

DIGITAL MAPPING TECHNIQUES 2021

The following was presented at DMT'21
(June 7 - 10, 2021 - A Virtual Event)

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2021)

<http://ngmdb.usgs.gov/info/dmt/>



Documentation of Alaska's geologic-GIS data management and delivery system


JENNIFER ATHEY¹, MIKE HENDRICKS¹,
AND PATRICIA EKBERG²

¹ ALASKA DNR/DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS (DGGS)

² FORMERLY OF ALASKA DGGS

DIGITAL MAPPING TECHNIQUES 2021, VIRTUAL, JUNE 7-10

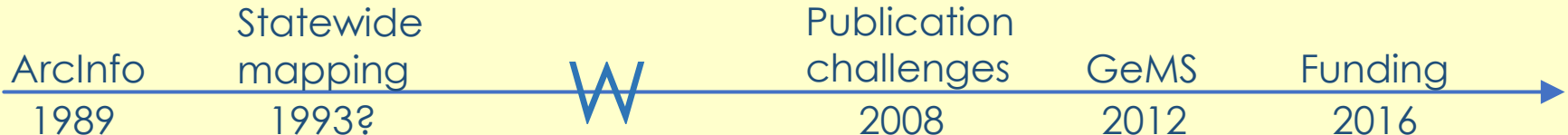
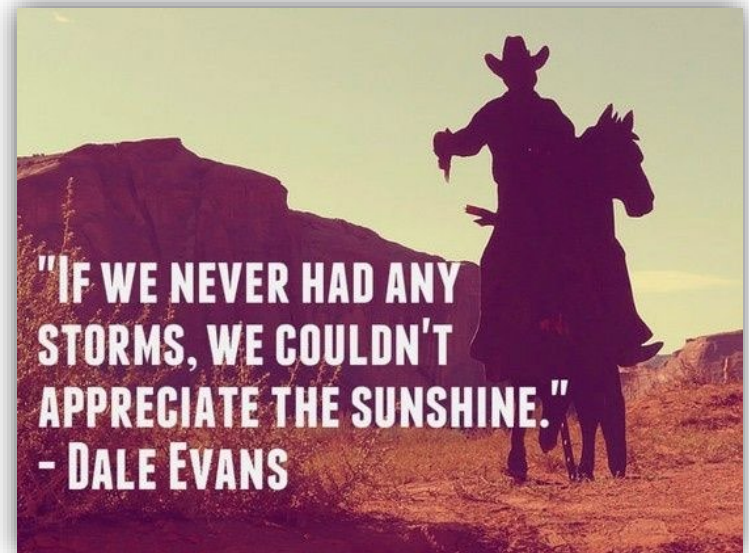
PRESENTED BY JENNIFER ATHEY, JUNE 7, 2021



In this presentation, the Alaska Division of Geological & Geophysical Surveys presents an overview of work to date and available documentation of our geologic mapping, data management, and product delivery systems. DGGS was an early adopter of the GeMS (then NCGMP09) standard for geologic mapping. Prior to 2012, DGGS utilized very few documented processes, and data creation and management was largely freeform. Despite the lofty agency goals of a statewide geologic mapping database and seamless 1:100,000- scale map of the state, as well as the need for increased mapping efficiency, DGGS did not have a geologic-GIS database standard to facilitate this work. We have come a long way from that Wild West era, with significant development of standardized and documented processes. Although work remains on many fronts, we have recently published some key parts of our geologic-GIS system and have a plethora of internal workflow documents in development.

DGGS history: Wild West era

- ▶ Adopted GeMS/NCGMP09, 2012
- ▶ Targeted funding beginning 2016
 - EPA
 - NGMDB Cooperative Agreements
 - NGGDPP
 - STATEMAP, GeoFramework Initiative
 - Earth MRI
 - Other mapping programs



How did we go about this?



- ▶ Targeted funding
- ▶ Agency commitment
- ▶ Iterative development
- ▶ Living documentation
- ▶ Documentation guru (Mike)
- ▶ Collaborative work
- ▶ Weekly meetings

Organizational structures

- ▶ Guidelines – Recommended guidance
What if I have a question?
- ▶ Procedure – Proper steps to take
How do we actually do it?
- ▶ Process – Workflow
Who will do what and when?
- ▶ Standards – Quantifiable requirements
What are the requirements?
- ▶ Objectives – Desired conditions to be met
What are the specific targets?
- ▶ Policies – High-level expectations
Why do we need to do this?



Base of the ladder

Policies

- ▶ Work must speak to DGGs' mission
- ▶ Data will be made available to the public through publications
- ▶ Follow USGS standards in geologic data delivery and production

Objectives

- ▶ Mission:

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).

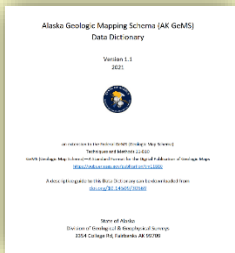
- ▶ Produce a 1:100,000-scale map of Alaska
 - Conduct new mapping
 - Convert legacy mapping to GeMS
- ▶ Be efficient, with reasonable turnaround time for publications

Standards

- ▶ Geologic Mapping Schema (GeMS), TM 11-B10
- ▶ FGDC Cartographic Standards, TM 11-A2
- ▶ CSDGM Metadata (FGDC-STD-001-1998)
- ▶ USGS Suggestions to Authors, DOI 10.3133/7000088

AK GeMS Extension v1.1, MP 169

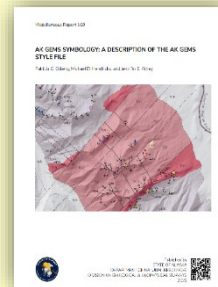
<https://doi.org/10.14509/30669>



- Report
- Data Dictionary (Excel)
- XML Workspace Document

AK GeMS Symbology v1, MP 167

<https://doi.org/10.14509/30584>



- Report
- Documentation (Excel)
- Style File

Standards: Managing change versions

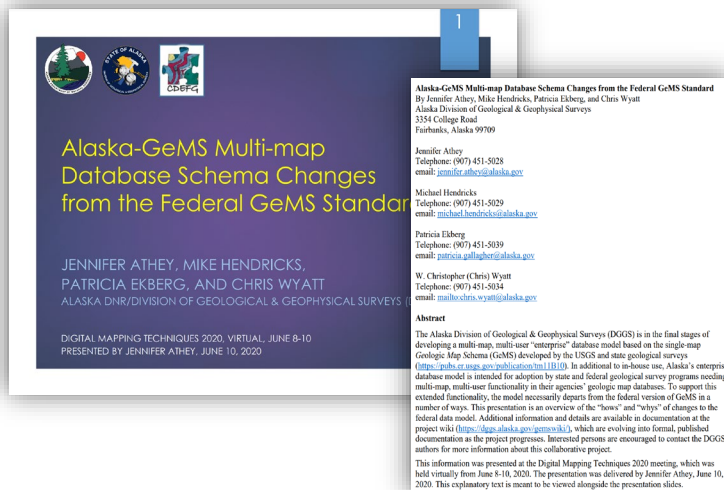
- ▶ **Data Dictionary suggestions for next version (v1.2)**
- ▶ Modification tracking for AK GeMS geodatabase template v1.1
- ▶ Modification tracking for the multi-map GeMS schema v1.1
- ▶ Modification tracking DGGS Style File v1

Date Suggested	Suggested Change	Submitted by	Action	Status
27 Nov 2020	Add Symbol field to the product_info table (ak.101.102 symbol value often used)	Trish	Jan 2021 Added style_file field	Implemented
07 Dec 2020	Add domain for paragraph style field in the dmU	Mike		Proposed
07 Dec 2020	Add domain for style field in the product_info feature class	Mike		Proposed
07 Dec 2020	Add domain for db_version field in the product_info feature class	Mike		Proposed
23 Dec 2020	Make Domain for Age_youngest and Age_oldest in DMU	Mike		Proposed
23 Dec 2020	Change domain for geo_material to show indent as description	Mike	Apr2021 Updated	Implemented

Standards: Supporting documentation

Comparison between GeMS and AK GeMS extension

- Figures and documentation
- DMT'20 presentation and report <https://doi.org/10.14509/30692>



Alaska-GeMS Multi-map Database Schema Changes from the Federal GeMS Standard
By Jennifer Athey, Mike Hendricks, Patricia Ekberg, and Chris Wyatt
Alaska Division of Geological & Geophysical Surveys
3354 College Road
Fairbanks, Alaska 99709

Jennifer Athey
Telephone: (907) 451-5028
email: jennifer.athey@alaska.gov

Michael Hendricks
Telephone: (907) 451-5029
email: michael.hendricks@alaska.gov

Patricia Ekberg
Telephone: (907) 451-5039
email: patricia.gallagher@alaska.gov

W. Christopher (Chris) Wyatt
Telephone: (907) 451-5034
email: mikechris.wyatt@alaska.gov

Abstract
The Alaska Division of Geological & Geophysical Surveys (DGGGS) is in the final stages of developing a multi-map, multi-user "enterprise" database model based on the single-map Geologic Map Schema (GeMS) developed by the USGS and state geological surveys (<https://pubs.er.usgs.gov/publication/tn11110>). In addition to in-house use, Alaska's enterprise database model is intended for adoption by state and federal geological survey programs needing multi-map, multi-user functionality in their agencies' geologic map databases. To support this extended functionality, the model necessarily departs from the federal version of GeMS in a number of ways. This presentation is an overview of the "how" and "why" of changes to the federal data model. Additional information and details are available in documentation at the project wiki (<https://dgggs.alaska.gov/gemswiki/>), which are evolving into formal, published documentation as the project progresses. Interested persons are encouraged to contact the DGGGS authors for more information about this collaborative project.

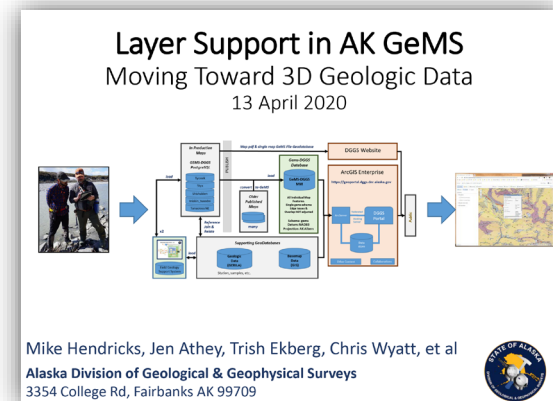
This information was presented at the Digital Mapping Techniques 2020 meeting, which was held virtually from June 8-10, 2020. The presentation was delivered by Jennifer Athey, June 10, 2020. This explanatory text is meant to be viewed alongside the presentation slides.

DIGITAL MAPPING TECHNIQUES 2020, VIRTUAL, JUNE 8-10
PRESENTED BY JENNIFER ATHEY, JUNE 10, 2020

Layer Support in AK GeMS

- CDEFG presentation and recording, April 2020

https://dgggs.alaska.gov/gemswiki/lib/exe/fetch.php?media=start:AK_GeMS_Layer_Support_to%20CDEFG_13_Apr_2020.pptx



Layer Support in AK GeMS Moving Toward 3D Geologic Data 13 April 2020

Mike Hendricks, Jen Athey, Trish Ekberg, Chris Wyatt, et al
Alaska Division of Geological & Geophysical Surveys
3354 College Rd, Fairbanks AK 99709

Process

Geologic Map Production & Management System

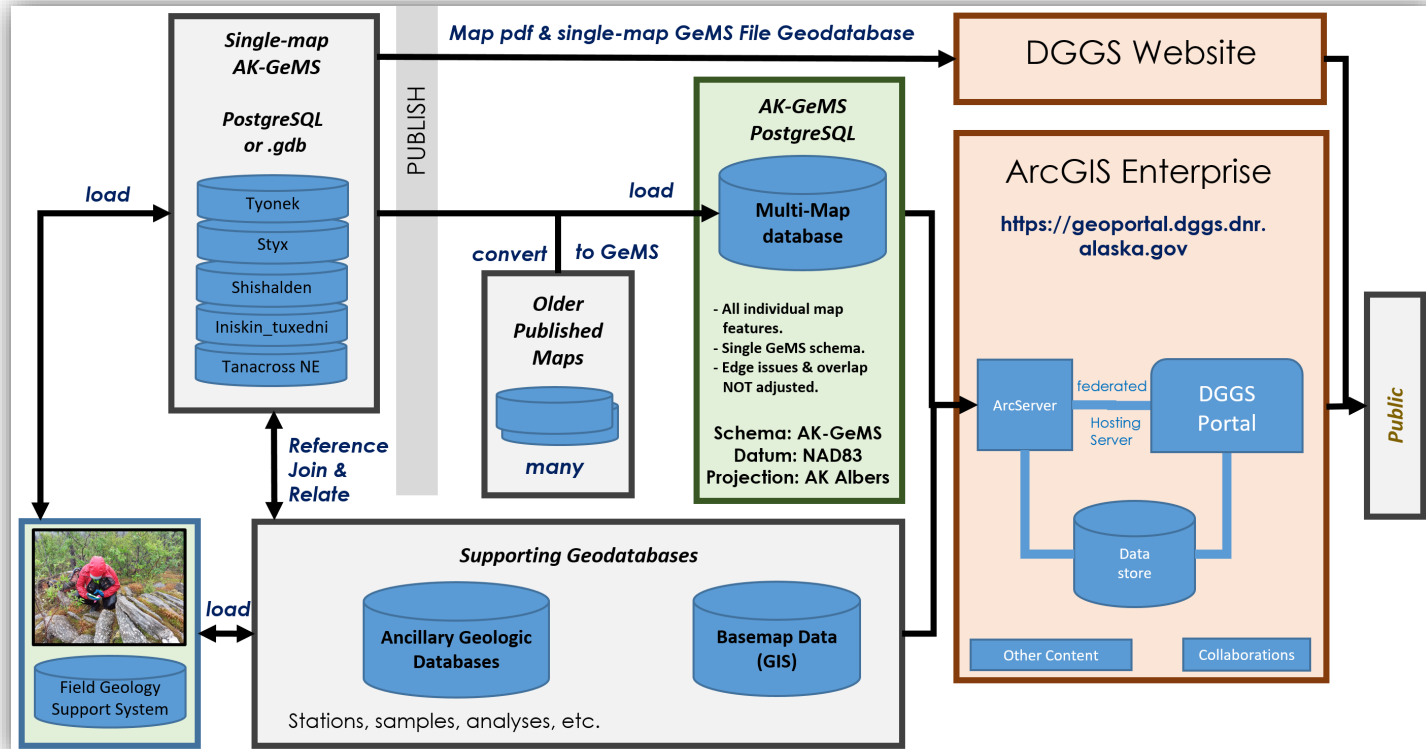
Phases, Roles, and Methods

Geologic Mapping System Components

Legacy Geologic Map Conversion Process

Geologic Field Support System

Production Workflow



Process

Geologic Map
Production &
Management System

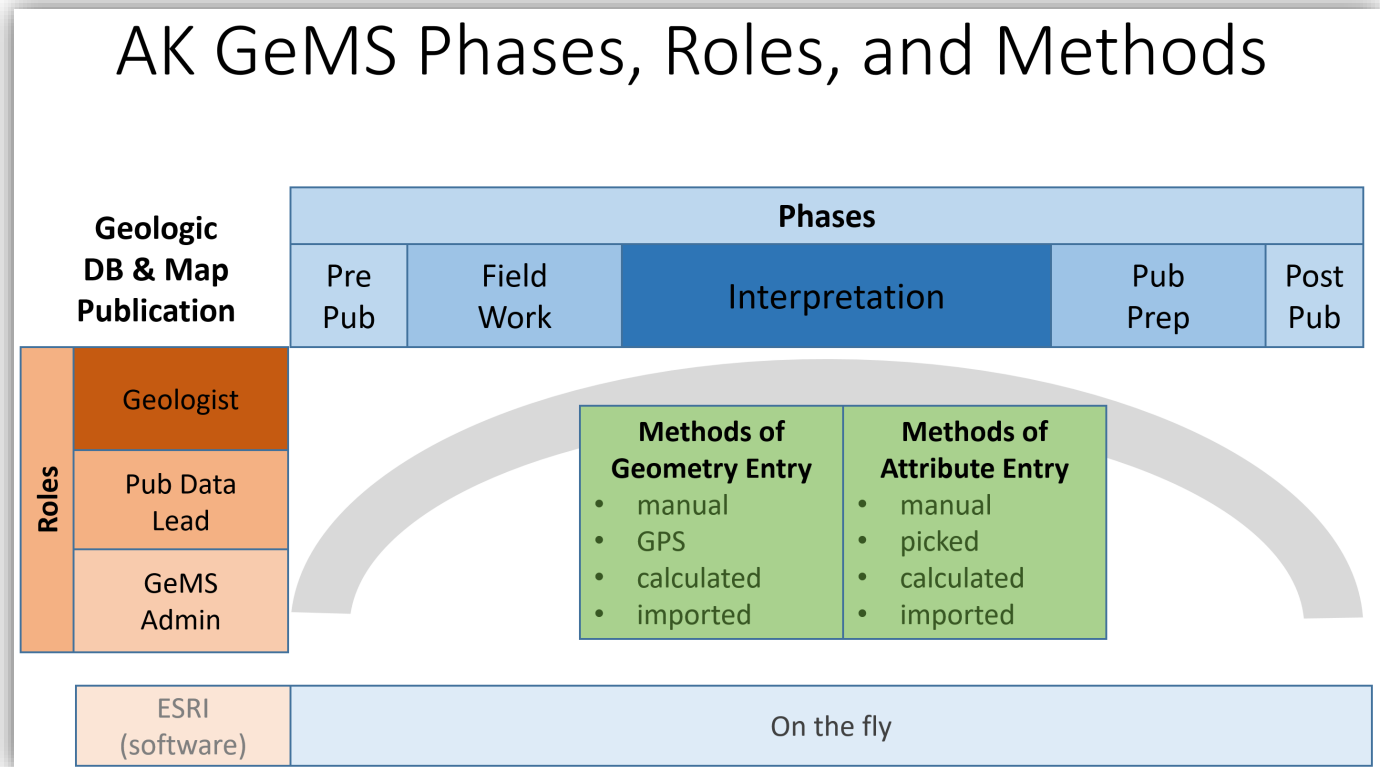
Phases, Roles, and Methods

Geologic Mapping
System Components

Legacy Geologic
Map Conversion
Process

Geologic Field
Support System

Production Workflow



Process

Geologic Map
Production &
Management System

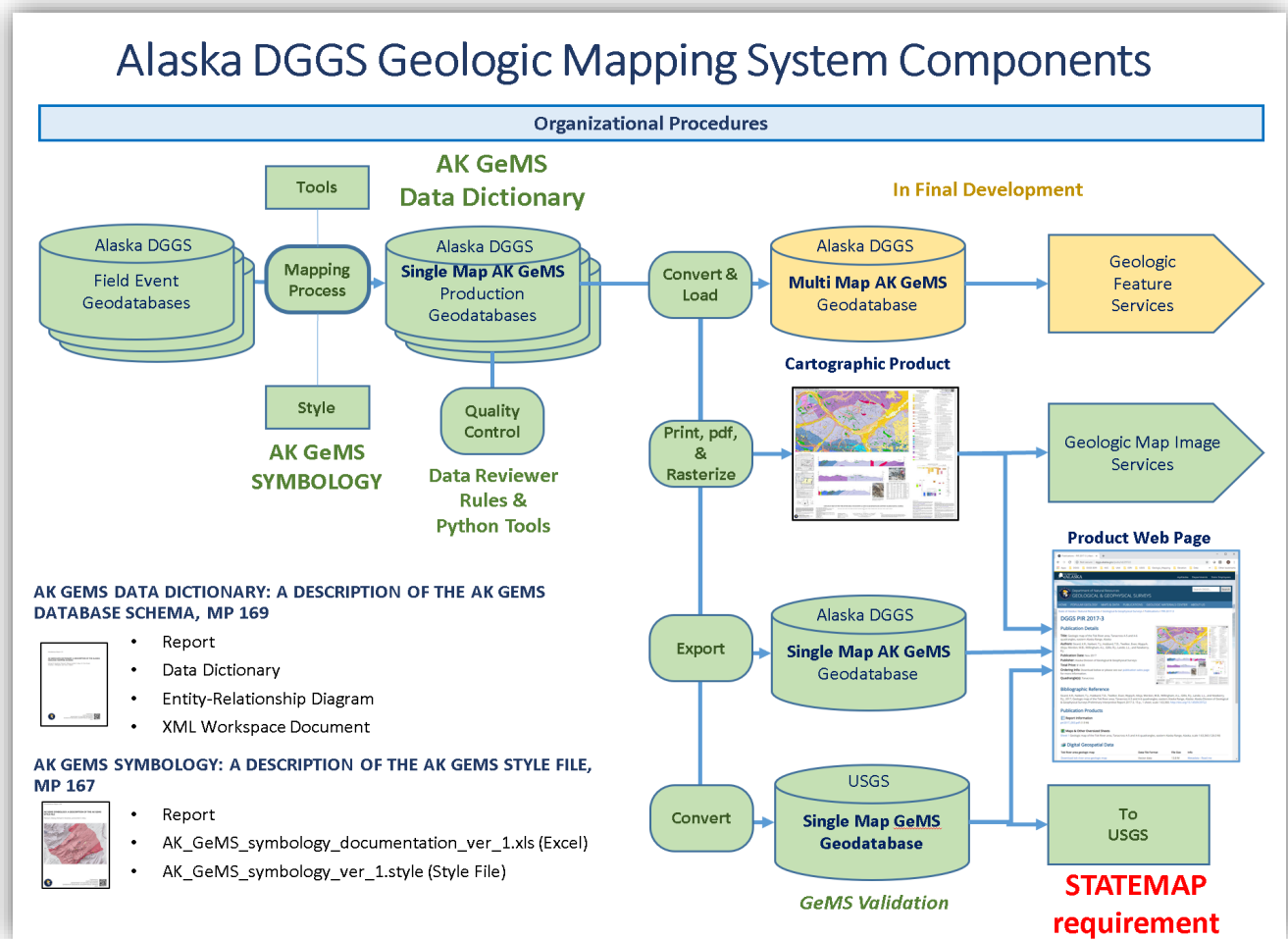
Phases, Roles, and
Methods

**Geologic Mapping
System Components**

Legacy Geologic
Map Conversion
Process

Geologic Field
Support System

Production Workflow



Process

Geologic Map
Production &
Management System

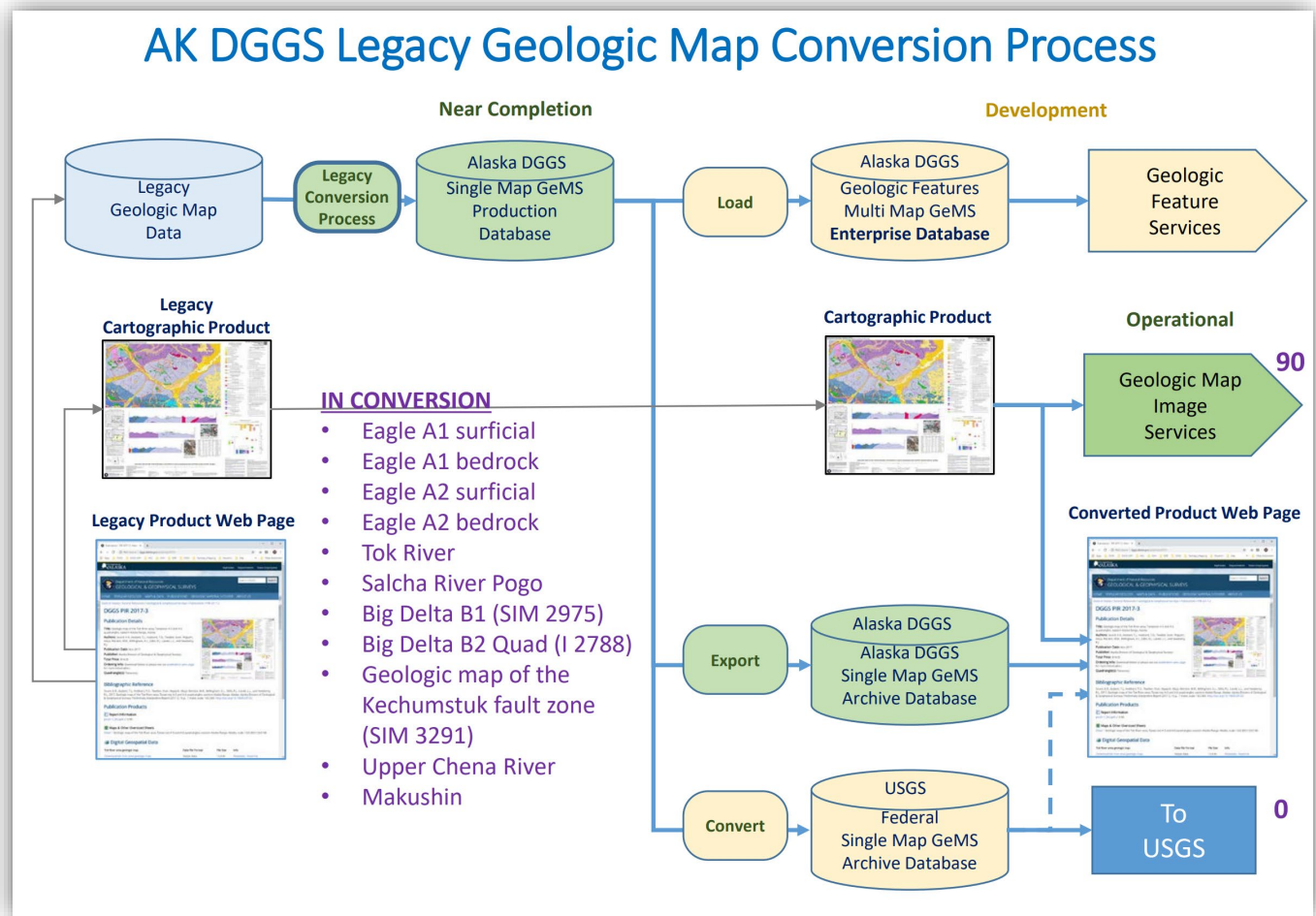
Phases, Roles, and
Methods

Geologic Mapping
System Components

**Legacy Geologic
Map Conversion
Process**

Geologic Field
Support System

Production Workflow



Process

Geologic Map Production & Management System

Phases, Roles, and Methods

Geologic Mapping System Components

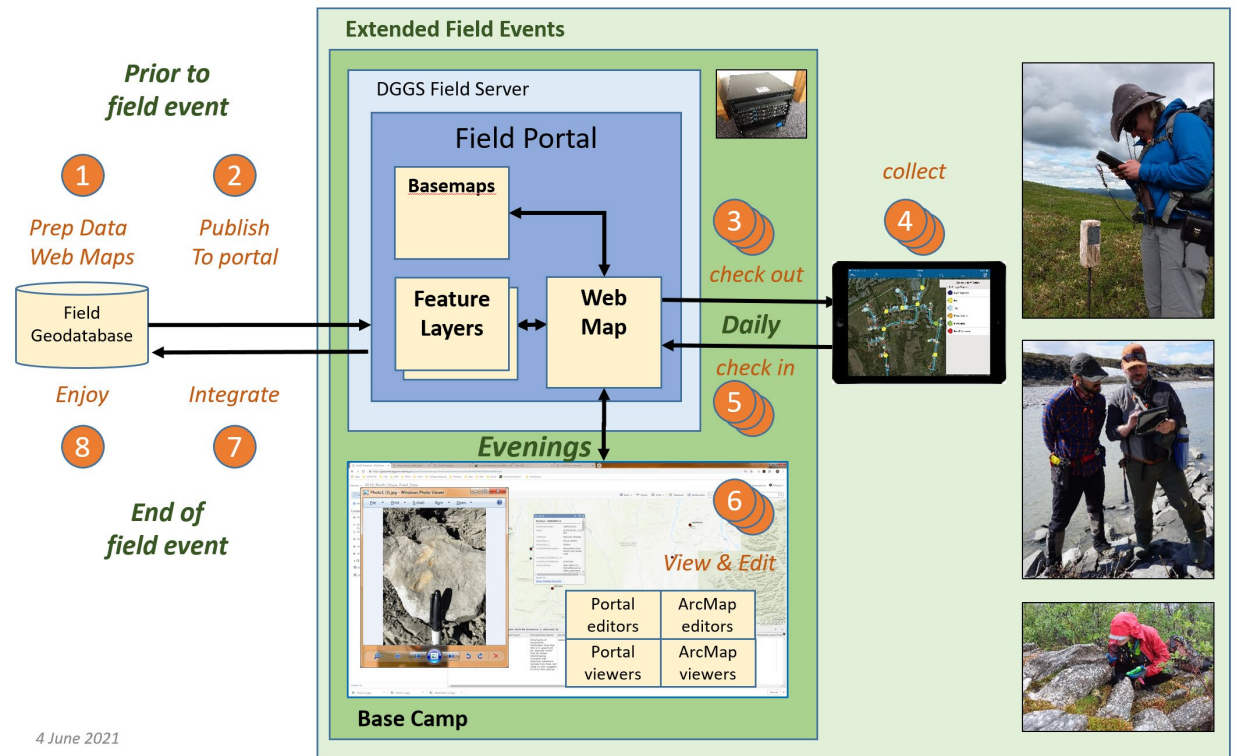
Legacy Geologic Map Conversion Process

Geologic Field Support System

Production Workflow



Geologic Field Support System



Process

Geologic Map
Production &
Management System

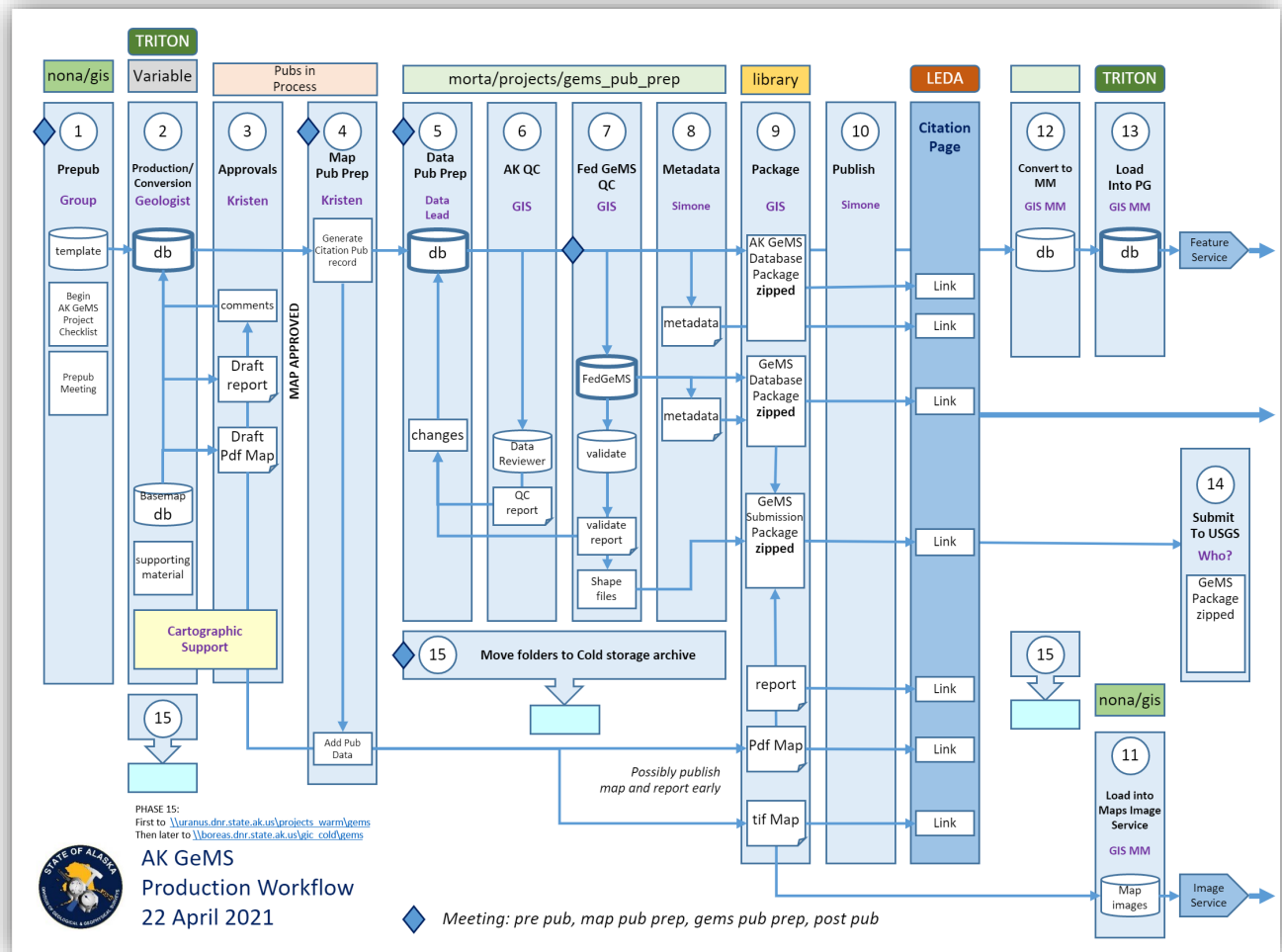
Phases, Roles, and
Methods

Geologic Mapping
System Components

Legacy Geologic
Map Conversion
Process

Geologic Field
Support System

Production Workflow



Procedures

- ▶ Production Task List
- ▶ Production Workflow Management/Task Tracking
- ▶ Production Worksheet
- ▶ **Product Quality Control**
- ▶ Product Distribution
- ▶ Product Layer File Standards
- ▶ Product Readme Files
- ▶ Use of Tools, Scripts, and Calculations
- ▶ Geologic Map Image Server
- ▶ Multi-map Database

Quality Control of Geospatial Data
A review of DGGs's implementation of
ESRI's Data Reviewer Tools
04 Mar 2021

Mike Hendricks, Jennifer Athey, Patricia Ekberg, and Chris Wyatt

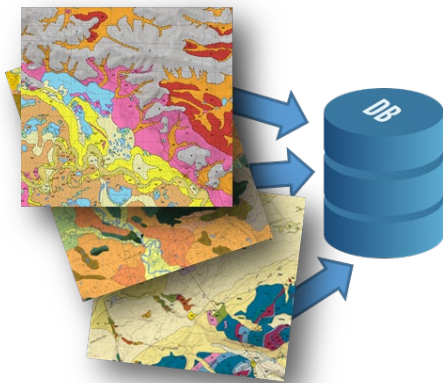
Alaska Division of Geological & Geophysical Surveys
3354 College Rd, Fairbanks AK 99709



Recording: <https://youtu.be/wtpiYAfeb6k>

Guidelines

- ▶ Database Manager's Guide
- ▶ **Data Producers' Guide**
- ▶ Cartographic Guidelines
- ▶ Legacy Data Conversion Guide



Overview

This is the overview

The AK Geologic Map Production System

The GEDI Council's role

The Schemas

Phases of Production

Technology

Software

ArcMap

ArcPro

Relationship to Federal GeMS standard

General Guidance

Adherence to the Schema

Fonts

Helvetica (Arial)

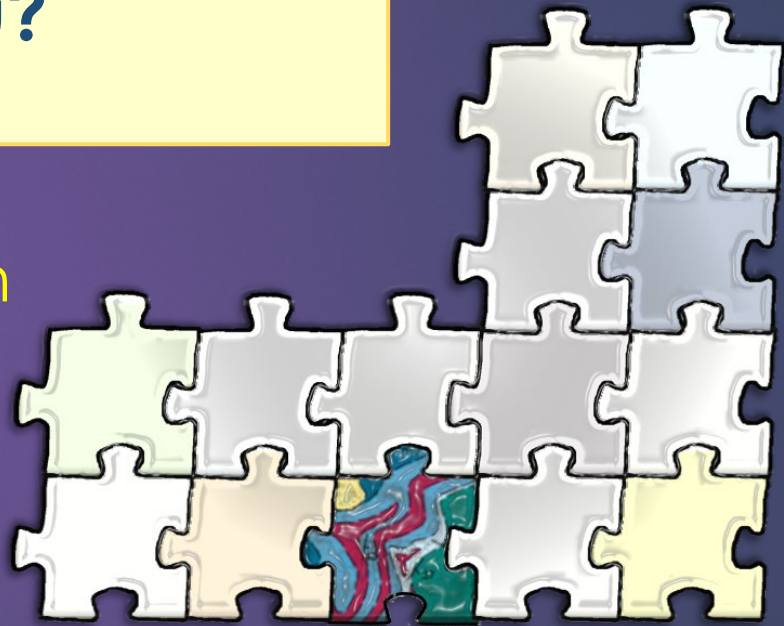
GeoAge

**How much of this
documentation would be
useful to you?**

Join the CDEFG discussion

- Monthly telecons
- Project wiki
- Questions?

Jen Athey, 907.451.5028 or
jennifer.athey@alaska.gov



<https://dggs.alaska.gov/gemswiki/>