

## Wyoming State Geological Survey FY2016 Annual Report

Thomas A. Drean, Director and State Geologist, Wyoming State Geological Survey

### Agency Contacts

Christina George, Outreach and Publications Manager, Wyoming State Geological Survey  
(307) 766-2286 x231  
[christina.george@wyo.gov](mailto:christina.george@wyo.gov)

Kathy Olson, Administration Manager, Wyoming State Geological Survey  
(307) 766-2286 x239  
[kathy.olson@wyo.gov](mailto:kathy.olson@wyo.gov)

Wyoming State Geological Survey  
P.O. Box 1347  
Laramie, WY 82073  
[www.wsgs.wyo.gov](http://www.wsgs.wyo.gov)

### Year Established

1933

### Statutory References

W.S. 9-2-801 Definitions (amended by Chap. 170, Session Laws of Wyoming 1997)  
W.S. 9-2-803 State Geologist, duties and powers  
W.S. 9-2-804 Geological Survey, location and headquarters  
W.S. 9-2-805 Geological Survey, duties and disposition of materials and specimens  
W.S. 9-2-806 State Geologist as chief administrative officer; appointment of employees  
W.S. 9-2-807 Geological Survey Board and operation  
W.S. 9-2-808 Authority to cooperate and exchange information  
W.S. 9-2-809 Use of University of Wyoming students  
W.S. 9-2-810 Cooperation with the U.S. Geological Survey  
W.S. 30-5-103 State Geologist participation on the Oil and Gas Commission  
W.S. 33-41-107 State Geologist participation on the Board of Professional Geologists (as amended by Chap. 170, Session Laws of Wyoming)  
W.S. 36-6-102 Submission, custody and confidentiality of subsurface log reports  
W.S. 36-6-105 Inspection reports for State Lands

### Organizational Structure

The Wyoming State Geological Survey (WSGS) has 23 full-time benefited staff positions (see chart for details). The WSGS has an Advisory Board. The board consists of the Governor, a University of Wyoming member appointed by the university president, the State Oil and Gas Supervisor, the State Geologist, and five appointed members.

In addition, the State Geologist serves as a commissioner on the Wyoming Oil and Gas Conservation Commission (W.S. 30-5-103), as a board member of the Wyoming Board of Professional Geologists (W.S. 33-41-107), as a commissioner for the Enhanced Oil Recovery Institute, and as a member of the Wyoming Consensus Revenue Estimating Group (CREG).

### Clients Served

Other local, state and federal government agencies, the Wyoming Legislature, industry, non-governmental organizations, the public, news media and education community.

| <b>Budget Information<br/>(FY2016)</b> |                       |
|--|-----------------------|
| General Funds<br>(Expenditures)        | 2,141,150.00          |
| Federal Grant Funds                    | 110,679.00            |
| State Grant Funds                      | 205,950.00            |
| Other Funds*                           | 15,962.00             |
|  | <b>\$2,473,741.00</b> |
| *Sales Reverted to State General Fund  |                       |

### **Basic Facts**

The WSGS has 23 legislatively approved positions and operated with a biennium budget of \$4,968,810 (2015-2016), not including exception requests or adjustments. The funding sources for the budget include general funds as well as state and federal grants. Research programs and divisions include the following:

- Energy and Mineral Resources
- Water Resources, Mapping, and Hazards
- Geographic Information Systems and Information Management
- Publications and Communications
- Administration
- Human Resources

### **Mission**

The mission of the WSGS is to promote the beneficial and environmentally sound use of Wyoming's vast geologic, mineral, and energy resources while helping to protect the public from geologic hazards. By providing accurate information and expanding knowledge through the application of geologic principles, the WSGS contributes to the economic growth of the state and improves the quality of life of Wyoming's residents.

The WSGS works to (1) study, examine, and understand the geology, mineral resources, and physical features of the state; (2) prepare, publish, and distribute (free or for sale) reports and maps of the state's geology, mineral resources, and physical features; and (3) provide information, advice, and services related to the geology, energy and mineral resources, hazards, and physical features of the state.

### **Wyoming Quality of Life Result**

Wyoming natural resources are managed to maximize the economic, environmental, and social prosperity of current and future generations.

### **Contribution to Wyoming Quality of Life**

The WSGS strives to provide decision makers with the best science possible to ensure that responsible resource development occurs to benefit Wyoming residents, promote economic prosperity and protect state resources. In addition to ensuring that Wyoming has the geologic, and geohydrologic information necessary to solve existing problems and anticipate future challenges, the WSGS collaborates closely with other state and federal agencies, various organizations, and stakeholders to solve multidisciplinary problems. The WSGS also supplies the geologic knowledge necessary for the beneficial and responsible development of Wyoming's unconventional energy resources.

While working to increase public awareness, the WSGS endeavors to provide Wyoming residents with the most accurate, up-to-date information on geologic hazards, natural resource and energy issues, water issues, and other geology-related topics so they can make informed decisions about issues that affect them. The WSGS aims to reduce risks associated with geologic hazards such as landslides, volcanism, earthquakes, avalanches, and floods, and also works in collaboration with the Yellowstone Volcano Observatory.

## **Report Narrative – FY2015 Projects Completed**

(Reporting Period: July 1, 2015 – June 30, 2016; all reports are available on the agency’s website.)

### *Zeolite Resources in Wyoming*

The WSGS published (June 2016) a report on zeolite resources in Wyoming as requested and funded by the Wyoming State Legislature. For this investigation, geologists verified previously reported occurrences and explored additional favorable locations for natural zeolite deposits.

### *Rare Earth Elements*

The WSGS published (June 2016) a comprehensive report on rare earth elements in Wyoming as requested and funded by the Wyoming State Legislature. The report is a continuation of a previous rare earth elements study. Geologists collected more than 275 new samples from known and potential host rocks of rare earth elements and other minerals. Another 45 samples previously collected by the WSGS for other projects were analyzed as well.

### *Groundwater Salinity in the Denver-Julesburg Basin*

The WSGS completed a groundwater salinity study in the Denver-Julesburg Basin of southeastern Wyoming (Open File Report 16-2). The report examines the salinity of groundwaters that occur at depths of 5,000 feet or less in the Denver-Julesburg structural basin where significant oil and gas activity has taken place in recent years.

### *Sinkholes and Karst Features in the Southern Laramie Basin*

The WSGS published a report (April 2016) on the occurrence of sinkholes and other evaporite related karst features in the southern Laramie Basin, including in and around the city of Laramie. For this study, geologists conducted field surveys, examined geophysical well logs, and reviewed historical records of gypsum karst occurrences in the basin.

### *Wyoming’s Potential Lithium Resources*

The WSGS published a report (February 2016) on Wyoming’s lithium resources as requested and funded by the Wyoming State Legislature. It is the first such comprehensive report and involved a review of geochemical data for nearly 68,000 Wyoming sediment, soil, rock, and water samples obtained from seven state and federal databases. Additionally, geologists collected 697 rock and soil samples.

### *Wyoming Phosphate Rock in Wyoming*

The WSGS published a report (November 2015) on phosphate rock in Wyoming. The study provides a geologic overview of phosphate occurrences in the state, and includes historical information, a compilation of previously published data and new data from samples collected in the field, and color location maps. Twenty samples from several known and potential deposits were collected for this study. Powder X-ray diffraction and whole-rock geochemical analysis of these samples were used to determine the amount and type of phosphates present.

### *Processes and Procedures for Recording Mineral Exploration Data in Major Mineral-Producing Jurisdictions*

The WSGS conducted a study (November 2015) on the processes and procedures for recording mineral exploration data in major mineral producing jurisdictions of the United States, Canada, and Australia as requested by the Wyoming State Legislature. The top 14 non-fuel mineral producing U.S. states, including Wyoming, were studied.

### *A Guide to Wyoming’s Cultural Geology*

The WSGS released an intelligent travel program, “The Origin of Landscape: A Guide to Wyoming’s Cultural Geology” (October 2015). The Guide allows users to see and virtually explore the nexus between geological phenomena, landscape, and cultural beginnings. The project involved collaboration with the Wyoming Department of Transportation, Wyoming Office of Travel and Tourism, and the Alliance for Historic Wyoming.

### *New Geologic Maps*

The WSGS, under its StateMap program, published three new geologic maps (September 2015) that are focused on the geology related to energy resources and geologic hazards in Wyoming.

- 1:24,000 scale Geologic Map of the Rawlins Peak SW Quadrangle, Open File Report 15-06, Carbon County
  - 1:24,000 scale Geologic Map of the Shamrock Hills Quadrangle, Open File Report 15-07, Carbon County
  - The above maps were part of the Eastern Greater Divide Basin, which included a report of geologic descriptions, geologic settings, and analyses of the samples collected in the field, Open File Report 15-08.
  - 1:100,000 scale Surficial Geology Map of the Afton Quadrangle (30' x 60'), Open File Report 15-09, Lincoln and Sublette counties
- The WSGS also published a 1:100,000 scale Surficial Map of the Red Desert Basin (October 2015).

### *New Geologic Signage Installed off Snowy Range Scenic Byway*

The WSGS collaborated with the Medicine Bow-Routt National Forests (September 2015) and installed two new interpretive signs at Libby Flats off Highway 30 and at the Medicine Bow Overlook, both sites along the Snowy Range Scenic Byway in Albany County. The WSGS designed the signs, which explain the area's geology.

### *Iron Resources in Wyoming*

The WSGS published a report (August 2015) on Wyoming's iron resources as requested and funded by the Wyoming State Legislature. Geologists sampled sites across the state based on previous state and federal iron investigations, known iron sources, and historic iron mining locations. The report is the first comprehensive statewide study that includes historical research coupled with current field investigations.

### *Geologic Study on the Great Divide Basin*

The WSGS published a geology study (Open File Report 15-3) on the Great Divide Basin. The "Stratigraphic Cross Sections and Subsurface Model of the Lance and Fort Union Formations, Great Divide Basin, Wyoming," report involved creating a database of more than 4,000 records of exploration wells with data provided by the Wyoming Oil and Gas Conservation Commission and the U.S. Geological Survey.

See next page for WSGS Organizational Chart.

# Wyoming State Geological Survey Organizational Chart

