Lessons From Converting Alaska Digital Geologic Maps to the USGS Geologic Map Schema (GeMS)

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Lessons From Converting Alaska Maps to GeMS

This presentation:
• The maps DGGS is prioritizing for converting to GeMS
• Getting started with a map conversion
• Challenges encountered with legacy map GIS data
Converting Alaska Maps: Where to begin?

• Map: Bedrock and surficial maps published by DGGS

• Includes:
  – Scanned paper maps, 1970s (and older?)
  – Maps with legacy digital geospatial data
  – Recently published maps with NCGMP09 and GeMS standard data

DGGS Geological Maps Web Map
https://geoportal.dggs.dnr.alaska.gov/portal/home/
Converting Alaska Maps: Where to begin?

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• Includes:
  – Scanned paper maps, 1970s (and older?)
  – **Maps with legacy digital geospatial data**
    – Recently published maps with NCGMP09 and GeMS standard data

• GeMS versions/conversions across the state
  – Aleutian Islands
  – North Slope

https://geoportal.dggs.dnr.alaska.gov/portal/home/
Map Conversion Target Area: YTU

- **Yukon-Tanana Uplands**
  - “mountainous region of about 30,000 sq. mi. between the Yukon and Tanana Rivers” (Foster et al., 1970)
  - **Gold** and other mineral resources identified and produced for >130 years

- **Our Mission at DGGS:**
  “Determine the potential of Alaskan land for production of metals, minerals, fuels, and geothermal resources, the locations and supplies of groundwater and construction material, and the potential geologic hazards to buildings, roads, bridges, and other installations and structures (AS 41.08.020).”
Mineral Potential of the YTU

- Hundreds of mineral prospects recognized
  - Alaska Resource Data File sites

- Includes two of Alaska’s largest producing hard-rock gold mines
  - Fort Knox
  - Pogo
Mineral Potential of the Y-T Uplands

Fort Knox Gold Mine near Fairbanks

Pogo Gold Mine Southeast of Fairbanks

- Paleozoic metamorphic rocks
- Cretaceous intrusions
- Tertiary volcanics

Fortymile District area placer mine near the US-Canada border

www.newsiner.com
www.fortymilegold.ca
Map Conversion: Legacy Map Input Data

- Variety of ESRI data structures
- Distribution in these different formats continues at AKDGGS and USGS

(Figure from: University of Toronto and Coursera, https://www.coursera.org)
Map Conversion: Legacy Map Input Data

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(Figure from: University of Toronto and Coursera, https://www.coursera.org)
Map Conversion: Download legacy data

Geologic Map of the Big Delta B-2 Quadrangle, East-Central Alaska

By Warren C. Day1, John N. Aleinikoff2, Paul Roberts2, Moira Smith2, Bruce M. Gamble2, Mitchell W. Henning2, Larry P. Gough2, and Laurie C. Morath1

Version 1.0

Input data source: https://pubs.usgs.gov/imap/i-2788/

ArcCatalog view of working folders on server or PC:

- .zip ➔ .e00 ➔ coverage ➔ feature class ➔ feature class
  (in .gdb)
  (in feature dataset, in desired projection)
Map Conversion: Download legacy data

Geologic Map of the Big Delta B-2 Quadrangle, East-Central Alaska


Version 1.0

The text of this report is presented here in Portable Document Format. The latest version of Adobe Acrobat Reader or similar software is required to view it. If you wish to download the latest version of Acrobat Reader free of charge, click here.

1-2788 PDF file (2.85 MB)
1-2788 text only PDF file (57 KB) (This version of the report is accessible as defined in Section 508.)
1-2788 MET file (21 KB) Metadata File
Bases ZIP file (1.14 MB) Contains georegistered raster images of the topographic base maps.
1-2788 ZIP file (807 KB) Contains gridded geospatial data set included in the archived files (below).

map data

coverages
Map Conversion: Download legacy data

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Bases ZIP file (1.14 MB) Contains georegistered raster images of the topographic base maps.

Each geospatial data set is included in the archived files (below).
1-2788 ZIP file (807 KB)
1-2788 orig_26 (3813 KB)
Map Conversion: .e00 to coverage
Map Conversion: coverage to .gdb

coverages
feature classes
Map Conversion: Feature Class into Feature Dataset

feature classes within a feature dataset (in desired coordinate system)

feature classes
GeMS: empty schema template

Copy/rename the empty template geodatabase to the working folder

Redefine the coordinate system of the empty ‘geologic_map’ feature dataset
Run “Frequency” on the input polygon feature class to generate a table with a row for each map unit:
Run “Merge” on the “Frequency” output table and the empty GeMS description_of_map_units table to generate a table with a row for each map unit:

Fields from empty GeMS DMU

Fields from “Frequency” output table
GeMS DMU: Hierarchy Key
Special cases: GeMS contacts_and_faults

Resolution: identify and manually edit coincident contacts and faults to comply with GeMS topology rules.

Contacts and faults are coincident but not congruent.
Special cases: “compound” orientation_points

Resolution: replicate original compound features to represent single orientation_points, and edit GeMS attributes (type, azimuth, inclination, etc.) for each as needed
In GeMS, solid lines will represent “location accurate” according to the FGDC symbol standards.

Resolution: code the GeMS version as “approximate” to agree with the legend description and GIS data.
Lessons From Converting Alaska Digital Geologic Maps to the USGS Geologic Map Schema (GeMS)

• Useful to have a prioritized list of maps in your GeMS conversion queue

• Helpful to be familiar with different ESRI data structures and how to migrate from them

• Expect to encounter features that require modest editing to be GeMS-compliant