Alaska Division of Geological & Geophysical Surveys

ANNUAL REPORT 2025

State of Alaska
Department of Natural Resources
Alaska Division of Geological & Geophysical Surveys

CONTENTS

MISSION

Determine the potential of Alaskan land for production of metals, minerals, fuels, and geothermal resources, the locations and supplies of groundwater and construction material, and the potential geologic hazards to buildings, roads, bridges, and other installations and structures (AS 41.08.020).

COVER PHOTOS

Front. Hydrology & Surficial Geology Section geologist Sandra Walser collects streamflow measurements in the Kugrua River, 30 miles east of Wainwright, Alaska.

Back. Mineral Resources Section geologist Rainer Newberry performs fieldwork northeast of Mt Prindle as part of the White Mountains mapping project.

STATE OF ALASKA
Mike Dunleavy, Governor

DEPARTMENT OF NATURAL RESOURCES
John Crowther, Commissioner-designee

DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
Erin Campbell, State Geologist and Director

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Alaska Resource Library and Information Services (ARLIS)
3150 C Street, Suite 100
Anchorage, Alaska 99503

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MESSAGE FROM THE DIRECTOR

It is an honor to write my first letter as the new Alaska State Geologist and Director of the Alaska Division of Geological & Geophysical Surveys (DGGS). Melanie Werdon retired as state geologist early this year after a long and distinguished career with DGGS and is reportedly enjoying her next chapter. From February to August, Jennifer Athey took the helm, masterfully balancing the roles of both acting director and operations manager.

When I joined the survey in August, I was amazed at the smooth and productive operation of the agency, which is a testament to both the superior interim leadership of the division, as well as the extraordinary and highly motivated and skilled staff of DGGS. But it was not until I met with staff individually that I came to appreciate the incredible breadth of work at the survey and the magnitude of its benefit to Alaska's residents.

This year was notable for the geologic hazards faced by Alaskans, and the staff at DGGS played crucial roles in preparation, response, and recovery. From volcanic unrest at Mt. Spurr near Alaska's most populated region, to the effects of Ex-typhoon Halong, which devastated communities and permanently altered the western coast of Alaska, DGGS geologists and IT, GIS, and administrative staff went above and beyond in their work to provide necessary data to emergency responders and decision-makers.

In a state where revenue is heavily dependent on natural resources, new baseline geologic and geophysical research is required to stimulate new exploration. At the same time, expanding access to existing data can equally benefit resource development. Through our publications, our databases, and our samples at the Geologic Materials Center, we continue to grow the collection of online and physical data that industry needs to thrive.

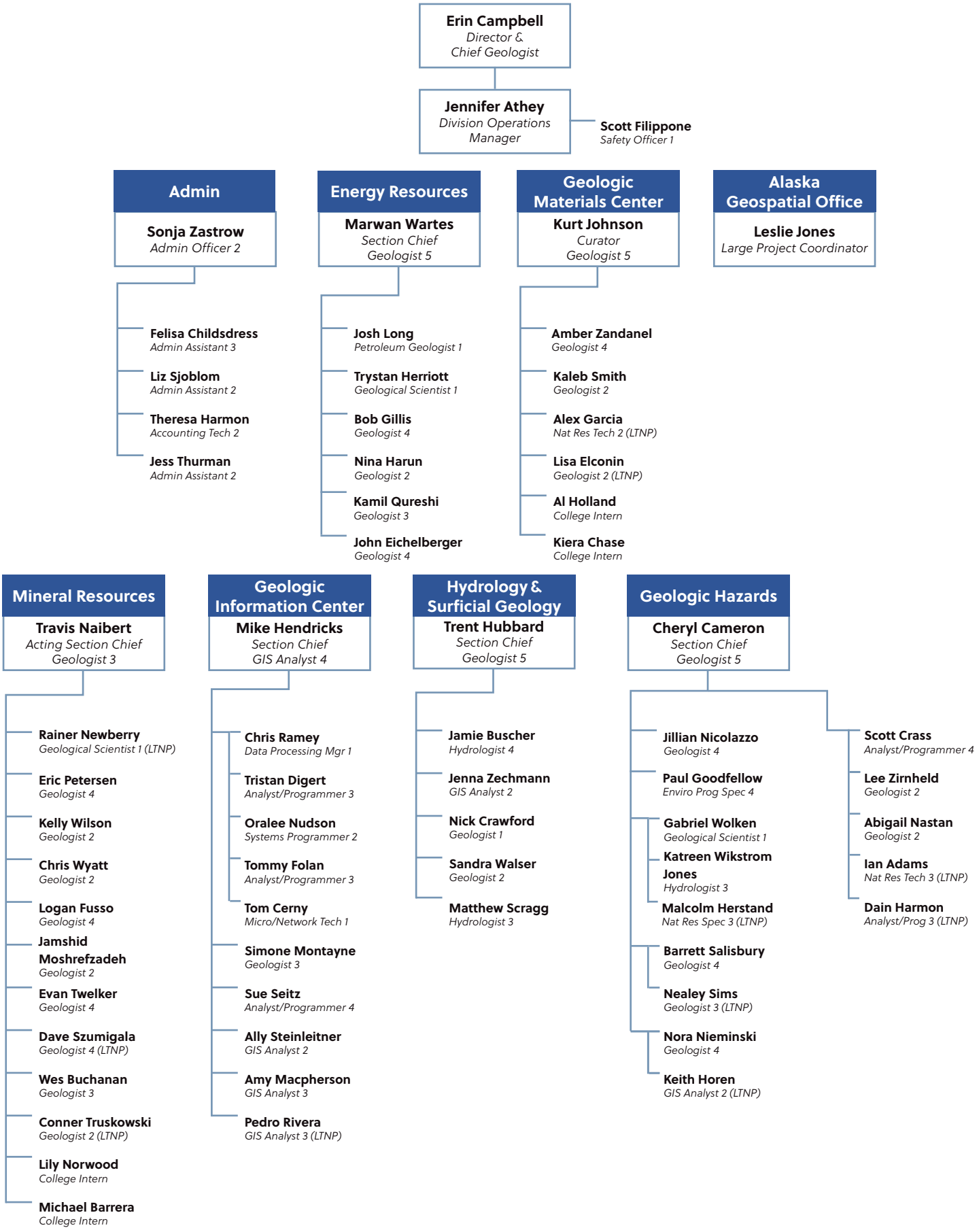
The remoteness of many Alaska communities creates unique challenges. From searching for nearby sources of aggregate to build roads, to identifying new energy sources such as geothermal and hydropower, DGGS staff are seeking to improve infrastructure for Alaska's residents.

These examples are a small sample of the work DGGS conducted in 2025, and I encourage you to read the pages that follow for a full update, as well as to visit our website (dggs.alaska.gov) for access to the many maps, reports, and data we published this year. We hope this report will help you understand and appreciate the immense scope of our work across this vast state, and how this work benefits Alaskans.

Sincerely,

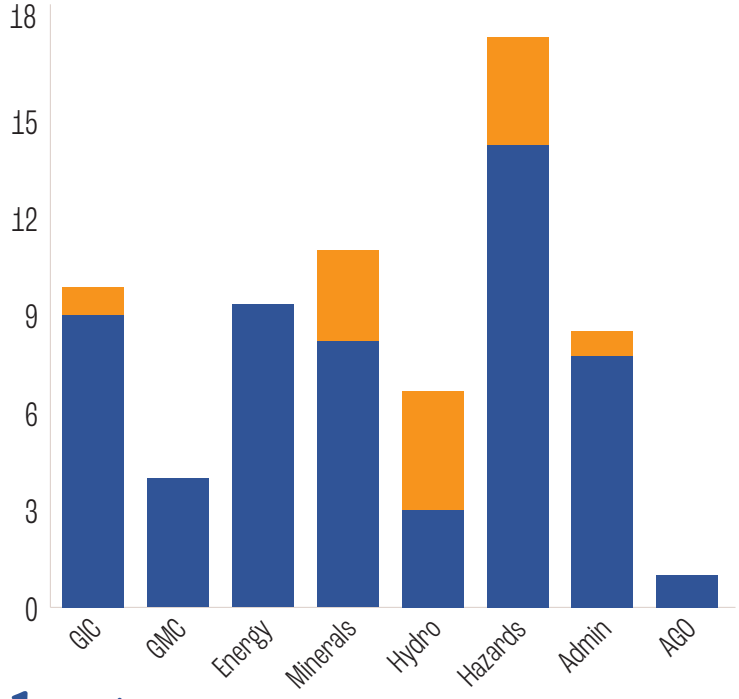
Erin Campbell
State Geologist & Director

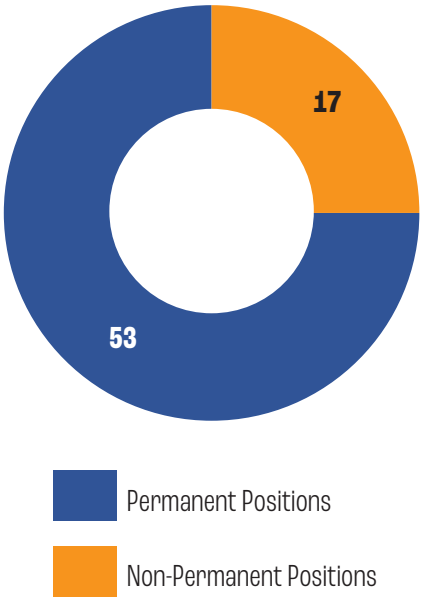
ORGANIZATION



...BY THE NUMBERS

Division Staff



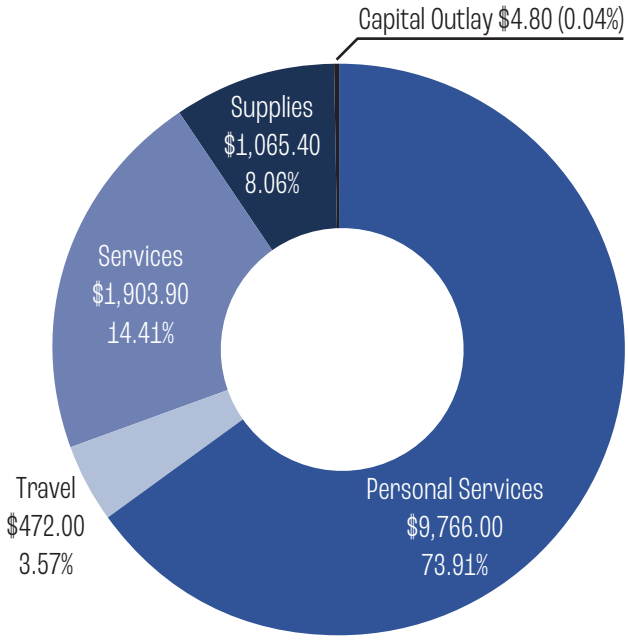


Budget

FY2025 Authorized Budget

$13,212.10

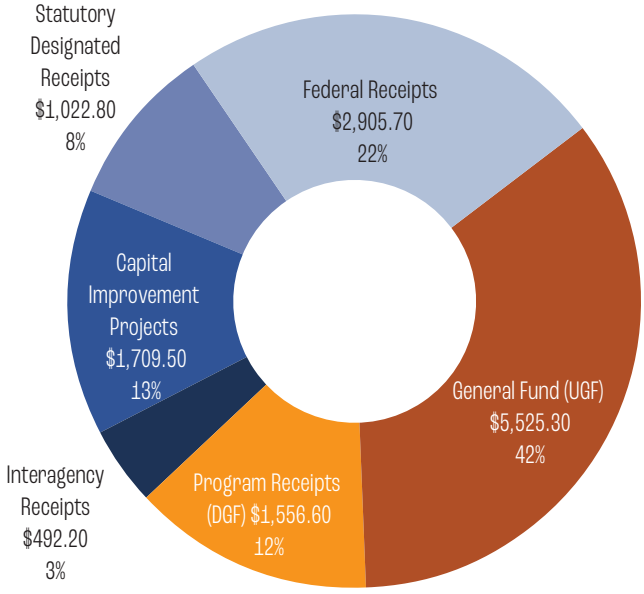
Total Budget (in thousands of dollars)



FY2025 Funding Sources

$13,212.10

Total Budget (in thousands of dollars)



...BY THE NUMBERS

Geologic Mapping

Detailed geological and geophysical maps of Alaska at scales needed for resource exploration, land-use management, and geologic-hazards assessment are currently available for 23 percent of the state, but our field programs are increasing this coverage gradually each year. DGGS prioritizes the selection of new mapping areas in consultation with other state agencies, appropriate state boards and commissions, its Geologic Mapping Advisory Board, industry resource-interest groups, and other stakeholders. The survey is committed to delivering the results of its extensive field mapping programs to the public in a timely manner. In FY2025 DGGS published a combined hazard and geologic mapping total of 4,068 mi² of Alaska lands. In calendar year 2025, DGGS published a combined 4,013 mi² of mapping. **Over the past 10 years, DGGS has published an annual average of ~3,500 mi² of peer-reviewed geologic mapping.**

2025 Geologic Maps

Geologic maps of the Haines-Takshunuk Mountains-Chilkat Peninsula area, Southeast Alaska (408 sq. miles),
PIR 2025-4

Geologic map of the Rooftop Ridge area, central North Slope, Alaska (260 sq. miles)

PIR 2025-5

Geologic map of the Racetrack Basin area, central North Slope, Alaska (260 sq. miles)

PIR 2025-6

Surficial-geologic and structural map of the Maynard Mountain landslide, Seward D-5 Quadrangle, southcentral Alaska (1 sq. mile)

PIR 2025-1

Bedrock geologic map of the Richardson Mining District, Big Delta Quadrangle, Alaska (750 sq. miles)

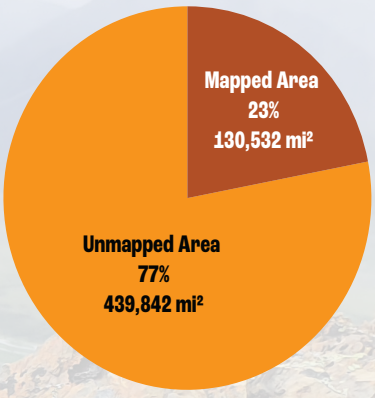
PIR 2025-2A

Bedrock geologic map of the Goodpaster River-Shaw Creek area, Big Delta Quadrangle, Alaska (591 sq. miles)

PIR 2025-2B

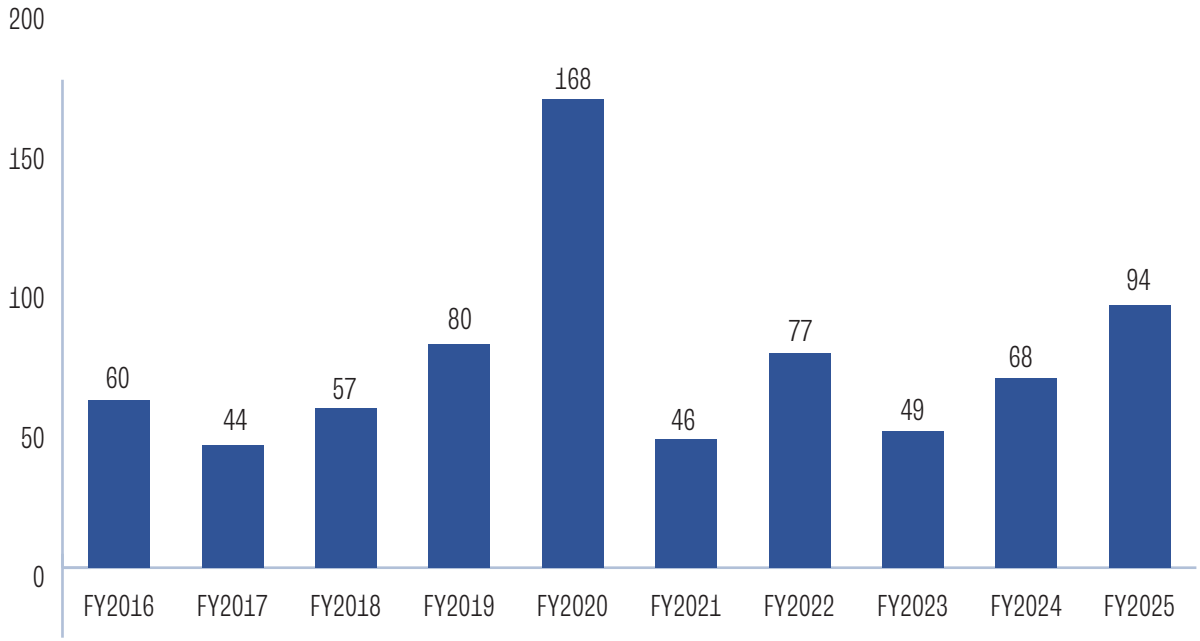
Bedrock geologic map of the Volkmar River-Healy River area, Big Delta and Mount Hayes quadrangles, Alaska (898 sq. miles)
PIR 2025-2C

Bedrock geologic map of the Mount Harper-Middle Fork area, Eagle Quadrangle, Alaska (845 sq. miles)
PIR 2025-2D



...BY THE NUMBERS

Publications Distributed*



**These numbers do not reflect the 2025 count of GeMS-compliant conversions of previously published geologic maps. For more information about these time-consuming and essential projects, see the GIC section.*

Total Volume of Data Distributed (Terabytes)

ENERGY RESOURCES


Marwan Wartes
Section Chief


Bob Gillis


Josh Long

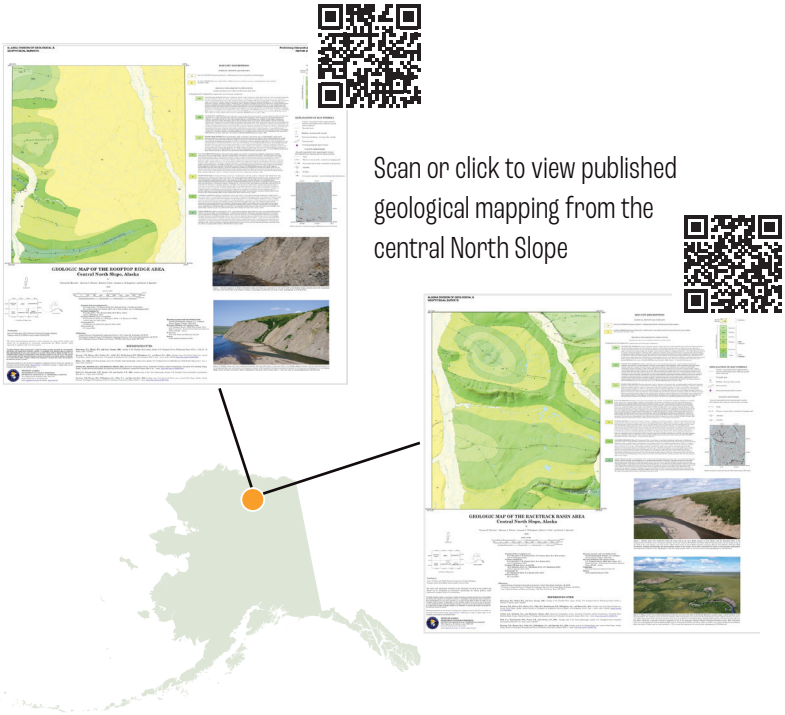

Nina Harun


Trystan Herriott


Kamil Qureshi


John Eichelberger

The Energy Resources Section generates new geologic information about Alaska's oil, natural gas, coal, and geothermal resources and presents this information to industry and the public through formal reports and presentations. DGGS collaborates with various state and federal agencies to integrate outcrop and subsurface data to understand Alaska's natural resources and attract new exploration investment. More recently, the section has expanded its scope to include evaluation of the state's carbon sequestration (see highlight) and hydrogen storage potential. This year also saw the initial build-out of an exciting new Geothermal Energy Program (see highlight).



NORTH SLOPE

Recent applied research in northern Alaska was supported by the state's Arctic Strategic Transportation and Resources project (ASTAR)— a multi-programmatic effort to strengthen North Slope community infrastructure and access to economic opportunities and resources (see highlight). In June and July, Energy Resources geologists conducted two weeks of helicopter-supported fieldwork on the east-central North Slope, focused on geologic mapping and topical studies relevant to exploration on state lands, the National Petroleum Reserve-Alaska (NPRA), and the Arctic National Wildlife Refuge (ANWR). This work builds on our long record of drawing attention to underexplored places, such as the section's important work on the Nanushuk Formation, a unit that is now recognized to host several major oil discoveries, including the largest onshore conventional field in North America in more than 30 years. The Energy Resources team published a number of important papers this year, including new interpretations of subsurface data and cutting-edge analyses that constrain the age and correlation of key reservoir intervals. The group also published two geologic maps from the central North Slope that include newly discovered exposures of the oil-stained Nanushuk Formation.

Geologist Bob Gillis collects samples in the Matanuska Valley.

SOUTHERN ALASKA

The section also conducted fieldwork in southern Alaska, including a new collaboration with the U.S. Geological Survey (USGS), assisting with its initial evaluation of how much oil and gas remain to be discovered in Cook Inlet. New geologic mapping in the western Susitna Basin (see highlight) provided new constraints on the area's hydrocarbon potential. Additional work in the Matanuska Valley area also improved our understanding of major fault systems that form the western and northern boundary of the Cook Inlet basin. This new structural framework reduces geologic uncertainty and risk, which can often inhibit oil and gas exploration investment. A number of energy-related datasets were also published for southern Alaska, including a study of ancient pollen to assess the age of strata and analysis of organic matter to determine the burial history of source and reservoir rocks. Another publication summarized new data on the properties of rocks in the Cook Inlet subsurface, highlighting their potential to seal and trap hydrocarbons or injected CO_2.

GEOTHERMAL

The new geothermal energy program (see highlight) focused on raising community awareness of its mission and promoting Alaska's geothermal potential and opportunities for investment. The new program is rapidly building a robust collaborative network that includes representatives from industry, National Laboratories, Native groups, and other researchers. To leverage state funding, the program collaborated on two major funding proposals to the Geothermal Technologies Office at the U.S. Department of Energy (DOE). A notable initial achievement was the collection of more than 30 mi² of high-resolution lidar elevation data over Augustine Island in Cook Inlet, a prospective target for geothermal exploration. The energy team also conducted reconnaissance fieldwork on the island, examining the older pre-volcanic units to better understand the rock types that would be encountered in geothermal exploratory drilling.

CARBON AND HYDROGEN STORAGE

The section is closely monitoring the continual evolution of Alaska's energy landscape, including the use of the pore space in Cook Inlet that once hosted natural gas to instead house injected waste CO_2 or temporarily store hydrogen,

DGGS geologists and partners explore potential CO_2 storage sites at Clam Gulch in Cook Inlet, Alaska.

a next-generation energy source. The Division of Oil and Gas and the Alaska Oil and Gas Conservation Commission have led efforts to erect a regulatory framework for the sequestration of captured CO_2. As part of a University of Alaska (UAF)-led project, DGGS created a geodatabase of essential Cook Inlet data to help partners evaluate the regional geology and model potential injection sites. This work is supported by the DOE and is a critical first step in building the geologic framework needed to evaluate the region's storage potential. High-quality geologic data will reduce uncertainty and attract industry investment in major storage projects (see highlight). Section staff also served on expert panels at town hall meetings around Alaska aimed at educating the public on carbon storage.

UNCONVENTIONAL CRITICAL MINERALS

DGGS co-leads an effort with the University of Alaska to assess Alaska's potential to produce critical minerals, including rare-earth elements (REEs), from unconventional feedstocks such as coal. These minerals are essential components in many modern products, yet the United States lacks sufficient domestic sources, resulting in economic and national security risks due to potential major supply chain disruptions. This project was funded by the DOE and included a diverse team of private and Native corporation partners. Preliminary results from Phase 1 of the project demonstrated that some high-ash coals and other associated strata contain sufficient critical mineral content to warrant further study. The team anticipates starting Phase 2 in the first quarter of 2026, collecting new data and bringing together various stakeholders interested in the establishment of a critical minerals industry in Alaska.

Energy Resources 2025 Publications

PIR 2025-5 | doi.org/10.14509/31722

Geologic map of the Rooftop Ridge area, central North Slope, Alaska

PIR 2025-6 | doi.org/10.14509/31723

Geologic map of the Racetrack Basin area, central North Slope, Alaska

RDF 2025-27 | doi.org/10.14509/31734

Palynological and thermal maturity analysis of outcrop samples from the West Susitna area STATEMAP project, southcentral, Alaska

RDF 2025-10 | doi.org/10.14509/31522

Mercury injection capillary pressure results from Middle and Upper Jurassic outcrop samples in the Iniskin Peninsula area of lower Cook Inlet, Alaska

Highlight

BUILDING THE GEOLOGIC FOUNDATION FOR ALASKA'S EMERGING CARBON STORAGE INDUSTRY

Carbon Capture and Storage (CCS) is rapidly emerging as an important technology to reduce greenhouse gas emissions while maintaining reliable and affordable energy. During the past year, DGGS played a key science and data role in two complementary CCS efforts that together position Alaska to participate in this growing industry.

DGGS is a core partner in the Alaska Railbelt Carbon Capture and Storage (ARCCS) project, a two-year U.S. Department of Energy–funded feasibility study led by the University of Alaska Fairbanks. The project is evaluating whether CO_2 from existing and proposed Southcentral power plants can be safely and permanently stored deep underground in northwest Cook Inlet. During the first year of work, the project team identified a promising storage location, with multiple deep sandstone layers capable of storing decades of CO_2 emissions beneath thick, naturally sealing rock layers. This zone is thousands of feet beneath the freshwater aquifer used for drinking water. Geologic data provided by DGGS help validate and improve confidence in underground storage models. DGGS geologic expertise also supported assessments of potential geologic hazards relevant to long-term storage safety.

In parallel, DGGS contributed to a statewide Carbon Capture, Utilization, and Storage (CCUS) Information Hub led by the Division of Oil and Gas. This effort assembled an array of datasets, including environmental, geology, land ownership, infrastructure, and utilities into a centralized online resource to support future CCS project screening, planning, and permitting.

Together, ARCCS and the CCUS Hubsite demonstrate how DGGS science directly supports emerging energy industries, responsible subsurface resource management, and long-term economic development. These projects build on Alaska's long history of oil and gas exploration while helping the state evaluate its potential to become a leader in regional carbon storage markets.

Scan to explore the Alaska CCUS Hub Site

Ninilchik, Alaska.

Highlight

DGGS'S NEW GEOTHERMAL ENERGY PROGRAM

Alaska's economic growth is hampered by high energy costs, with much of the state relying on diesel, natural gas, and coal. Diversifying energy sources in the state is important to reduce these costs and add resiliency. In recent years, Alaska has witnessed a notable increase in renewable energy sources like solar, wind, and hydropower. Another large potential source of energy could come from tapping geothermal heat in the subsurface. Geothermal energy has been successfully developed around the world and can provide stable baseload power with no polluting emissions.

Alaska has some of the most significant geothermal resource potential in the nation, with 97 known geothermal springs and more volcanoes than any other state. Despite this, only a small number of sites have witnessed advanced exploration, and just one of these–Chena Hot Springs in Interior Alaska–has been developed as a source of heat and power for local use. The poorly characterized geothermal potential of the rest of the state highlights the pressing need for new geoscience information.

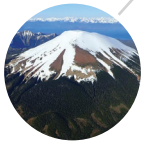
Scan or click to visit the Geothermal Sites of Alaska Web App

Pilgrim Hot Springs

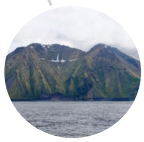
Chena Hot Springs

Akutan Volcano

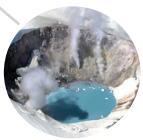
Augustine Volcano



Edgecumbe Volcano



Adagdak Volcano



Makushin Volcano

In response to this need, DGGS established the Geothermal Energy Program aimed at collecting baseline geological and geophysical data to advance understanding of Alaska's geothermal potential. These data are critical for resource identification and risk reduction, both of which attract industry to invest in exploration and development and create the environment for economic growth. We hired a very qualified program manager (John Eichelberger – see welcome bio) in March and hope to recruit and fill two additional positions early in 2026.

Initial efforts have focused on outreach, including the creation of an Alaska Geothermal Regional Interest Group that provides a venue for stakeholder networking. The rapid growth of this new group demonstrates the strong interest in Alaska's geothermal potential and the future availability of new data. Additional momentum is reflected by the recent awarding of commercial geothermal prospecting permits by the Division of Oil and gas for two volcanoes in Cook Inlet: Augustine Island and Mount Spurr. Initial results from industry geophysical exploration efforts at Augustine have reportedly identified multiple low resistivity zones that may reflect shallow magma storage that could be promising targets for drilling and possible geothermal energy development.

Realizing Alaska's geothermal energy potential appears more promising than ever. There have been several advances in geothermal drilling technology, particularly surrounding enhanced geothermal systems that use artificial stimulation to create reservoir permeability and porosity required for hot fluids to flow into the producing well. Combining these engineering advances with modern geological and geophysical data and interpretations will create opportunities to provide lower-cost, clean, reliable geothermal energy and play an important role in generating a sustainable future for Alaska.

Mount Spurr (top) and Augustine Volcano (bottom), both located in Cook Inlet, are the subject of prospecting permits granted by the Alaska Division of Oil and Gas.

MINERAL RESOURCES


Travis Naibert
Acting Section Chief


Jamshid Moshrefzadeh


Kelly Wilson


Dave Szumigala


Wes Buchanan


Evan Twelker


Conner Truskowski


Logan Fusso


Rainer Newberry


Chris Wyatt


Eric Petersen

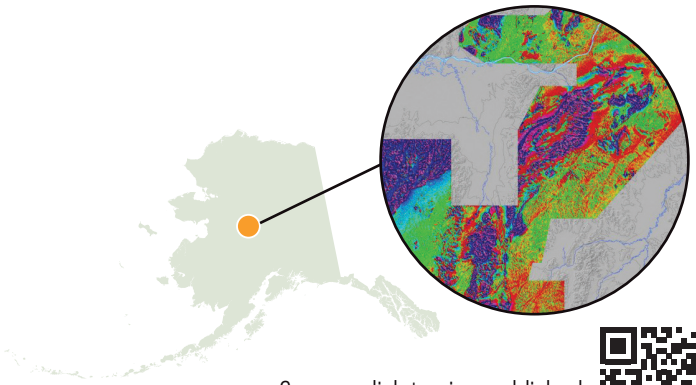
DGGS conducts geological mapping, geochemical sampling, and geophysical surveys to attract mineral exploration investment and support responsible development of Alaska's mineral resources. DGGS participates in the USGS's Earth Mapping Resources Initiative (Earth MRI) program, a critical-minerals-focused cooperative formed to increase the nation's mineral security through geophysical surveys, geologic mapping, and geochemical analyses. These primarily federally funded projects, supplemented with state matching funds, allow DGGS Mineral Resources geologists to produce and disseminate new geoscientific data types that have historically been shown to stimulate mineral industry interest and resource discovery, resulting in increased revenue to the state.

The Earth MRI program currently benefits from expanded funding through the Infrastructure Investment and Jobs Act (IIJA) bill. Alaska has received $21 million in federal funds through the program since 2019, and in calendar year 2024 DGGS received $5.2 million. Similar funding levels are expected to be awarded late in calendar year 2025.

Right: Mineral Resources geologist Conner Truskowski mapping geology south of the Steese Highway and east of Fairbanks for the Steese Earth MRI project.

GEOPHYSICAL SURVEYING

2025 was another active year for geophysics at DGGS. The Earth MRI program continued to focus on the Kuskokwim mineral belt, a broad area of prospective geology between Manley Hot Springs, McGrath, Bethel, and Dillingham. The belt includes the Donlin Gold, Nixon Fork, and Illinois Creek deposits, and the Sleitat, Shotgun, Vinasale, Nyac, and Colorado Creek prospects, among others. Flatter topography was surveyed with fixed-wing aircraft and a helicopter-borne system surveyed the more rugged terrain. This high-quality dataset, which we anticipate will be completed in 2026, will benefit Alaska for decades to come. Results published in 2025 are available at https://doi.org/10.14509/31724 and https://doi.org/10.14509/31493.



Scan or click to view published geophysical data for the northern Kuskokwim Mountains

On the Seward Peninsula, DGGS participated in a USGS mineral assessment study focused on the critical mineral graphite, a major component of electric vehicle batteries, which included an airborne electromagnetic survey of the Kigluaik, Bendeleben, and Darby mountains north and east of Nome. This survey was completed in 2024 and is available at doi.org/10.14509/31303. As part of this survey, DGGS also acquired a modern airborne electromagnetic survey over geothermal resources at Pilgrim Hot Springs, published December 2025.

Additionally, DGGS acquired follow-up, state-funded geophysical data over selected areas of the Earth MRI focus area, including a high-resolution magnetic survey of the REE-bearing Tofty carbonatite (https://doi.org/10.14509/31683) and a time-domain electromagnetic survey in the Kaiyuh Mountains and Illinois Creek mining district (https://doi.org/10.14509/31304). These surveys are intended to foster mineral exploration and development in areas that include significant state land ownership (see highlight).

GEOLOGIC MAPPING

DGGS Mineral Resources geologists continued their multi-year Yukon-Tanana Upland geologic mapping campaign, fielding 11 geologists for 380 person-days of work in June, July, and August. This program aims to generate modern, updated, and detailed geologic maps for the mineral-rich Yukon-Tanana Upland; the work is funded by the USGS Earth MRI program and State of Alaska Capital Improvement Project funds. Earth MRI mapping projects are funded on a three-year cycle, so that each map area receives two summers of fieldwork and one year of map production. Multiple projects run concurrently.

This year, geologists completed the fieldwork phase of the Steese project, initiated in 2024, which includes the Steese National Conservation

Right: Mineral Resources geologist Wes Buchanan mapping the geology south of Twelvemile Summit for the Steese Earth MRI Project.
Left: Mineral Resources geologist Travis Naibert mapping the geology north of Porcupine Creek in the northern Circle mining district for the Steese Earth MRI Project.

Area, the White Mountains National Recreation Area (prospective for tin, tungsten, and REEs), the Steese Highway corridor, the Circle mining district, and the Fairbanks mining district (notable producers of gold, antimony, and tungsten). Map production for the Steese project will occur in 2026 with expected publication in 2027.

As part of the Earth MRI program, DGGS continues to collaborate with the USGS on the reanalysis of archived USGS stream-sediment pulps and previously collected outcrop samples from across the Yukon-Tanana Upland and Kuskokwim mineral belts; results include a full suite of elements using modern analytical methods. The published data are available for download through the USGS website: doi.org/10.5066/P9WHRLXH; DGGS website: maps.dggs.alaska.gov/geochem; and for viewing through the DGGS Exploration Geochemistry Web App (DGGS's most popular web app): geoportal.dggs.dnr.alaska.gov/portal/apps/webappviewer/.

ALASKA MINERAL INDUSTRY REPORT

The DGGS mineral resource industry expert, Dr. David Szumigala, presented updates on Alaska's mineral industry in Vancouver, Canada, and Reno, Nevada, in 2025. Dr. Szumigala published the 2021 Alaska's Mineral Industry report and the 2022 report is in review for publication. DGGS continues compiling data for the 2023 and 2024 reports. This report series provides an annual summary of activity in the mining sector and gives a consistent, factual snapshot of the exploration, development, and production of Alaska's mineral resources.

Mineral Resources 2025 Publications

PIR 2025-2A | doi.org/10.14509/31649

Bedrock geologic map of the Richardson Mining District, Big Delta Quadrangle, Alaska

PIR 2025-2B | doi.org/10.14509/31650

Bedrock geologic map of the Goodpaster River-Shaw Creek area, Big Delta Quadrangle, Alaska

RDF 2025-2C | doi.org/10.14509/31651

Bedrock geologic map of the Volkmar River-Healy River area, Big Delta and Mount Hayes quadrangles, Alaska

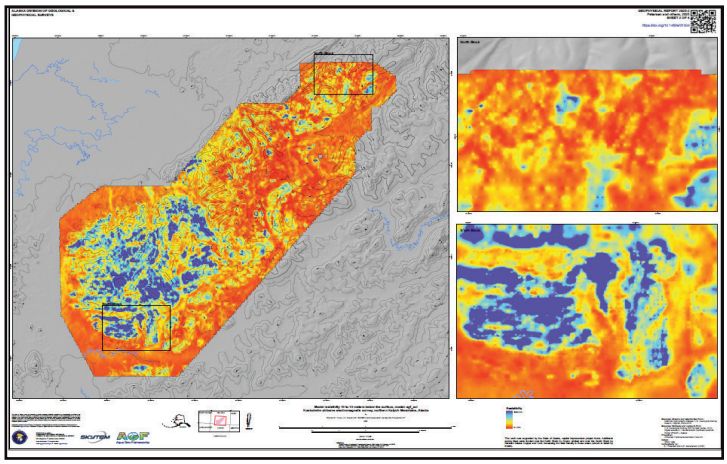
RDF 2025-2D | doi.org/10.14509/31652

Bedrock geologic map of the Mount Harper-Middle Fork area, Eagle Quadrangle, Alaska

Mineral Resources geologist Jamshid Moshrefzadeh mapping geology in the White Mountains Recreation Area south of Beaver Creek during the Steese Earth MRI Project.

Highlight

Electromagnetic Surveys Show Alaska's Mineral Resources in 3D



Alaska hosts world class mineral resources, but much of the state is covered by dense forests and tundra, affectionately known to geologists as "moose pasture." To see under the vegetation, soil, and permafrost, DGGS conducts geophysical surveys to map unseen rock formations based on their physical properties.

One such technology is electromagnetic surveying, which highlights rocks that conduct electricity. Modern time-domain electromagnetic surveys are highly sensitive and can sense conductive rocks hundreds of meters (greater than 1,000 feet) below the surface. This technology can find and map extents of conductive mineral deposits, like the sulfide-rich ores of the Ambler District or the high-grade graphite deposits at Graphite Creek on the Seward Peninsula. It can also be used to map permafrost to inform the engineering of Alaska's critical infrastructure. We successfully seek private-sector partnerships to help fund the surveys.

In 2025, DGGS completed the Granite Mountain and Candle Hills electromagnetic survey in partnership with Doyon, Ltd. and contractors Geotech Ltd. and Aqua Geo Frameworks. This survey covered 148 mi^2 in the Candle Hills and 360 mi^2 in the Granite Mountains near McGrath, Alaska. The results, to be published soon, offer an exciting new look at the geology of the area and will help focus and decrease exploration risk for critical minerals in the survey area.

The 2024 electromagnetic survey of the northern Kaiyuh Mountains has led to successful exploration efforts this past summer in Alaska. The SkyTEM-contracted survey in this region, published in 2025 (https://doi.org/10.14509/31304), covers the past-producing Illinois Creek and Perseverance mines, and an active exploration area for gold, silver, copper, and zinc. We worked with private-sector partners Alaska Silver and Doyon, Ltd. to expand and enhance the survey, which has launched the next phase of exploration in this highly prospective district. Alaska Silver claimed this survey helped define their trenching, drilling, and geochemical exploration efforts this past season, with successful identification of an entirely new mineralized zone called the "Silver Sage" discovery.

Mineral Resources geologist Evan Twelker mapping geologic contacts in the Mt. Prindle area.

HYDROLOGY & SURFICIAL GEOLOGY

Trent Hubbard
Section Chief

Nick Crawford

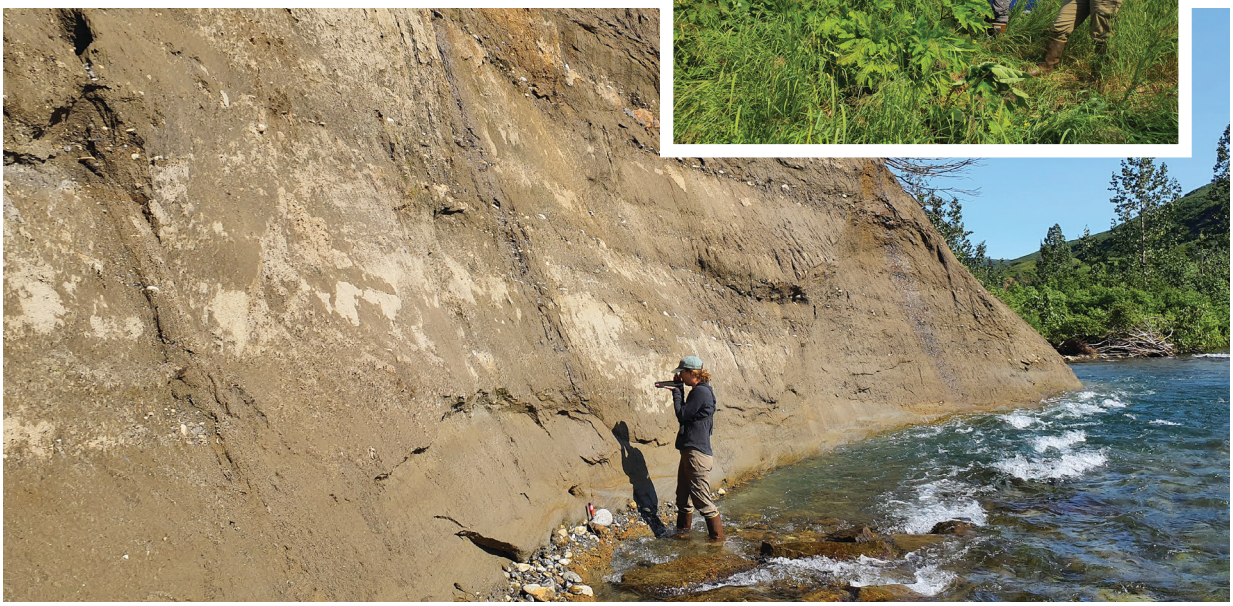
Jamie Buscher

Sandra Walser

Jenna Zechmann

Matthew Scragg

The Hydrology & Surficial Geology Section includes programs focused on lidar (light detection and ranging), surficial geologic mapping and material resource assessment, and hydrology data collection and processing. Our programs enhance understanding of hydrologic processes throughout the state, identify the locations and distributions of hydrologic resources, provide information on the characteristics and distribution of construction materials and placer resources, and improve knowledge of geologic hazards such as landslides, active faulting, and erosion. Many of our projects involve collaborative efforts with scientists from external organizations and other sections, including the Geologic Hazards Section (https://dggs.alaska.gov/hazards/index.html). Programs like ASTAR rely on collaboration and relationships with other state and federal agencies, regional and local governments, Tribal and Indigenous organizations, academic institutions, and non-profit organizations, to name a few. Data and expertise from our section provide essential baseline information for long-term planning and infrastructure development projects, which is lacking throughout much of the state.



DGGS geologist Sandra Walser examines a cut bank of Canyon Creek during West Susitna STATEMAP fieldwork.

DGGS geologist Trent Hubbard displaying a clast collected from Pleistocene-age glacial sediments.

LIDAR

DGGS continues to collect, process, and utilize lidar data to support geologic mapping, monitoring geologic hazards, and evaluating landscape change. With our in-house lidar system, we collect and process high-resolution elevation data for small areas, even in dense vegetation, where aerial photography or other remotely sensed imagery alone are inadequate for project work. We can efficiently collect and provide vital data to partners and collaborators, often helping to identify and address hazard-related issues, such as impending or ongoing landslide activity. We also have the capacity to respond to short-fuse disaster response requests, often near communities, where timely information is vital. Our data help inform residents, emergency services, builders, and land users making safety decisions, supporting the division's and state's mission.

This year, we conducted repeat surveys along unstable slopes near infrastructure at Portage Lake, Barry Arm, Columbia Glacier, Maynard Mountain, and Matanuska Narrows. We also collected lidar data to assess the historically large South Sawyer Glacier terminus/Tracy Arm landslide, which occurred in the summer of 2025 and initiated a tsunami that stripped away all vegetation 1,500 feet up the slope opposite the failure. Because many landslides occur in areas recently uncovered by retreating glacial ice, DGGS has begun using ice-penetrating radar to evaluate ice thickness, complementing our lidar surveys.

In addition to collecting lidar in areas of geologic hazards, we collected and processed lidar data near the Jago River on the North Slope to better understand hydrologic system changes, and within the Bonanza Creek State Forest to support a study evaluating landscape change over time. Altogether this year, we surveyed 46 mi² of land, processed more than 15 mi² of data, and published 84.7 mi² of lidar maps.

Select Hydrology & Surficial Geology 2025 Publications

RDF 2025-12 |doi.org/10.14509/31536

2023 Arctic Strategic Transportation and Resources (ASTAR) project geotechnical data and sample descriptions: Point Lay, North Slope, Alaska

RDF 2025-18 | doi.org/10.14509/30840

Catalog of drill log cards and sample images from USGS seismic shothole sites in the National Petroleum Reserve - Alaska (1974–1981)

RDF 2025-27 | doi.org/10.14509/31734

Lidar-derived surface elevation data for Dickason Highlands, southcentral Alaska

GEOLOGIC MAPPING AND CONSTRUCTION MATERIALS RESOURCE ASSESSMENT

This year, the Surficial Geology Program continued work on several geologic mapping projects, supporting a better understanding of the location and characteristics of construction resource materials, geologic hazards such as faults and landslides, areas susceptible to erosion or flooding, and the impacts of climate change. The baseline data provided by geologic mapping is essential when considering safety in developing or at-risk regions, the location of materials necessary for maintenance or infrastructure, or how a changing climate may impact the landscape.

In 2025, we published the final report and maps from our debris-flow hazard evaluation and mapping project near Sitka. We also published a geologic map of the Haines area (1:50,000), fulfilling our required deliverable for the federal FY2023 STATEMAP project. Both publications provide vital geologic information on landslide hazards and slope instability that planners and decision makers can use.

We continued work on several geologic mapping projects this year, including Yukon River crossing, ASTAR, and West Susitna. More details about these projects can be found in separate highlight articles. Although these projects are ongoing, we have produced several publications with surface materials information, including field site and sample descriptions near the communities of Point Lay and Nuiqsut, providing vital information for interested stakeholders.

HYDROLOGY

Over the last year, we have been building the Hydrology Program by improving our capacity to address the state's critical hydrologic issues, including supporting responsible infrastructure development, evaluating hydropower potential, and addressing Alaskans' safety needs.

A significant accomplishment of the program in 2025 was resuming the collection and evaluation of ASTAR hydrologic data. This work is described in a separate highlight article.

In March, we hired Matthew Scragg to lead the Renewable Hydropower Program and build its capacity to collect, compile, and disseminate data and information on the state's hydropower resources. In 2025, we published an informational sheet on the Renewable Hydropower Program and hydropower potential in Alaska.

During the past year, we have developed collaborations with public and private stakeholders, including the University of Alaska Fairbanks' Alaska Center for Energy and Power (ACEP), the USGS, utility providers, and others, working to identify data gaps and provide technical guidance to develop potential hydropower resources.

In June, we joined the ACEP team at the Tanana River Test Site for a test run of the Blade Runner hydrokinetic turbine system. In July,

program staff led a river trip for the Middle Yukon River Community Outreach project, discussing potential in-river projects with local communities and learning about river behavior through field observations and discussions with residents. In November, the program received an award from the DOE's Energy Technology Innovation Partnership Project to provide technical support for the Nuyakuk Hydroelectric Project, with work set to begin in 2026.

Upcoming work for the Renewable Hydropower Program includes the following objectives: 1) identifying areas where hydropower may be a viable alternative; 2) assessing Alaska's hydrokinetic resources aimed at sparking long-term investment in emerging hydrokinetic turbine technology and project implementation; 3) maintaining an Alaska Hydropower Database, which shares existing and new geospatial and temporal data related to hydropower; and 4) collecting data and using instrumentation to monitor and characterize the hydrology of potential hydropower projects.

The Hydrology Program is also actively exploring funding opportunities to continue long-term hydrologic and meteorological monitoring near the proposed Triangle Community Road (TCR). Additional funding would allow the team to visit field sites multiple times per year (peak, moderate, and low river levels) to maintain field equipment, download data, and take stream discharge and stage measurements. Funding would also allow installation of new stream gages to expand the scope of stream monitoring, focusing on the coastal stretch of the proposed TCR, providing essential planning and development information in an area of need. We would also be able to install a satellite telemetry system to transmit weather station and stream gage data online for year-round monitoring, providing vital information not only for this potential project but also for the public, in an area where such data are scarce.

DGGS hydrologist Matthew Scragg collecting samples of Nanushuk sandstone for laboratory analysis.

Outcrop of Cretaceous Nanushuk Formation sandstone along the Kugrua River.

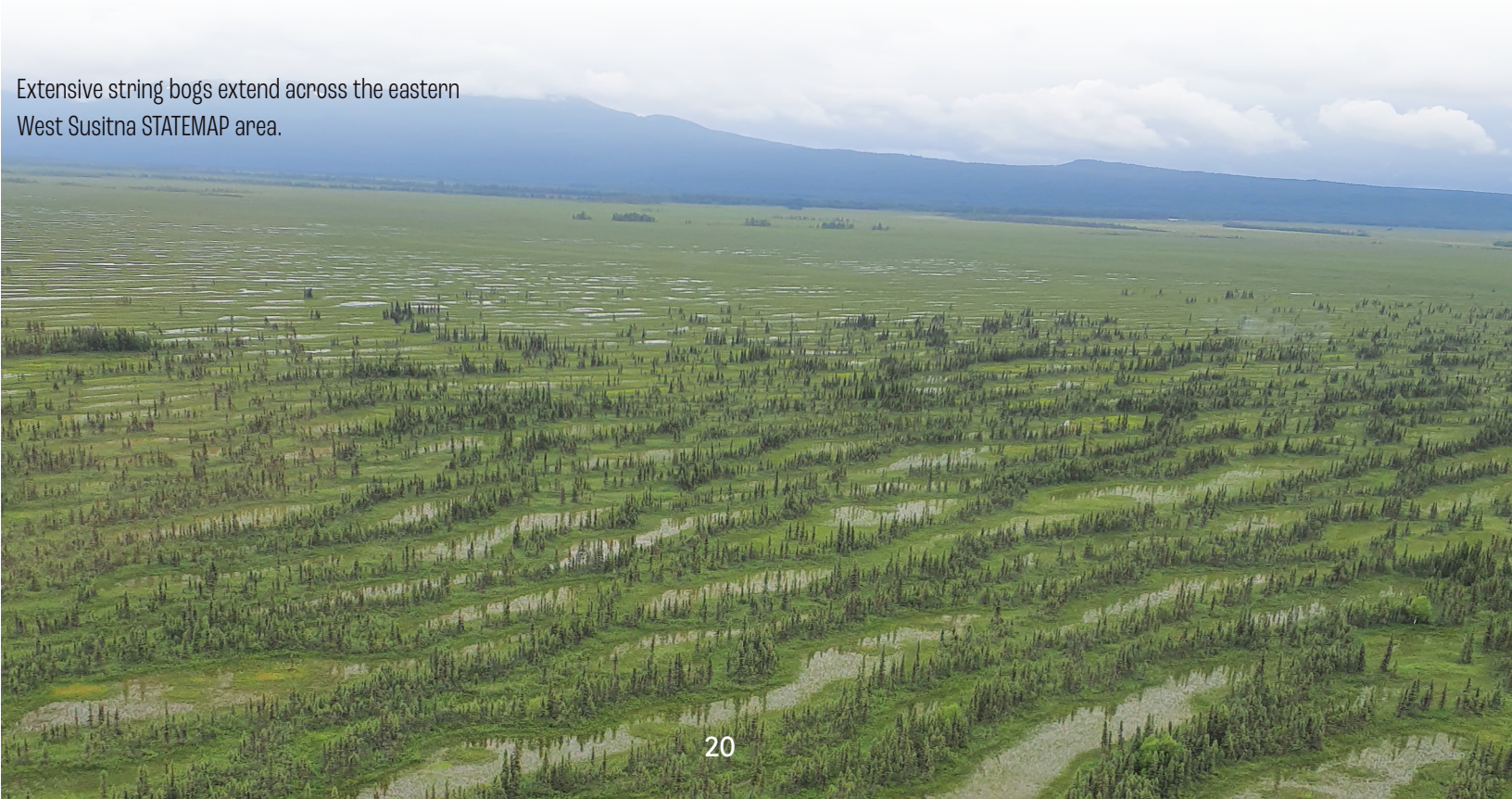
Highlight

West Susitna STATEMAP Project

In 2025, geologists from the Energy Resources, Geologic Hazards, and Hydrology & Surficial Geology sections continued work on the West Susitna STATEMAP project. The ~500 mi² area encompasses ~50 miles of the proposed West Susitna Access Corridor, which would connect Anchorage to the Happy River Valley on the western edge of the Susitna Basin, providing access to potential mineral, oil, and gas resources, opportunities for timber harvest, alternative energy projects, and recreational activities. Our mapping will provide baseline geologic information for land-use management decisions and stakeholders in the area, while helping to better understand the region's Quaternary geology, surface materials, petroleum resources, and geologic hazards. Our focus this year was to compile, evaluate, and publish data in preparation for completing the map. We anticipate publishing the map later in 2026.

In the past year, we published regional data on geochemistry, palynology (microorganisms in sediments), and a high-resolution, lidar-derived elevation dataset for the Dickason Highlands. These data are essential for our mapping and project work and will also benefit other interested stakeholders, including those involved in planning and land-use management decisions. For example, geochemical data are a valuable resource for the mineral industry, and palynological data support regional stratigraphic interpretations relevant to the availability of resources such as coal and construction materials.

In 2025 we refined previous surficial and bedrock geologic mapping in the area by interpreting imagery and evaluating field and laboratory data. We identified and characterized glacial and alluvial landforms and bedrock units, helping us better understand the area's geologic framework and potential material resources. Importantly, we have defined the glacial chronology of the area more clearly. We also used new lidar-derived high-resolution elevation data and field investigation to evaluate geologic hazards such as landslides and other slope



Extensive string bogs extend across the eastern West Susitna STATEMAP area.

instabilities, potentially active faults in the Dickason Highlands, and known active faults in the West Susitna lowlands. We mapped new surface traces of the Bulchitna Lake and Kahiltna River faults, initially identified in subsurface seismic data, in the southeast corner of the mapping area.

The project area encompasses a wedge of bedrock that separates two sedimentary basins that are prospective energy resources (the Cook Inlet and Susitna basins). The map area contains coal-bearing strata that are the focus of a current exploration lease. The new mapping and associated age dating provide the necessary framework to construct a history spanning 130 million years, during which the region evolved from a marine environment to a locus of intense continental volcanic activity, followed by placid deposition in bogs and lakes. Perhaps more importantly, the mapping effort provided the structural architecture necessary to evaluate a previously proposed model for the development of the western Susitna basin margin, which predicted the potential for an oil hydrocarbon play beneath the margin highlands. Although we now consider the play type unlikely, our new structural model provides a framework for better evaluating the region's seismic hazards.

We are working on a report describing our findings from active faulting investigations, including the evaluation of lidar and a trench dug in the southeastern part of the map area in a location near a magnitude six earthquake on Thanksgiving Day, 2025. This report will provide important information about potential geologic hazards in the area.

DGGS geologist Sandra Walser observes Pleistocene glacial sediments (**above**) and collects a sample of Miocene-age silt and clay (**right**) for palynological analysis as part of the West Susitna STATEMAP project. Sediment descriptions and sample dating are useful tools for correlating geologic units in the map area.

Highlight

Arctic Strategic Transportation and Resources (ASTAR)

The ASTAR project is a partnership between DNR, the Department of Transportation and Public Facilities (AKDOT&PF), and the North Slope Borough (NSB) to identify, evaluate, and advance opportunities to enhance the quality of life and economic prospects in NSB communities through infrastructure development. In 2025, DGGS continued work on the ASTAR program through four different projects focused on energy resources, coastal flooding and erosion, hydrology, and sand and gravel resource evaluation.

Energy Resources

The Energy Resources Section collaborated with the USGS to collect two bedrock cores from along the Dalton Highway on the North Slope during the summers of 2023 and 2024. The goal of the project was to supplement our investigations of incomplete outcrops with a continuous record of important oil and gas reservoir and source rock intervals.

The Slope Mountain #1 well recovered 560 ft of core from the Nanushuk Formation and was drilled on an elevated bench on the eastern face of Slope Mountain. The Landslide #4 well recovered 860 ft of Seabee Formation from a road-level site near Icecut.

In 2025, Energy staff oversaw the slabbing and polishing of the cores and the collection of core plugs to study the reservoir quality and sandstone composition. In addition, the full length of both cores underwent continuous dual-energy computed tomographic (CT) scanning (similar to a medical CAT scan). This specialized dataset allows geologists to distinguish different minerals and highlights subtle variations in bedding that are critical to correctly interpreting the core.

These cores are unique and will continue to be analyzed for years to come to extract new insights into the region's petroleum geology. DGGS and the USGS held a two-day public core viewing workshop at the Geologic Materials Center, sharing preliminary results from the two test cores. The event was attended by a variety of interested oil and gas companies involved in North Slope exploration and development.

Left: Energy Resources geologist Bob Gillis collects field notes on the North Slope.
Right: Community members explore ASTAR core samples at the Geologic Materials Center.

ASTAR Coastal Flooding & Erosion

The Coastal Hazards Program's ASTAR-funded work focuses on assessing flood and erosion risk in North Slope coastal communities. This work is motivated by interests in developing insights into the possible future impacts of Arctic storm events and longer-term trends of erosion and flood risk, and their impact on critical infrastructure. This information helps guide the development of mitigation strategies to ensure the resilience of Alaska's North Slope coastal communities.

Aerial view of Point Hope, Alaska.

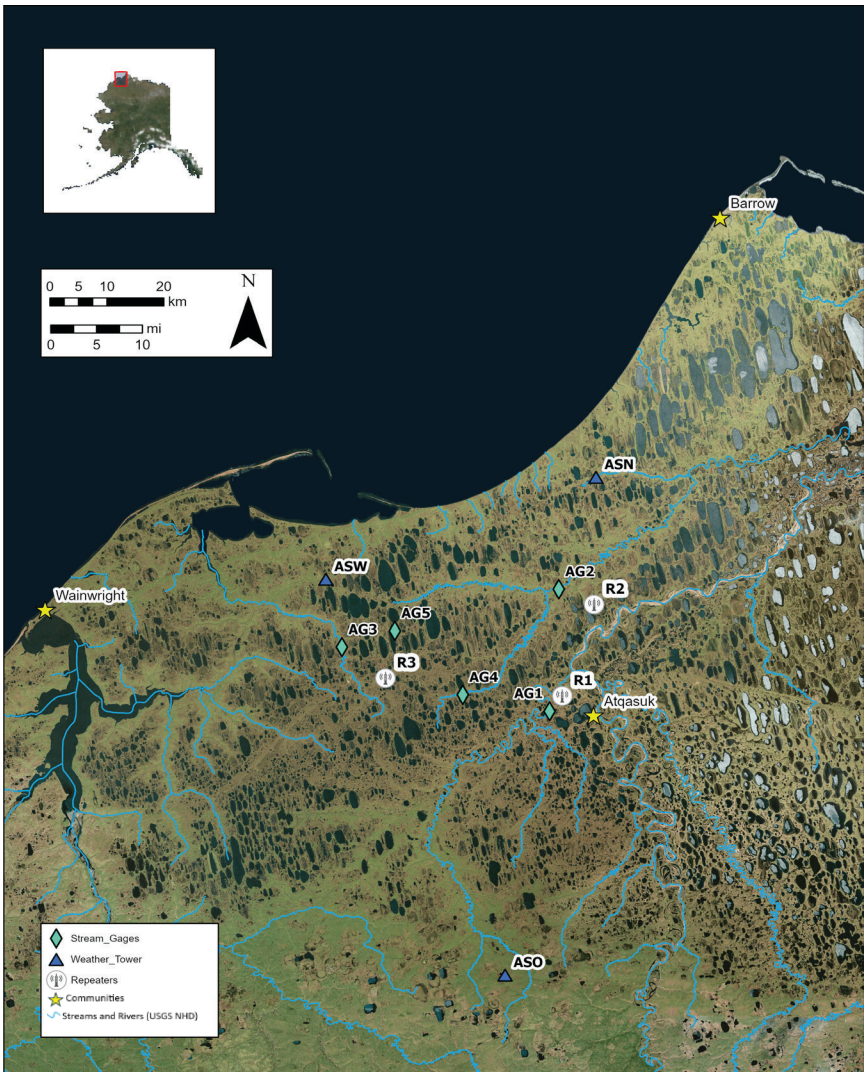
Although the Coastal Hazards Program could not conduct North Slope ASTAR fieldwork in 2025, the program continued to process data collected in Point Hope and Kaktovik in 2024. Data collected in Point Hope have proven integral in further plans of the Cold Regions Research and Engineering Laboratory (CRREL) Alaska Research Office of the United States Army Corps of Engineers, and the U.S. Military Academy at West Point. Namely, DGGS's Coastal Hazards Program is coordinating with CRREL to keep re-collecting coastal elevation profiles in the same locations as previously collected by EA Engineering in July 2021, September 2022, and October 2022, and by DGGS August 2024, where we have learned from the community that significant storm-induced erosion is washing out original cultural landmarks and meat cellars.

Keith Horen surveying in the community of Point Hope, Alaska.

Hydrology

In the summer of 2025, DGGS collected data near the communities of Utqiaġvik, Atqasuk, and Wainwright to support hydrologic investigations along the proposed TCR. We successfully repaired and maintained field stations, downloaded stream-gage and weather-station data, recalibrated sensors, conducted discharge measurements, and established elevation datums to maintain standardized data collection.

Work is underway to prepare field data for publication, making critical information publicly available to stakeholders and land-use planners working on the proposed TCR. DGGS will use the data to analyze the relationship between surface water runoff and streambank instability, providing vital information to support the development of a potential Environmental Impact Assessment for this project, which is important to the NSB and associated stakeholders.



Locations of DGGS weather towers, stream gages, and radio repeaters in the Triangle Community Road area.

In addition to this work, the Hydrology Program assisted the Coastal Hazards Program by collecting aerial reconnaissance photographs of the coastline nearest the proposed TCR. These critical photographs will be used to conduct an initial assessment of the proposed route's coastal erosion risk and to determine whether any additional data are needed to inform future project development plans.

Sand and Gravel

The Sand and Gravel Resources team continues to collect, process, and evaluate data to provide information about construction materials across the North Slope, which is needed for community and Borough initiatives, including community maintenance and infrastructure projects, as well as the advancement of the proposed TCR. Information is also vital to potential North Slope resource development projects.

In 2025, we published data from a 2019 DGGS field campaign in eastern NPRA, including drill hole logs from collaborative efforts with the AKDOT&PF. We also published images of drill cards and geologic samples, collected from over 25,000 seismic holes between 1974 and 1981 and currently housed at the Geologic Materials Center in Anchorage. We are presently entering information from the drill cards into a database to facilitate easier data access.

We continued our efforts to compile, evaluate, and prepare information collected during the 2023 and 2024 field seasons near the communities of Point Lay and Anaktuvuk Pass for publication. We also collected rock samples during hydrology fieldwork on the North Slope, which we anticipate evaluating as a potential construction material resource.

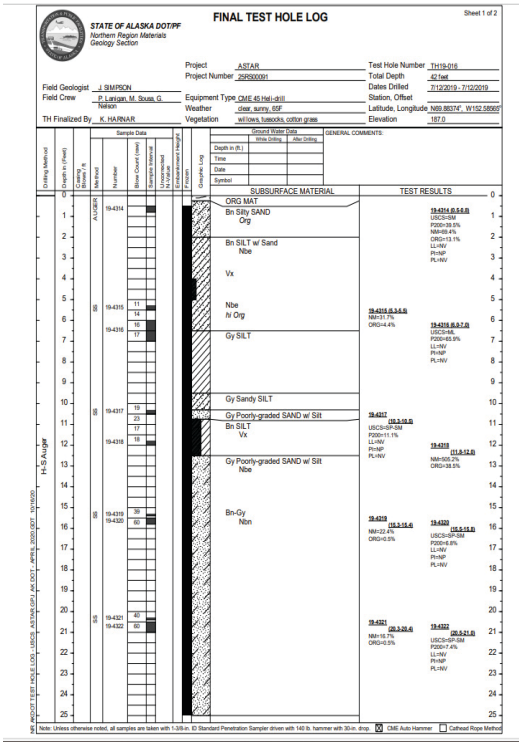
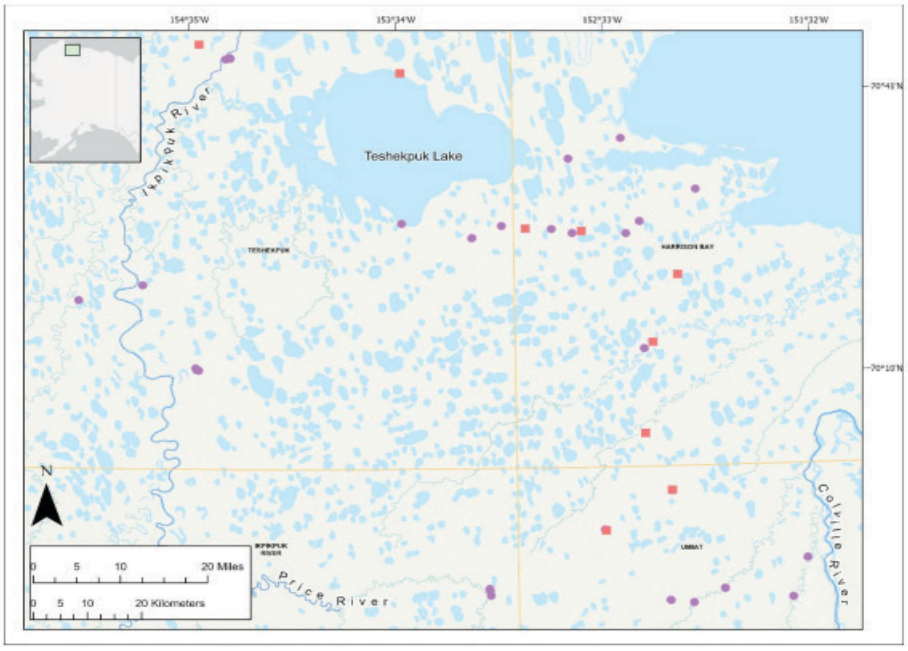


Figure of a drill hole log from the 2019 DGGS field campaign in eastern NPRA.

This past year, we continued our efforts to review terrain unit mapping for over 169 1:63,360-scale quadrangles across the North Slope. We are using mapping, along with five seasons of field data, to develop a database and maps that will provide stakeholders with reconnaissance-scale information on construction material resource potential across the North Slope, with a focus on communities and areas where we collected field data. Once completed, we will publish terrain unit and construction material resource potential maps and the associated digital data.



Map showing DGGS field station locations (purple circles) and AKDOT&PF test holes (red squares) where field data were collected during the 2019 field season.

GEOLOGIC HAZARDS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Abigail Nastan


Lee Zirnheld


Paul Goodfellow


Dain Harmon

The Geologic Hazards Section is focused on studying geologic processes that threaten lives and infrastructure. The section is composed of six unique programs that investigate and respond to coastal erosion and flooding, landslides, earthquakes and tsunamis, changes to the cryosphere (ice- and snow-covered areas), volcanoes, and mineral-related health hazards. The six programs focus on geologic hazards research and baseline data collection to support the advancement of scientific knowledge and statewide hazard mitigation. The section also manages division-wide grants that support high-value geologic data preservation projects and a statewide geologic map compilation. All programs within the Geologic Hazards Section are highly collaborative and staff work closely with the rest of the division, other state and federal agencies, regional and local governments, Tribal and Indigenous organizations, academic institutions, and non-profits.

Coastal Hazards Program staff member Nora Nieminski collects profile data in Wainwright, Alaska.

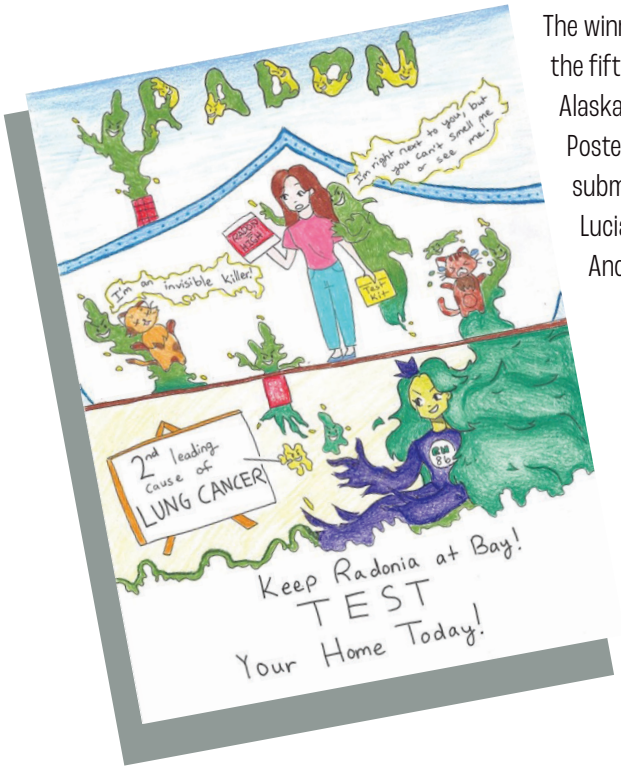
GEOLOGICAL HEALTH HAZARDS PROGRAM

The Geological Health Hazards Program (GHHP) includes both the Alaska Radon and the Alaska Groundwater Quality programs. Both programs provide vitally needed data to the public on risks to their home health and act as a bridge to join public information with actionable scientific data. More importantly, GHHP improves the health and well-being of residents in all areas of the state and at all income levels.

Alaska Radon Program

Radon is a colorless and odorless radioactive gas that is now the second leading cause of lung cancer. It is estimated that at least 21,000 deaths per year are the result of home radon exposure across the United States. The Alaska Radon Program is funded by the federal Environmental Protection Agency (EPA) through a grant to the Alaska Department of Environmental Conservation, Air Quality Division. DGGS manages the program in coordination with partners at the UAF Cooperative Extension Service. The program provides free home radon testing kits to Alaska residents. It also provides technical information on resources for homes with testing results at or above the EPA action level of 4 picocuries per liter of air of radon gas.

dggs.alaska.gov/hazards/radon.html



The winner of the fifth annual Alaska Radon Poster Contest submitted by Luciana Liu from Anchorage.

Coastal erosion in Shishmaref, Alaska.

In 2025, the program tested a total of 537 homes in Alaska, with 116 homes and public buildings testing at or above 4 picocuries. Through the program's public outreach and engagement efforts, we reached 44,264 Alaskans through social media channels, news media, and interviews with television stations. Additionally, the program spoke directly with over a hundred Tribal and village environmental staff at indoor air quality trainings held in 2025.

We continue to build out our engagement throughout Southcentral Alaska, along with off-road communities throughout the state. In spring 2025, the state supported a research project on St. Lawrence Island which identified radon hot spots in areas that had not previously been tested. The Alaska Radon Program followed up with long-term testing to provide additional data points for the project.

Alaska Groundwater Quality Program

In 2020, the division received funding from the EPA to develop a methodology to track groundwater quality in Alaska. The program's goal is to provide information to state residents on their groundwater quality through an online portal which will collect and map home and business well-water testing results. In 2025, DGGS hired geologist James Salvador, who completed most of our non-public-facing programming work. This includes our staging databases to support EPA data submissions, and an automated download script to integrate processed well-water data into an online map. At present, the map is the last element of our program which needs to be completed.

We have submitted an application for a new round of EPA funding for the 2027 federal fiscal year and are planning to integrate radon-in-water testing data into the larger dataset. This will allow the groundwater quality program to provide overlapping data which will support both GHHP programs and their outreach to Alaska residents.

Nora Nieminski collects sand samples in Utqiagvik, Alaska.

Shaktoolik, Alaska, was one of six communities where the CHP completed a flood impact assessment in 2025.

COASTAL HAZARDS PROGRAM

The Coastal Hazards Program (CHP) closed out three major projects in 2025: a Climate Adaptation Science Center project funded by the USGS, a five-year water-level monitoring project in partnership with Alaska Ocean Observing Systems, and a National Climate Resilience Fund (NCRF) project. The CHP's continued focus in 2025 was to produce flood impact assessments for at-risk communities to wrap up and fulfill NCRF project objectives in partnership with the Alaska Native Tribal Health Consortium. As part of this effort, the program completed and published six flood impact assessments (for Kwigillingok, Deering, Teller, Shaktoolik, Stebbins, and Kivalina). The field investigations and research conducted for each of these risk assessments provide direct benefits to coastal and riverine communities and the state's resilience to changing environments.

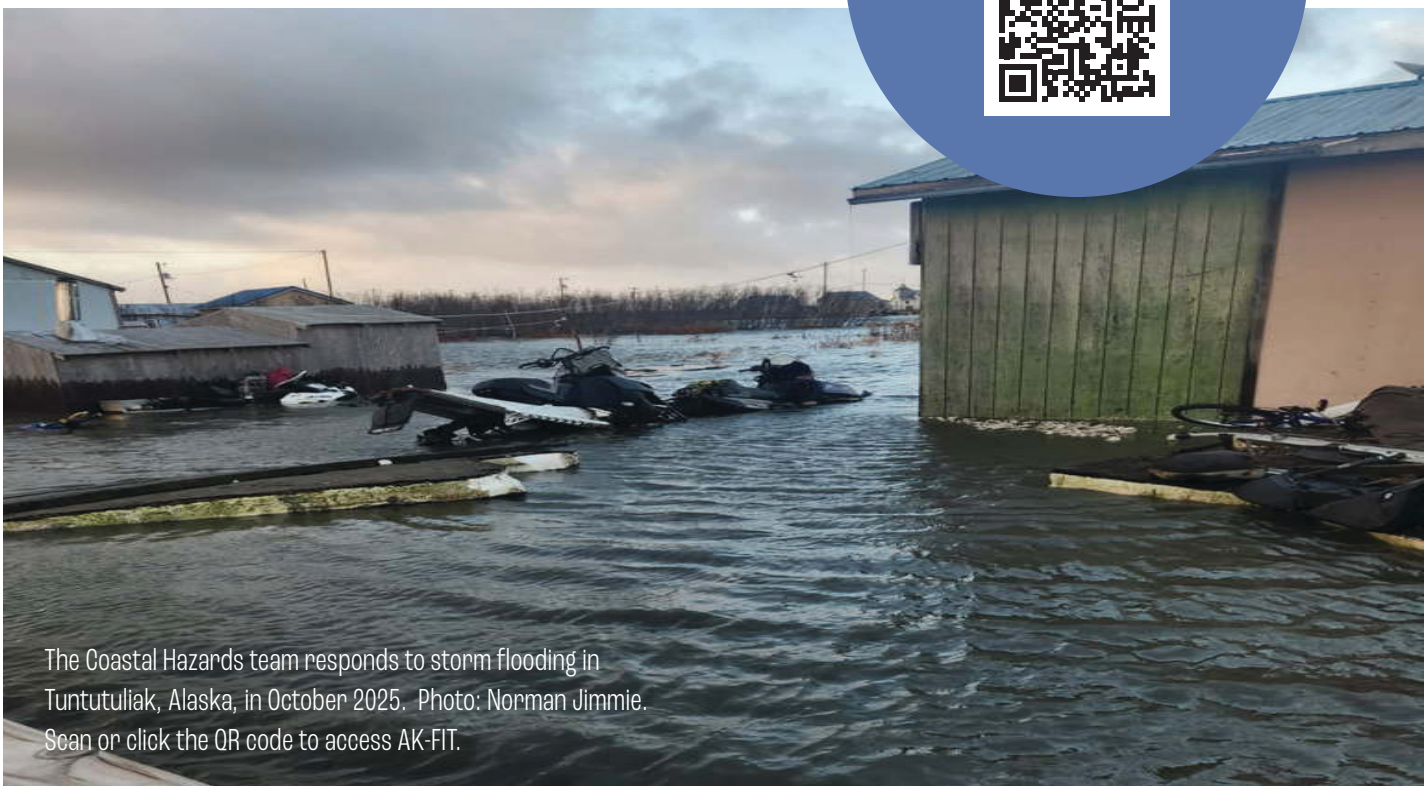
In 2025, the CHP also significantly enhanced its Alaska Flood Inundation Tool (AK-FIT). In early October, in anticipation of two significant forecasted storms, the CHP rushed to add 24

additional models to the flood extent mapping tool, bringing the total coverage to 32 communities. Many of these new flood maps proved critical information for improving National Weather Service (NWS) flood impact forecasts, as well as for emergency planning and evacuation purposes.

The CHP was invited to present at a variety of local, regional, national, and international conferences in 2025. The program strategically participated in these forums to increase global awareness of coastal research efforts in Alaska and to ensure that Alaska's specific coastal hazard needs inform international arctic research and funding priorities. Namely, the CHP presented at the tenth International Conference on Arctic Margins and chaired a session at the Fourth International Conference on Arctic Research Planning, in addition to continuing to engage with Alaska Native communities at more local and regional meetings and workshops.

The CHP continues to work closely with state, federal, Tribal, academic, public, and private institutions, and connects with community members to support geologic hazard response and resource management through scientific investigations informed by local knowledge. The program officially received funds this year for two new National Oceanic and Atmospheric Administration (NOAA) grants that were awarded in 2024: the Climate Regional Resilience Challenge and Effects of Sea Level Rise. These two projects will allow the program to continue to provide technical guidance and develop new, need-inspired tools to help support and advance resilient coastal and riverine communities over the next five years.

Click or scan to access AK-FIT



The Coastal Hazards team responds to storm flooding in Tuntutuliak, Alaska, in October 2025. Photo: Norman Jimmie. Scan or click the QR code to access AK-FIT.

Highlight

West Coast Storms

Early October 2025 brought two devastating, back-to-back storms. The first was a strong low-pressure system that moved toward Alaska on October 6, 2025. This storm brought west-southwesterly storm-force winds that caused coastal flooding, high surf, and erosion from Kotzebue Sound and along the coast of the Northwest Arctic Borough. Water levels in Kotzebue and Kivalina prompted evacuations, with waters peaking on October 8. Immediately following this Bering Sea storm came the remnants of Typhoon Halong, which brought widespread damaging winds gusting in excess of 100 miles per hour in some communities in the Yukon–Kuskokwim Delta and a record-breaking storm surge that resulted in catastrophic flooding and destruction across west coast communities. Particularly devastating flooding was observed in Kipnuk and Kwigillingok, where record high water level data were recorded by DGGS water level sensors in each community before these sensors were then damaged by the storm.

Comparison of bridge in Kipnuk, Alaska, before and after the October storm. Photo Above: Rayna Paul. Below: Nora Nieminski, DGGS.

In response to the initial storm forecast, the Coastal Hazards Program updated DGGS's AK-FIT online application with 24 additional Still Water Inundation Models (SWIM), bringing impact forecasting and safety planning capabilities to 32 communities in total. This online tool is designed to help inform flood preparedness by allowing the user to visualize modeled flood extents at various forecasted water levels. Modeled flood extents are generated by the simple, but powerful SWIM method that uses hydrological connectivity to improve accuracy. These flood extent models, in conjunction with DGGS flood impact assessments, were critical for the NWS forecasts as each of the storms developed.

Following the storms, DGGS executed a Master Agreement for ground surveys to collect high-water marks and coastal elevation profiles in several communities, including Tuntutuliak, Kongiganak, Kwigillingok, Kipnuk, Chefornak, Nightmute, Tununak, Tooksook Bay, Quinhagak, and Nunnam Iqua. DGGS also coordinated assistance from NWS personnel who collected high-water mark survey data in Kotzebue, Kivalina, and Deering.

Additionally, DGGS's Alaska Geospatial Office coordinated with the Federal Emergency Management Agency (FEMA) Geospatial team on imagery collections and prioritization of oblique and orthomosaic collections. Post-storm imagery that was collected included Civil Air Patrol fixed-wing oblique and orthoimagery, Satellite Synthetic Aperture Radar (SAR) data, Satellite Optical Imagery, and National Aeronautics and Space Administration (NASA) Disaster Program satellite-based data. In the coming months, DGGS will be processing much of the available pre- and post-storm data to report out on the historical storm impacts and continue to produce products aimed at helping decision makers and communities make informed decisions and build resilient futures.

CLIMATE AND CRYOSPHERE HAZARDS PROGRAM

In 2025, the Climate and Cryosphere Hazards Program (CCHP) achieved a pivotal year of product implementation and innovative applied research, solidifying its commitment to providing actionable science that directly enhances the resilience of Alaska communities and vital infrastructure. CCHP advanced significant improvements in the Alaska Weather Observation Network and sustained intensive engagement with stakeholders to co-produce science for better decision-making.

CCHP's scientific output in 2025 delivered tangible benefits for the State of Alaska's hazard resilience. The program authored a seminal publication milestone with the widely cited Karasözen et al. (2025) publication on the Surprise Inlet landslides, providing critical insights that directly inform the state's approach to mitigating dynamic landslide and tsunami risks. Furthermore, the program substantially increased Alaska's geospatial data resources by publishing several new lidar datasets and conducting rapid-response lidar acquisitions across the state to support urgent geologic hazard projects, notably capturing data following the August 10, 2025, landslide in Southeast Alaska's Tracy Arm to accelerate mapping and assessment efforts.

October 11, 2025, lidar survey of the landslide and impacted areas near South Sawyer Glacier in Tracy Arm, Alaska.

Ice-Penetrating Radar survey on Mendenhall Glacier in support of GLOF assessment and glacier evolution studies. Photo: Jamie Pierce, USGS.

Glacier-related hazards remained a core priority, leveraging innovative Ice-Penetrating Radar (IPR) and lidar data. IPR data collected on Cascade and Barry glaciers, funded by the USGS and in collaboration with USGS colleagues, significantly advanced the understanding of hydrological mechanisms influencing motion on the Barry Arm landslide. New IPR and lidar data were acquired at Portage Glacier (U.S. Forest Service funding) for glacier change and landslide hazard assessment, established via a new multi-agency partnership. Furthermore, comprehensive IPR mapping on Mendenhall Glacier allowed the program to map bed topography and ice thickness, contributing critical data to a multi-agency/institute study focused on Glacial Lake Outburst Floods (GLOFs) and future glacier evolution. To ensure future program continuity, CCHP successfully co-authored

proposals focused on Mendenhall GLOFs (USGS and National Science Foundation [NSF]) and a critical landslide proposal near Klukwan and the Haines Highway (NSF).

CCHP reached a major milestone in snow distribution and avalanche research, finalizing large-scale snow avalanche hazard mapping products for Southeast Alaska (USGS funding) and completing a critical snow avalanche hazard assessment for Cordova (FEMA funding). Ongoing work continued for the Municipality of Anchorage, building local capacity for preparedness. Continued snow distribution analysis at Barry Arm, alongside a new U.S. Bureau of Reclamation-funded study, utilized high-resolution lidar and Community Snow Observations data to refine snowpack distribution models.

CCHP strategically engaged in global and regional forums to bring cutting-edge Arctic science directly back to Alaska. By serving as a lead author in the 2025 Arctic Report Card and participating in the Fourth International Conference on Arctic Research Planning process, CCHP ensured that Alaska's specific hazard needs informed international research and funding priorities. Furthermore, CCHP's commitment to localized impact was demonstrated through 18 science communication events and extensive exchange meetings with 14 external agencies, research institutes, and communities, effectively translating global cryosphere knowledge into practical applications and decision support for Alaska residents and infrastructure managers.

LANDSLIDE HAZARDS PROGRAM

This year marked a milestone for the Landslide Hazards Program, as we completed and published two long-term, multi-year projects: the statewide landslide inventory, and the statewide deep-seated landslide susceptibility map. These accomplishments reflect significant staff time, commitment, and collaboration across hazard programs. The inventory incorporates previously mapped landslides from more than 350 USGS and DGGS publications, plus newly mapped landslides, covering a cumulative area greater than six million acres across the state. Deep-seated landslide susceptibility was modeled using bedrock geology information and slope angle derived from Interferometric Synthetic Aperture Radar (IFSAR) data. The completion of these projects enhances our understanding of landslide hazards across the state,

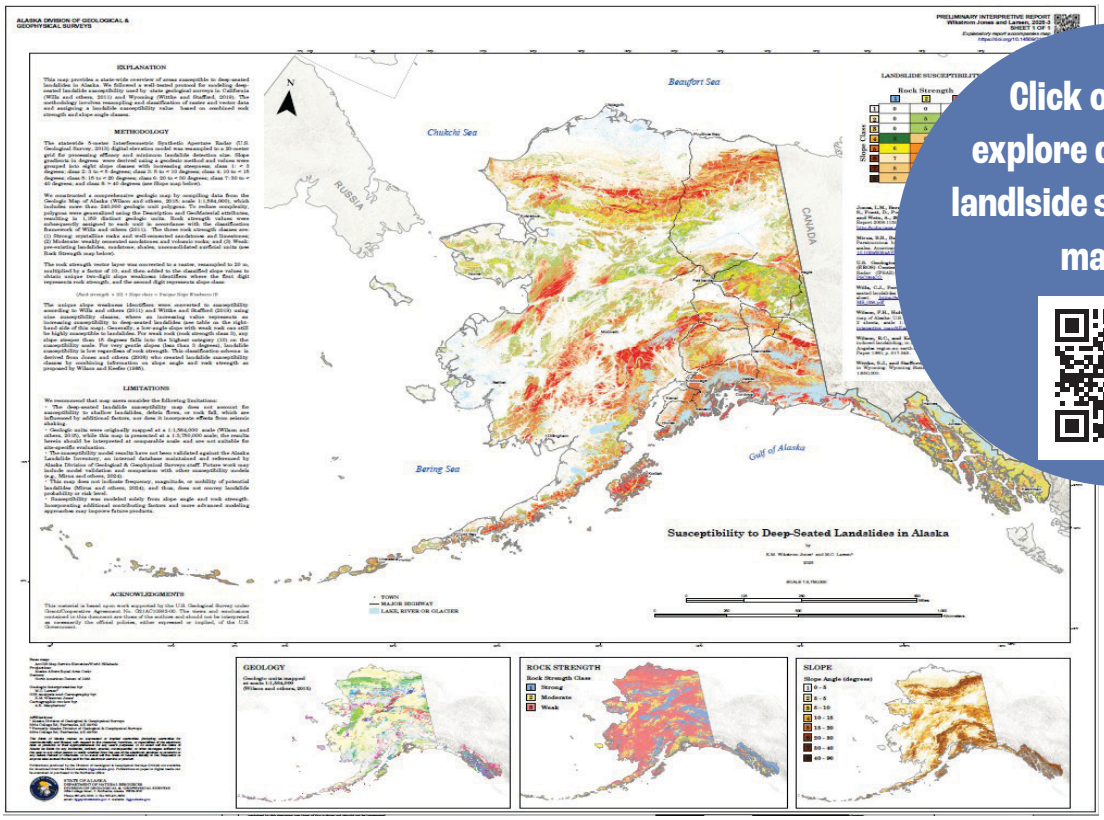
and strengthens our ability to support communities, advance landslide science, and improve hazard preparedness statewide.

Funding from a USGS Cooperative Agreement continues to sustain the program and supports landslide monitoring and research across Southcentral and Southeast Alaska. With this support, monitoring of the Barry Arm landslide in Prince William Sound is now in its fifth year. We also completed work on the two publications mentioned above and purchased equipment and scouted locations for two new high-altitude weather stations that we plan to install next summer.

In addition, we completed landslide mapping and hazard assessment for the City of Cordova, funded through the FEMA Cooperative Technical Partnership Program, which also funded snow avalanche hazard assessments for Cordova; this work is currently in pre-publication review.

We began similar work for the City and Borough of Wrangell, with funding extending through September 2026.

Thankfully, the state did not have any fatal landslides this year, but that does not mean houses and infrastructure were damage free. Debris flows damaged homes in Ketchikan and Sitka, and the North Tongass and Taylor highways were temporarily closed due to landslide debris. A strong storm in Southeast severely impacted Elfin Cove and prompted an emergency declaration by the governor. The Tracy Arm landslide was recorded by seismometers and first reported by the Alaska Earthquake Center. Follow-up investigations revealed it was one of the largest landslides and landslide-triggered tsunamis that the state has experienced. These events underscore the importance of monitoring, mapping, and hazard assessments across the state.

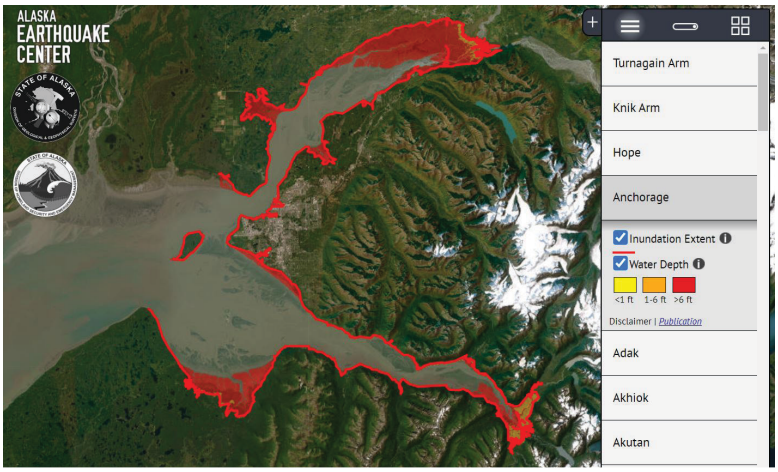


Click or scan to explore deep-seated landslide susceptibility mapping

EARTHQUAKE AND TSUNAMI HAZARDS PROGRAM

The Earthquake and Tsunami Hazards Program (ETHP) is focused on reducing the impact of future earthquakes and earthquake-induced geohazards. This includes damage resulting from the primary effects of earthquakes—strong ground shaking and surface rupture—as well as damage from secondary effects of earthquakes, like tsunamis and slope failures. Hazard assessment is fundamental to earthquake resilience, and the ETHP continues to assess relative seismic and tsunami hazards posed to communities, statewide infrastructure, and planned future projects. In 2025, the DGGS Geologic Hazards Section welcomed Nealey Sims to the ETHP, who is focused on updating the statewide Quaternary Fault and Fold Database, especially utilizing new information from the 2023 update to the National Seismic Hazard Model (Alaska's first update since 2007).

DGGS continues to administer the Alaska Seismic Hazards Safety Commission (ASHSC)—a diverse panel of professionals who provide information to the public after significant earthquakes, promote public education and legislative policy to reduce the state's vulnerability to earthquakes, and amplify results of earthquake engineering resilience studies in Alaska. The ETHP manager, Barrett Salisbury, holds the longest-standing seat on the commission representing DNR, and in



This online, interactive tool allows the public to view and download published tsunami inundation data: earthquake.alaska.edu/sites/default/eqMap2/tsunami/html/tsunami.html.

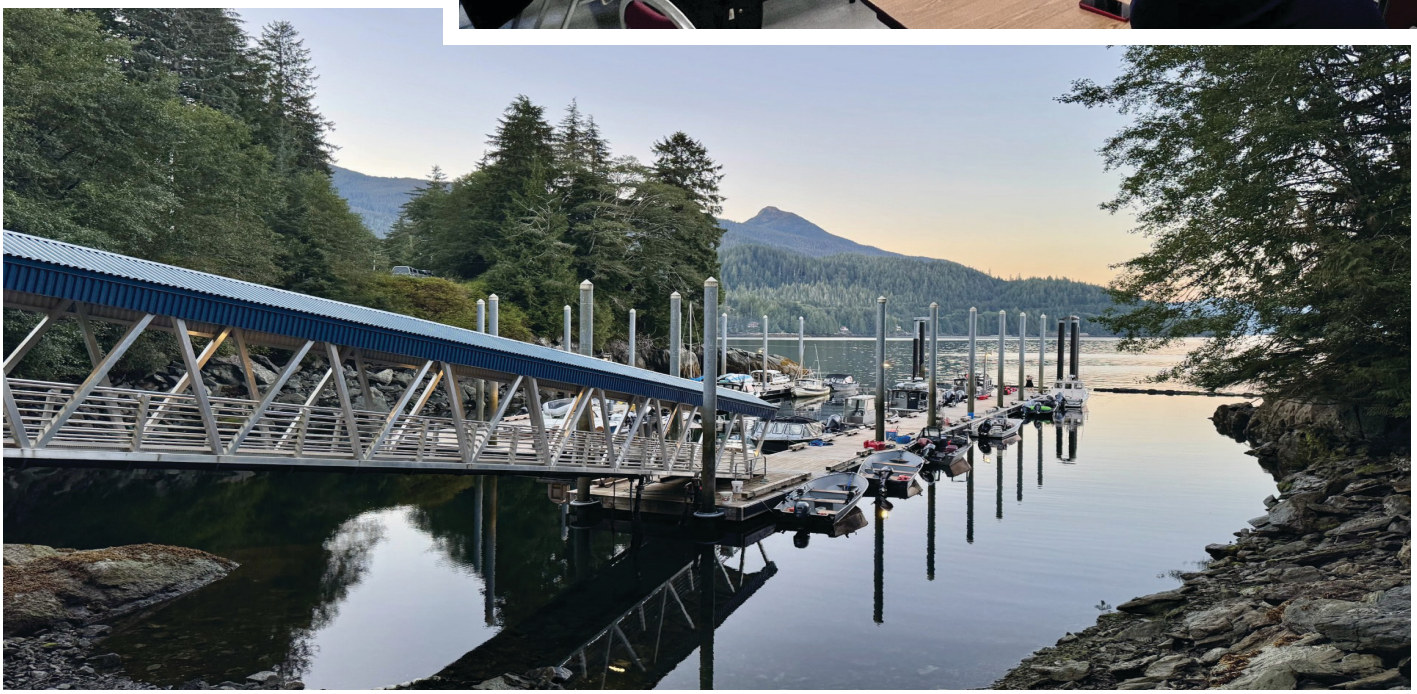
2025 completed a three-year tenure as chair of the commission. Salisbury was invited to present on the history, achievements, and hurdles facing the ASHSC at the National Forum on Seismic Safety Commissions hosted by the Cascadia Region Earthquake Workgroup and the Central U.S. Earthquake Consortium. The commission traveled to Juneau in February to speak with legislators, advocating for a statewide residential building code and to recommend that critical infrastructure like schools and hospitals be prioritized for inspections to determine if structural retrofits are necessary. The ASHSC, with the help of the Alaska Division of Homeland Security & Emergency Management (DHS&EM), have utilized National Earthquake Hazard Reduction Program funds to outline a path for improved building code adoption and enforcement in Alaska communities.

On July 29, 2025, a M8.8 megathrust earthquake off the coast of Kamchatka, Russia, reminded Alaskans once again that home on the Pacific Ocean tectonic plate boundary not only means threats from local earthquakes but also includes threats from distant earthquakes. This sixth largest earthquake ever recorded triggered

tsunami warnings and advisories across the entire Pacific coastline in Alaska and triggered many tsunami evacuations in western and central Aleutian communities. Thankfully, wave heights in Alaska were moderate, and no significant damage or fatalities were reported.

Fostering a population resilient to local and distant earthquakes involves working directly with Alaskans (including emergency management, law enforcement, community officials, and residents) to help them be prepared in the face of ever-present earthquake-related geologic hazards through education, planning, mitigation, and response. To this end, under the National Tsunami Hazard Mitigation Program, the ETHP program conducted 38 presentations around the state in FY2025 (many in partnership with DHS&EM and the Alaska Earthquake Center [AEC]), played a critical role in a Southeast Alaska Seismic and Tsunami Operations workshop in Ketchikan, and worked with Cordova, Yakutat, Kodiak, and Ouzinkie on achieving or maintaining TsunamiReady certification. Also in partnership with the AEC, DGGS published tsunami hazard reports for False Pass and a digital catalog of source data for tsunami inundation modeling in Alaska.

Right: Geologist Barrett Salisbury leads an earthquake and tsunami hazard presentation to the Tribal elders in Ouzinkie, Alaska, as a step towards becoming TsunamiReady under the National Weather Service.
Bottom: DGGS staff often travel to different communities throughout the state to educate the public and local officials about tsunami risks and hazards. This photo is from a trip to Ketchikan.



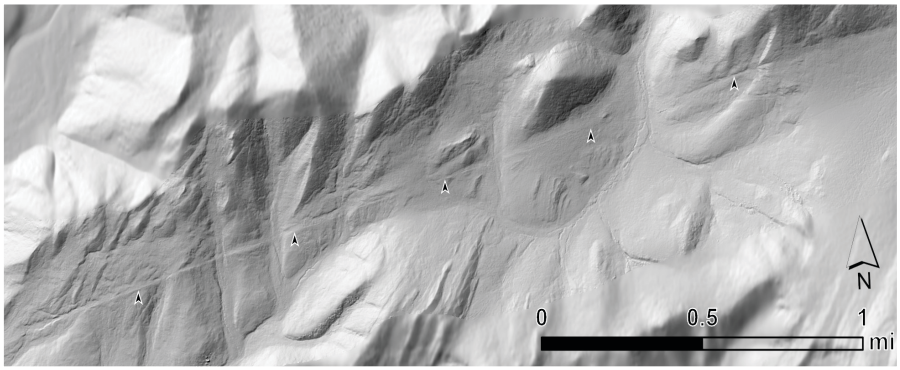
Highlight

Yukon River Crossing Project

The Earthquake and Tsunami Hazards Program and the Hydrology and Surficial Geology Section have partnered to complete a multi-year assessment of surficial and bedrock geology and geologic hazards focused around the Yukon River Crossing (YRC) in Interior Alaska. The YRC is a critical point on the only land link along the Trans-Alaska Pipeline System (TAPS), Dalton Highway, and proposed natural gas pipeline corridor. With nearly 90 percent of state revenue crossing the bridge daily, state revenue, Alaska's economy, human safety, and the environment are all potentially vulnerable. The YRC is in an area of geologic faults similar in scale to the Denali fault responsible for the 2002 M7.9 earthquake, and this state capital improvement project provided means for much-needed regional geologic mapping and fault characterization.

In summer 2016, DGGS conducted a helicopter-supported field campaign to support 1:50,000-scale mapping in the area surrounding the YRC, which will help better understand the distribution of the area's ice-rich silt and delineate areas of potential slope instability. Data collected by bedrock, surficial, and tectonic geologists are currently being compiled for an area of 567 mi². Surficial and bedrock mapping will provide greater resolution than legacy 1:250,000-scale maps, including newly delineated faults interpreted from geophysical data collected in 2016. Geologic mapping is essential for understanding regional geologic conditions and local instability, such as the 2012 landslide near the South Bridge abutment.

The YRC is located at the western end of the contiguous Rocky Mountain and Tintina trenches, a 2,200 mi-long system of faults that spans the entire Canada-Alaska Cordillera, where the Tintina system transitions to the Kaltag fault of western Alaska. DGGS conducted several helicopter-supported field expeditions and collected and processed 72 mi² of high-resolution lidar data, providing an unprecedented look at fault zone topography in inaccessible areas without obstruction from dense high-latitude trees and shrubs. Investigations revealed recent surface ruptures 37 mi west and 34 mi east of the Dalton Highway and TAPS. Ruptures to the west of the YRC offset relatively young Holocene (<10,000 yrs) colluvial sediments, suggesting that the westernmost end of the Tintina fault near the YRC is active. The concealed fault trace crosses the Dalton Highway and TAPS 8 mi southeast of the Yukon River bridge, though no scarps are mapped in the linear Isom and Rogers creek valleys immediately west and east of the highway, respectively. About 56 mi west of the YRC, we identified a 22-mi-long fault stepover from the Tintina to Kaltag fault near Rampart and Tanana. The presence of surface ruptures indicates potential for M6.5+ earthquakes, though the detailed age of recent earthquakes and average recurrence will require additional study.



Top: In fall 2012, a landslide occurred on the south bank of the Yukon River at the E.L. Patton Bridge, ~90 miles northwest of Fairbanks.
Bottom: DGGS geologists identified the westernmost extent of geomorphically preserved (recent) tectonic activity on the Tintina fault, ~30 mi southwest of the Yukon River bridge.

VOLCANOLOGY

In 2025, Volcanology staff responded to volcanic eruptions at Great Sitkin and the Atka volcanic complex, unrest at Mount Spurr and Shishaldin Volcano, and many resuspended ash events in the Katmai area. During unrest and eruptions, Volcanology personnel work with Alaska Volcano Observatory (AVO) partners on numerous response duties, including:

- Issuing volcanic eruption alerts in collaboration with USGS and UAF colleagues
- Monitoring satellite and seismic data streams 24/7, keeping detailed records of eruption chronologies, impacts, and response activities
- Conducting outreach to engage citizen scientists
- Maintaining current information on public and internal websites, Facebook, X, and Instagram

Great Sitkin 2021–2025 Eruption

In 2025, Great Sitkin Volcano in the central Aleutians continued its slow and steady eruption of lava. This eruption began in 2021, and the alert levels for Great Sitkin remained at ORANGE/WATCH throughout 2025. AVO scientists continue to monitor the extent of the lava flow within the summit crater, mostly using satellite radar data.

Great Sitkin's summit crater, showing steam and bare ground where the active lava dome is warm. Taken February 16, 2025. Photo: S. Rhodes.

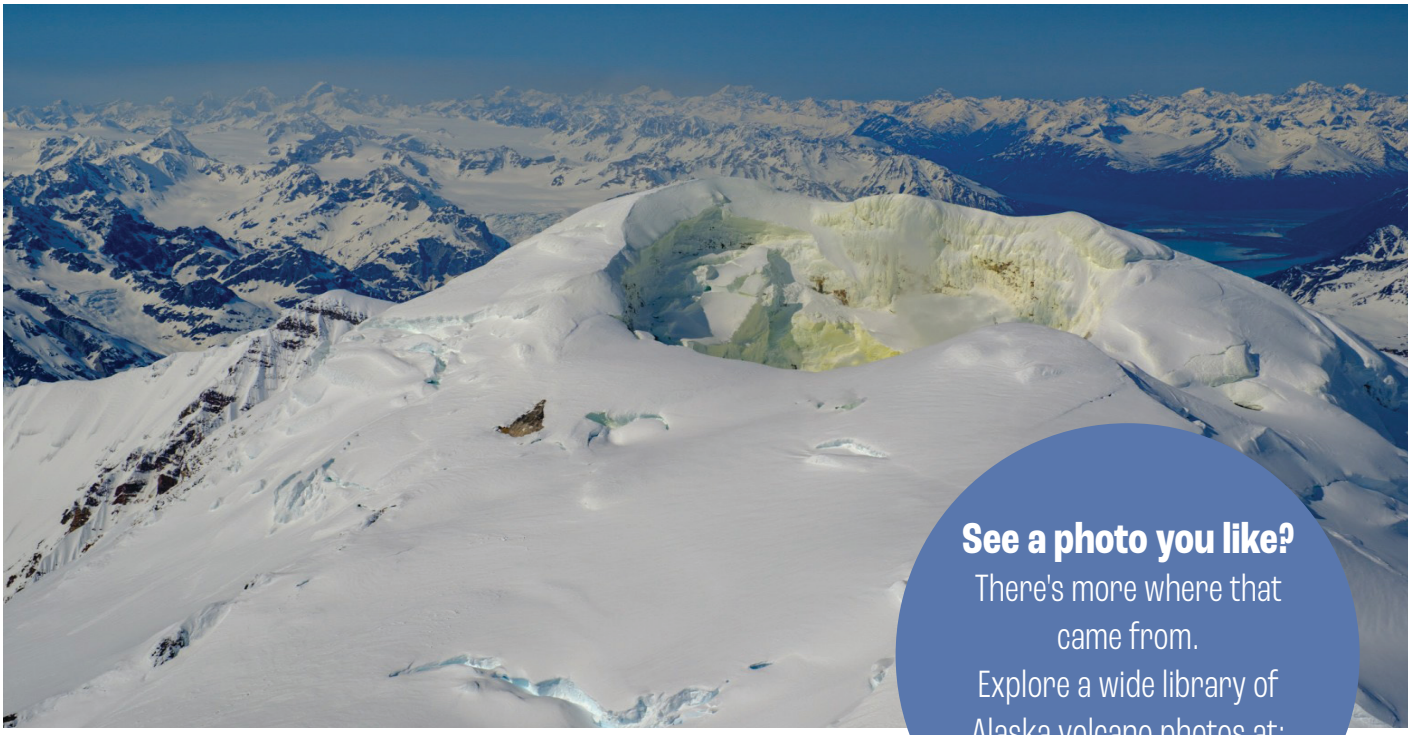
Atka Volcanic Complex 2025 Eruptions

Korovin volcano, part of the Atka volcanic complex in the central Aleutians, experienced several brief phreatic (steam-driven) explosions on February 20, April 25, and October 29, 2025. These small explosions are typical at Korovin and usually occur with little to no precursory activity. In response, AVO raised the alert levels (on February 20 to ORANGE/WATCH, and in April and October to YELLOW/ADVISORY). Seismic activity remained low after each event, and the alert levels were returned to GREEN/NORMAL one to two weeks after each event.

Shishaldin Unrest

Shishaldin Volcano with steam and gas venting from the summit crater. The visible notch through the summit area formed during the 2023 eruption. August 17, 2025. Photo: M. Loewen, AVO/USGS.

Shishaldin Volcano in the eastern Aleutians is frequently active, with the most recent eruption occurring in 2023. Beginning in mid-July 2025, Shishaldin experienced a gradual increase in volcanic unrest, with more vigorous degassing and more frequent volcanic earthquakes and infrasound detections. On August 25, AVO raised the alert levels at Shishaldin to YELLOW/ADVISORY. Since that time, seismicity and degassing have remained somewhat elevated, though no hot material has been detected at the surface.



Mount Spurr summit from the northeast during an approach for a gas and photo survey on June 11, 2025. Sulfur has stained the snow yellow within the summit crater. Photo: M. Loewen, AVO/USGS.

See a photo you like?
There's more where that came from.
Explore a wide library of Alaska volcano photos at:
avo.alaska.edu/image/

Mt. Spurr Response

In spring 2024, the Alaska Volcano Observatory detected volcanic unrest at Mount Spurr through several data streams, including sustained upward and outward motion of our GNSS receivers, a gradual increase in seismicity, and the development of a small crater lake in early summer. On October 16, 2024, in light of this ongoing unrest, consistent with likely magma intrusion under Mount Spurr, AVO elevated the aviation color code and the volcano alert level at Spurr from GREEN/NORMAL to YELLOW/ADVISORY.

Throughout the fall, seismicity at Mount Spurr had some notable periods of increased earthquakes, and earthquake locations began to cluster underneath Crater Peak, the vent that produced Spurr's 1953 and 1992 eruptions of Spurr. By February 6, AVO had located more than 2,700 earthquakes during this period of unrest and detected 2.4 inches of upward ground movement, as well as continued growth of the summit crater lake. Gas flight measurements continued to show low levels of volcanic gases. However, in early March, AVO undertook additional gas flights. These flights detected a marked increase in sulfur dioxide and carbon dioxide, along with newly-reactivated fumaroles at Crater Peak. These observations were consistent with magma rising under Mount Spurr, and at the time AVO believed an eruption was likely.

Mount Spurr sits approximately 80 miles west of Anchorage, the largest-population center of Alaska, and public interest in a potential eruption was high. To help meet public demands for information, AVO members from the USGS gave dozens of presentations and question-and-answer sessions to Alaska communities and organizations. AVO worked closely with the State Emergency Operations Center and local Southcentral Alaska governments to create and keep updated an FAQ on ready.alaska.gov about what residents could expect from a potential eruption and about preparedness activities.

GEOLOGIC INFORMATION CENTER


Mike Hendricks
Section Chief


Amy Macpherson


Simone Montayne

Chris Ramey


Oralee Nudson


Tom Cerny


Sue Seitz


Ally Steinleitner

Pedro Rivera

Tristan Digert

The Geologic Information Center (GIC) provides publication, geographic information systems (GIS), and information technology (IT) support services that provide access to geologic information related to Alaska's vast resources and support for geologic hazard response. The GIC's ability to publish, host, and distribute large volumes of data facilitates collaborations with federal and other state organizations, minimizing duplication of effort and cost. The wide range of published services helps to better inform land management decisions and encourage investment, exploration, and development of the state's resources, resulting in a beneficial fiscal impact to Alaska's economy, worth billions of dollars. The quality of DGGS's Alaska geological database, the quality and scale of maps, and the ease of access was rated number one in the nation by the recently released Fraser Institute's 2024 Annual Survey of Mining Companies.

The Fraser Institute's 2024 Annual Survey of Mining Companies rated DGGS number one in the nation for the quality of our geological database, the quality and scale of maps, and the ease of access to data.

The GIC successfully supports the state's geologists, scientists, engineers, and decision makers with effective, timely, and low-cost solutions to complex problems. This is only possible by having our team of highly skilled professionals embedded and integrated within the division. This allows GIC staff to (1) work closely and directly with domain experts, (2) rapidly respond to issues, and (3) develop cost effective storage and processing solutions that support the division and many others throughout the state.

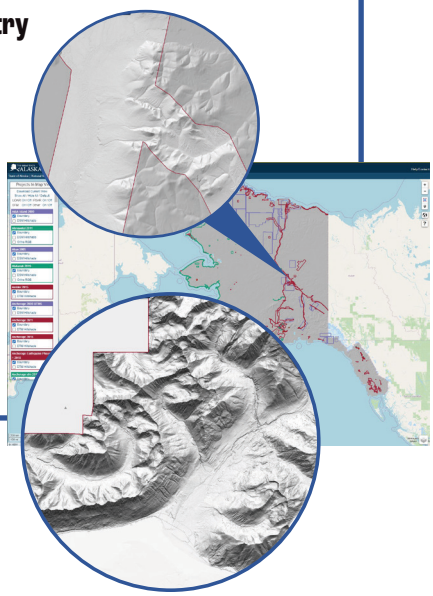
Our most popular services and apps

Exploration Geochemistry
44K+ views

Alaska Radon
28K+ views

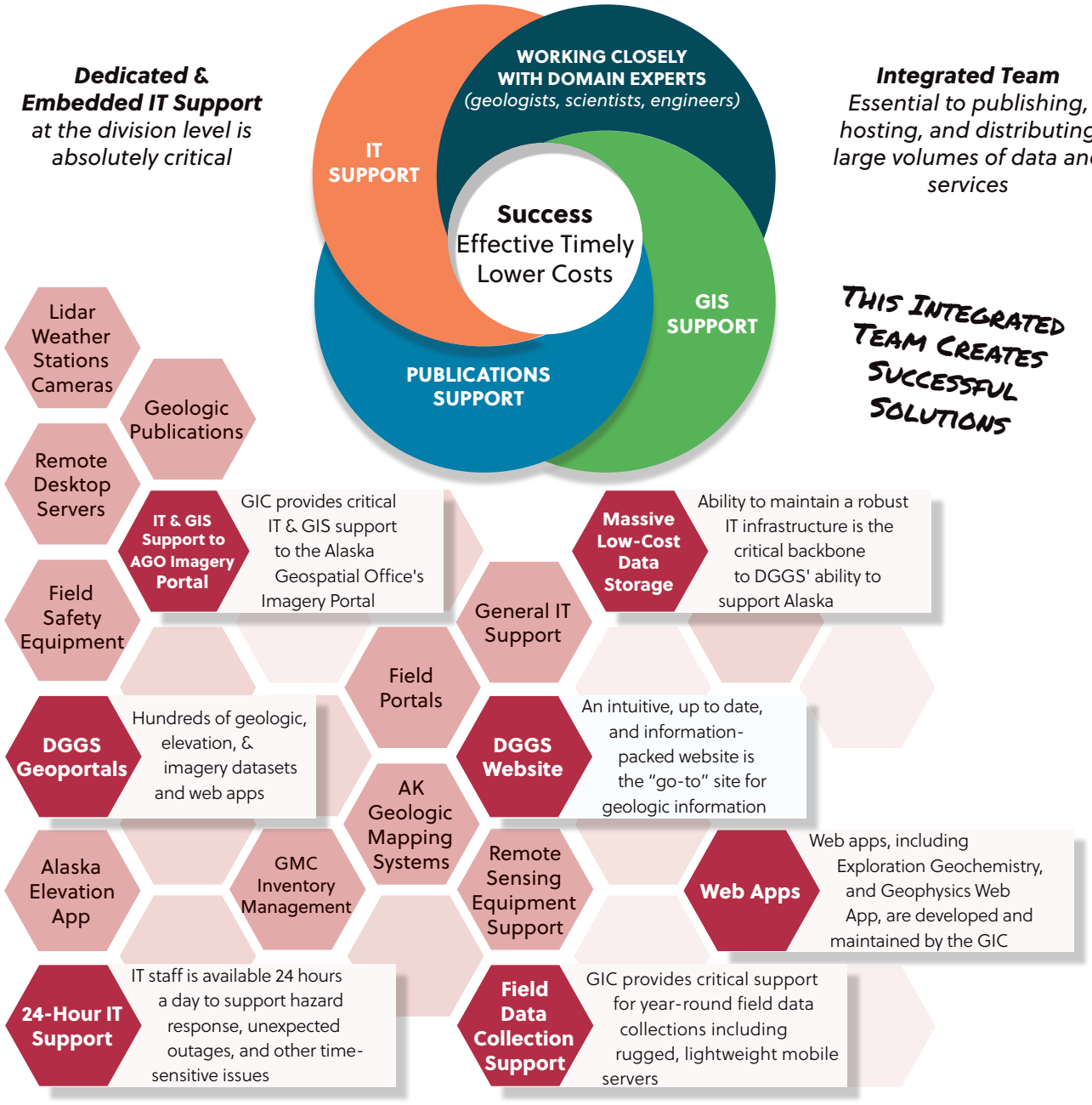
Elevation Data Status
17K+ views

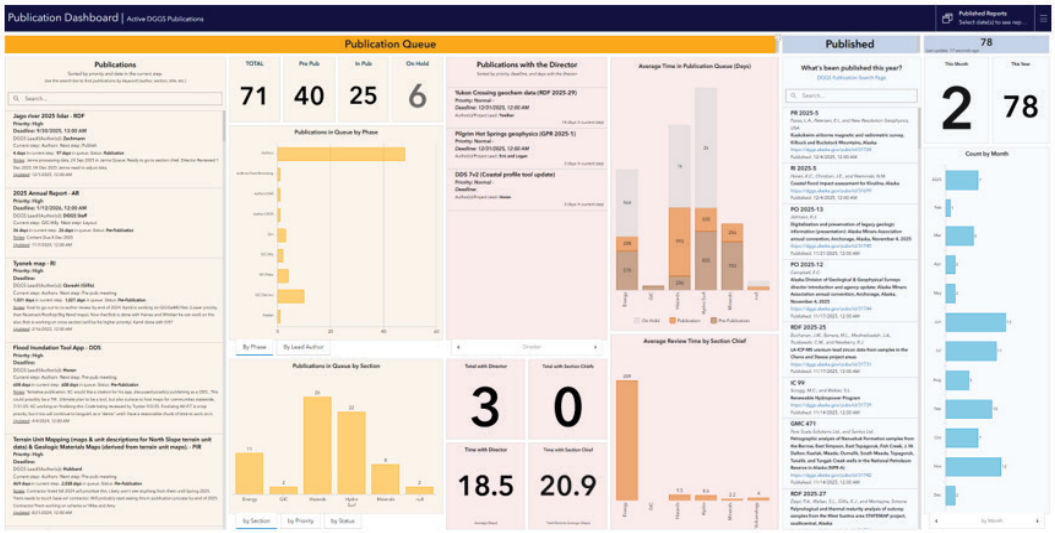
Geothermal Sites of Alaska Web Map
15K+ views



This year the GIC facilitated the publication of 88 new geologic reports, maps, and datasets—a five-year high! See our new publication releases web site for details, https://dggs.alaska.gov/pubs/newreports. We published five geophysical datasets and seven elevation datasets. We also published our first Techniques and Methods (TM) report, a new series that describes approved techniques and methods related to the collection, storage, visualization, analysis, or interpretation of scientific data.

We published fourteen maps this year consisting of three community landslide hazards maps (Sitka, Haines, and Juneau), a statewide mineral resources map, a statewide landslide susceptibility map, a tsunami inundation map of False Pass, Alaska, and eight new geologic maps. The eight new geologic maps covered 4,013.6 mi². We have twelve new geologic maps in production for publication next year, as well as fifteen additional geologic map conversions as part of the STATEMAP program.





GIC staff created an online dashboard to track publications through the multi-step review process, as well as present frequently requested publication statistics.

We served over 38 terabytes of digital geologic data and information from the DGGS website (dggs.alaska.gov) and geoportals. The GIC also manages DGGS's public outreach efforts, which include over 4,000 followers on Twitter, 2,000 followers on Facebook, 730 users on LinkedIn, as well as 530 subscribers to the division's news feed. In addition, we respond to hundreds of in-person, phone, and email information requests.

A LOOK INSIDE PUBLICATIONS

The GIC oversees the publication and distribution of DGGS's numerous maps, reports, and data releases. Publications include everything from handouts on the dangers of radon to technical reports on coastal erosion and geologic maps. At any given time, there are dozens of publications in the works, each of which require different review and editorial needs, depending on the publication series. Numerous hours of review, layout, GIS work, editing, and metadata writing go into each, and that does not count the time authors spend conducting fieldwork, preparing, and analyzing data, and writing the reports! GIC staff are continually looking for ways to improve the efficiency of our publication process to ensure data releases are timely, while maintaining rigorous scientific standards. We have updated our online Publication Dashboard to allow managers and staff to quickly determine the status of items in our publication queue. We have also initiated a quarterly division publications meeting to increase the visibility of publication status and priorities.

Late this year our leader of the publications process, Kristen Janssen, moved on to newer opportunities. We will be welcoming Kelsey Aho as our new publications specialist in January.

IC 97, which was created to communicate geologic hazards and information to the public, is just one example of the types of publications GIC releases for the public.

FIELD COMMUNICATION AND SAFETY

Fieldwork is the heart of DGGS's geoscience research. GIC personnel support our scientists with training and equipment needed to operate safely in the field and respond to emergencies. Essential safety and communication equipment includes helicopter helmets, radios and repeaters, satellite phones, GPS trackers, and emergency first aid & bivouac kits to equip roughly 33 staff on 33 distinct field projects. In addition to providing equipment support for this year's fieldwork, GIC staff co-leads the annual collaborative review of the division's Field Operation Safety Manual and field safety outcomes.

GIS SUPPORT TO THE DIVISION

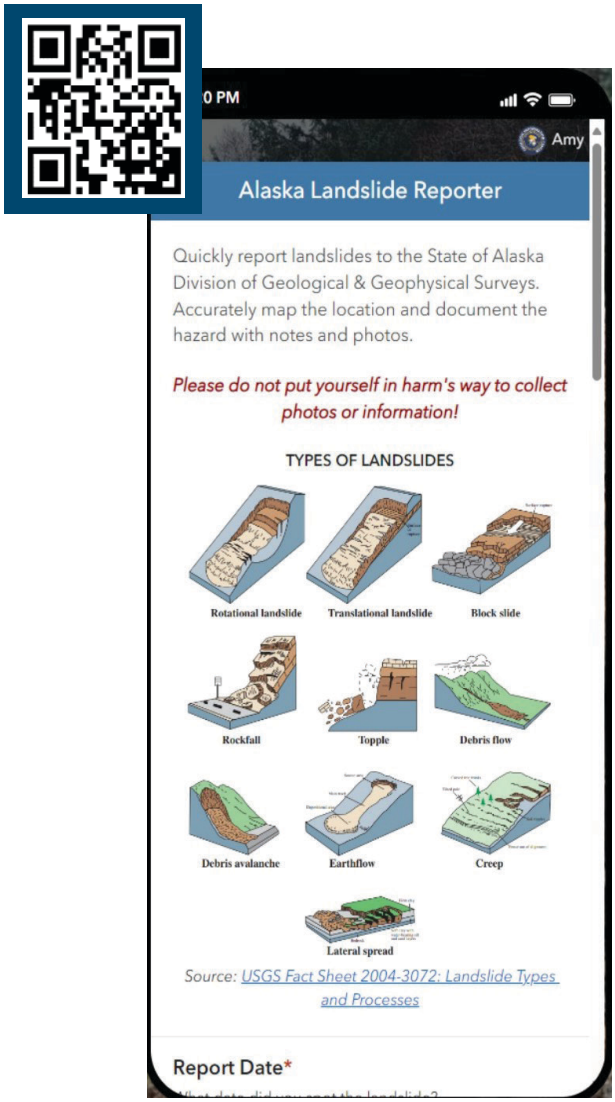
The Geologic Information Center provides a full range of GIS support to the division. We have six dedicated GIS Analysts within the division, four of which are with the GIC. Many additional employees at DGGS, though not identified as GIS Analysts, are advanced users and use GIS daily for data collection, creation, storage, and distribution. We place heavy emphasis on geospatial education, a prime example being our GIS Tips and Tricks training sessions; a weekly sharing of GIS knowledge that has been going on for over eight years. The reach of these training sessions extends beyond the division and now has over 50 State of Alaska personnel attending many of these sessions. Our GIS team also hosts the monthly State of Alaska Technical Exchange Meeting, which provides a regular meeting for State of Alaska employees to exchange information related to technical aspects of GIS operations within state government.

In addition to education, GIS supports the division with online geoportals, data services, and applications, and cartography guidance and creation, as well as one-on-one assistance. To meet our mission requirements as efficiently as possible, we primarily leverage the full suite of Esri GIS software through a multi-year enterprise agreement, which was just renewed this past year. We supplement this with their Advantage Program, which provides us additional resources to better support the division with quality GIS support. Some projects that we have worked on this year include: developing Python/ArcPy scripts to automate repetitive tasks like copying geodatabases, setting projections, and validating schema, and rendering wider DNR GIS support, for example, providing technical direction for the CCUS Hub Site, requested maps and data, and assistance to other divisions with GIS troubleshooting and brainstorming.

DGGS GEOPORTALS: EASY ACCESS TO DATA AND APPS

Over the years, GIC personnel have built and now maintain a suite of geoportals that host and share hundreds of geologic, elevation, and imagery datasets, along with interactive web applications designed for both the public and Alaska decision makers. These geoportals—key components of the State of Alaska Spatial Data Infrastructure—enable users to discover, access, and share geologic data, maps, and interactive tools.

The division's primary geoportal (geoportal.dggs.dnr.alaska.gov) continues to grow in both



The Alaska Landslide Reporter App allows citizen scientists to report critical information about landslide hazards to DGGS.

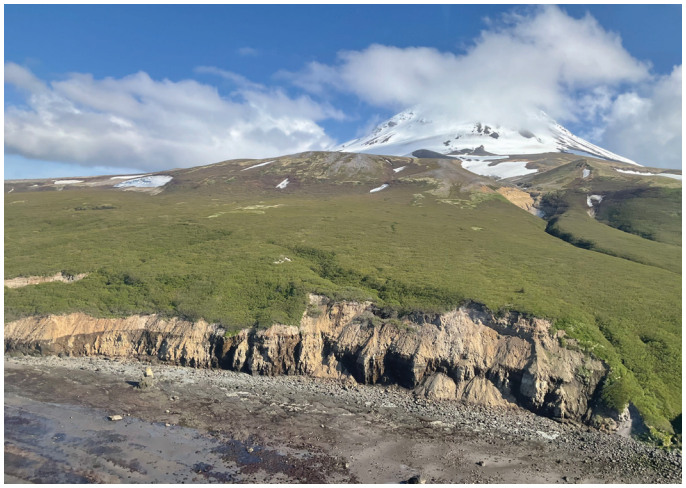
quality and quantity of data and applications. Under the expert administration of Amy Macpherson, the portal has seen numerous improvements, including deeper integration with the Alaska DNR ArcGIS Online Portal and the State of Alaska Hub site (gis.data.alaska.gov). New applications such as the Alaska Landslide Inventory Web App and the Alaska Landslide Reporter App highlight DGGS publications while engaging the public in timely geohazard awareness.

Working closely with IT staff, GIC modernized the Geoportal Architecture last year by distributing components across multiple virtual machines, optimizing configurations with dedicated servers for primary functions, imagery, and enterprise databases. Building on that foundation, this year we added a Notebook Server and a 3D Scene Server (Object Store) and upgraded to the most recent Long-Term Support release of ArcGIS Enterprise Server. These enhancements strengthen performance, expand functionality, and ensure the division's geoportal infrastructure is positioned to support DGGS and its stakeholders well into the future.

Beyond the geoportal, GIC continues to provide access to approximately 11 terabytes of Alaska elevation data through the Elevation Portal and supports the Alaska Geospatial Office in developing an integrated Imagery and Elevation Portal, further strengthening statewide access to critical geospatial resources.

DGGS Geoportal

GIC staff has worked hard to increase the quality and quantity of data and web apps on the division's geoportal (geoportal.dggs.dnr.alaska.gov). We have also added numerous improvements and deeper integration with the Alaska DNR ArcGIS Online Portal and the State of Alaska Hub site (gis.data.alaska.gov). We have over a thousand services and items on the DGGS Geoportal.



DGGS Field Geoportals

The GIC's IT and GIS staff provided DGGS geologists with upgraded capabilities for long-term, multi-user field GIS data collection in areas without internet access. We developed a set of rugged, mobile field geoportals that run an installation of ArcGIS Enterprise on a lightweight mobile server that can be disconnected and transported to remote field camps. These field portals allow geologists to use mobile data collection apps like Esri's Collector or Field Maps and upload, share, review, and backup their daily work while operating in remote locations anywhere in Alaska. DGGS can also deploy these field portals for hazard response events and still collect, combine, and analyze data if internet connectivity is not available.

Alaska Elevation Portal

The GIC continues to work in partnership with the Alaska Geospatial Office to consolidate public domain elevation data for the state. Roughly 11 terabytes of point cloud, raster elevation models, and ortho-rectified imagery data are downloadable from our web app at elevation.alaska.gov. Additional data can be accessed from more than two hundred image services on our geoportal.

IT SUPPORT

DGGS's IT staff provides critical infrastructure and support to geologists, scientists, and engineers, delivering cost-effective solutions compared to commercial services. Our team of highly skilled Alaskan IT professionals offers timely, efficient, and low-cost support tailored to DGGS's unique and complex requirements. By working closely with domain experts, they rapidly resolve technical issues and develop economical computing solutions. Emphasizing local talent and infrastructure, DGGS IT ensures efficiency while supporting the economy and community.

Digital Platforms

DGGS maintains a large catalog of databases, applications, and websites that play a vital role in fulfilling our mission to provide timely and accurate data on Alaska's natural resources and geologic hazards. This includes the systematic collection, evaluation, archiving, and public distribution of geoscientific data. The significance of this information is demonstrated by the over 41 terabytes of data distributed through our websites in 2025, serving researchers, government agencies, and the public across the state.

Programming

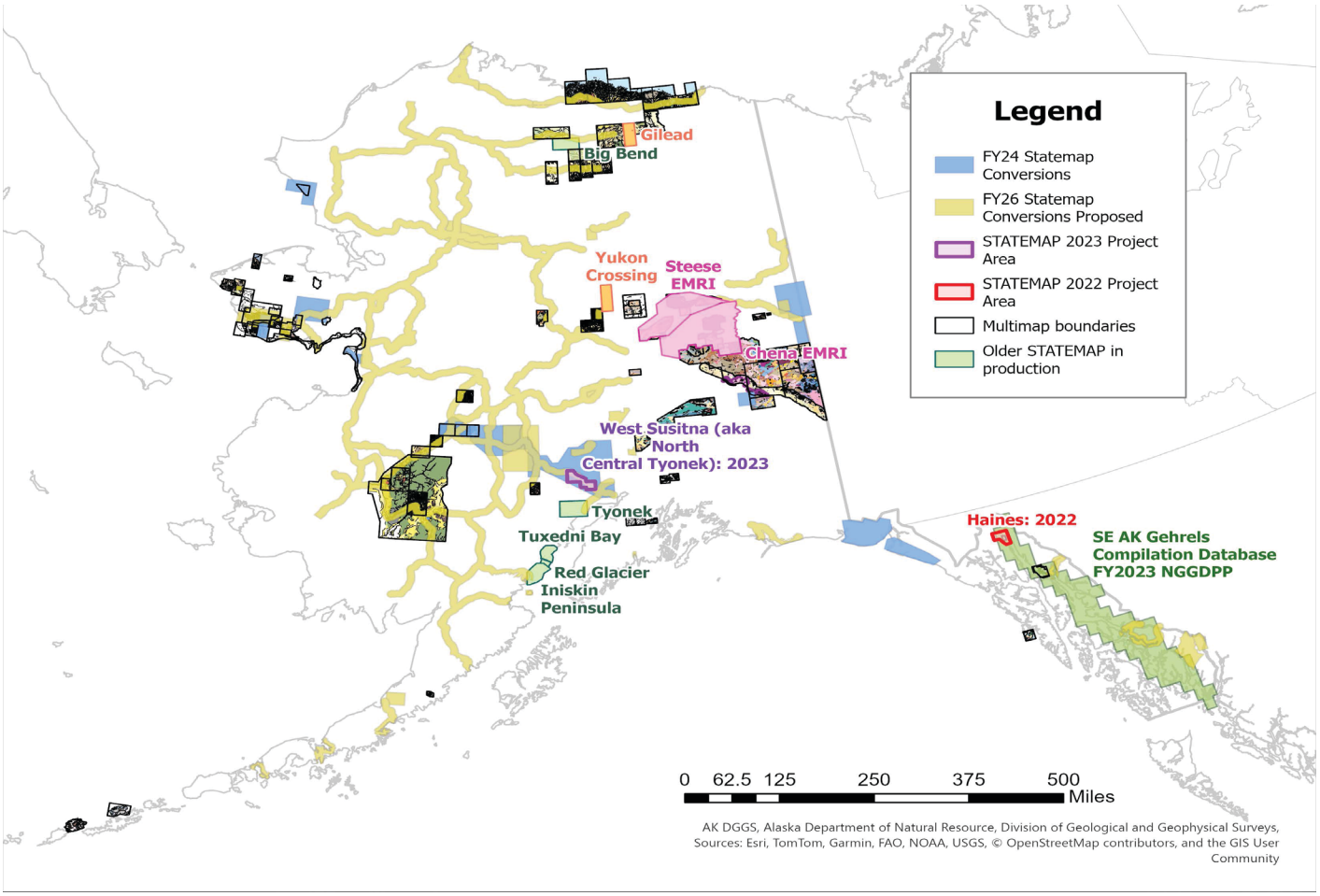
The GIC IT staff provides programming expertise to support a wide range of projects within DGGS, including our publications, photo, geochemical, elevation, and online inventory systems. This in-house programming support allows us to design and develop essential applications, tailored to the specifics required for the data (e.g., the Palynology Database, doi.org/10.14509/30900).

Highlight

The Alaska Geologic Mapping System

GIC staff is a critical component in developing and maintaining DGGS's Alaska Geologic Mapping System, which produces standards-based, Geologic Mapping Schema (GeMS)-compliant geologic maps and data for publication. The system controls the process of collecting, producing, converting, packaging, publishing, and sharing geologic map data. The system includes hardware, GIS software, data standards, and well-defined organizational procedures with a 16-phase workflow to ensure high quality products are created and shared. We have published eight new geologic maps this year covering more than 4,000 mi². Over 90 standards-based geologic map databases have been created and shared through this system with an expected 20 more to be published within the next two years.

Our multi-map geodatabase now includes 95 map databases. This past year we published Digital Data Series (DDS) 24, the Alaska Geologic Mapping Schema (AK GeMS) multi-map repository database, https://doi.org/10.14509/31706. The Alaska Geologic Mapping System comprises several key components working together to ensure that the GIS database and its maintenance processes work seamlessly. A critical component of this system is our AK GeMS Multi-Map Repository Database structure, which combines the individual geologic map data into a single GIS-based enterprise geodatabase. The DDS 24 publication allows users to download date-stamped, file geodatabase-format snapshots of our multi-map repository database.



AK GeMS Multimap Repository Database

GIC staff, along with other geologists from the division, though unable to attend in person, presented at the Annual Digital Mapping Techniques workshop in Oklahoma on the following:

Poster | doi.org/10.14509/31687

Alaska mapping system poster

Presentation | doi.org/10.14509/31688

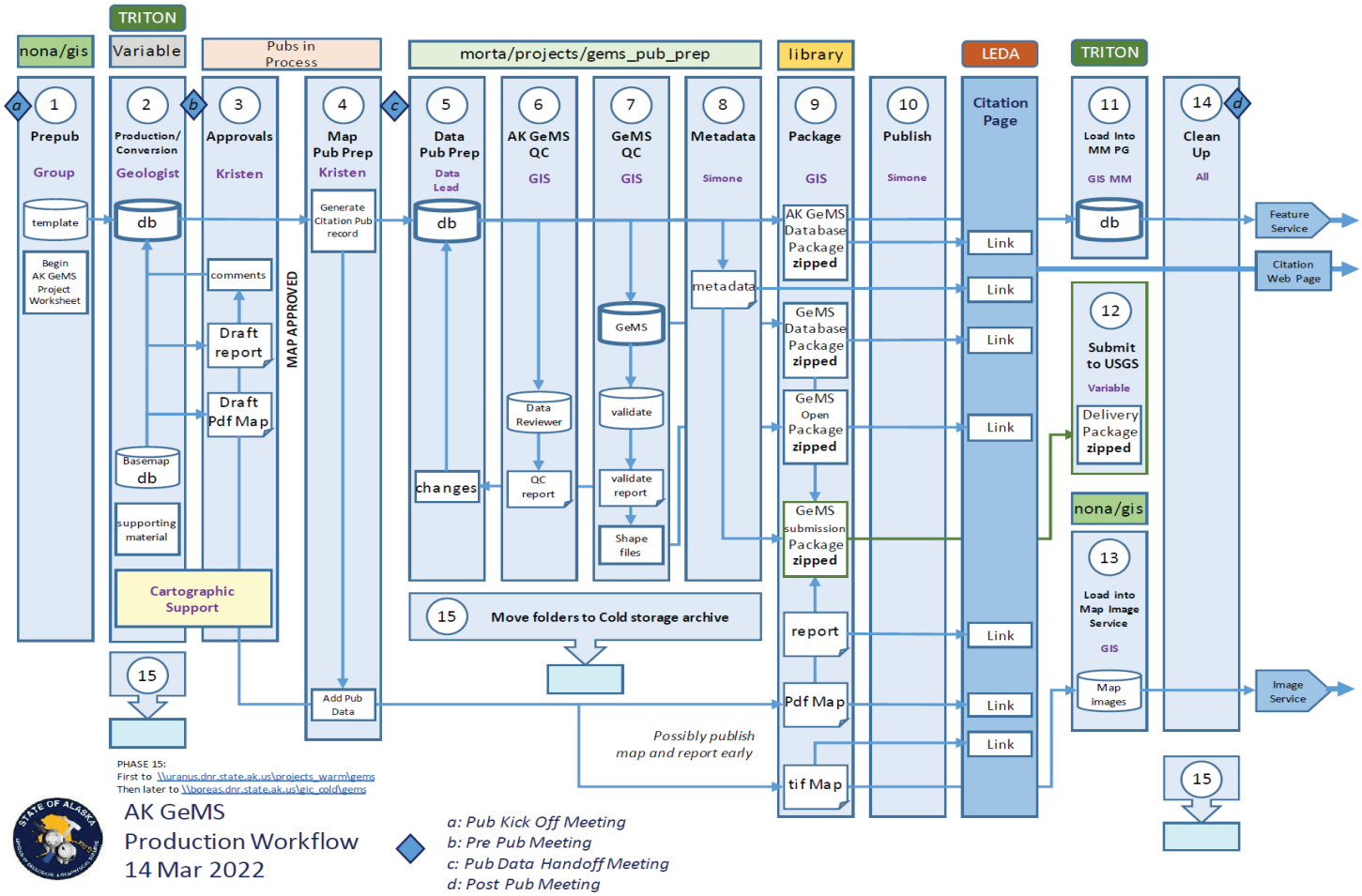
Alaska DGGS geologic mapping system overview

Presentation | doi.org/10.14509/31689

Increasing efficiency of contracted geologic map digitization - hail the feature template

Presentation | doi.org/10.14509/31690

Color optimization metrics for geologic maps: Beyond the basics of geologic map database QA/QC



The GeMS workflow includes several steps to ensure each release distributes meaningful and accurate geologic data.

ALASKA GEOSPATIAL OFFICE

Leslie Jones

MAPAK
ALASKA GEOSPATIAL OFFICE

Maps have always shaped how we explore, navigate, and understand Alaska. Early maps documented the rivers and waterways that formed the state's first transportation network. As the landscape changes, development needs morph, and technologies evolve, the maps and data that support state, federal, Tribal, and local decision-making must keep pace. The Alaska Geospatial Office (AGO) plays a central role in ensuring that Alaska has accurate, modern, and accessible maps and data.

Reliable geospatial data now underpin nearly every public service and infrastructure investment across the state.

• **Time is money.** Rapid access to authoritative data reduces delays, lowers costs, and accelerates decision-making.

• **Safety depends on it.** Modern data strengthens preparedness, emergency response, and situational awareness.

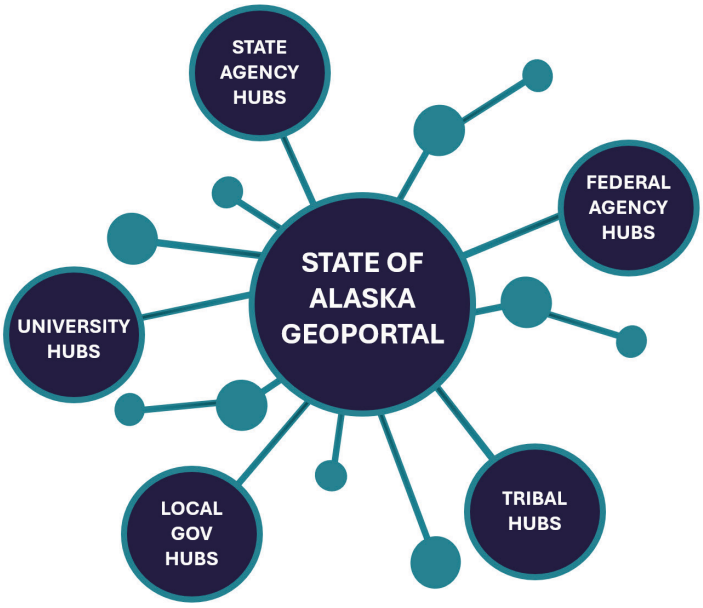
• **Technology modernization requires it.** Digital services, permitting reform, and AI-enabled decision platforms all rely on current, standardized, authoritative data.

AGO serves as a statewide enabler by providing a shared data foundation supporting natural resources, emergency management, public safety, energy development, risk reduction, and economic growth. AGO's State Geoportal serves as a centralized discovery platform for data stewards across the state creating time savings and reduced costs for public and private sectors.

The State Geoportal now supports more than 5,000 users each month, underscoring the growing demand for reliable, easy-to-access geospatial data.

THE ROAD TO ALASKA MAPPING AND DATA MODERNIZATION

In 2011, Alaska's leadership called for federal support to address critical data gaps, noting that "Mars was better mapped than Alaska" because the state's elevation data was more than 40 years old and, in many areas, off by a quarter mile or more. Since 2012, the Alaska Mapping Executive Committee (AMEC), a partnership of federal agencies and the State of Alaska, has



coordinated major statewide mapping initiatives. This committee has delivered Alaska's first statewide elevation dataset, topographic map, statewide transportation network, and three statewide imagery basemaps, each providing updated imagery with greater accuracy and resolution. The statewide imagery basemap hosted by the Alaska Geospatial Office now attracts over 21,000 users each month.

AMEC continues to advance Alaska's modernization goals in close partnership with AGO. To date, partners have completed 64 percent of statewide surface-water remapping (rivers and lakes), secured full funding for statewide wetland mapping, advanced implementation of the Alaska Coastal Mapping Initiative, and completed airborne gravity mapping, enabling accurate GPS-based elevation measurements. Together, these datasets represent the foundational geospatial framework upon which nearly every map and application relies.

SPOTLIGHT: ELEVATION DATA MODERNIZATION CONTINUES

AMEC's most significant accomplishment was the completion of a 10-year, $68 million statewide elevation mapping project, jointly funded by seven federal agencies and the State of Alaska. The resulting dataset, produced using IFSAR, dramatically improved aviation safety, resource planning, and emergency response. Building on this foundation, AMEC partners are now transitioning to lidar, a higher-accuracy and higher-resolution technology that enables use of data in applications such as:

- Permitting and project development across transportation, energy, and mineral sectors.
- Hazard assessments for flooding, coastal

ALASKA GEOSUMMIT 2025
Anchorage, Alaska

2025 Alaska Geosummit Highlights

Alaska Geospatial Office hosted the second Alaska Geosummit in April 2025, convening 270 participants from state and federal agencies, Tribes, local governments, universities, and industry sectors. The event highlighted advancements in GeoAI, satellite-based observation systems, 3D mapping, and cross-sector partnerships that align geospatial capabilities with the state's priorities. The Geosummit remains Alaska's leading venue for collaboration on geospatial technology, policy, digital infrastructure, and innovation.

change, landslides, wildfire, and earthquakes.

- Site-specific engineering for rural communities and essential infrastructure.

Over the past year, 16,600 mi² of new lidar have been contracted, bringing the total to approximately 64,000 mi² over the past five years, approximately 11 percent of the state. Despite this progress, Alaska ranked last in the nation in 2025 for lidar coverage and accessibility. Continued investment and coordinated acquisitions are essential to close this gap and ensure Alaska can access the same safety, accuracy, and economic opportunities available in other states.

MODERNIZING ACCESS TO ALASKA'S REMOTE SENSING DATA

Alaska depends on high-value remote sensing data—imagery, elevation, and bathymetry—to support community planning, natural resource development, hazard assessment, and emergency response. As demand for these datasets grows, Alaska needs a coordinated, long-term approach to managing and delivering these datasets.

AGO is advancing this effort through a new statewide remote sensing data hub that will provide unified access to imagery, lidar, and other critical data collected. This modernization will improve long-term data stewardship, reduce duplication of redundant collections, and ensure Alaska's remote sensing resources are accessible and ready to support statewide priorities.

DATA MODERNIZATION: HOW DOES ALASKA COMPARE TO OTHER STATES IN THE NATION?

In 2018, the Geospatial Data Act (GDA) was enacted to modernize how the United States governs, manages, and invests in geospatial data and technologies. At its core, the GDA recognizes that the nation needs complete, consistent, and up-to-date maps. The Act outlines both federal and state responsibilities, and to measure state progress toward these goals, the National States Geographic Information Council conducts a Geospatial Maturity Assessment every two years.

The Alaska Mapping Executive Committee has contracted 16,600 square miles of new lidar collection over the past year.

Despite meaningful progress in filling critical data gaps and improving from a D+ to a C-, Alaska still ranked last among states in both 2023 and 2025. This reflects the unique challenges of modernizing geospatial data across a vast and rapidly changing landscape, paired with limited stewardship capacity and lack of real-time data accessibility. Sustained investment and coordinated support are essential to build on recent improvements, meet national standards, and keep pace with growing geospatial needs across all sectors.

ALASKA GEOLOGIC MATERIALS CENTER

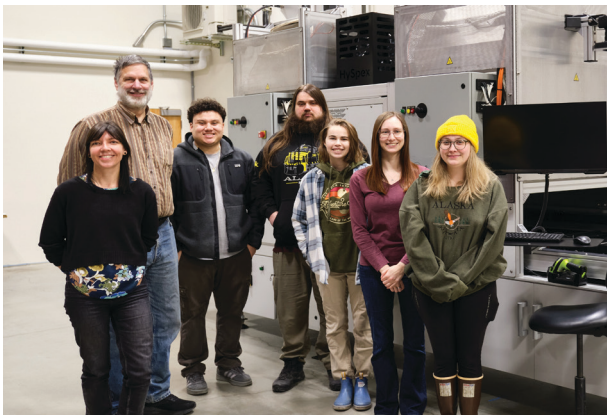
The Alaska Geologic Materials Center (GMC), operated by DGGS, hosts an archive of geologic data with an estimated replacement value of $35 billion. The decades' worth of data from energy, mineral, and geologic collections are housed in the Anchorage-based facility, a venue that provides a wide range of users (industry, government, academia, and the public) access to these samples for identifying new resource prospects and increasing our geologic knowledge of the state.

The Anchorage repository opened on July 1, 2015, and has completed its tenth fiscal year since moving from its original location in Eagle River. Fee collection began in fall 2018. Like last year, there were more than 700 visits to the facility in 2025.

The GMC's database-driven search engine allows users to view a real-time inventory of nearly 780,000 public sample items quickly and easily before visiting the facility. This innovative and complex database and online search engine was developed in-house by DGGS staff and continues to serve user needs. In 2025, more than 3.5 terabytes of data were downloaded from GMC web pages.

The GMC's overarching objectives are to physically and digitally curate its collection and enable global access to materials to stimulate exploration and development of Alaska's resources. Automated, nondestructive scanning equipment will allow for the digital visualization and distribution of these datasets to the global geologic community.

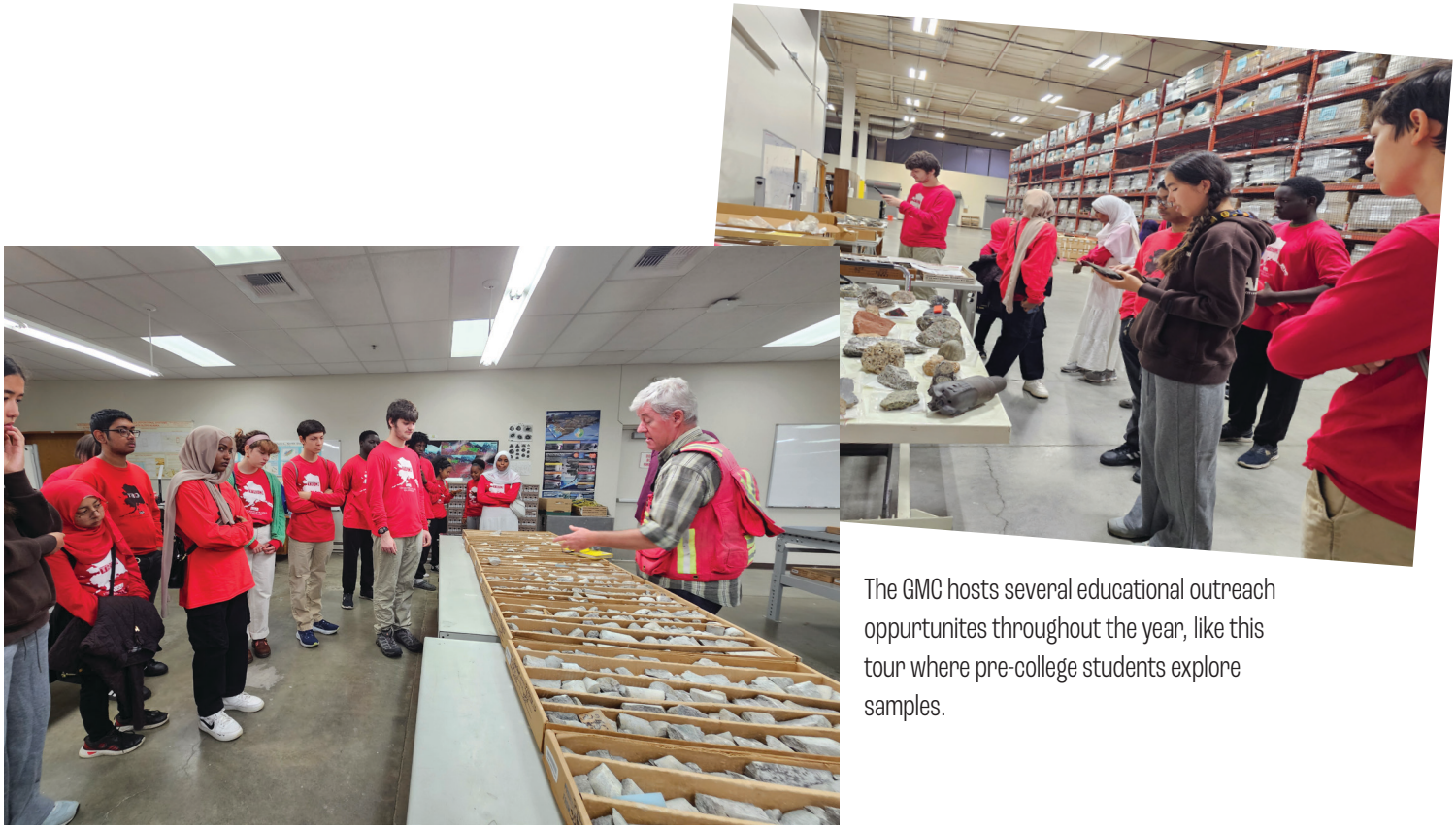
The HySpex hyperspectral scanning platform is currently in the installation process and initial production scans of mineral and energy cores



GMC staff from left to right: Amber Zandanel, Kurt Johnson, Alex Garcia, Kaleb Smith, Kiera Chase, Lisa Elconin, and Al Holland

2025...by the numbers

- ***770 visitors***
- ***100,000 ft² repository***
- ***78,000 public inventory items***



The GMC hosts several educational outreach oppurtunites throughout the year, like this tour where pre-college students explore samples.

could start as soon as March 2026. Several USGS National Geological and Geophysical Data Preservation Program (NGGDPP) grants and state capital improvement projects support personnel costs, data storage hardware, and related programming needs.

Geologists from independent and major energy companies continue to represent the most frequent visitors to the GMC and travel to Anchorage to sample and examine tens of thousands of feet of drill core and cuttings per year. As production declines within the mature Prudhoe Bay oil field, it is essential to encourage oil and gas exploration and development by industry elsewhere in Alaska. Strong interest in the North Slope Nanushuk play continues, and several industry workshops have been hosted at the GMC on this topic.

Government researchers were the second most frequent visitors, followed by those from academia, who examined GMC core samples to model geologic carbon sequestration, including the potential for chemical capture of carbon dioxide. Minerals industry visitation focused on potential critical minerals like nickel, cobalt, REEs, or other deposit types. Visitors and academic researchers also find value in the educational opportunities offered by this facility.

The GMC celebrates its 10-year anniversary!

The following list of entities that visited the GMC illustrates the wide-ranging interest in the geological inventory:

Academic

- U.S. academic institutions

Energy

- Private-sector oil and gas companies
- Consultants
- Researchers
- Native Corporations

Government

- Federal agenceis
- State agencies

Minerals

- Private-sector mineral exploration companies

Seismic

- Academic institutions
- Federal agencies
- Private-sector petroleum companies
- Finaciers

Above: GMC staff celebrate Halloween at the GMC.
Left: Geologists Lisa Elconin and Kurt Johnson share samples for National Fossil Day at the Alaska Botanical Garden.

Highlight

Expanding Access to Alaska's Geologic Archives

The geologic samples housed at the GMC represent an irreplaceable public resource that offers critical insights into Alaska's geologic history and resource potential. Each sample is cataloged in the GMC Inventory and available for in-person viewing at the Anchorage repository. However, not all researchers, educators, or industry professionals can travel to Alaska to access these materials. To address this, DGGS is launching a transformative initiative to digitize the GMC's core collection using a newly acquired suite of core scanning instruments.

Scheduled for installation and operation in 2026, this advanced instrumentation suite will enable high-resolution imaging of core samples, including both conventional digital photography (in the visible light spectrum) and hyperspectral imaging. Hyperspectral imaging offers a powerful, non-destructive method for analyzing rock composition. By capturing data across visible and infrared wavelengths, the system can detect unique spectral signatures associated with different minerals, organics, and alteration patterns. This capability provides consistent, reproducible mineralogical data that go beyond what can be observed with the human eye. These digital records will be integrated into the GMC Inventory, allowing users worldwide to explore Alaska's geologic materials remotely—without ever leaving their desks.

The digitization effort is not intended to replace the physical collection, but to enhance it—broadening access, preserving sample integrity, and enabling new forms of analysis. Over time, the system will generate tens of thousands of high-resolution images and billions of spectral data points across nearly 500,000 feet of core. Supported by state capital improvement funds and federal grants, this project also includes upgrades to the GMC's data infrastructure and staffing to manage the large digital outputs. The result will be a modern, accessible archive that captures multiscale characteristics of energy and mineral systems in Alaska and strengthens the impact of GMC resources on discovery, innovation, and resource development.

HySpex/NEO Mechanical Designer Peter Jorgensen sets up the GMC's new hyperspectral scanner.

RELATIONSHIPS WITH OTHER AGENCIES

DGGS develops its strategic programs and project schedules through consultation with the many users of geologic information: state and federal agencies, the Alaska Legislature, the congressional delegation, professionals in the private sector, academia, and individual Alaskans. Their input to DGGS programs comes through the Alaska Geologic Mapping Advisory Board (GMAB), liaison activities of the Director, and personal contact between DGGS staff and these groups.

State Agencies

DGGS provides DNR and state agencies with routine analyses and reviews of various geologic issues such as geologic hazards; evaluations of pending oil and gas lease tracts; area plans; competitive coal leases; geologic assessments of land trades, sales, selections, or relinquishments; oil and gas and mineral potential; and construction materials availability.

Each year DGGS works closely with:

- DNR Division of Oil & Gas (DOG) on issues related to energy resources, and on providing geologic control for the subsurface oil-related geologic analyses conducted by DOG.
- DNR Office of Project Management and Permitting, to provide technical expertise during large project permitting and to report on the status of Alaska's mineral industry.
- Department of Revenue to report on the status of Alaska's mineral industry.
- DHS&EM, in the Department of Military and Veterans Affairs, and the Department of Environmental Conservation to evaluate volcanic and other hazards, develop scenarios for hazard events, and update the State Hazard Mitigation Plan.
- AKDOT&PF, UAF, and other agencies to assess the impacts of landslides, slope failures, avalanches, flooding, erosion, and construction materials availability.
- Alaska Energy Authority to evaluate the potential hazards and viability of proposed hydroelectric, geothermal, and other energy projects; to provide technical expertise on geothermal resource potential; and to evaluate resource potential around the state that might provide viable alternatives for energy development in rural Alaska.
- DNR's Division of Mining, Land and Water to evaluate groundwater issues, address land selection and sale questions, and to report on the status of Alaska's mineral industry.

In recent years, DGGS has also collaborated with the Alaska Natural Gas Pipeline project, Alaska Gasline Development Corporation, and the State Pipeline Coordinator to assist in geologic data collection and hazards assessment for proposed natural gas pipelines.

DGGS also assists in large inter-division or other one-time efforts responding to special needs that are generally supported by interagency fund transfers. Smaller requests are funded by DGGS's annual general fund appropriation.

Local Governments

Many of the cooperative efforts implemented by DGGS with borough and municipal governments are conducted on a mutually beneficial but informal basis. For example, DGGS participates in a federally funded cooperative program to develop tsunami-inundation maps for coastal communities. In communities for which inundation maps have been prepared in recent years, DGGS works closely with collaborators and city and borough governments to design project outputs to meet community needs for planning evacuation areas and routes.

DGGS works closely with local communities to help assess hazards and alternatives for mitigating the effects of erosion, flooding, and other surface processes that threaten their sustainability. Similarly, DGGS works with rural communities to help assess potential local energy resources as alternatives to diesel fuel. During volcanic unrest and eruption, DGGS, as a partner in the Alaska Volcano Observatory, communicates with local villages—as well as with industry sectors, the aviation community, and the military—to share information and observations of volcanic unrest.

The University of Alaska

DGGS has a longstanding and productive professional association with geoscientists and students at the University of Alaska. University of Alaska faculty often work as DGGS project team members on a wide range of collaborative research projects. University student interns are also an important part of the DGGS workforce; while working on DGGS projects, students learn a wide variety of geology-related skills. Some graduate students are able to apply their DGGS intern work to their thesis projects through research programs established through a Memoranda of Agreement with the UAF Department of Geosciences. DGGS and the university make frequent use of each other's libraries and equipment and University of Alaska faculty and students also frequent the Geologic Materials Center in Anchorage, where faculty conduct core logging classes. DGGS's Volcanology Program has a long-term cooperative relationship with the UAF Geophysical Institute, resulting from partnership in the Alaska Volcano Observatory.

Federal Agencies

DGGS has cooperative programs with numerous federal agencies, including the USGS, NOAA, the U.S. Fish and Wildlife Service, NASA, the National Science Foundation, and periodically with FEMA, the U.S. Department of Housing and Urban Development, the BLM, the DOE, etc. In the past, DGGS has also engaged in cooperative programs with the U.S. Minerals Management Service, now the Bureau of Ocean Energy Management.

DGGS receives federal funds, some from matching grants, for which the division must compete nationally with other organizations on a yearly basis. DGGS has been successful in securing federal funds to support mineral inventory mapping, surficial and earthquake hazards-related mapping, geologic-hazards evaluations, and studies related to oil and gas and geothermal potential. Although DGGS has historically been very successful in receiving federal grants and appropriations, the process is competitive, and these funds are therefore project-specific, complementary to state-funded programs, and do not replace state general fund support. Federal funding is pursued only for projects that advance and serve the division's statutory mission.

Two ongoing cooperative federal programs have provided support for key elements of the DGGS mission for many years. One is AVO—a partnership established in 1988 consisting of USGS, DGGS, and the UAF Geophysical Institute. The USGS funds and administers the program for the purpose of providing a coordinated approach to mitigating volcano-hazard risks to the public, state infrastructure, and air commerce. The second ongoing program is the STATEMAP component of the National Cooperative Geologic Mapping Program, which was established by Congress in 1992 and is administered by the USGS. STATEMAP provides matching funds for geologic mapping projects according to priorities set by GMAB.

DGGS has been successful in receiving cooperative agreements from the National Geological and Geophysical Data Preservation Program (NGGDPP) and the National Cooperative Geologic Mapping Program. The NGGDPP, funded by the USGS, has supported several DGGS projects to preserve and make geologic information publicly available. STATEMAP funds provide a stable source of federal funding for geologic mapping in the state. Both of these programs require a 1:1 match in state funding.

Since 2019, DGGS critical mineral assessments through USGS Earth MRI funding have successfully produced geophysical surveys, geologic maps, and associated datasets to facilitate resource development. These mineral assessments have been matched with state funding recently, as well as funded in prior years (FY1993–FY2015) through the state's Airborne Geophysical/Geological Mineral Inventory program.

ALASKA GEOLOGIC MAPPING ADVISORY BOARD

The Alaska Geologic Mapping Advisory Board (GMAB) guides DGGS in pursuing its goal of providing earth science information to the Alaska public. A number of prominent geologists and community leaders, with a variety of backgrounds and a broad spectrum of experience in Alaska, have agreed to serve on the advisory board. The board held its first meeting in Fairbanks on October 22, 1995, and normally meets three times a year to discuss state needs, review DGGS programs, solicit and welcome comments and suggestions from the public, and provide recommendations to the state geologist.

Current members of the board are:

Matthew Hanson, Chair

Geologist, Doyon Limited. Mr. Hanson is a Resources Manager representing Alaska Native corporations and communities and helping manage natural resource issues. He has expertise in land management and mineral exploration.

Scott Digert

Professional Engineer and Alaska Resource Development Manager, BP Exploration Alaska (retired). Mr. Digert represents the industry sector and his expertise includes energy project evaluation, exploration, development, and production.

Dr. Douglas Kreiner

U.S. Geological Survey, representing the federal government, mineral resources, and mapping interests. Dr. Kreiner is Associate Center Director, Geology at the Alaska Science Center, specializing in mineral resources and geologic mapping.

Dr. Nicole Kinsman

Deputy Regional Director, NOAA/NWS Alaska. Dr. Kinsman has many years of experience in geospatial science and technology, environmental observing, and natural hazard response/mitigation.

Dr. Paul McCarthy

Professor, Department of Geosciences, University of Alaska Fairbanks. Dr. McCarthy has research interests in paleolandscape evolution, alluvial architecture, and nonmarine sequence stratigraphy. He represents the University of Alaska Fairbanks on the Board.

Rob Retherford

President, Alaska Earth Sciences. Mr. Retherford has decades of experience managing mineral exploration and geoscience projects in Alaska.

Russell Kirkham

Manager, Alaska Coal Regulatory Program for the Division of Mining, Land and Water, State of Alaska. Mr. Kirkham has many years of experience managing coal resources and related regulation.

Mischa Ellanna

Geologist, Bristol Bay Native Corporation. Mr. Ellanna has nearly three decades of experience in land management and mineral exploration. He has an strong background in geochemistry, geophysics, GIS, and construction aggregates.

Kyle Brennan

Professional Engineer and Vice President, Shannon & Wilson, Anchorage Office. Mr. Brennan's experience includes road and rail infrastructure; pedestrian walkways, trails, and bridges; pavement analysis and remediation; utilities and power generation/distribution; new building development; and airports and seaports.

Dr. Caixia Wang

Chair of Department of Geomatics, University of Alaska Anchorage. Dr. Wang is an associate professor and director of the GeoComputing Lab, with research interests in remote sensing and geographic information science.

DGGS MISSION AND HISTORY

Department of Natural Resources:
Develop, conserve, and enhance natural resources for present and future Alaskans.

Division of Geological & Geophysical Surveys: *Determine the potential of Alaskan land for production of metals, minerals, fuels, and geothermal resources, the locations and supplies of groundwater and construction material; and the potential geologic hazards to buildings, roads, bridges, and other installations and structures (AS 41.08.020).*

HISTORY

DGGS evolved from Alaska's Territorial Department of Mines. That heritage is reflected in the division's ongoing commitment to the application of geology to improve the welfare of Alaska citizens. The current name and mission of the division were established in 1972 with the passage of Alaska Statute AS 41.08.

- Territorial Department of Mines, prior to 1959
- Division of Mines and Minerals, 1959–1966
- Division of Mines and Geology, 1966–1970
- Division of Geological Survey, 1970–1972
- Division of Geological & Geophysical Surveys, 1972–Present

LEADERSHIP

Sixteen qualified professional geoscientists have formally served as state geologist or acting state geologist:

- Jim Williams, 1959–1971
- William Fackler, 1971–1973
- Donald Hartman, 1973–1975
- Ross G. Schaff, 1975–1986
- Robert B. Forbes, 1987–1990
- Thomas E. Smith, 1991–1995
- Milton A. Wiltse, 1995–2002
- Rodney A. Combellick (Acting), 2003–2005
- Mark D. Myers, February–October 2005
- Robert F. Swenson, 2005–2013
- Steven S. Masterman, 2013–2022
- David L. LePain, 2022–2023
- Kenneth Papp (Acting), July–December 2023
- Melanie Werdon, December 2023–February 2025
- Jennifer Athey (Acting), February–August 2025
- Erin Campbell, August 2025–present

By statute, the state geologist serves as the director of DGGS and is appointed by the Department of Natural Resources (DNR) commissioner. Since the early 1970s, State Geologists have been selected from lists of candidates prepared by the geologic community and professional societies in Alaska. A department order in 2002 formalized a process whereby the Geologic Mapping Advisory Board oversees evaluation of candidates and provides a list to the commissioner. The qualifications and responsibilities of the state geologist and the mission of DGGS are defined by statute.

ORGANIZATION

DGGS is one of seven divisions and six offices in DNR. Under the overall administration of the director's office, DGGS is organized into six sections, the Geologic Materials Center, and the Alaska Geospatial Office (see organization). DGGS also administers the Alaska Seismic Hazards Safety Commission.

Welcome!

DR. ERIN CAMPBELL — OUR NEW DIRECTOR & STATE GEOLOGIST

Erin was appointed Alaska State Geologist and Director of the DGGS in August of 2025. Prior to this position, she was the Wyoming State Geologist from 2017 to 2025 and led the Wyoming State Geological Survey. As Wyoming State Geologist, she served in the cabinet for two Wyoming governors and was a commissioner for the Wyoming Oil and Gas Conservation Commission and the Enhanced Oil Recovery Commission. She was also a member of the Wyoming Consensus Revenue Estimating Group, Wyoming Board of Professional Geologists, State Groundwater Coordination Committee, State GIS Advisory Board, Yellowstone Volcano Observatory, and the National Volcano Early Warning System Federal Advisory Committee.

She is currently a member of the National Academy of Sciences Committee on Earth Resources as well as being the AASG Foundation treasurer. She was on the AASG Executive Committee from 2019–2023 and was elected president of AASG in 2021–2022.

Dr. Campbell has a bachelor's degree in geology from Occidental College and a PhD in geology from the University of Wyoming specializing in structural geology. She worked for several years as a geologist for Chevron in Louisiana and California before returning to Wyoming to teach at the University of Wyoming. During her 15 years at the University of Wyoming, she directed the Geology Field Camp, taught undergraduate and graduate courses, and conducted research in structural geology and geomechanics.

She has two adult children, and in her spare time she enjoys fishing and hunting, as well as quilting and weaving.

SPECIAL THANKS TO JENNIFER ATHEY

Jennifer served as acting director for much of 2025, following Melanie Werdon's retirement. Jennifer, our division operations manager, stepped up to the plate to keep DGGS running smoothly, successfully juggled requests from the commissioner's and governor's offices, maintained building operations, and tackled day-to-day director tasks. Jennifer's empathy, patience, and dedication during her time as acting director is greatly appreciated by her DGGS colleagues. Thank you, Jennifer!

ERIC PETERSEN

Eric joined DGGS's Mineral Resource Section in January as the second member of the geophysics team, based in Anchorage. Eric's geophysics background is in radar, potential fields, glaciology, and planetary science. At DGGS he supports the Mineral Resources mapping efforts by managing airborne magnetic, radiometric, gravimetric, and electromagnetic surveying. He is also interested in the application of geophysics to geothermal, permafrost, and geohazards assessments. Outside work, Eric is passionate about Alaska's geomorphology and recreation. He is an avid skier, packrafter, and weekend explorer and couldn't imagine a better place to live than Alaska.

Eric grew up in northern Idaho where his love for the outdoors and geology began. He pursued a bachelor's degree in physics at Simon Fraser University (SFU), where he also worked part time as a lab assistant managing field data and glacier melt models for the SFU glacier research group. Eric then moved to Austin, Texas, to pursue a PhD at the University of Texas Institute for geophysics, where he wrote his dissertation on investigating buried glacier ice on Mars and across North America using various geophysical techniques. Afterwards he worked with the NASA-funded Mars Subsurface Water Ice Mapping team as a lead radar scientist. Eric then worked for four years as a postdoctoral researcher at the University of Alaska Fairbanks where he led a glacier monitoring campaign and published research on the debris-covered Kennicott Glacier in the Wrangell Mountains, Alaska. After a brief stint in environmental and geotechnical consulting, he began his position as a geophysicist with the State of Alaska.

KELLY WILSON

Kelly joined the DGGS Mineral Resources team as a geologist 2 in April of 2025. She received her BS in geology from Northwest Missouri State University in 2017, followed by an MS in geology from Southern Illinois University in 2019, with her thesis focused on rare earth mineralization at Hicks Dome. Kelly then spent four years with the Illinois State Geological Survey, gaining experience in environmental surveying, assisting the bedrock mapping team, and being involved in the Earth MRI project researching the Illinois-Kentucky Fluorspar District for rare earth elements. She brings her knowledge of geochemistry and petrology to DGGS and is currently working with the Mineral Resources Section bedrock geologic mapping program.

Kelly was born and raised in Nebraska and enjoys visiting family when she can. Outside of smashing rocks, Kelly loves watching movies, painting, learning new skills, exploring the wilderness, photography, and snuggling with her two cats. She's thoroughly enjoying and embracing living in Alaska and is excited to learn and grow as a geologist within DGGS.

MATT SCRAGG

Matt joined DGGS's Hydrology and Surficial Geology Section in Anchorage in September 2024 as the new Hydropower Program manager. Prior to Alaska, Matt earned his BS in civil engineering at Northern Arizona University. He applied his skillset towards wildfire modeling and post-wildfire flood warning as an engineer in Flagstaff, Arizona. His interest in hydrologic and cryosphere sciences led him to pursue an MS in earth systems science at the University of Alaska Fairbanks in 2022. As a research assistant with the Fresh Eyes on Ice project, Matt studied river ice processes throughout Interior Alaska, collecting field data and modeling ice jam hydraulics. Concurrently, he began working as a hydrographer at the U.S. Geological Survey's Fairbanks Field Office, where he traveled around Alaska collecting hydrologic data. In March of 2025, Matt moved to Anchorage to take on the role of the Hydropower Program manager with DGGS. He aims to bring a practical understanding of hydrologic science and engineering to developing hydropower resources that support energy and economic development throughout the state. When out of the office, Matt enjoys spending time in the mountains and on rivers with his friends and dog, Avy.

NEALEY SIMS

Nealey joined DGGS's Geologic Hazards Section in November to work on updating and expanding the Quaternary Faults and Folds database. Originally from Alabama, she first came to Alaska as an undergraduate intern from the University of North Alabama, assisting with the installation of seismic stations in and around the Lake Clark region of southern Alaska—an experience that sparked a lasting interest in remote fieldwork and the Alaskan wilderness. Upon earning a BS in physics, she returned to Fairbanks to pursue graduate studies at the University of Alaska Fairbanks. She recently completed a PhD in geophysics, where her research focused on fault identification and earthquake nucleation processes in Interior Alaska.

In addition to her academic research, Nealey has participated in numerous seismic and GPS field campaigns throughout Alaska and northwestern Canada, gaining broad experience in remote logistics, instrumentation, and data collection.

Outside of work, Nealey enjoys painting, crafting, and playing games often with her partner and their dog, Brunello.

AMBER ZANDANEL

Amber Zandanel joined the DGGS Geologic Materials Center (GMC) in September of 2025. She completed a BS in geography from the Oregon State University where she assisted with research projects on snow hydrology and ice core geochemistry. After a stint working in utility patent law, she continued a path in research through an MS in geology at the University of Wyoming on mineral alteration during hydraulic fracturing in sandstone reservoirs. Studies continued with a PhD in earth sciences at the Université Grenoble Alpes in France focused on mineral evolution and serpentinization in the icy moons of Saturn. Her research background is in subsurface-analogue hydrothermal experiments, characterizing minerals and organic compounds using microscopy and spectroscopy, and applying geochemical modeling to relate laboratory observations to field- and planetary-scale processes over geological time. Following completion of her doctorate in 2021, Amber applied her expertise in mineral alteration processes as a research associate at Los Alamos National Laboratory in New Mexico.

In the current position at the DGGS, Amber is developing the GMC's hyperspectral imaging program and facilitating the installation of new core-scanning instruments. Project deliverables include creation of an open dataset of core images and mineral maps that can complement aerial surveys and outcrop-scale geological interpretations. Outside of work, Amber is settling into life in Alaska by (re)learning to ski and getting really involved with making sourdough bread.

ALEX GARCIA

Alex Garcia joined DGGS in 2022 as an intern and later transitioned into the role of natural resource technician 2, where he is currently part of the GMC's handheld X-ray fluorescent (XRF) data collection project team. He recently graduated from the University of Alaska Anchorage with a degree in geology, where he built a strong foundation in geological principles and fieldwork. During his internship, he gained hands-on experience identifying core characteristics and supporting resource evaluation projects, as well as helping palletize thousands of boxes that make up the GMC's core inventory. Outside of work, Alex is an avid Manchester United fan who enjoys spending time outdoors and exploring new movies.

LISA ELCONIN

Lisa Elconin joined DGGS's Geologic Materials Center in February 2025 as a geologist 2 supporting the Hyperspectral Core Scanning Project. She graduated with a BS in geology from Cal Poly Humboldt in 2023, then moved back home to Anchorage where she worked in environmental consulting for a year. As the core scanner is not operational until 2026, she has been assisting with GMC warehouse operations and generating thousands of handheld XRF data points across energy and mineral cores. She is excited to start scanning the GMC's extensive core collection and gathering hyperspectral data. In her free time, Lisa enjoys knitting, sewing, wrangling her new kitten, and hiking (with obligatory geologizing, of course).

SCOTT FILIPPONE

Scott joined DGGS in October 2025 as the division's first Safety Officer. He graduated from Virginia Commonwealth University in 2013 with a BS in biology and, again, in 2015 with an MS in physiology & biophysics. During his graduate school studies, Scott obtained his Emergency Medical Technician (EMT) certification, which he has held for the past 12 years.

After working for three years as an urban EMT in Richmond, VA, Scott pursued a lifelong dream of relocating to Alaska when he moved in 2018. It was there that he has spent the past six years working as the Lead EMT/Safety Officer for the University of Alaska Fairbanks Toolik Field Station. In this capacity, he supported science in a remote tundra research station on the North Slope of Alaska by leading the station's medical clinic and safety program. Scott is excited to bring his experience to DGGS by helping to shape division policy and procedures in order to make it a healthier, safer place to conduct work.

Scott is not ashamed to admit that he genuinely enjoys reading the Code of Federal Regulations, as well as some select National Fire Protection Association standards. He has a great deal of respect for compressed gases and moving water. Scott has strong opinions about a variety of topics, particularly food, board games, and movies from the late 80s and early 90s.

JOHN EICHELBERGER

John Eichelberger joined DGGS's Energy Resources team in March 2025 as the new Geothermal Program Manager, bringing a wealth of experience in volcanology, geothermal systems, and science leadership. John earned his BS and MS in earth sciences from the Massachusetts Institute of Technology and his PhD in geology from Stanford University. He is internationally recognized for his widely-cited research on magmatic processes and leadership in pioneering scientific drilling projects on active volcanoes.

Prior to joining DGGS, John held senior roles at Sandia National Laboratories and Los Alamos National Laboratory. He later joined the University of Alaska Fairbanks, where he was a Professor and Chair of the Department of Geology and Geophysics. He also has deep ties to the Alaska Volcano Observatory, having served many years as Coordinating Scientist at UAF's Geophysical Institute. He was later appointed Program Coordinator for the entire U.S. Geological Survey's Volcano Hazards Program. John returned to Alaska as Dean of the UAF Graduate School.

John has been a long-time advocate for the important role geothermal energy could play in Alaska. In his new role with DGGS, John will lead efforts to collect geologic and geophysical data to advance understanding of Alaska's geothermal resource potential, and attract exploration interest to the state. DGGS is fortunate to have someone of John's caliber and experience to build this new program and broaden Alaska's energy portfolio to include sustainable geothermal sources.

Farewell!

MELANIE WERDON

Melanie served as the first female DGGS Director and State Geologist from December 2023 through January 2025. She first joined DGGS as a permanent geologist in 1999 and spent the next 25 years focusing on geologic mapping and minerals-related projects throughout Alaska, fostering relationships with the U.S. Geological Survey and the mineral industry, and leading the Mineral Resources Section as section chief for twelve years. She served as principal investigator for several mapping projects in Interior Alaska and on the Seward Peninsula and participated in many summer field campaigns, including as recently as 2018. She is the only geologist recorded in the DGGS database to have collected over 1000 samples in a single field season, a feat she achieved four different summers. She was first author on 59 DGGS publications and a coauthor on over 120 publications.

We appreciate Melanie's years of commitment and service to Alaska, her mentorship and leadership of Mineral Resources Section colleagues, and her vast knowledge of Alaska's geology and mineral industry. We wish Melanie good health and a happy retirement.

ALEENA MERIN JOSE

Aleena Merin Jose joined the Hydrology and Surficial Geology Section as part of the Arctic Strategic Transportation and Resources (ASTAR) team in 2024. In her role as geologist 2 with DGGS, Aleena was primarily focused on organizing and preparing ASTAR North Slope field data from the past several field seasons for publication. Aleena enjoyed working with data, paying great attention to detail and helping the team improve the consistency and quality of our data. Aleena was soft-spoken with a positive, upbeat attitude that was infectious. The close-knit, family-like atmosphere Aleena shared with her team members made her a pleasure to have on our team.

Originally from India, Aleena was eager to learn about the unique features of Alaska and share them with others. In July 2025, Aleena departed DGGS to begin a new chapter with her family. We miss her

KRISTEN JANSSEN

Kristen joined DGGS in early 2017, after first moving to Alaska in 2015 and working as communications coordinator at the Northern Alaska Environmental Center. Kristen graduated from the Rochester Institute of Technology, where she studied Medical Illustration, with high honors. With her impressive fine art and illustration skills, she immediately improved the look and feel of the division's on-line content and published products. A great example of how her graphic design skills greatly benefited DGGS is the long list of one-page factsheets she created. These popular, well-designed fact sheets are regularly used to better inform legislators, visitors, and the public. In her eight years at DGGS, she expertly coordinated with a long list of authors, reviewers, and directors as she efficiently guided 643 products through the publications process. Kristen tracked each publication through the entire process, created publication layout templates, expertly coordinated between authors and outside reviewers, prepared professional scientific visualizations, and conducted a long list of other related tasks. Throughout the years she continued to improve and uphold the division's branding, general design standards, and scientific writing style conventions to ensure the high quality of the organization's publications and other public content. She also led our Fairbanks "office beautification" efforts, curating and installing professionally framed photos, artwork, and posters throughout the office.

Kristen left DGGS in the fall of 2025 to pursue a business opportunity with her husband, becoming owners of Beaver Sports, a longtime local Fairbanks sporting goods store. We've realized since she left, how much the publication specialist is a critical piece to the well-oiled machine of our publications process at DGGS. We wish her the best in her future career!

JESSIE CHRISTIAN

Jessie joined the DGGS's Coastal Hazards Program in June 2023. During her time with DGGS, Jessie leveraged her experience, having already traveled to nearly 20 rural, coastal communities to conduct coastal hazards research and work to improve community-based monitoring. Jessie's passion for coastal science and building resilience in Alaska Native communities was very apparent in the fieldwork she conducted, presentations she gave, and connections she made. Jessie also assisted with the installation, monitoring, and maintenance of several water-level sensors and time-lapse cameras for monitoring erosion, in addition to contributing to several critical flood impact assessments published by DGGS in 2025. We wish Jessie the best in all her future endeavors!

ALLISON WOODWARD

This year, the Geological Health Hazards Program is saying goodbye to our front-line radon employee, Allison Woodward. She has been the public face of the program since 2023, where Allison has given public presentations, held open houses, led school trainings, and responded to public questions on radon testing and mitigation in Alaska for almost three years. In 2024, she moved with the program from Fairbanks to Anchorage to support its expansion in Southcentral and Southeast Alaska.

Allison's work with the Alaska Radon Program has left a positive impact on both public health and educational outreach. She focused her time in spring 2025 to support the build-out of the radon program's testing engagement in rural Alaska. Allison answered questions and worked with the Gambell School District to set up a testing regimen for the community. As a result, the radon program has identified areas with radon testing and mitigation needs that were unknown just a year ago.

Allison left DGGS at the end of November to assume a new position with the Department of Commerce, Community, and Economic Development. There, she will continue her work with external stakeholders and the public on pressing environmental topics and risks to public safety. We wish her good luck in her future endeavors!

HALBE BROWN

DGGS said goodbye to Halbe Brown in October, one of our geologists working on archival projects at the GMC. Halbe came to DGGS in December 2024 to complete the UAF Sample Rescue Project, funded under the 2023 NGGDPP grant. Prior to this position, he received a Bachelor of Science in geology from UAF in 2024 and worked as a volunteer and a paid employee for the National Park Service at Denali National Park.

Halbe spent 2025 working on the UAF sample collection at the GMC. This collection contains nearly 30 pallets of master's thesis and PhD dissertation geologic samples, including hand samples, rock core, and other materials. This archival recovery project supports the GMC and DGGS core mission of ensuring public access to Alaska geologic data. Halbe was able to complete all but a few pallets in his 10 months with DGGS and processed over 15,000 individual samples and sample boxes.

Halbe plans to return to UAF in fall 2026 to pursue his MS in geology. DGGS wishes him success in his upcoming academic work!

JAMES SALVADOR

The Geological Health Hazards Program said goodbye in November to James Salvador, our front-line employee working on the Alaska Groundwater Quality Program. James came to DGGS in December 2024 after completing his BS in geology from the University of California at Santa Cruz, along with a semester-long internship with the Washington State Department of Ecology.

He spent 2025 building out the Groundwater Quality Program staging database and automated download system, connecting DGGS's well-water data collection program directly to EPA reporting. James conducted DGGS's first successful upload of data to those EPA online reporting platforms.

Due to ongoing changes to federal grant funding, James moved from the groundwater quality program over to AVO in September. There, he worked with USGS and DGGS staff in the tephra lab and processed samples gathered during the 2025 field season.

Thanks to James's work this year, DGGS will be able to complete the last of our work on the statewide GIS well-water map in winter 2026 and publish it online for public use.

James left DGGS in November to take a position with an engineering firm. GHHP and DGGS wish him good luck at his new position!

MORT LARSEN

This year we said goodbye to Mort Larsen, who led the Landslide Hazards Program since 2023. His outgoing personality fostered strong relationships among community leaders, our state, and federal partners, strengthening communication and collaboration across several projects. He provided valuable input during the development of the statewide landslide inventory database, which was a multi-year effort published this year, and he championed the Landslide Reporter web map. We appreciate the positive impact he had on our team and our work, and we wish him and his family the very best in their new life in the Lower 48.

Alaska Division of Geological & Geophysical Surveys

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