

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

FY11 Project Description

DIGITAL GEOLOGIC DATABASE PROJECT

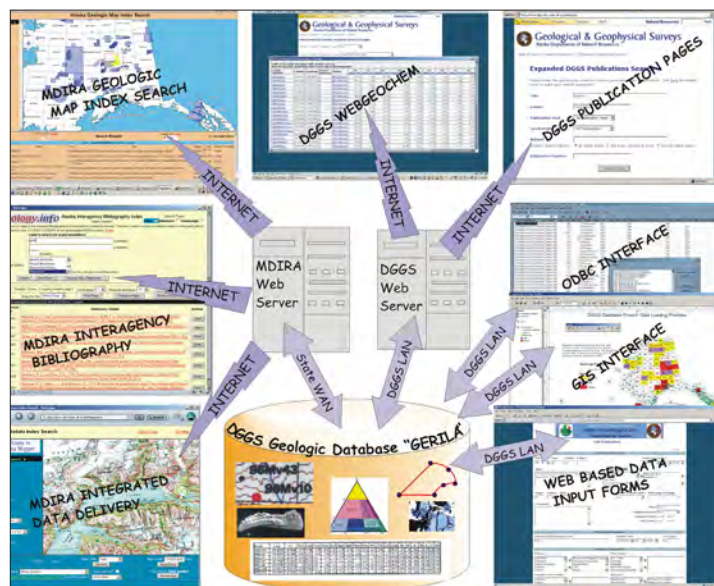
In 2000, the Alaska Division of Geological & Geophysical Surveys (DGGs) set out to develop a geologic database system to provide the architecture for consistent data input and organization. That database system now includes data identification and retrieval functions that guide and encourage users to access geologic data online at no charge. This project was initially part of the federally funded Minerals Data and Information Rescue in Alaska (MDIRA) program; ongoing data input, use, and maintenance of the database system are now part of DGGs's normal operations supported by State General Funds.

The Digital Geologic Database Project has three primary objectives. The first is to provide a spatially referenced geologic database system in a secure, centralized information architecture with networked data access for new and legacy DGGs geologic data. The second objective is to develop functional online interfaces that allow the public to find and identify geologic data available from DGGs and then view or download selected data. The third objective integrates DGGs's minerals-related data with data from other agencies through the MDIRA website akgeology.info/.

During the first 9 years, the project work group established a secure and stable enterprise database structure, started loading data into the database, and created Web-based user interfaces. As a result, the public can access Alaska-related reports and maps published by DGGs, the U.S. Geological Survey, the U.S. Bureau of Mines, and the University of Alaska Fairbanks Mineral Industry Research Laboratory. Also easily accessible are DGGs project digital GIS data through a search page on the DGGs website (www.dggs.alaska.gov/pubs), and DGGs geochemical data through a search engine (dggs.alaska.gov/webgeochem). Users can also find DGGs reports and maps, along with geology and minerals reports from other agencies, through an integrated information portal at the AKGeology.info website, akgeology.info.

During 2010, the project team continued development of various projects requiring database and application support: National Geological & Geophysical Data Preservation Program (datapreservation.usgs.gov) (p. 77), loading Alaska-related U.S. Bureau of Mines publications (p. 76), the online Guide to Geologic Hazards in Alaska (p. 54, 75), Geochronologic Database for Alaska (p. 53), Alaska Geologic Map Index (p. 52), and other ongoing maintenance of existing applications.

Additionally, DGGs secured short-term leftover funding from the MDIRA program in 2010 to ensure the maintenance of several MDIRA products on a long-term basis, both to facilitate our geologic work, and to provide public access to this geologic and mineral resource information. Two datasets compiled under MDIRA have become unavailable or are at risk of becoming unavailable: the Alaska Minerals Industry Data Inventory (AKMIDI) (p. 79) database and the Alaska Paleontological Database (<http://alaskafossil.org/>) (p.80). The databases and user interfaces for both datasets will be migrated to existing DGGs servers by the end of 2011 to ensure regular maintenance, backups, continued data expansion, and consistent public internet access.



Contacts: Jennifer Athey, 907-451-5028, jennifer.athey@alaska.gov
Susan Seitz, 907-451-5052, susan.seitz@alaska.gov

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

FY11 Project Description

FIELD MAPPING TECHNOLOGY PROJECT

The Alaska Division of Geological & Geophysical Surveys (DGGS) collects, analyzes, and publishes geological and geophysical information in order to inventory and manage Alaska's natural resources and mitigate geologic-hazard risks. DGGS creates a large amount of new data each year and synthesizes the data into multiple reports and maps for publication. On average, DGGS 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 approximately 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.



DGGS is committed to the timely release of data to the public and prompt fulfillment of obligations to funding sources. In 2005, DGGS began investigating the potential of digital field mapping to streamline data collection and processing. Digital mapping is defined as using a computer or personal digital assistant (PDA) to show 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 different physical characteristics of a rock. Additionally, computers can now perform some tasks that were formerly difficult to accomplish in the field, for example, recording text or voice digitally and annotating photographs on the spot. DGGS believes that the greatest benefit of digital mapping will be a decrease in the amount of project time necessary for data entry, thereby potentially increasing the amount and quality of information that can be recorded during a given period of time.

In 2007 and 2008, DGGS tested hand-held tablet computers and third-party field mapping software with mixed results. Ultimately, geologists decided that the mapping software setup was too different from the current work flow, and they would ideally like a customized data entry program. Also, geologists requested lighter weight, fully ruggedized, field-ready tablet computers with screens readable in bright light, the likes of which are not yet being manufactured. DGGS actively monitors technological advances in this area for likely prospects.

In order to facilitate discussion in the geologic community regarding digital field mapping technology, DGGS implemented a three-prong plan. In 2009, DGGS created a digital geologic mapping Wikipedia page (http://en.wikipedia.org/wiki/Digital_geologic_mapping). The web page was accepted into WikiProject Geology, which is an attempt to create a standardized, informative, comprehensive and easy-to-use geology resource. In 2010, DGGS created a mailing list (http://list.state.ak.us/soalists/geomapping_technology/jl.htm) that currently has 59 members in the U.S. and abroad. DGGS also surveyed the geologic community regarding their interest in digital geologic mapping and the current technology being used. With the help of the American Geological Institute, the e-mail survey went out to over 1,250 organizations (university geology departments, state and national geological surveys, and the private sector) with a ~13% response rate. Preliminary results of the survey are posted at (http://ngmdb.usgs.gov/Info/dmt/docs/DMT10_Athey.pdf). DGGS is currently compiling the final survey results for release in a U.S. Geological Survey publication.

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

FY11 Project Description

WEBSITE DEVELOPMENT/ONLINE DIGITAL DATA DISTRIBUTION

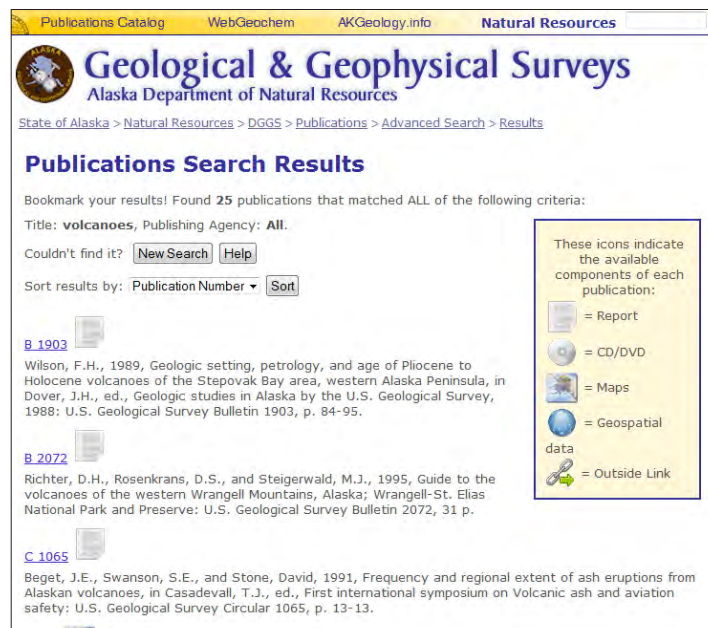
Since its creation in the late 1990s the DGGS website (www.dggs.alaska.gov) has grown from a few static HTML pages to the division's primary mechanism for distribution of geologic publications and information. As the cumulative result of a series of multi-year projects, our current website allows our online customers to search our publications catalog, download DGGS and USGS publications, view and download DGGS geochemical data, and find current information about various geologic projects and topics of interest. Users can currently select and download (at no charge) more than 7,000 text reports, 9,000 oversize sheets and more than 100 digital geospatial datasets.

The DGGS digital geospatial datasets are among the most popular items on the DGGS website. These datasets provide internal and external users with geospatial data that are organized and distributed in formats that can be readily utilized in spreadsheet programs as well as GIS and database applications. Currently, nearly all of our map and analytical publication releases are accompanied by a downloadable digital data package. Each data distribution package includes geospatial data in either CSV (comma-separated values) or ESRI shapefile format as well as an accompanying FGDC metadata file.

Developing an expedient process for generating organized and accurate metadata for digital data has required dedicated effort. One of the most significant challenges to geospatial data distribution is providing users with consistent and meaningful documentation of each dataset's entity-attribute values and relevant data-quality information. DGGS provides this documentation in the form of FGDC (Federal Geographic Data Committee) compliant metadata files. While providing FGDC metadata is an essential step in making our digital data meaningful and available to the public, DGGS scientists and publications staff have found that efficient implementation requires ongoing investment into developing GUI based data entry tools, internal standards for digital data organization, and specific staff training in how to apply the FGDC metadata standard to geologic data.

In previous years DGGS Geologic Communications staff provided authors with customized metadata editing software to facilitate data entry. During FY09 and FY10, we have continued work to facilitate data documentation by developing an in-house training program for publication authors. The training module teaches DGGS authors how to: navigate existing metadata files to find pertinent information, populate metadata fields, and use in-house tools and standards. It expedites the DGGS publication process and provides a higher quality digital data distribution product by helping authors identify and utilize relevant preexisting data, reducing metadata compilation and editing time, and providing subsequent users with high quality data documentation.

In addition to ongoing work in expanding our selection of digital data files, DGGS has also completed an update of our online *Guide to Geologic Hazards in Alaska*. This guide provides general information about geologic hazards in Alaska, links to timely geohazard advisory information, links to pertinent DGGS and USGS publications, and geohazard publication listings grouped by Alaska Coastal Management Program (ACMP) coastal district. Work for this project is funded by the ACMP Enhancement Grants Program. Project objectives were to (1) update the information included in the online Guide to Geologic Hazards in Alaska (maps, reports, and website resources), (2) improve hazards map search capabilities by incorporating a map-based interface to allow users to graphically select specific geographic areas about which they need geologic-hazards information, and (3) maintain the currency of the delivered data.



Contact: Simone Montayne, 907-451-5036, simone.montayne@alaska.gov

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

FY11 Project Description

PUBLICATIONS AND OUTREACH PROJECT

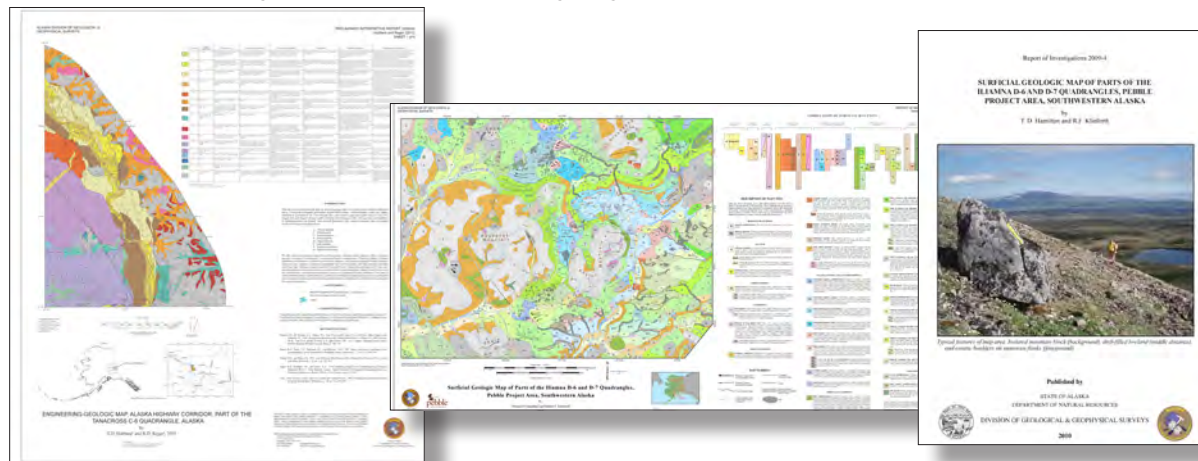
The Publications and Outreach Project publishes and distributes geologic data that has been collected, analyzed, and assembled by geologists in the Minerals, Energy, Engineering Geology, and Volcanology sections of DGGS. Some of the functions carried out under this project are:

- 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, written by division staff and required by statute, recounting DGGS activities, announcing products, and describing plans for future projects.
- Publish newsletters that summarize DGGS's progress and report new publications.
- Prepare displays and represent the division at geologic conferences and meetings by providing staff and assembling and transporting the display booth (seen at right).
- Staff geologic information center in Fairbanks, providing information about Alaska's geologic resources and hazards through DGGS's publications and other resources. Sell and distribute printed and online geologic reports, maps, and digital data.
- Review and complete metadata for each digital project and file it in its appropriate online repository. Assist DGGS staff as they prepare metadata for digital spatial data.
- Manage DGGS'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 publications produced by the U.S. Geological Survey, the former U.S. Bureau of Mines, and the U.S. Bureau of Land Management; 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) 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 and pamphlets explaining Alaska's geology or natural-science features. Some of the most recent DGGS publications include: Historically Active Volcanoes of Alaska playing cards; Tsunami-inundation Maps for Seward and northern Resurrection Bay; a Surficial Geologic map of the Pebble project area in southwestern Alaska; four technical reports on faults, floods, permafrost, and engineering-geologic information on the Alaska Highway Corridor; two geochemical reports; and 14 reports describing analyses of materials housed at the Geologic Materials Center.

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 DGGS web page (available for download at no charge). An increasing number of digital datasets are available on the publications pages as additional products are completed. Work continues in FY2011 to increase the availability of digital datasets from which GIS maps are produced, so that customers can manipulate data as they choose; and publishing documents in digital format first, then using the digital publication to produce a paper copy when necessary. The geological and geophysical data and reports published by DGGS encourage wise management and exploration of Alaska's natural resources and mitigation of risks from the state's geologic hazards.



Contact: Paula Davis, 907-451-5053, paula.davis@alaska.gov

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

FY11 Project Description

NATIONAL GEOLOGICAL & GEOPHYSICAL DATA PRESERVATION PROGRAM

The Alaska Division of Geological & Geophysical Surveys (DGGs) is statutorily charged with the responsibility for collecting, archiving, managing, and disseminating geological and geophysical data describing and inventorying the subsurface energy resources, mineral resources, and geologic hazards of the state. During the past 10 years, through the federally funded former Minerals Data and Information Rescue in Alaska (MDIRA) program, DGGs cataloged and greatly improved the condition of its geological and geophysical data archive, upgraded its data management system, and began disseminating this data through the internet.

DGGs is advancing its data preservation goals by participating in the federally funded National Geological & Geophysical Data Preservation Program (NGGDPP). This program is committed to assisting state geological surveys with four data preservation priorities: (1) inventory geological and geophysical data collections to assess their data preservation needs, (2) create site-specific metadata for individual items in those data collections,



(3) create new digital infrastructure or improve the state's existing digital infrastructure for archiving and preserving these data, and (4) rescue geologic data at risk of loss through "special needs" awards. DGGs received funding for the FY2010 phase of NGGDPP to directly address the site-specific metadata priority and the "special needs" data preservation priority.

First, site-specific catalog metadata will be prepared and submitted for published data from the inventoried energy-related collection of organic geochemistry analyses of samples collected during projects involving DGGs geologists. Project team members are currently completing a collection inventory on this dataset, extracting the proper metadata profile elements and analysis data values to be

loaded into DGGs's central database. The division has 30–40 publications to review as sources of published energy-related data, and approximately 20 of the publications contain organic geochemistry data.

Second, DGGs is rescuing the valuable Amchitka hard-rock mineral core and coalbed methane core samples stored in deteriorating boxes in unheated Connex containers at the Alaska Geologic Material Center (GMC) in Eagle River. NGGDPP support will prevent the loss of up to 1,600 boxes of rock material, representing approximately 10,300 feet of core. The samples are in jeopardy, as sample information recorded on severely damaged boxes is deteriorating, and samples are being further damaged from multiple freeze–thaw cycles and moisture. Project team members are currently inventorying and re-boxing these valuable samples. The updated inventory will subsequently be loaded into the DGGs central database.

The metadata records of these collections will be served out to the National Digital Catalog through DGGs's Web Feature Service (WFS) interface. The DGGs WFS is currently a beta version for internal staff to import data into Geographic Information Systems (GIS) software. However, the WFS allows the site-specific metadata records to be harvested and synchronized automatically by the National Catalog system, thus freeing DGGs staff members of the manual task of uploading data to an additional database on a regular basis. These relevant energy-related datasets will be available for harvest by National Digital Catalog by the end of FY2011. Access to these collections through the National Digital Catalog will improve their accessibility to both in-state and national users.

This project is funded by the U.S. Geological Survey as part of the National Geological & Geophysical Data Preservation Program, authorized by the National Energy Policy Act of 2005. For more information on this program, please refer to the web page: <http://datapreservation.usgs.gov/>.

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

FY11 Project Description

INFORMATION TECHNOLOGY (IT) INFRASTRUCTURE PROJECT

The major accomplishment of the Division of Geological & Geophysical Surveys' (DGGS) Information Technology group during the last year was virtually to eliminate the incidence of server downtime. Our disk-based backup system for both desktop machines and servers has performed flawlessly. While this year did not see many large upgrades to server architecture, the IT staff has still been busy. We have integrated our remote access and inventory software, LANDesk, to act as the primary tool to track DGGS's current hardware and software inventory, not only for the backup server and the Microsoft Update procedure, but also for the anti-virus server. This change ensures that no computer hardware in the division is overlooked for backups or updates. It also allows for more accurate inventory control and tracking, as well as development of life-cycle-based plans for hardware upgrades and replacements.

With the help of its IT staff, the division acquired and configured the domain name dggs.alaska.gov. We experienced a seamless transition to the new domain name, while concurrently keeping the older www.dggs.state.ak.us name active for all existing links. This will eliminate "web rot," a situation when a bookmarked link becomes non-functional and the server responds with "file not found" messages.

The IT group also set up a separate domain name and website for the Alaska Seismic Hazards Safety Commission (<http://seismic.alaska.gov/>). The commission now has their own web presence separate from DNR and DGGS, which will provide simpler website access, and allow them to continue their mission to reduce the state's vulnerability to earthquakes.

The Information Technology group marched ahead in efforts to find innovative ways to distribute geologic information online to the public. In addition to its website presence (with 111,765,249 views on the main DGGS and Alaska Volcano Observatory [AVO] websites in FY 2010), DGGS now hosts a Facebook "fan" page (www.facebook.com/akdggs) where users can read notifications of the most recent publications or just a random interesting geologic fact. DGGS has also added a Twitter page (www.twitter.com/akdggs). Twitter is a social networking and microblogging service that enables its users to send and read user messages. At last count, more than 300 people had signed up to read our Twitter postings. By choosing to use Facebook and Twitter as communication tools, we have another information distribution channel to interested members of the public.

This year, DGGS established a cooperative agreement with the University of Alaska Fairbanks (UAF) wherein we physically host an AVO webserver in our server room, but its Internet connectivity remains through UAF. This allows us to have 24-7 physical contact with the AVO webserver, in the unlikely event that the server needs hands-on attention. Three new AVO servers were added to the State of Alaska network in April to facilitate bandwidth conservation, GIS mapping tools, and database synchronization. As AVO is a high-traffic site that responds to hundreds of millions of data requests per year, multiple levels of built-in redundancy are required to eliminate the chance that the website will not answer.

The Geologic Materials Center (GMC) in Eagle River was finally able to join the State of Alaska network this year. This change allows staff at the GMC to not only access the main fileserver in Fairbanks, but they can now drag and drop files to the server just as if they were in the Fairbanks office, eliminating the tedious process of transferring files via e-mail or an FTP site. Also through this connection, GMC staff has access to the ArcGIS licenses in Fairbanks. In adding the GMC to the state network, we were also able to bring a strong motion instrument online for the Alaska Earthquake Information Center (AEIC), passing live earthquake data as needed back to the AEIC.

Plans in the immediate future include relocating a backup server to another DNR facility in Fairbanks, upgrading our Oracle database to the most current release, and surplusizing our last Sun-based server.



ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

FY11 Project Description

ALASKA MINERAL INDUSTRY DATA INDEX (AKMIDI)

The Alaska Mineral Industry Data Index (AKMIDI) is a database of nearly 16,000 records of mineral information owned by 18 different groups around the state, including Native corporations, private companies, state libraries, and land managers. This index includes industry reports and maps, field notes, drill logs, and other archived data from the private sector. Much of the actual data may still be held and controlled by the 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). The AKMIDI web search engine was de-supported in 2009 and is currently off-line. In the interim, the original Microsoft Access database is available for download at (<http://www.dggs.alaska.gov/pubs/akmidi.jsp>).



This project will integrate the existing AKMIDI database into DGGS's enterprise Oracle database and convert the search- and data-management tools into Java server pages (JSP). DGGS will create an organized index of its archived project file materials, allowing for web-based public queries of the data, as well as routine, secure data maintenance. The search pages will be enhanced with a map-based search tool, and digital images, including those of the Anaconda Collection maps, will be made available for viewing online. The index will be available on DGGS's website and through a link on the website (<http://akgeology.info/>).

DGGS will also create a data-entry interface so the AKMIDI database holdings can be expanded in the future. As in the past, new data will be added to the database through a process of sorting, bar coding, and indexing. Digital images of maps, reports, and other data will be collected and linked to or stored in 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.

This project is funded through the federal Minerals Data and Information Rescue in Alaska (MDIRA) program. The primary objective of the MDIRA program is to ensure that all available Alaska minerals data are securely archived in perpetuity and in a format readily accessible by all potential users. Information on mineral resources is important for management policy decisions in both the public and private sectors. Increased use of high-quality data should lead to better economic, legislative, and environmental decisions.

Contacts: Jennifer Athey, 907-451-5028, jennifer.athey@alaska.gov
Simone Montayne, 907-451-5036, simone.montayne@alaska.gov

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

FY11 Project Description

ALASKA PALEONTOLOGICAL DATABASE MIGRATION

The Alaska Paleontological Database contains detailed information on fossils and fossil localities in Alaska. The database was created by Alaska paleontologist Robert Blodgett and computer paleontologist/programmer Ning Zhang with funding from the federal Minerals Data and Information Rescue in Alaska (MDIRA) program. The primary objective of the MDIRA program is to ensure that all available Alaska minerals data are securely archived in perpetuity and in a format readily accessible by all potential users. Information on mineral resources is important for management policy decisions in both the public and private sectors. Increased use of high-quality data should lead to better economic, legislative, and environmental decisions.

Information contained in the fossil database is sourced from informal, unpublished USGS "Examine and Report" (E&R) fossil reports (fig. 1) and published literature (fig. 2), as well as released industry data. Data entry for this project is about 60 percent complete. The database's website (<http://alaskafossil.org/>) receives daily traffic, primarily from Alaskans, including those from bush communities, and from worldwide locations. The database most specifically benefits the minerals community in areas with sedimentary -rock-hosted stratiform or stratabound mineral occurrences. Currently the database is hosted on a privately owned server, which is occasionally (and currently) off line.

The purpose of this MDIRA-funded project is to migrate the fossil database to DGGS's Digital Geologic Database so the database is assured ofensured regular maintenance, back-up, continued data expansion, and consistent public internet access. The existing database system and user interface are incompatible with DGGS's database and web environment. The current SQL database will be transferred to DGGS's existing enterprise Oracle database. Current ASP-based user interfaces (a data-entry form and a public-access, text-based search application) will be rebuilt into JSP-based web pages. The paleontological database will be available on DGGS's website and through a link on the MDIRA website (<http://akgeology.info/>).

Figure 1. Example E&R report.

REPORT ON REFERRED FOSSILS

P & S Branch, U. S. Geological Survey
345 Middlefield Road, Menlo Park, California

Stratigraphic range: Upper Triassic	Kinds of fossils: Marine invertebrates
General locality: Alaska	Quadrangle or area: Charley River
Referred by: Earl E. Brabb, Alaskan Geology Branch, 10/16/61	Shipment No: A-61-27M
Report prepared by: N. J. Silberling, 11/17/61	Date material received: 10/61
Status of work: Complete	

Report not to be quoted or paraphrased in publication without a final recheck by the Paleontology and Stratigraphy Branch.

61ABa 1732. (USGS Mes. loc. M1266). Charley River B-5 quad; NW¹ sec. 21, T. 6 N., R. 22 E.; lat 65°20'N., long 143°13.1'W.; coords (8.2, 5.7).

Pelecypod:
Monotis sp. indet.

Hydrozoan coelenterate:
Heterastridium sp.

Age: Middle or late Norian (late Late Triassic). Heterastridium, the oblate spherical objects referred to as "echinoids?" on the field label, is a common associate of Monotis in Norian deposits throughout the world. These specimens are probably secondarily flattened.

61ABa 1824. (USGS Mes. loc. M1267). Charley River A-2 quad.; NW¹ sec. 29, T. 4 N., R. 29 E., lat 65°09'N., long 141°53.1'W.; coords (3.4, 10.3).

Pelecypods:
Monotis sp. indet.
Halobia aff. H. distincta Mojsisovics

Age: middle or late Norian (late Late Triassic).

N. J. Silberling
N. J. Silberling

Figure 2. Photographs of fossils described in the database.

