

DIGITAL MAPPING TECHNIQUES 2024

The following was presented at DMT'24
May 13 - 16, 2024

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2024)

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


Results of the GeMS User Assessment Survey – Spring 2024

The 2024 GeMS User Assessment Survey was developed to achieve a key objective established under the newly approved cooperative agreement between the USGS and SCGS, titled "*Creating and Testing Workflow Processes to Develop GeMS Maps and Databases in ArcPro Using Updated GeMS Tools*" (Award #G24AC00074).

The survey was conducted to identify needs and gather suggestions for future GeMS guidance materials and documentation. These resources are intended for the wider GeMS community's use, so keeping our fingers on the pulse of the community's needs is essential.

A secondary goal of the survey was to assess changes in staffing and GIS practices within the GeMS userbase since the 2019 GeMS User Survey. The initial 2019 survey, with 48 respondents, was designed to evaluate GeMS implementation among state surveys. Its findings were presented at DMT '21 Lite alongside a live follow-up poll that was conducted via Mentimeter; results of the previous survey can be made available upon request (debruhld@dnr.sc.gov). The new survey saw a slight increase in participation with 53 respondents; this reflects a growing engagement with the schema.

The feedback collected through the survey will play a significant role in shaping the rest of the project, which will be developed in collaboration with the USGS over the next two years. Possibilities to explore include text-based and video-based tutorials, ArcGIS Task files, and more robust documentation of ancillary elements (i.e. metadata, tool usage, etc.)



Results of the GeMS User
Assessment Survey –
Spring 2024

Background

- Initial survey distributed in 2019 with the goal of assessing GeMS implementation amongst state surveys
 - 48 respondents
 - Presented at DMT '21 Lite, alongside brief follow-up poll that was conducted live
- New survey intended to both follow up on the 2019 survey *and* to better inform the creation of new guidance materials
 - 53 respondents

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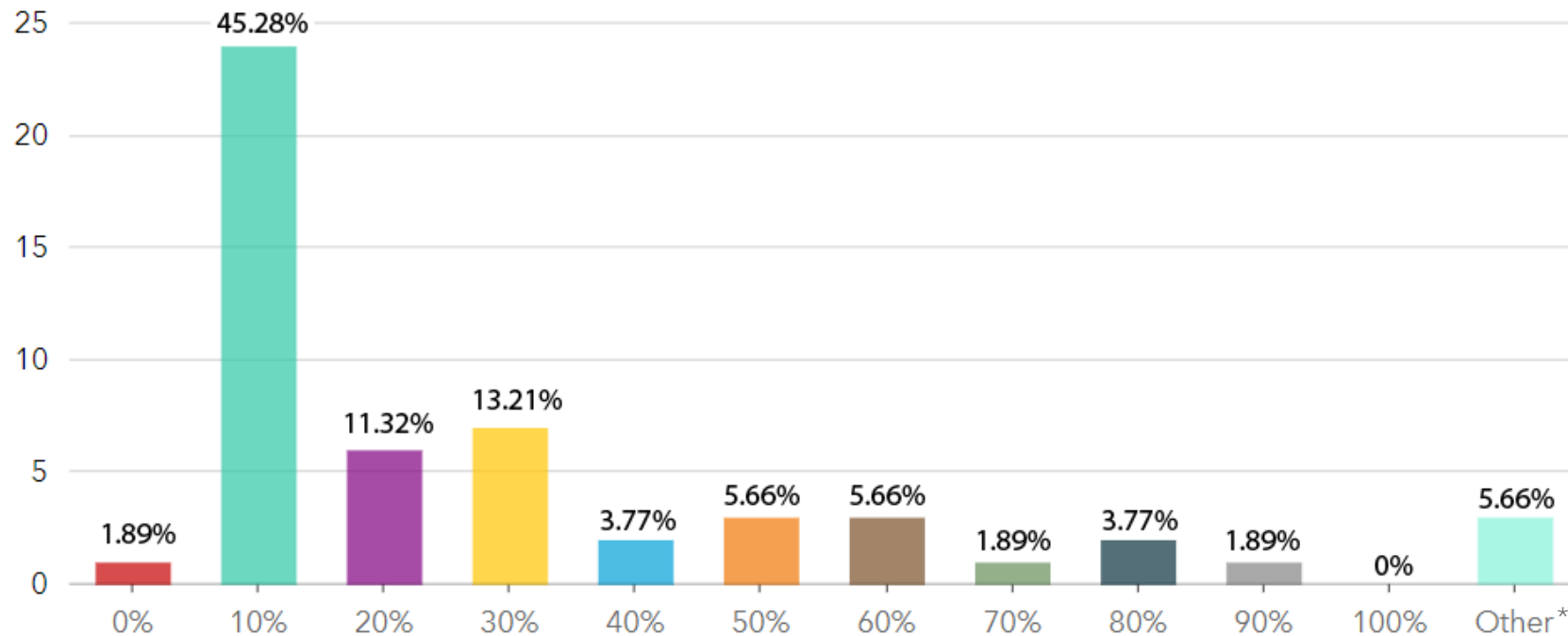
Jerry Krieger
Cartographer



SOUTH CAROLINA
GEOLOGICAL SURVEY

“What percentage of your agency's staff are proficient in GeMS?”

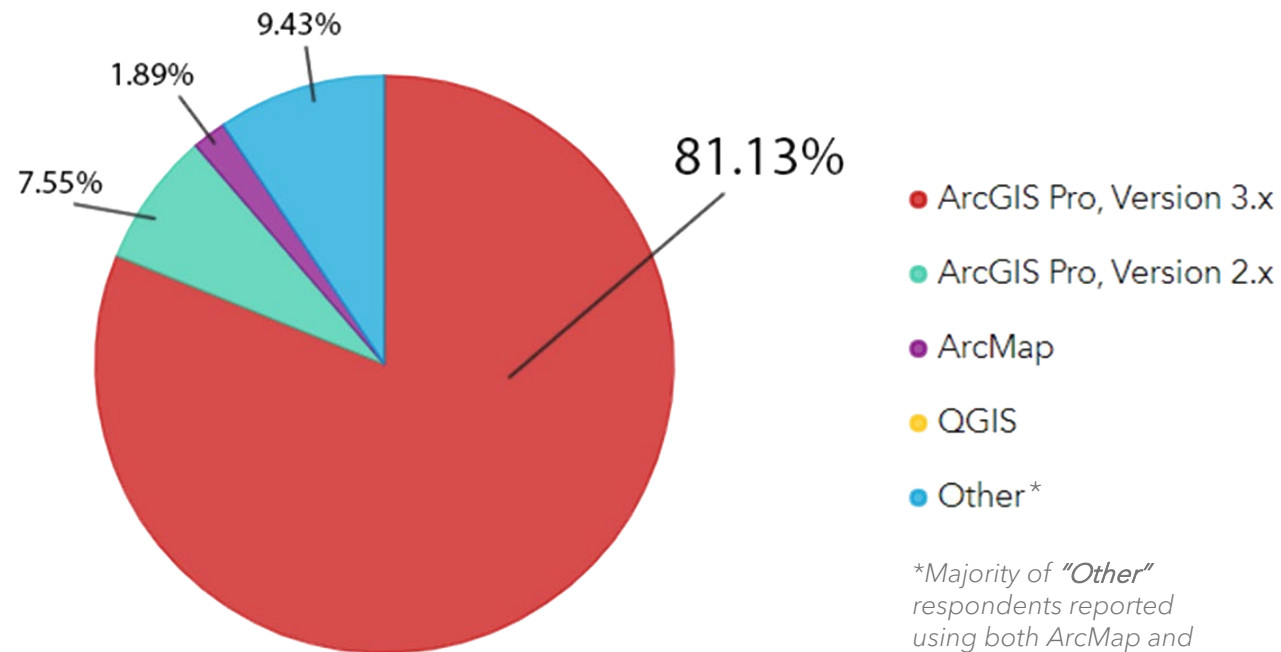
‘Proficiency’ indicates a regular use of the schema and a comfortable understanding of the majority of its concepts.



**Majority of “Other” respondents reported a percentage between 0% and 10%*

“Which software does your organization PRIMARILY use to create GeMS packages?”

If you use two different programs an equal amount, please explain this under 'Other'.



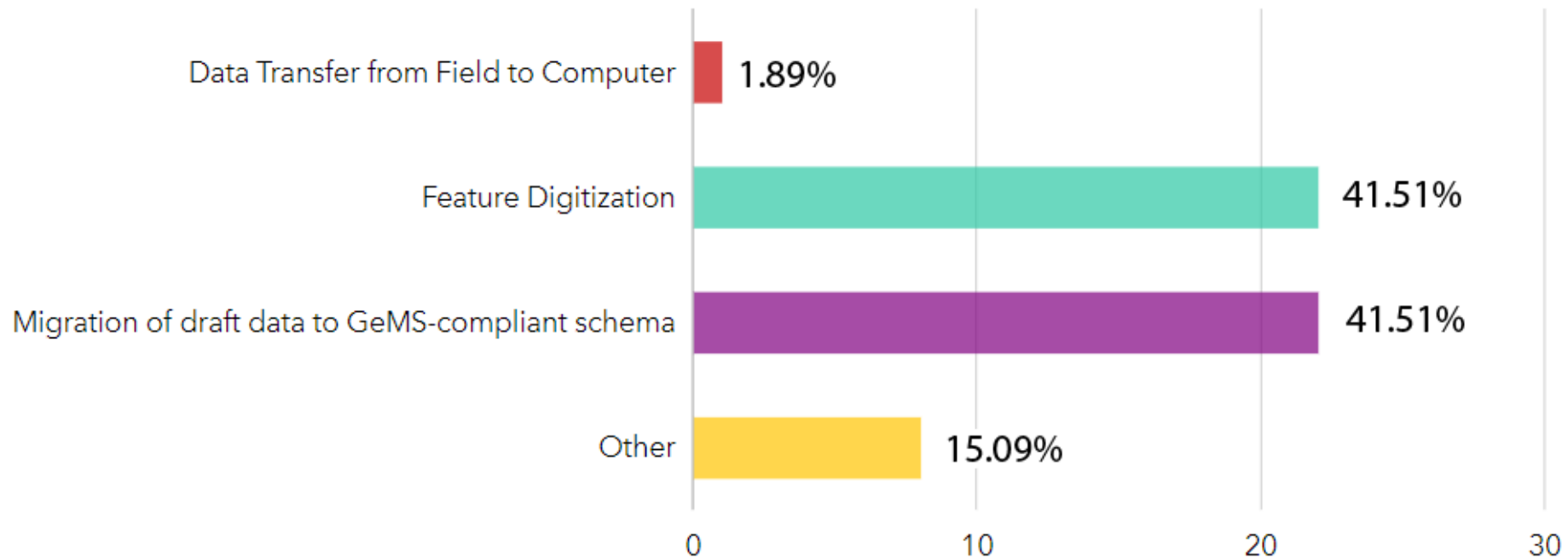
- ArcGIS Pro, Version 3.x
- ArcGIS Pro, Version 2.x
- ArcMap
- QGIS
- Other*

**Majority of "Other" respondents reported using both ArcMap and ArcGIS Pro 3.x equally.*

Previous survey:

Software	Percentage
ArcMap	54.17%
ArcGIS Pro	25%
QGIS	2.08%
Other	16.67%

“What is the most time-intensive part of creating GeMS-compliant databases, besides field data collection?”

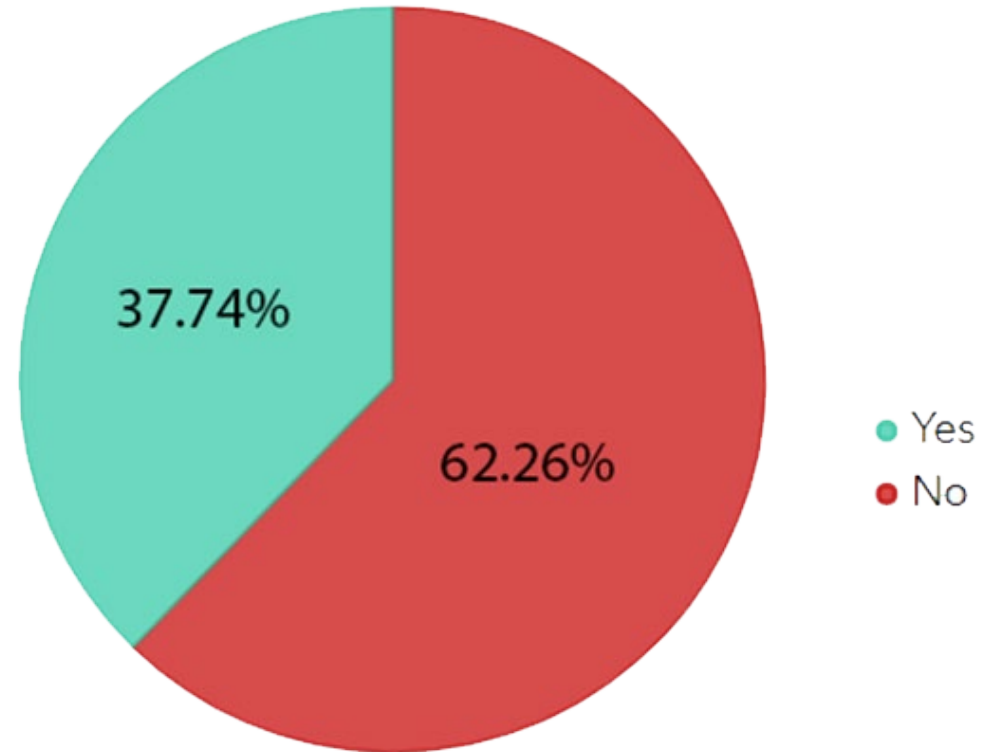


“Other” responses include:

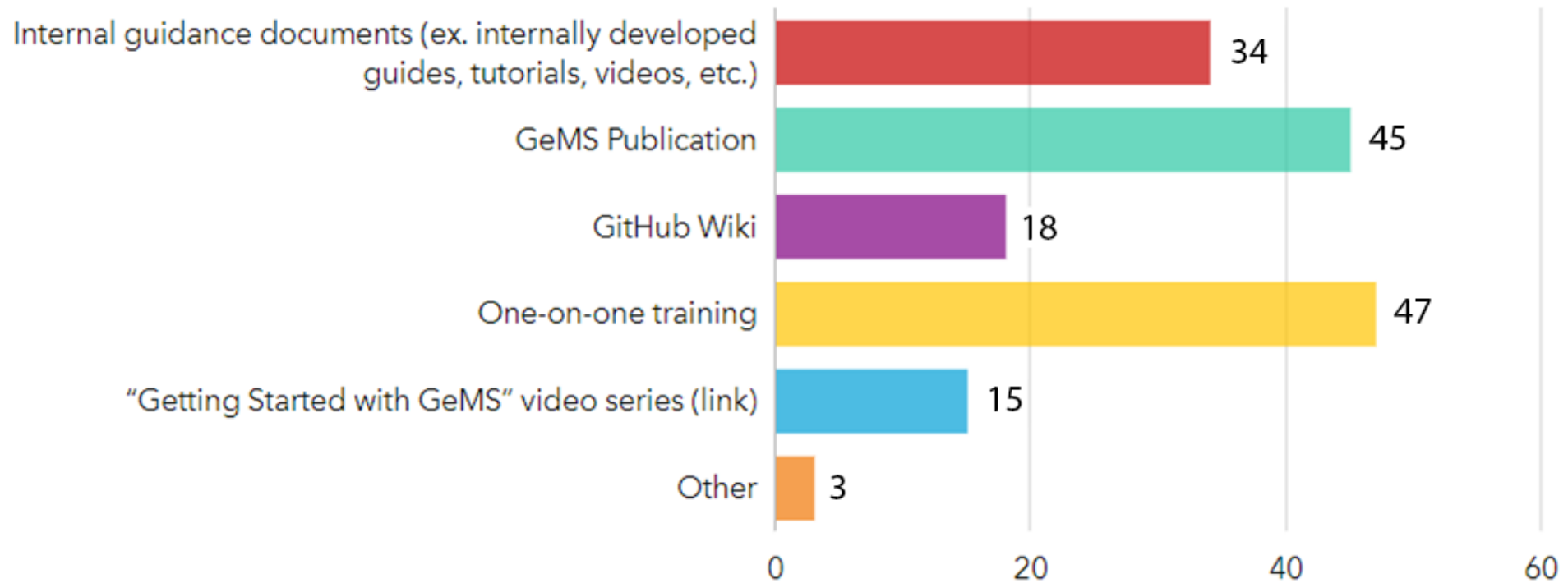
- Creating ancillary products required for the GeMS submission package (e.g. metadata)
- Developing a workflow
- Disagreement between the geologists when reviewing the data

“Does your agency use interns or other temporary workers to complete GeMS-related tasks?”

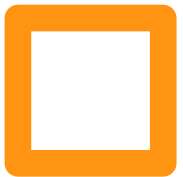
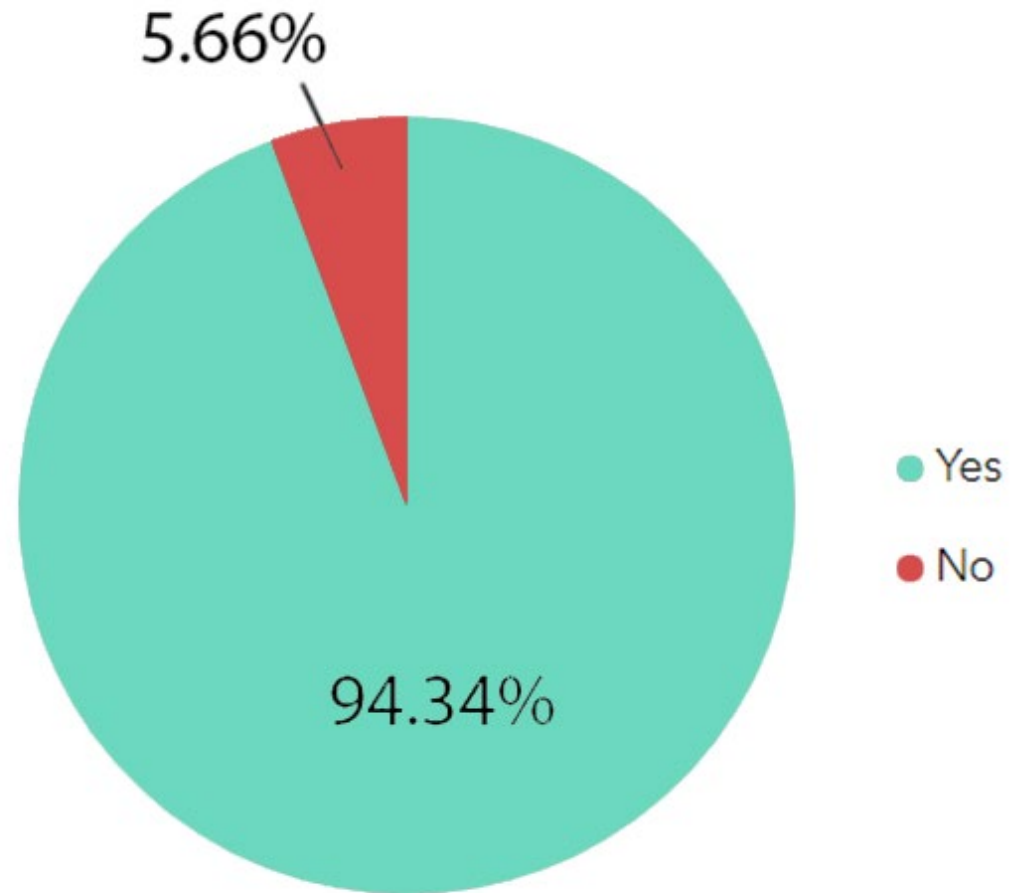
“This question aims to identify how often newcomers to GeMS may be inexperienced with GIS in general.”



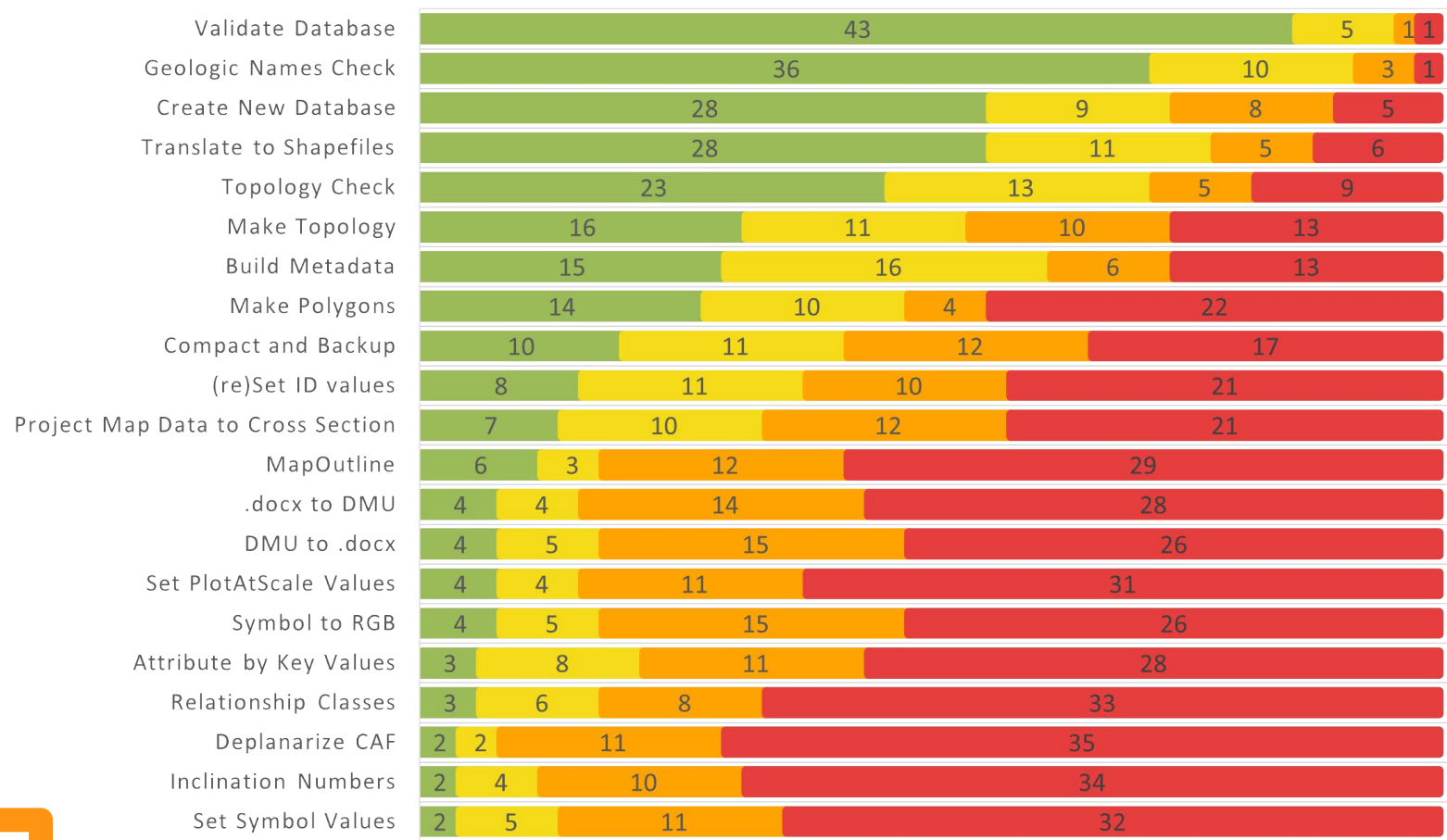
“Which of the following resources do you use to train new staff on the GeMS schema? Select all that apply.”



“Does your survey utilize the GeMS toolbox provided by USGS?”



“Rate the frequency with which you use each GeMS tool.”

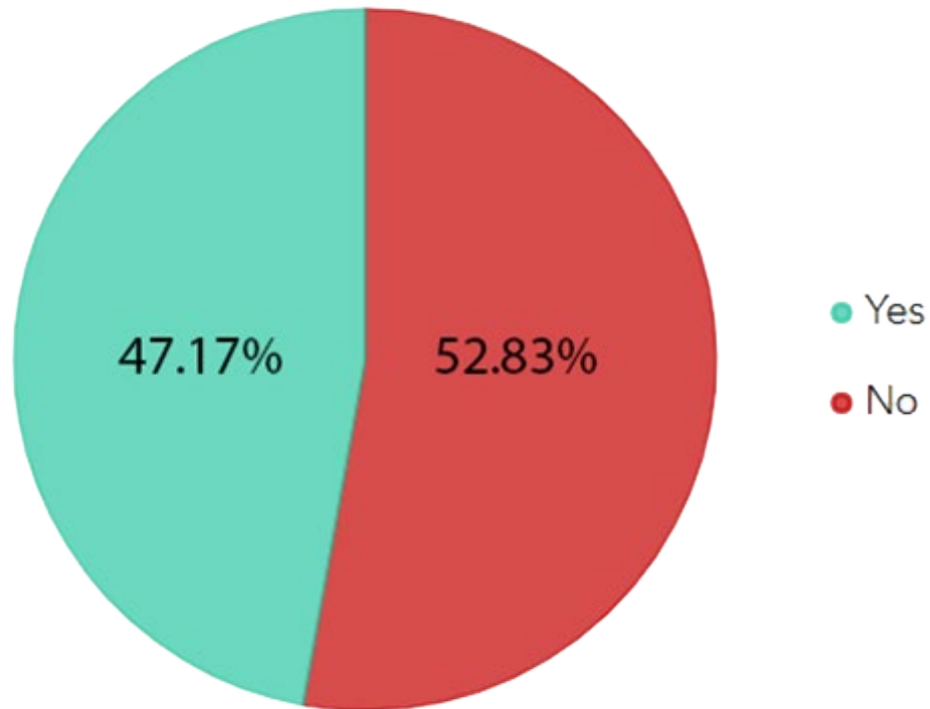


■ A lot
■ Sometimes
■ Rarely
■ Never

Top 10 most used tools from previous survey results:

1. Validate Database
2. Create New Database
3. Topology Check
4. Geologic Names Check
5. Make Topology
6. Translate to Shapefiles
7. Set ID Values
8. Attribute by Key Values
9. Make Polygons
10. MapOutline

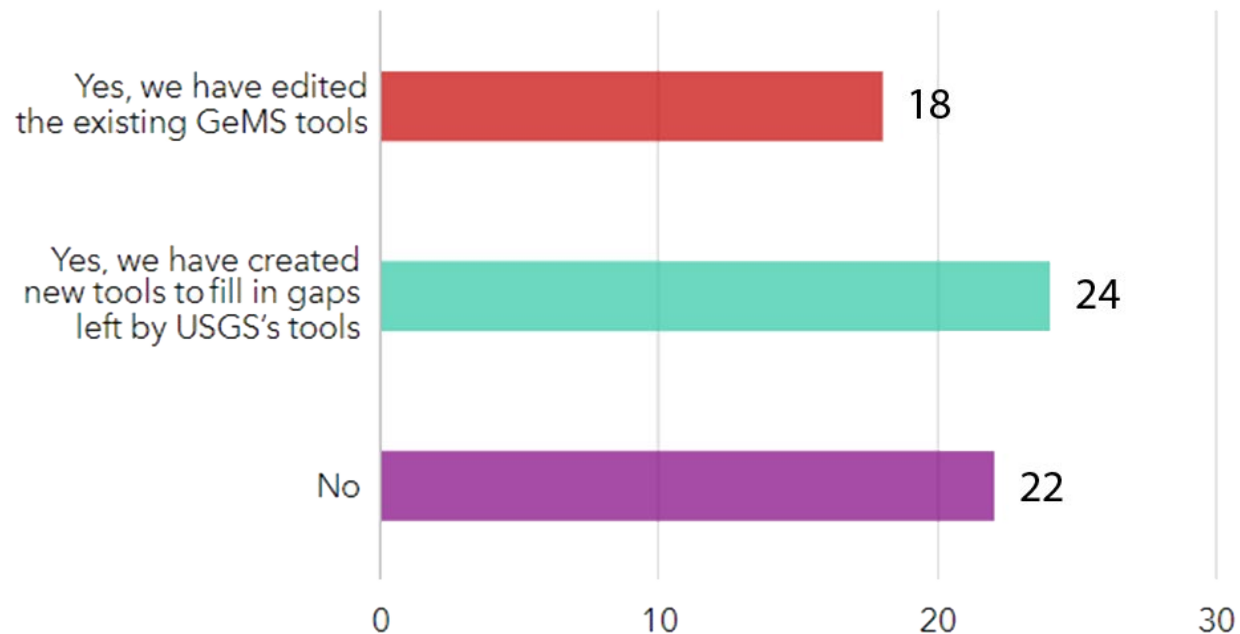
“Have you identified any gaps in your organization’s GeMS workflow that could be remedied with the development of a new tool or the amendment of an existing one?”



Respondents who answered “Yes” reported a desire for the following:

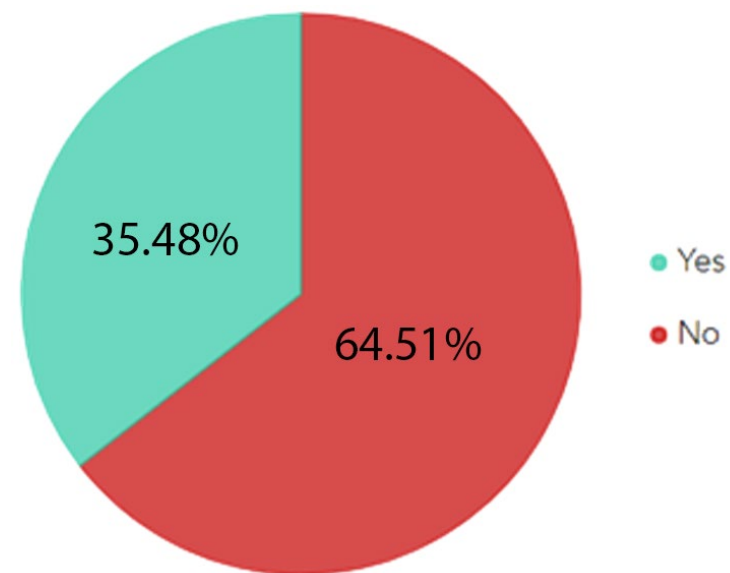
- Layer (or map)-to-shapefile tool
- A tool that could automatically populate RGB codes based on colors in a style file
- A more robust Cross Section tool
- Tools that could better facilitate interaction with ArcGIS Online layers
- Greater interoperability between the tools and external files - e.g., incorporation of the MiscMapInfo table into a new tool to create metadata or transmittal letters programmatically
- A more robust metadata tool in general
- A more effective means of importing data from Strabospot
- An easier way to add custom feature classes to the Create New Database tool
- More thorough error reporting to ease debugging

“Has your organization created any original scripting to accomplish GeMS-related tasks? This includes specialized edits to the existing tools, as well as the development of entirely new ones. Select all that apply.”



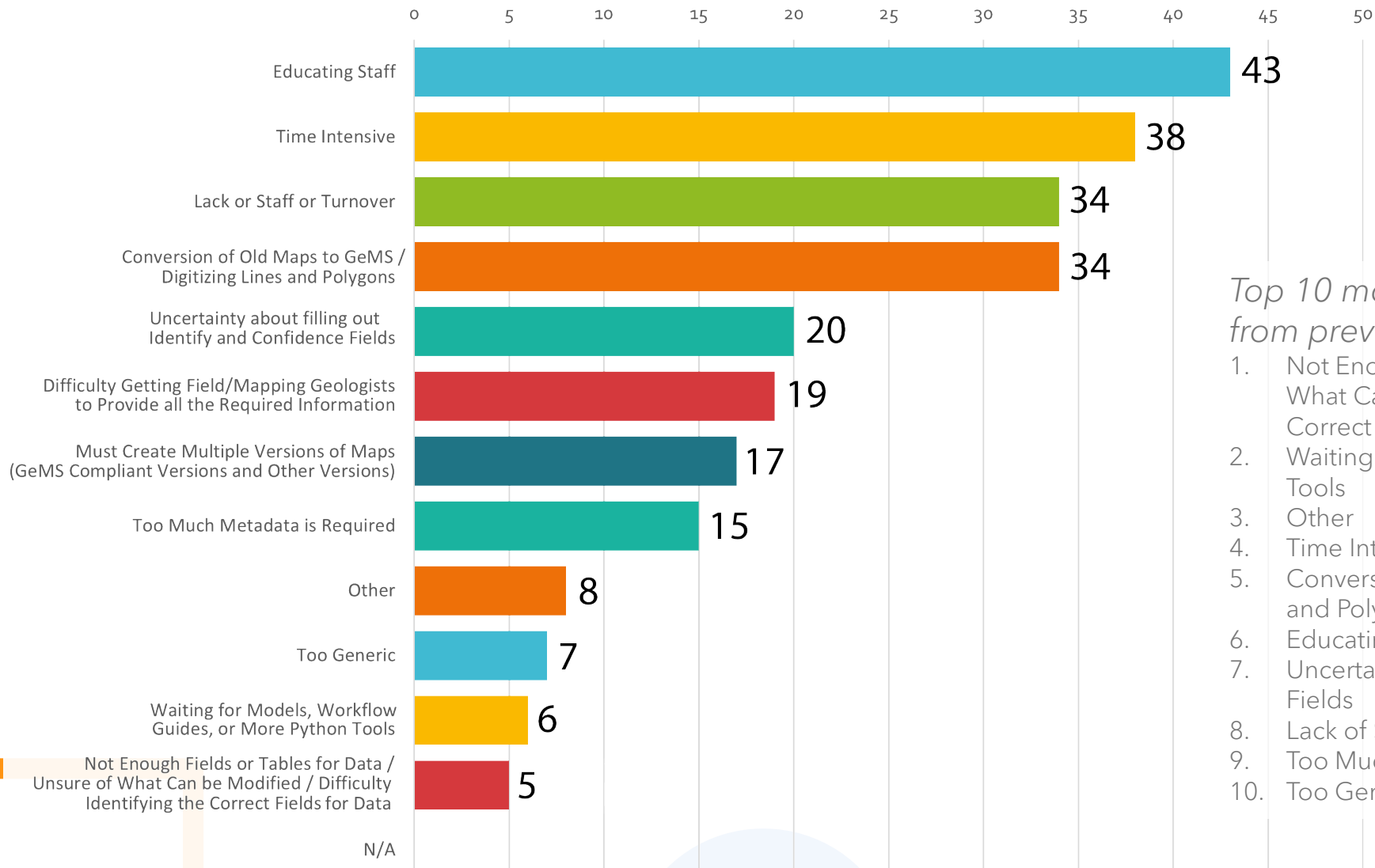
If yes:

“If your agency has developed a tool(s), have they been shared?”



Respondents reported sharing tools internally via their own agency-run GitHub repositories, in the “Discussions” section of the main GeMS GitHub repository, through GitLab, through personal communication, and via reports to USGS.

“Please indicate challenges that you've already experienced when creating maps in the GeMS format. Select all that apply.”



Top 10 most frequently reported challenges from previous survey results:

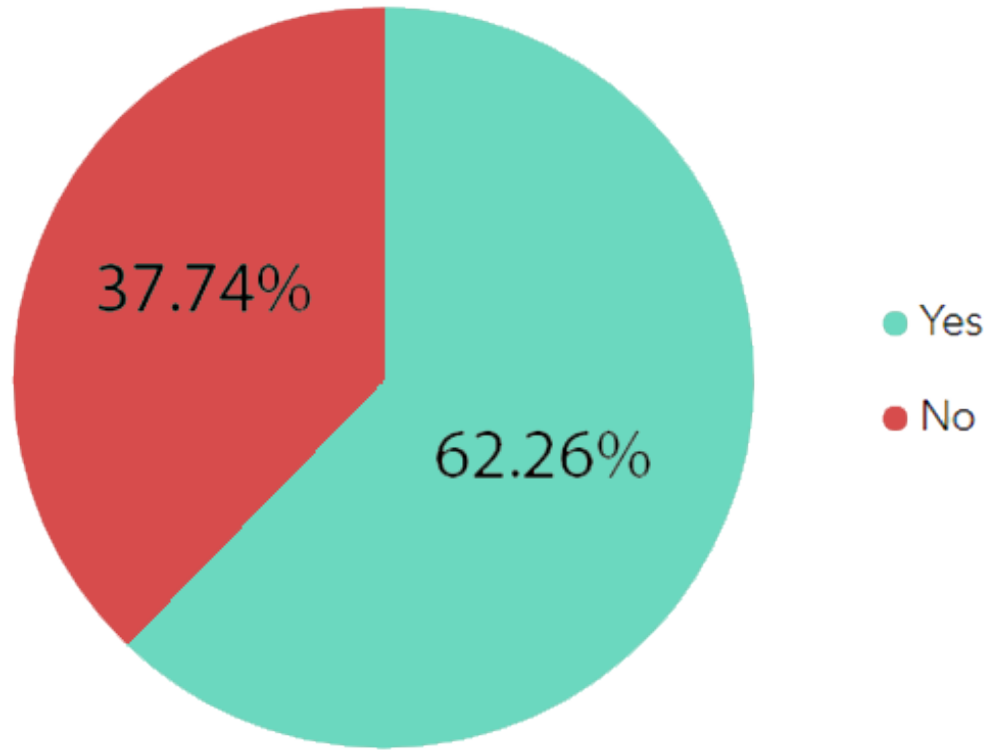
1. Not Enough Fields or Tables for Data / Unsure of What Can be Modified / Difficulty Identifying the Correct Fields for Data
2. Waiting for Models, Workflow Guides, or More Python Tools
3. Other
4. Time Intensive
5. Conversion of Old Maps to GeMS / Digitizing Lines and Polygons
6. Educating Staff
7. Uncertainty about filling out Identify and Confidence Fields
8. Lack of Staff or Turnover
9. Too Much Metadata Required
10. Too Generic

“If needed, please expand upon the challenges your organization has faced here.”

Respondents mentioned:

- *Training and keeping GIS Analysts on GeMS to assist the Geologists*
- *More detail needed in point feature classes to capture important data (observed rock textures, key minerals, grain size, shear/strain indicators, etc.)*
- *Time constraints of edgematching large-scale compilations*
- *No time for geologists to revisit already-published maps to add required information that was not originally captured (Confidence fields, DataSources for specific features, etc.)*
- *Keeping datasets consistent amongst multiple mappers (remedied by using as many domain-controlled values as possible)*
- *Lack of compatibility of GeMS tools with Enterprise geodatabases*
- *Not having a formal process for FedMap projects to submit databases directly to NGMDB*
- *Transition from ArcMap to ArcGIS Pro*
- *Lack of dedicated GIS staff; geologists are having to learn GIS and GeMS at the same time*
- *Creating metadata consistently*
- *Creating the submission package consistently*
- *Staffing limitations*
- *“GeMS QC team has sent back edits to our deliverables based on validation criteria that are newer than the original deliverable”*
- *more basic tutorials and solid examples of fully compliant, complete maps*
- *Reluctancy to report low confidence or questionable data, possibly due to inadequate training in handling scientific uncertainty*
- *Need guidance on packaging non-vector data in GeMS deliverables (e.g. contours, a surface raster)*
- *University colleagues struggle with understanding or teaching GeMS as they have nobody on-hand to educate an EdMAP student how to use GeMS and limited resources for how to make a GeMS-compliant database*
- *Intern turnover - differences in how databases are started vs. how they're finished*

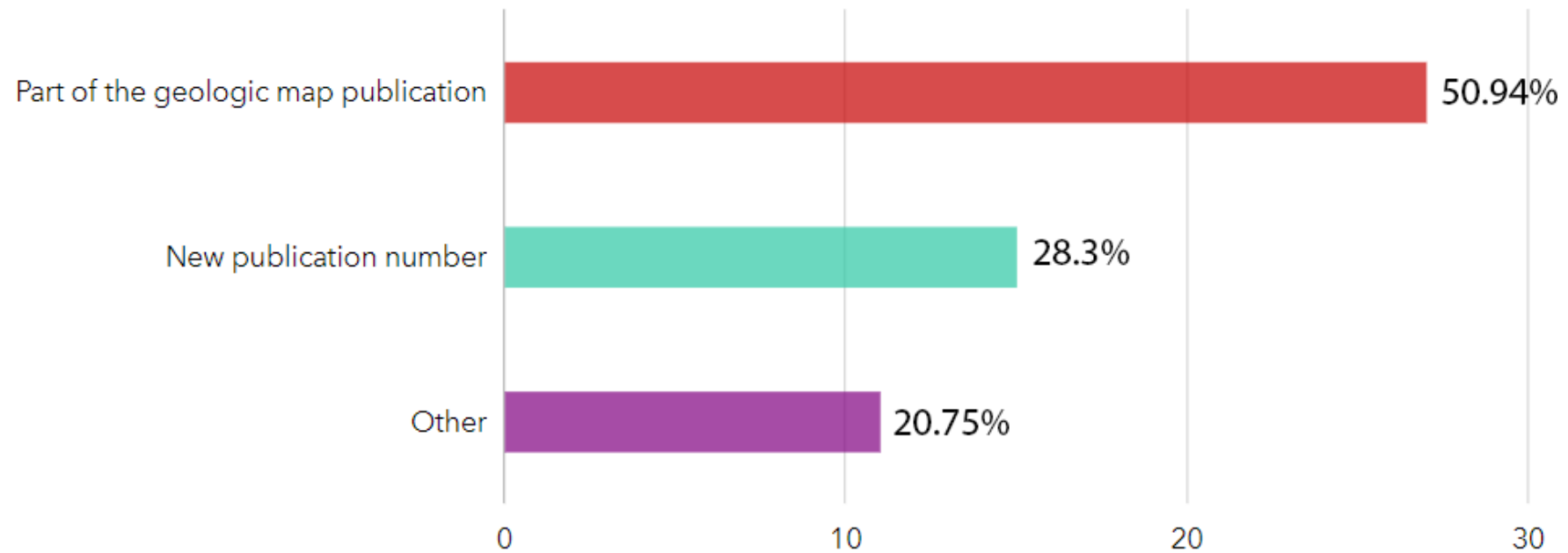
“Does your agency ensure that map PDFs for your website and for GeMS packages are prepared in a consistent fashion, to ensure the PDFs are not overly large?”



Methods disclosed included:

- Flattening all layers
- Flattening certain rasters and optimizing particularly heavy layers; the PDF is not completely flattened, as certain layers are maintained for accessibility reasons
- Adjusting DPI in ArcGIS Pro before exporting to PDF
- Adobe PDF compression tools (ex. “Reduce File Size” option in Acrobat; Adobe’s online PDF compressor; Adobe Distiller)

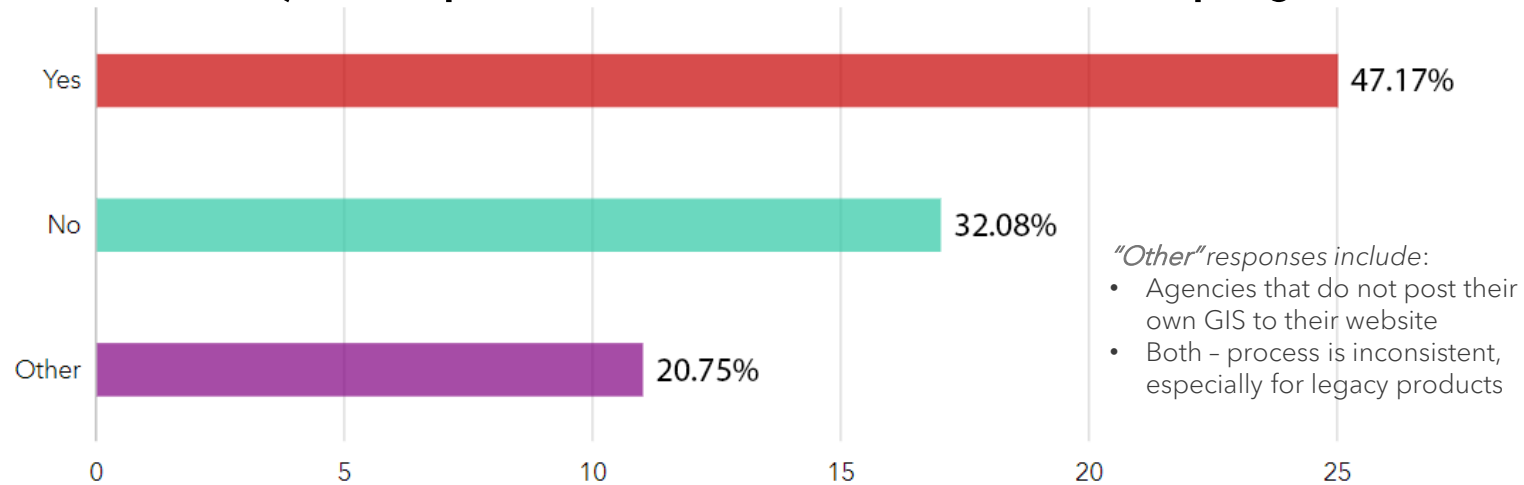
“When you post the GeMS package (or your agency's preferred GIS format) of a published geologic map to your website, do you give it a new publication number, or do you consider it to be part of the original geologic map publication?”



“Other” responses include:

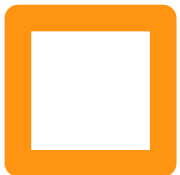
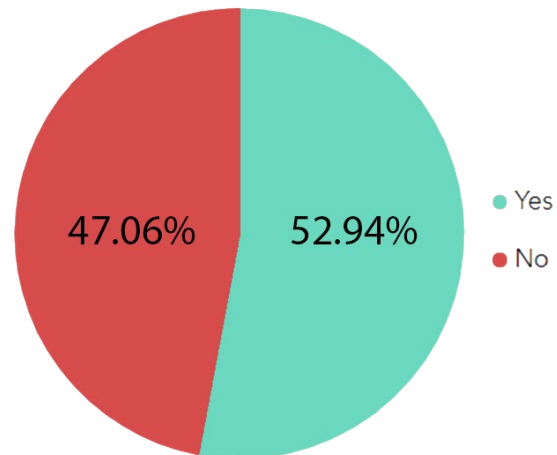
- Agencies that do not post their own GIS to their website
- Both - for new maps, it is considered part of the geologic map publication; for old maps, it's considered a “digital reproduction” and often receives its own publication number

“On your agency's website, do you post the GeMS package (or your agency's preferred GIS format) of a publication to the same Web page as the map?”

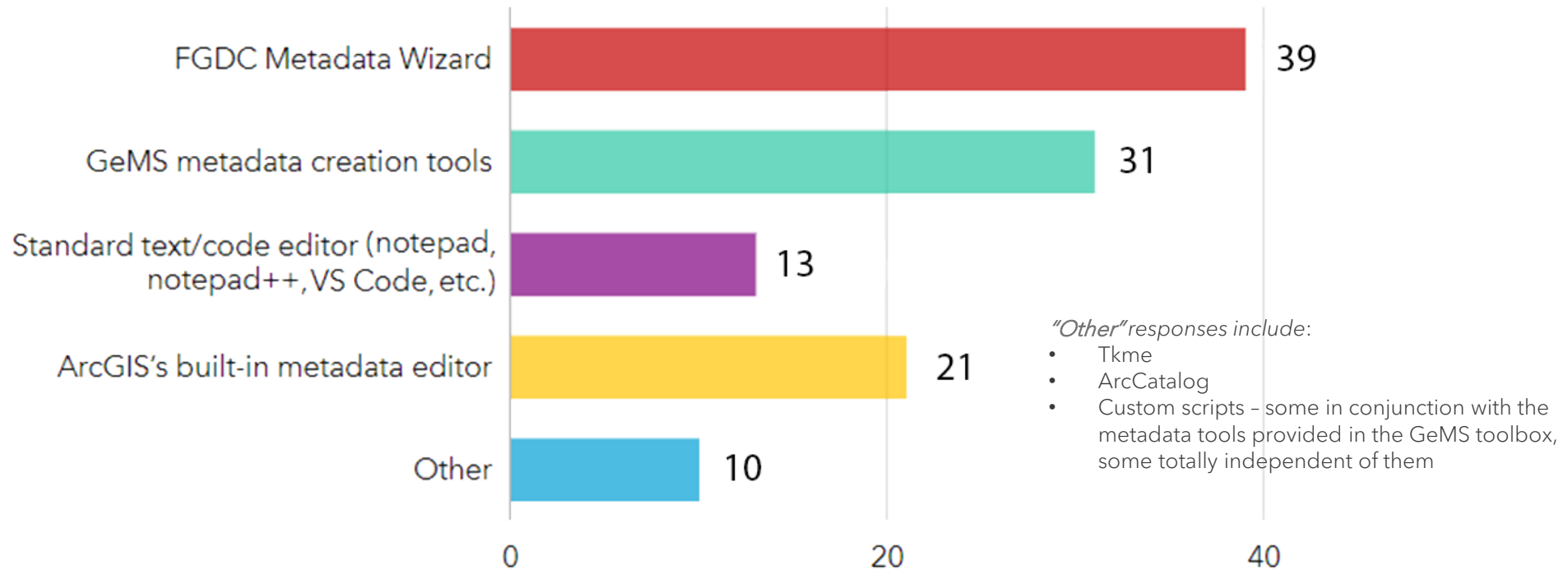


If no:

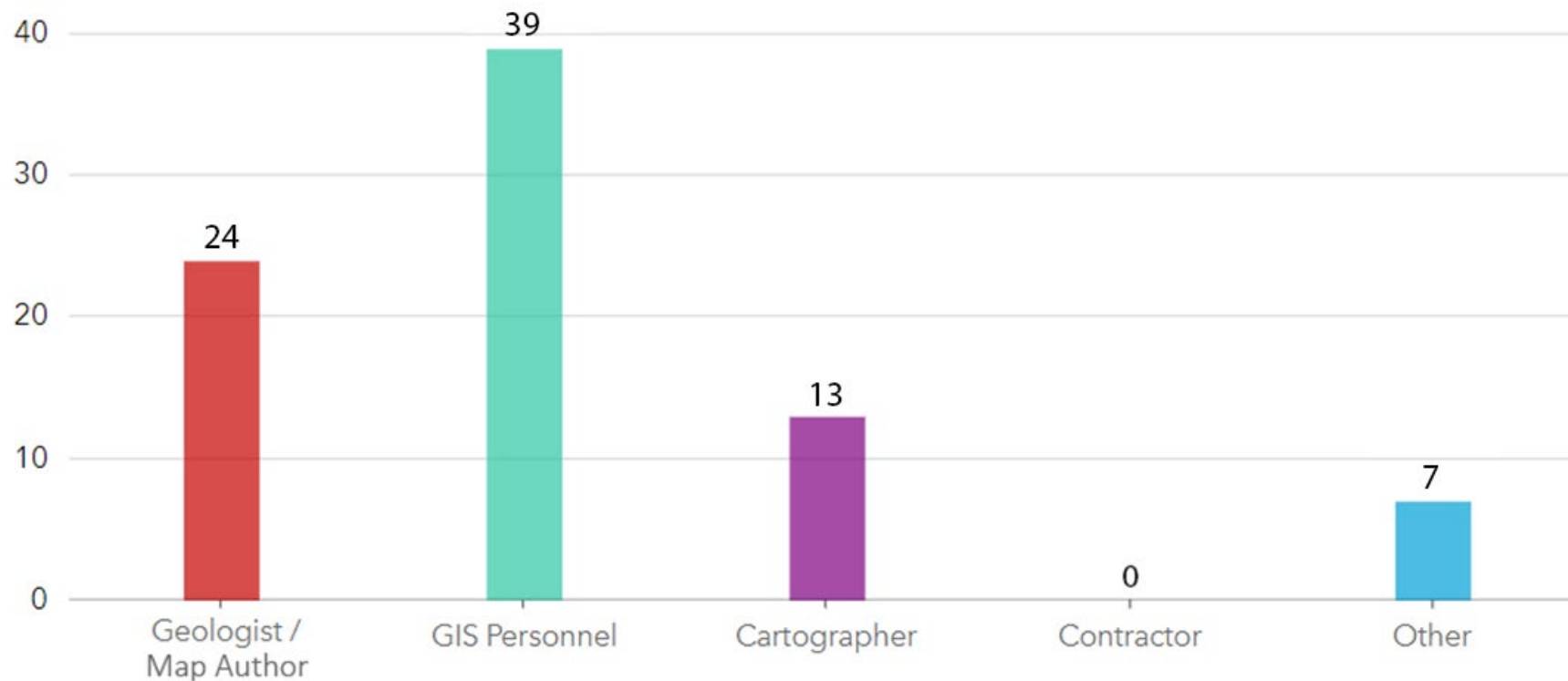
“If you do not post the GIS package and the map to the same Web page, do you cross-link their pages?”



“Which of the following tools do you use to create metadata for GeMS packages? Select all that apply.”

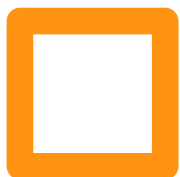


“Who in your organization is responsible for ensuring compliance with the GeMS schema before submission?”

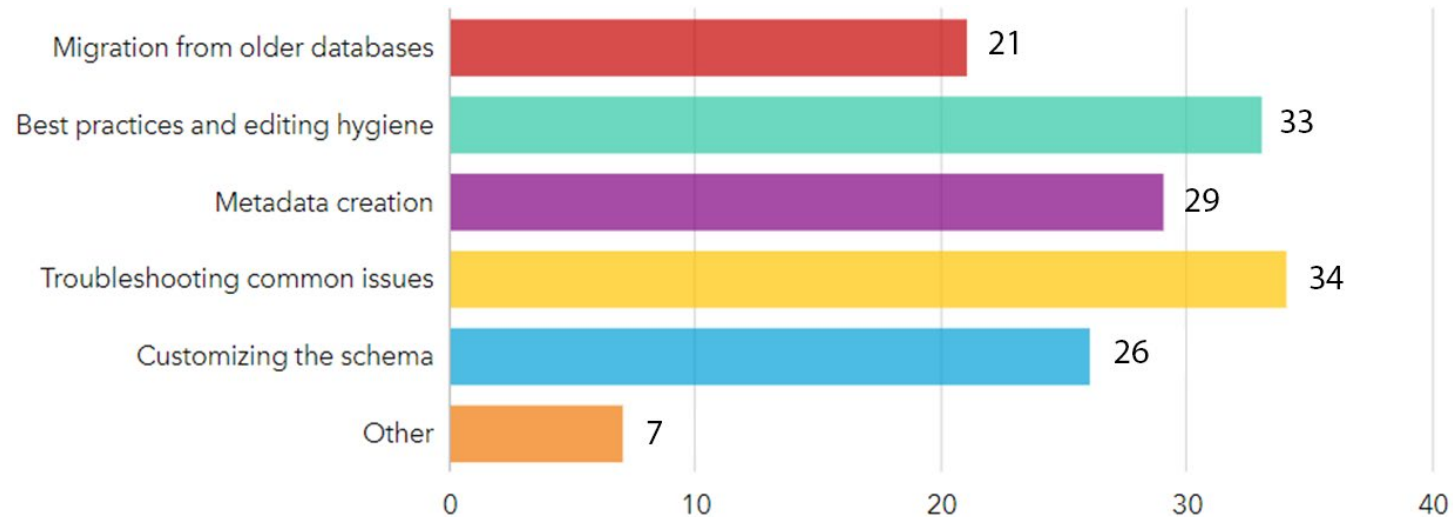


“Other” responses include:

- GIS Personnel in a specific data reviewer role (ex. QA/QC specialist)
- A designated GeMS coordinator
- Multiple people from across these categories
- The State Geologist themselves!



“Are there any topics in particular that you would like to see covered in future GeMS guidance materials? Select all that apply.”



“If needed, please expand upon your requests from the previous question here.”

Responses included:

- More guidance on the level of detail recommended for metadata
- More guidance on the customizability limits of the schema - how far can we push it before it stops being GeMS? Publicly-available examples of customized feature classes would be useful.
- Advice on backwards compatibility issues that come with ESRI products
- Updated GeMS video tutorials that show ArcGIS Pro tools and workflows
- Creating guidance for producing GeMS-compliant 3D datasets
- Interest in a dedicated space to share workflows and tips between surveys more easily
- Continuation of GeMS Office Hours
- More comprehensive tool documentation
- More guidance on lesser-used feature classes (MapUnitLines, GeologicPoints, etc.)
- Standards for multi-layer and large-scale maps
- More guidance for the creation of external documents - eg., metadata, transmittal letters
- More robust guidance on versioning datasets
- More clearly-defined instruction for migrating legacy data from a pre-GIS era

Moving forward...

Plans include:

- Text-based tutorials - comprehensive documentation of various workflow processes in ArcGIS Pro
- Working towards updated video tutorials - "Getting Started With GeMS" video series, remade for ArcGIS Pro
- ArcGIS Tasks - Interactive files that walk users through workflows within ArcGIS Pro itself
- More robust tool documentation
- Additional guidance on ancillary requirements, e.g. metadata



Thank you!

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