

A N N U A L R E P O R T
THE GEOLOGICAL SURVEY OF WYOMING
July 1, 1976 to June 30, 1977

August 1977

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I N T R O D U C T I O N

The Wyoming Geological Survey is a State Agency located on the University of Wyoming campus, established in 1933 and modified by the Legislature in 1957 and 1969 (Wyoming compiled statutes 9-264.1 to 9-264.10), and modified again in 1975. As designated by law, the Survey has eleven objectives and operates in an effort to provide information and public services concerning the geology and mineral resources of the State. The Survey functions under an Advisory Board as shown on the Organizational Chart (p. 2).

Since 1969 the activities of the Survey have steadily increased in order to assist with the orderly development of mineral activities in the State and with problems related to potentially impacted areas involving Wyoming's communities and people. In addition, the Survey's staff is now called upon frequently to act in an advisory capacity to State Legislators, legislative committees, State Agencies, and numerous other State and Federal commissions and councils. Since the passage of the new land use and industrial plant siting legislation, the Survey's staff is also called upon to assist planning coordinators and officials in practically all of Wyoming's 23 counties. The Survey's principal objective is to supply the kinds of reports, maps, and data, that are needed in order to respond to these obligations as well as to many thousands of other requests from the mineral industries and the general public.

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

Services -- Compilation and continuous updating and maintenance of files and libraries of all published 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 county and state officials, state agencies, the minerals industries, research organizations, and the general public.

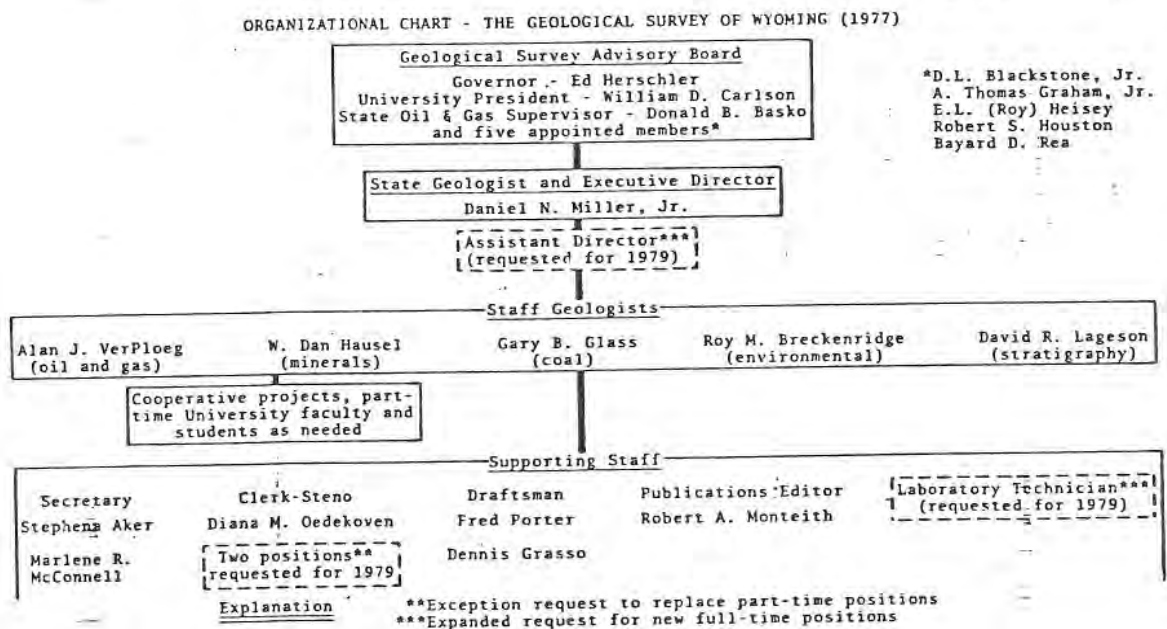
Investigations -- Through field investigations that contribute new geological information to the State concerning mineral resources, and other matters or problems that have a practical bearing on Wyoming's communities and people, and by conducting cooperative investigations with other state and federal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

ORGANIZATION

The Geological Survey presently has a staff of twelve consisting of a director, five staff geologists, a technical publications editor, two draftsmen, and three secretaries or clerk-stenos. In addition, the Survey employs a varying number of part-time student help when necessary to assist with investigations and office activities.

The Organizational Chart illustrates the administrative structure of the present staff, and the positions of four additional personnel that are urgently needed.



During the 1976-77 fiscal year the Survey staff experienced difficulty in keeping up with the responsibilities expected of the agency. Requests for information regarding the State's geology and mineral resources essentially doubled. In addition, Survey personnel have been called upon with greater frequency to act in an advisory capacity to other state and federal agencies, and the University of Wyoming.

Table I shows the personnel categories and the number of employees in each category during 1976-77 and those positions requested in the 1979-80 biennial budget.

TABLE I

	Projected Staff Needs					
	FY 1976	1977	1978	1979	1980	1981
State Geologist & Director	1	1	1	1	1	1
Assistant Director	0	0	0	1**	1	1
Staff Geologists	4	5	5	5	5	5
Publications Editor	1	1	1	1	1	1
Publication Sales Clerk	0	1	1	1	1	1
Draftsmen	1	2	2	2	2	3
Laboratory Technician	0	0	0	1**	1	1
Secretaries	2	2	2	2	2	2
Clerk-Stenos Requested	0	0	0	2*	2	2
Total Permanent Staff	9	12	12	16	16	17
Part-time technical and office help	5	7	8	9	9	9

Table I - Organizational projections of staff requirements to 1981.

* Indicates EXCEPTION positions to replace what were part-time positions in 1976-78.

** Indicates EXPANDED positions requested for 1979-80.

MAJOR ACCOMPLISHMENTS BY PROGRAMS

During the past year the agency operated under four separate budget categories: Administration, Publications, Capital Expenditures, and Cooperative Programs.

Administration (Budget 01)

The main thrust of the Survey's activity is to provide public service with emphasis on the distribution of information through the publication of reports and maps. The Survey attempts to provide timely and significant information regarding the major facets of Wyoming's geology and its relationship to mineral resources and environmental concerns as described under the following categories.

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 150 telephone, letter or personal inquiries concerning petroleum and natural gas in Wyoming.

A new colored geologic reference map of Wyoming's Over-thrust 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.

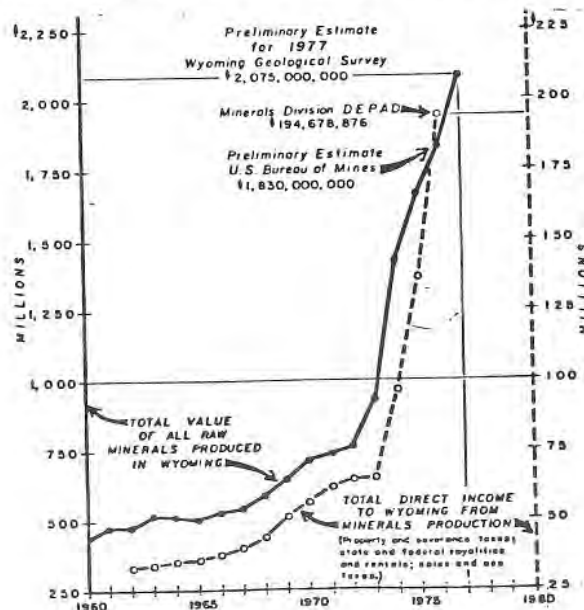
In addition, the Section published the oil and gas and geology maps of Johnson County, and completed similar maps and text material for Sheridan County as part of the County Resource Series Reports 4 and 5.

Minerals Section - (W. Dan Hausel) - The Minerals Section functions as a principal source of information on Wyoming uranium, industrial minerals, 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 a preliminary survey of diamond occurrences on State lands in south-central Albany County. At the request of the State Board of Land Commissioners, Dr. Forrest Root prepared a recommendation for leasing State lands where valuable mineral deposits are either known or highly probable. Since that time an effort has been made to develop a prospecting permit procedure that is acceptable to the State, Rocky Mountain Energy Company and a fee land owner in the first test area. Analyses conducted by Dr. Malcolm McCallum of Colorado State University working in cooperation with the Wyoming Geological Survey has produced more than 80 micro-sized diamonds (1-3mm.) from samples of kimberlite diatremes in southeastern Wyoming and northeastern Colorado.

During the year Dr. Forrest Root resigned from the Staff Geologist-Minerals position and was replaced in August 1977 by W. Dan Hausel. Mr. Hausel was previously employed by the Conservation Division of the U. S. Geological Survey in Casper.

In addition to the preparation of maps for the County Resource Series reports on Johnson and Sheridan Counties, the Minerals Section has prepared a second revised edition of Bulletin 56 "Minerals and Rocks of Wyoming", and compiled numerous tables, graphs and reports for other State agencies the most important of which is shown below.



The graph clearly illustrates the growth rate of the total value of all raw minerals produced in Wyoming since 1960. The preliminary estimate of this value by the end of 1977 will exceed two billion dollars. The total direct income to Wyoming reached \$194,678,876 at the end of 1976.

The Section has also been involved in several federally financed cooperative field investigations described under the heading "Cooperative Programs."

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 450 telephone and letter inquiries, and was interviewed by 120 individuals seeking advice or information related to coal in Wyoming.

Mr. Glass presented numerous talks and lectures on coal related activities to industry, professional and academic research groups, and educational and governmental organizations. In addition, the Section published - "Review of Wyoming Coal Fields, 1976"; participated in two cooperative programs, and completed maps of coal occurrences and activities in Johnson and Sheridan Counties.

Mr. Glass also serves on several committees and participates with various groups on short-term study projects when requested by other State agencies or the University of Wyoming.

Environmental Section (Roy Breckenridge) - This Section handles the primary responsibility of reviewing all of the environmental impact statements directed to this agency, and provides advice to regulatory agencies of the State. During the year Dr. Breckenridge completed a geological assessment of the Greyrocks Dam site project in Platte County and prepared a surficial geology map of portions of the Medicine Bow Mountains. He also compiled several maps for the Johnson and Sheridan County Resource Series Reports and responded to numerous requests from the public with regard to ground water geology.

The Section completed the state-wide investigation of hot springs and is presently compiling data for a geologic hazards map that will help define active faults, subsidence, landslides and flood plains for use by Wyoming's communities and State agencies.

Stratigraphy Section (David Lageson) - The addition of David Lageson to the staff in May of 1977 marked the beginning of the Stratigraphic Section's activities. The role of the Section will be to catalog and index all information on the stratigraphy of the State for use by the other Staff Geologists, the minerals industry, and the public. Mr. Lageson will also act as project coordinator during the preparation of the County Resource Series publications. He will also act in an advisory capacity with regard to all requests relating to paleontology and lithology of the State's sedimentary rocks.

The following table shows an approximation of each Section's man-hour time allocations to major categories of work.

TABLE II

Percentage Of Staff Time Allocation By Section

	<u>Oil & Gas</u>	<u>Minerals</u>	<u>Coal</u>	<u>Environmental</u>	<u>Stratigraphy</u>
Services					
Public	40%	20%	20%	30%	30%
State Agency	5	15	5	25	5
Federal Agency	-	5	5	2	20
Field and Laboratory					
Project Investigations	25	35	12	20	25
Data Organization	25	5	5	5	3
Report Writing and					
Editorial Reviews	-	20	43	13	15
Administration	5	-	10	5	2

It is evident from the Time Allocation Table that the major accomplishments of the Survey are services to the public and industry representatives, and to County, State and federal agencies. The Survey has now reached the point where each Staff Geologist needs a part-time student assistant to expedite the handling of these service related functions; to collect field data, to help sort and catalog new information that arrives almost daily, and to generally assist the staff with public inquiries.

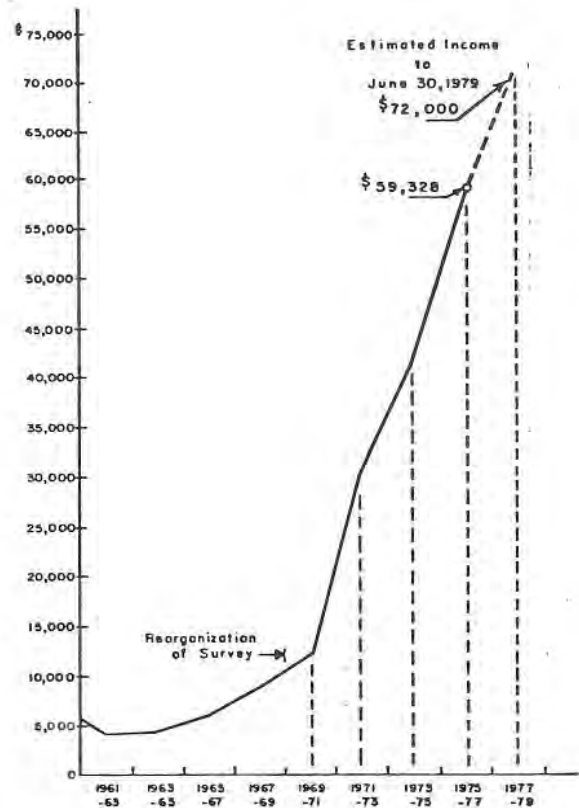
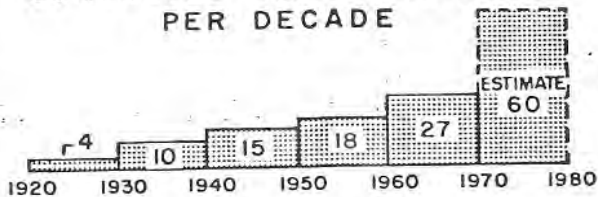
Publications (Budget 02)

The Publications Section of the Survey consists of Technical Writer-Editor, Robert A. Montieth, 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 contracts in a timely fashion. The following graphs illustrate the productivity and income derived from the sale of publications.

CONTENT OF SURVEY PUBLICATIONS
(1911 TO 1977)



NUMBER OF SURVEY PROJECTS
COMPLETED AND PUBLISHED
PER DECADE



BIENNIAL INCOME FROM SURVEY PUBLICATIONS
DEPOSITED IN GENERAL FUND

During the year the Section published the following material of both scientific and public interest.

- Mineral and Mining Laws of Wyoming (Revisions for 1974, 1975, 1976)
- Bulletin 56 - Minerals and Rocks of Wyoming (Revised 2nd Edition)
- CRS-4 - County Resource Series Report - Johnson County, Wyoming
- Tectonic Map of the Overthrust Belt, Wyoming
- Public Information Circulars Numbers 4, 5, and 6
- Teacher's Guide to the County Resource Series (Instruction Booklet)
- Careers in Geology (pamphlet)
- Geological Survey of Wyoming (pamphlet)
- 12 2-minute tape narrations for radio use
- 35 mm. slide presentation on map making (for teachers)
- 1977 Source Book Geologic Information and Consultants List

In addition, the staff helped to develop two manuscripts for publication by the Wyoming Geological Association to appear in the forthcoming Overthrust Belt guidebook. Copies of all publications are distributed free to county and public libraries 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.

Capital Expenditures (Budget 70)

Dedication and cornerstone ceremonies for the new Wyoming Geological Survey Building were held on the University campus in Laramie on September 11, 1976. During September, October and November, Survey personnel helped with the move into the new quarters and installed new furnishings and most of the equipment that was planned.

The operation of the building's mechanical systems were tested and serviced many times by safety inspectors and University personnel through the winter months. By July 1977 the building was completely operational.

As of August 1977 the building is functioning very well and there have been no significant problems with design or construction.

The Geological Survey reimburses the University of Wyoming for all utilities and for janitorial services related to the operation of the building.

The Attorney General's office is still attempting to negotiate a lease agreement with the General Accounting Office for space occupied by U.S. Geological Survey personnel.

Cooperative Programs (Budget 03)

During the year the Survey engaged in three federally funded cooperative investigations as follows:

Minerals Section - (Budget 03.10) - Approximately \$10,000 were utilized during the year from a cooperative grant with the Geologic Division of the U.S. Geological Survey involving the mapping, sampling and analysis of Precambrian rocks in the Medicine Bow Range and Sierra Madre with special emphasis being given to occurrences of uraniferous material and gold in the conglomerates.

Coal Section - (Budget 03.07) - About \$6,500 of this grant was used during the past year from a cooperative grant with the U.S. Bureau of Mines to ascertain the strippable coal reserves in the Hanna Basin of Carbon County.

Coal Section - (Budget 03.09) - Is a carry over from the previous year involving a cooperative arrangement with the Conservation Division of the U.S. Geological Survey relating to the core drilling of coal deposits in the Carbon Basin. The project has been completed.

In addition, the Coal Section continues with a U.S. Bureau of Land Management cooperative agreement wherein the Survey is a cooperator along with the University of Wyoming Department of Geology. The Survey contributes man-power and time to this experimental coal sampling project but receives no funds.

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 are 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, ERDA, National Park Service, National Forest Service and the Office of Technology Assessment.

PROBLEM AREAS AND RECOMMENDATIONS

For the first time in its history, since 1933, the Wyoming Geological Survey has adequate work space and facilities in which to conduct its operation as prescribed by law. 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 Geologist - Salary: The Legislature should take immediate steps to amend or to otherwise clarify, the salary of the State Geologist and Executive Director of the Geological Survey. The total salary is presently made up of two parts: the salary set by law for the State Geologist during the six year appointment term, and the salary established by the Governor after consultation with the Advisory Board for the position of Executive Director (1975 Cumulative Supplement 9-254.1 and 9-264.3). In recent years the salary has fluctuated substantially because of various rulings by the Attorney General.

Recommendation - That the appropriate legislative committee consult with the Survey's Advisory Board and the Governor in an effort to establish the procedure to be used in determining the salary of the State Geologist and Executive Director of the Survey. Such a procedure could be modeled after the law presently applied to the position of State Engineer (9-140, 1975 Cumulative Supplement) that allows the salary to be classified by the Personnel Commission.

2. State Mineral Supervisor - Until about 1968 there was a position of State Oil, Gas and Mineral Supervisor in State government. The position was then modified to just State Oil and Gas Supervisor and the "Mineral" portion was left out. At present there is no position of State Mineral Supervisor at a time when mineral production from State lands is rapidly increasing, and becoming much more complicated.

There is an immediate need for the Legislature to reinstate the position of State Mineral Supervisor, or its equivalent, to assume full responsibility for oil, gas, coal, and mineral production on State lands

and assume the other responsibilities associated with these activities. The position should probably be placed in the office of the State Land Commissioner in Cheyenne where complete records are available. Mr. A. E. King, State Land Commissioner should be consulted as soon as possible on this matter. As an alternative, the Legislature may wish to assign the duties normally expected of a State Mineral Supervisor in another fashion; but, in any event there is an immediate need for someone to assume these responsibilities in State Government.

3. State Mapping Coordinator - There is an immediate need for the State to develop the position of State Mapping Coordinator to expedite the mapping programs of State agencies, with authority to initiate and execute contracts with the federal government. The coordinator should be assigned to one of the State agency offices that has adequate map reproduction capability, and should be provided with enough clerical help to operate effectively.
4. Geological Survey Staff - At present each of the five operational sections; oil and gas, coal, minerals, stratigraphy and environmental are one-man operations. In every case the work load expected of each section continues to increase substantially with the momentum of mineral activity, and federal involvement. It has now become necessary to assign part-time student assistants to each section to help expedite the work and recommendations are included in the 1979-80 Biennial Budget Request for additional part-time salaries. Furthermore, we have requested that two part-time clerical positions be up-graded to full-time positions to handle the increasing volume of filing, indexing and typing that must be done.

In addition, the Survey is also requesting two additional expansion positions in the Biennial Budget Request; an Assistant or Deputy Director, and a Laboratory Technician to assist with the greatly increased administrative and technical parts of the Survey's operation.

It is quite clear that in the years ahead, the services rendered by this agency will be expected to increase, and that the scope and responsibilities will broaden. Immediate consideration should be given now to these personnel needs.

5. Equipment Requests - Also included in the 1979-80 Biennial Budget Request is the justification for the purchase of analytical equipment for the laboratories including an 8 mm. Micro-film Reader-Printer. Our staff rely heavily on electrical logs of oil well drill holes to calculate geologic and engineering properties of strata. Micro-film of more than 15,000 electrical logs will soon be available for use by the staff and the public. These files are essentially useless until a reader-printer becomes available.

In the Publications part of the Survey's budget (02), there is a request for \$25,000 to permit the publication of reports and maps that are needed now by Wyoming's communities and other State agencies. The graph on page 7 showing the biennial income from the sale of publications demonstrates the Survey's ability to recover funds used for this purpose.

SUMMATION

The Wyoming Geological Survey continues to function in a productive manner fulfilling the requirements prescribed by law and developing new information important to the State's future. Several additional part-time and two additional full-time personnel are urgently needed to carry out administrative and technical responsibilities. The Publications Section is attempting to improve its operation to meet the growing needs of the State.

State Legislators should arrange as soon as it is practical to: review the procedure for establishing the salary of the State Geologist and Executive Director of the Survey, consider the reinstatement of the position of State Mineral Supervisor, authorize a new position of State Mapping Coordinator, and review and authorize personnel and equipment requests described in the 1979-80 Biennial Budget Request.