties of the state. It is the intention of the general assembly that the provisions of this part 3 have full force and effect throughout such populous counties, including, but not limited to, the city and county of Denver and any other home rule city or town within each such populous county but shall have no application outside such populous counties.

Source: L. 73, p. 1046, § 1; C.R.S. 1963, § 92-36-1.

Law reviews. For article, "1974 Land Use Legislation in Colorado", see 51 Den. L. J. 467 (1974).

34-1-302. Definitions. As used in this part 3, unless the context otherwise requires:

(1) "Commercial mineral deposit" means a natural mineral deposit of limestone used for construction purposes, coal, sand, gravel, and quarry aggregate, for which extraction by an extractor is or will be commercially feasible and regarding which it can be demonstrated by geologic, mineralogic, or other scientific data that such deposit has significant economic or strategic value to the area, state, or nation.

(2) "Extractor" means any individual, partnership, association, or corporation which extracts commercial mineral deposits for use in the business of selling such deposits or for use in another business owned by the extractor or any department or division of federal, state, county, or municipal government which extracts such deposits.

(3) "Populous county or populous counties of the state" means any county or city and county having a population of sixty-five thousand inhabitants or more according to the latest federal decennial census.

Source: L. 73, p. 1047, § 1; C.R.S. 1963, § 92-36-2.

34-1-303. Geological survey to make study. After July 1, 1973, the Colorado geological survey shall contract for a study of the commercial mineral deposits in the populous counties of the state in order to identify and locate such deposits. Such study shall be of sand, gravel, and quarry aggregate, and shall be completed on or before July 1, 1974, and shall include a map or maps of the state showing such commercial mineral deposits, copies of

which may be generally circulated. Any commercial mineral deposits discovered subsequent to July 1, 1974, may be, upon discovery, included in such study.

Source: L. 73, p. 1047, § 1; C.R.S. 1963, § 92-36-3.

34-1-304. Master plan for extraction. (1) The county planning commission for unincorporated areas and for cities and towns having no planning commission or the planning commission for each city and county, city, or town, within each populous county of the state, shall, with the aid of the maps from the study conducted pursuant to section 34-1-303, conduct a study of the commercial mineral deposits located within its jurisdiction and develop a master plan for the extraction of such deposits, which plan shall consist of text and maps. In developing the master plan, the planning commission shall consider, among others, the following factors:

(a) Any system adopted by the Colorado geological survey grading commercial mineral deposits according to such factors as magnitude of the deposit and time of availability for and feasibility of extraction of a deposit;

(b) The potential for effective multiple-sequential use which would result in the optimum benefit to the landowner, neighboring residents, and the community as a whole;

(c) The development or preservation of land to enhance development of physically attractive surroundings compatible with the surrounding area;

(d) The quality of life of the residents in and around areas which contain commercial mineral deposits;

(e) Other master plans of the county, city and county, city, or town;

(f) Maximizatio·)f extraction of commercial mineral deposits;

(g) The ability reclaim an area pursuant to the provisions of article 32 of this title; and

(h) The ability t reclaim an area owned by any county, city and county, city, town, or oth· governmental authority or proposed, pursuant to an adopted plan, to be used for public purposes by such a governmental authority consistent with such proposed use.

(2) A planning commission shall cooperate with the planning commissions of contiguous areas and the mined land reclamation board created by section 34-32-105 in conducting the study and developing the master plan for extraction.

(3) (a) A county planning commission shall certify its master plan for extraction to the board of county commissioners or the governing body of the city or town where the county planning commission is acting in lieu of a city or town planning commission. A planning commission in any city and county, city, or town shall certify its master plan for extraction to the governing body of such city and county, city, or town.

(b) After receiving the certification of such master plan and before adoption of such plan, the board of county commissioners or governing body of a city and county, city, or town shall hold a public hearing thereon, and at least thirty days' notice of the time and place of such hearing shall be given by one publication in a newspaper of general circulation in the county, city and county, city, or town. Such notice shall state the place at which the text and maps so certified may be examined.

(4) The board of county commissioners or governing body of a city and county, city, or town may, after such public hearing, adopt the plan, revise the plan with the advice of the planning commission and adopt it, or return the plan to the planning commission for further study and rehearing before adoption, but, in any case, a master plan for extraction of commercial mineral deposits shall be adopted for the unincorporated territory and any city and county, city, or town in each populous county of the state on or before July 1, 1975.

Source: L. 73, p. 1047, § 1; C.R.S. 1963, § 92-36-4; L. 75, p. 1336, § 1; L. 77, p. 289, § 67.

Cross reference: For establishment and functions of a county planning commission, compare § 30-28-133.

Applied in Hudspeth v. Board of County Comm'rs, 667 P.2d 775 (Colo. Ct. App. 1983).

34-1-305. Preservation of commercial mineral deposits for extraction. (1) After July 1, 1973, no board of county commissioners, governing body of any city and county, city, or town, or other governmental authority which has control over zoning shall, by zoning, rezoning, granting a variance, or other official action or inaction, permit the use of any area known to contain a commercial mineral deposit in a manner which would interfere with the present or future extraction of such deposit by an extractor.

(2) After adoption of a master plan for extraction for an area under its jurisdiction, no board of county commissioners, governing body of any city and county, city, or town, or other governmental authority which has control over zoning shall, by zoning, rezoning, granting a variance, or other official action or inaction, permit the use of any area containing a commercial mineral deposit in a manner which would interfere with the present or future extraction of such deposit by an extractor.

(3) Nothing in this section shall be construed to prohibit a board of county commissioners, a governing body of any city and county, city, or town, or any other governmental authority which has control over zoning from zoning or rezoning land to permit a certain use, if said use does not permit erection of permanent structures upon, or otherwise permanently preclude the extraction of commercial mineral deposits by an extractor from, land subject to said use.

(4) Nothing in this section shall be construed to prohibit a board of county commissioners, a governing body of any city and county, city, or town, or other governmental authority which has control over zoning from zoning for agricultural use, only, land not otherwise zoned on July 1, 1973.

(5) Nothing in this section shall be construed to prohibit a use of zoned land permissible under the zoning governing such land on July 1, 1973.

(6) Nothing in this section shall be construed to prohibit a board of county commissioners, a governing body of any city and county, city, or town, or any other governmental authority from acquiring property known to contain a commercial mineral deposit and using said property for a public purpose;

except that such use shall not permit erection of permanent structures which would preclude permanently the extraction of commercial mineral deposits.

Source: L. 73, p. 1048, § 1; C.R.S. 1963, § 92-36-5; L. 75, p. 1336, § 2.

Law reviews. For article, "Severed Minerals as a Deterrent to Land Development", see 51 Den. L. J. 1 (1974).

Local governments can permit uses compatible with mining. By zoning, rezoning, granting a variance, or other action or inaction, local governments can permit any use of land known to contain a commercial mineral deposit so long as the permitted use is not incompatible with mining, such as erecting permanent structures on this land; the preservation act does not require local governments to allow mining in any area where it is commercially practicable, but only to preserve access to the mineral deposits. C & M Sand & Gravel v. Board of County Comm'rs, 673 P.2d 1013 (Colo. Ct. App. 1983).

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22-32-124. Building codes - zoning - planning. (1) Prior to the acquisition of land or any contracting for the purchase thereof, the board of education shall consult with and advise in writing the planning commission, or governing body if no planning commission exists, which has jurisdiction over the territory in which the site is proposed to be located in order that the proposed site shall conform to the adopted plan of the community insofar as is feasible. In addition, the board of education shall submit a site development plan for review and comment thereon to such planning commission or governing body prior to construction of any structure or building. The planning commission or governing body may request a public hearing before the board of education relating to the proposed site location or site development plan. The board of education shall thereafter promptly schedule the hearing, publish at least one notice in advance of the hearing, and provide written notice of the hearing to the requesting planning commission or governing body. Prior to the acquisition of land for school building sites or construction of any buildings thereon, the board of education also shall consult with the Colorado geological survey regarding potential swelling soil, mine subsidence, and other geologic hazards and to determine the geologic suitability of the site for its proposed use. All buildings and structures shall be erected in conformity with the standards of the division of labor. Nothing in this subsection (1) shall be construed to limit the authority of a board of education to finally determine the location of public schools within the district and erect necessary buildings and structures.

30-28-133. Subdivision regulations.

(3) Subdivision regulations adopted by a board of county commissioners pursuant to this section shall require subdividers to submit to the board of county commissioners data, surveys, analyses, studies, plans, and designs, in the form prescribed by the board of county commissioners, of the following items:

(a) Property survey and ownership of the surface and mineral estates including mineral lessees, if any;

(b) Relevant site characteristics and analyses applicable to the proposed subdivision including the following, which shall be submitted by the subdivider with the sketch plan:

(I) Reports concerning streams, lakes, topography, and vegetation;

(II) Reports concerning geologic characteristics of the area significantly affecting the land use and determining the impact of such characteristics on the proposed subdivision;

(III) In areas of potential radiation hazard to the proposed future land use, evaluations of these potential radiation hazards;

(5) No subdivision shall be approved under section 30-28-110 (3) and (4) until such data, surveys, analyses, studies, plans, and designs as may be required by this section and by the county planning commission or the board of county commissioners have been submitted, reviewed, and found to meet all sound planning and engineering requirements of the county contained in its subdivision regulations.

(6) No board of county commissioners shall approve any preliminary plan or final plat for any subdivision located within the county unless the subdivider has provided the following materials as part of the preliminary plan or final plat subdivision submission:

(c) Evidence to show that all areas of the proposed subdivision which may involve soil or topographical conditions presenting hazards or requiring special precautions have been identified by the subdivider and that the proposed uses of these areas are compatible with such conditions.

30-28-136. Referral and review requirements. (1) Upon receipt of a complete preliminary plan submission, the board of county commissioners or its authorized representative shall distribute copies of prints of the plan as follows:

(i) To the Colorado geological survey for an evaluation of those geologic factors which would have a significant impact on the proposed use of the land.

(2) The agencies named in this section shall make recommendations within thirty-five days after the mailing by the county or its authorized representative of such plans unless a necessary extension of not more than thirty days has been consented to by the subdivider and the board of county commissioners of the county in which the subdivision area is located. The failure of any agency to respond within thirty-five days or within the period of an extension shall, for the purpose of the hearing on the plan, be deemed an approval of such plan; except that, where such plan involves twenty or more dwelling units, a school district shall be required to submit within said time limit specific recommendations with respect to the adequacy of school sites and the adequacy of school structures.

APPENDIX C

COMPARISON FISCAL AND PERSONNEL RESOURCES
GEOLOGICAL SURVEYS, COLORADO AND SURROUNDING STATES

	FUNDS FY 85/86 ($1000'S)					PERSONNEL (FTE'S)				
State	State Appropriation	Transferred State Moneys	Other Non-Federal Income	Federal Contracts and Grants	Total Income	State Funded Prof	State Funded Support	Contract or Grant Funded Prof	Contract or Grant Funded Support	Total Staff
Kansas	$ 3,592	$ 0	$ 65	$ 303	$3,960	61	38.5	4	1	104.5
Montana	1,474	0	563	246	2,283	17.75	12.25	7	4.75	41.75
Nebraska	1,474	208	333	135	2,382	37	29	7.5	3	76.5
New Mexico	2,219	0	726	321	3,267	58	22	5	2	87
Oklahoma	1,734	0	20	150	1,904	27*	40*	0	0	67
Utah	584	115	1,120**	504	2,323	30*	16*	1	0	47
Wyoming	743	0	3	67	814	8*	12.5*	0	0	20.5
Totals	$12,052			$1,726	$16,933	239	170	20.5	10.75	443.75
						Total Prof 263.5		Total Supp 180.75		
Average	1,722			247	2,556	34	24.3	3	1.5	63.4
						Aver Prof 37.6		Aver Supp 25.8		
COLORADO	$ 265	$ 355	$ 0	$ 341	$ 960	3.25	1	9.5	7.5	21.25

* Federal and Contract moneys used to pay part of regular staff with no breakdown of percentages

** Moneys derived from 2 1/4% of Federal mineral revenues appropriated to Utah Survey.

DATA FROM ASSOCIATION OF STATE GEOLOGISTS, STATISTICIAN'S REPORT FY 85/86

INCOME TO STATE GEOLOGICAL SURVEYS

Fiscal Year 1985-86

State	*	Total Income	Directly Appropriated	Transferred State Funds	Other Non-Federal Income	Federal Funds
Alabama	4	$2,048,308	$1,660,415	$18,500	$154,599	$214,794
Alaska	2	$9,177,272	$8,066,200	$380,499	$0	$730,573
Arizona	2	$390,872	$337,989	$0	$0	$52,883
Arkansas	2	$844,533	$844,248	$0	$0	$305
California	2	$9,897,000	$8,674,000	$0	$218,000	$1,005,000
Colorado	2	$959,987	$264,683	$354,743	$0	$340,561
Connecticut	2	$1,342,369	$1,118,780	$30,000	$10,000	$183,589
Delaware	5	-	-	-	-	-
Florida	2	$1,113,294	$1,083,294	$0	$30,000	$0
Georgia	2	$2,640,970	$2,057,494	$50,000	$71,810	$461,666
Hawaii	2	$992,124	$992,124	$0	$0	$0
Idaho	2	$381,051	$302,500	$0	$0	$78,551
Illinois	2	$7,617,467	$4,930,800	$0	$2,295,504	$391,163
Indiana	2	$1,973,423	$1,773,053	$31,000	$0	$164,370
Iowa	2	$1,566,956	$1,427,665	$0	$90,250	$49,041
Kansas	2	$3,959,928	$3,591,867	$0	$65,114	$302,947
Kentucky	2	$2,143,415	$1,219,000	$449,543	$128,222	$346,650
Louisiana	2	$3,409,752	$1,752,688	$836,227	$0	$820,837
Maine	2	$973,661	$639,411	$0	$0	$334,250
Maryland	2	$2,944,547	$2,053,428	$390,791	$500,328	$0
Massachusetts	5	-	-	-	-	-
Michigan	4	$5,398,600	$559,600	$0	$4,800,000	$39,000
Minnesota	2	$1,828,211	$1,477,408	$0	$93,415	$257,288
Mississippi	2	$1,042,676	$844,072	$189,906	$8,698	$0
Missouri	2	$2,939,238	$2,144,266	$0	$101,521	$693,451
Montana	2	$2,282,525	$1,474,042	$0	$562,553	$245,930
Nebraska	2	$2,382,327	$1,706,057	$208,384	$333,260	$134,626
Nevada	2	$1,871,500	$962,500	$198,000	$168,000	$553,000
New Hampshire	2	$124,200	$64,200	$0	$0	$60,000
New Jersey	2	$5,106,000	$4,737,000	$250,000	$0	$119,000
New Mexico	2	$3,266,580	$2,219,277	$0	$726,391	$320,912
New York	1	$1,343,000	$1,100,000	$0	$43,000	$200,000
North Carolina	2	$2,440,926	$2,390,109	$0	$41,457	$50,817
North Dakota	2	$953,693	$937,586	$0	$0	$16,107
Ohio	2	$2,234,306	$1,285,197	$0	$929,109	$20,000
Oklahoma	2	$1,903,665	$1,734,187	$0	$19,612	$149,866
Oregon	2	$1,810,923	$927,801	$5,700	$171,923	$706,129
Pennsylvania	2	$2,464,772	$2,140,067	$0	$43,630	$281,075
Puerto Rico	5	-	-	-	-	-
Rhode Island	6	-	-	-	-	-
South Carolina	2	$645,196	$568,046	$10,000	$15,000	$52,150
South Dakota	2	$1,117,225	$1,112,225	$0	$0	$5,000
Tennessee	2	$1,047,300	$974,700	$0	$72,600	$0
Texas	3	$7,138,581	$999,697	$0	$2,327,561	$3,811,323
Utah	2	$2,322,682	$583,956	$115,000	$1,119,505	$504,221
Vermont	2	$70,000	$70,000	$0	$0	$0
Virginia	2	$2,251,300	$1,810,000	$30,000	$0	$411,300
Washington	2	$1,658,196	$1,397,364	$0	$0	$260,832
West Virginia	2	$2,080,041	$1,770,945	$0	$241,523	$67,573
Wisconsin	2	$1,329,832	$890,332	$290,400	$107,100	$42,000
Wyoming	2	$813,601	$743,161	$0	$3,313	$67,127
TOTALS		$112,195,717	$78,753,019	$3,838,693	$15,492,998	$14,545,907

FY 1986-87 (Estimate)

State	Total Income	Federal Funds
Alabama	$2,024,217	$178,479
Alaska	$7,682,400	$435,000
Arizona	$386,442	$55,000
Arkansas	$1,015,100	$74,570
California	$11,308,000	$1,766,000
Colorado	$1,117,068	$344,200
Connecticut	$1,074,681	$28,826
Delaware	-	-
Florida	$1,158,294	$35,000
Georgia	$2,643,385	$426,725
Hawaii	$1,052,004	$0
Idaho	$355,400	$50,000
Illinois	$9,372,438	$694,020
Indiana	$2,175,922	$215,673
Iowa	+$1,040,156	+$136,662
Kansas	$4,063,851	$258,345
Kentucky	$2,096,416	$246,151
Louisiana	$3,245,469	$819,569
Maine	$1,147,540	$381,000
Maryland	$2,761,220	$0
Massachusetts	-	-
Michigan	$5,901,500	$598,800
Minnesota	$1,775,700	$69,000
Mississippi	$990,646	$0
Missouri	$3,524,317	$1,026,389
Montana	$2,019,390	$238,520
Nebraska	$2,471,736	$43,986
Nevada	$1,796,000	$450,000
New Hampshire	$104,470	$40,270
New Jersey	$3,697,000	$0
New Mexico	$3,005,300	$190,000
New York	$1,429,000	$224,000
North Carolina	$2,441,000	$51,000
North Dakota	$973,490	$0
Ohio	$2,609,947	$33,000
Oklahoma	$1,839,206	$238,465
Oregon	$1,709,853	$588,341
Pennsylvania	$2,660,000	$358,000
Puerto Rico	-	-
Rhode Island	$15,000	$0
South Carolina	$583,796	$17,750
South Dakota	$1,285,593	$23,000
Tennessee	$1,156,400	$0
Texas	$8,599,697	$5,200,000
Utah	$2,411,913	$528,431
Vermont	$89,950	$12,700
Virginia	$2,239,500	$363,800
Washington	$1,642,782	$15,620
West Virginia	$2,288,433	$35,009
Wisconsin	$1,236,696	$13,278
Wyoming	$854,599	$92,528
TOTALS	$116,032,761	$16,500,445

STATE GEOLOGICAL SURVEY EMPLOYEES

Full-Time Equivalents

State	State-funded Professional FT	State-funded Professional PT	State-funded Support FT	State-funded Support PT	Contract-funded Professional FT	Contract-funded Professional PT	Contract-funded Support FT	Contract-funded Support PT
Alabama	22.00	1.00	16.00	2.00	3.00	0.00	4.00	2.00
Alaska	70.00	6.00	25.00	1.00	0.00	0.00	0.00	0.00
Arizona	4.00	3.00	5.00	1.00	0.00	1.00	0.00	0.00
Arkansas	13.00	0.00	16.00	0.00	1.00	0.00	0.00	0.00
California	67.20	0.20	49.00	0.80	4.40	0.50	0.00	0.00
Colorado	3.00	0.25	1.00	0.00	8.00	1.50	4.00	3.50
Connecticut	14.00	0.00	9.00	0.00	4.00	0.00	2.00	3.00
Delaware	-	-	-	-	-	-	-	-
Florida	20.00	0.00	10.00	2.50	0.00	0.00	0.00	4.00
Georgia	25.00	3.00	8.00	2.00	7.00	0.00	2.00	1.00
Hawaii	14.00	0.00	12.00	0.00	0.00	0.00	0.00	0.00
Idaho	6.00	0.00	2.00	0.50	0.00	0.00	1.00	0.00
Illinois	83.00	5.20	64.00	0.05	48.00	8.72	18.00	11.45
Indiana	28.00	2.00	11.00	40.00	4.00	0.00	0.00	0.00
Iowa	21.00	0.00	15.00	0.00	4.00	1.50	1.00	6.75
Kansas	43.50	17.50	26.00	12.50	0.50	3.50	1.00	0.00
Kentucky	25.40	3.00	11.80	3.50	7.10	7.50	3.00	1.50
Louisiana	40.00	0.00	12.00	0.00	0.00	0.00	0.00	0.00
Maine	8.00	0.00	6.00	0.00	1.00	0.00	1.00	0.00
Maryland	32.00	0.00	14.00	2.00	1.50	0.00	0.00	0.00
Massachusetts	-	-	-	-	-	-	-	-
Michigan	73.00	0.00	21.00	5.00	0.00	0.00	0.00	0.00
Minnesota	19.50	0.60	6.00	1.00	2.00	0.48	0.00	8.00
Mississippi	21.00	0.00	9.00	1.00	0.00	0.00	0.00	0.00
Missouri	43.50	0.00	36.00	0.00	13.50	1.50	10.00	3.00
Montana	17.24	0.50	12.25	0.00	7.00	0.00	4.75	0.00
Nebraska	34.00	3.00	21.00	8.00	1.00	6.50	2.00	1.00
Nevada	14.00	4.00	9.00	5.00	1.00	2.00	0.00	2.00
New Hampshire	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
New Jersey	60.00	7.00	23.00	0.00	0.00	2.00	0.00	0.00
New Mexico	32.00	26.00	20.00	2.00	5.00	0.00	1.00	1.00
New York	15.00	0.00	4.00	0.00	0.00	3.00	0.00	0.00
North Carolina	29.00	0.00	32.00	0.00	0.00	1.00	0.00	0.00
North Dakota	12.00	0.00	13.00	4.00	0.00	0.00	0.00	0.00
Ohio	34.00	3.00	27.00	1.00	0.00	1.00	0.00	1.00
Oklahoma	22.00	5.00	19.00	21.00	0.00	0.00	0.00	0.00
Oregon	15.00	0.00	11.00	0.00	3.00	0.00	0.00	0.00
Pennsylvania	29.00	1.00	18.00	0.00	0.00	0.00	10.00	0.00
Puerto Rico	-	-	-	-	-	-	-	-
Rhode Island	-	-	-	-	-	-	-	-
South Carolina	7.00	4.00	10.00	3.00	0.00	0.00	0.00	0.00
South Dakota	15.00	1.00	10.00	7.00	3.00	0.00	3.00	0.75
Tennessee	19.00	0.00	12.00	0.00	0.00	0.00	0.00	0.00
Texas	26.00	2.00	26.00	41.00	81.00	0.00	52.00	64.00
Utah	23.00	7.00	15.00	1.00	1.00	0.00	0.00	0.00
Vermont	1.00	0.75	0.00	0.40	0.00	0.00	0.00	0.00
Virginia	27.00	0.00	11.00	0.00	0.00	5.00	0.00	0.00
Washington	13.00	2.90	10.00	2.00	0.00	0.00	0.00	0.00
West Virginia	35.00	0.00	27.00	6.00	2.00	1.00	5.00	5.00
Wisconsin	16.00	4.05	6.00	11.60	0.00	0.00	0.00	0.00
Wyoming	8.00	0.00	7.00	5.50	0.00	0.00	0.00	2.00
TOTALS	1200.34	112.95	728.05	194.35	213.00	47.70	124.75	120.95

* 1. Fiscal Year: April 1, 1985 - March 31, 1986
2. Fiscal Year: July 1, 1985 - June 30, 1986
3. Fiscal Year: September 1, 1985 - August 31, 1986
4. Fiscal Year: October 1, 1985 - September 30, 1986
5. No Report
6. Rhode Island State Geologist did not exist prior to FY 1987

\+ Agency reorganized. Figures not comparable to prior years

Note: The figures listed in this report are those provided by the State Geological Surveys; because of variations in procedures and classifications, they may not be directly comparable and are not intended to be a basis for rigorous analysis. Additional information or detail should be sought directly from individual State Geological Surveys.

APPENDIX D
BIOGRAPHICAL SUMMARIES OF TASK FORCE MEMBERS

STANLEY DEMPSEY, Task Force Chairman: A.B. Geology and J.D. University of Colorado; currently the President of Royal Gold, Inc.; previously in mineral investment banking; associated with the law firm of Arnold and Porter; his earlier career with AMAX, Inc. and its subsidiaries included positions as Vice President for Environmental Affairs and President of AMAX's Australian subsidiary; under his leadership Climax received numerous prestigious national awards for its utilization of environmental factors in mine design, development and reclamation.

ROY "ANDY" ANDERSON: Chief Building Official, Mesa County and Grand Junction, Colorado; experience as an independent contractor and construction manager for an architectural firm; currently Vice Chairman of the Colorado State Electrical Board and serves on the Advisory Committee developing the Colorado State Landslide Mitigation Plan; currently a part-time student pursuing a geology degree at Mesa College.

STANDISH R. "STAN" BROOME: B.S. Forestry, Colorado State University; currently the Executive Director for Region 10 League for Economic Assistance and Planning, Montrose, Colorado; previously served as County Manager of Garfield and Grand Counties; was employed 8 years by Colorado State Forest Service and for 10 years by the U.S. Forest Service.

ROBERT W. FLEMING: B.S., Oklahoma, M.S., Brown, Ph.D. Geology, Stanford; currently an engineering geologist with U.S. Geological Survey working on large landslides and debris flows; previously with U.S. Corps of Engineers involved in dam-site and water-well investigations; was assistant professor of geology at the University of Cincinnati; currently President of the Colorado Scientific Society.

JANE GNOJEK: B.A. Music Education, University of Colorado Boulder; a Registered Medical Technologist; long active with the League of Women Voters, she now serves as their State Natural Resources Coordinator and legislative lobbyist in the natural resource area.

JERRY C. KEMPF: Vice President of Governmental Affairs for the Colorado-Ute Electrical Association; previously served as Manager of Revenue for the City and County of Denver; prior to that, he was employed by the Colorado Municipal League and the City of Yuma, Colorado; long active in community and business affairs, he's a past Chairman of Club 20.

WILLIAM Y. KLETT, JR.: B.S. and M.S. Geology, University of Georgia; Director of Marketing for CH2M HILL; his 20 years of geotechnical experience includes employment as Manager of Geotechnical Operations and Vice President of Marketing for F.M. Fox and Associates; long active in community and professional affairs; he served on the Board of Directors of the Bear Creek Water and Sanitation District; is a member of the American Institute of Professional Geologists, Society of Mining Engineers and Association of Engineering Geologists; he is a Registered Professional Geologist in the State of Georgia.

SENATOR HAROLD MCCORMICK: B.S.C., University of Denver; currently President Pro Tem of the Colorado State Senate, represents the mineral rich district of Lake, Fremont, Park, Custer and Pueblo Counties; member and former Chairman of the House and Senate Agriculture and Natural Resource Committees; has served in State Legislature since 1961; legislative interests in natural resources, water law, land use, tourism and skiing; business interests in motion picture theatres.

DAVID B. MACKENZIE: B.S. Geology, California Tech, Ph.D. Geology, Princeton University; petroleum geology consultant in the U.S., North Sea and Africa; retired Exploration Manager for Marathon International Petroleum; previously Vice President of Marathon Minerals and Manager of Geological Research for the Marathon Research Center; past President of Rocky Mountain Association of Geologists and the Colorado Scientific Society.

CHARLES W. MARGOLF: B.S. Industrial Eng., Penn State, J.D., University of Pittsburgh School of Law; currently Vice President Coal Development, ColoWyo Coal Company; previously Vice President Western Coal Development, W.R. Grace & Co.; previously employed as Vice President Coal, Water, and Environmental Affairs, Cameron Engineers, Inc.; Wyoming Division Manager, Reynolds Mining Corp., Buffalo, Wyoming; and Attorney Law Dept., Reynolds Metals Company; active in the Rocky Mountain Coal Mining Institute, Member of Society of Mining Engineers of AIME and several Bar Associations.

REPRESENTATIVE RICHARD F. "DICK" MUTZEBAUGH: J.D., Denver University College of Law, Master of Education, Colorado State University; State Representative from Jefferson County since 1983; Republican Caucus Chairman, Vice Chairman of the House Judiciary Committee; member of the Legal Services and Rules Committees; served as a Jefferson County attorney for nine years; lecturer at high schools, universities and Continuing Legal Education classes.

JANE P. OHL: B.S. Geology, Colorado College; currently the Colorado State Mineral Officer, U.S. Bureau of Mines; previously employed as a geologist for the U.S. Geological Survey; active in professional and scientific societies; currently an officer in the Denver Mining Club, a past officer of the Colorado Scientific Society and a Committee Chairman for the Geological Society of America 1988 Annual Meeting.

JOHN M. PARKER: B.S. Geology, Kansas State University; petroleum geology consultant with 44 years experience with major and independent company employment and consulting; primary interests are in the Rocky Mountain region, but also works South America and the North Sea; past President of the American Association of Petroleum Geologists, Rocky Mountain Section of American Association of Petroleum Geologists, Rocky Mountain Association of Geologists and Montana Geological Society.

GEOFFREY SNOW: B.A. Geology, Dartmouth, Ph.D. University of Utah; currently mining consultant and partner in Barranca Resources; previously President of Noranda Exploration, Inc.; worked in metals exploration and management for Dow Chemical Company, Midwest Oil Corp. and Climax Molybdenum Co.; past Counselor of Geologic Society of America and currently Counselor of Society of Economic Geologists.

ROBERT J. WEIMER: B.A. and M.A. Geology, University of Wyoming, Ph.D., Stanford; consulting geologist, Professor Emeritus and former Geology Department Chairman at the Colorado School of Mines; widely known, world-wide lecturer on the geology of petroleum; past President and Honorary Member of the Colorado Scientific Society, the Rocky Mountain Association of Geologists and the Society of Economic Paleontologists and Mineralogists; he was awarded the Sidney Powers Medal (the AAPG's highest award in 1984) and the Ben H. Parker Medal by the American Institute of Professional Geologists in 1986.

KENNETH WRIGHT: B.S. and M.S. Engineering, B.B.A., University of Wisconsin; currently President of Wright Water Engineers which specializes in hydrology, water resource and waste disposal engineering with industrial, government and agricultural clients; although practice emphasizes Colorado, projects include much of the U.S., as well as Australia and South America.