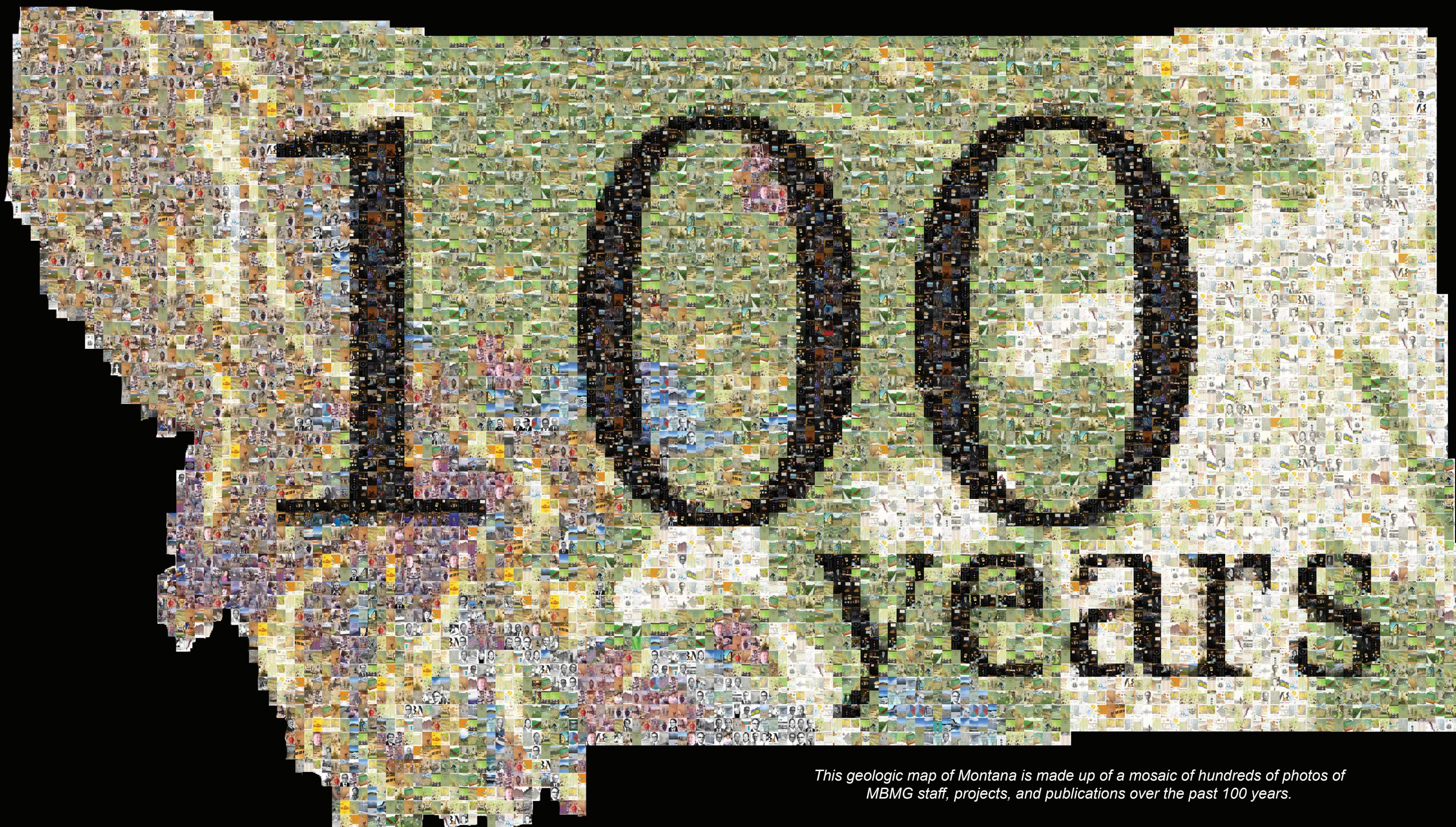


100 Years of Science and Service for Montana



This geologic map of Montana is made up of a mosaic of hundreds of photos of MBMG staff, projects, and publications over the past 100 years.

Montana Geology 2019

January

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Main Hall on the campus of the School of Mines, the MBMG's first home, 1923.

February

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Willis Johns, in the field near Lima, Montana, 1960s.

March

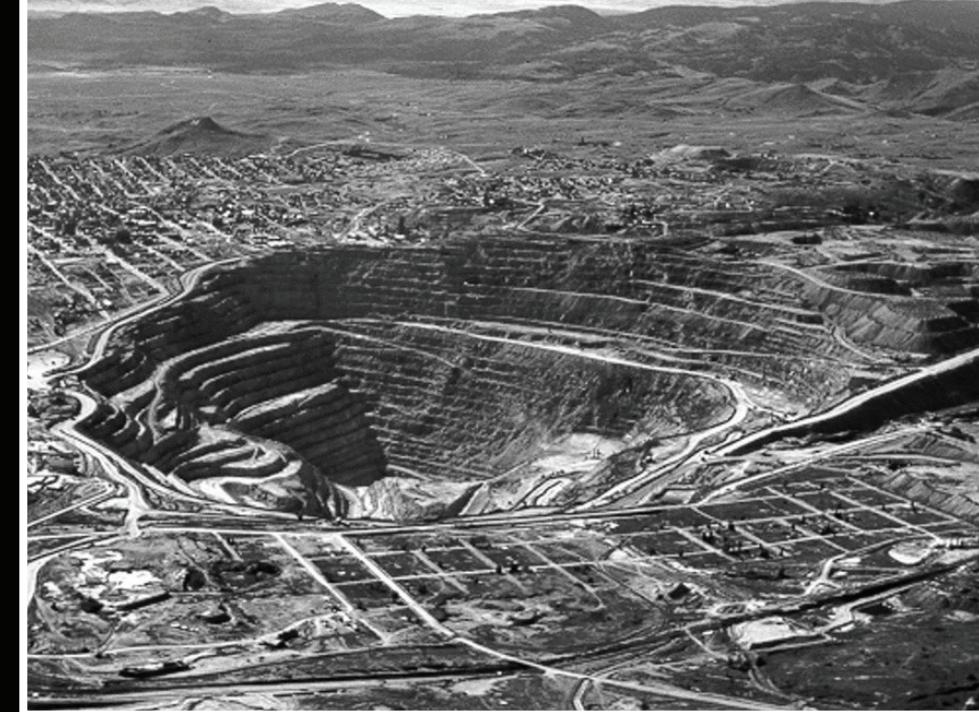
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April

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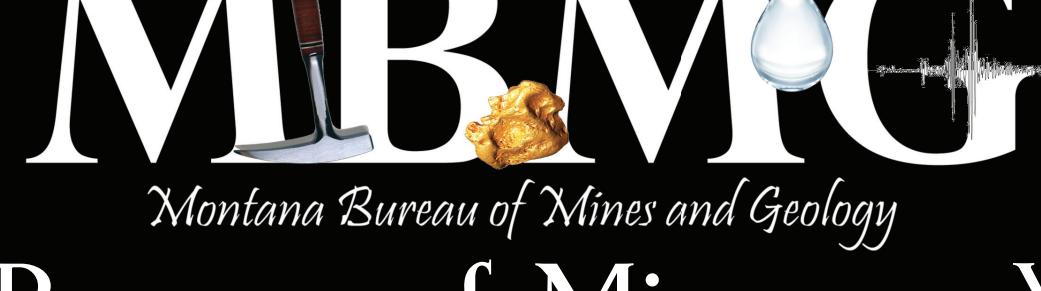
Berkeley Pit, Butte, Montana, 1970s.



Jeff Lonn, current MBMG geologist, in the wild reaches of Montana for research.

June

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Butte Office
1300 W. Park Street
Butte, Montana 59701-8997
406-496-4180

Montana Bureau of Mines and Geology

Billings Office
101 Grand Avenue
Billings, Montana 59101
406-272-1600

July

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August

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October

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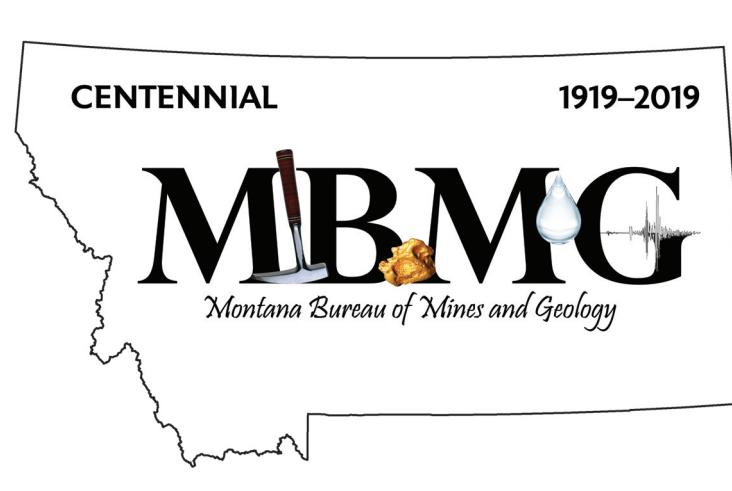
November

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December

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MBMG Centennial: A Brief History

Our mission: Providing information for the sound use of Montana's geologic, mineral, and water resources.

Introduction

Change was rapid and widespread in the early 20th century. In 1919, the Treaty of Versailles ended World War I, the first international mail service and U.S. passenger air service began, and Congress passed Prohibition and granted women the right to vote. In Montana, oil was discovered in Cat Creek Field, the Spanish Influenza pandemic was finally near an end, and Jeanette Rankin represented the State as the first woman to serve in Congress. It was in this heady time of transition and beginnings that the Montana Bureau of Mines and Geology (MBMG) was born.

The Montana Legislative Assembly created the *Montana State Bureau of Mines and Metallurgy* as a non-regulatory State agency to "promote the development of mineral resources, increase mine safety and efficiency, collect and disseminate geologic information, and address elements of conservation of resources."

The President of the Montana School of Mines was appointed Director of the new organization; his staff consisted of two part-time professors, a mining engineer, and a metallurgist. The fledgling agency did significant work in the first decade, compiling information on Montana's mineral industry, releasing five Bulletins and a Memoir about oil and gas resources, operating mines, and mineral lands.

In 1929, the Legislature changed the agency's name to the *Montana Bureau of Mines and Geology* to reflect the MBMG's increasing role as the State's geological survey. Staff remained limited to part-time faculty of the School of Mines until 1931, when Uuno M. Sahinen (fig. 1) became the first full-time employee of the MBMG. Sahinen worked as statistician, geologist, draftsman, and (probably) janitor while he completed his Master's degree; he was the only full-time professional until well into the 1950s.



Figure 1. Uuno Sahinen, the MBMG's first full-time employee and first Director.

In response to the expanding role of the MBMG and the changing needs of Montana, in 1969 the Legislature established the position of State Geologist adjointed with the Director of the MBMG—for the first time, a separate position from the President of the School of Mines. Sahinen filled this new position. In the 50 years since, nine Directors and Acting Directors have followed.

The MBMG occupied Main Hall for 91 years, growing from 1 to more than 50 members. In 2010, MBMG staff moved to the new Natural Resources Building (NRB), with funds provided by the Legislature. The NRB provided new space for the MBMG's state-of-the-art water, rock, and computer labs, student space, and public access to our offices.

The MBMG also curates the Mineral Museum at Montana Tech, which began as a collection of 177 specimens on the top floor of Main Hall in 1901. The collection was moved to the new Library/Museum Building in 1940 and now has more than 12,000 specimens, with about a third on display to the public.

Geology

Geology was the foundation of the MBMG's work from the beginning, though much of our early efforts related to minerals and mining.

The mining section split off in 1967, with the creation of the Small Miner's Assistance Program funded by the U.S. Bureau of Mines. Though the Small Miner's program is no longer active, the MBMG's Economic Geologist investigates mining-related areas and provides guidance to miners and mining operations. The MBMG Mining Archives and Data Preservation Program restores and archives mining-related material and maps.

Geologic mapping in Montana and the U.S. was typically small-scale and general; the first geologic map of Montana was released, but not published, by the MBMG in 1933 at a scale of 1:2.5M and presented 26 geologic units (fig. 2). The first published map was released in 1955 at a scale of 1:500,000 and presented 78 geologic units. In 1990, Congress established the National Cooperative Geologic Mapping Program within the U.S. Geological Survey; this competitive grant program, in which the MBMG has always been very successful, awards states matching federal dollars to produce geologic maps. The MBMG is now a nationwide leader in mapping and digital presentation, with hundreds of published geologic maps of Montana. The latest statewide geologic map of Montana, released in 2007, presents 322 geologic units (fig. 3); a geologic roadmap for general use was released in 2015.

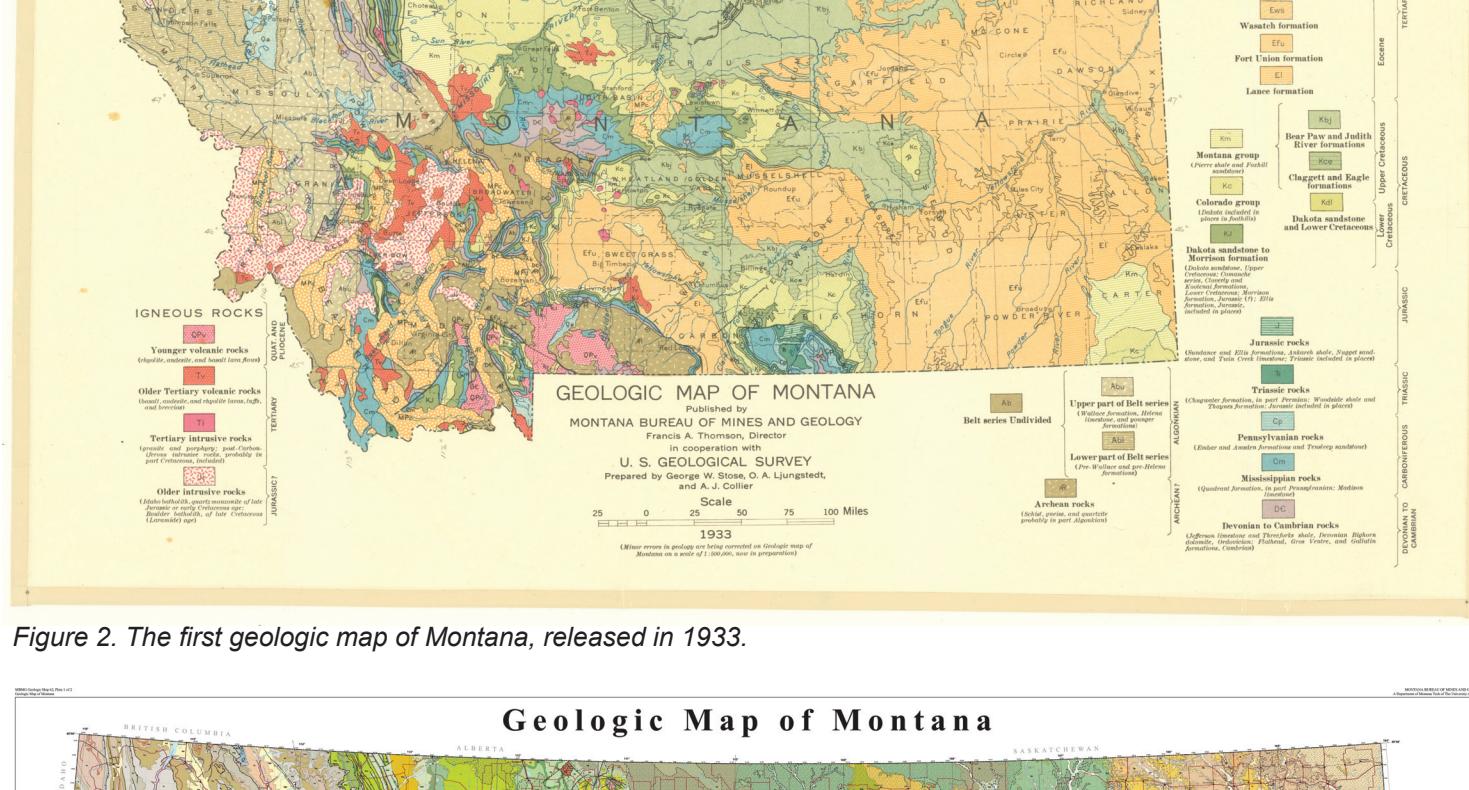


Figure 2. The first geologic map of Montana, released in 1933.

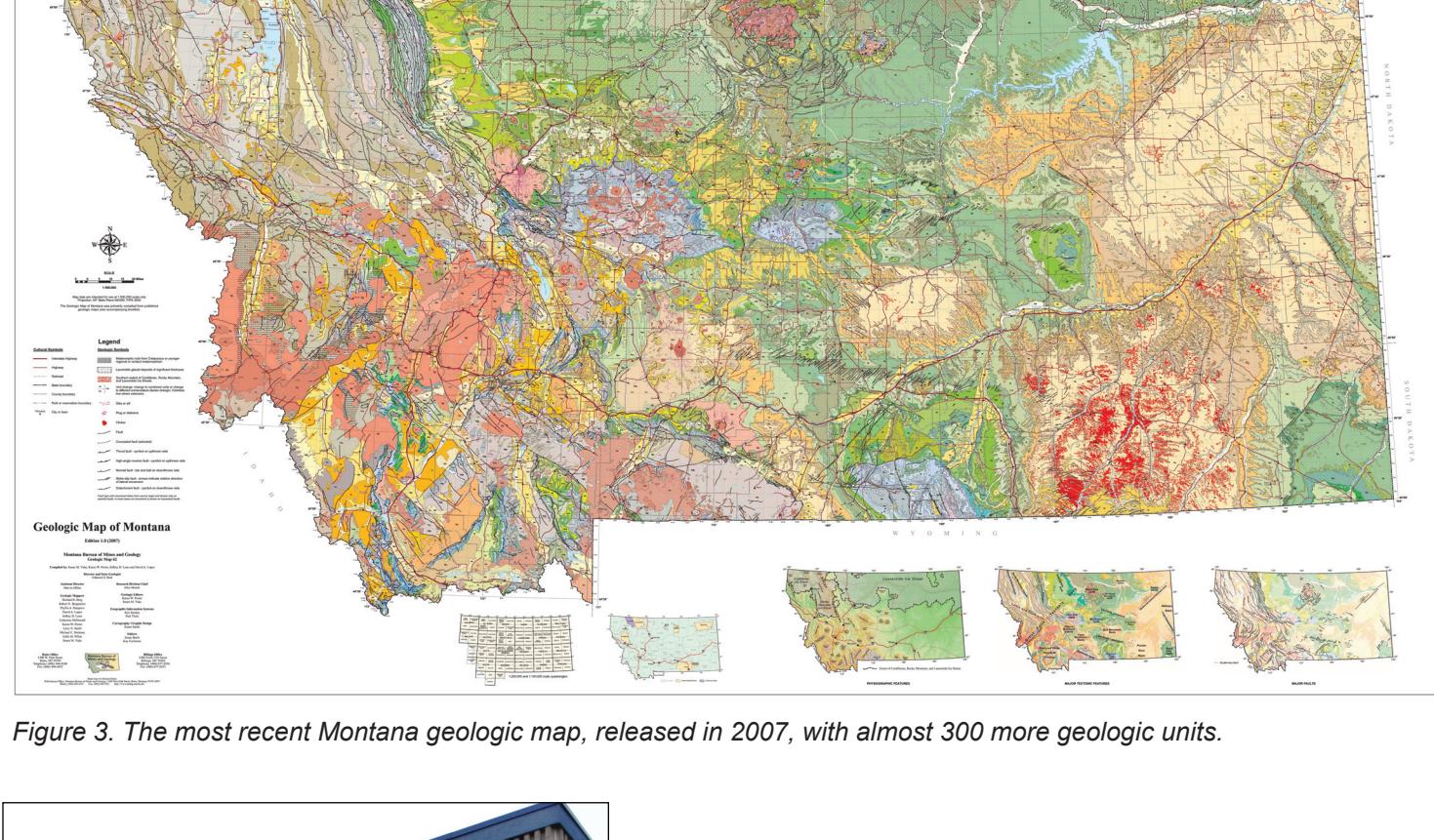


Figure 3. The most recent Montana geologic map, released in 2007, with almost 300 more geologic units.



The Billings Office
Montana has the fourth largest coal reserves in the United States. Since the 1960s, the MBMG has been heavily involved in coal availability studies across the State to map coalbeds, delineate coal reserves, and gather data on the quality and recoverability of coalbeds and coal hydrology. Coal, oil, gas, and coalbed-methane studies are still very active, mostly centered in the Billings branch office, which opened in 1970. Groundwater studies related to coal strip mining expanded to coalbed methane as well as agriculture and groundwater development for a growing population. In 2013 the Billings staff moved into a new office (fig. 4), after decades in a small building on the MSU-Billings campus.

Figure 4. The Billings staff in their new office on Grand Avenue.

Hydrogeology

In the 1930s, the MBMG conducted several groundwater reconnaissance studies, but it was in the 1960s and 1970s that groundwater became a programmatic research area. Between 1960 and 1980, the MBMG published more than 40 publications on local and regional groundwater resources of Montana. In addition to field studies, well data from across Montana were coded into flat files that were key-punched and put on tape, then computer. The systematic recording of well logs and related data continued as an *ad hoc* effort to answer public inquiries until 1985, when official responsibility and funding were granted to the MBMG to manage and maintain Montana's Ground Water Information Center (GWIC). GWIC went online in 1999, and now has nearly 48,000 registered users across 54 countries, who have downloaded more than 2.96 billion records.

In 1991, the Legislature established the Montana Ground Water Assessment Program (GWAP), assigning the MBMG responsibility for conducting Montana's baseline groundwater monitoring and characterization; the program comprises groundwater characterization, statewide groundwater monitoring, and GWIC. GWAP, along with several other MBMG programs, routinely identified local issues and specific sites for which a detailed investigation was needed. In 2009, the Legislature passed a bill creating the Ground Water Investigations Program (GWIP) to focus on the most urgent research needs of the State. Both GWAP and GWIP are guided by a steering committee made up of State and Federal agency representatives as well as citizens of Montana. The MBMG was recently tasked to evaluate issues more directly related to surface water under a new effort, the Surface Water Assessment and Monitoring Program. This too will be guided by a steering committee.

Earthquakes, Hazards, and Environmental Programs

The MBMG's Earthquake Studies Office (ESO) monitors earthquake activity in Montana and surrounding areas using the 45-station Montana Regional Seismograph Network, plus data from several networks in bordering states. Data are exchanged with other seismic research centers and the USGS National Earthquake Information Center, and are archived at the IRIS Data Management Center. This system rapidly provides the public and emergency responders with information about the location and severity of significant earthquakes affecting the State. The ESO records data from 103 seismic stations in 13 seismic networks, with real-time data streaming to the MBMG website. The MBMG has also conducted studies focusing on other natural hazards, such as landslides, rock falls, and swelling clay.



Figure 5. An MBMG hydrogeologist measuring stream flow as part of a groundwater investigation.

Changes in State and Federal environmental law and enforcement in the 1980s fostered demand for investigations related to soil and water contaminated by past industrial practices. The MBMG has conducted independent investigations related to the Clark Fork River Superfund Area between Butte and Missoula, abandoned-inactive mines on Federal lands throughout Montana, underground coal mines, and organic compound releases in Butte, Bozeman, and Missoula, among many others.

Figure 6. The Earthquake Studies Director and assistant installing a seismic station in a remote location in western Montana.

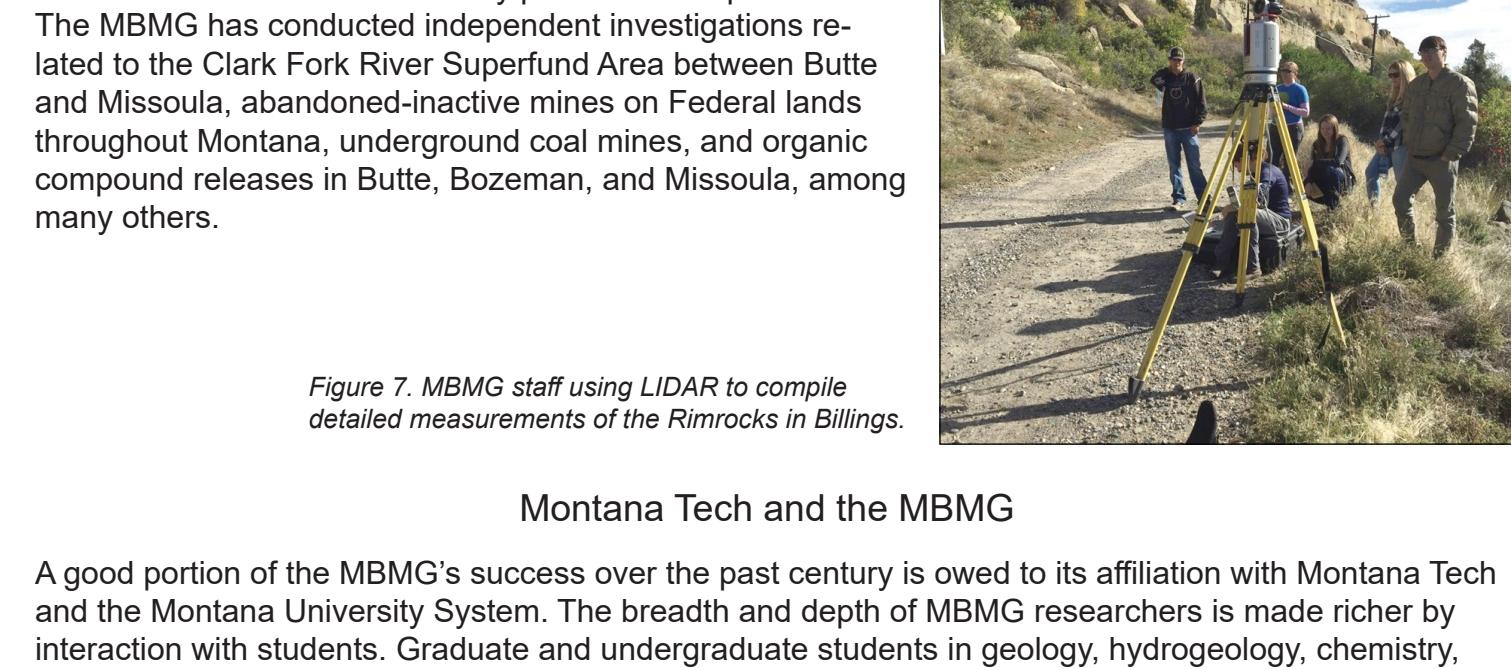


Figure 7. MBMG staff using LIDAR to compile detailed measurements of the Rimrocks in Billings.

Montana Tech and the MBMG

A good portion of the MBMG's success over the past century is owed to its affiliation with Montana Tech and the Montana University System. The breadth and depth of MBMG researchers is made richer by interaction with students. Graduate and undergraduate students in geology, hydrogeology, chemistry, engineering, and biology employed by the MBMG since 1969 number in the hundreds; direct funding for graduate student research leading to Master's degrees average two per year.

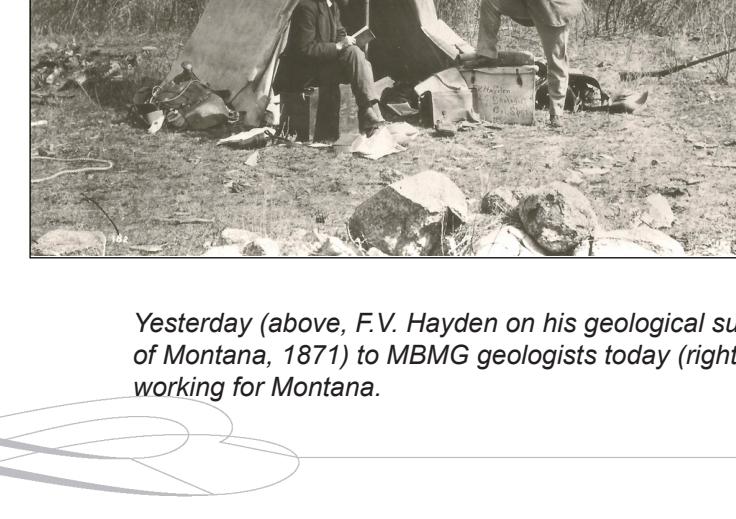
Like the mosaic on the front of the calendar, the MBMG is made up of people: hundreds of people over the years dedicated to providing non-biased scientific information to the citizens of Montana. After 100 years, we are still here, still working hard, and very much a part of Montana's history...and future.



MBMG staff group photo, Butte, April 2018.

Acknowledgments

The foresight and vision of the Montana Legislature and Governor recognized the growing demand for high-quality unbiased research on our natural resources. Rooted in the Montana University system, the MBMG has thrived through collaboration with State and Federal agencies as well as academia. Foremost in our enduring success is the trust of Montana's citizens and landowners who allowed us to map and sample, scratch and scrape our way through their yards and fields to do our work. It is a focused passion that drives our work, and we have been most fortunate to attract the best scientists and engineers as well as the best and brightest students from around the world to honor that commitment made 100 years ago. Text for this history is by Susan Barth and John Metesh, MBMG. Photos are from MBMG archives or were generously contributed by MBMG staff.



Yesterday (above) F.V. Hayden on his geological survey of Montana, 1871 to MBMG geologists today (right), still working for Montana.



MONTANA BUREAU OF MINES AND GEOLOGY Montana Tech of The University of Montana

Scope and Organization

The Montana Bureau of Mines and Geology (MBMG) was established in 1919 as a non-regulatory public service and research agency for the State of Montana, to conduct and publish investigations of Montana geology, including mineral and fuel resources, geologic mapping, and groundwater quality and quantity.

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<http://mbmg.mtech.edu>

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Geologic Mapping	496-4883
Groundwater Assessment Program	496-4306
Groundwater Information Center	496-4336

Groundwater Investigation Program	496-4152
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Mineral Museum	496-4414
Oil & Gas	272-1602
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Publications Division	496-4687