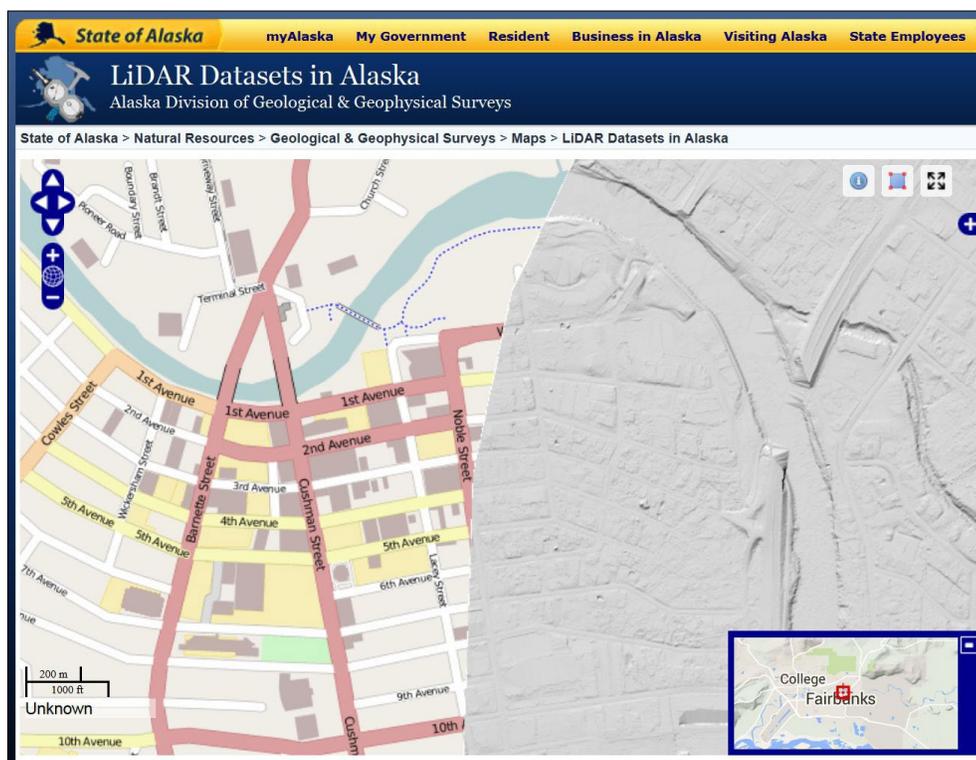


ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS FY2015 Project Description

INTERACTIVE MAPS: HIGHLIGHTING LIDAR, AIRBORNE GEOPHYSICS, AND GEOLOGIC MAPS

The Alaska Division of Geological & Geophysical Surveys (DGGs) is committed to providing easy access to geology-related datasets. Technological advances and in-house expertise have allowed us to significantly advance online data delivery of important geologic information through easy-to-use, web-based, searchable interfaces. Most importantly, these online applications include spatial functionality so that users can select their area of interest and search for or download only the data they want. Maintenance of the applications is supported by State of Alaska General Funds. All of the Division's web mapping applications are available at <http://maps.dggs.alaska.gov/>; below, we highlight several applications of interest.

LiDAR Datasets of Alaska is the only single-source map interface to lidar point-cloud data in Alaska (<http://dx.doi.org/10.14509/lidar>) (see figure). Currently, the online application provides free access to more than 8,395 square miles of public-domain point-cloud data, covering Eklutna Glacier, Golovin, Unalakleet, Whittier, and proposed and existing pipeline corridors. The interface displays lidar hillshades, which are grayscale images portraying the relief of the landscape. Once an area of interest has been selected, the raw point-cloud downloads are compressed for delivery to the user. Users may uncompress the files using the open-source "LASzip" tool and add them to their own Geographic Information System software. Additional publicly available datasets from a variety of agencies, including the National Oceanic and Atmospheric Administration and the Alaska Department of Transportation and Public Facilities, will be available from this interface in the future.



DGGs interactive map, *LiDAR Datasets of Alaska*. Users can select from multiple options for base map and overlays.

Airborne GeophysWeb facilitates public access to published Alaska airborne geophysical data from DGGs, the U.S. Geological Survey (USGS), and the Bureau of Land Management since 1993 (<http://dx.doi.org/10.14509/gp>). The application displays a representative image for each survey area and type of survey so users can get an idea of what the processed dataset looks like before they download the geophysical data for free from DGGs's online publications database. The DGGs Airborne Geophysical/Geological Mineral Inventory program provided the original funding for this application.

Geologic Map Index of Alaska provides the locations and outlines of most DGGs and USGS geological and geophysical maps of Alaska in the only existing online geographic index for the state (<http://dx.doi.org/10.14509/mapindex>). Search results link to DGGs's comprehensive, multi-agency publications database, where users may view and download publications for free. Users can save search results by highlighting individual publication or map selections and exporting them to an Adobe PDF document. Reports without maps can be accessed through DGGs's comprehensive publications database, www.dggs.alaska.gov/pubs/advanced-search.

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DIGITAL DATA DISTRIBUTION

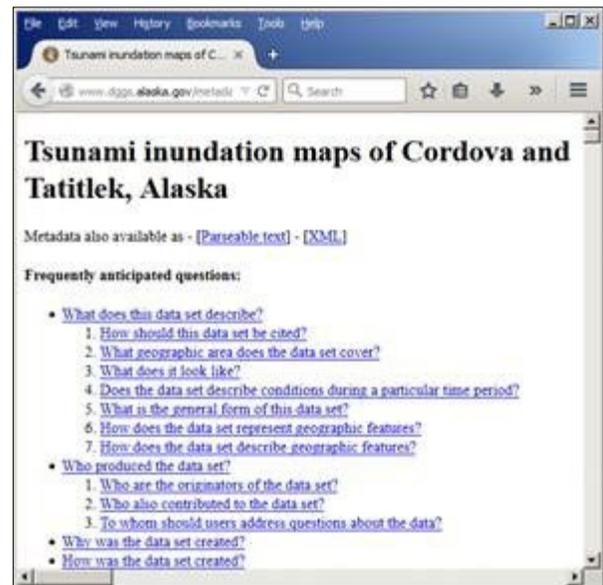
Geospatial datasets published by the Alaska Division of Geological & Geophysical Surveys (DGGs) are designed to be compatible with a broad variety of digital mapping software, to present DGGs's geospatial data in multiple ways, and to provide the State with a comprehensive repository of geoscientific data that the Division collects and distributes. While we continue to provide conventional maps and reports (available in both paper and PDF formats), we are rapidly expanding our publication products to include spreadsheets of analytical data, map data in shapefile and geodatabase format, geospatially-referenced image collections, web map services, and online map- and text-based search interfaces.

Although the Division provides a variety of GIS (Geographic Information System) products, the bulk of our collection consists of spreadsheets, shapefiles, and georeferenced raster files. These files are typically paired with an accompanying report or printable map that provides scientific observations, interpretations, and data acquisition parameters. Additional information about the data acquisition parameters as well as a succinct description of the positional accuracy, precision, scale, resolution, completeness, and scope is also provided to users in a metadata file.

DGGs metadata files conform to the FDGC-CSDGM (Federal Geographic Data Committee-Content Standard for Digital Geospatial Metadata) standard. This national metadata standard was developed to ensure that geospatial data distributors provide sufficient documentation to allow users to make informed decisions about appropriate use of geospatial data. Due to the importance of providing substantive supporting documentation, DGGs scientists work collaboratively with database managers and GIS staff to ensure that our agency consistently and efficiently generates comprehensive geospatial data files and metadata.

Our methods for generating geospatial data and metadata records have evolved to accommodate the Division's growing geospatial data collection. Ten years ago we typically published fewer than five geospatial datasets per year. Between 2008 and 2010 the average number of new geospatial data releases doubled to ten per year. Beginning in 2011, the annual average number of DGGs geospatial data releases more than doubled again (to about 22 per year). This exponential growth rate is fueled by both an ever-increasing customer preference for geospatial data and by workflow modifications that reduce redundant tasks.

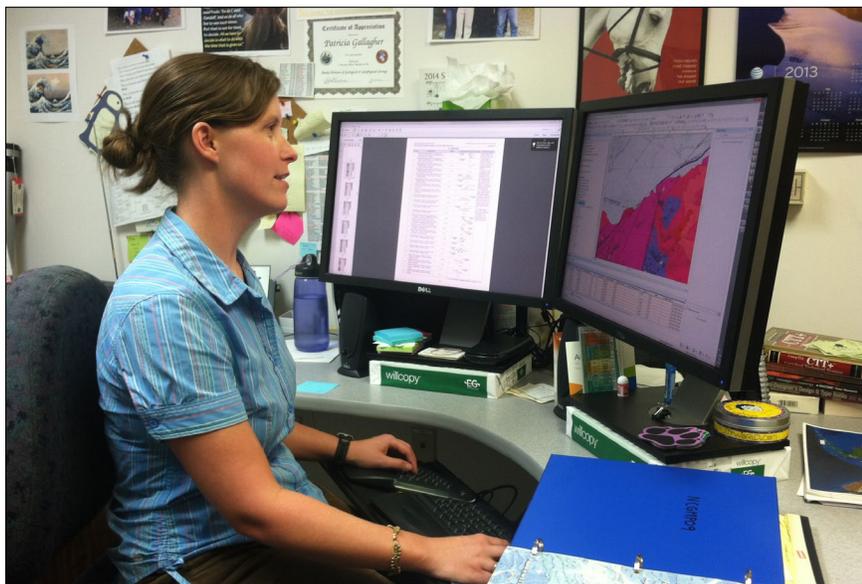
Sustaining the growth of our geospatial data collection is an ongoing challenge. Practices that worked well when our products were mostly print files resulted in unsustainable duplication of tasks as our emphasis shifted from paper to data. Development and implementation of division-wide data standards have been key to accommodating the growth of our geospatial data inventory. A commitment to providing standardized data has enabled us to develop an efficient and rigorous process for validating data and generating metadata. These improvements provide a solid organizational foundation from which we can cost-effectively manage our repository of legacy geospatial data while supporting ongoing development and publication of new science.



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GEOGRAPHIC INFORMATION SYSTEM (GIS) NETWORK

To effectively understand and manage Alaska's vast geologic resources requires powerful support systems designed to gather, store, analyze, and communicate complex geospatial data. Geographic Information Systems (GIS) are specifically designed to meet this requirement. The Alaska Division of Geological & Geophysical Surveys' (DGGs) scientists and geospatial analysts employ GIS daily to visualize, explore, and analyze complex geologic information and relationships. In addition, GIS is critical for the efficient storage and distribution of the Division's valuable geologic analyses, which are critical to many public and private entities as they work to develop Alaska's natural resources.



Standard design for DGGs digital data: DGGs continues implementation of a Division-wide standardized geodatabase model based on the U.S. Geological Survey's (USGS) National Cooperative Geologic Mapping Program (NCGMP) format (<http://ncgmp.usgs.gov/>). This national model standardizes data content, attributes, naming conventions, and other pertinent information required for archiving and disseminating geologic map data. The standardized data design is instrumental in streamlining cartographic production and metadata creation. DGGs is one of the leading states to adopt and implement the NCGMP standard, and is currently developing procedures and best practices for the first release of a large, fully NCGMP-compliant geodatabase directly to the public.

GIS training and education: In FY2014, the Division continued its commitment to GIS education for geologic staff. A series of custom GIS training workshops were designed based on the skills and knowledge needed to create digital geologic data. The training material covered the NCGMP data standard, national digital cartographic standards, suggested workflows and best practices, and provided basic to advanced GIS tips. With improved GIS skills and knowledge, DGGs scientists can better visualize, analyze, interpret, and manipulate geologic data.



Interagency GIS support: The GIS team at DGGs continues to provide GIS and cartographic support to other state agencies. In FY2014, DGGs converted the Mesozoic Subcrop Map of Cook Inlet Basin for the Division of Oil and Gas (DOG) to the NCGMP data standard and is in the final stages of producing the cartographic product. We also compiled USGS geologic data and created a series of Naturally Occurring Asbestos maps for the Alaska Department of Transportation and Public Facilities (DOT&PF). Providing GIS and cartographic support to other state agencies facilitates cooperation and communication between agencies and allows scientists to focus on data collection and interpretation rather than cartography.

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BEDROCK POTENTIAL FOR NATURALLY OCCURRING ASBESTOS IN ALASKA

Asbestos has come under close scrutiny in recent decades due to its link to lung diseases such as asbestosis, lung cancer, and malignant mesothelioma. Health hazard concerns have concentrated on man-made hazards such as mining, manufacturing, and products in which asbestos was used or disturbed. More recently, studies have looked at environmental exposure to asbestos occurring in natural rock outcrops and derived gravel and soils, but it is not yet clear how low-level environmental exposure affects health.

The Alaska Department of Transportation & Public Facilities (DOT&PF) has been impacted by the occurrence of naturally occurring asbestos (NOA) during the course of several projects. In 2000, the Department established a NOA task group, which has gathered information and posted it on the DOT&PF website, <http://www.dot.alaska.gov/stwddes/desmaterials/noa.shtml>. DOT&PF contracted the Alaska Division of Geological & Geophysical Surveys (DGGS) in 2014 to evaluate the bedrock geology of the state for naturally occurring asbestos potential.

For this project, DGGS uses the term 'asbestos' in the geologic sense, in which asbestos is the subset of a group of minerals that sometimes has an asbestiform (fibrous) shape that is strong, can bend under force, and will split lengthwise into thinner fibers. Based on known geologic settings where naturally occurring asbestos is most likely to be found, DGGS and a consulting geologist formulated a set of criteria to rate NOA potential according to rock type. Using existing geologic map compilations of the state, the consultant then assigned a rating of NOA potential to each bedrock map unit. Reported asbestos localities in Alaska were compiled from Alaska Resource Data File (ARDF) and Mineral Resource Data System (MRDS) data, although this list is by no means exhaustive. There are undoubtedly numerous additional occurrences of asbestos in Alaska that are not listed in ARDF and MRDS data tables.

This statewide study includes a report, data tables, and a series of maps of NOA potential in bedrock, and is anticipated to be published by DGGS in 2015. The products will be available digitally or printed on demand. Evaluation of surficial-geologic units for NOA potential has not been addressed in this product.

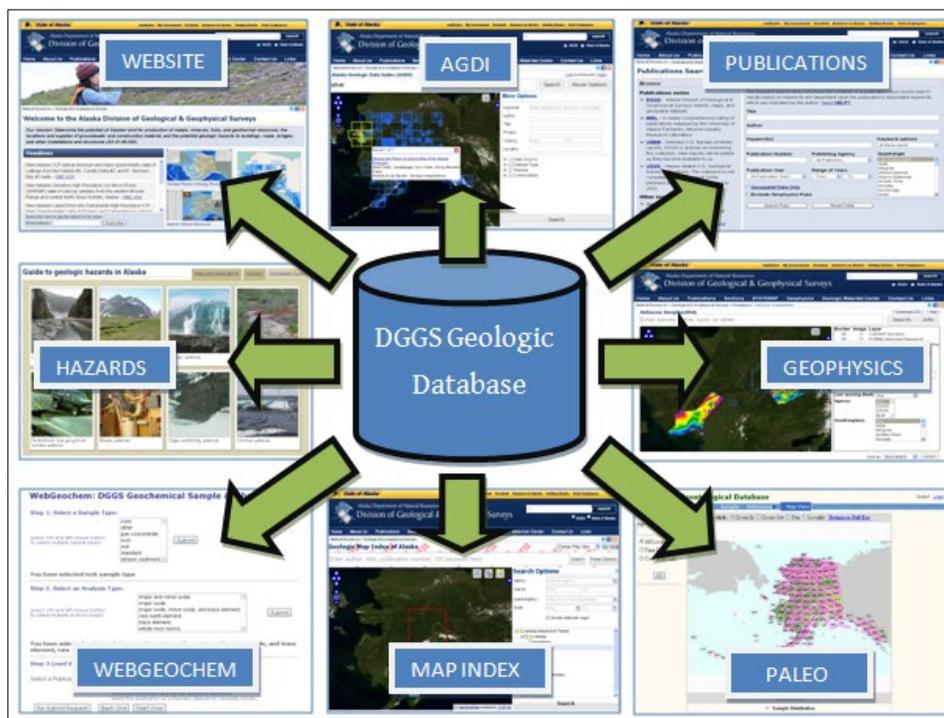


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WEBSITE DEVELOPMENT AND DIGITAL GEOLOGIC DATABASE

Over the past decade, the Alaska Division of Geological & Geophysical Surveys (DGGS) website (dggs.alaska.gov) has grown from a few static HTML pages to the Division's primary mechanism for distributing geologic information, publications, and interactive maps. DGGS has become the leading state agency for Alaska geology-related databases and a trusted online repository of geologic publications and data. The website allows users to search our publications catalog, an extensive collection of scanned reports, maps, and Geographic Information System datasets produced by DGGS and other geoscience agencies, including the U.S. Geological Survey, University of Alaska Fairbanks Mineral Industry Research Lab, and U.S. Bureau of Mines. The volume of files and information available through the DGGS website has grown exponentially. The catalog recently expanded to include bibliographic references for all Alaska-related geology and geophysics Master's theses and Ph.D. dissertations. It also provides web users easy access to geophysical data, geochemical data, information about the DGGS Geologic Materials Center, the Alaska Geologic Data Index, descriptions of the Division's projects and special studies, Alaska's mineral industry reports, and other topics of interest.

The Division's database system dynamically generates the majority of the website content and serves as the backbone of many of its web applications. Development of this geologic database was initiated as part of the federally funded Minerals Data and Information Rescue in Alaska program in 2000; ongoing data input, use, and maintenance of the database system are now an integral part of DGGS's operations and are supported by State general funds.



Since 2000, the database and website development team has established a secure and stable enterprise database structure, loaded data into the database, and created multiple web user interfaces. During 2014, the team's achievements included joining the DOI (digital object identifier) system that creates permanent links to online documents, a system widely used by the academic and scientific communities. This step created DOIs for all DGGS publications, linking to each citation web page and improving the discoverability of DGGS maps and reports and the permanence of their location on the internet. The team also secured funding from the National Geological and Geophysical Data Preservation Program to develop an interface for indexing and annotating staff field photos and begin the inventory process for our extensive field photo collection. The team continued support and maintenance of various projects and applications: Geologic Map Index of Alaska, Airborne GeophysWeb, Alaska Geologic Data Index, LiDAR Datasets of Alaska, Geologic Materials Center Inventory, Alaska Paleontology Database, and other web mapping applications in our Digital Data Series. Also, the backlog of geochemistry data from 2009 through 2014 has been loaded into Webgeochem, the DGGS geochemical data application.

In the coming year, the team's major projects include the development of an interactive Geothermal Map of Alaska and a complete redesign of Webgeochem. DGGS will also continue to expand its repository of geologic data and strive to incorporate new technologies that meet public demand for advanced, easy-to-use, online data delivery systems.

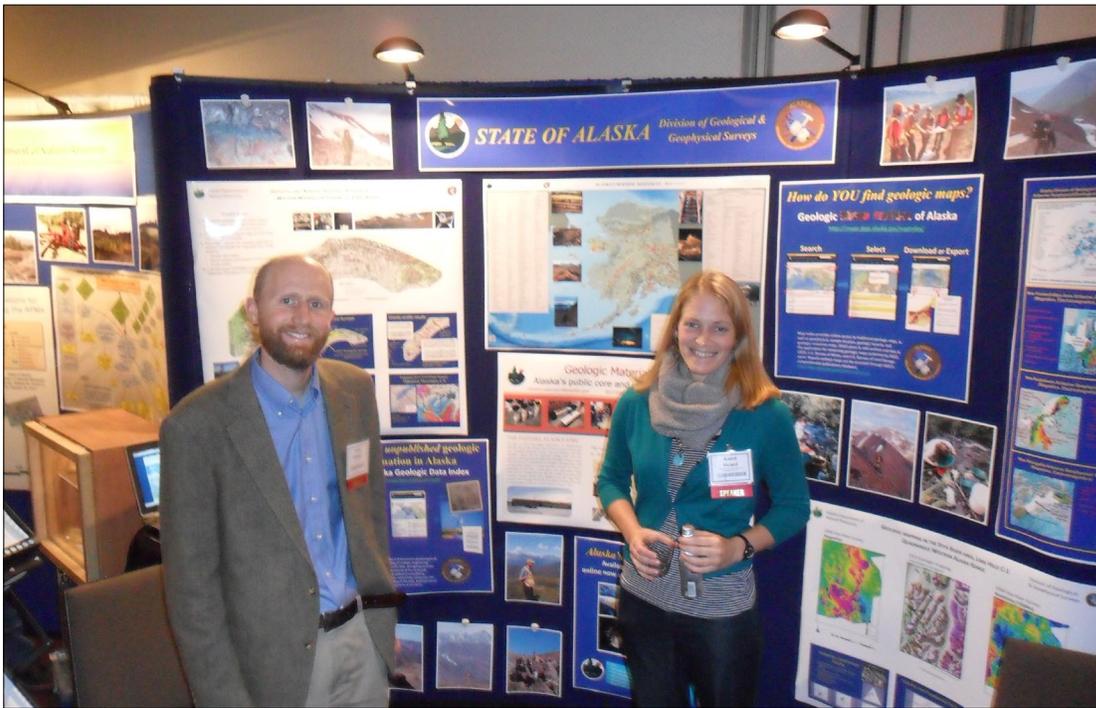
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PUBLICATIONS AND OUTREACH

The Alaska Division of Geological & Geophysical Surveys (DGGs) publishes and distributes, in many different formats, geologic data that has been collected, analyzed, and assembled by DGGs geologists. Below are some of the functions associated with publications and outreach:

- Design, digitally assemble, edit, and coordinate production of technical and educational geologic maps, reports, and informational publications in printed and digital formats.
- Prepare an annual report describing DGGs projects, activities, and accomplishments, and relating future goals and challenges.
- Prepare displays; represent the Division at geologic conferences and meetings by providing staff and designing, assembling, and transporting the display booth.
- Staff full-time geologic information center, providing data about Alaska's geologic resources and hazards through Division publications, geoscience specialists, and other resources. Sell and distribute printed and online geologic reports, maps, and digital data.
- Manage DGGs's reference library so that reports, maps, and other data are available and publications that scientists need to prepare geologic products are readily accessible.
- Maintain as complete a collection as possible of Alaska-related geoscience publications produced by the U.S. Geological Survey, the former U.S. Bureau of Mines, the U.S. Bureau of Land Management, and the UAF Mineral Industry Research Laboratory; and other Alaska-related publications as needed.



Publications produced by this group record and preserve geologic data such as: statistics for Alaska's mineral industry; detailed (1:63,360-scale or greater) bedrock, surficial, and engineering-geologic maps for specific areas in the state; sources of Alaska's geologic information; annual information about DGGs's programs and accomplishments; airborne geophysical data for areas with promising mineralization; and educational brochures explaining Alaska's geology or natural features. Some of DGGs's recent publications include: • Airborne GeophysWeb, an online map compilation of geophysical data, • Geologic Map Index of Alaska, an online geospatially-searchable database of geologic maps of Alaska, • Yukon River bridge landslide evaluation, • Passage Canal-Portage Valley area assessment of geologic hazards, • Lidar data for Whittier, Passage Canal, and Portage Lake areas, and • Tsunami hazard reports for Valdez and Sitka.

Publications are available in paper format (plotted as needed and sold for cost of printing) and as digital PDF documents and scanned, compressed maps on the DGGs website (available for free download). More than 180 digital geospatial datasets are now available on the DGGs website; that number continues to grow. Having the geospatial data available allows our users to download the data and use it as they need. The geological and geophysical data and reports published by DGGs encourage informed management and exploration of Alaska's natural resources, and provides critical scientific information to help mitigate risks from the state's geologic hazards.

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