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Abstract

During the FY 2014 cycle of the National Geological and Geophysical Data Preservation Program, the Alaska Division of Geological & Geophysical Surveys (DGGS) received funds to conduct a collection-level inventory of the vast number of legacy field photographs taken by current and former DGGS geologists, and to create metadata for a scientifically valuable collection of digitized legacy field photos taken by deceased DGGS geologist Rocky Reifenstuhl. As a result of this project, 2,231 metadata records for individual Reifenstuhl photographs were submitted to the National Digital Catalog and three collections of an estimated total of 220,038 photographs were identified and inventoried through interviews of present and former DGGS geologists. DGGS created a tool that programmatically associates and archives photos with locations and other pertinent data to facilitate the creation of metadata for field photographs for this project, documentation of photographs collected during future field seasons, and preservation of this valuable resource for the future. The tool is available for additional development via a public source code repository.

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Introduction

The Alaska Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGS) has as its statutory mission the responsibility for collecting, archiving, managing, and disseminating geological and geophysical data on the subsurface energy resources, mineral resources, and geologic hazards of the state. DGGS maintains its own statewide databases of this information on servers at its office in Fairbanks, and manages a collection of rock samples and archive materials at the Alaska Geologic Materials Center (GMC) in Anchorage representing more than 12 million linear feet of exploration and production drilling. DGGS networks with private industry and other agencies that use these data to accept donations, archive, and provide public access to samples, metadata, and analyses. Samples from these collections are examined frequently by private exploration companies, universities, and state agencies as a critical step in resource development and management. DGGS may be engaged in multiple archiving projects at any given time; this technical report describes the *Alaska Inventory and Metadata for Geologic Field Photo Collections* project funded by the National Geological and Geophysical Data Preservation Program in FY2014, award number G14AP00164.

FY 2014 Inventory—Geologic Field Photo Collections

Goal

DGGS identified, prioritized, and completed collection inventories of our current and former staff's legacy geologic field photos that include digital, print, and 35 mm slide format. We also identified photo collections from former, retired, and deceased DGGS geologists as candidates for future digital conversion and metadata record generation.

Methodology

DGGS interviewed current and former staff regarding their digital, print, and 35 mm slide photo collections. Collection information was compiled and aggregated for submission into the National Digital Catalog:

1. Collection of Energy Resources Field Photographs from AK, Item 55ce5b1ee4b01487cbfc7104,
2. Collection of Engineering Geology Field Photographs from AK, Item 55ddf268e4b0518e354dfcad, and
3. Collection of Mineral Resources Field Photographs from AK, Item 55d7b885e4b0518e3546dbf3.

- *Data collection.* Photo inventory collection information was harvested primarily through interviews. DGGS created an inventory form and interview questions to collect photo information to help the Division locate legacy photos and determine their archiving priority. Required information included geographic area, project, photographer, year, photo format, number of photos, condition, availability of supporting information, and archiving status and priority. Appendix A is the compiled version of the form. Additional information collected through the interview process but not shown in Appendix A includes network paths to locations of digital files, hardware locations of digital files not saved on the network, storage locations of physical photos, and additional comments. Current employees/interns and past employees/interns with valid

contact information were solicited in person, by phone, or by email to ask about field photos they have in their possession (table 1). Most initial email contacts were followed by phone calls.

Table 1. Project staff attempted to contact and gather information from former and current DGGS employees and interns who worked in the field and took photos. Prior to 2003, employees used slide film in cameras.

Years Employed at DGGS	Estimated Number of Employees	Number of Employees Contacted	Number of Employees Responded	Number of Employees with Images on DGGS Network	Employees' Inventories Captured
2015 (current)	29	29	29	29	100%
2003–2014	21	17	4	10	67%
1970–2003	18	11	5	—	28%

A comprehensive list of digital image file paths and file owners was generated from DGGS's server network to help current employees determine the locations and number of files in their collections. This list was also used to find images photographed or scanned by past employees. Staff spent additional time reviewing their digital files and past projects to create the metadata requested in the inventory form.

- *Inventory submittal*. Inventory data were compiled into three collections of photos corresponding to the three main categories of fieldwork at DGGS—energy resources, engineering geology, and minerals resources. The three inventory collections were created in DGGS's main folder in the ScienceBase catalog:

  (https://www.sciencebase.gov/catalog/item/4f4e4762e4b07f02db47e002)

Results

The inventory of DGGS's legacy photos was successful and fairly comprehensive. An estimated total of 220,038 photos were identified, located, and ranked in priority for archiving (table 2). It should be noted that within each collection there are many photos that do not need archiving, such as duplicates, poor quality images, and non-field photos.

Table 2. Results for the three photo collections submitted to the National Digital Catalog.

Collection	Estimated number of items
Collection of Energy Resources Field Photographs from AK	51,167
Collection of Engineering Geology Field Photographs from AK	133,000
Collection of Mineral Resources Field Photographs from AK	35,871

The number of items identified in each collection, as sorted by media type, was significantly lower than estimated in the proposal (table 3). Very few print or negative collections were identified. In the era before digital cameras, geologists preferentially used slide film; however, the estimated number of slides proved to be too high as well.

Table 3. Estimated and actual size of collections by media type.

Media Type	Estimated Collection	Actual Collection
Prints/negatives	5,000	1,234
Slides	50,000	11,242
Digital (and some video stills)	400,000	191,026
Video and stills	—	22,202+

There are additional slide collections belonging to past employees that have not been inventoried yet, and DGGS hopes to be able to find out more about those collections as time and staffing allow. Additional collections that we know exist, but for which we do not have estimated numbers of photos, include a collection to be donated to the Geologic Materials Center by the family of John Dillon, a deceased DGGS geologist. The Dillon family is making arrangements to have the slides scanned. Slides belonging to Gil Mull, an 80-year-old retired DGGS energy-resources geologist residing in New Mexico, likely number in the thousands. DGGS staff visited Mull in May 2015 to find out more about his photo collection and plan for its archiving. Mull's collection is considered a high priority for archiving.

According to former employees, DGGS geologists who took slide photographs prior to the 1990s(?) were expected to use their personal cameras and pay for the development of their film themselves. Consequently, these geologists do not consider their project slides to be DGGS property. Most past employees were willing to have their slides scanned by DGGS but did not want to donate their physical collections for archiving. Many of the slide collections reside in closets, sheds, and garages and are not well protected.

The estimate of the quantity of digital photos was based on the number of image files on the server. The actual collection, which is considerably smaller, was carefully winnowed through the removal of duplicate files (based on file name, size, date, and time) and differentiation of field photos versus other images such as presentations and converted PDFs. Digital photos from non-DGGS authors were also cataloged, and an additional category of video and video stills was added.

FY 2014 Metadata Creation—Reifenstuhl Photo Collection

Goal

DGGS created metadata records for the northern Alaska portion of the scanned field photo collection of deceased DGGS geologist Rocky Reifenstuhl for inclusion in the National Digital Catalog.

Methodology

DGGS geologist Trystan Herriott reviewed and captured metadata for the Energy-project related photos from the Reifenstuhl collection. He collected year, geologist's name, project name, location, and subject metadata where possible. To assist in the creation of metadata records for these field photos, DGGS developed an open-source data entry web application so that the Reifenstuhl collection could be easily uploaded and essential information, including locations and descriptions, captured. These irreplaceable photos were archived in the Division's database and will eventually be accessible online through DGGS's website. The 2,231 site-specific metadata records were submitted to the National Digital Catalog (NDC) as part of the Collection of Energy Resources Field Photographs from AK, item 55ce5b1ee4b01487cbfc7104.

- *Web application*. A Java-based application was created to display pictures, collect metadata, attach the metadata to the images, and store both in a PostgreSQL database. The application contains image search functionality and the ability to upload new images for archiving (photo 1). The application retrieves EXIF meta information from incoming images and automatically populates the latitude, longitude, and date fields. Information can also be keyed in or edited manually, and the same information can be attached to multiple images (photo 2). Locations for images without embedded location information can be captured through the selection of a point on the interactive map. The application is in early alpha development, and is available at https://binarythought.com/fossils/photodb/home.

Photo 1. Web application search and upload page.

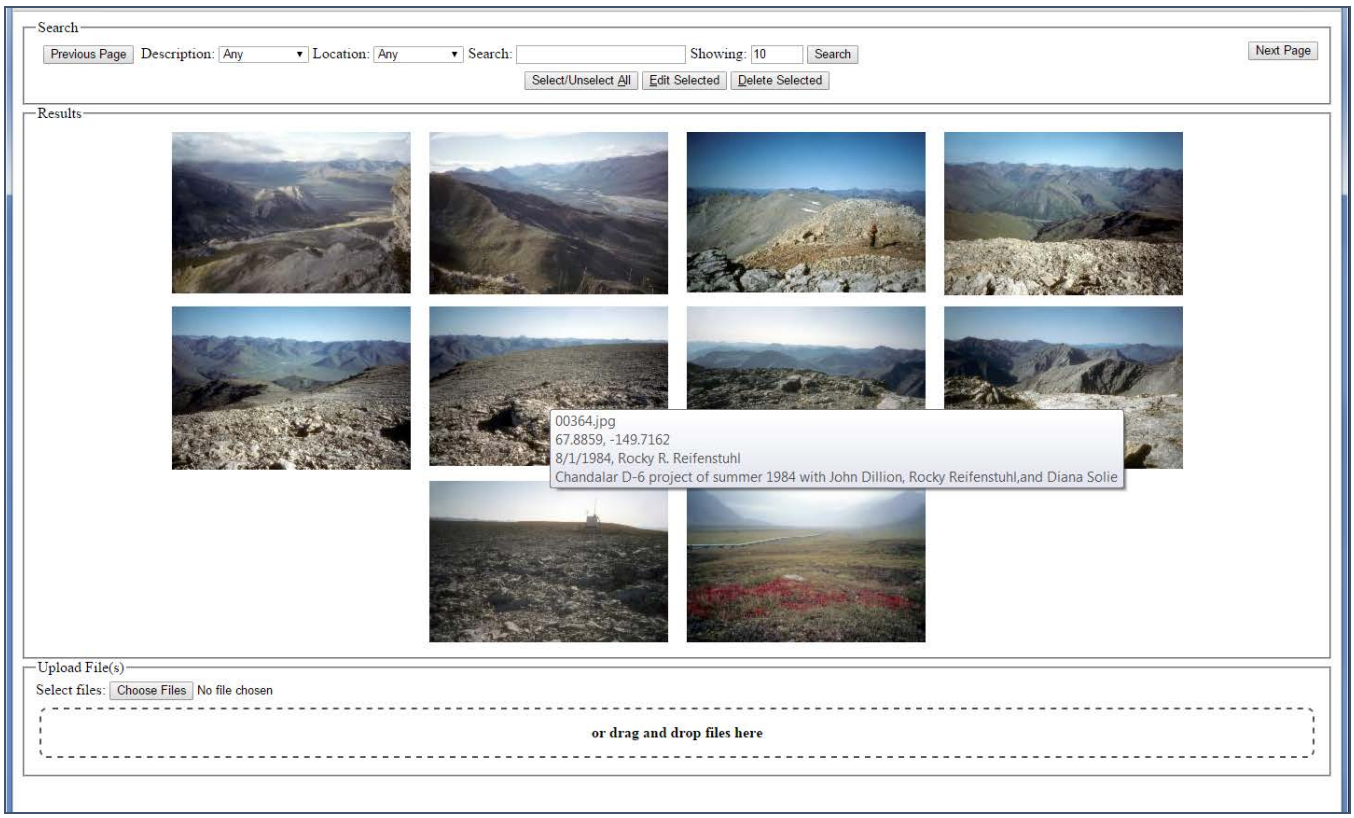
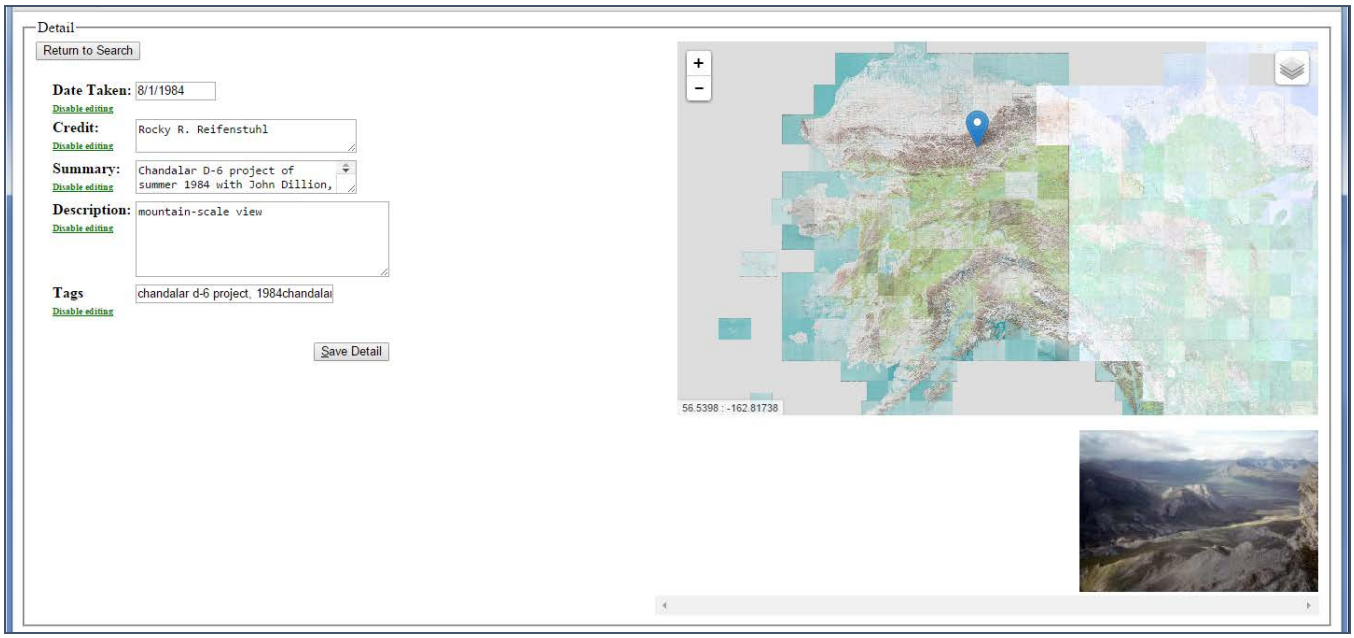


Photo 2. Web application detailed metadata page.



- *Metadata creation*. The Reifenstuhl collection images were pre-staged on DGGS's file server and selected for archiving in batches. Batches were determined by the need to attach the same metadata to multiple images. The name of the folder in which the image resided was preserved in the "Tags" field, because the folder name often contained the project, area, or subject name of the series of photos. Related field photos were then queried on the original folder name. DGGS geologist Trystan Herriott used Reifenstuhl's field notes and his own knowledge of the project areas to locate and annotate the images.

  The following fields and information were collected to populate the metadata:

  - Date: Date taken; harvested from EXIF data when possible or field notes (good accuracy). Noted as the first day of the month, if the day is unknown (fair accuracy); noted as January 1, if the month and day are unknown (poor accuracy). Date accuracy (poor/fair/good) recorded in the Tags field.
  - Credit: Photographer's first and last name. Field may be auto-populated on import.
  - Summary: Title, which included project and summary of photo subject.
  - Description: Longer description and "scale" of the photo (mountain-scale view, outcrop-scale view, campsite, etc.).
  - Tags: Project name, original folder name, general location or 1:250,000-scale quadrangle, locational accuracy (poor/fair/good), date accuracy (poor/fair/good)
  - Latitude and longitude (WGS84): Locations were collected hierarchically, depending on available information. (1) Locations were harvested from EXIF data. (2) Locations were based on field notes, and entered by selecting a point on a map. (3) Locations were estimated by Mr. Herriott to the outcrop, identifiable feature, or quadrangle centroid, and entered by selecting a point on a map.

Good accuracy is defined as known outcrop location or constrained to within several kilometers. Fair accuracy is defined as location known at 1:63,360 scale or larger, and commonly selected as the centroid of a 1:63,360-scale quadrangle map (±10 km). Poor accuracy is defined as location known at smaller than 1:63,360 scale, and commonly selected as the centroid of a 1:250,000-scale quadrangle map (±60 km). Locational accuracy (poor/fair/good) was recorded in the Tags field.

  - Archival date: Auto-populated date and time stamp when the photo is archived

- *XML generation and National Digital Catalog (NDC).* Due to the changing needs of the program, DGGS provided metadata records to the NDC in XML format. A Java-based script dynamically queries the PostgreSQL field photo database for any new or existing records to create an XML document according to the NGGDPP metadata requirements. The following NGGDPP metadata fields are translated from PostgreSQL fields:
  - title = Summary
  - datasetReferenceDate = Archival date
  - abstract = Description + Credit
  - supplementalInformation = Boilerplate text on use constraints of the photo and how to contact DGGS
  - alternateGeometry = Datum of the latitude/longitude data (WGS84)
  - dates = Date
  - datatype = "Photograph"
  - coordinates = Latitude and longitude
  - onlineResource = Two URLs, one to the image and one to the thumbnail

Results

Of the originally estimated 3,500 metadata records to be submitted from the Reifenstuhl collection, 2,231 site-specific metadata records were submitted to the NDC. DGGS geologist Trystan Herriott reviewed all of the Energy-project photos in the collection and archived most of those for which he was able to identify at least a general location. Photos that were not archived include duplicates, poor quality images, images unrelated to field work or geology, and photos with no documentation.

DGGS was delighted to have feedback on the content of our provided metadata records from the NGGDPP program and adjusted them according to the program's suggestions to make the information as human readable as possible. This existing infrastructure will serve new field photo metadata records and upload the generated XML file to the NDC catalog via Data Provider Dashboard for the near future. The timing of the updates to the NDC catalog will be based on the entry of new field photos into the application at the end of the geologists' field season or as legacy photo archive initiatives are completed.

Conclusion

As DGGS builds the premier disciplinary repository focused on Alaska Geology, we are concentrating on the three essential functions of a repository: data archiving, ensuring data integrity, and providing public access. The NGGDPP program is an important funding vehicle for data preservation projects. DGGS has many datasets that need physical or digital preservation, and we continue to make inroads and expand our repository as time, staffing, and funding allow. Information about DGGS archiving efforts is available in Appendix B.

The FY14 NGGDPP photo archiving project is viewed as a springboard toward image management at DGGS for legacy collections as well as incoming photos from future field projects. The new photo archiving application will facilitate the data entry, organization, and security of new photos. DGGS will create new business processes to encourage geologists to use the application, and modify the application as necessary to accommodate archiving needs. The 2016 field season will be the first test of the system. Several years will likely be needed before all images are routinely managed through the application, given the variety of technology involved in image capture and different field methodologies employed by geologists. DGGS plans to use documented images to automatically update the Division's website and possibly to create a publicly accessible database of Alaska photos geared toward non-scientists.

As this program continues to evolve, DGGS would be interested in exploring other options for the Data Preservation program to harvest the metadata details of the field photos, in addition to any other applicable metadata records in the DGGS division-wide database. DGGS programming and IT staff have experience with a variety of OGC-compliant data formats and data-serving methodologies, which enables us to be flexible when planning future tools to serve DGGS data.

Appendix A. Detailed photo collection inventory information from interviews and research.

Section	Area	Project or Area	Photographer(s)	Date taken	Photo format	Format comments	Collection size	Condition	Supporting information	Archive status	Archive priority	Priority comments
Volcanology	general Alaska	various Alaska Volcano Observatory (AVO)	K.F. Bull	2005-2012	digital		3,000	good	Field notes are available. Most of the photos are available in AVO's photo database. They do not plan to index any more of these photos and have indexed the important ones already. DGGS will not upload these photos into the application.	not planned	low	
Energy	Alaska Peninsula	Bristol Bay	R.J. Gillis, R.R. Reifenstuhl	2006-2007	digital		200	good	Field notes are available but not keyed to photos. Photos need to be correlated by date and memory.	unknown	low	
Energy	Alaska Peninsula	Bristol Bay	R.J. Gillis, R.R. Reifenstuhl	2006-2007	print		100	good	Field notes are available but not keyed to photos. Photos need to be correlated by date and memory.	unknown	low	
Energy	Brooks Range Foothills	Brooks Range Foothills and North Slope	M.A. Wartes, P.L. Decker	2004-2014	digital		8,100	good	Field notes are available. Pictures would need to be keyed to the notes from memory.	unknown	medium	Photos from 2004-2005 would be high priority, as they depict important geology from federal lands that are difficult to visit. Those photos would be hard to replicate. Most photos are low priority. Gas seeps would be medium priority.
Energy	North Slope	Brooks Range Foothills and North Slope	R.F. Swenson	2004	digital		150	good	Field notes are available.	unknown	low	
Energy	North Slope	Brooks Range Foothills and North Slope	R.A. Kirkham	1998-2001	slide		300	good	unknown	potential plans	low	
Energy	general Alaska	Coalbed methane	T.E. Smith	1996	slide		80	fair	In the binder with the slides are some loose photocopied sheets with notes.	unknown	low	
Energy	Cook Inlet	Cook Inlet	K.F. Bull	2013-2014	digital		1,100	good	Supporting information is available in field notes and published materials. Pictures would need to be keyed to field notes to obtain locations.	unknown	medium	
Energy	Cook Inlet	Cook Inlet	R.J. Gillis	2006-2015	digital		2,000	good	Field notes are available but not keyed to photos. Photos need to be correlated by date and memory.	unknown	low	
Energy	Cook Inlet	Cook Inlet	D.P. Shellenbaum, Rick Stanley, D.L. LePain	2002-2014	digital		7,200	good	Information for about 70% of the photos are in notebooks. Some other information is available from memory.	planned	high	
Energy	Cook Inlet	Cook Inlet geology and hydrocarbon potential	M.A. Wartes	2006-2015	digital		9,800	good	Field notes are available. Pictures would need to be keyed to the notes from memory.	unknown	low	Overall low to medium priority. Includes photos from 2012-2013 of new oil-stained outcrops. It would be good to be able to get people back to the exact same rocks.
Energy	Copper River	Copper River coalbed methane	J.T. Roe(?)	1993, 2000	digital		256	good	There may be DGGS publications associated with the images. Images are scanned from slides.	unknown	low	
Energy	Copper River	Copper River coalbed methane	J.G. Clough	2000	slide		100	fair	It is unknown if notes are available. There may be associated DGGS publications.	unknown	low	
Energy	Brooks Range Foothills	Galbraith Lake	D.S.P. Stevens	2001	slide		80	good	Field notes are available and would need to be keyed to the photos.	unknown	low	
Energy	Cook Inlet	Iniskin	P.M. Betka	2014	digital		1,289	good	Field notes are available and would need to be keyed to the photos.	unknown	medium	
Energy	Interior Alaska	Interior basins (Nenana, Holitna, etc.), coal	various	1973, 1985, 1986, other(?)	slide		360	fair	Some of the slides have notes written on them.	unknown	low	
Energy	Interior Alaska	Nenana and Tanana basin natural gas potential	M.A. Wartes	2012	digital		58	good	Field notes are available. Pictures would need to be keyed to the notes from memory.	unknown	low	Collection includes some important and difficult-to-acquire photos from Wood River area, which was very brushy and hard to get to.

Section	Area	Project or Area	Photographer(s)	Date taken	Photo format	Format comments	Collection size	Condition	Supporting information	Archive status	Archive priority	Priority comments
Energy	Interior Alaska	Nenana-Tanana basin natural gas potential	R.J. Gillis	2012	digital		400	good	Field notes are available but not keyed to photos. Photos need to be correlated by date and memory.	unknown	low	
Energy	North Slope	North Slope	K.H. Clautice	2000s(?)	digital(?)		100	fair	It is unknown if supporting information is available. Quality of digital images was low.	not planned	medium	
Energy	North Slope	North Slope	R.J. Gillis	2006-2011(?)	digital		1,000	good	Field notes are available but not keyed to photos. Photos need to be correlated by date and memory.	unknown	low	
Energy	North Slope	North Slope	D.L. LePain	2002-2014	digital		600	good	Information for about 70% of the photos are in notebooks. Some other information is available from memory.	planned	medium	
Energy	general Alaska	Northwest Coal Geologic Re-source Evalu-ation (GRE)	Gil Eakins	1982-1983	slide		260	fair	Some of the slides are labeled. They are a mixture of Ektachrome and Kodachrome.	unknown	low	
Energy	Cook Inlet	Red Glacier	N.T. Harun	2015	digital		854	good	Field notes are available and would need to be keyed to the photos.	unknown	medium	
Energy	Sagavanirktok Quadrangle	Sag B-1	D.S.P. Stevens	1999	slide		20	good	Field notes are available and would need to be keyed to the photos.	unknown	low	
Energy	Sagavanirktok A-3, A-4, B-3, and B-4 quad-rangles	Sagavanirktok	D.S.P. Stevens	2002	digital		50	good	Field notes are available and would need to be keyed to the photos.	unknown	low	
Energy	Sagavanirktok A-3, A-4, B-3, and B-4 quad-rangles	Sagavanirktok River	T.D. Hubbard	2008	digital		1,323	good	Some documentation available in GPS-Photo Link. Archiving would take time but might not be too bad.	unknown	low	
Energy	southeast Alaska	southeast Alaska coal	K.H. Clautice	2000s(?)	digital(?)		100	fair	It is unknown if supporting information is available. Quality of digital images was low.	not planned	medium	
Energy	south-central Alaska	Susitna basin natural gas potential	M.A. Wartes	2011	digital		25	good	Field notes are available. Pictures would need to be keyed to the notes from memory.	unknown	low	
Energy	south-central Alaska	Susitna basin natural gas potential	R.J. Gillis	2012, 2014	digital		500	good	Field notes are available but not keyed to photos. Photos need to be correlated by date and memory.	unknown	low	
Energy	south-central Alaska	Susitna basin natural gas potential	D.L. LePain	2002-2014	digital		1,000	good	Information for about 70% of the photos are in notebooks. Some other information is available from memory.	planned	medium	
Energy	south-central Alaska	Susitna basin natural gas potential	N.T. Harun	2014	digital		236	good	Field notes are available and would need to be keyed to the photos.	unknown	medium	
Energy	northwestern Cook Inlet	Tyonek - Capps Glacier	R.D. Koehler	2009	digital		100	good	These are random pictures collected during the project. Locations must be assigned from memory.	unknown	low	
Energy	northwestern Cook Inlet	Tyonek - Capps Glacier	L.K. Freeman	2010	digital		136	good	Field notes are available. Pictures would need to be keyed to notes and the field sheets.	unknown	medium	
Energy	northwestern Cook Inlet	Tyonek - Capps Glacier	Kandace Krejci	2009	digital		65	good	Short descriptions and locations are available via GPS-Photo Link.	unknown	medium	
Energy	northwestern Cook Inlet	Tyonek - Capps Glacier	R.D. Reger	2009	digital		190	good	Short descriptions and locations are available via GPS-Photo Link.	unknown	medium	
Energy	northwestern Cook Inlet	Tyonek - Capps Glacier	D.S.P. Stevens	2009	digital		290	good	Short descriptions and locations are available via GPS-Photo Link.	unknown	medium	
Energy	northwestern Cook Inlet	Tyonek - Capps Glacier	D.J. Mauel	2010	digital		297	good	Field notes are available and would need to be keyed to the photos.	unknown	medium	
Energy	North Slope	Umiat	D.J. Mauel	2010-2011	digital		776	good	Field notes are available and would need to be keyed to the photos.	unknown	medium	
Energy	North Slope	unknown	Tim Ryherd (DOG)	2001	digital		70	good		unknown	medium	
Energy	general Alaska	various (North Slope, Sleet-mute, Holitna)	D.L. LePain	1998-2003	slide		360	good	About 60% of the slides are recorded in the notes; finding informa-tion on the others would take detective work and be from memory. Information also written on slide rolls and frames for some of them.	planned	medium	

Section	Area	Project or Area	Photographer(s)	Date taken	Photo format	Format comments	Collection size	Condition	Supporting information	Archive status	Archive priority	Priority comments
Energy	general Alaska (and others)	various non-DGGS (PhD thesis, field trips, contiguous states, Asia, North Slope with Anadarko, Icy Bay)	M.A. Wartes	2000-2001	slide, digital		1,350	good	Slides need to be located from memory. Some notes might be available.	unknown	low	
Energy	east-central Interior Alaska	Yukon Flats basin	D.L. LePain	2002-2014	digital		200	good	Information for about 70% of the photos are in notebooks. Some other information is available from memory.	planned	medium	
Energy	general Alaska	various (North Slope, Chugach, Kodiak, etc.)	R.R. Reifenstuhl	1982-2004	digital		1,300	good	Information is available in field notes. Photos would have to be keyed to field notes or recognized. These images were scanned from slides.	in progress	high	Reifenstuhl is deceased. His photos are a valuable record of geology across the state. His North Slope photos are being archived.
Energy	general Alaska	various (North Slope, Bristol Bay, Fairbanks, field trips, etc.)	R.R. Reifenstuhl	2002-2008	digital		5,861	good	Information is available in field notes. Photos would have to be keyed to field notes or recognized.	in progress	high	Reifenstuhl is deceased. His photos are a valuable record of geology across the state. His North Slope photos are being archived.
Energy	North Slope and Brooks Range	North Slope	R.R. Reifenstuhl	2001-2009	digital		2,981	good	Information is available in field notes. Photos would have to be keyed to field notes or recognized.	in progress	high	Reifenstuhl is deceased. His photos are a valuable record of geology across the state. His North Slope photos are being archived.
Engineering Geology	Alaska Highway	Alaska Highway Corridor	L.K. Freeman	2007, 2009	digital		400	good	Field notes and Access database of notes are available. The photos need to be matched up with the notes and locations.	unknown	low	
Engineering Geology	Alaska Highway	Alaska Highway Corridor	M.B. Werdon	2006-2008	digital		500	good	Field notes and Access database of notes are available. The photos need to be matched up with the notes and locations.	unknown	low	
Engineering Geology	Alaska Highway	Alaska Highway Corridor	B.A. Elliott, G.A. Griesel, J.E. Andrew	2007-2013	digital		unknown	unknown	Field notes are available.	unknown	low	
Engineering Geology	Alaska Highway	Alaska Highway Corridor	R.D. Reger	2007	digital		310	good	Short descriptions and locations are available via GPS-Photo Link.	unknown	medium	
Engineering Geology	Alaska Highway	Alaska Highway Corridor	D.S.P. Stevens	2007	digital		260	good	Short descriptions and locations are available via GPS-Photo Link.	unknown	medium	
Engineering Geology	Alaska Highway	Alaska Highway Corridor - Northway landslide	D.N. Solie, L.K. Freeman, D.J. Szumigala, R.D. Reger, T.D. Hubbard, L.E. Southerland, G.A. Carver, interns, and others	2006-2012	digital		3,000	good	Some supporting data are available. Various methods were used to collect it, including GPS-Photo Link and some field notes. Methodology varies by year.	unknown	low	
Engineering Geology	Prudhoe to Anchorage	Alaska Stand Alone Pipeline (ASAP) gasline	E.R. Spangler	2014	digital		500	good	Some notes are available, but most locations would be assigned from memory. About 20% of them are locatable.	brief archiving planned	low	Essentially the same photos as taken by Rich Koehler from the helicopter.
Engineering Geology	Prudhoe to Anchorage	Alaska Stand Alone Pipeline (ASAP) gasline	T.D. Hubbard	2011(?)	digital		100	good	Field notes are available.	unknown	low	
Engineering Geology	Prudhoe to Anchorage	Alaska Stand Alone Pipeline (ASAP) gasline	R.D. Koehler	2011-2014	digital		4,000	good	Rich has a published report describing geomorphology along the pipeline route. Notes are in field books.	unknown	high	Photos document proposed infrastructure and preconstruction site conditions; useful for planning purposes.
Engineering Geology	south-central Alaska	Castle Mountain	G.R.C. Graham	1994	print, negative		50	good	Field notes available, but not in a traditional field notebook. They would need to be located. Photos needs to be keyed to field notes.	unknown	low	
Engineering Geology	Haines Highway	Climate & Cryosphere Hazards: Debris flows along Haines Highway	G.J. Wolken, E.N. Whorton, R.P. Daanen	2014	video, digital	311 field photos, 2,385 VIRB stills, 11 VIRB videos: 33.4 Gb, 3,803 stills	6,499	good	Locations are available from field notes and memory.	unknown	medium	VIRB videos and stills are medium priority.

Section	Area	Project or Area	Photographer(s)	Date taken	Photo format	Format comments	Collection size	Condition	Supporting information	Archive status	Archive priority	Priority comments
Engineering Geology	central Alaska Range	Climate & Cryosphere Hazards: Glacier runoff changes	G.J. Wolken, Regine Hock, Anna Liljedahl, E.N. Whorton, A.I. Gould, Joanna Young, Alessio Gusmeroli, Andrew Bliss, Florian Ziemen, Christian Kienholz, Cody Beedlow	2012-2015	digital, video	VIRB: 407 videos, 338.4 Gb and 2 stills	13,996 (as of 7/9/2015)	good	Field notes are available and would need to be keyed to the photos.	unknown	medium	Timelapse and VIRB images are higher priority than personnel pictures.
Engineering Geology	Hubbard Glacier	Climate & Cryosphere Hazards: Hubbard Glacier	G.J. Wolken	2013	digital	178 VIRB stills, 35,806 timelapse stills	35,984	good	Images are from four timelapse cameras. Locations are available from field notes and memory. Some of the images have exif data.	unknown	high	Timelapse camera images are high priority. The timelapse camera images are data. Any personal photos are low priority.
Engineering Geology	Seward	Climate & Cryosphere Hazards: Seward	G.J. Wolken, M.S. Balazs	2011	digital	738 VIRB stills	738	good	Locations are available from field notes and memory. Some of the images have exif data.	unknown	medium	
Engineering Geology	Richardson Highway (milepost 0-67) and Atigun Pass	Climate & Cryosphere Hazards: Snow avalanche hazards	G.J. Wolken, George Gordon Scott, E.N. Whorton	2014-2015	digital	27 VIRB stills	27	good	Locations are available from field notes and memory.	unknown	low	
Engineering Geology	Valdez and Cordova	Climate & Cryosphere Hazards: Valdez Glacier and Scott Glacier	G.J. Wolken, E.N. Whorton, A.I. Gould, City of Valdez, Laura Robertson, Christian Kienholz, Michael Williams	2012-2015	digital, video	VIRB: 14 videos, 21.8 Gb, 46 stills	1,707	good	Locations are available from field notes and memory. Some of the images have exif data.	unknown	medium	Timelapse and VIRB pics are higher priority than personnel pictures. Some higher priority pictures of the ice dammed lake.
Engineering Geology	general Alaska	Coastal Hazards: assorted	R.A. Combellick, R.D. Koehler, Ruth Carter, others	2007(?)-2014(?)	digital		108	good	None	unknown	Low	
Engineering Geology	St. Lawrence Quadrangle	Coastal Hazards: Gambell	N.E.M. Kinsman, J.R. Smith, M.R. DeRaps, Vickie Butherus	2013	digital		8,689	good	Field notes are available.	unknown	Low	
Engineering Geology	Solomon Quadrangle	Coastal Hazards: Golovin	N.E.M. Kinsman, J.R. Smith, M.R. DeRaps, Alex Busk	2012	digital		7,561	good	Field notes are available.	unknown	Low	
Engineering Geology	Solomon Quadrangle	Coastal Hazards: Golovin	J.R. Smith, A.I. Gould	2013	digital		394	good	Field notes are available.	unknown	Low	
Engineering Geology	Hooper Bay Quadrangle	Coastal Hazards: Hooper Bay	N.E.M. Kinsman, A.I. Gould	2013	digital		704	good	Field notes are available.	unknown	Low	
Engineering Geology	Nome Quadrangle	Coastal Hazards: Nome	N.E.M. Kinsman, J.R. Smith, M.R. DeRaps	2012	digital		2,242	good	Field notes are available.	unknown	Low	
Engineering Geology	Chignik Quadrangle	Coastal Hazards: Port Heiden	N.E.M. Kinsman, A.I. Gould, M.R. DeRaps	2013	digital		7,787	good	Field notes are available.	unknown	Low	
Engineering Geology	general Alaska	Coastal Hazards: Sallenger Archive	Asbury H. Sallenger	1975(?)-1996(?)	digital		3,496	good	Same folder	in process	High	
Engineering Geology	St. Lawrence Quadrangle	Coastal Hazards: Savoonga	N.E.M. Kinsman, J.R. Smith, M.R. DeRaps, Vickie Butherus	2013	digital		3,241	good	Field notes are available.	unknown	Low	
Engineering Geology	Norton Bay Quadrangle	Coastal Hazards: Shaktoolik	N.E.M. Kinsman, J.R. Smith, M.R. DeRaps, D.S.P. Stevens, Harvey Smith, Karin Ohman	2011	digital		4,388	good	Field notes are available.	unknown	Low	
Engineering Geology	Shishmaref Quadrangle	Coastal Hazards: Shishmaref	N.E.M. Kinsman, J.R. Smith, M.R. DeRaps	2012	digital		3,113	good	Field notes are available.	unknown	Low	

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Engineering Geology	Unalakleet Quadrangle	Coastal Hazards: Tununak/ Unalakleet	N.E.M. Kinsman, A.I. Gould	2014	digital		476	good	Field notes are available.	unknown	Low	
Engineering Geology	Unalakleet Quadrangle	Coastal Hazards: Unalakleet	N.E.M. Kinsman, J.R. Smith, M.R. DeRaps, D.S.P. Stevens, Harvey Smith, Ruth Carter, Martin Smith, G.J. Wolken	2011	digital		4,430	good	Field notes are available.	unknown	Low	
Engineering Geology	Teller Quadrangle	Coastal Hazards: Wales	N.E.M. Kinsman, J.R. Smith, M.R. DeRaps, Alex Busk	2012	digital		9,543	good	Field notes are available.	unknown	Low	
Engineering Geology	Yakutat Quadrangle	Coastal Hazards: Yakutat	N.E.M. Kinsman, A.I. Gould, L.E. Southerland	2014	digital		1,528	good	Field notes are available.	unknown	Low	
Engineering Geology	Alaska Highway	Friends of the Pleistocene (field trip)	L.E. Southerland	2012	digital		50	good	Photos go with a guidebook	not planned	low	
Engineering Geology	Dalton Highway (southern Brooks Range and Yukon River bridge)	Frozen debris lobe - Yukon River landslide	T.D. Hubbard, L.E. Southerland, E.R. Spangler	2013-2015	digital		2,000	good	In 2015 used Adobe Bridge to manage photos. Field notes files are in project folder and list the pictures. Some pictures have exif data and can be correlated with notes, but this will take time.	unknown	medium	Because the topics are geologic hazards still occurring, there is a higher chance these photos might be reused.
Engineering Geology	Dalton Highway (southern Brooks Range and Yukon River bridge)	Frozen debris lobe - Yukon River landslide	R.P. Daanen	2007-2014	digital		2,250	good	Locations and descriptions would need to be added from memory.	unknown	high	These images show movement of frozen debris lobes over time.
Engineering Geology	Tanana B-6 and northern part of A-6 quadrangles	Kaltag Fault - Moran	R.D. Koehler	2011	digital		200	good	These are random pictures collected during the project. Locations must be assigned from memory.	unknown	low	
Engineering Geology	Noatak C-5, D-5, and D-6 quadrangles	Kivalina	T.D. Hubbard	2010	digital		70	good	Notes are available and photos are tied to notes.	unknown	low	
Engineering Geology	Kivalina	Kivalina	D.S.P. Stevens	2010	digital		50	good	Locations are available via GPS-Photo Link for 30 of the photos. Separate documentation is available for the subject of the photo.	unknown	medium	
Engineering Geology	Unalaska	Makushin	D.S.P. Stevens	1996	slide		40	good	Field notes are available and would need to be keyed to the photos.	unknown	low	
Engineering Geology	Fairbanks	MapTEACH - Fairbanks	D.S.P. Stevens, P.A. Craw	2004	digital		35	good	Short descriptions and locations are available via GPS-Photo Link.	unknown	medium	
Engineering Geology	Nome	MapTEACH - Nome	D.S.P. Stevens	2004	digital		85	good	Locations are available via GPS-Photo Link.	unknown	medium	
Engineering Geology	Seward Peninsula	NASA - Council	D.S.P. Stevens	2002	digital		85	good	Field notes are available and would need to be keyed to the photos.	unknown	low	
Engineering Geology	Seward Peninsula	NASA - Council	D.S.P. Stevens	2003	digital		190	good	Locations are available via GPS-Photo Link.	unknown	medium	
Engineering Geology	Shaktoolik	Shaktoolik	D.S.P. Stevens	2011	digital		100	good	Field notes are available and would need to be keyed to the photos.	unknown	medium	
Engineering Geology	central Alaska Range	Susitna Glacier fault	Patricia Craw	2003	digital		600	good	Locations are available via GPS-Photo Link.	unknown	high	Images of the rupture of the fault.
Engineering Geology	central Alaska Range	Susitna Glacier fault	Stephen Personius	2003	digital		230	good	Locations are available via GPS-Photo Link.	unknown	medium	Images of the rupture of the fault.
Engineering Geology	central Alaska Range	Susitna Glacier fault	Anthony Crone	2003	digital		130	good	Locations are available via GPS-Photo Link.	unknown	medium	Images of the rupture of the fault.
Engineering Geology	Interior Alaska (mostly)	various (Koyukuk, Livengood-Valdez pipeline, local field trips)	T.D. Hubbard	2010-2012	digital		150	good	Field notes are available.	unknown	low	
Engineering Geology	general Alaska	various neotectonic	R.D. Koehler	2009-2014	digital		100	good	These are random pictures collected during the project. Locations must be assigned from memory.	unknown	low	

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Engineering Geology	Whittier	Whittier	D.S.P. Stevens	2012	digital		230	good	40 photos were taken with Garmin GPS camera; the remainder would need to be keyed to field notes.	unknown	medium	
Engineering Geology	Dalton Highway, Yukon River bridge	Yukon River landslide	R.D. Koehler	2013	digital		200	good	Photo documentation is in published DGGS report.	unknown	high	
Engineering Geology (primarily)	general Alaska	non-DGGS G.R.C. Graham various (BLM-Denali Highway, AVO Spurr-Redoubt, FELS Black Rapids Glacier, UAF field camp)	G.R.C. Graham	1990s	print, negative		500	good	Supporting information for some photos is in a BLM guidebook for the Denali Highway. Field notebooks are available but need to be located. Photos needs to be keyed to field notes.	unknown	low	
Geologic Communications	general Alaska	pre-digital publications (published)	J.M. Robinson	1970-1998(?)	photo, slide, negative		200	good	Photographs are generally with publications, but some are undocumented. Undocumented pictures will be hard to locate, and will take some detective work to obtain information for them.	not planned	low	
Minerals	general Alaska	Alaska's mineral industry	various companies and agencies	2012-2015(?)	digital		49	good	Information and captions are available in email for most of the pictures. Some of the pictures may be proprietary. Some of the pictures will be published in the "Alaska's Mineral Industry Report."	unknown	high	
Minerals	southern Brooks Range	Arctic Camp paper and Geological Association of Canada (GAC) meeting	M.A. Wiltse	1977	slide		25	good	Associated with paper "Regional setting of southern Brooks Range copper deposits, Alaska," by M.A. Wiltse and W.G. Gilbert. Slides are well organized and annotated. Slides are in plastic sleeves. Many of the slides have field stations on them.	potential plans	low	
Minerals	Fairbanks and Healy quadrangles	Bonnifield	R.F. Swenson, J.E. Andrew, L.K. Freeman (dup), M.B. Werdon, D.J. Szumigala, and others	2008	digital		5,510	good	Field notes and Access database of notes are available. The photos need to be matched up with the notes and locations.	unknown	low	
Minerals	Fairbanks and Healy quadrangles	Bonnifield	L.K. Freeman	2008	digital		996	good	Field notes are available. Photos are arranged by month/day and then ID number. One could figure out the traverse and possibly the actual photo location.	unknown	medium	
Minerals	Brooks Range	Brooks Range Cu belt (pillow basalt)	M.A. Wiltse	1970s(?)	print		3	fair	pillow basalt	loose photos	low	
Minerals	Big Delta Quadrangle	Caribou Creek (MS thesis)	R.R. Lessard	2002	slide(?)		100	good	Field notes are available. Photos would need to be keyed to locations.	unknown	low	
Minerals	Walker Lake and Ambler quadrangles	central Brooks Range	J.M. Zdepski	1971-1973	slide		330	good	Collection needs to be organized. Slides are in sheet protectors. He took perhaps 100-120 slides per summer, shot with Pentax SLR. Almost all are on Kodachrome 64 ASA, although he did use Ektachrome at times. Many of the photos could be located from memory, and they have a date stamped on the slide.	unknown	low	
Minerals	Chugach Mountains	Chugach	L.E. Burns	1979-1983	slide		1,700	good	Sample locations are scanned on compilation maps with topography. Field notes may not be available. Some slides have notes on them or can be located from memory. Slides are stored in binders and boxes in plastic sleeves. Slides are mixture of kodachrome and ektachrome.	planned	medium	Photographer is retired and wants to do the archiving herself. Photos of world-class outcrops with great textures and lots of faults. Can get there flying; some outcrops are now underwater. Glacier has receded and more rock is visible.
Minerals	Healy A-6 Quadrangle	Chulitna	K.H. Clautice	1997-1998	slide		100	good	Some supporting information is in related Chulitna publications. It is unknown if field notes are available. Slides need to be scanned and located. Slides are stored mostly in plastic sleeves (some in boxes) by project, but not by location. In some cases the photographer can assign a rough location from memory. A very few may have an associated sample number.	not planned	medium	
Minerals	Healy A-6 Quadrangle	Chulitna	D.S.P. Stevens	1997	slide		8	good	Field notes are available and would need to be keyed to the photos.	unknown	low	

Section	Area	Project or Area	Photographer(s)	Date taken	Photo format	Format comments	Collection size	Condition	Supporting information	Archive status	Archive priority	Priority comments
Minerals	Solomon D-4 and Bendeleben A-4 quadrangles	Council	M.B. Werdon, L.K. Freeman, D.J. Szumigala, J.E. Athey, R.J. Newberry, D.S.P. Stevens	2003, 2004, 2006	digital		1,000	good	Field notes and Access database of notes are available. The photos need to be matched up with the notes and locations.	unknown	medium	
Minerals	Solomon D-4 and Bendeleben A-4 quadrangles	Council	D.S.P. Stevens	2002-2003	print		30	good	Field notes are available and would need to be keyed to the photos.	unknown	low	
Minerals	Solomon D-4 and Bendeleben A-4 quadrangles	Council I	D.S.P. Stevens	2004	digital		500	good	Short descriptions and locations are available via GPS-Photo Link.	unknown	medium	
Minerals	Solomon D-4 and Bendeleben A-4 quadrangles	Council II	D.S.P. Stevens	2006	digital		350	good	Short descriptions and locations are available via GPS-Photo Link.	unknown	medium	
Minerals	eastern Brooks Range	Eastern Brooks Range Cu belt (Arctic, Dead Creek, Picnic Creek, etc., and Chandalar Lake area)	M.A. Wiltse	1974-1975	slide		140	good	Notes and field maps were given to DGGS for archiving. Slides look well organized and annotated. They are in plastic sleeves in binders. Many of the slides have field stations on them.	potential plans	low	
Minerals	Fairbanks Quadrangle	Fairbanks gravity	G.R.C. Graham	1999?	print, negative		2	good	Field notebooks are available but need to be located. Photos needs to be keyed to field notes.	unknown	low	
Minerals	Prince William Sound (and others)	Fe-Cu talk for GSA Cordilleran Section meeting	M.A. Wiltse	1973	slide		49	good	Slides associated with paper and talk, "Fe-Cu massive sulfide deposits in ancient outer arc ridge--Trench slope environments," by M.A. Wiltse. Slides are well organized and annotated; in plastic sleeves.	potential plans	low	
Minerals	Prince William Sound (and others)	Fe-Cu talk for GSA Cordilleran Section meeting	M.A. Wiltse	1973	print		49	good	Slides associated with paper and talk, "Fe-Cu massive sulfide deposits in ancient outer arc ridge--Trench slope environments," by M.A. Wiltse. Consists of two piles of prints bound by a rubber band.	potential plans	low	
Minerals	Eagle A-1, A-2 quadrangles	Fortymile mining district	M.B. Werdon, L.K. Freeman, D.J. Szumigala, J.E. Athey, R.J. Newberry, K.H. Clautice	1999, 2000, 2001	digital(?), slide		1,000	good(?)	Field notes and Access database of notes are available. The photos need to be matched up with the notes and locations. May be some digital files with this project.	unknown	medium	
Minerals	Eagle A-1, A-2 quadrangles	Fortymile mining district	K.H. Clautice	1999-2000	digital(?)		100	fair	Supporting information in publications PIR 2002-1. Quality of digital images was low.	not planned	medium	
Minerals	Eagle A-1, A-2 quadrangles	Fortymile mining district	D.S.P. Stevens	1999, 2001	slide		90	good	Field notes are available and would need to be keyed to the photos.	unknown	low	
Minerals	Haines Quadrangle	Haines	K.H. Clautice	1990s	slide		100	good	It is unknown if supporting information is available. Slides need to be scanned and located. Slides stored mostly in plastic sleeves (some in boxes) by project, but not location. In some cases photographer can assign rough location from memory. A very few may have an associated sample number.	not planned	medium	
Minerals	Dalton Highway	Haul Road	K.H. Clautice	1990s	slide		100	good	It is unknown if supporting information is available. Slides need to be scanned and located. Slides stored mostly in plastic sleeves (some in boxes) by project, but not location. In some cases photographer can assign rough location from memory. A very few may have an associated sample number.	not planned	medium	
Minerals	Talkeetna Mountains B-5 Quadrangle	Iron Creek	M.B. Werdon	1999	digital, slide(?)		300	good(?)	Field notes and maybe Access database of notes are available. The photos need to be matched up with the notes and locations.	unknown	medium	
Minerals	general Alaska	L.K. Freeman mineral industry (non-DGGS)	various companies	pre 2000	slide		2,000	half good/ half fair	Photo information is available from memory or may be written on carousels. Photographer thinks he would could figure out projects and years for most slides. Kodachrome slides are in good shape, but Ektachrome RGB Color Lab slides are fading. He has negatives but their status is unknown.	potential plans	low	

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Minerals	general Alaska	Land Selection	K.H. Clautice	1990-1993	slide		100	good	Supporting information is in a series of Land Selection publications. Slides need to be scanned and located. Slides are stored mostly in plastic sleeves (some in boxes) by project, but not location. In some cases the photographer can assign a rough location from memory. A very few may have an associated sample number.	not planned	medium	
Minerals	Fairbanks A-4 Quadrangle	Liberty Bell	L.K. Freeman	2005	digital		133	good	Field notes and Access database of notes are available. The photos need to be matched up with the notes and locations.	unknown	low	
Minerals	Fairbanks A-4 Quadrangle	Liberty Bell	R.L. Smith	2005	digital		250	good	unknown	unknown	low	
Minerals	Fairbanks A-4 Quadrangle	Liberty Bell	J.E. Athey, D.J. Szumigala	2005	digital		320	good	Field notes and Access database of notes are available. The photos need to be matched up with the notes and locations.	unknown	low	
Minerals	Fairbanks A-4 Quadrangle	Liberty Bell	D.S.P. Stevens	2005	digital		175	good	Short descriptions and locations are available via GPS-Photo Link.	unknown	medium	
Minerals	Fairbanks A-4 Quadrangle	Liberty Bell	Kimberley Streeter	2005	digital		120	good	Short descriptions and locations are available via GPS-Photo Link.	unknown	medium	
Minerals	Livengood C-3 and C-4 quad-rangles	Livengood	L.K. Freeman, M.B. Werdon, P.A. Craw, D.J. Szumigala	2003-2004	digital		120	good	Field notes and Access database of notes are available. The photos need to be matched up with the notes and locations.	unknown	low	
Minerals	Livengood C-3 and C-4 quad-rangles	Livengood	Lauren Staft	2003	digital		60	good	Most have short descriptions and locations available via GPS-Photo Link.	unknown	medium	
Minerals	Livengood C-3 and C-4 quad-rangles	Livengood	P.A. Craw	2003	digital		160	good	Short descriptions and locations are available via GPS-Photo Link.	unknown	medium	
Minerals	Livengood B-3 and B-4 quad-rangles	Livengood South	B.A. Elliott, G.A. Griesel, L.K. Free-man, M.B. Werdon, R.J. Newberry, D.J. Szumigala	2010	digital		460	good	Field notes and Access database of notes are available. The photos need to be matched up with the notes and locations.	unknown	low	
Minerals	McGrath Quadrangle	McGrath	K.H. Clautice	1996	slide		100	good	It is unknown if supporting information is available. Slides need to be scanned and located. Slides are stored mostly in plastic sleeves (some in boxes) by project, but not location. In some cases the photographer can assign a rough location from memory. A very few may have an associated sample number.	not planned	medium	
Minerals	Melozitna Quadrangle	Melozi	G.R.C. Graham	1998?	print, negative		150	good	Field notebooks are available but need to be located. Photos need to be keyed to field notes.	unknown	low	
Minerals	Tanana and Melozitna quadrangles	Moran	B.A. Elliott, G.A. Griesel, L.K. Free-man, M.B. Werdon, R.J. Newberry, D.J. Szumigala, T.A. Lough	2011	digital		1,512	good	Field notes are available. The photos need to be matched up with the notes and locations. Photos are arranged by month/day and then ID number. One could figure out the traverse and possibly the actual photo location. GPS-Photo Link data are available for some of them.	unknown	medium	
Minerals	Tanana and Melozitna quadrangles	Moran	D.S.P. Stevens	2011	digital		50	good	Field notes are available and would need to be keyed to the photos.	unknown	low	
Minerals	Circle Quadrangle	Northeast Fairbanks	M.B. Werdon, R.R. Lessard, D.J. Szumi-gala	2007	digital		1,092	good	Field notes and Access database of notes are available. The photos need to be matched up with the notes and locations.	unknown	low	
Minerals	Circle Quad-rangle	Northeast Fairbanks	L.K. Freeman	2007	digital		188	good	Field notes available. Photos arranged by month/day and ID number. Could figure out the traverse and possibly the actual photo location.	unknown	medium	
Minerals	Circle Quad-rangle	Northeast Fairbanks	D.S.P. Stevens	2007	digital		380	good	Short descriptions and locations are available via GPS-Photo Link.	unknown	medium	
Minerals	Ophir and Ruby quad-rangles	Ophir-Poorman	D.S.P. Stevens	1996	slide		20	good	Field notes are available and would need to be keyed to the photos.	unknown	low	
Minerals	Yentna mining district	Petersville	D.S.P. Stevens, D.J. Szumigala, K.H. Clautice, D.L. LePain, Andrew McCarthy	1998	slide, print		90	good	Field notes are available and would need to be keyed to the photos.	unknown	low	

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Minerals	Tanana A-1, A-2, and B-1 quadrangles	Rampart mining district	K.H. Clautice	1996-1997	slide		100	good	Supporting information available in DGGS publications PDF 1998-37, RI 97-15, and others. Slides need to be scanned and located. Slides stored mostly in plastic sleeves (some in boxes) by project, but not location. In some cases photographer can assign a rough location from memory. A very few may have an associated sample number.	not planned	medium	
Minerals	Tanana A-1, A-2, and B-1 quadrangles	Rampart mining district	D.S.P. Stevens	1996	slide		40	good	Field notes are available and would need to be keyed to the photos.	unknown	low	
Minerals	Tanana A-1, A-2, and B-1 quadrangles	Rampart mining district	D.S.P. Stevens	1997	slide		15	good	Field notes are available and would need to be keyed to the photos.	unknown	low	
Minerals	Beaver, Livengood, Bettles, and Tanana quadrangles	Ray Mountains	R.D. Koehler	2012	digital		100	good	These are random pictures collected during the project. Locations must be assigned from memory.	unknown	low	
Minerals	Beaver, Livengood, Bettles, and Tanana quadrangles	Ray Mountains	L.K. Freeman, T.C. Wright, M.B. Werdon, E.N. Bachmann, and others	2012	digital		750	good	Field notes are available. The photos need to be matched up with the notes and locations. Photos are arranged by month/day and then ID number. One could figure out the traverse and possibly the actual photo location.	unknown	low	
Minerals	Livengood Quadrangle	Roy Creek	L.K. Freeman	2014	digital		7	good	Field trip notes available. Photos arranged by month/day and ID number. Could figure out traverse and possibly actual photo location.	unknown	medium	
Minerals	Big Delta Quadrangle	Salcha River-Pogo	M.B Werdon, L.K. Freeman, D.J. Szumigala, J.E. Athey, R.J. Newberry	2000, 2001, 2002	digital, slide(?)		750	good(?)	Field notes and maybe Access database of notes are available. The photos need to be matched up with the notes and locations.	unknown	medium	
Minerals	Big Delta Quadrangle	Salcha River-Pogo	D.S.P. Stevens	2000	slide		80	good	Field notes are available and would need to be keyed to the photos.	unknown	low	
Minerals	Nome Quadrangle	Seward Peninsula, Cape Nome	K.H. Clautice	1990s	slide		100	good	Unpublished mapping is available in this area and possibly field notes that could be keyed to pictures. Slides need to be scanned and located. Slides stored mostly in plastic sleeves (some in boxes) by project, but not location. In some cases photographer can assign rough location from memory. A very few may have an associated sample number.	not planned	medium	
Minerals	Nome Quadrangle	Seward Peninsula, Cape Nome	G.R.C. Graham	1994-1995(?)	print, negative		150	good	Field notebook are available but need to be located. Photos needs to be keyed to field notes.	unknown	low	
Minerals	Chistochina mining district, Mount Hayes Quadrangle	Slate Creek-Slana	C.P. Hults, J.E. Athey, D.J. Szumigala	2009	digital		2,687	good	Field notes are available. The photos need to be matched up with the notes and locations. Chad Hults's photos have exif data.	unknown	low	
Minerals	Chistochina mining district, Mount Hayes Quadrangle	Slate Creek-Slana	L.K. Freeman	2009	digital		413	good	Field notes are available. Photos are arranged by month/day and then ID number. One could figure out the traverse and possibly the actual photo location.	unknown	medium	
Minerals	Chistochina mining district, Mount Hayes Quadrangle	Slate Creek-Slana	D.S.P. Stevens	2009	digital		275	good	Short descriptions and locations are available via GPS-Photo Link.	unknown	medium	
Minerals	Lime Hills C-1 Quadrangle	Styx River	T.C. Wright, D.A. Reioux, E.N. Bachmann, Evan Twelker, K.R. Sicard	2013	digital		3,306	good	Photos are associated with Trimble Junos and digital field stations. Most photos have locations.	unknown	low	
Minerals	Lime Hills C-1 Quadrangle	Styx River	L.K. Freeman	2013	digital		194	good	Field notes available. Photos arranged by month/day and ID number. Could figure out the traverse and possibly the actual photo location.	unknown	medium	
Minerals	Talkeetna Mountains	Talkeetna Mountains	K.H. Clautice	1989	slide		100	good	Some supporting information in related publications. Slides must be scanned and located. Slides stored mostly in plastic sleeves (some in boxes) by project, but not location. In some cases photographer can assign rough location from memory. A very few may have an associated sample number.	not planned	medium	
Minerals	Valdez Quadrangle	Tonsina	M.B. Werdon	2014	digital		200	good	Field notes are available. The photos need to be matched up with the notes and locations.	unknown	medium	

Section	Area	Project or Area	Photographer(s)	Date taken	Photo format	Format comments	Collection size	Condition	Supporting information	Archive status	Archive priority	Priority comments
Minerals	Valdez Quad-rangle	Tonsina	A.M. Emond	2014	digital		25	good	Locations would need to be added from memory.	unknown	low	
Minerals	Valdez Quad-rangle	Tonsina	G.R.C. Graham	2014	digital		1,038	good	Notes are recorded in a spreadsheet. Photos need to be keyed to notes.	unknown	low	
Minerals	general Alaska	various	M.D. Albanese and others	1980s	digital		50	good	Photographs were scanned from slides and associated with the book "Midnight Sun, Arctic Moon", http://www.midnightsunarcticmoon .com/. Author is willing to send CD of the photos. They would need locations and annotation. She might be willing to assign locations.	potential plans	medium	
Minerals	southeast Alaska (mostly)	various (Bruin Bay Fault, Kluk-wan, Haines ul-tramafic rocks, PhD thesis de-fense, Duke Island)	L.E. Burns	1975-1985(?)	slide		30	good	Slides need to be located from memory.	planned	low	Photographer is retired and wants to do the archiving her-self. Photos of world-class out-crops with great textures and lots of faults. Can get there fly-ing; some outcrops are now underwater. Glacier has re-ceded and more rock is visible.
Minerals	general Alaska	various (field trips and mis-cellaneous fieldwork)	M.A. Wiltse	1970-2000(?)	slide		500	good	unknown	unknown	low	
Minerals	western Alaska Range	western Alaska Range	K.F. Bull	1981-1982	slide		75	unknown	It is unknown if field notes are available. Slides need to be scanned and located.	not planned	medium	
Minerals	western Brooks Range, Nabesna-Wrangell	Western Brooks Range Cu belt	M.A. Wiltse	1974	slide		200	good	Milt gave notes and field maps to DGGS for archiving. Slides look well organized and annotated. They are in plastic sleeves in binders. Many of the slides have field stations on them.	potential plans	low	
Minerals	Talkeetna Mountains	Wrangellia	T.D. Hubbard	2014	digital		100	good	Locations captured in GPS tracklog. Pictures are stored with video for that day. Photos are annotated and have locations. Camera is Garmin VIRB.	partially archived	low	
Minerals	Talkeetna Mountains	Wrangellia	T.D. Hubbard	2014	video	video in gigabytes	50	good	Locations captured in GPS tracklog. Videos are sorted by day and are located. Camera is Garmin VIRB.	partially archived	low	
Minerals	Talkeetna Mountains	Wrangellia	S.S. Masterman	2013	digital		25	good	Pictures would need to be located from memory.	unknown	low	
Minerals	Talkeetna Mountains	Wrangellia	T.C. Wright, D.A. Reioux, Evan Twel-ker, Alicja Wypych, K.R. Sicard, M.B. Werdon	2013, 2014	digital		3,989	good	Most photos are associated with Trimble Junos and have locations. Includes some regular camera photos, too. One would have to look through the field notes for the camera photos.	unknown	low	
Minerals	Talkeetna Mountains	Wrangellia	L.K. Freeman	2013, 2014	digital		411	good	Field notes available. Photos arranged by month/day and ID number. Could figure out the traverse and possibly the actual photo location.	unknown	medium	
Non-DGGS, energy	Arctic National Wildlife Ref-uge (ANWR)	ANWR (D.L. LePain PhD dissertation)	D.L. LePain	1988-1993	slide		2,000	good	Information for about half of the photos is logged in field notebooks.	planned	high	

Appendix B. Overview of DGGS archiving efforts, needs, and success stories.

DGGS's Geologic Communications Section creates, preserves, and provides access to the state's geologic data repository from which the Section develops and serves all DGGS geologic data products to the public to answer questions about land management, resources, and natural hazards. The repository is continuously growing and evolving. Most of the data management projects listed below are designed to accommodate future data collection, for which DGGS is committed over the long term to providing resources such as staff time for maintenance and IT infrastructure. DGGS strives to appropriately apportion available resources among rescuing legacy data, preserving new data, and maintaining current archiving systems.

In 2015 DGGS requested that the Alaska Geologic Mapping Advisory Board (GMAB) review the organization's archiving needs and present their priorities as part of GMAB's general oversight of DGGS's programs. Alaska's Geologic Mapping Advisory Board comprises a balanced group of representatives encompassing State, Federal, engineering geology, geologic hazards, energy, minerals, academia, and Alaska Native issues. The Board meets with DGGS three times each year to review our entire program, discuss strategic and legislative issues, and advise us on our future programs, including U.S. Geological Survey STATEMAP projects. Future archiving projects will be undertaken with consideration for the Board's suggested archiving activities.

Minerals Data and Information Rescue in Alaska (MDIRA) program

The State of Alaska received Federal funds through congressional appropriations to the U.S. Geological Survey (USGS) and Bureau of Land Management (BLM) from FY1998 through FY2004 and FY2011 through FY2013 to recover, archive, catalog, and make publicly accessible minerals-related geologic data and publications that were in danger of being lost or destroyed following the cancellation of Federal minerals programs such as the U.S. Bureau of Mines, and the closing of many private mineral-exploration companies over the past few decades. Through the Minerals Data and Information Rescue in Alaska (MDIRA) program, DGGS has made available to the public, via the internet, many geologic reports, maps, and data that were previously unavailable or difficult to find. The following are just a few of DGGS's notable accomplishments through MDIRA:

- Completed a full data assessment focusing (but not exclusively) on non-fuels solid-mineral resources data and samples.
- Built a public web-accessible catalog for searching and accessing the scanned maps and reports (http://dggs.alaska.gov/pubs). Scanned all previously published DGGS and pre-digital USGS reports and maps with subject material relating to Alaska geology.
- Designed and built a database-driven internal application to distribute DGGS GIS data via the internet. Documented available DGGS digital GIS data with FGDC-compliant metadata.
- Recovered geochemical datasets published in multiple DGGS reports and integrated them into a web-accessible database system (http://dggs.alaska.gov/webgeochem/). The application and database are currently being redesigned with State funds.

  User successes: In 2014 a consultant from Jacobs Engineering Group requested rock geochemical data to provide background arsenic levels in Interior Alaska. She was able to query the data she needed directly through the application.

- Captured outlines or spatial extents of published geology-related maps in Alaska authored by multiple agencies, and developed an online, interactive web mapping application that provides access to the publications (http://dx.doi.org/10.14509/25601).
- Began cataloging and archiving field project files and unpublished geologic compilations by DGGS and predecessor agencies. The index now includes unpublished industry and other geoscience data and is available online through a searchable web mapping application (http://dx.doi.org/10.14509/25601). This application is DGGS's primary archiving tool for paper collections.

  USER SUCCESSES: In 2014 an anonymous geologic consultant reported the value of data discovered in the unpublished data index and stored at the GMC: "Scans of the CIRI–Anaconda maps acquired from the GMC will save my client over a hundred thousand dollars worth of helicopter-supported geological mapping this field season, allowing us to focus our efforts and free-up more funds for drilling and potential discovery."

In 2011, the Geologic Materials Center (GMC) received additional funds from the MDIRA program to allow GMC staff to finish indexing and detailing the remaining 30 percent of the facility's hard-rock core inventory. The funds were used to (1) research and identify missing information related to the hard-rock mineral core, such as unknown prospect or property locations, missing borehole numbers, and unknown property owners, consultants, or drill companies by working with staff, scientists and geologists at DGGS, BLM, ARLIS, and Alaska Earth Sciences; (2) perform a major re-boxing effort (in conjunction with NGGDPP funds) for core samples to prevent major data loss due to substantial box deterioration; and (3) research and understand the potential radiation impacts of several prospects.

NGGDPP program

FY 2007: DGGS requested and received funding to provide collection-level information on its data holdings. DGGS completed evaluations for 12 of its geologic data and sample collections, and entered detailed information about each one into the NGGDPP online inventory system. See the updated summary table of DGGS collections in Appendix B.

DGGS also received funding to participate in the design and testing of the National Digital Catalog. DGGS helped establish standards for the content, quality, and consistency of metadata describing digital data and physical samples; protocols for searching, transferring, and presenting metadata; clear and consistent ways to explain how users can request access to physical materials; and the extent to which the user interfaces convey branding or meet other organizational needs.

FY 2008: DGGS received funding to implement a Web Feature Service (WFS) interface to deliver site-specific metadata files to the National Digital Catalog for six of its geologic data collections: (1) core samples and drill cuttings stored at the Alaska Geologic Materials Center (GMC), (2) glass slide collection of processed samples at the GMC, (3) data reports on core samples that have been borrowed from the GMC for analysis, (4) geochemical analyses of rock, soil, and stream-sediment samples collected during projects involving DGGS geologists, (5) geochronology analyses of samples collected during projects involving DGGS geologists, and (6) hard-rock surface samples collected by DGGS staff.

The database development team installed GeoServer, a Java-based, Open Source server software that allows publishing of geospatial data to the web, on DGGS's web server to provide a Web Feature Service (WFS) interface. DGGS collection information, generated from the database with a unique dynamic URL identifier for each sample or location, was made available to the National Digital Catalog through the WFS. As DGGS and NDC technologies have evolved, the WFS is no longer generated or harvested in this manner. Once NDC has migrated to the new inventory system, DGGS will consider creating services to repopulate these collections.

USER SUCCESSES: DGGS received multiple requests for geochronological data compiled through the MDIRA program and made available through WFS to the National Digital Catalog. For example, in 2015 a UAF graduate student wrote, "I'm… studying age relationships of the Talkeetna Arc in south-central AK. I spoke with Evan Twelker and he mentioned you're distributing the DGGS geochronology database. It could potentially be a great resource to use for my project…"

FY 2010: DGGS received funding to create site-specific metadata for two geologic data collections: (1) organic geochemistry analyses published by DGGS, and (2) valuable hard-rock mineral core and coalbed methane core samples stored in deteriorating boxes at the Alaska Geologic Materials Center (GMC). In addition, decaying core samples were re-boxed into new core boxes and relocated to an environmentally controlled area in the GMC. To serve the metadata records to the National Digital Catalog, DGGS created a Web Feature Service and SiteMap for each dataset. The WFSs are no longer available due to DGGS's evolving IT infrastructure but could be recreated in the future.

USER SUCCESSES: Addition of coalbed methane core metadata into the GMC database has improved the ability to answer user questions about available core samples in southwestern Alaska. USGS researchers reviewed several coalbed methane wells over several visits. USGS, Purdue University, and University of Cincinnati researchers traveled to the GMC to review the well documented coalbed methane core and finished their work in one day due to easy access to materials.

FY 2013: GMC staff and the DGGS database development team created site-specific metadata for two DGGS geologic data collections: (1) U.S. Bureau of Land Management (BLM) surface pulp samples and (2) valuable U.S. Bureau of Mines (BOM) hard-rock mineral core samples. All BOM core samples were reboxed into new core boxes. In addition, more than 14,000 BLM pulp samples were reboxed. Both collections of samples are now relocated to an environmentally controlled area in the new GMC facility. Inventory of surface pulps has progressed through more than 94,000 of an estimated 104,000 potential samples. Slightly over 8,000 of the inventoried surface pulps were tied to specific locations in Alaska, and in total, 8,831 metadata records for the BOM and BLM collections were submitted to the National Data Catalog as XML files.

USER SUCCESSES:

1. In August 2015, 90 newly reboxed U.S. Bureau of Mines mineral core boxes were made available to Southern Methodist University for analysis of crustal heat flow across the southeastern panhandle of Alaska.
2. Improvement of the U.S. Bureau of Land Management surface sample collection, including the BLM pulp samples of this project, is a continuing and long-term priority of the GMC. Beginning in August 2015, detailed examination of BLM heavy sands along the Gulf of

Alaska resulted in high-quality metadata for 2,300 samples, the discovery of 311 new samples, and likely locations for about 2,000 samples, including 474 pulp samples. These data are currently undergoing analysis by the Alaska Trust Land Office to better delineate the mineral potential of the region and allow for more tightly focused field studies in summer 2016.

Other Active Data-Rescue and Archiving Projects

Elevation data: Distribution, management, and archiving of all publicly available elevation data (LiDAR, IfSAR, etc.) in Alaska through a custom web application used by workers at the State, Federal, and municipal level, along with private businesses and individuals. Current data holdings exceed 14 terabytes and are accessed at http://dx.doi.org/10.14509/25239.

USER SUCCESSES: In 2015 the Municipality of Anchorage decided to release their LiDAR data through DGGS's data delivery system to decrease their data management time and facilitate easy user access to the data.

GMC Inventory Management: Created the Geologic Materials Center's spatially-aware, end-to-end, inventory management tool to track the center's priceless collection of core, cuttings, slides, geologic samples and analyses, and more (500,000-plus item inventory). The database generates reports, allows easy searching of the inventory database, performs auditing functions, and manages quality assurance.

USER SUCCESSES: In 2015 a consultant for the Alaska Trust Land Office wrote:

> "Mr. Kurt Johnson proved himself to be an irrefutable asset to our directive. In the weeks leading up to our visit, he offered invaluable support via email and telephone. He was thorough, pleasant, and proactive in ensuring that the samples were accounted for and ready prior to our arrival. Without his efforts in sample retrieval, data matching, and communication, our work could have easily taken twice as long. Thanks to his foresight and preparation, we were able to work ahead of schedule and find time to enjoy your beautiful state.
>
> The staff outperformed our expectations and raised our standard for warehouse teams. Kurt, Jean, Alex the intern, and Mary at the front desk made this retrieval mission pleasant, easy, and an all-around best-case scenario."

Airborne Geophysical Data: Online text- and map-based search interface for publicly available airborne geophysical surveys conducted in Alaska since 1993 by the Division of Geological & Geophysical Surveys (DGGS), U.S. Geological Survey (USGS), and Bureau of Land Management (BLM). The application provides access to DGGS's geophysical publications where users may view and download data and maps (http://dx.doi.org/10.14509/27222).

Alaska Coastal Data: Two online tools that provide access and archiving for beach elevation profile measurements collected throughout Alaska since the 1960s (http://dx.doi.org/10.14509/27359) and historic and predicted shoreline position throughout Alaska (http://dx.doi.org/10.14509/29504).

Geothermal Data: DGGS serves data to the National Geothermal Data System (NGDS), a U.S. Department of Energy-funded distributed national network of databases and data sites that collectively form a system for the acquisition, management, and maintenance of geothermal-based data (http://www.geothermaldata.org/). DGGS is developing an online digital Geothermal

Sites of Alaska map using the content model templates developed for and archived in the NGDS.

Summary of DGGS data preservation progress and needs

Shaded collections have received funding from the USGS National Geological and Geophysical Data Preservation Program (NGGDPP) in the past to briefly assess or preserve part or all of the collection. Completeness is defined in terms of physical preservation, available contextual metadata including location of sample, and public accessibility. Status describes the current state of work and maintenance being performed on the collection.

Publication collections	***Media***	***Completeness***	***Status***
DGGS publications	Paper, digital	Complete	Active
GMC data reports	Digital	Complete	Active
USGS Alaska publications	Paper, digital	Complete	Active
U.S. BLM/BOM Alaska publications	Paper, digital	70% complete	Active
UAF MIRL publications	Paper, digital	99% complete	Active
Bibliography of Alaska volcanism (AVO)	Paper, digital	Complete	Active
Alaska theses	Paper, digital	Complete	Passive
Map Index outlines	Paper, digital	Complete	Active
Published GIS files	Digital	Complete	Active
Legacy GIS files	Digital	Not funded	None
Reference Library	Paper, digital	90% complete	Active

Published and unpublished data collections	***Media***	***Completeness***	***Status***
Minerals-related inorganic geochemical data	Paper, digital	Complete	Active
Energy-related inorganic geochemistry	Paper, digital	Not funded	None
Alaska Quaternary volcanic whole rock geochemical data (AVO)	Paper, digital	Complete	Active
DGGS Tephra analyses	Paper, digital	Not funded	None
AVO Tephra/glass analyses	Paper, digital	10% complete	Active
Organic geochemical data	Paper, digital	98% complete	Inactive
Geochronology (Ar-Ar, K-Ar, conventional U-Pb)	Paper, digital	80% complete	Inactive
U-Pb detrital zircon analyses	Paper, digital	Not funded	None
Apatite fission track analyses	Paper, digital	Not funded	None
Porosity and permeability data	Paper	Not funded	None
Sandstone composition reports	Paper	Not funded	None
Sediment grain-size analyses	Paper, digital	Not funded	None
Pebble counts	Paper, digital	Not funded	None
Measured stratigraphic sections	Paper, digital	Not funded	None
Petrographic analyses	Paper, digital	Not funded	None
Paleontology reports	Paper, digital	20% complete	Inactive
Microfossil reports	Paper, digital	Not funded	None
Seal capacity analyses (MICP)	Digital	Not funded	None
Geothermal data	Paper, digital	Complete	Active
Permafrost depth and ice content	Paper, digital	Not funded	None
Radiocarbon ages	Paper, digital	Not funded	None
Slope stability data	Paper	Not funded	None

Paleoseismic data	Paper	Not funded	None
DGGS field photographs	Slide, paper, digital	2% complete	Active
Gil Mull field photograph collection	Slide	Not funded	None
AVO field photographs	Paper, digital	Complete	Active
AVO vent features	Paper, digital	Complete	Active
AVO historical eruption data	Paper, digital	Complete	Active
Minerals Industry tracking and resources data	Paper, digital	20% complete	Inactive
Unpublished field data and project files	Paper	75% complete	Active
Unpublished field data and project files	Digital	Not funded	None
DGGS digital field station and sample locations	Paper, digital	20% complete	Active
Alaska Quaternary volcanism field station and sample locations (AVO)	Paper, digital	Complete	Active
Wes Wallace field data collection	Paper, digital	Not funded	None
Geophysical data	Paper, digital	50% complete	Active
VHS geophysical flight line video	Film	Not funded	None
AMS/AOF geophysical flight line film	Film	Not funded	None
Gravity data	Paper, digital	Not funded	None

Physical sample and legacy paper collections	***Media***	***Completeness***	***Status***
Oil & gas well samples (GMC)	Physical samples	95% complete	Active
Processed slides (GMC)	Physical samples	84% complete	Active
DGGS surface samples (GMC)	Physical samples	16% complete	Active
Non-DGGS surface samples (GMC)	Physical samples	1% complete	Inactive
Megafossils (GMC)	Physical samples	7% complete	Active
Mineral exploration core (GMC)	Physical samples	66% complete	Active
U.S. BLM pulps (GMC)	Physical samples	8% complete	Active
U.S. BOM core (GMC)	Physical samples	89% complete	Active
U.S. BLM surface samples (GMC)	Physical samples	10% complete	Active
DGGS petrographic slides	Physical samples	Not funded	None
AVO petrographic slides	Physical samples	50% complete	Inactive
AVO rock samples	Physical samples	80% complete	Active
AVO processed samples	Physical samples	80% complete	Active
UAF Tectonics and Sedimentation Group samples	Physical samples	Not funded	None
Geo-engineering core samples	Physical samples	Not funded	None
Legacy analog geophysical data rolls	Paper, mylar	Not funded	None
Legacy paper air photos	Paper	Not funded	None
Legacy mineral industry data (AKMIDI)	Paper, digital	Complete	Passive
Szumigala defunct minerals company files	Paper	Not funded	None