

# DIGITAL MAPPING TECHNIQUES 2019

The following was presented at DMT'19  
(May 19 – 22, 2019 - Montana Technological  
University)

The contents of this document are provisional

See Presentations and Proceedings  
from the DMT Meetings (1997-2019)

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

## **Presenting Data Using Story Maps**

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Esri Story Maps are web applications that let authors tell stories using narrative text, maps, images, and/or multimedia such as videos. Authors can start with a template, upload content, customize layout, and finally publish Story Maps online.

Montana Bureau of Mines and Geology (MBMG) started to create and publish Story Maps since 2017. The purpose is to share earth science information of Montana to a wider audience. Topics of Story Maps by MBMG may range from geology to ground water, earthquakes, mineral resources, and so on. This presentation briefly describes four of the Story Maps made by MBMG as well as the challenges and concerns we've had so far.

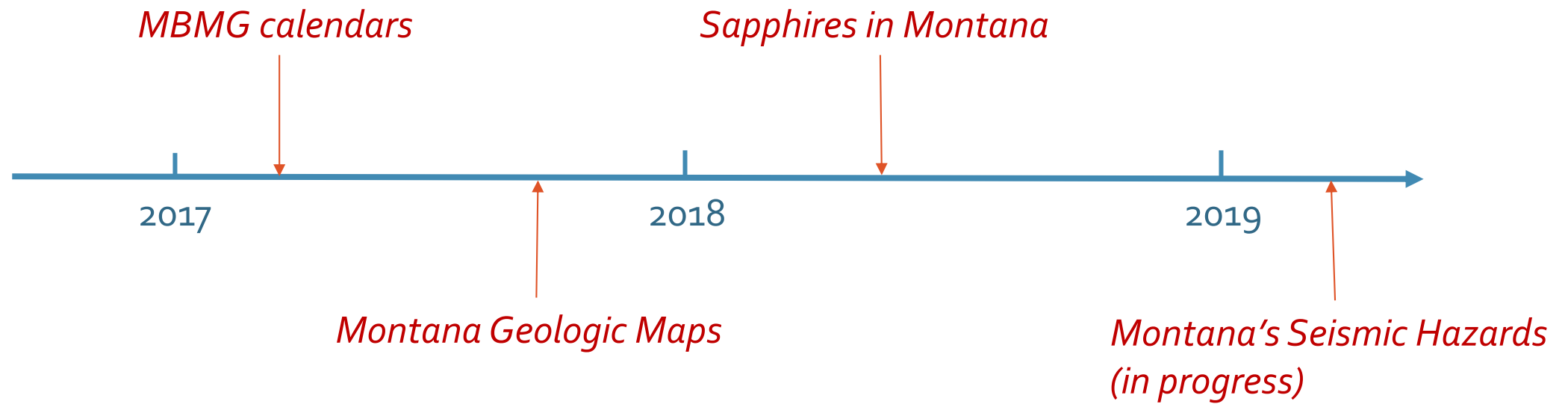
An aerial photograph of a mountain range. The foreground shows a rocky, scree-covered slope leading down to a valley. In the center of the valley is a dark blue lake. The valley floor is covered with a dense forest of evergreen trees. In the background, several mountain peaks are visible under a clear blue sky with a few wispy clouds.

# Presenting Data Using Story Maps

Yiwen Li  
Montana Bureau of Mines and Geology (MBMG)  
May 2019

*Photo by Jeff Lonn, MBMG*

## Story Maps by MBMG:



# 1<sup>st</sup> Story Map:

Presenting the front photos of the MBMG calendars from 1987-current year

- ✓ Displaying all photos at one place
- ✓ Locating the photos on a map
- ✓ Showing photo descriptions
- ✓ Linking to PDF of each calendar

Glacial Lake Missoula and the Last Age Floods

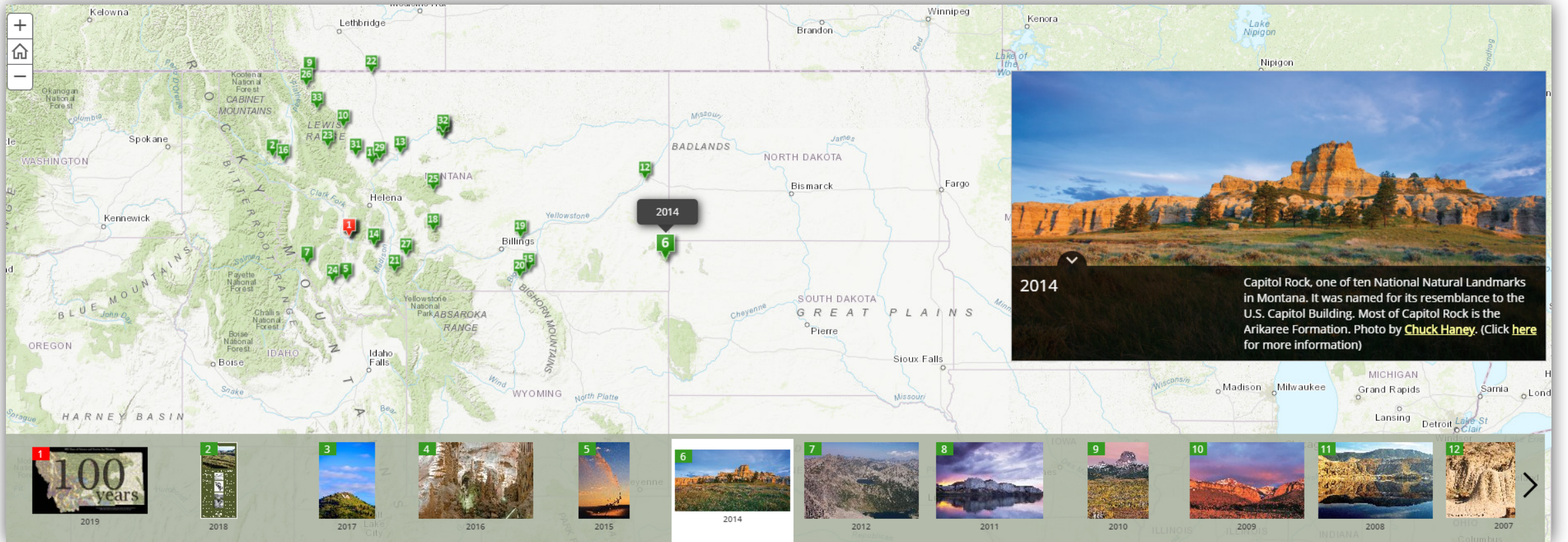
**Montana Geology 2018**

Montana Bureau of Mines and Geology

Montana Geology 2018

Montana Bureau of Mines and Geology

<http://mbmg.mtech.edu/pubs/pubs-calendars.html>



Problem: Cannot get permission to use some photos.

## MBMG Series Descriptions

**Title**

**Author**

**Keyword(s)**

**County**

**Publication Type**

**Year**  to

Do not show out of print publications

## Browse our catalog

Use the link below to browse the entire contents of our online catalog

## Publications Catalog:

- ✓ Search for all MBMG Publications
- ✓ View detailed publication info
- ✓ View/Download digital map data
- ✓ Buy paper maps

<b>Publication</b>	GM 71	<input type="button" value="Add to Cart"/>	
<b>Citation</b>	Scarberry, K.C., Coppage, E.L., and English, A.R., 2018, Geologic map of the Bison Mountain 7.5' quadrangle, Powell and Jefferson counties, Montana: Montana Bureau of Mines and Geology Geologic Map 71, 10 p., 1 sheet, scale 1:24,000.		
<b>Price</b>	\$ 9.00		
<b>Document Version</b>	Final		
<b>Document Status</b>	Print on Demand		
<b>Description</b>	STATEMAP deliverable. Map encompasses portions of the Boulder Batholith, Elkhorn Mountains volcanic field, and the Elliston Mining district west of Helena, MT.		
<b>Subject(s)</b>	ELKHORN MOUNTAINS VOLCANIC FIELD, BOULDER BATHOLITH, MESOZOIC MAGMATISM, CENOZOIC MAGMATISM, ELLISTON MINING DISTRICT, VOLCANIC		
<b>Geographic Area/Counties</b>	JEFFERSON, POWELL		
<b>Files Available for Download</b>	<b>Link</b>	<b>Size</b>	<b>Added</b>
	<a href="#">Download map</a>	33 Mb	1/8/2019
	<a href="#">Download pamphlet with additional data and information</a>	5.3 Mb	1/8/2019
	<a href="#">Download ArcGIS Map Package</a>	4.0 MB	5/10/2019

## Limitations:

- Not tailored to geologic maps
- Do not visually display the spatial extent of the geologic maps

<https://mbmg.mtech.edu/mbmgcat/catmain.asp>

## 2<sup>nd</sup> Story Map: Montana Geologic Maps

### Montana Geologic Maps

INSTRUCTIONS MT STATE MAPS 24k QUAD MAPS 100k QUAD MAPS 250k QUAD MAPS SPECIAL FOCUS MAPS MAP SEARCH

Quadrangle Maps - 1:24,000 scale

Find address or place

**About This Map:**  
7.5' quadrangles (1:24,000 scale) highlighted in green are areas where pdf maps, geotiff files, GIS geodatabases, or other types of digital data are available from MBMG. Click a quadrangle to view more information or download data from pop-up window.

Light green area: EDMAP available  
Dark green area: Maps other than EDMAP are available

Use tools in the upper-right corner to:

- View map legend
- Turn on/off map layers
- Change basemap
- Execute a query based on

Tasks	Results
	Quadrangle Maps - 1:24,000

Query criteria

QUAD NAME KEY WORDS:

PUBLICATION YEAR:

PUBLICATION NUMBER:

Result layer name  
Quadrangle Maps - 1:24,000\_Query result

Apply

Challenge: Make sure first-time users know how to use this app.

<https://mbmg.mtech.edu/storymaps/GeologicMaps.html>



### 3<sup>rd</sup> Story Map: Sapphires in Montana

<b>Publication</b>	DIGITALPUB 1		
<b>Citation</b>	Yiwen Li, 2018, Sapphires in Montana: Montana Bureau of Mines and Geology Digital Publication 1.		
<b>Price</b>	\$ 0.00		
<b>Document Version</b>	Final		
<b>Document Status</b>	Digital Data		
<b>Description</b>	A digital story map of the sapphires in Montana, based on the work of Dick Berg, MBMG.		
<b>Subject(s)</b>	SAPPHIRE, STORY MAP, MONTANA		
<b>Geographic Area/Counties</b>	DEER LODGE, GRANITE, JUDITH BASIN, LEWIS AND CLARK		
<b>Files Available for Download</b>	<b>Link</b>	<b>Size</b>	<b>Added</b>
	<a href="#">Story Map link</a>		

[http://mbmg.mtech.edu/mbmgcat/public/ListCitation.asp?pub\\_id=32024&](http://mbmg.mtech.edu/mbmgcat/public/ListCitation.asp?pub_id=32024&)

Acknowledgements: Richard Berg (Dick Berg), Brad Somers

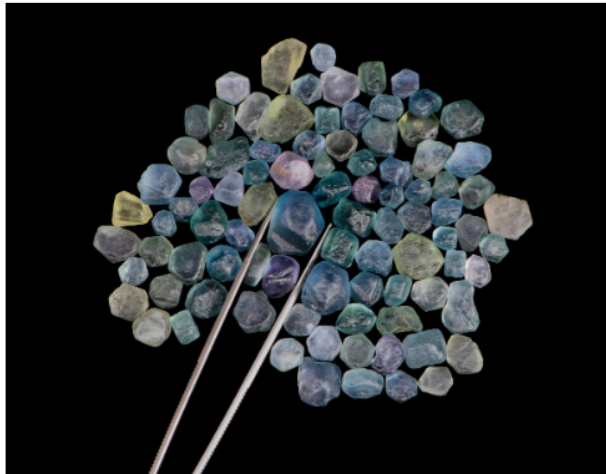
## Sapphires in Montana, 2018

[OVERVIEW](#)[DEPOSIT LOCATION MAP](#)[ROCK CREEK DISTRICT](#)[MISSOURI RIVER DISTRICT](#)[DRY COTTONWOOD CREEK DISTRICT](#)[YOGO DISTRICT](#)[FURTHER READING](#)

### Sapphires in Montana

[Introduction](#) [History](#) [Sapphire Origin](#)

Sapphires and rubies are both gem varieties of the mineral *corundum* (see Glossary). Rubies are **red**. Most people probably think of sapphires as **blue**, but the term "sapphire" is used to cover all colors of gem-quality corundum other than red. Corundum's light-transmitting properties and hardness of 9, ranking next to diamond, make it a durable and very attractive gemstone.



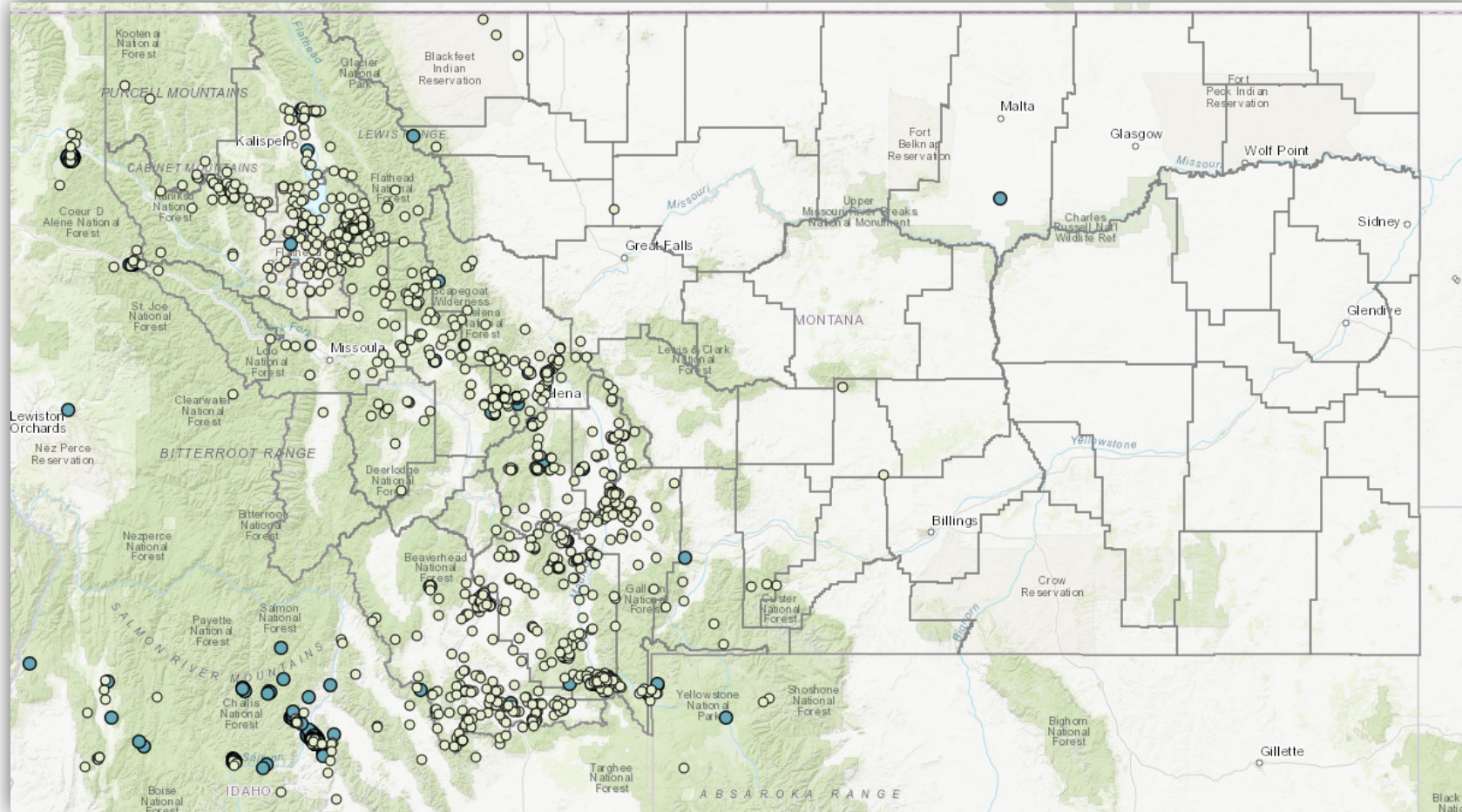
Left: sapphires from Missouri River. Sapphires provided by Robert E. Kane and American Sapphire Company. Photograph is copyright Robert E. Kane, All Rights Reserved. Middle and Right: sapphires from Dry Cottonwood Creek, MT. Photo by R.B. Berg.

Challenge: I had very limited knowledge of gems.

<https://mbmg.maps.arcgis.com/apps/MapSeries/index.html?appid=11c1f93eb77244bo85f5bbd41fb2eaff>

## 4<sup>th</sup> Story Map: Montana's Seismic Hazards

By Mike Stickney, Yiwen Li



- Earthquake Monitoring:
- ✓ Earthquake maps
  - ✓ Seismograph stations
  - ✓ Seismic data analysis
  - ✓ Data archival

2401 earthquakes monitored in and near Montana in 2015;  
235 of them had a magnitude  $\geq 2$

# BAN IS AGAIN PLACED ON ALL PUBLIC GATHERINGS

EMERGENCY RECONSTRUCTION COMMITTEE TO MAKE SYSTEMATIC STUDY OF REQUIREMENTS OF STRICKEN AND HOMELESS CITIZENS; THOSE NEEDING AID WILL BE DIRECTED TO PROPER AGENCY; FEDERAL MONEY IS ON WAY.

Helena cast a wary eye over its shaken properties today, and, while counting three major quakes and hundreds of lesser ones within the last few weeks, it steadfastly went ahead making the necessary arrangements for a complete and scientific survey of the damaged areas of the city.

The ban against public gatherings of all kinds was placed in effect again by order of Commissioner of Public Safety A. M. Shellady as an emergency measure. It will not be lifted until assurance of safety from earth shocks is had.

Governor Frank H. Cooney declared yesterday that the needs of all Helena people made destitute by the quake would be taken care of and that he had received a wire from Aubrey Williams of Washington, D. C., assistant relief director, allocating an additional \$100,000 to Montana for the month of November, for earthquake relief.

"This was not solicited but came out of a clear sky to Helena," the governor said. He said that everyone in Helena in need of food, clothing and shelter would be adequately taken care of and no one would be in want.

## MURRAY HELPS

U. S. Senator James Murray of Butte, who has taken an active part in helping Helena in its catastrophe, made a splendid contribution yesterday when he notified J. H. Rowe, personal representative of Frank Walker, executive assistant to President Roosevelt, that he was turning over Boulder Hot Springs, which he owns, for the housing of approximately 140 orphans from the St. Joseph's orphanage. These little persons were cared for Thursday and Friday nights in the Great Northern coaches, but today will be transferred to Boulder.

Montana's junior senator was in New York city when he heard of the quake and of the plight of the orphans at St. Joseph's. He immediately contacted Mr. Rowe, donating the Boulder Hot Springs for their care. While the youngsters are at Boulder, the orphanage will be repaired and placed in shape for occupancy, Mr. Rowe said.

Mr. Rowe reiterated his statement made earlier in the day that

the government, while not expected to remedy all of the city's ills would see that no one was in want during the emergency crisis.

## No Gatherings

Scarcely out of its last restriction, Commissioner Shellady ordered a second ban on all public gatherings. The ban will not be lifted until buildings are inspected and certificates of occupancy granted.

(Continued on Page 10)



Photo source: MBMG

- Historic Earthquakes:
- ✓ Historic news articles
- ✓ Historic photos



Photo source: MBMG

Challenge: How to display a large number of historic news articles and photos?

# Story Map Draft

## Montana's Seismic Hazards

OVERVIEW & INSTRUCTIONS

HISTORIC EARTHQUAKES

EARTHQUAKE MONITORING

EARTHQUAKE MITIGATION

### Historic Earthquakes

No issues detected x

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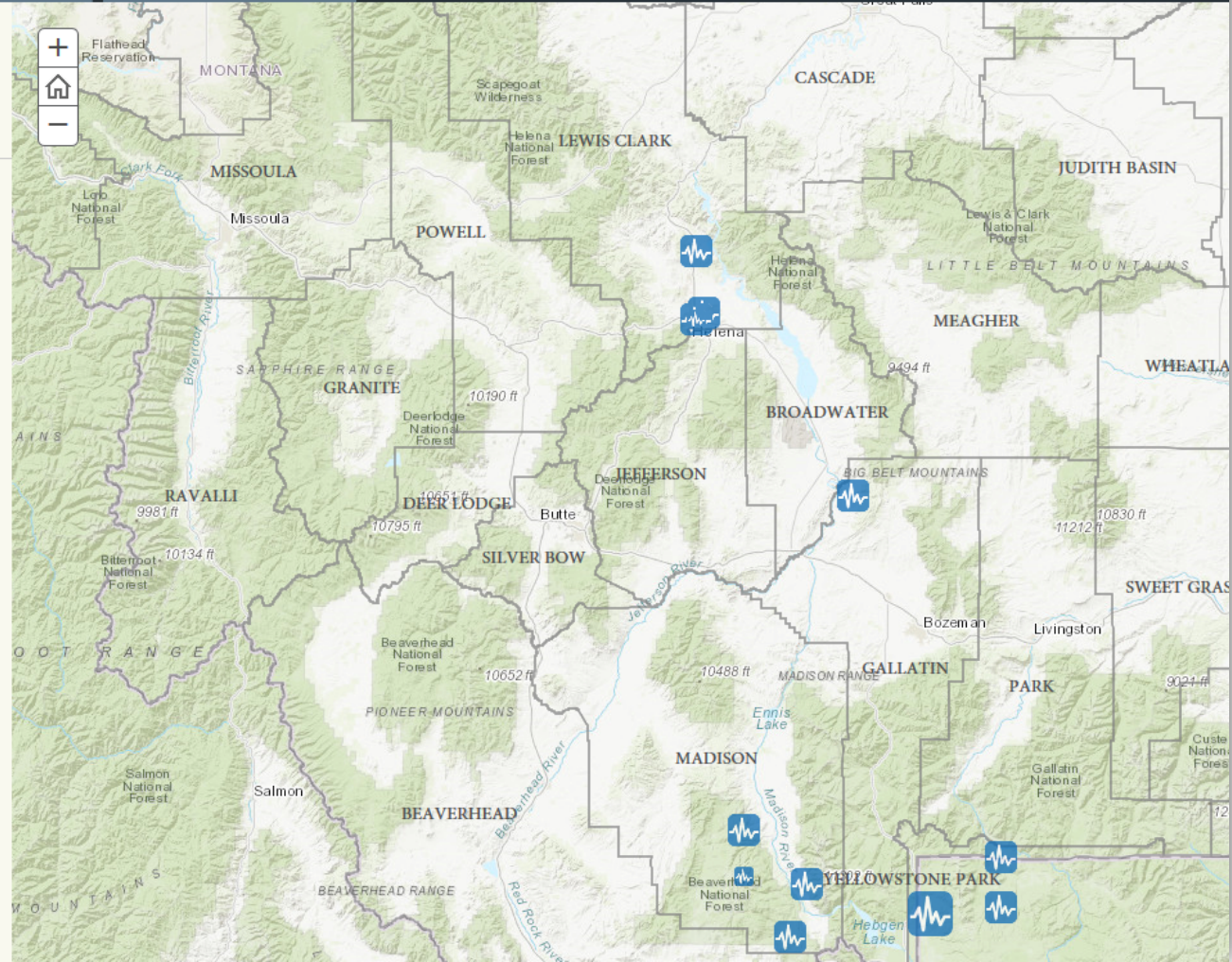
#### Part 1: Summary of Major Historic Earthquakes

1. [1925 Clarkston Valley earthquake](#)
2. [1935 Helena earthquake sequence](#)
3. [1947 Virginia City earthquake](#)
4. [1959 Hebgen Lake earthquake](#)

#### Part 2: News Articles of Historic Earthquakes

1. [1925 Clarkston Valley earthquake](#)
2. [1935 Helena earthquake sequence](#)
3. [1947 Virginia City earthquake](#)
4. [1959 Hebgen Lake earthquake](#)

#### Part 3: Historic Photos of the Earthquakes



<https://mbmg.maps.arcgis.com/apps/MapSeries/index.html?appid=e7411102c8bb42a187da5fbegceedcog>

# Using Story Maps – Advantages and Drawbacks

## **Advantages:**

- Easy to create
- Various templates
- Can be viewed on PCs, mobile phones, and tablets.

## **Drawbacks:**

- Sometimes need to explain the term “Story Map” to my colleagues and audience
- May need instructions showing general users how to use the story maps
- How long will ESRI keep supporting Story Maps?

Questions?