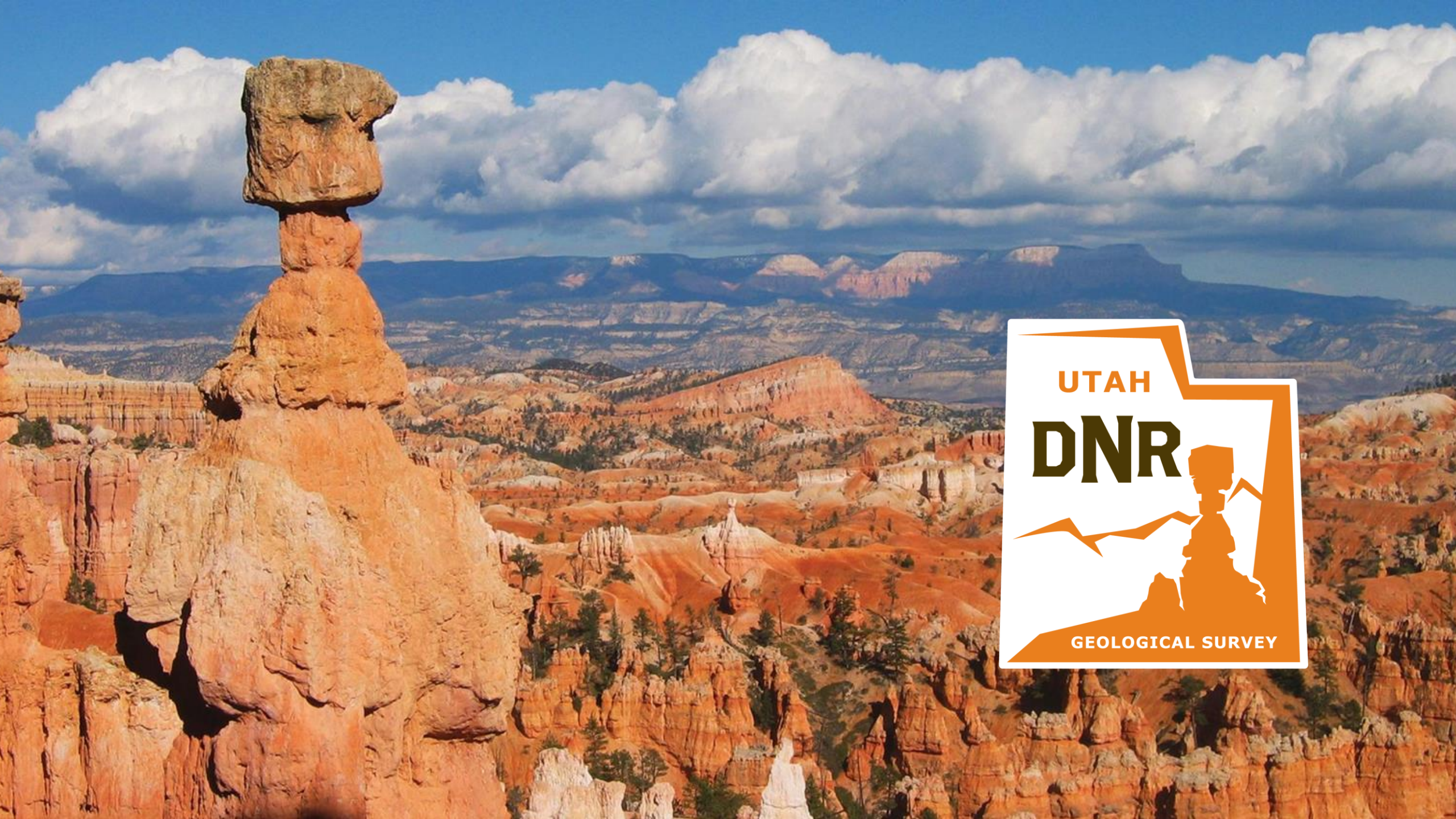
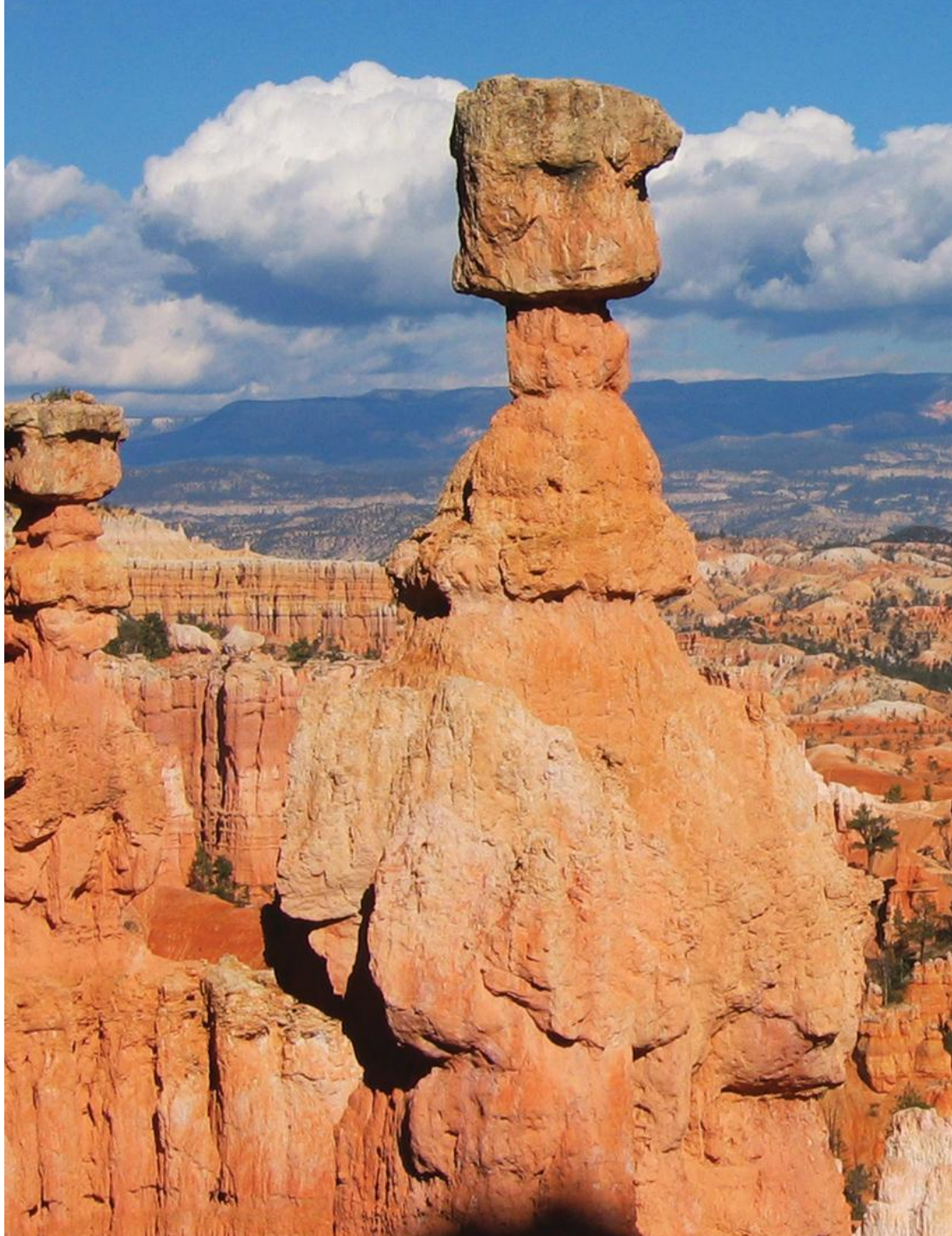

UTAH
DNR
GEOLOGICAL SURVEY

January 23, 2025

Utah Geological Survey

“The Utah Geological Survey provides timely scientific information about Utah’s geologic environment, resources and hazards”



Bill Keach | State Geologist
Director – Utah Geological Survey

We Are the Utah Geological Survey

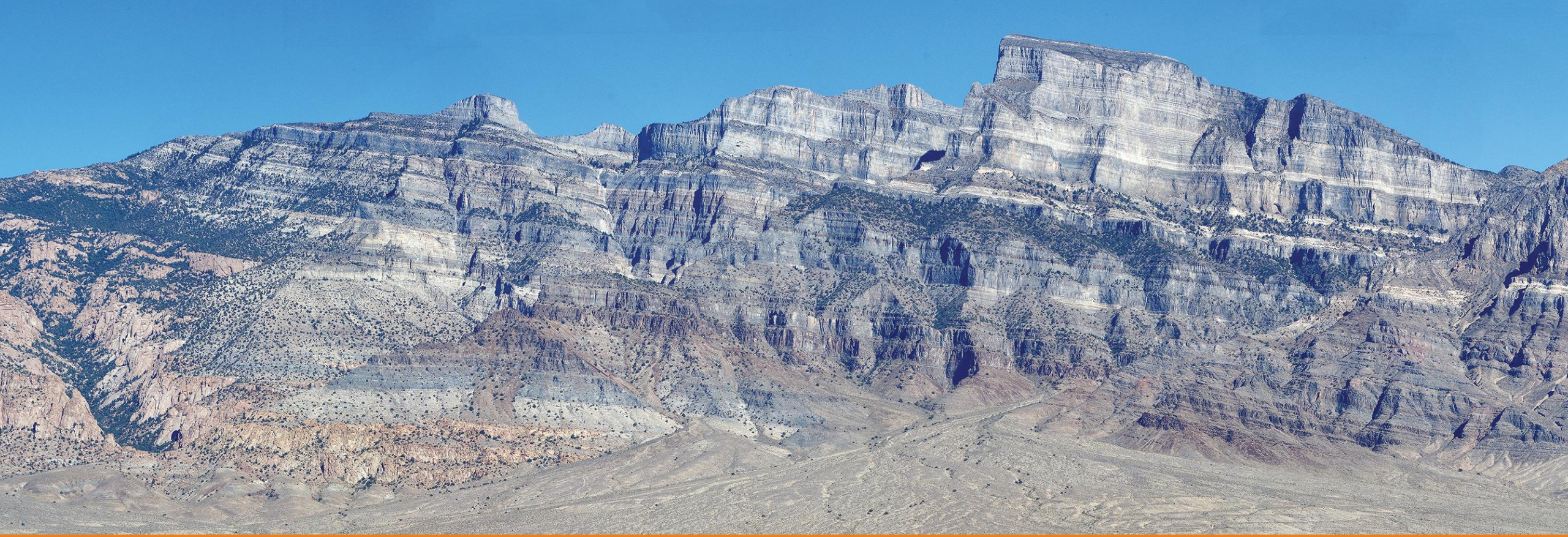
UTAH GEOLOGICAL SURVEY

THE BEDROCK OF UTAH'S SUCCESS

As a division of the Utah Department of Natural Resources, the UGS is a non-regulatory state agency that provides unbiased geoscience information.

UGS comprises six technical programs:

- Energy & Minerals
- Groundwater & Wetlands
- Geologic Mapping & Paleontology
- Geologic Hazards
- Geologic Information & Outreach
- Data Management



Updates on recent funding

Thank You For Legislative Support

Aqueduct Resilience - $50M Funding

Summer 2022

Summer 2024

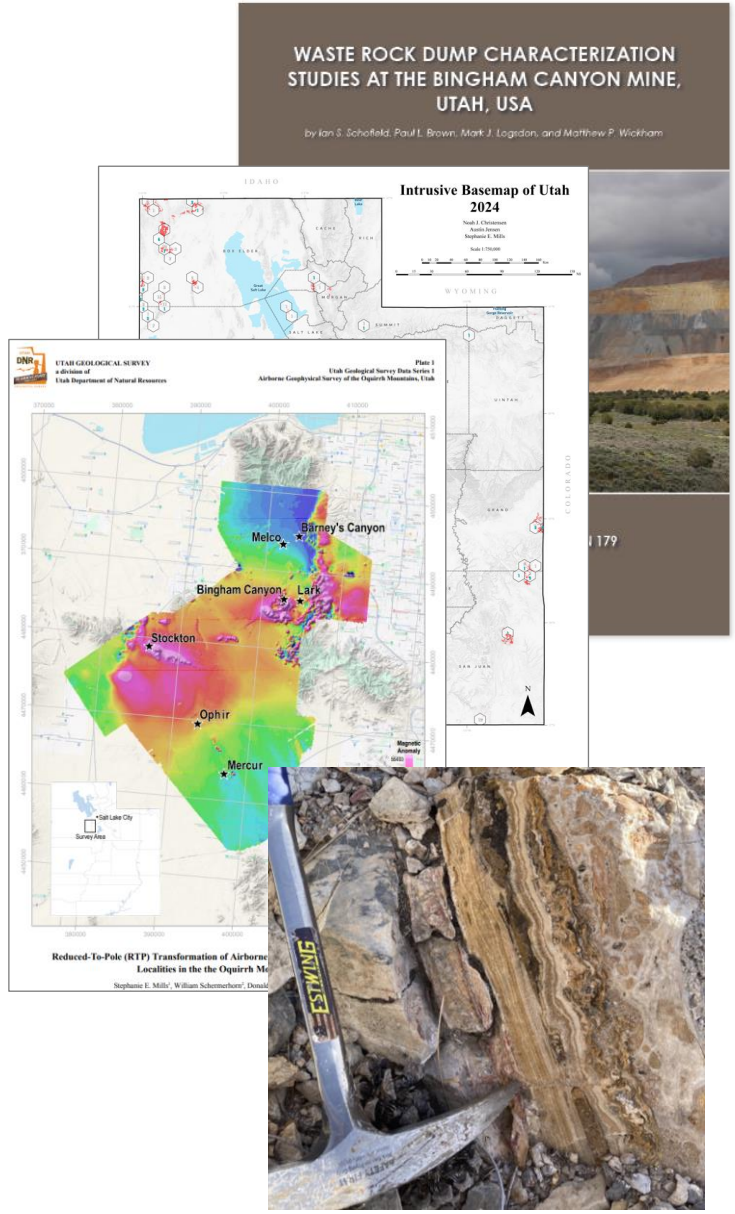
Critical Mineral (CM) Funds - $400K

Project start date: July 1, 2024

- Published 3 new papers on Utah's CM resources and geology
- Hired a Project Geologist with deep knowledge of Utah mining
- Currently mapping and collecting geophysics in Utah's historic mining districts
- Presented Utah's CM resource potential at two national conferences

Ongoing/future work:

- Produce data to support CM industry exploration and investment
- Map Utah's CM resources
- Publish information about CMs to benefit all Utahns



Ground Deformation Monitoring by Satellite Remote Sensing (InSAR)

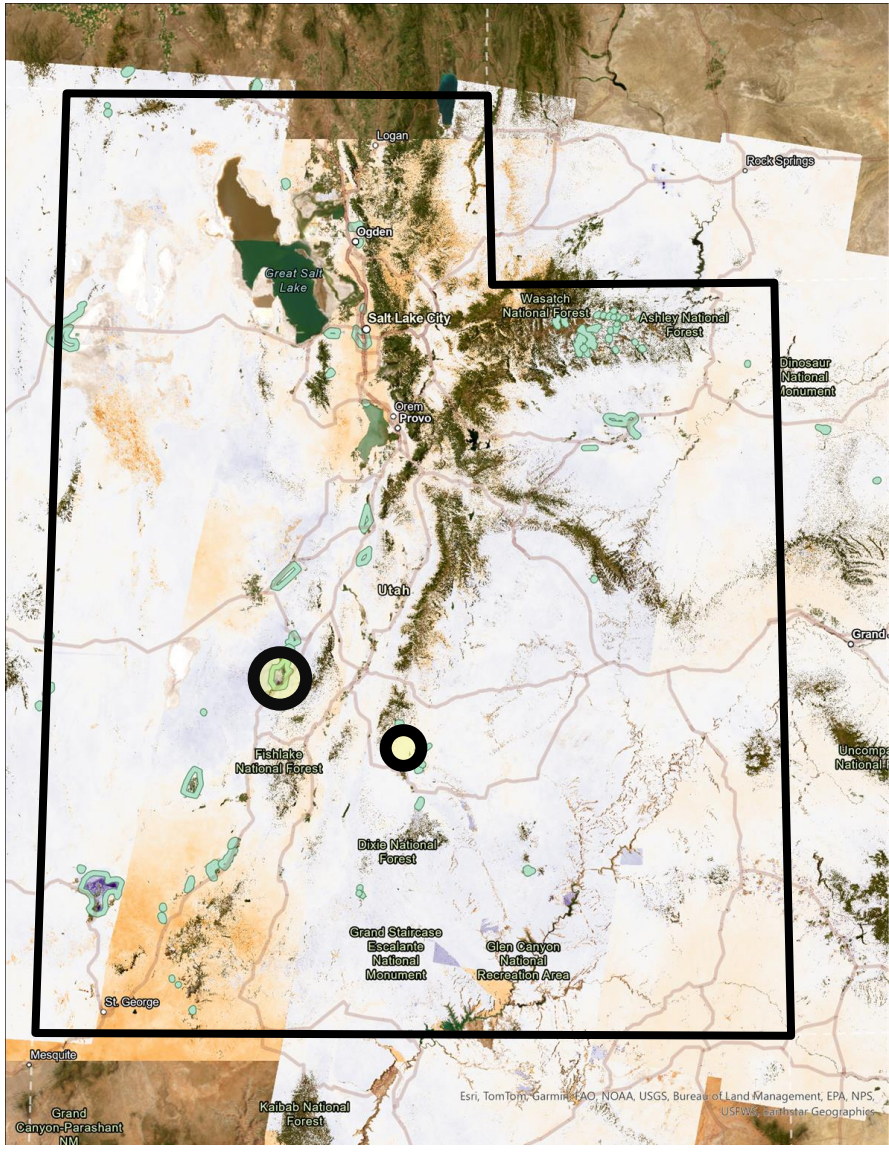
Goals: Monitoring land subsidence due to groundwater withdrawal and landslide movement.

Preliminary results:

- Statewide measurements of ground deformation rates from 2022–2024
  - 30+ deforming regions identified

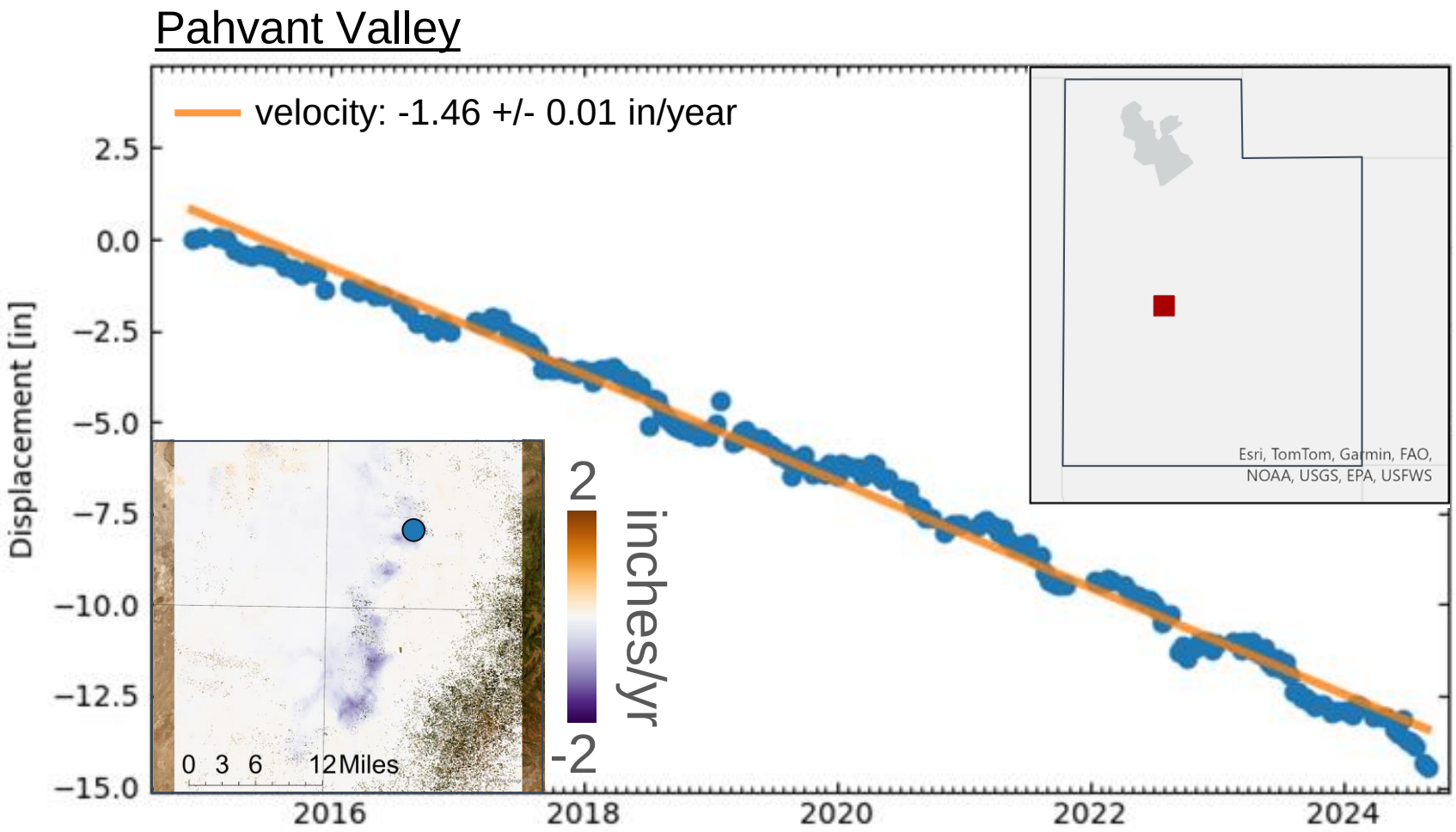
Implications:

- Help water providers better manage groundwater pumping and aquifer recharge projects
- Expand landslide monitoring for better land-use planning



2015–2024 Ground Deformation Rates

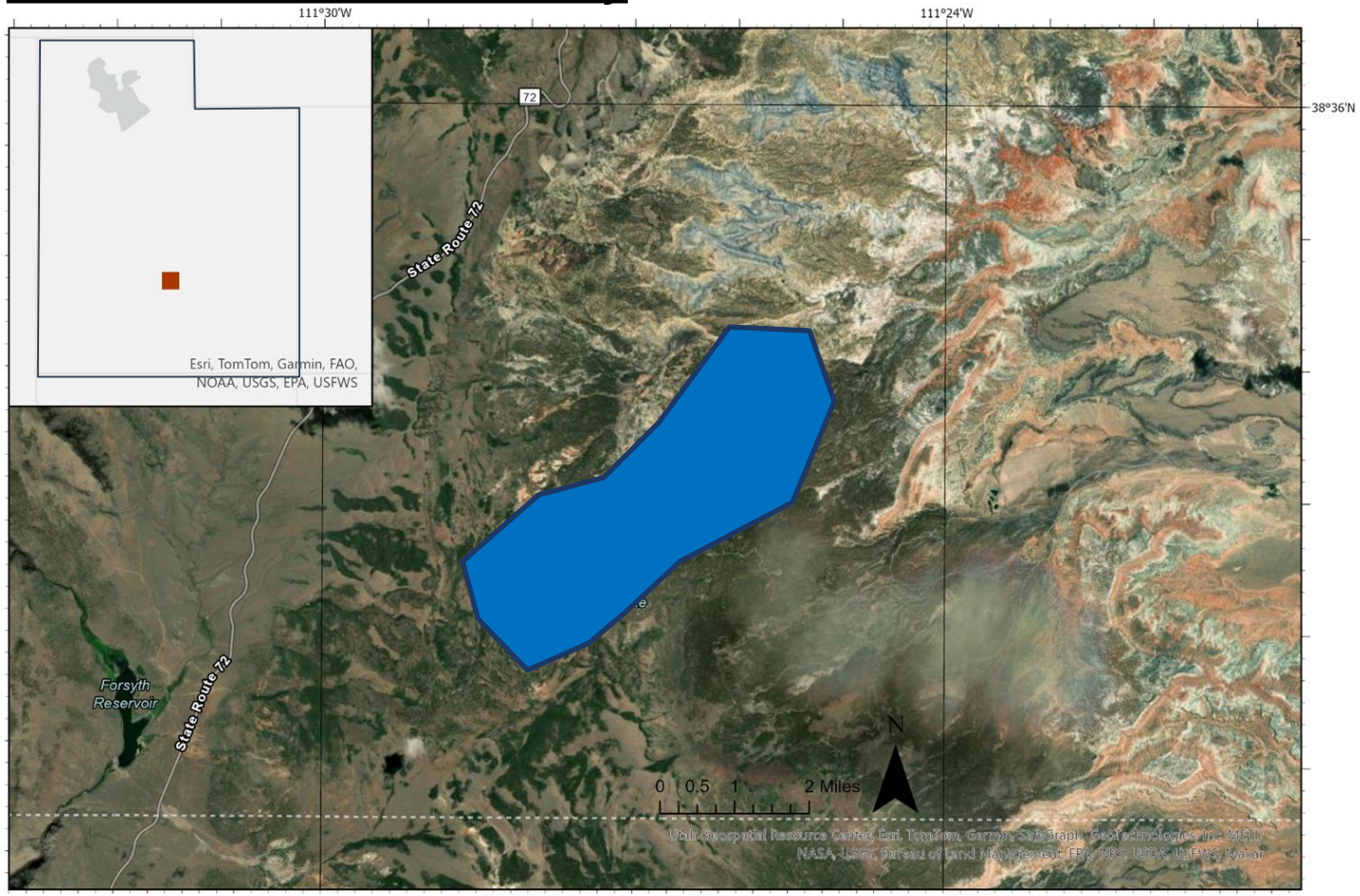
- Found ongoing subsidence from 2015 to present in multiple basins
- Subsidence rates up to 2 inches/year
- Future work will expand statewide measurements from 2015–present



Active Landslide Monitoring

- Initial statewide results indicate large active landslides can be identified and monitored
- Average deformation rates <2 in/year in direction of satellite
- Will work towards tracking changes in landslide motion over time in collaboration with landslide geologists

Meeks Lake, Sevier County



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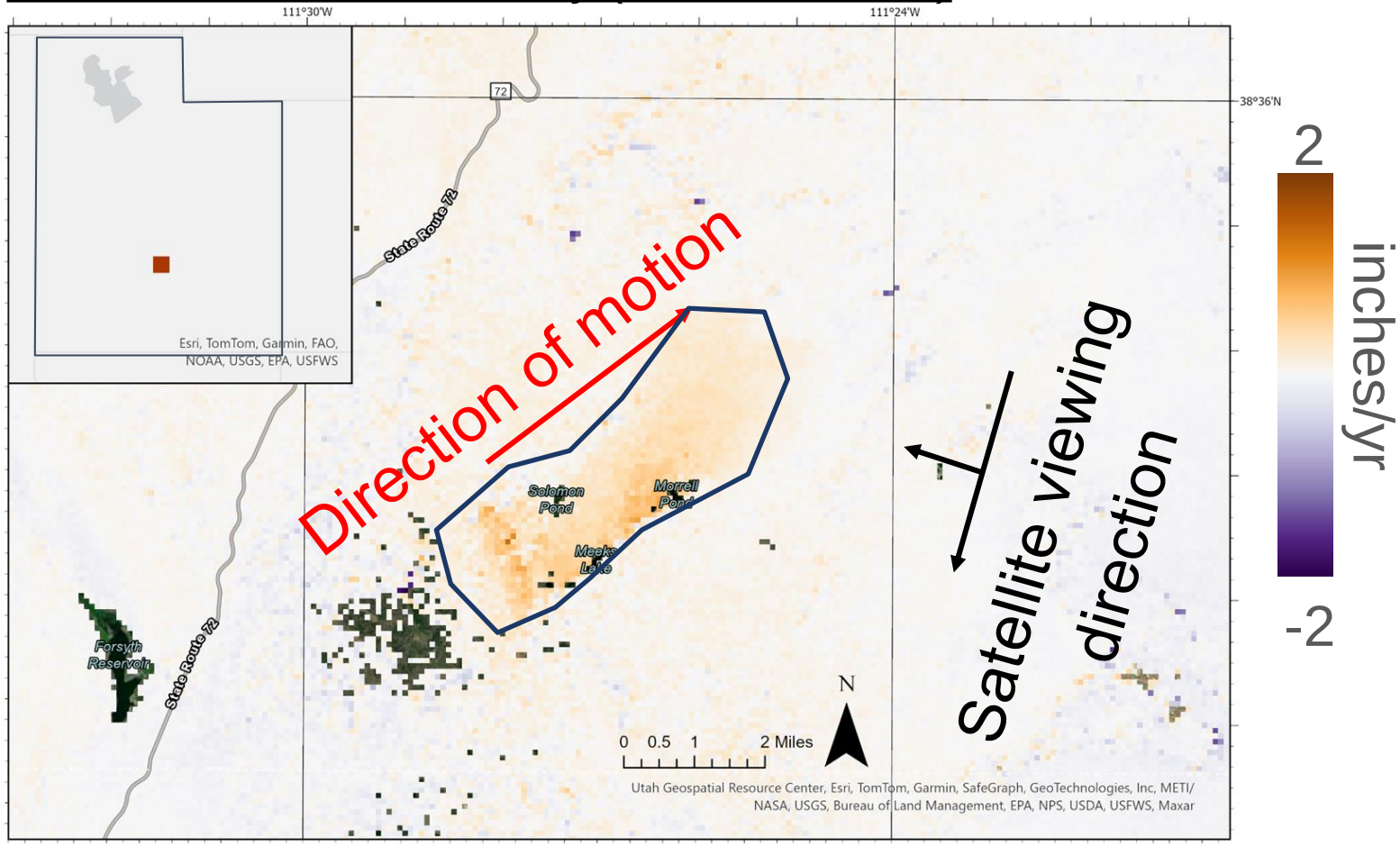
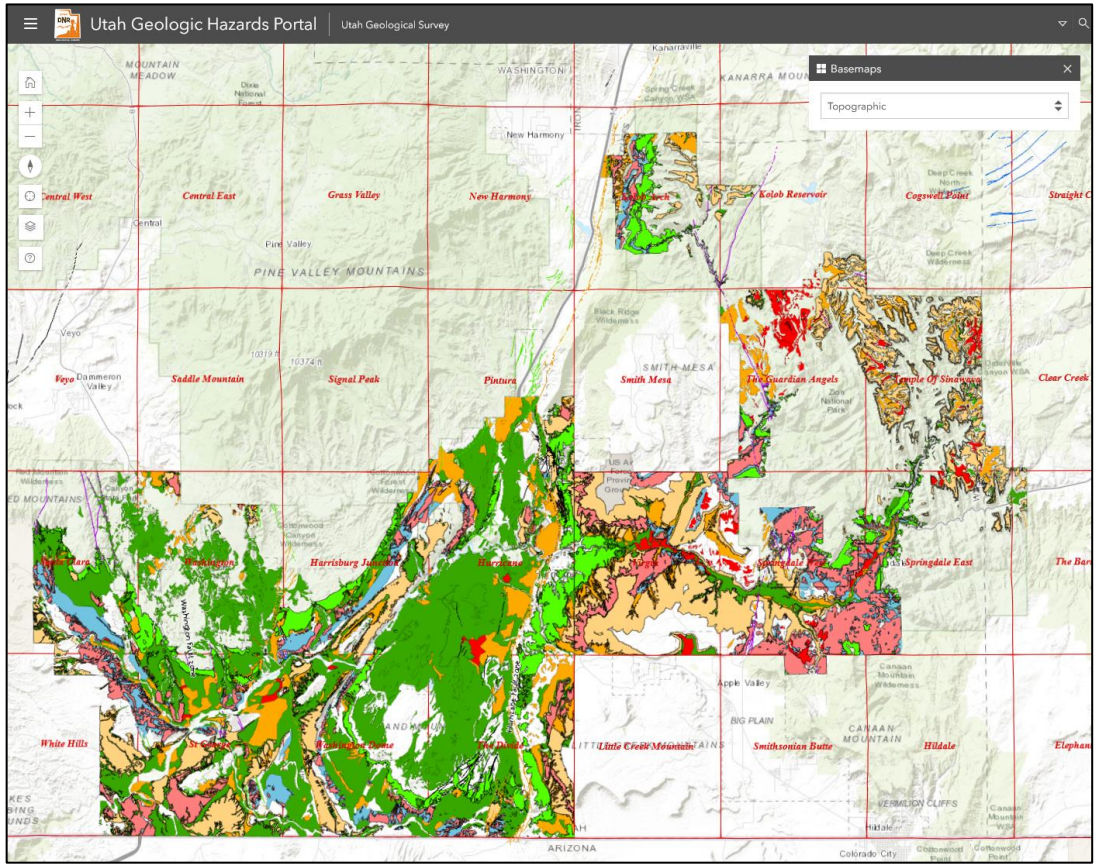
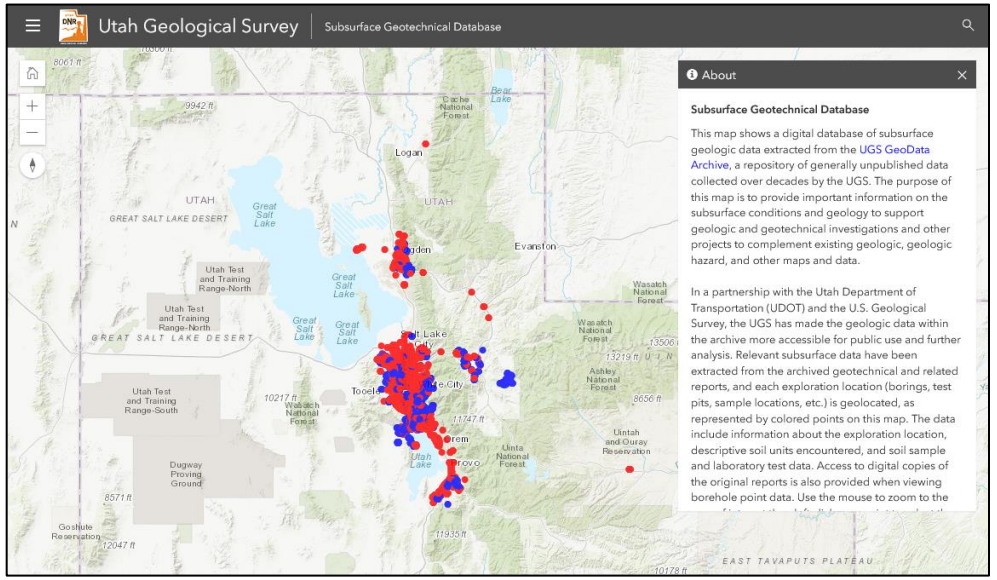
Meeks Lake, Sevier County (NE of Fremont)



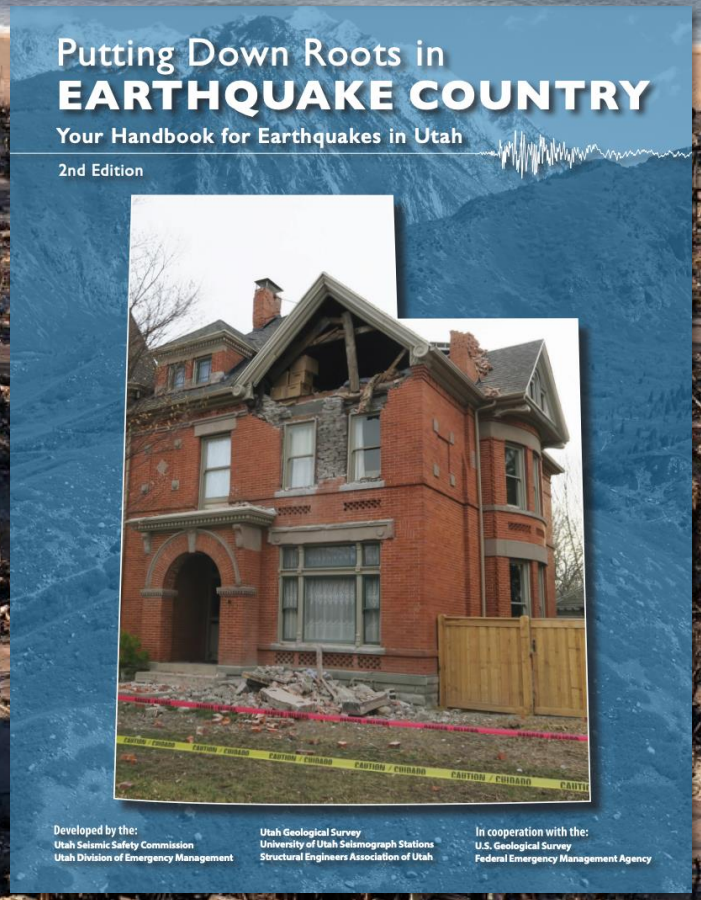
2024 HB384 Update - Utah Geological Survey Data Submission Amendments

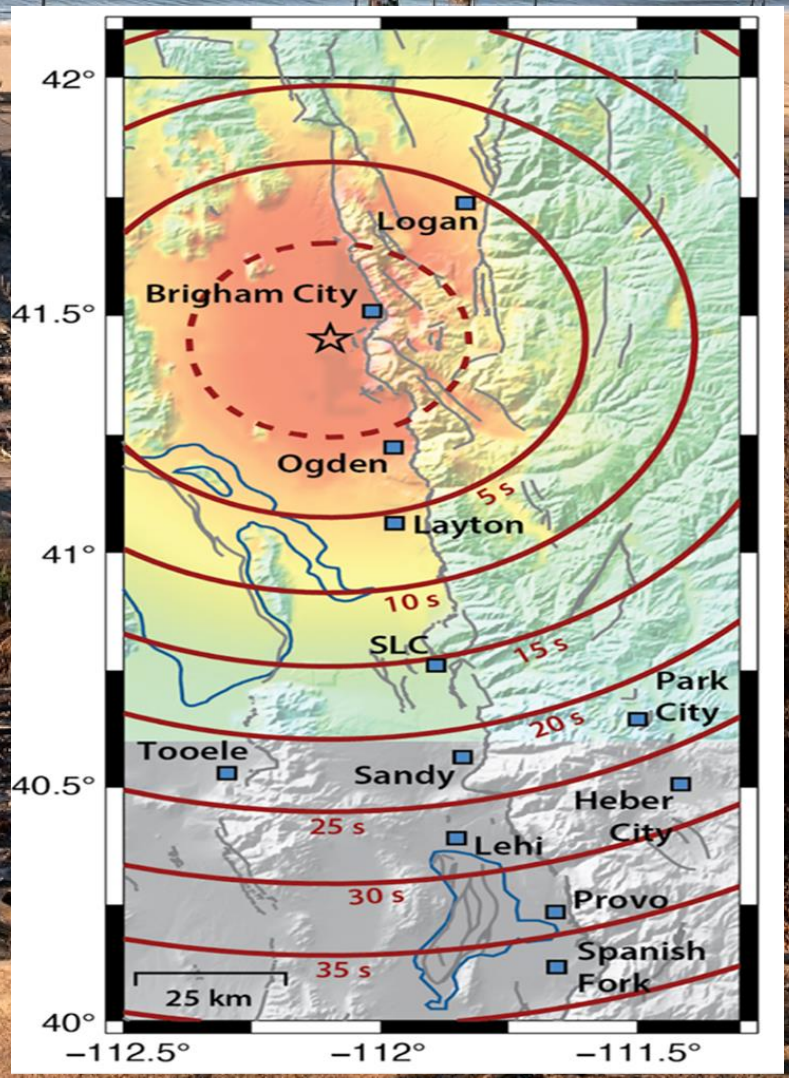
- As of January 21, 2025, over **1530** hazard reports have been submitted by Utah's local governments.
- Submitted reports available online at https://geodata.geology.utah.gov/pages/collections_featured.php?parent=186081.





Be Prepared





Earthquakes.Utah.gov

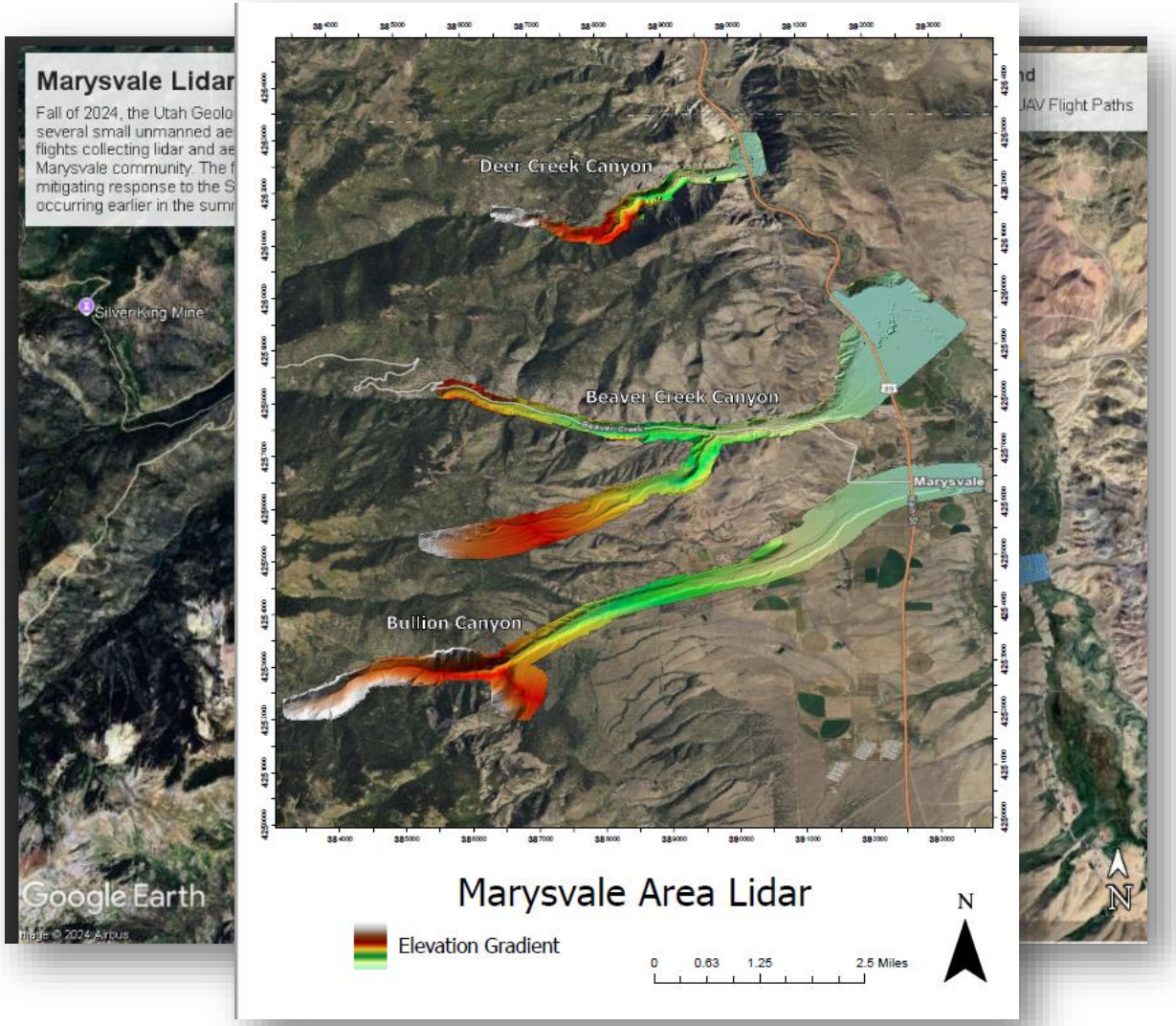
https://www.ready.gov/

Accomplishments

UTAH DNR GEOLOGICAL SURVEY

Geologic Hazards

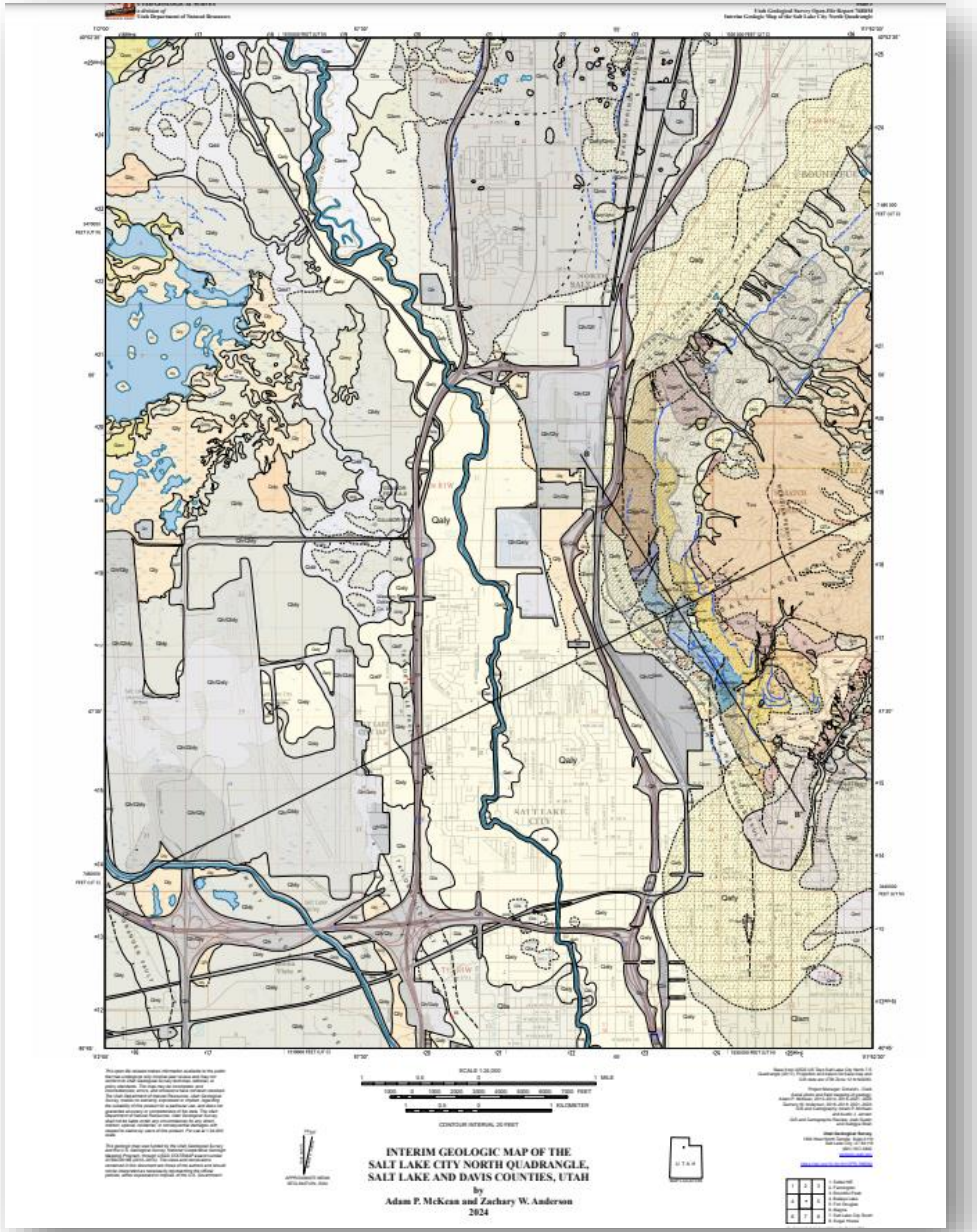
Silver King Fire, Marysvale City – UGS provided UAV-based aerial orthoimagery and lidar elevation data to support efforts to reduce flooding and debris flow hazards



Geologic Hazards

Interim Geologic Map of Salt Lake City North – Provides a significant update to geology and fault mapping in northern Salt Lake City and southern Davis County

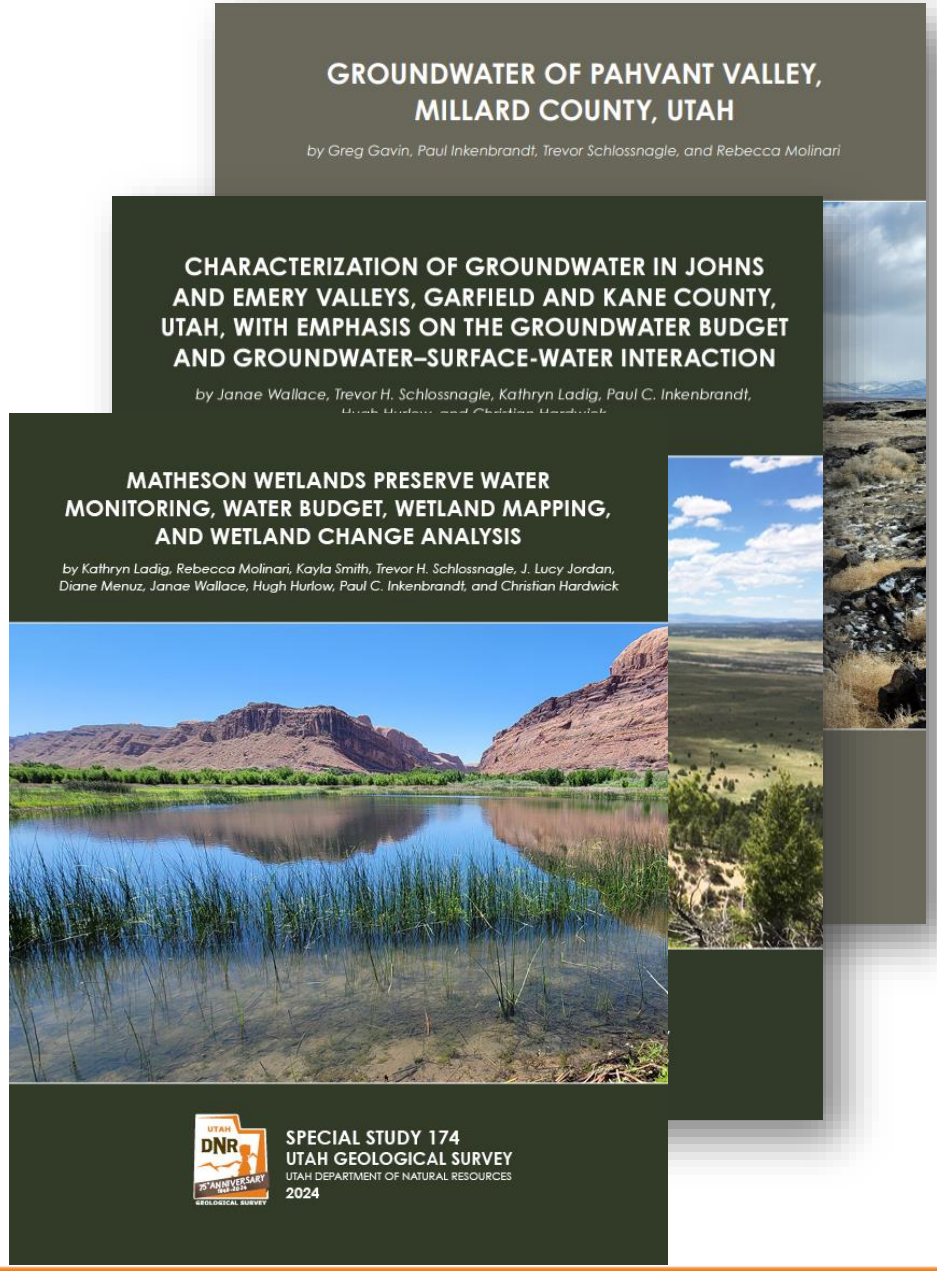
- UGS meeting with local government agencies to update them



Groundwater & Wetlands

Major Groundwater Basin Studies- *Interagency Cooperation & Support:*

- Groundwater of Pahvant Valley, Millard County, Utah *(DWRi)*
  - Characterizes Pahvant Valley's primary hydrogeologic units, quantifies groundwater pumping, storage loss, and recharge
- Groundwater in Johns and Emery Valleys, Garfield and Kane County, Utah- Groundwater Budget and Groundwater–Surface-water Interaction
- Matheson Wetlands Preserve Water Monitoring, Water Budget, Wetland Mapping, and Wetland Change Analysis
  - *Cooperative project with DWR, Grand County, The Nature Conservancy*
  - *Characterized water supply and needs; brine layer below the Preserve*



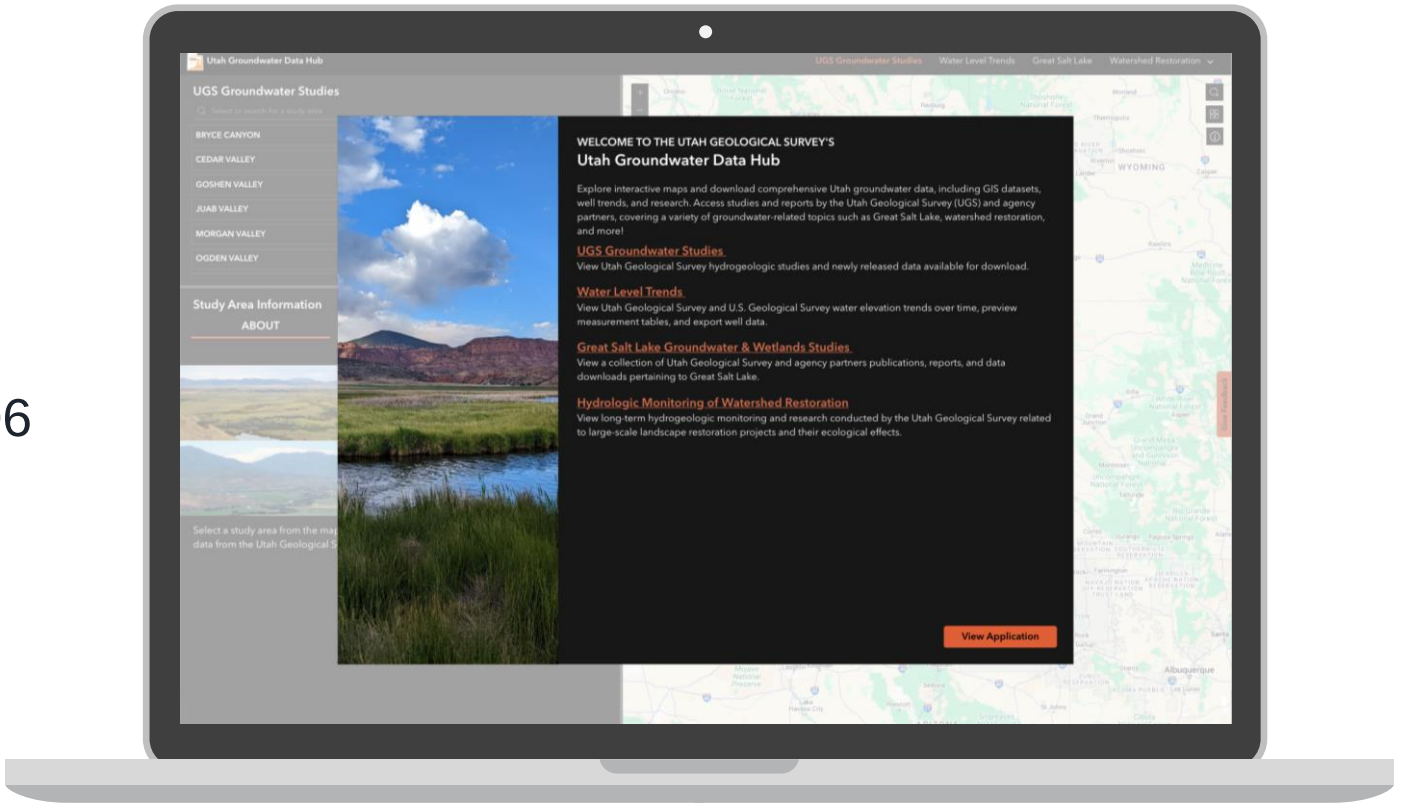
Groundwater & Wetlands

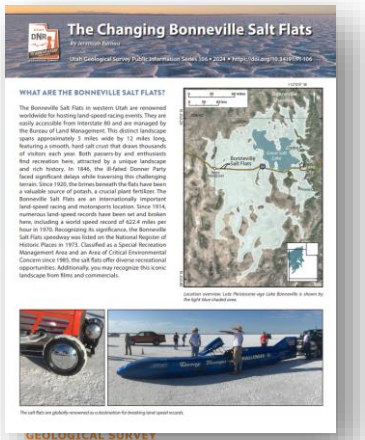
Utah Groundwater Data Hub

- Officially launched last year; version 2 coming soon
- Funded by the legislature

Bonneville Salt Flats

- Work is continuing
- Public Information Series 106
- Story Map

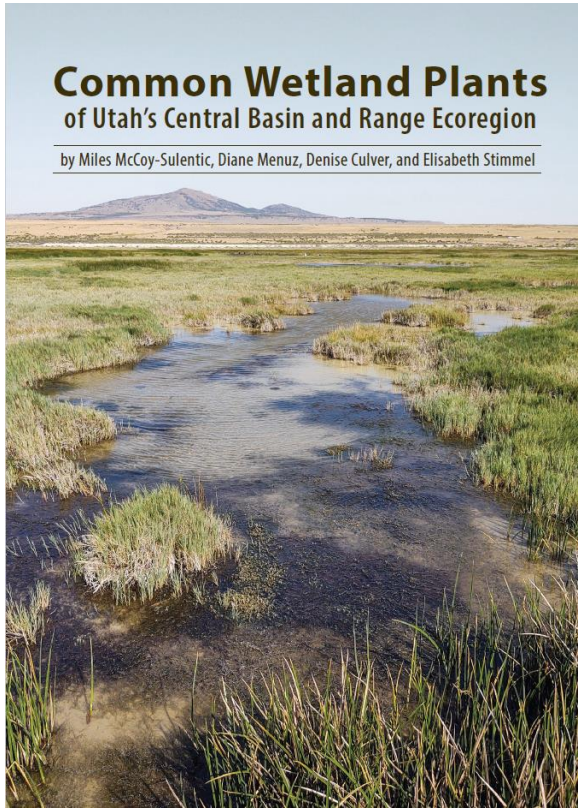




Groundwater & Wetlands

Recent Grant Projects

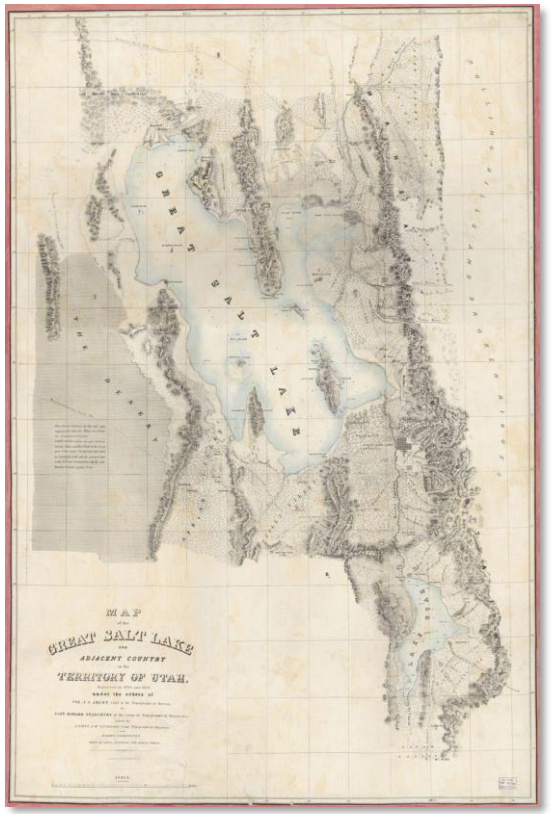
- Basin & Range Wetland Plant Guide
- StoryMap on Wetland Mapping
- StoryMap on assessment of montane wetlands will be completed soon

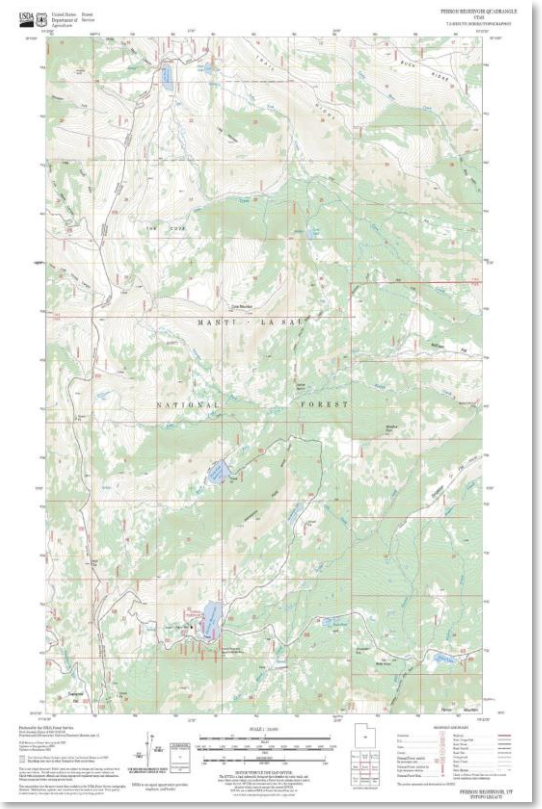


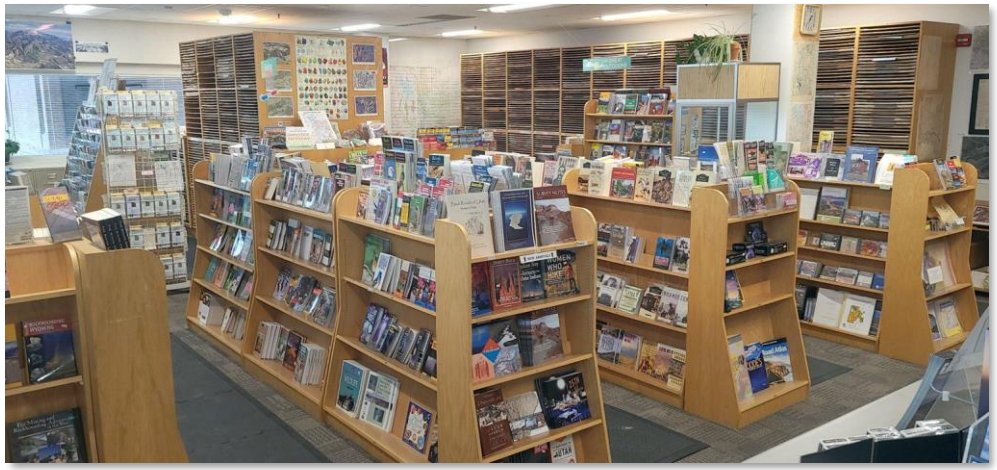
Montane wetlands surrounding Fish Lake in Sevier County, Utah

Natural Resources Map & Bookstore

- Provides outdoor and scientific information—not a “gift shop”
- Inquiries for all DNR divisions, especially State Parks and Wildlife Resources
- Print on demand maps—hunting, OHV trails, hiking, etc.
- Sale of state and national park passes
  - Distribution of Veterans honor passes







Laura Wilson
17 reviews
★★★★★ 4 months ago

Every one I've ever spoken with there is extremely knowledgeable about all things utah. From geology to hunting to indigenous,pioneer and mining history and beyond, there is something for everyone who goes in looking to explore utah.

Energy & Minerals

Bathymetric lidar data collection at GSL and Bear Lake

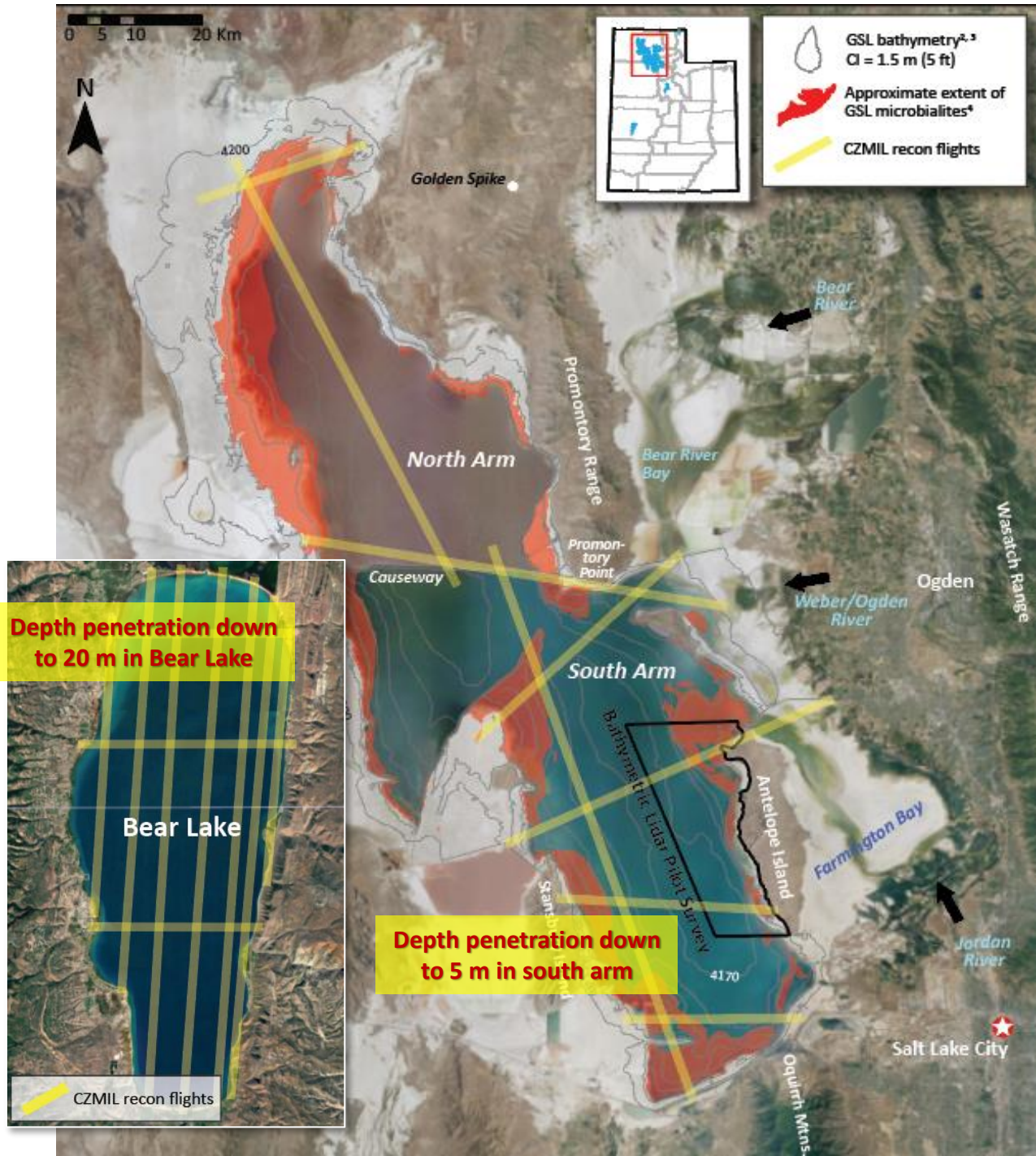
Pilot Project – ($100k funded by GSLAC) June 2023 - 50 sq. mi. – west side of Antelope Island

Current Work: $1.8 M One-time funds awarded in FY24 (FFSL)

UGS charged with project oversite

Progress and Future plans

- Use information from pilot to inform data collection best practices for entire GSL
- Flew several “recon” flights in summer 2024
- Additional wholesale data collection in near shore spring 2025

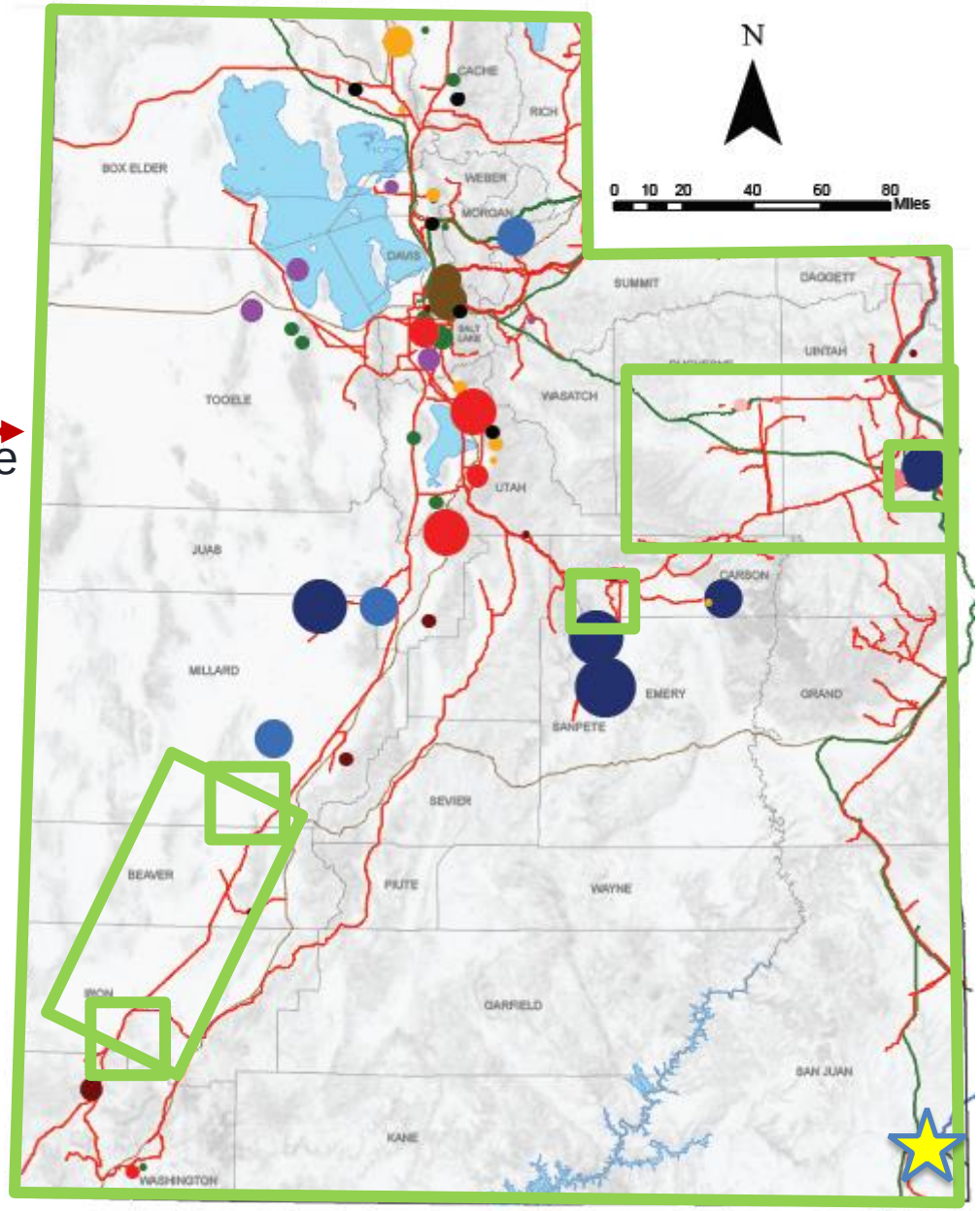


Energy & Minerals

Carbon Capture and Storage Research at UGS

- 7 current projects
- ~$40 million in DOE funding

Statewide Assessment for Geologic CO_2 Storage



Uinta Basin Region

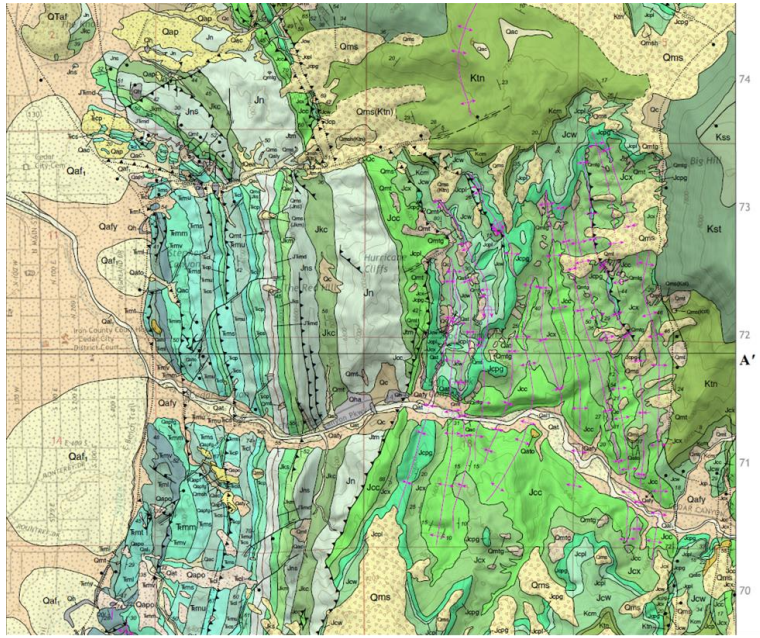
- RITAP: Uinta-Piceance Region (workforce readiness and education)
- Uinta Basin CarbonSAFE Phase 2 – with Bonanza PP, etc.
- San Rafael Swell CarbonSAFE Phase 2 – with PacifiCorp, Urban, etc.

Southern Basin and Range

- Red Rocks DAC Hub - with Fervo
- Great Basin CarbonSAFE Phase 2 - with Fervo, Cyrq, and Utah Iron
- Iron Mountain CUSP focus project - with Utah Iron

Geologic Mapping & Paleontology

- UGS - **3rd** in the nation in cumulative external funding ($1.29 million for FY25)
- 2024
  - Seven 7.5′ quads;
  - One 30′ x60′ quad;
  - Multiple stratigraphic studies to facilitate resource (Oil and Gas) exploration
- New maps of **SLC area** and **rural Utah** facilitate wise growth and water resource development
  - Vernal, Blanding, Navajo Nation, Cedar City, and Kamas

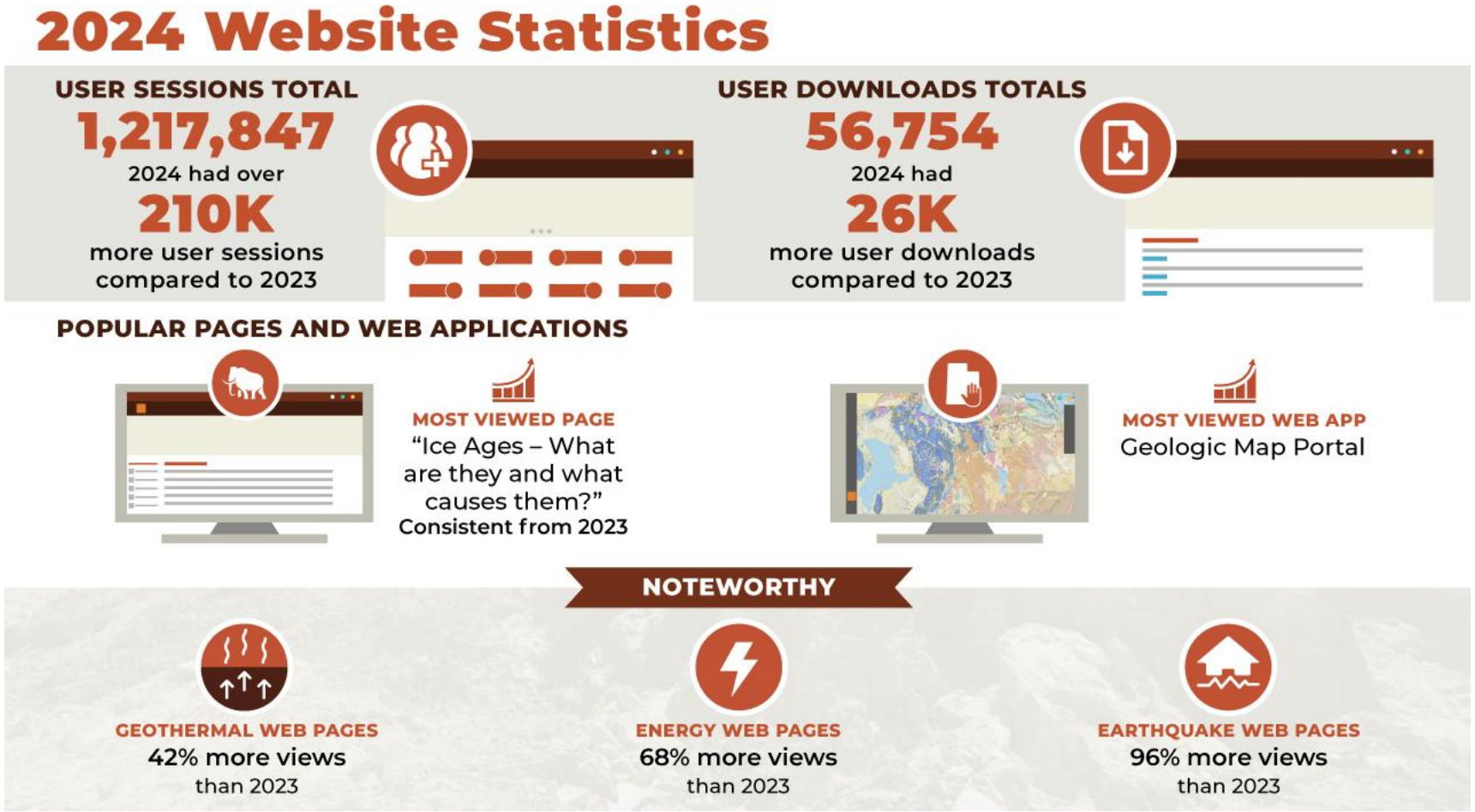


Geologic Map of Cedar City 7.5′, T. Knudsen, GIS by J. Dustin and others

- UGS leads or involved in Dinosaur and other fossil discovery across Utah
- Fossils are a significant tourist resource for parts of rural Utah

Measurable Statistics

There is high demand for geologic information in a variety of forms

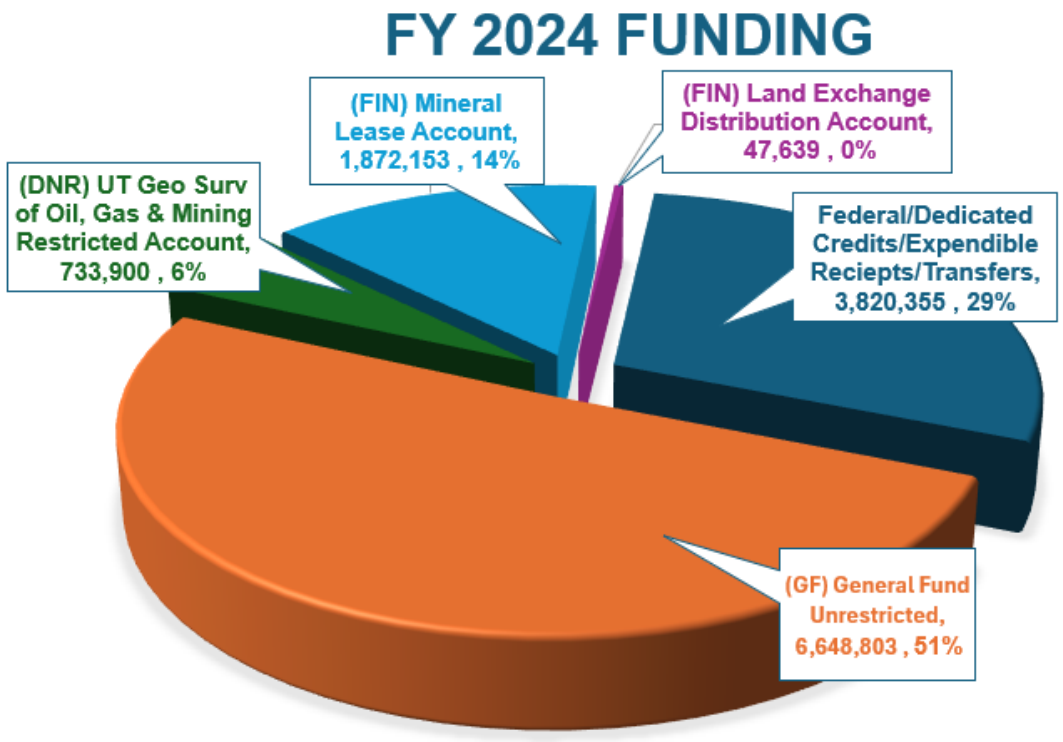


Funding Updates

UTAH DNR GEOLOGICAL SURVEY

UGS Budget

FY 2025 Funding Challenge: Mineral Lease funding is projected to be **$791,700** less than appropriated.



FY 2024 EXPENDITURES BY PROGRAM		
UGS PROGRAM	**AMOUNT**	**%**
Administration	1,232,512	9%
Geologic Information & Outreach	499,685	4%
DNR Map & Bookstore	257,160	2%
Technical Services	64,856	0%
Editorial	541,325	4%
Technical Review	103,685	1%
Data Management	1,425,417	11%
Energy & Minerals	2,442,328	19%
Geologic Hazards	1,512,823	12%
Geologic Mapping	2,240,366	17%
Paleontology	513,461	4%
UGS Board	2,103	0%
Groundwater & Wetlands	2,287,132	17%
	13,122,850	**100%**

Funding and Budget

During the first half of FY25 the UGS went from having a forecast of a small surplus to a shortfall. The UGS is forecasting a shortfall of about $273,000 (as of December 1st, 2024) for FY25. There are several factors that contribute to the shortfall.

- Mineral Lease royalties forecast is ~$1,600,000, which is $791,700 less than the $2,391,700 appropriated for FY25

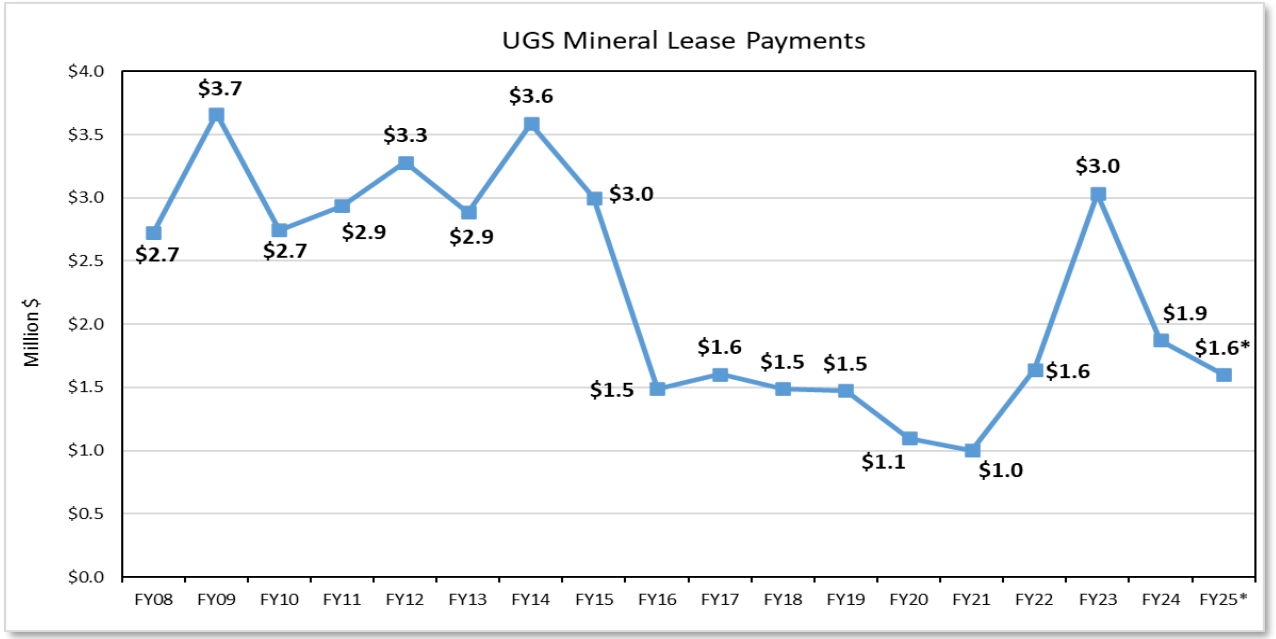


Chart courtesy of Mike Vanden Berg

Funding and Budget

What are we doing about funding issues?

Instituted cost savings in several areas:

- Not filling open positions,
- Limit out-of-state travels and
- Deferring capital expenditures where possible.

Funding and Budget

What are we doing about funding issues?

- Made a FY25 supplemental Building Block request to spend up to $700,000 from our restricted account. This will provide the buffer needed to cover any shortfall. This account was created(SB 133, 2021) for times like this, to cover unexpected shortfalls.
- Last year updated UC 59-21-2, to deposit Mineral Lease Royalties into the UGS Restricted account.
- In the future we can more effectively plan how much to budget for.

New Requests

UTAH DNR GEOLOGICAL SURVEY

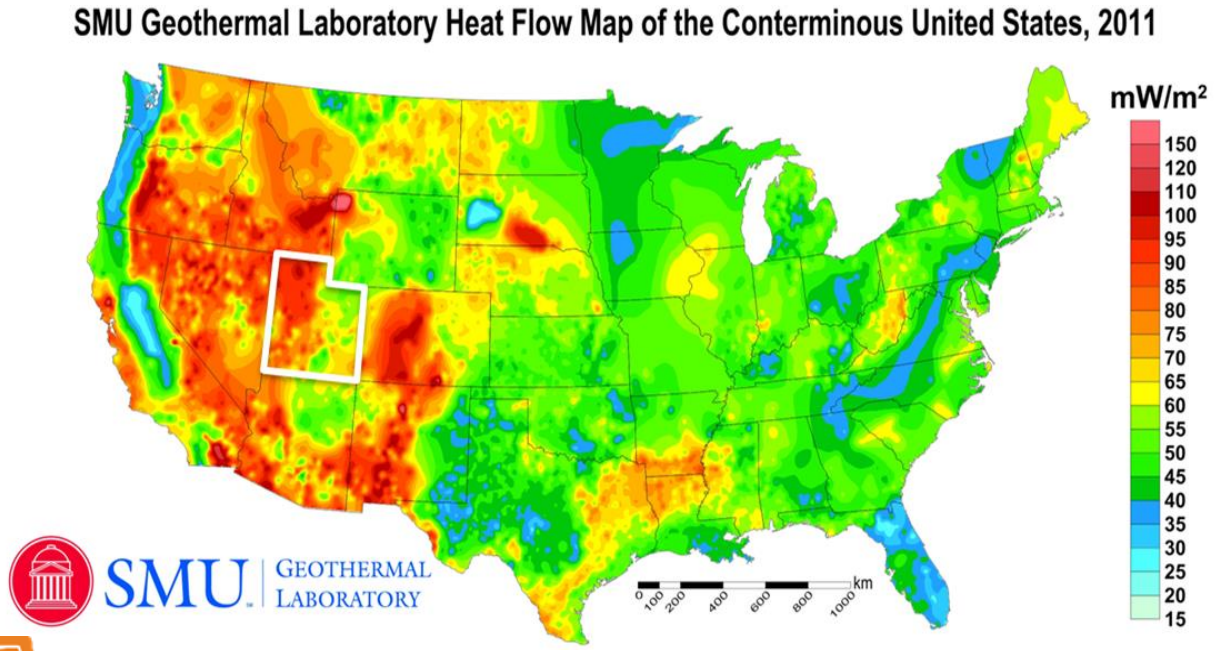
Geothermal Resources in Utah

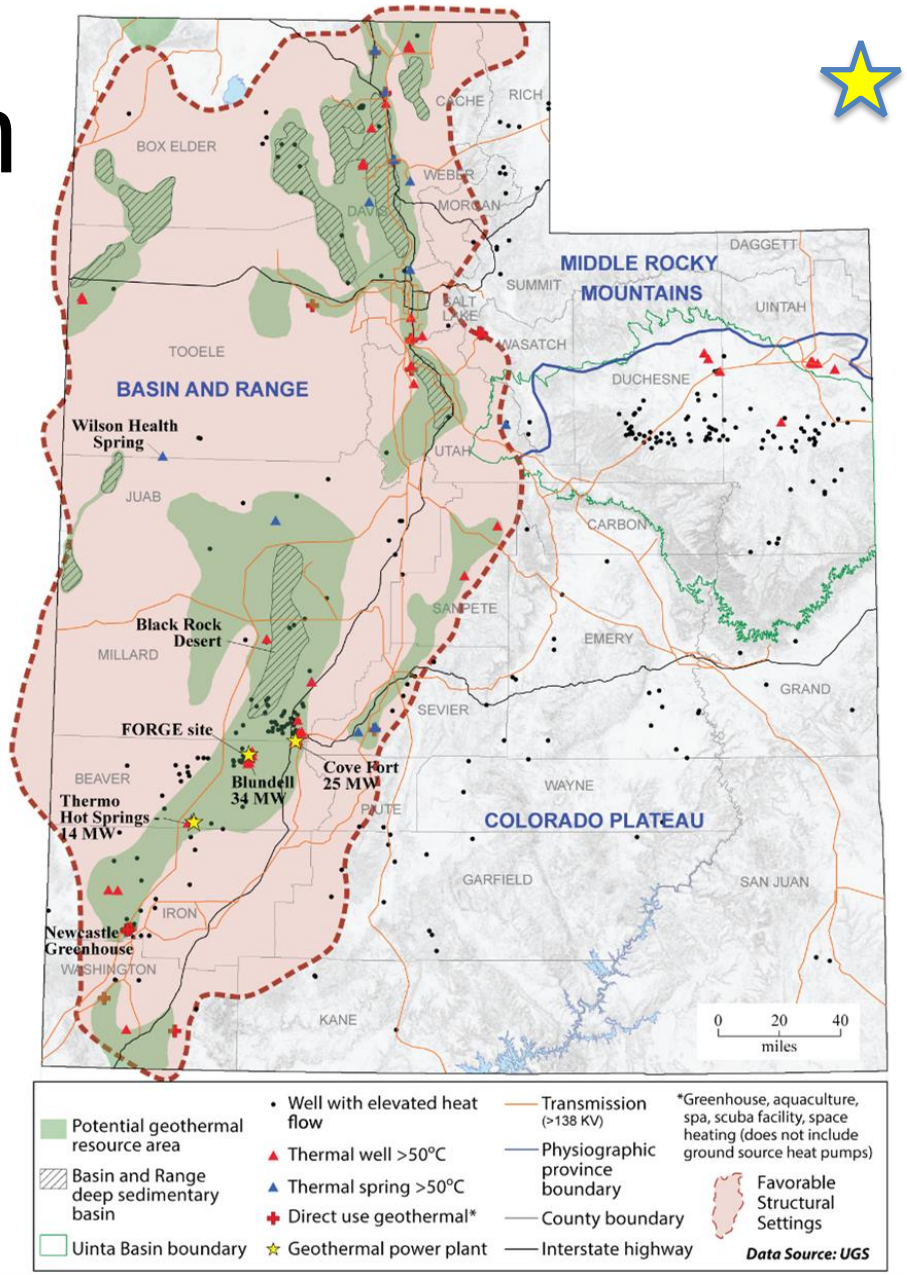
Utah's investment in research yields returns!

Potential in Utah = 49,400 MW

Current Development = 73 MW = 0.1% of potential

Adding new Fervo development (400 MW) only takes us to 1%

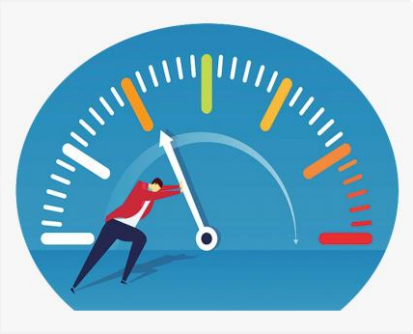


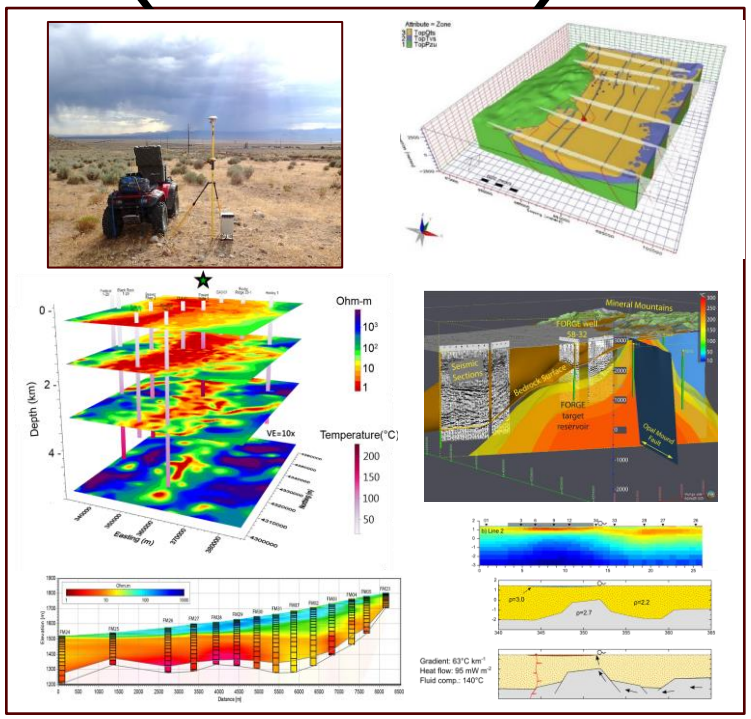


Operation Gigawatt – Geothermal (~$4.3M)

How the UGS moves the needle:

1) Modernize tools to collect innovative data
2) Technical expertise bandwidth to collect, analyze, and interpret data
3) New data will lead to private industry investment





ROI potential already demonstrated for this model!

~$2.5M
investment in research

~$300M
investment in FORGE

~$1B+
investment by Fervo

March 2024

Geothermal developer Fervo Energy raises $244M as it builds 400-MW Utah project

"Cape Station is now positioned to channel $1.1 billion to supply chains and local businesses, catalyzing critical growth into the county."

https://fervoenergy.com/fervo-energy-breaks-ground-on-the-worlds-largest-next-gen-geothermal-project/
https://www.blm.gov/blog/2023-10-13/collaboration-and-innovation-power-geothermal-energy-project-public-lands

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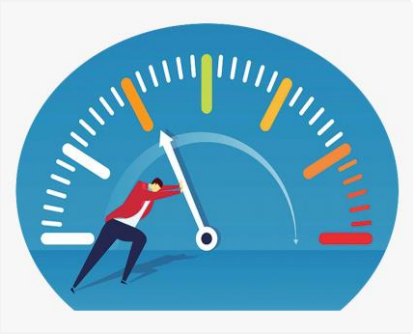
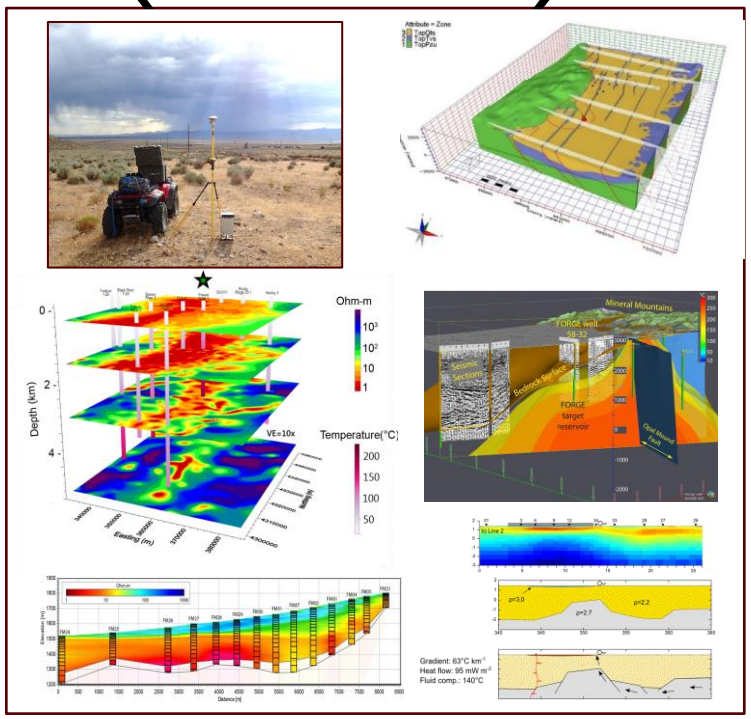




3-Step plan for Building Block $$:

new surface data collection locates potential sites

e.g., mapping, gravity, seismic, (electro-)magnetics, hyperspectral, etc.

→

new subsurface data collection quantifies heat resource and confirms resource leads

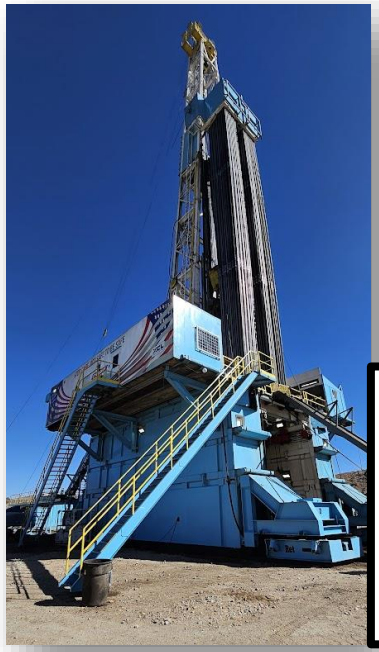
e.g., temperature probes, exploration wells

→

UGS hands off leads to private industry for development

Anticipated Outcomes

- Statewide favorability maps (direct-use & electricity)
- Public repository of Utah geothermal data
- 3 to 4 resource leads for private industry hand-off
- Strengthen the Utah Geothermal Working Group



The Bedrock of Utah's Success!

Questions?


UTAH
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GEOLOGICAL SURVEY

Thank you.


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NATURAL RESOURCES


UTAH
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UTAH
DNR
WILDLIFE


UTAH
DNR
STATE PARKS


UTAH
DNR
FORESTRY


UTAH
DNR
WATER RESOURCES


UTAH
DNR
WATER RIGHTS


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OIL, GAS & MINING


UTAH
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PUBLIC
LANDS


UTAH OFFICE OF
ENERGY
DEVELOPMENT