

ANNUAL REPORT
THE GEOLOGICAL SURVEY OF WYOMING
July 1, 1977 to June 30, 1978

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INTRODUCTION

The Wyoming Geological Survey is a State agency, established in 1933, located on the University of Wyoming campus in Laramie. The agency is authorized and operates under Wyoming Compiled Statutes 9-264.1 to 9-264.10 which have been modified periodically through 1976. Functioning under an Advisory Board, the Survey attempts to supply the State with significant and timely reports and maps on all aspects of geology and mineral resources.

Overall operation of the Survey can be summarized into three general categories as:

Services -- Compilation and continuous updating and maintenance of public files and libraries of all new material, records, maps, and data relating to the surface and subsurface geology and mineral resources of the State; and distribution of this information upon request to city, county, and state officials, state and federal agencies, the minerals industries, research organizations, and the general public.

Investigations -- Through field and laboratory studies that contribute new geological information to the State concerning mineral resources, and other matters or problems that have a practical bearing on Wyoming's communities and people, and by conducting cooperative investigations with other state and federal agencies on problems of mutual concern or interest.

Publications -- By publishing timely and significant reports, maps, books, tables, graphs and charts, in an effort to communicate the results of the investigations to other agencies, the minerals industry, and the public.

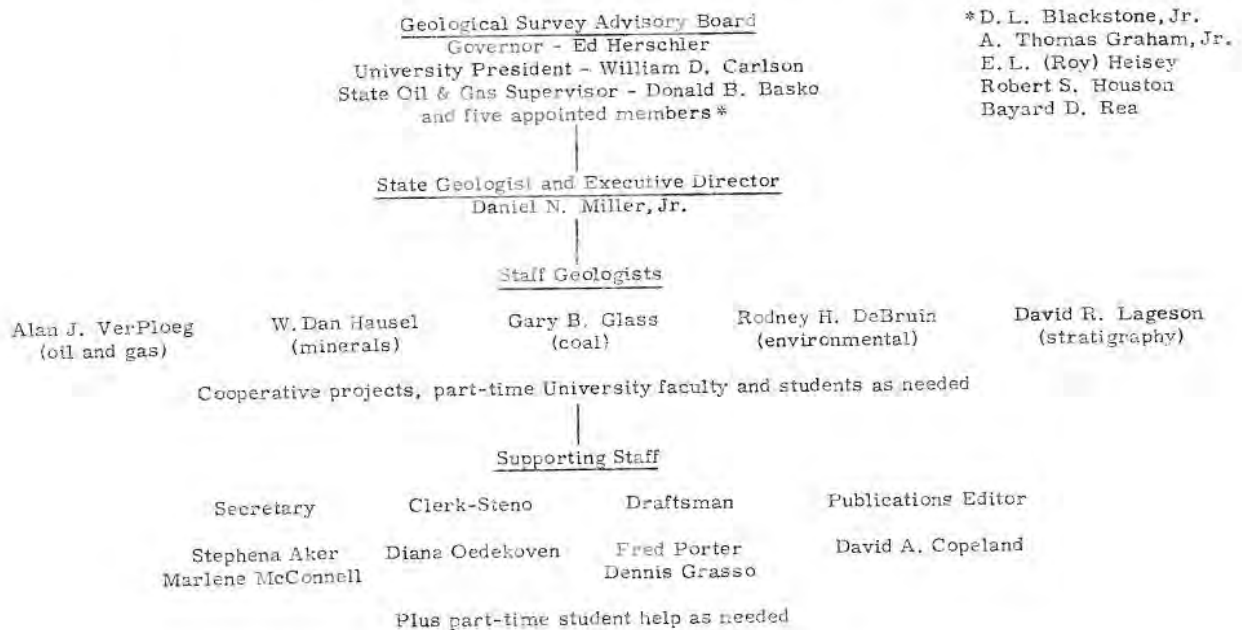
In addition, the Survey's professional staff also functions rather continuously in an advisory capacity for State officials and for all branches of State government on matters directly and indirectly related to minerals, mining, leasing, proposed legislation, and the impact of federal actions.

Activities within the Survey have been steadily increasing since 1969 in an effort to keep pace with exploration and development of the State's mineral and energy resources. A variety of projects are constantly underway that result in new information that is then made available to appropriate city, county, and state officials, state agencies, and the public. Every available means is used to expedite the Survey's investigations so that completed reports and maps are available when needed.

ORGANIZATION

During FY-78 The Geological Survey had an operating staff of 12 full-time employees - a director, five staff geologists, a technical publications editor, two draftsmen, and three secretaries or clerk-stenos. In addition, the agency employed a varying number of part-time student help when necessary to assist with investigations and routine office work.

ORGANIZATIONAL CHART - THE GEOLOGICAL SURVEY OF WYOMING (1978)



Activities center around the productivity of the Staff Geologists who are responsible for five specific areas of expertise - oil and gas, coal, minerals, general stratigraphy, and environmental geology. They maintain current files on all new geologic information for the State, attempt to keep abreast of state, federal, and industrial activity, and conduct appropriate field and laboratory investigations as required. The supporting staff assists with the preparation of the material and eventual printing, and the sale of publications. All Survey staff cooperate in responding to the many thousands of inquiries for geologic and mineral resource information received during the year.

Table I shows the personnel categories and the number of employees in each category during FY 77 and 78, as well as the projected needs anticipated during the coming years.

There is every likelihood that the responsibilities of the Survey will continue to increase just as they have for the past nine years, and that additional professional and clerical help will be needed in the future.

TABLE I

	Projected Staff Needs					
	FY 1977	1978	1979	1980	1981	1982
State Geologist & Director	1	1	1	1	1	1
Deputy Director	0	0	1 *	1	1	1
Staff Geologists	5	5	4	5	5	6
Publications Editor	1	1	1	1	1	1
Publication Sales Clerk	1	1	1	1	1	1
Draftsmen	2	2	2	2	3	3
Laboratory Technician	0	0	1 *	1	1	1
Secretaries	2	2	2	2	2	3
Clerk-Stenos	0	0	1 *	2	2	2
Total Permanent Staff	12	12	14	16	17	19

*Reallocation and new positions authorized by the Legislature in January 1978

In terms of the total number of professional personnel, the Wyoming Survey ranks fifth smallest in the nation behind Louisiana, Massachusetts, South Carolina, and Wisconsin.

MAJOR ACCOMPLISHMENTS BY PROGRAMS

Administration (Budget 01)

During FY-78 the Survey operated under a State appropriated Administration Budget of \$345, 937, and a Publications Budget of \$29, 511. The major accomplishments have been:

1. Design and implementation of a prospecting permit, with preferential right to lease, for diamonds and associated minerals on a 2900 acre test block of State and Union Pacific lands in southernmost Albany County. The procedure was worked out jointly by the State Land Commissioner and the State Geologist in conjunction with representatives of Rocky Mountain Energy Company of Denver. Five mining companies have submitted assessment proposals to the State as the result of this effort. Work is expected to begin during October of 1978.
2. Completion, publication, and distribution of nine formal reports, and maps on geology and mineral resources of the State that are described more completely on pages 7 and 8.

The main thrust of the Survey's activity is to provide public service. In this regard, the following material provides a summation of accomplishments by Section.

Oil and Gas Section (Alan Ver Ploeg) - Throughout the year the Oil and Gas Section continued to receive, classify and file substantial amounts of new subsurface information provided by the petroleum industry and directed through the Wyoming Oil and Gas Conservation Commission. All new discoveries are evaluated with respect to State mineral ownership and reported to the Commissioner of Public Lands. All logs, maps, field reports, and production data are filed and made available for public use. During the year the Section responded to approximately 130 telephone, letter or personal inquiries concerning petroleum and natural gas in Wyoming.

A second revised geologic reference map of Wyoming's Overthrust Belt was published in cooperation with Dr. D. L. Blackstone, Jr., and the Wyoming Geological Association that shows the location of all oil and gas tests and producing fields in portions of Uinta, Lincoln, Sublette and Teton counties, Wyoming, and parts of Utah and Idaho.

In addition, the Section published the oil and gas and geology maps of Sheridan County, and compiled similar maps and text material for Natrona County as part of the County Resource Series Reports 5 and 6.

Mr. Ver Ploeg also completed a special report on Lost Soldier Oil Field, Sweetwater County, that is to be published in the Wyoming Geological Association's Oil Field Symposium. He has also been working with the State Planning Coordinator's Office in an effort to develop State Position Papers with regard to the Federal RARE II roadless area studies.

Minerals Section (W. Dan Hausel) - The Minerals Section functions as a principal source of information on Wyoming uranium, industrial minerals, construction materials, and metal deposits for industry, other government bodies, and the general public. The section also supervises and conducts independent and cooperative investigations on the characteristics and distribution of mineral deposits of all kinds.

During the year the Minerals Section continued the preliminary mapping of diamond occurrences on State lands in south-central Albany County. An effort has been made to develop an assessment procedure that is acceptable to the State and Rocky Mountain Energy Company. Previous analyses conducted by Dr. Malcolm McCallum of Colorado State University, working in cooperation with the Wyoming Geological Survey, produced more than 80 micro-sized diamonds (1-3 mm.) from samples of kimberlite pipes in southeastern Wyoming and northeastern Colorado.

As the result of this work, the State and Rocky Mountain Energy Corporation have now accepted five proposals from industry for further quantitative assessment of a 2900 acre block that will begin in late 1978 following final approval by the State Land Board.

Mr. Hause also completed and published a "Minerals Map of Sheridan County" as part of County Resource Series Report No. 5, and has begun compilation for a new revised edition of the "Mines and Minerals Map of Wyoming", originally published in 1970. He has also begun an update on Bulletin 50, "Mineral Resources of Wyoming", last published in 1966.

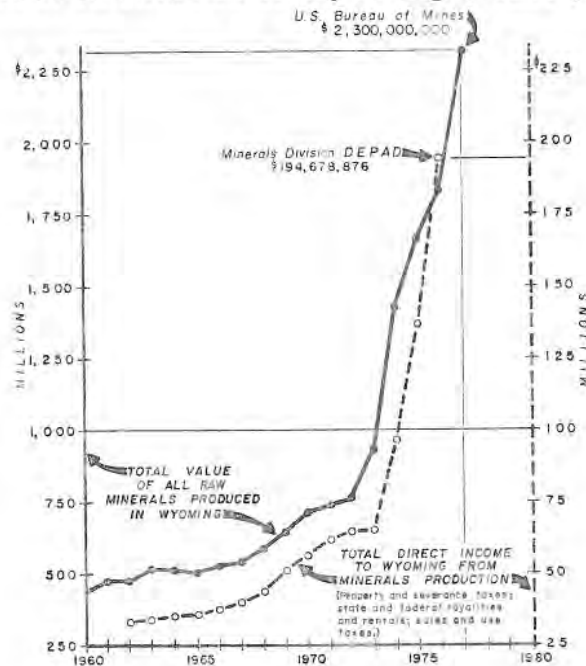


Figure 1 shows the relative rate of increase in the value of Wyoming's overall mineral production and the total direct income to Wyoming from 1960 to 1977.

Coal Section (Gary B. Glass) - The Coal Section responds to all inquiries on coal geology, coal mining, and other coal related matters directed to the Survey. In carrying out its duties the Coal Section conducts field investigations and laboratory analyses, and interprets and publishes information of all kinds for a wide variety of users.

During the year the Section responded to more than 400 telephone and letter inquiries, and was interviewed by 130 individuals seeking advice or information related to coal in Wyoming.

Mr. Glass continues to present talks and lectures on coal related activities to industry, professional, and academic research groups, and educational and governmental organizations. In addition, he prepared a special report on the coal resources of the Ham's Fork Coal Region of Lincoln County that was published in the Wyoming Geological Association Overthrust Belt Guidebook. He also completed a similar report for the Wind River Basin that will be published by the WGA in September 1978.

In response to a request from the State Planning Coordinator's Office, Mr. Glass has also devoted considerable time to preparation of State Position Papers in regard to federal coal leasing policies, and to the RARE II roadless area study.

Mr. Glass has also undertaken additional responsibilities as Deputy Director of the Survey, and has worked extensively to reorganize the contracting, purchasing, accounting, and inventory procedures.

Environmental Section (Rodney DeBruin) - This Section handles responsibility for the environmental aspects and potential problems associated with the State's geology and mineral resources. Mr. DeBruin replaced Dr. Roy Breckenridge in May 1978. The Section completed several large scale maps of Sheridan County as part of the County Resource Series Report, and completed and published Bulletin 60, Thermal Springs of Wyoming.

Mr. DeBruin is presently compiling statewide information on geologic hazards; subsidence landslides, active faults, and flood plains, in cooperation with county planning offices and several state agencies.

Stratigraphy (David Lageson) - Mr. Lageson is the staff coordinator for the County Resource Series Reports, and provides expertise for the State's stratigraphy in responding to inquiries from the staff, the public, industry, and government. He has been mapping in the Overthrust Belt of extreme western Wyoming, and has completed two maps for the Sheridan County Report. Mr. Lageson also published two other reports - Depositional Environment of the Madison Limestone in South Central Wyoming and a petrographic study of selected strata in the northern Salt River Range, Lincoln County.

TABLE II - Percentage of Staff Time Allocation by Section

	<u>Oil & Gas</u>	<u>Minerals</u>	<u>Coal</u>	<u>Environ.</u>	<u>Stratigraphy</u>
Services					
Public	20%	30%	23%	25%	5%
State Agency	10%	15%	7%	5%	-
Federal Agency	5%	10%	3%	5%	15%
Field and Laboratory					
Project Investigations	20%	15%	7%	25%	50%
Data Organization	25%	10%	4%	20%	10%
Report Writing and Editorial Reviews	10%	10%	14%	10%	20%
Administration	5%	5%	41%	5%	-
Other Activities	5%	-	1%	5%	-

It is evident from Table II that the Survey's chief function has been in the broad category of service to the public and industry, and to state and federal agencies. Each Staff Geologist now has a part-time student assistant to expedite the handling of these service related functions; to collect field data, and to help sort and catalog new information that arrives daily.

Publications (Budget 02)

The Publications Section of the Survey consists of a Technical Publications Writer-Editor, David Copeland, and one part-time clerk-typist. Their chief responsibility is to assist the Staff Geologists with the preparation of manuscripts and maps for publication and to negotiate printing in a timely fashion. The following graphs illustrate the productivity and income derived from the sale of publications.

CONTENT OF SURVEY PUBLICATIONS
(1911 TO 1978)



NUMBER OF SURVEY PROJECTS
COMPLETED AND PUBLISHED
PER DECADE

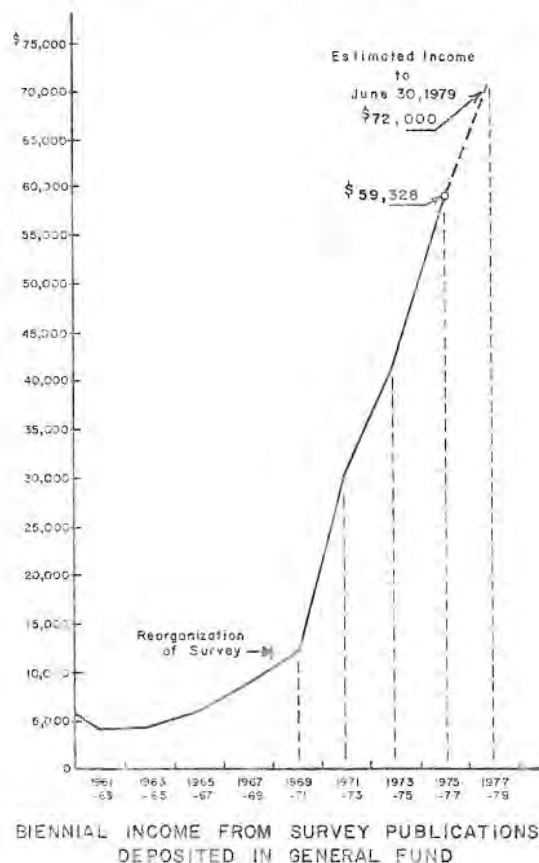
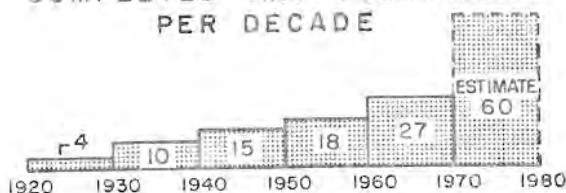


Figure 2. Status of publications activity

During the year the Survey completed, published and distributed the following reports and maps:

Rept. of Investigations No. 12 - Diamond in State-Line Kimberlite Diatremes; 36 pp., M. E. McCallum and C. D. Mabarak. (2nd printing - 1500 copies)

- Prelim. Rept. No. 16 - Late Cretaceous and Early Tertiary Provenance and Sediment Dispersal, Hanna and Carbon Basins; 17 pp. by J. Donald Ryan. (1500 copies)
- Prelim. Rept. No. 17 - Petrography of Selected Rock Samples and a Discussion of Structural Fabric, Northern Salt River Range; 20 pp. by David R. Lageson. (1500 copies)
- Bull. No. 55 - Traveler's Guide to the Geology of Wyoming; 90 pp. by D. L. Blackstone, Jr. (3rd printing, 5000 copies)
- Bull. No. 60 - Thermal Springs of Wyoming; 104 pp. by Roy M. Breckenridge and Bern S. Hinckley. (2000 copies)
- County Resource Series No. 5 (Sheridan Co.) - Geology, Petroleum, Coal, Minerals, Water, Stratigraphy, Land Use, Landforms, Vegetation; 9 sheets by Staff, Wyo. Geol. Survey and Dept. of Geology, Univ. of Wyo. (3000 sets)
- Tectonic Map of the Overthrust Belt, Western Wyoming, Southeastern Idaho and Northeastern Utah, (showing oil and gas drilling and development) 1 colored sheet, D. L. Blackstone, Jr. (revised ed., 1500 copies)
- Public Information Circular No. 7 - Occurrences of Uranium in Precambrian and Younger Rocks, A Symposium of Abstracts by David R. Lageson and W. Dan Hausel, 35 pp.
- Public Information Circular No. 8 - The Wyoming Mineral Industry - 34 pp. by Staff, Wyo. Geol. Survey (2000 copies)
- Reprint No. 33 - Depositional Environments and Diagenesis of the Madison Limestone, Northern Medicine Bow Mountains, 10 pp. by David R. Lageson

In addition, Survey staff members published three articles in the Wyoming Geological Association 1977 Guidebook, presented 23 outside lectures to professional and educational groups, co-hosted a Precambrian uranium seminar for 250 people at the University, and hosted the 70th Annual Meeting of the Association of American State Geologists, in Jackson.

Copies of all publications are distributed free to all county and public libraries in Wyoming, and to agencies and officials in state government. The Survey also participates in an interlibrary exchange program with all other state geological surveys and the U.S. Geological Survey, and contributes copies to the Library of Congress.

During FY-78 the Publications Section spent \$29,511. Income from the sale of publications for the same period amounted to \$29,716. For the overall 1976-78 biennium \$55,950 was spent, and \$62,134 was recovered from sales and returned to the General Fund.

Cooperative Programs (Budget 03)

During the year the Survey either completed or essentially completed three federally funded cooperative investigations, as follows:

Coal Section (Budget 03.07) - Mr. Glass is still attempting to complete the last of the work and the final report for the U.S. Bureau of Mines to determine the strippable coal reserves of the Hanna Basin, Carbon County. During the year he spent \$869 of the grant, and \$1943 remain.

Coal Section (Budget 03.09) - Mr. Glass has completed the lithologic description of four core tests in the Carbon Basin as part of a grant from the U.S. Geological Survey. He spent \$19,600, and there is \$1767 remaining to cover publication costs.

Coal Section - The Coal Section continues to function in an advisory capacity with the Bureau of Land Management grant along with the University Department of Geology on an experimental coal sampling project in the Powder River Basin. No funds are received by the Survey.

Minerals Section (03.10) - All contractual obligations except submittal of the final report have been completed. Preparation is now underway to publish the results as Reports of Investigations 13, 14, 15. During the year the Section spent \$8519, and there is \$401 remaining to help cover publication costs.

Other Cooperative Services - The Geological Survey is the principal source of information within the State on: surface and subsurface geology, oil and gas occurrences, coal, uranium and mineral deposits, natural geologic hazards, geothermal resources, and a host of other related subjects. The staff of the Survey is therefore called upon frequently to review agency reports and other state documents, federal bills before the Congress, University research proposals, and many other items that involve geological interpretation in one form or another. The Survey staff is also called upon with regularity to review and advise on a variety of federal agency proposals from the Bureau of Land Management, DOE, National Park Service, National Forest Service, and the Office of Technology Assessment.

PROBLEM AREAS AND RECOMMENDATIONS

The most important problems that involve both State and Survey affairs, which should be called to the attention of Legislators, are as follows:

1. State Mineral Supervisor - There is an immediate need for the Legislature to reinstate the position of "State Mineral Supervisor", or its equivalent, to assume full responsibility for exploration activity and mineral production on State lands. If a reinstatement of the position is not acceptable, then it is recommended that the responsibility and authority for that position be reassigned preferably to the office of the State Land Commissioner, to the Minerals Division of DEPAD; or, if absolutely necessary, to the State Geologist.
2. State Geologist's Salary - Compensation provisions under the law (9-254.1 and 9-264.3) for the position of State Geologist and Executive Director of the Geological Survey of Wyoming are not being implemented in an appropriate fashion. During FY-78 delays in rulings by the Attorney General's office cost the incumbent, Daniel N. Miller, Jr., in excess of \$1000 in unpaid salary. Each year, for the past seven years, there have been similar losses in income that result from administrative reviews by Legislative Services and the office of the Attorney General. Any relief that can be provided by the Legislature to help straighten out these inequities will be appreciated.
3. Additional supplementary funds will be necessary in FY-79 to cover the increased cost of operating the Geological Survey Building. During the first full year of occupancy of the Survey Building it became obvious that estimated budgeted funds to cover the cost of utilities and maintenance are insufficient. At present the Survey obtains these funds and then compensates the University of Wyoming Physical Plant that supplies the services.

Two requests will be made of the Legislature in 1979:

- a. Now that utility meters are installed, we are in a position to determine the actual cost of operation for - full year services. A supplemental request for \$3000 will be made of the Legislature to cover the increased utility costs for reimbursement to the University.
- b. A recommendation will be made to simplify budgeting and accounting by deleting line items relating to the utilities, maintenance and service of the Survey Building from the Survey's budget, and adding them directly to the Physical Plant budget of the University.

*Note: The Federal General Services Administration pays the State of Wyoming \$5650/year for space leased in the Survey Building by the U.S. Geological Survey.