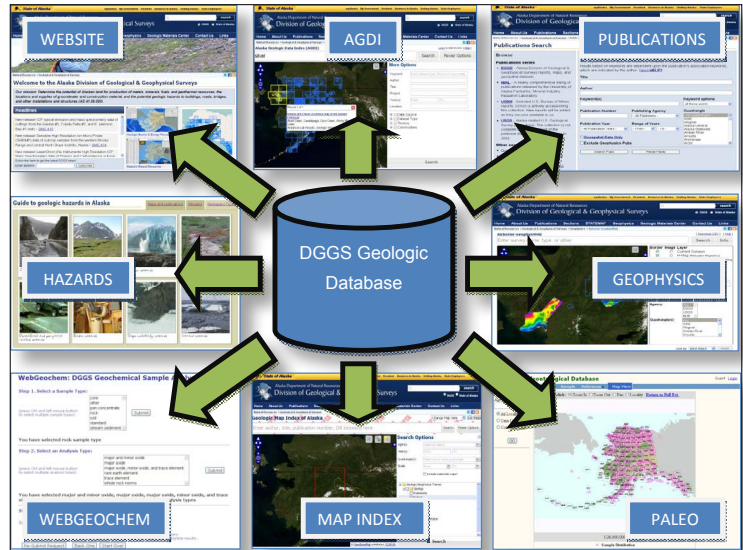


# ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

## FY13 Project Description

### WEBSITE DEVELOPMENT AND DIGITAL GEOLOGIC DATABASE

The Division of Geological & Geophysical Surveys' (DGGs) website (<http://www.dggs.alaska.gov>) allows users to search, view, and download DGGs publications and associated digital data. DGGs has become the leading Alaska geology-related database agency and a trusted online repository of geologic publications and data. In addition to DGGs publications, our online library includes an extensive collection of scanned reports and maps produced by other geoscience agencies, including the U.S. Geological Survey, UAF Mineral Industry Research Lab, and U.S. Bureau of Mines. DGGs's site also provides easy access to its geophysical data, geochemical data, information about its Geologic Materials Center, an online Guide to Geologic Hazards in Alaska, the Alaska Geologic Data Index (a database of industry reports and maps, field notes, drill logs, and other unpublished geology-related data), descriptions of the division's projects and special studies, annual reports from previous years, and other topics of interest.



Over the past decade, DGGs has transformed its website from a few static HTML pages into an informative, database-driven content management system that is now the division's primary means to announce and distribute geological and geophysical publications and information. The volume of files and information provided by the DGGs website has grown exponentially. To facilitate website growth and support the public's need for expedient access to a multitude of geologic data sources, our focus for 2012 has been to increase efficiency by optimizing site performance, standardizing our digital data releases, and to better integrate the website with data stored in our geologic database.

The DGGs geologic database system includes data identification and retrieval functions that guide and encourage users to access geologic data online. Development of this database was initiated as part of the federally funded Minerals Data and Information Rescue in Alaska (MDIRA) program in 2000; ongoing data input, use, and maintenance of the database system are now an integral part of DGGs's operations supported by State general funds.

Since 2000, the database and website team has established a secure and stable enterprise database structure, loaded data into the database, and created multiple web-based user interfaces. During 2012, the team continued progress on various projects requiring database and web application support: Alaska Geologic Data Index (page 68), Geologic Map Index of Alaska (page 67), Alaska Paleontology Database (page 67), Airborne GeophysWeb (page 42), and Guide to Geologic Hazards in Alaska. Also, we manage ongoing additions of geochemistry data to Webgeochem, and Alaska-related U.S. Bureau of Mines and U.S. Geological Survey publications to the publications search, as well as maintenance of existing applications. Over the coming years, DGGs will continue to expand its repository of geologic data and strive to meet public demand for technologically advanced, easy-to-use, online data delivery systems.

# ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

## FY13 Project Description

### PUBLICATIONS AND OUTREACH PROJECT

The Publications and Outreach Project publishes and distributes geologic data that has been collected, analyzed, and assembled by geologists in DGGGS's Minerals, Energy, Engineering Geology, and Volcanology sections and Geologic Materials Center (GMC). Some of the functions carried out under this project are:

- Design, digitally assemble, edit, and oversee final production of technical and educational geologic maps, reports, and informational publications in printed and digital formats.
- Prepare an annual report, with articles written by division staff, describing DGGGS projects and activities, announcing new products, and relating plans for future projects.
- Publish newsletters to summarize DGGGS's progress and announce new publications.
- Prepare displays and represent the division at geologic conferences and meetings by providing staff and assembling and transporting the display booth.
- Staff full-time geologic information center in Fairbanks, providing data about Alaska's geologic resources and hazards through DGGGS's publications, geoscience specialists, and other resources. Sell and distribute printed and online geologic reports, maps, and digital data.
- Assist staff in writing, then review and ensure completeness and accuracy of metadata for each digital project and file in its appropriate online repository.
- Manage DGGGS's reference library so that reports, maps, and other data are available, and publications are on hand that geologists need to prepare geologic products.
- 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; collect and maintain other Alaska-related publications as needed.



Publications produced and distributed by this group record and preserve geologic data such as definitive 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 DGGGS's programs and accomplishments; airborne geophysical data for areas with promising mineralization; and educational brochures and pamphlets explaining Alaska's geology or natural-science features. Some of the most recent DGGGS publications include: ♦ annotated bibliography in support of Northwest coastal community hazard planning (includes 21 communities) ♦ fossil fuel and geothermal energy sources for local use in Alaska (includes 12 regions) ♦ Alaska Geologic Data Index, which includes information about industry reports and maps, field notes, drill logs, and other unpublished geology-related data ♦ surficial, engineering-geologic, and reconnaissance maps of the Alaska Highway corridor, Tetlin Junction to Canada border ♦ active and potentially active faults along the Alaska Highway corridor, Tetlin Junction to the Canada border ♦ ash fall contour map of the 2009 eruption of Redoubt Volcano, including digital shapefiles of contours and sample locations ♦ spatially referenced oblique aerial photography of Eastern Norton Sound and Golovin shorelines ♦ migrated hydrocarbons in exposure of Maastrichtian nonmarine strata near Saddle Mountain, lower Cook Inlet ♦ coastal hazards field investigations in response to the November 2011 Bering Sea storm, Norton Sound ♦ digital elevation model of Sitka Harbor and the city of Sitka ♦ updated map of Alaska's mineral resources ♦ geologic basins and energy resources of Alaska ♦ a report on Alaska's Mineral Industry 2011 – exploration activity; and ♦ a digital database of Quaternary faults and folds in Alaska.

Publications are available in paper format (plotted as needed and sold for the cost of printing) and as digital PDF documents and scanned, compressed maps on the DGGGS website (available for download at no charge). An increasing number of GIS digital datasets are available on the DGGGS website, along with the maps and other images that DGGGS has produced with those datasets. Having the geospatial data available allows our users to download the data and customize its use to their needs. The geological and geophysical data and reports published by DGGGS encourage wise management and exploration of Alaska's natural resources and mitigation of risks from the state's geologic hazards.



# ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

## FY13 Project Description

### INFORMATION TECHNOLOGY (IT) INFRASTRUCTURE PROJECT

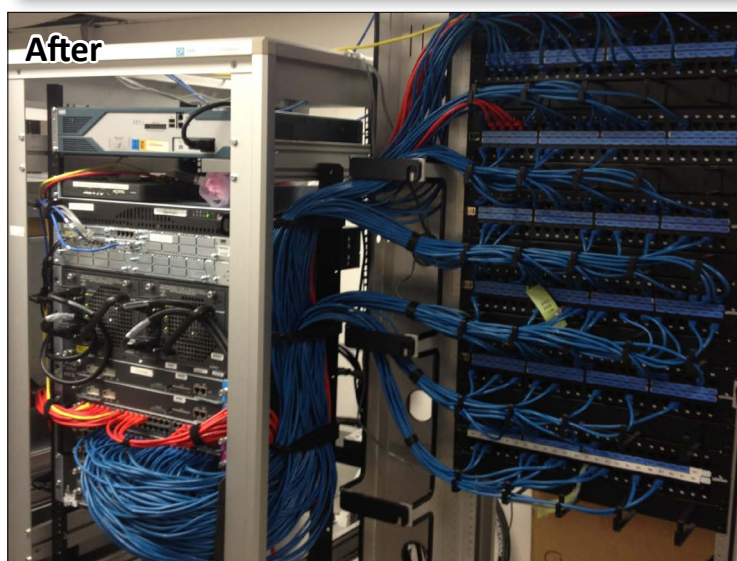
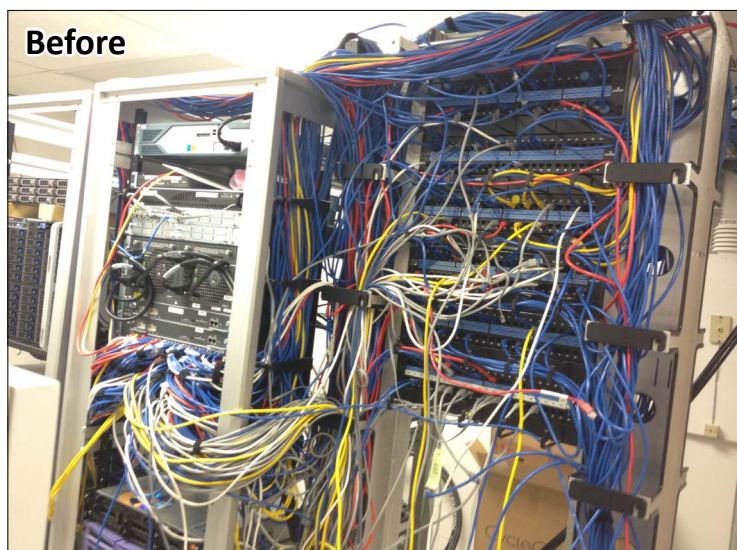
The Division of Geological & Geophysical Surveys' (DGGS) Information Technology group significantly upgraded server and other IT architecture during the past year. Aging hard drives in the primary file server were replaced and now provide 33 terabytes (TB) more storage and archive space for geologic data. DGGS's Oracle database software was upgraded to current standards, allowing the use of DNR's Oracle database performance monitoring system. DGGS IT staff in Fairbanks and DNR IT staff in Anchorage can now proactively manage any database issues before they create downtime.

Backups, disaster recovery, and physical data distribution continue to be an important part of daily IT tasks. DGGS is unique within DNR in that all desktop and laptop computers are backed up. While most staff members utilize server-based storage and keep very little data on their desktop machines, the files that remain on user machines are still important and often irreplaceable. Newly released open-source software allowed IT staff to change the configuration of the drive arrays on the backup servers, reducing the amount of processing time required by daily, weekly, and monthly backups by 50 percent. Automated systems run daily backups after hours so that changes during the day are incorporated into the backups at night. The primary backup server, used for backing up all UNIX and Windows servers, is now a single RAID5 84-TB volume. The server used for backing up Windows-based desktop and laptop computers is a single RAID5 30-TB volume. The offsite backup server, used to store only the most recent copy of any backup, is a RAID5 26-TB volume.

The IT group also configured a new server to display electronic maps. Part of this server will be used to provide Internet users an easy way to quickly see where a publication is located or what coverage a map provides. Because these "thumbnail maps" use existing GIS shapefiles, very little additional development is required to add them to DGGS's website. A proof-of-concept thumbnail map can be viewed at <http://dggs.alaska.gov/pubs/id/24264>. An additional part of this mapping server is used to display the Alaska Geologic Data Index, a public interface to unpublished geologic data (see page 68), and Airborne GeophysWeb, an interface to airborne geophysical data (see page 42).

IT staff continued standard in-house support, including new software installation, upgrading end-of-life hardware, tracking inventory, and responding to hardware issues. DGGS's social media sites, Twitter (<http://www.twitter.com/akdggs>) and Facebook "fan" page (<http://www.facebook.com/akdggs>), promoted new publication releases, news, and announcements. DGGS also continued a cooperative agreement with the University of Alaska Fairbanks (UAF) to physically host part of the Alaska Volcano Observatory (AVO) web server infrastructure in DGGS's server room while its Internet connectivity remains through UAF.

Future plans include decommissioning the only remaining Sun server, upgrading and reconfiguring our web server infrastructure by adding a caching front-end interface, adding an ESRI ArcSDE cluster to communicate between our map server and our databases, and adding another equipment rack in our server room for expanding server infrastructure.



*New cabling infrastructure makes server maintenance significantly faster and more reliable.*



# ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

## FY13 Project Description

### FIELD MAPPING TECHNOLOGY PROJECT

The Alaska Division of Geological & Geophysical Surveys (DGGGS) collects, analyzes, and publishes geological and geophysical information toward its mandate to inventory and manage Alaska's natural resources and evaluate geologic hazards. DGGGS collects a large amount of new data each year and synthesizes the data into multiple reports and maps for publication. On average, DGGGS conducts seven field projects per year, each with teams of five geologists in the field for three weeks, or 735 person-days in the field. Each geologist records detailed observations at an average of 25 locations per day in a notebook or on a paper map, which amounts to more than 18,000 multi-part parcels of data per year that must be hand recorded and then translated and parsed into digital media for analysis and eventual publication.



DGGGS is committed to the timely release of data to the public and prompt fulfillment of obligations to funding sources. In 2005, DGGGS began investigating the potential of using digital field mapping technology to streamline data collection and processing. Digital mapping is defined as using a computer or personal digital assistant (PDA) to display and record information that has traditionally been recorded on paper, whether on note cards, in a notebook, or on a map. Computer technology and software are now becoming portable and powerful enough to take on some of the burden of the more mundane tasks a geologist must perform in the field, such as obtaining precise locations, plotting structural data, and color coding physical characteristics of a rock. Additionally, computers can now perform some tasks that were formerly difficult in the field, for example, recording text or voice digitally and annotating photographs on the spot. The greatest benefit of digital mapping is a decrease in the amount of time necessary for data entry, thereby potentially increasing the amount and quality of information that can be recorded during a field day.



In 2012, the Ray Mountains Strategic and Critical Minerals Assessment project (see page 38) was challenged to repetitively collect rock, stream-sediment, and pan-concentrate samples and structural data over a 3,500-square-mile area. Project geologists determined that field computers would best facilitate collecting information that was consistent among field personnel and help keep field plans up-to-date as the project progressed. The project rented a Trimble TSC3 handheld field computer for each geologist. Prior to field work, a series of data-entry forms that resembled the paper field cards staff had used in the past were customized with ESRI ArcPad/ArcPad Studio mobile GIS data collection software. Geologists filled out the forms throughout the day and, in the field office, synchronized their handheld computers with a master geodatabase that kept a running record of all samples and supporting data. Once the master was complete, the files were loaded back onto the field computers so the geologists could use them for field reference the next day. The devices also helped with navigation and allowed geologists to overlay their data on digital geologic and geophysical maps, facilitating real-time interpretation. Although there were some problems with synchronization that had to be resolved, field personnel were generally happy with the methodology and data collectors. DGGGS anticipates developing an enterprise GIS-database structure that will support and expand future uses of field technology.





# ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS FY13 Project Description

## GEOGRAPHIC INFORMATION SYSTEM (GIS) PROJECTS

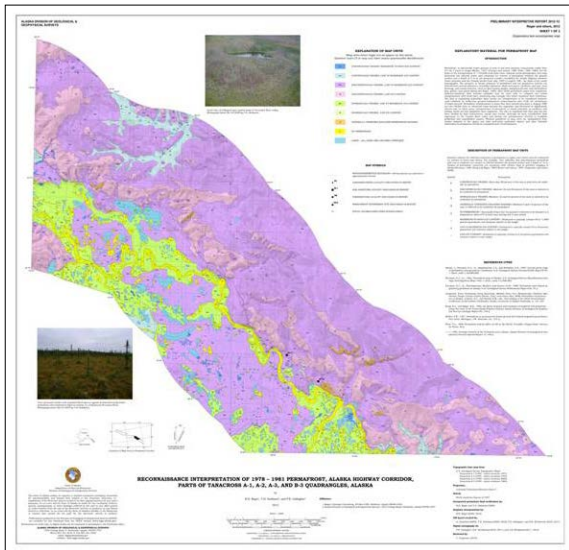
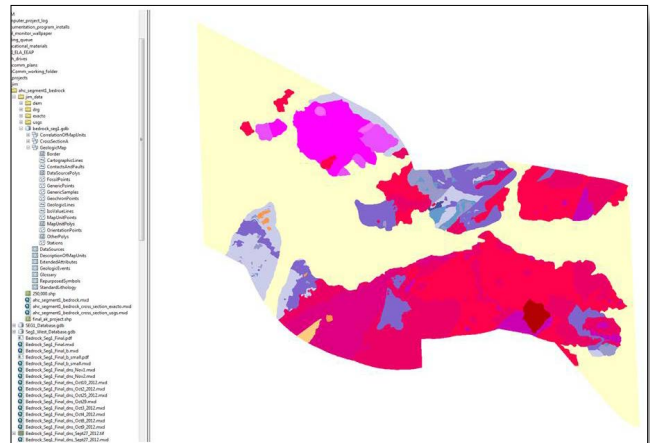
The GIS projects underway at the Division of Geological & Geophysical Surveys (DGGs) are designed to take advantage of recent advancements in geospatial tools, and to present DGGs's geospatial data in multiple ways, making the data more accessible and easier for users to view, acquire, and use.

### WEB MAP APPLICATIONS

DGGs is beginning to design web-map applications for internal and public use. A web map is an Internet-based, interactive map application that allows the user to display and query the layers on the map. A web map contains one or more *ArcGIS for Server*<sup>®</sup> map services. A prototype of the new application can be viewed at <http://www.dggs.alaska.gov/pubs/id/24264>.

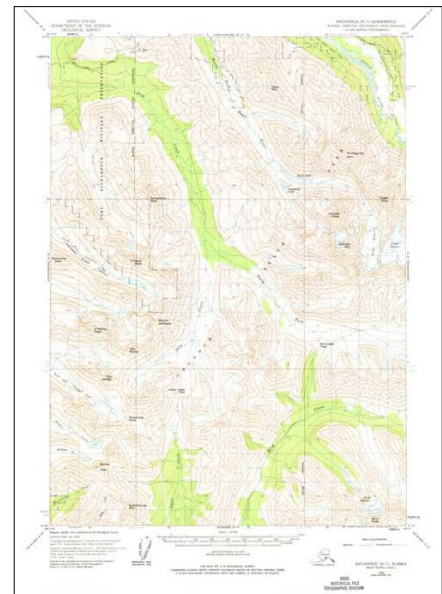
### USGS National Cooperative Geologic Mapping Program (NCGMP) Geodatabase

DGGs is implementing a division-wide, standardized geodatabase model based on the U.S. Geological Survey (USGS) NCGMP (<http://ncgmp.usgs.gov/>) format. The NCGMP is a proposed standard for digital publication of geologic maps that are funded by the USGS under the STATEMAP program. Instituting a division-wide geodatabase has several benefits, including standardizing the data's content, attributes, naming conventions, and other pertinent information required for archiving and disseminating geologic map data. A standardized geodatabase is instrumental in creating future web map applications and streamlining the metadata creation process.



### DGGs Geologic Mapping Template

DGGs has finalized and is utilizing a geologic mapping template for use by the division's GIS/cartographic staff. The benefit of instituting a division-wide template is to standardize the design layouts while streamlining the process used to create geologic maps, thereby making them available to the public in a more timely manner.



### Historical U.S. Geological Survey Topographic Map Inventory and Archive

DGGs has nearly completed the inventorying and archiving of its collection of historical USGS topographic maps. A database was created based on the publication dates of the maps. A retired DGGs employee currently volunteers time as the project manager for creating and populating the inventory database. These maps are available for use by DGGs staff and inspection by the public. They contain important historical cartographic data, much of which is omitted on more recent topographic maps.

# ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS FY13 Project Description

## INCREASED DATA ACCESS VIA WEB MAPPING APPLICATIONS

The Division of Geological & Geophysical Surveys (DGGS) is increasingly looking to electronic data delivery to quickly provide up-to-date, detailed information to the public. Specifically DGGS is currently developing several online map- and text-based search interfaces to allow public access to a variety of data types, including applications to discover publications (below), fossil data (below), unpublished geologic data (see page 68), and geophysical surveys (see page 42). This technology can also supply online real-time data services (i.e., Web Feature Services [WFS]) that users may easily open and manipulate in their own Geographic Information System (GIS) software. Of course, most DGGS publications are also available as free downloads from <http://www.dggs.alaska.gov/pubs/> and via print-on-demand from the DGGS Fairbanks office.

The “Geologic Map Index of Alaska” web application (fig. 1) will, when complete, provide the locations, outlines, and current status of Alaska geological and geophysical maps from all government agencies in a single, interactive, Internet-accessible location. No geographic index of Alaska geologic maps exists at this time. DGGS is working with Geographic Information Network of Alaska (GINA) at the University of Alaska Fairbanks to upgrade the Map Index interface to a fully integrated map- and text-based search application based on real-time data served from DGGS’s central Oracle database. DGGS anticipates that the web application will be completed in late 2013. This upgraded resource will make it easier for the public and government agencies

to find the maps they need to make informed resource- and land-management decisions.

The Alaska Paleontology Database contains detailed information on fossils and fossil localities in Alaska (fig. 2). The database was originally created by Alaska paleontologist Robert Blodgett and paleontologist/computer programmer Ning Zhang, and hosted on a privately owned server. DGGS optimized the database and migrated the structure and data to DGGS’s Digital Geologic Database so the database is ensured regular maintenance, back-up, continued data expansion, and consistent public internet access. The online, interactive, spatially enabled application will be released in summer 2013.

Both of these projects were initiated with funding from the federal Minerals Data and Information Rescue in Alaska (MDIRA) program and continue to be supported by State of Alaska general funds. The primary objective of the MDIRA program is to ensure that all available Alaska minerals-related data are preserved in a safe and readily accessible format.

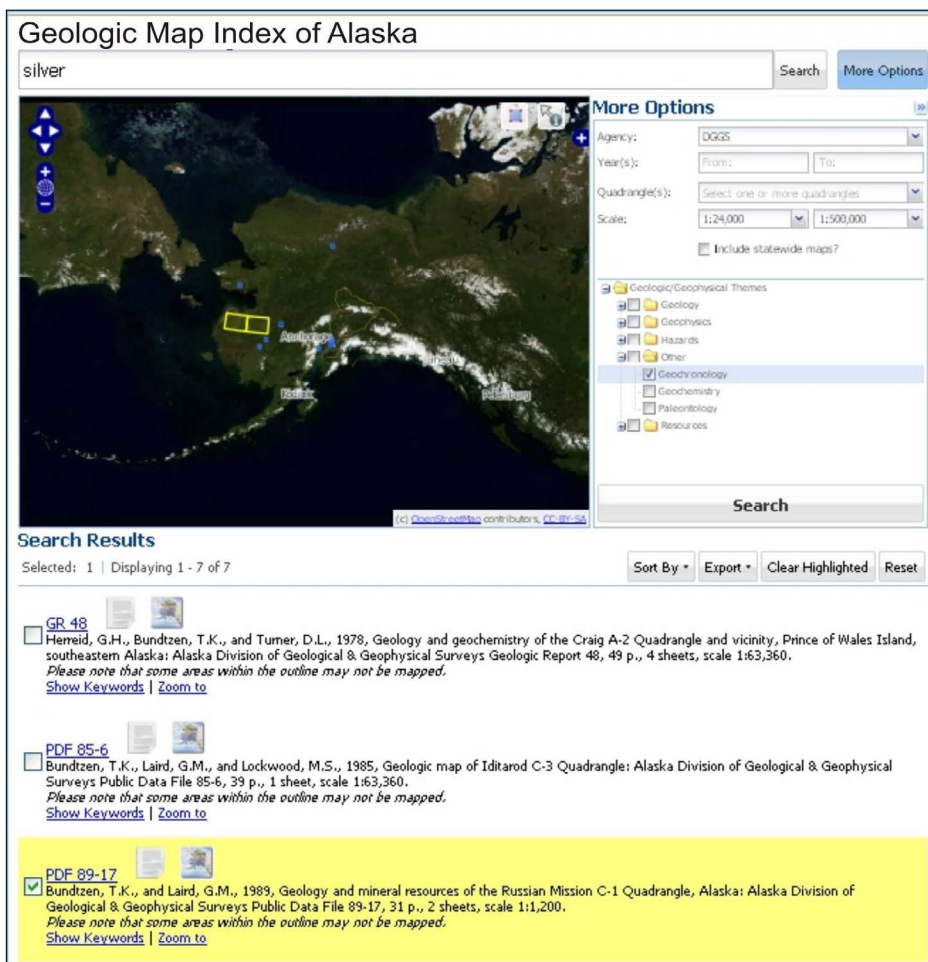


Figure 1. Geologic Map Index of Alaska application. mat.

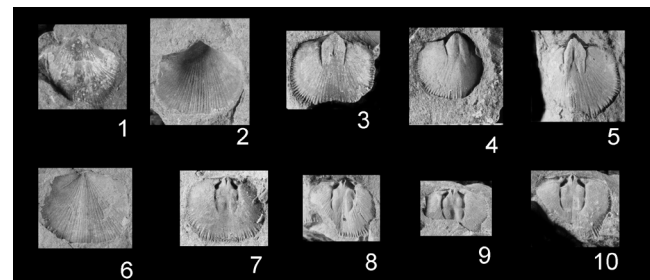


Figure 2. Photographs of fossils described in the Alaska Paleontology Database.



# ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

## FY13 Project Description

### ALASKA GEOLOGIC DATA INDEX (AGDI)

The Alaska Geologic Data Index (AGDI) online application delivers a growing list of unpublished public- and private-sector geologic data for Alaska from any subdiscipline of geology, including oil and gas, engineering geology, mineral resources, scientific data, and agency archives. Information about the data is easily discovered through a map-based search application (<http://maps.dggs.alaska.gov/agdi/>) that allows web-based public queries of the data. An online data-entry interface conveniently supports the expansion of AGDI database holdings over time; administrative capabilities provide for routine, secure data maintenance. The database currently contains 16,991 records. Potential data contributors are encouraged to contact DGGS at [dnr.dggs.webapps@alaska.gov](mailto:dnr.dggs.webapps@alaska.gov) to find out more about the project.

Prior to release, the AGDI database was integrated with the Alaska Mineral Industry Data Index (AKMIDI), a federal Minerals Data and Information Rescue in Alaska (MDIRA) project that catalogued nearly 16,000 records of mineral resource information owned by 18 diverse organizations, including Native corporations, private companies, state libraries, and land managers. The AKMIDI data includes information needed to find industry reports and maps, field notes, drill logs, and other data from the private sector. Much of the data is still held and controlled by private entities. Approximately 1,800 files and 4,300 maps from the Anaconda Collection of minerals exploration data are available through Alaska Resources Library and Information System (ARLIS) and Geologic Materials Center. Upon addition of public-sector geologic data, the database was renamed the Alaska Geologic Data Index.

The AGDI database captures the physical location of archived physical files, contact information and rules for accessing the data, and three levels of proprietary access. At the most secure level, data owners may make their records invisible to the public and other data owners. Digital images of maps, reports, and other data (such as the images of the Anaconda Collection) can be linked to the relational database so that the public can obtain some insight about the content of a potentially useful map, figure, or photograph without having to retrieve the physical materials from the archive. The application also allows for electronic information to be linked via URL.

AGDI was supported by the federally funded MDIRA program, administered by the U.S. Geological Survey, and released to the public in November 2012. The data will also be available as a Web Feature Service (WFS), an online, real-time data service supported by most Geographic Information System (GIS) software. DGGS believes increased access to hard-to-find, unpublished geologic information will advance scientific knowledge of the geologic framework of Alaska and help spur exploration and informed management of its geologic resources.

Title / Authority	Year	Dataset Type	Places
<a href="#">CENTRAL ALASKA GOLD CO. REGION FORMAL PHYSICOSPHERICAL</a> U.S. Bureau of Land Management	1991	Geologic Interpretations	Heaton Park
<a href="#">Page 104, Name, Oil, Classification, County</a> Anaconda Minerals Company		Analytical Lab Results, Geologic Interpretations	Kona
<a href="#">Page 103, Name, Oil, Classification, County</a> Cathlamet Golf Corporation	1991	Analytical Lab Results, Geologic Interpretations	Heaton Park
<a href="#">Johnson Tract, Worksheet, State, Statewide</a> Wilderness Resources Center	1993	Administrative	
<a href="#">Page 103, Name, Oil, Classification, County</a> Cathlamet Golf Corporation	1991	Analytical Lab Results, Geologic Interpretations	
<a href="#">Page 9, Johnson Prospect, Section 10, 10, 10, Section</a> Skeeter, Carl F., Anaconda Minerals Company	1985	Geologic Interpretations	Johnson
<a href="#">Page 8, Johnson Prospect, Section 10, 10, 10, Section</a> Skeeter, Carl F., Anaconda Minerals Company	1985	Geologic Interpretations	Johnson
<a href="#">Page 7, Johnson Prospect, Section 10, 10, 10, Section</a> Skeeter, Carl F., Anaconda Minerals Company	1985	Geologic Interpretations	Johnson
<a href="#">Page 6, Johnson Prospect, Section 10, 10, 10, Section</a> Skeeter, Carl F., Anaconda Minerals Company	1985	Geologic Interpretations	Johnson
<a href="#">Page 5, Johnson Prospect, Section 10, 10, 10, Section</a> Skeeter, Carl F., Anaconda Minerals Company	1985	Geologic Interpretations	Johnson
<a href="#">Page 4, Johnson Prospect, Section 10, 10, 10, Section</a> Skeeter, Carl F., Anaconda Minerals Company	1985	Geologic Interpretations	Johnson
<a href="#">Page 3, Johnson Prospect, Section 10, 10, 10, Section</a> Skeeter, Carl F., Anaconda Minerals Company	1985	Geologic Interpretations	Johnson
<a href="#">Page 2, Johnson Prospect, Section 10, 10, 10, Section</a> Skeeter, Carl F., Anaconda Minerals Company	1985	Geologic Interpretations	Johnson
<a href="#">Page 1, Johnson Prospect, Section 10, 10, 10, Section</a> Skeeter, Carl F., Anaconda Minerals Company	1985	Geologic Interpretations	Johnson
<a href="#">Page 104, Name, Oil, Classification, County</a> Cathlamet Golf Corporation	1991	Analytical Lab Results, Geologic Interpretations	Heaton Park
<a href="#">Page 103, Name, Oil, Classification, County</a> Cathlamet Golf Corporation	1991	Analytical Lab Results, Geologic Interpretations	Heaton Park
<a href="#">Page 102, Name, Oil, Classification, County</a> Cathlamet Golf Corporation	1991	Analytical Lab Results, Geologic Interpretations	Heaton Park
<a href="#">Page 101, Name, Oil, Classification, County</a> Cathlamet Golf Corporation	1991	Analytical Lab Results, Geologic Interpretations	Heaton Park
<a href="#">Page 100, Name, Oil, Classification, County</a> Cathlamet Golf Corporation	1991	Analytical Lab Results, Geologic Interpretations	Heaton Park