

DIGITAL MAPPING TECHNIQUES 2025

The following was presented at DMT'25
May 18 - 21, 2025

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2025)
<http://ngmdb.usgs.gov/info/dmt/>

Mapping a 7.5' Quadrangle in Two Weeks: A Training Exercise

Wyoming State Geological Survey



WSGS

Exploring the Past, Empowering the Future

Presented at the Digital Mapping Techniques Conference, May 2025, Norman, Oklahoma

Derek Lichtner and Katie Lyon





OBSELETE TECHNOLOGY

WHOA, THIS IS RUNNING MS-DOS! IT'S WEIRD HOW NEW TECHNOLOGY TAKES FOREVER TO REACH SOME INDUSTRIES.

YEAH. LIKE HOW WE STILL USE GUNPOWDER FOR FIREWORKS, EVEN THOUGH WE'VE HAD NUCLEAR WEAPONS FOR OVER 70 YEARS.



<https://xkcd.com/1891/>



Problem:

- Wyoming Survey is small; limited documentation & tech support
- Little time to test & implement new methods and technologies

Solution:

"Map Blitz" as low-stakes training exercise:

- For new hires and "resident luddites"
- Dedicated time to learn all-things-mapping, especially field tech
- Proactive troubleshooting—fix things now, not during your "real" project
- Optional & flexible participation



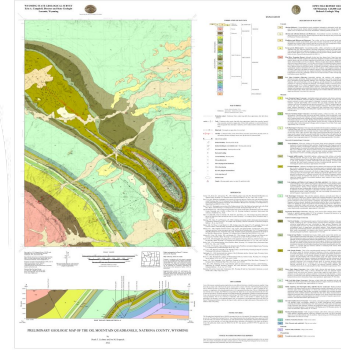


Deliverables:

- *Preliminary Bedrock Geologic Bedrock Map of the Osborne Well 7.5' Quadrangle, Sweetwater County, Wyoming* (Open File Report 2025-#)
- GeMS geodatabase

Internal Outcomes:

- Refined standard operating procedures (SOPs) & templates
- New-to-us technologies tested
- Everyone learns something!



Geologic map product

Version 0.1, April 2025

Making a Geologic Map at the WSGS: An Overview

Maintained by **Derek Lichtner** and Everyone Else

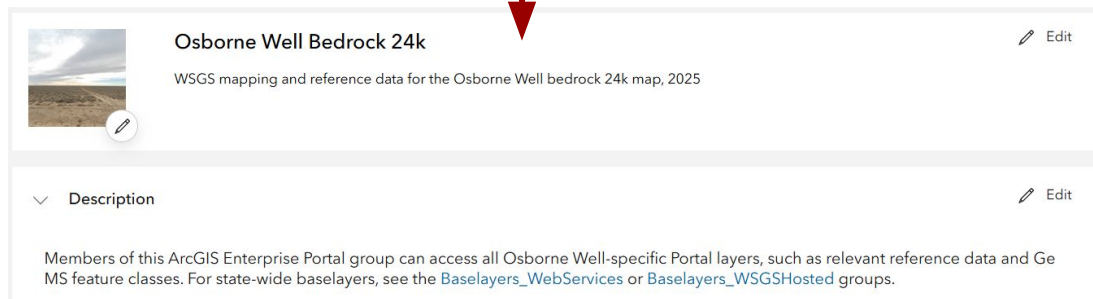
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Refined WSGS guidance documents

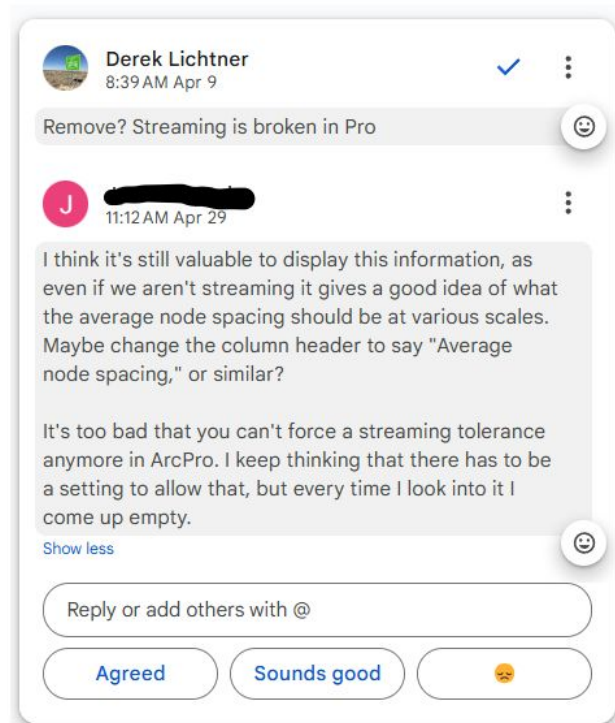


Self-Directed & Collaborative Learning

- Hands-on exercise
- Driven by individual interests
- Collaborative improvement of SOPs
- Peer-to-peer knowledge transfer
- Real-world conditions
- Teamwork, in real-time



Contacts and faults and other GeMS feature classes were shared as editable, multi-user layers on our ArcGIS Enterprise Portal

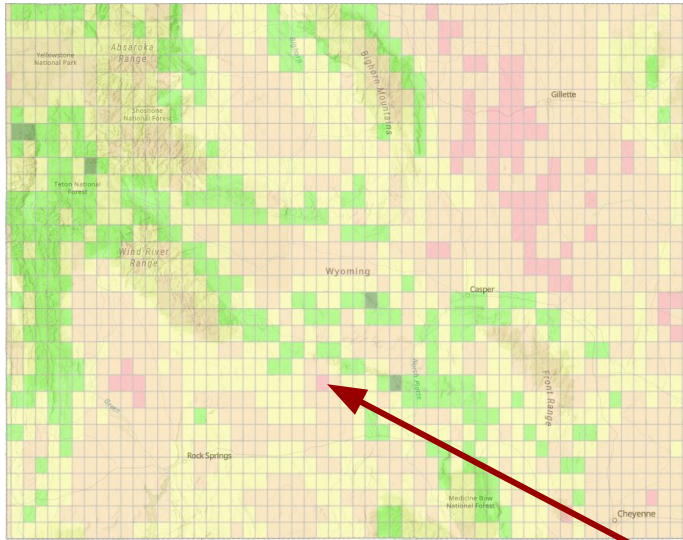


Suggestions and comments in Google Docs are enabled for all WSGS guidelines and SOPs



Osborne Well 7.5' quadrangle, Sweetwater County, WY

- Simple surface geology, but important area for uranium resources



Number of 500k bedrock units in 7.5'
quads in WY; **red** = only 1 unit;
green = many bedrock units



The Osborne Well—how deep does the rabbit hole go?



Phase 1:

Behind-the-Scenes Preparation

- Set up of project infrastructure & compilation of helpful resources by 3-person prep team:
 - Organize project directory, READMEs, templates
 - Update WSGS SOPs
 - Review literature (first pass)
 - Basic setup of ArcGIS and Portal
 - Curate base layers
 - Initial config of field tech



Zotero citation manager



ArcGIS Pro and Enterprise Portal



ESRI Field Maps



ESRI Survey123



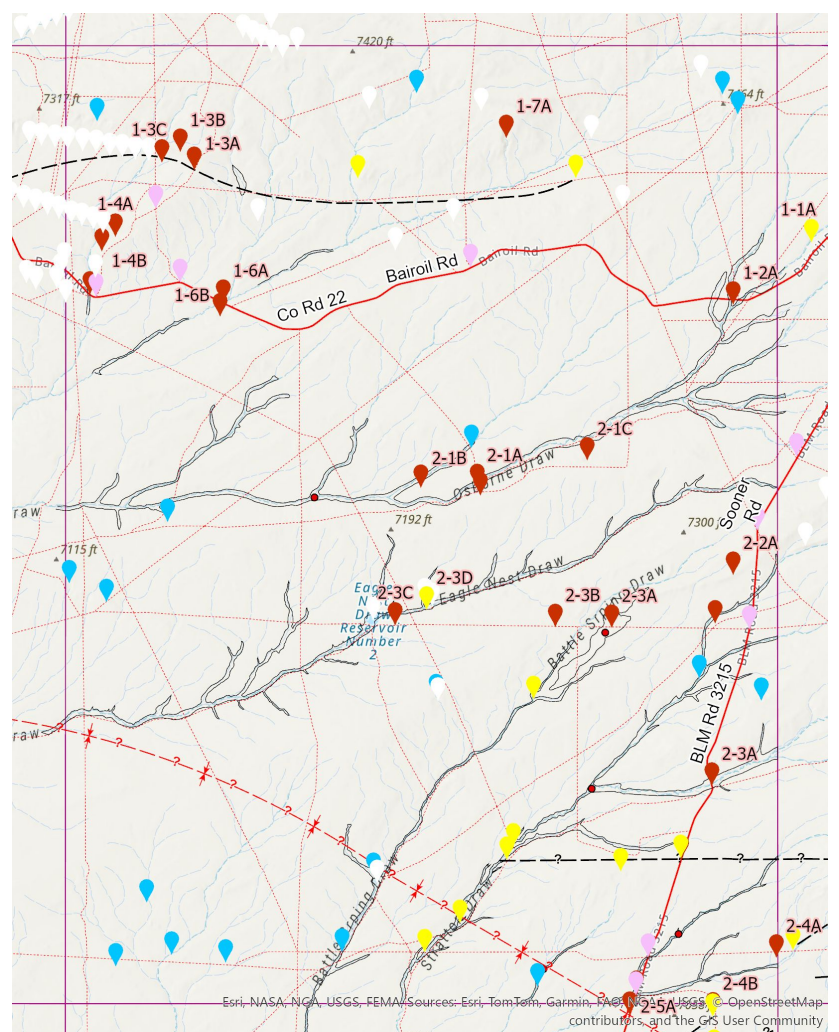
AVENZA MAPS



Garmin InReach

Phase 2: Making the Map

- Two weeks!
 - Field Prep (1 week)
 - Field Days (2 days)
 - Cleanup (3 days)
- Two teams (7 people each):
 - Literature review
 - Test field tech
 - Digitize first draft
 - Conduct fieldwork
 - Integrate field data
 - Reconcile mapping by Teams 1 & 2
 - Write DMU, etc.



Preliminary linework, field planning



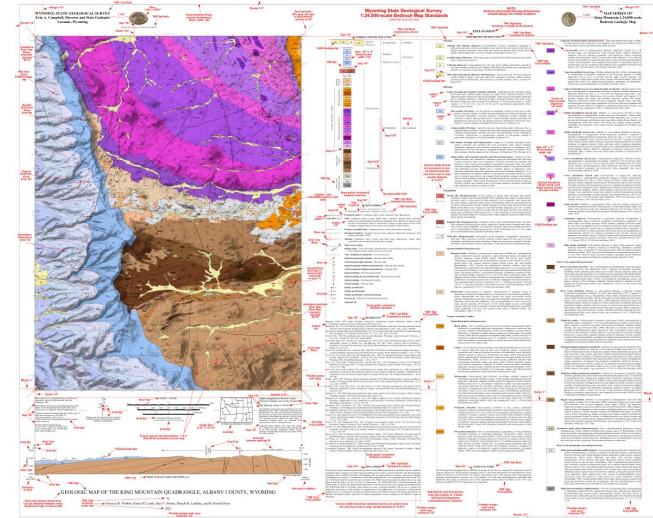
Phase 2: Making the Map – Fieldwork



Phase 3: Final Products

Interested participants walk through the review & publication process:

- **WSGS Technical Reviews:**
 - Geologist peer reviews
 - Supervisor & Director reviews
- **Validate digital data, draft layout for PDF**
- **WSGS Map Publication Reviews:**
 - Author & Editor data/layout reviews
 - Supervisor & Director layout approvals
 - Finalization: GeMS compliance checks, digital-data package and upload
- **Post-Production:** News release, DOI assignment, official publication



WSGS layout template: **red text, arrows** ⇒ fonts, margins, other specifications



Lessons Learned: Tech in General

“Field tech is **amazing**, and field tech is a **major headache**.”

“**I am very pro field tech!** Once we work the kinks out I think it will really simplify our data collection in the field and analysis when we get back to the office.”

“**TBH, [the exercise] reinforced my skepticism about field tech.**”

“It really enforced the **need to test devices completely offline**.”

“**Geotagged field photos** are very useful.”

“**I'm much more comfortable with what we have available**, how to use it, and know which ones I will try to prioritize and utilize in the future.”



Lessons Learned: Devices

“**Tablets** are simply way **too bulky**.”

“The **phone** was the **perfect size**.”

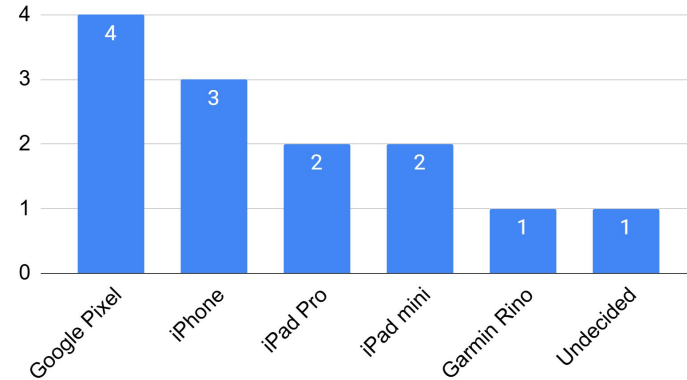
“The **Ipad mini** is a **perfect size** for me (large enough to see maps easily, and small enough to handle easily in the field).”

“If I need **higher-accuracy** GPS data, I'd plan to pair the **Bad Elf** to the Pixel.”

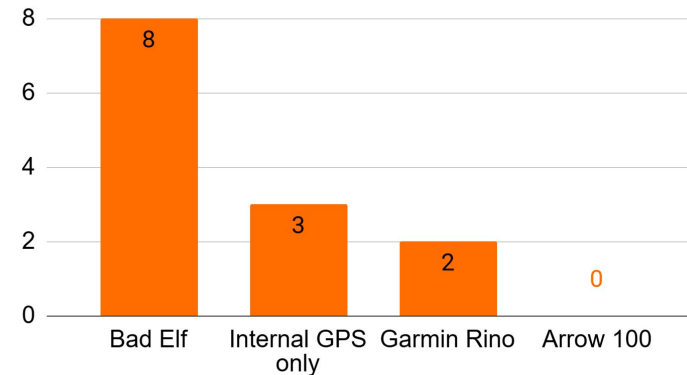
“I find that **internal gps** accuracy is usually **good enough** for my needs.”

“I take notes and map on paper, and I use the tablets for **navigation** and **reference**.”

Preferred Field Device



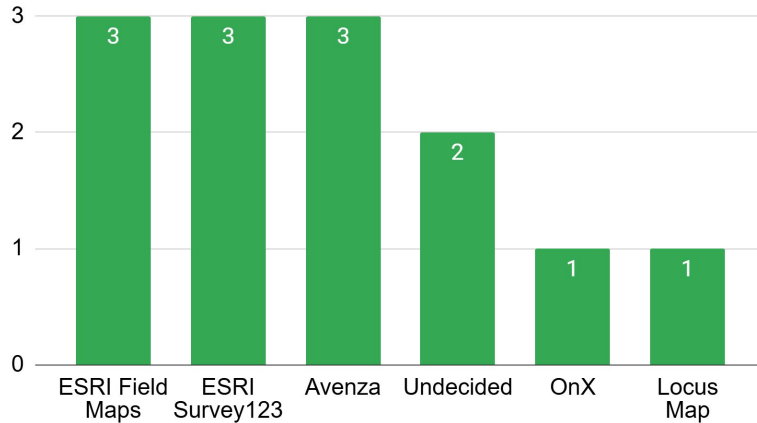
Preferred GPS





Lessons Learned: Apps

Preferred Field App



“I am much **more interested in FieldMaps and Survey123** than I previously was.”

“I'm intrigued with **ESRI Field Maps**, but am **not sure I have the time or bandwidth** to figure it out myself.”

“**Survey123** is like having a **digital field notebook**. It was really **easy to sync** when we go back to the office.”

“Next field season I will use **Survey 123 for data logging**, **Avenza for visualizing** lidar and select **basemaps**, and **OnX for field navigation**.”

“I would be interested in experimenting with the field logging app used by the Canadian Geological Survey, **GSC-Field-App**.”



Key Takeaways

“This was great! I really liked the idea of it, learned a ton, and **could see the value of doing this again.**”

“It was great to get **people at all different phases of career and skill level working together.**”

“I think that all of the **SOPs and guides** will be very **useful in the future.**”

“Not only did the Map Blitz serve as a **training exercise** while developing a **true final product** but it also served as a **team building exercise.**”

“Maybe we should do this every year 😊”

Questions?

New-to-us tech:



Collaborative improvement of
WSGS SOPs and guidelines:

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