WSGS
Exploring the Past, Empowering the Future

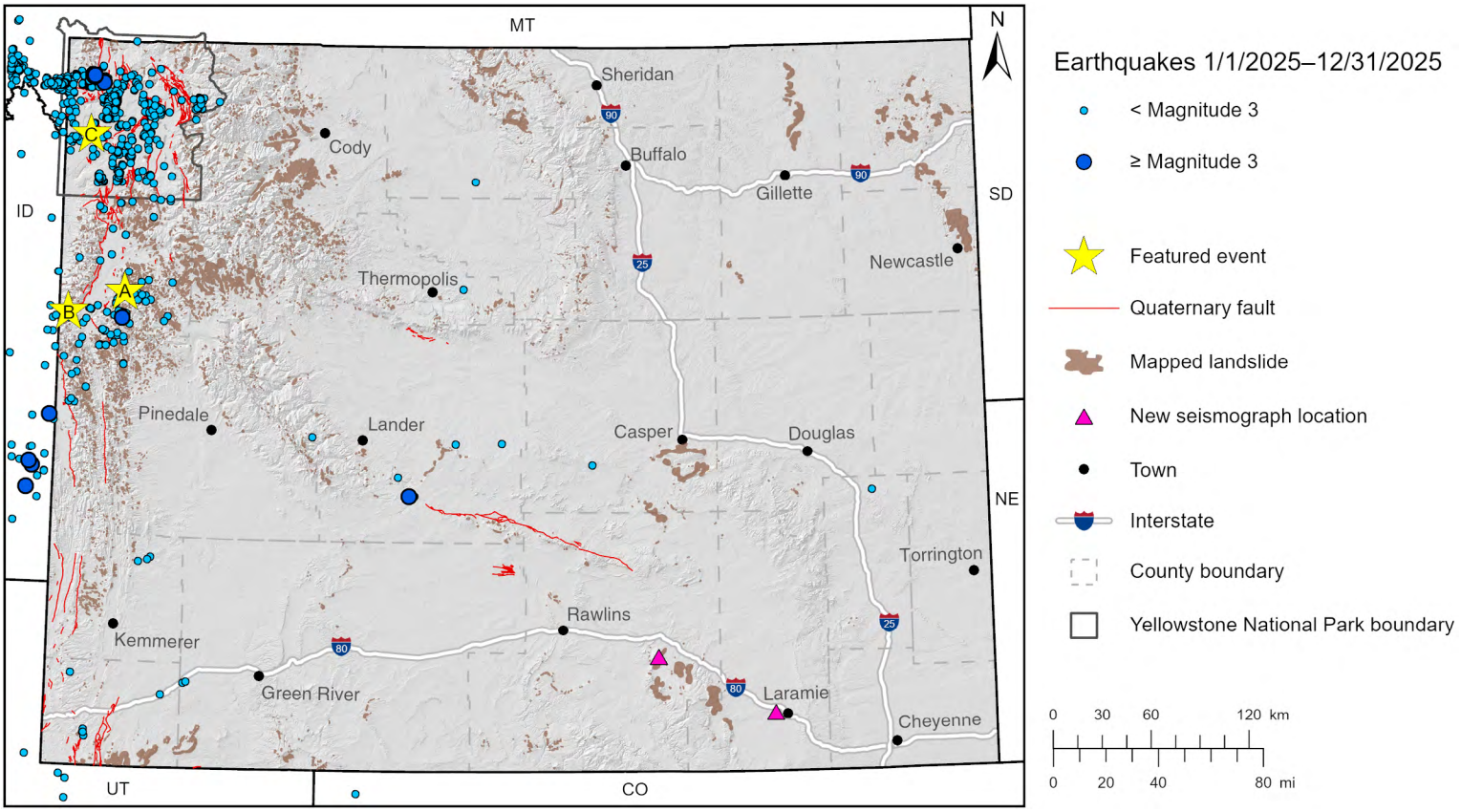
Wyoming Geologic Hazards Summary

Wyoming State Geological Survey Published January 2026

Geologic Hazards in Wyoming

Geologic hazards are natural conditions that have the potential to harm human life and property. These conditions can occur throughout Wyoming and are an inseparable aspect of the state's dynamic landscape. Due to Wyoming's sparse and rural population, many geologic hazards occur without endangering the public and go largely unnoticed. However, hazards that occur near population centers and infrastructure can pose a serious risk to the health, safety, and economic well-being of Wyoming citizens.

The Wyoming State Geological Survey (WSGS) works to study, characterize, and disseminate critical information about geologic hazards to help decision makers and the public plan for, mitigate, and respond to adverse geologic conditions. Geologists at the agency conduct studies on earthquakes, landslides, shrink-swell soils, ground subsidence, volcanic eruptions, radon, and other hazards. They maintain publicly accessible databases on geologic hazards, display updated information on interactive online maps, and partner with organizations at the county, state, and federal levels to equip decision makers and the public with sound scientific information. Ultimately, the agency's efforts help protect lives and property from a variety of geologic threats. This report highlights a few types of geologic hazards in Wyoming, some notable recent events, and work that the WSGS is conducting to help address these hazards.



Overview map of select geologic hazards in Wyoming. Earthquakes from January 1, 2025, through December 31, 2025; Quaternary-active faults; and landslides from the WSGS database are shown. Notable geologic hazard events discussed in the text are displayed with yellow stars: A = Gros Ventre Slide, B = Big Fill Slide, C = Biscuit Basin hydrothermal explosion.

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Earthquakes

Earthquakes are common in Wyoming, and the majority occur in the state's western mountains due to tectonic stretching of the Earth's crust. While most earthquakes are too weak to be felt by humans, ground shaking from large earthquakes can damage infrastructure and property and is a threat to life when structures collapse or unsecured objects fall. There were 1,061 recorded earthquakes with epicenters in Wyoming in 2025. The largest of these was a magnitude 3.9 that occurred on April 18 in the Gros Ventre Range, which was widely felt in Teton County but did not cause damage.

The U.S. Geological Survey's National Seismic Hazard Model, which was updated in 2023 with data from the WSGS and other contributors, assigns a greater than 50 percent chance that parts of Lincoln, Sublette, Fremont, Teton, and Park counties will experience damaging earthquake shaking in the next 100 years, and a 5 to 50 percent chance for the rest of Wyoming. Though most of Wyoming's notable historic earthquakes are in the western mountains, damaging earthquakes do occur farther east. For example, a magnitude 6.6 earthquake in 1882 in northern Colorado and a magnitude 5.3 earthquake in 1984 in the Laramie Mountains both caused damage in southeastern Wyoming.

Quaternary faults (those active in the last 1.6 million years) are potential sources of large earthquakes and hold clues to long-term seismic history, which allows geologists to better forecast the probabilities of future earthquakes. Studies of Quaternary faults in western Wyoming suggest that magnitude 7.2–7.5 earthquakes are possible in this region. The WSGS is currently conducting similar studies on Quaternary faults in the Ferris and Seminoe mountains and in Yellowstone National Park.

In 2024 and 2025, the WSGS installed two seismographs (instruments that measure ground shaking) in southeast Wyoming to densify the seismic network and detect smaller earthquakes in the region, which will contribute to future seismic hazard assessments. The agency continues to maintain a database of all earthquakes recorded in the state since the early 1970s, which is displayed on the interactive Wyoming Geologic Hazards Map on the WSGS website.

Landslides

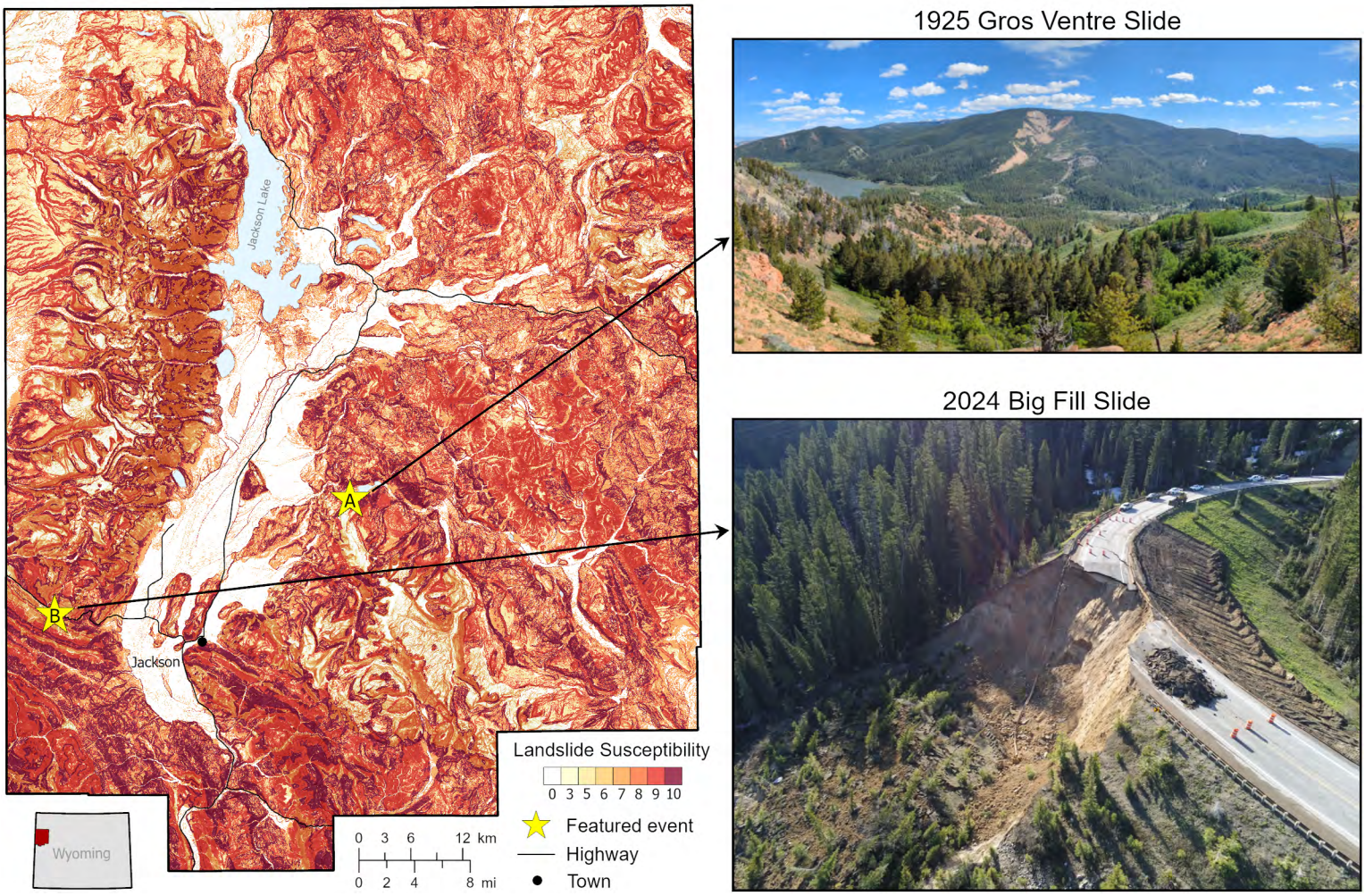
Landslides are gravity-driven downslope movements of masses of rock or soil. They occur every year in Wyoming, often during the spring and early summer runoff season. The WSGS has mapped more than 33,000 historic and prehistoric landslides across Wyoming and maintains a database with the location footprint and movement characteristics for each of these features.

The most significant landslide to occur in Wyoming in recent years was the June 2024 Big Fill Slide, which destroyed a section of Wyoming Highway 22 near Teton Pass. In response to this landslide, the Wyoming Department of Transportation and its contractors worked around the clock for three weeks to reopen the highway. During the temporary closure, drivers were forced on a 60-mile, two-hour detour that disrupted commuter traffic and caused significant economic losses.

Another notable landslide in Wyoming's past, the Gros Ventre Slide, reached its 100-year mark in 2025 and remains one of the largest landslides in the historic record. On June 23, 1925, 50 million cubic yards of rock rushed down a mountainside northeast of Jackson, damming the Gros Ventre River in the span of a few minutes. Two years later, the landslide dam was breached during the spring runoff, unleashing the devastating Kelly Flood that killed six people.

Photograph of the Gros Ventre Slide taken several months after the event in the summer of 1925. Note the slide path (background), and debris and impounded water (foreground). Image credit: William C. Alden, U.S. Geological Survey.

In response to impactful events like the Big Fill and Gros Ventre slides, and to provide local land-use planners and emergency managers with more detailed information about where future landslides are likely to occur, the WSGS published a high-resolution landslide susceptibility map for Teton County in 2025. The map depicts the relative likelihood of deep-seated, bedrock-involved landslides on a 10-meter grid based on analysis of rock strength and slope angle. This work complements landslide mapping that the agency is conducting in western Wyoming using recently available lidar digital topographic data.



Map of landslide susceptibility in central and southern Teton County from WSGS Open File Report 2025-1. Darker red colors indicate higher susceptibility to deep-seated landslides. Photos and locations of the 1925 Gros Ventre Slide and 2024 Big Fill Slide are shown. Gros Ventre Slide photo was taken in June 2025, 100 years after the event. Big Fill Slide photo shows the damaged section of Wyoming Highway 22; photo taken in June 2024 by the Wyoming Department of Transportation.

Yellowstone Volcanic System

The world-renowned landmarks in Yellowstone National Park owe their existence to a magma chamber a few miles beneath the earth's surface—the central component of the Yellowstone Volcanic System. The heat from this magma chamber combined with circulating groundwater in the shallow subsurface produces the geysers and hot springs for which the park is famous. The high heat flow and thin crust are also responsible for a suite of geologic hazards that are unique within Wyoming. Of these hazards, a large caldera-forming eruption—like the kind commonly portrayed in the media—is exceedingly unlikely on human timescales. Instead, the more likely geologic hazards in Yellowstone are hydrothermal explosions and earthquakes.

Hydrothermal explosions occur when hot water rapidly expands into pressurized steam in a confined underground cavity, which can rupture the surrounding rock and eject debris hundreds of feet into the air. This hazard was highlighted in July 2024 with the Biscuit Basin hydrothermal explosion, two miles northwest of Old Faithful. The explosion sent hot water, mud, and rock 400 feet into the air and heavily damaged a boardwalk. Fortunately, no one was injured, and Biscuit Basin remains closed as geologists assess the ongoing activity. The historic and geologic records suggest that hydrothermal explosions the size of the Biscuit Basin event occur every 10 to 20 years, while smaller explosions likely occur every year in Yellowstone.

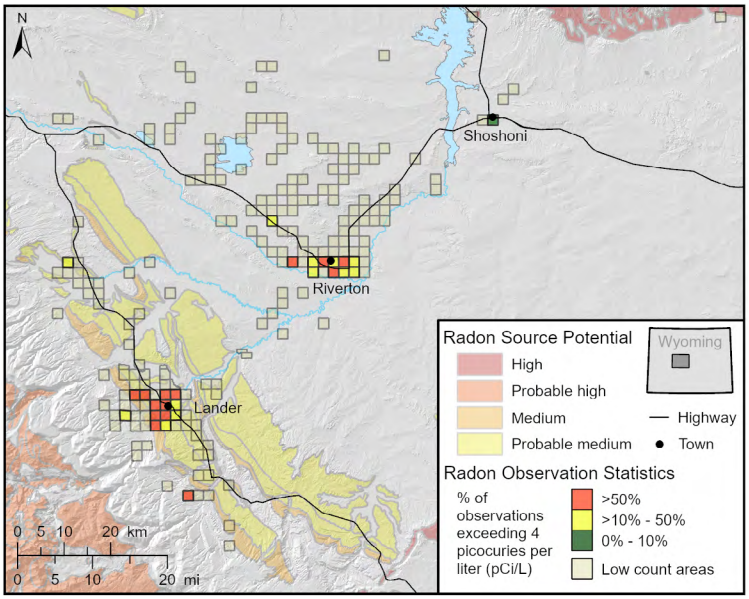
The Yellowstone region experiences the highest number of earthquakes in Wyoming. Damaging earthquakes, like the 1959 magnitude 7.2 Hebgen Lake, Montana, earthquake, occur on average once to several times per century. WSGS geologists are currently studying the East Gallatin Fault in Yellowstone to better characterize its history of large

earthquakes and to improve regional seismic hazard models. Geologists are particularly interested in Yellowstone earthquakes because of the potential for "hazard cascades," where earthquakes can set into motion other geologic hazards like landslides and hydrothermal explosions. Through its current projects in Yellowstone and its contributions as a member agency of the Yellowstone Volcano Observatory, the WSGS is working to better understand the active hazards of this dynamic corner of Wyoming.

Still image from a video of the July 23, 2024, Biscuit Basin hydrothermal explosion in Yellowstone National Park. The boardwalk pictured was heavily damaged by falling debris. Image credit: Juliet Su.

Radon

Radon is a colorless, odorless, radioactive gas released by the decay of natural uranium in rock, soil, and groundwater.



Map of geologic radon potential and test result statistics in the Wind River Basin, modified from the online Wyoming Geologic Hazards Map. Red polygons represent high geologic potential for radon, and red boxes show areas where greater than 50 percent of radon test results exceed the EPA's mitigation threshold.

Long-term exposure to elevated levels of radon is the second-leading cause of lung cancer in the U.S. Certain geologic factors can increase the concentration and mobility of radon gas, including high uranium content in bedrock, porous and permeable soil, and a high water table. Wyoming has many of these conditions, making radon the most widespread geologic hazard in the state. Test results have found elevated radon in homes and buildings in all 23 Wyoming counties.

Radon concentrations in a building can be lowered by installing a mitigation system. The Environmental Protection Agency (EPA) recommends mitigation if radon levels reach 4.0 picocuries per liter. Several locations in Wyoming have a high percentage of tested buildings that exceed this threshold, including Lander, Sheridan, Jackson, and Casper. The WSGS partners with the Wyoming Department of Health to analyze and map statistics from radon test results throughout the state. These maps show areas where tested radon concentrations frequently exceed the EPA mitigation levels, though only a properly used test kit or monitor can determine the radon level in an individual building. The WSGS recommends that all homeowners test for radon.

Additional Resources

Established in 1933, the Wyoming State Geological Survey has a long-standing history of documenting Wyoming's geology in service of public safety and informed decision-making. The WSGS's geologic hazards work focuses on helping communities, land managers, and homeowners better understand risks such as landslides, radon, earthquakes, subsidence, and other natural processes that can affect where and how we live and build. A key part of that work is translating technical data into practical maps and guidance that can be used by planners, emergency managers, landowners, and the public. Below is a curated set of resources that highlight the agency's geologic hazards information and mapping tools.

WSGS Geologic Hazards Webpage

Wyoming Geologic Hazards Map