DIGITAL MAPPING TECHNIQUES  2017

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The contents of this document are provisional

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http://ngmdb.usgs.gov/info/dmt/
Visit Wyoming’s Geology!

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INTERACTIVE MAPS AT THE WYOMING STATE GEOLOGICAL SURVEY

Interactive online maps are becoming more prominent at the Wyoming State Geological Survey, being that they are more accessible to the public, faster to create and update, and offer the spatial information their predecessor paper maps could not.

In 2016, WSGS launched the interactive Oil & Gas Map of Wyoming, highlighting a new 223-element model that when run, delineates which wells go into which oil and gas fields. This enhancement allows updates of this map on a yearly basis, or more often if necessary, when it used to take many years to organize and update this map.

Other interactive maps available through the WSGS website include the Wyoming Groundwater Atlas launched in March 2017, the Geochronology map, which went online in June 2017, the Bedrock and Surficial Geologic Map Index, that has been available for several years in different forms, and coming in 2018, the Mines and Minerals Map of Wyoming.

One more map currently available for the 2017 tourist season is an ESRI Story Map, Visit Wyoming’s Geology. This map highlights eight main geologic sites, with numerous surrounding geologic sites, museums, and hidden gems. Many sites lie within the path of the total solar eclipse, shown on the map, which will occur in August 2017. Personal experience with this map allows me to talk about testing of ESRI’s story map templates, which ones worked for what we needed, which ones didn’t, what worked within the Map Series template we chose, and where problems arose with it. Some were solved by us, some by ESRI, and some unsolved issues we simply worked around.

Teams were organized to craft each map; each team had a map steward that was assigned the ArcGIS Online license, and that person created and is responsible for updates of that map. Map usage is tracked through ArcGIS Online.

REFERENCES


Visit Wyoming’s Geology!

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WYOMING STATE GEOLOGICAL SURVEY
Here’s a list of the various online maps at WSGS. I’ll talk a bit about each one, ending with the fun one, our GeoTourism story map.
Maps completed:

In 2016 our oil and gas geologist and her team created the online **Oil and Gas Map**, to complement the traditional paper map. This map depicts about 122,000 wells, oil and gas fields, reservoirs, pipelines, and other infrastructure.

Our Natural Resources Analyst set up a 223-element model to streamline updates of this map on a yearly basis; or more often if necessary. The advantage of the model is that updates are relatively quick, and are consistent. It’s not left to the whim of an individual to decide what wells go in what fields, as in the past.
The Powder River Basin in Wyoming is an example of why this model is such a welcome addition.
On the western side of the state, in the Pinedale anticline they're drilling 30-40 directional wells from each well pad!

Both the online and paper versions of the oil and gas map have won several awards in the last year. The model behind the online map was also featured in the winter 2017 issue of ArcNews.

This is one of our more popular maps.
This year in March, our hydrology section created a **Groundwater Atlas** application. It offers surface hydrology, hydrologic units, water wells, water rights, aquifers, groundwater quality data. It’s important information in a dry state. This is information that people are always coming looking for, so they got busy and put it all together for easy access. It will be updated as needed. This application has had about 1500 views since its launch.
The **Published Maps Index** is a basic application, but useful. It shows our bedrock, surficial, 100k, 24k published geologic maps, and links to pdfs. We have the shapefiles on our website. You can see we’ve got a ways to go to complete the statewide bedrock mapping at 1:100,000. A lot more geologic mapping has been done by the USGS of course, and is available through NGMDB.
That’s what I’m talking about!

Online maps available at WSGS
- Oil and gas map
- Groundwater atlas
- Published maps index
- Geochronology map (coming soon)
- Mines and minerals map (coming soon)
- NREX* (Natural Resource and Energy Explorer)
- GeoTourism story map (what worked, what didn’t)

Maps in the making...
We have a Geochronology app coming out in June. It’s a compilation of internal and external radiometric data for the state. I don’t have an official map to show, so I made something up.

Hey, we’re not all geologists!
Our Minerals geologist is working on a Mines and Minerals online map. I do not have a shot of this map either, so I’m just showing some of Wyoming’s rocks and minerals. This map will have mineral sample locations, chemical analyses, active and inactive mine locations, and everything from precious minerals, metals, and rare earth elements, to industrial minerals and construction aggregates, like sand and gravel. It will be a useful tool for mineral investigations. ETA on this map is summer 2018.
NREX is not our application. It was mandated by the governor a couple of years ago, to get publicly available statewide data of all kinds into a usable app, and was created by WyGISC, the Wyoming Geographic Information Science Center. It’s kind of Wyoming’s data clearinghouse. Our 500k geology and oil & gas fields are in this app. It’s a useful application, but does however require a login to use.
Now on to our GeoTourism Story Map! Let’s take a drive.

Last fall we put together a small team consisting of a couple of geologists, the two of us in GIS, our PR person, and our supervisor, as the voice of reason. We then started working on how best to get Wyoming’s geology out to the public.

“The voice of reason” wanted to keep it simple, so out-of-the-box story maps were chosen, and we started scheming.
We all threw our ideas for geologic sites into a hat and after much debate we narrowed them down to eight final sites. These sites met certain criteria: accessibility, popularity (or in some cases just nice geology), and a good spread throughout the state.
We decided to add museums, and narrowed the list down to those with any geologic interest.

Then we started experimenting with Story Map templates.
We tried the Map Tour template. We put together a collection of sites to test it out. It was catchy, but not quite what we needed. We wanted more flexibility in the map symbology, and more options for descriptions.
We couldn’t get too wordy or our photo would disappear!
We tried the Map Journal template. I liked it, but it got voted down as it was too wordy. The “voice of reason” argued that people these days have the attention span of a two-year-old, would read a line or two, and shut it down and move on.
So this was *too much* description. We were suffering from the Goldilocks Effect. Too little in Map Tour, too much in Map Journal!

We tried Cascade. And Shortlist. They didn’t fit our needs.
Then we found our way to the Map Series template. This was the one!

And as it turns out, ESRI’s “Ask a Pro” suggested that we use Map Series. I just didn’t discover this early on. But then, I wouldn’t have had all the fun and gained all the experience of testing out the other story map templates. Which was a good thing!

Map Series gave us our map, front and center, with the flexibility of symbology that we wanted.
This template allowed us to delineate our original eight sites clearly in the tabs above, matching the symbols on the map. We created a simple bulleted description, and if people want more information...
...clicking on More... takes them to a web page for each of the eight sites with more detailed information and links. These pages reside on our website.

And the fun part? Visitors can cruise across the state from site to site in the little red jeep, in the dynamic graphic above.
We’ve added the museums with customized popups that include short bulleted descriptions and links to their websites.
We’ve included additional geologic sites in the blue dots, with a little information on each, and websites.
Then there’s the Big Event! Wyoming is smack dab in the path of the Total Solar Eclipse in August. First time in Wyoming since 1918, and it won’t happen again until 2106. It’s estimated Wyoming’s population will likely double for that week! (No kidding!) So we’ve added a selection of geologic sites within the path so people have something to do before and after the 2-minute event.
Then we have added a BONUS feature we call Hidden Gems, which are rockhounding areas or just nice geologic sites for those that would like to explore a little further. They aren’t immediately obvious, so like hidden treasure, people have to search for them.
Problems we had with Map Series?

Probably the biggest hurdle is the disconnect between the symbol on the map, and the tab! It doesn’t go both ways. Click on a tab above, and the description panel pops up on the map, but click on the rock hammer symbol on the map, and it does NOT bring up the corresponding information panel. I wrote ESRI about this, and they said they will ‘incorporate my comments into future app development’.
A couple of heartburn issues were line spacing and symbols in the description panel.

Line spacing was erratic, it might look fine in edit mode, but moving to final, the spacing would often change.

And the symbol images in the key on the Intro panel were unpredictable; some added blow-up arrows where I requested none. And it was inconsistent, as some had them and some did not. So after struggling with this at great length, I left them off altogether.
Considering the wish list we had for the out-of-the-box quick-and-easy story maps, we probably could have downloaded and customized an app more quickly. But we like the look and feel of the story map, and I think we came up with a winning app in the end.

So, if you’re not doing anything August 21, come out to Wyoming for 2 minutes of eclipsing excitement! Or better yet, to enjoy Wyoming’s world-class geology.
Thank you!

Links

Visit Wyoming’s Geology!
http://wsgs.maps.arcgis.com/apps/MapSeries/index.html?appid=d89f3810924b4c35884d58481b7ac01a

Wyoming State Geological Survey
http://www.wsgs.wyo.gov/
Albino pronghorn antelope near Laramie, Wyoming