THE GEOLOGICAL SURVEY OF WYOMING

Daniel N. Miller, Jr., State Geologist

Thirty-Eighth Biennial Report of the State Geologist for 1975-1978

Wyoming Geological Survey Building

Laramie

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DANIEL N. MILLER, JR.
DIRECTOR AND
STATE GEOLOGIST

STAFF GEOLOGISTS
ROY M. BRECKENRIDGE
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November 6, 1978

The Honorable Ed Herschler
Governor of the State of Wyoming
State Capitol Building
Cheyenne, Wyoming 82002

Sir:

Submitted herewith is the Thirty-eighth Biennial Report of the State Geologist covering the period from July 1, 1975 to June 30, 1978, as required by Article 11, Section 9-252, Wyoming Compiled Statutes, 1957.

The timing on this report has been altered by one additional year in order to more nearly coincide with the Legislative budget session that has recently been changed to even numbered years.

Respectfully submitted,

Daniel N. Miller, Jr.

Daniel N. Miller, Jr.
State Geologist

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FOR THE

GEOLOGICAL SURVEY OF WYOMING

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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 1977. 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 1970 in an effort to keep pace with exploration and development of the State's mineral and energy resources. A variety of projects and programs are constantly underway that result in new geologic information that is prepared, published and distributed. Every available means is used to expedite the Survey's investigations so that complete reports and maps are available when needed.

ORGANIZATION AND ADMINISTRATION

Since 1975 the Survey's professional and supporting staff has increased to 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 varying numbers of part-time student help to assist with investigations and routine office work.

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.

ORGANIZATIONAL CHART - THE GEOLOGICAL SURVEY OF WYOMING (1978)

Geological Survey Advisory Board
Governor - Ed Herschler
University President - William D. Carlson
State Oil & Gas Supervisor - Donald B. Basko
and five appointed members *

*D. L. Blackstone, Jr.
A. Thomas Graham, Jr.
E. L. (Roy) Heisey
Robert S. Houston
Bayard D. Rea

State Geologist and Executive Director
Daniel N. Miller, Jr.

Staff Geologists

Alan J. VerPloeg (oil and gas)	W. Dan Hausel (minerals)	Gary B. Glass (coal)	Rodney H. DeBruin (environmental)	David R. Lageson (stratigraphy)

Cooperative projects, part-time University faculty and students as needed

Supporting Staff

Secretary	Clerk-Steno	Draftsman	Publications Editor
Stephena Aker Marlene McConnell	Diana Oedekoven	Fred Porter Dennis Grasso	David A. Copeland

Plus part-time student help as needed

Table I shows the personnel categories and the number of employees in each category during FY 77 and FY 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.

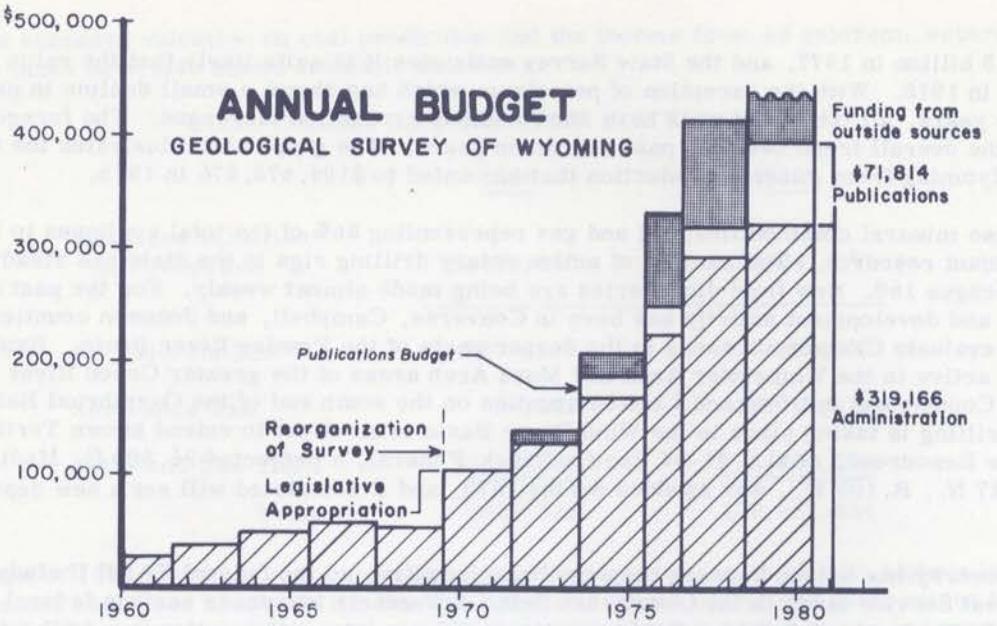
TABLE I

	FY 1977	1978	Projected Staff Needs 1979	1980	1981	1982
State Geologist and 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
	12	12	14	16	17	19

There have been several personnel changes during the three year period. Sally L. Petersen, technical-writer-editor, was replaced by Robert Monteith, and he in turn was replaced by David A. Copeland in 1977. Dr. Roy M. Breckenridge resigned to assume a position with the Idaho Bureau of Mines and Geology, and was replaced by Rodney H. DeBruin. Alan VerPloeg has replaced William G. Wendell as head of the oil and gas section, and W. Dan Hausel has replaced Dr. Forrest K. Root.

Several new positions were added - David R. Lageson is now head of the stratigraphy section; and there are now two full-time draftsmen and an additional clerk-steno.

The operating budget (Administration plus Publications) of the Survey has steadily increased since publication of the last Biennial Report in 1975.

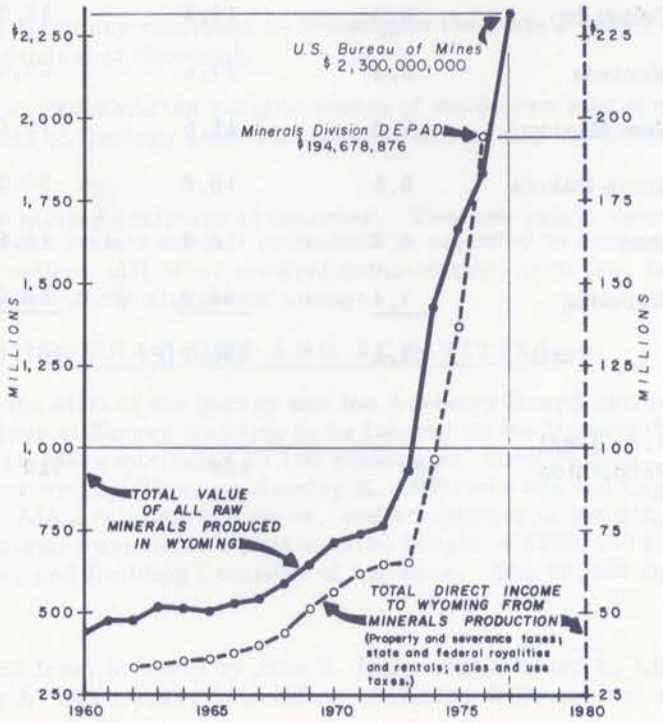


During the same time the Legislature approved funding for a new 22,400 square foot Wyoming Geological Survey Building that was completed at an overall cost of $950,000, and dedicated September 11, 1976. The design of the building was done by the Survey staff and implemented by Henry Therkildsen, AIA Architect of Casper, Wyoming.

After two years of occupancy the building has proven quite satisfactory in every way. Approximately 1100 square feet of office space on the second floor is now under lease to the USGS.

WYOMING'S MINERAL PRODUCTION AND RELATED GEOLOGICAL ACTIVITIES

The value of Wyoming's overall mineral production including oil and gas continues to escalate. The U.S. Bureau of Mines has conservatively estimated that the total value of raw minerals produced



reached $2.3 billion in 1977, and the State Survey estimates it is quite likely that the value will exceed $2.7 billion in 1978. With the exception of petroleum which has shown a small decline in production in the past few years, all other minerals have shown steady production increases. The foregoing graph illustrates the overall trend over the past seventeen years. The graph also illustrates the total direct income to Wyoming from mineral production that amounted to $194,678,876 in 1976.

Of these mineral commodities, oil and gas representing 56% of the total continues to be Wyoming's most significant resource. The number of active rotary drilling rigs in the state has steadily increased and now averages 160. New field discoveries are being made almost weekly. For the past several years exploratory and development activity has been in Converse, Campbell, and Johnson counties as industry attempts to evaluate Cretaceous sands in the deeper parts of the Powder River Basin. Exploration continues to be active in the Wamsutter Arch and Moxa Arch areas of the greater Green River Basin of Sweetwater County; and in Uinta and Lincoln counties on the south end of the Overthrust Belt. In addition, very deep drilling is taking place in the Wind River Basin in an effort to extend known Tertiary gas fields. The Rainbow Resources, et al., #1-34 Pacific Creek-Federal, a projected 26,500 ft. Madison test in Sec. 34, T.27 N., R.103 W., was spudded during 1978, and if completed will set a new depth record for Wyoming.

Controversy has arisen between the petroleum industry and the federal RARE II study efforts involving Forest Service lands in the Overthrust Belt. For nearly two years various federal restrictions have delayed all aspects of Industry field operations. In one interesting instance a drill site had to be relocated in order to avoid damaging a stand of "loco weed" because this species of plant is on the federal Endangered Species List.

Coal production continues to increase rather dramatically throughout the western states, but especially in Wyoming where the total production is expected to reach 60 million tons per year in 1978.

WESTERN COAL PRODUCTION

(Millions of tons)

	1970	1977	1978 (Est.)
Arizona	0.1	11.8	11.9
Colorado	6.0	12.5	14.5
Montana	3.4	27.6	29.0
New Mexico	7.4	11.6	15.0
North Dakota	5.6	18.8	20.5
Utah	4.7	8.8	16.9
Wyoming	7.4	44.0	60.0
Total	34.6	135.1 (P)	167.8
U.S. Total Production	603	689	710 (Est.)

Both the assessed valuation on coal production and the income from ad valorem, severance, and sales and use taxes have also shown dramatic increases.

COAL INCOME AND TAXATION IN WYOMING

	1969	1977
Assessed valuation on Production	$5,158,890	$182,641,777
Ad Valorem Tax	$278,203	$11,216,632
Severance Tax	51,592	17,716,252
Sales and Use Tax	53,000	1,700,000
Total	$382,795	$30,632,884

By the end of 1978 Wyoming coal production will probably rank fourth or fifth highest in the nation. Several new mines have been opened in the Powder River and Hanna basins and older mines have expanded their operations. Special high volume equipment designed for Wyoming strip mines is largely responsible for the increased production. As an example, unit trains are now being loaded at the rate of 10,000 to 11,000 tons per hour for shipment to markets over 1500 miles away.

The moratorium on federal coal leasing begun in 1971 is still in effect causing no end of concern among industry officials.

There has been rather continuous small scale experimentation during the past few years with in-situ coal gasification at shallow depths in the Hanna Basin by the Department of Energy (U.S. Bureau of Mines), and in the Powder River Basin by Lawrence Livermore Laboratories. Both organizations are reporting successful operational results, but acknowledge that many more years will be required to reach a commercial pilot plant scale.

Uranium exploration and production in Eocene strata continues to expand into new areas in the Red Desert Basin and in northern Albany County. Market prices have increased to a point where lower grade deposits now appear economic.

Rocky Mountain Energy Company continues to investigate the State's only Precambrian deposits at Copper Mountain 20 miles northeast of Shoshoni.

Radioactive anomalies in Precambrian conglomerates of the Sierra Madre and Medicine Bow Mountains discovered by Department of Geology students from the University has created renewed interest in that area.

Activity involving trona mining continues to increase. Two new mines have become operational during the past few years and the State's overall production is expected to show a dramatic increase when they are finally on production. All other mineral commodities, iron ore, bentonite, gypsum, feldspar, etc., continue to function without significant change.

OPERATIONS AND ACTIVITIES

During 1973 and 1974, the staff of the Survey and the Advisory Board carried out the initial planning for a new Wyoming Geological Survey Building to be located on the University campus. Initial planning funds of $10,000 (plus $10,000 contributed by 100 companies, corporations, and individuals in the minerals industry*) were approved by Governor Stanley K. Hathaway and the Legislature that lead to the hiring of Henry Therkildsen, AIA Architect of Casper, and completion of the schematic and working drawings in 1974. The Legislature approved a construction budget of $950,000 in 1975, and the contract was let to Spiegelberg Lumber and Building Company of Laramie. The 22,400 square foot two-story

* Contributions were solicited from industry by John S. Runge and Richard K. Lisco of the Advisory Board with the help of Dr. James A. Barlow, Jr., President of Barlow & Haun, Inc. of Casper.

stone and brick building was completed and a dedication ceremony was held September 11, 1976. Mrs. Thyra Thomson, Secretary of State, unveiled the new State Seal, sculptured by Evan S. Groutage, that was mounted on the stone facing at the front of the building. Mr. Groutage, a draftsman with the Wyoming Geological Survey from July 1973 to February 1977, designed the Seal with Mrs. Thomson's assistance to conform specifically with the law. This was the first State Seal that conformed to all of the requirements, and was displayed to the public for the first time on the Survey building.

Dr. Charles J. Mankin, State Geologist of Oklahoma, presented the dedication address. Governors Stanley K. Hathaway, Ed Herschler, and all members of the Advisory Board were in attendance.

The Survey staff moved into the building later in 1976, and new furniture and equipment continued to arrive well into 1977. Since then the building has continued to function very well through the cooperative maintenance efforts of the University Physical Plant.

Survey operations have expanded somewhat since the move into the new facilities, and the addition of new equipment. For the most part, the new building has made it possible to expedite all aspects of the Survey's operations.

Services

The Survey's principal service function is to respond to inquiries from the public and industry, and to assist the executive and legislative arms of state government wherever possible. In addition, the Survey works cooperatively with agencies of the federal government on projects of mutual concern. In recent years the Survey has been deluged with requests from federal agencies and their sub-contractors (university faculty, private consultants, and research groups) for information on the State's energy and mineral resources, and related environmental concerns. Between 5000 and 6000 requests for information are being processed each year by the Survey's staff.

Continuing Services (1975-1978)

Monthly participation by the State Geologist as a Commissioner on the Wyoming Oil and Gas Conservation Commission.

Weekly tally of all drilling activity for oil and gas with respect to State mineral ownership for the State Board of Land Commissioners.

Monthly participation by the State Geologist in the State Interdepartmental Water Planning Conference.

Screening of applications for fossil removal permits for the State Board of Land Commissioners.

Frequent participation by the Survey professional staff through informal seminars and lectures for Wyoming's professional, educational, civic and social organizations.

Continuous publication of Public Information Circulars on significant geological and mineral resource activity in the State.

On call in an advisory capacity to all State officials and agencies.

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, Department of Energy, National Park Service, National Forest Service, and the Office of Technology Assessment.

Activities

The Survey is divided into five operational sections; oil and gas, minerals, coal, environmental and stratigraphy. Each section is essentially a one-man operation that functions with the help of one or more part-time graduate student assistants. The specific investigations conducted by each section from 1975 through 1977 are described in the Annual Reports submitted to the State at the close of those fiscal years. The following report will serve to update the activities of each section during FY-78.

Oil and Gas Section (Alan VerPloeg) - 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. VerPloeg 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 reviewed five proposals from industry for further quantitative assessment of a 2900 acre block, and awarded an exclusive assessment permit to Cominco American of Spokane, Washington. At present Cominco is resurveying all property lines in the area and making plans for an extensive sampling program that will begin in the spring of 1979.

Mr. Hausel also completed and published a "Minerals Map of Sheridan County" as part of a County Resource Series Report No. 5, and has nearly completed 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.

Coal Section (Gary B. Glass) - The Coal Section reponds 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 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 H. 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 R. 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.

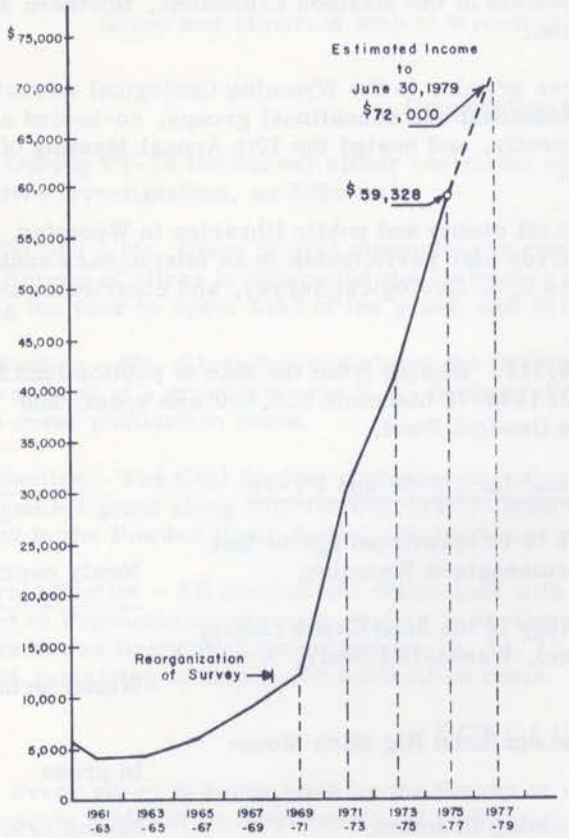
TABLE II - Percentage of Staff Time Allocation by Section

	Oil & Gas	Minerals	Coal	Environ.	Stratigraphy
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%	-

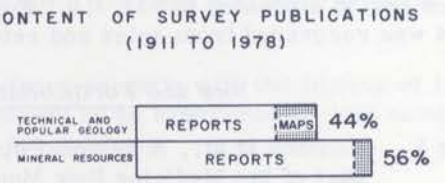
It is evident from Table II that the Survey's chief function has been in the broad category of service to the public and industry, and to state and federal agencies. Each Staff Geologist now has a part-time student assistant to expedite the handling of these service related functions; to collect field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

Publications

The Publications Section of the Survey consists of a Technical Publications Writer-Editor, David A. Copeland, and two part-time clerk-typists. 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.



BIENNIAL INCOME FROM SURVEY PUBLICATIONS DEPOSITED IN GENERAL FUND



During FY-78 the Survey completed, published and distributed the following reports and maps:

Rept. of Investigations No. 12 - Diamond in State-Line Kimberlite Diatremes, Albany County, Wyoming and Larimer County, Colorado; 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 (Abstracts); 35 pp., by David R. Lageson and W. Dan Hausel.

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.

New and Forthcoming Publications for FY-78 and FY-79

Memoir 1	Houston et al., A regional study of rocks of Precambrian age in that part of the Medicine Bow Mountains in southeastern Wyoming.	Newly reprinted
Memoir 2	Bown, Geology and mammalian paleontology of the Sand Creek facies, Lower Willwood Formation (Early Eocene), Washakie County, Wyoming.	Winter printing
Bulletin 48	Osterwald, Structure and petrology of the northern Big Horn Mountains, Wyoming (reprint).	In press
Bulletin 61	Copeland and Banks, Bibliography of Wyoming Uranium.	Spring printing
Bulletin 62	Nace, Bibliography of Wyoming geology, 1950-1959.	Winter printing
Bulletin 63	Grande, Field guide to the fossils of the Green River Formation, with a review of the fish.	Spring printing
PR-17	Lageson, Petrography of selected rock samples and a discussion of structural fabric, northern Salt River Range, Lincoln County, Wyoming	Recently published
RI-13	Karlstrom and Houston, Stratigraphy and uranium potential of the Phantom Lake and Deep Lake groups, Medicine Bow Mountains, Wyoming.	Winter printing
RI-14	Graff, Stratigraphy of the Early Proterozoic (Precambrian X) rocks of the Sierra Madre, Wyoming.	Winter printing
RI-15	Lanthier, Stratigraphy and structure of the lower part of the Precambrian Libby Creek Group, central Medicine Bow Mountains, Wyoming.	Winter printing
RI-16	Glass, Coal analyses and lithologic descriptions of five core holes drilled in the Carbon Basin of southcentral Wyoming.	In press
PIC-8	WGS Staff, The Wyoming mineral industry	Recently published

PIC-9	Glass, Wyoming coal fields, 1978.	Winter printing
CRS-5	Sheridan County Resource Series Report.	Recently published
CRS-6	Natrona County Resource Series Report.	Spring printing
	Mines and Minerals Map of Wyoming (Second Ed. 1979).	Winter printing

Cooperative Programs

During FY-78 the Survey either completed or essentially completed three federally funded cooperative investigations, as follows:

Coal Section - 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 - Mr. Glass has completed the lithologic description of four special 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 - All contractual obligations with the U.S. Geological Survey have been completed with regard to Precambrian uranium studies in southern Wyoming. 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.

CONCLUSIONS

Every effort is being made by the Survey to expedite publication of the kinds of semi-technical maps and reports that will be most beneficial to Wyoming's communities, people, and industry. But, in addition, readers are advised that the Survey is the State's repository for topographic, geologic, paleontologic, and energy and mineral resource information that arrives almost daily as the result of other state and federal agency, and industrial activity. Persons desirous of information on any of these subjects should inquire about its availability by calling (307) 742-2054 or (307) 766-2286, or by writing the Wyoming Geological Survey, P.O. Box 3008 University Station, Laramie, Wyoming 82071.

As mineral and mine related industrial activity continues to expand in parts of Wyoming, as competition for the State's ground water increases, and as the Executive Branch of State Government continues to cope with the deluge of federal regulatory controls, the demands on the Geological Survey become increasingly more complex. In an effort to help meet these demands the staff has prepared and published, in cooperation with the Minerals Division of the Department of Economic Planning and Development, such things as Mineral and Mining Laws of Wyoming with annual updates, the Coal Directory, a Source Book of Geological Information including a cross-indexed reference list of geological consultants, and an assortment of material published in the Public Information Series. To meet the special needs of planners and county officials, the Survey publishes the County Resource Series that includes other items of environmental concern. At times the Survey is called upon to design and prepare, in cooperation with the State Land Commissioner, such things as exploration and lease forms for geothermal resources, fossil removal permits, or prospecting permits for diamonds.

Neither is there an end to the expanding role that the Survey will be called upon to play in the future in helping to forecast the extent of new exploration and development, levels of mineral production, or mineral market trends. Hence, the functions of the Survey constantly change depending upon the needs of the State. Here again, if you have questions, or would like to obtain more information on these or any related subjects, contact the Survey office and the staff will do what they can to assist you.