DIGITAL MAPPING TECHNIQUES 2015

The following was presented at DMT'15
(May 17-20, 2015 - Utah Geological Survey,
Salt Lake City, UT)

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2015)

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

ACCESSING MINNESOTA'S GEOLOGICAL DATA USING ARCGIS ON-LINE

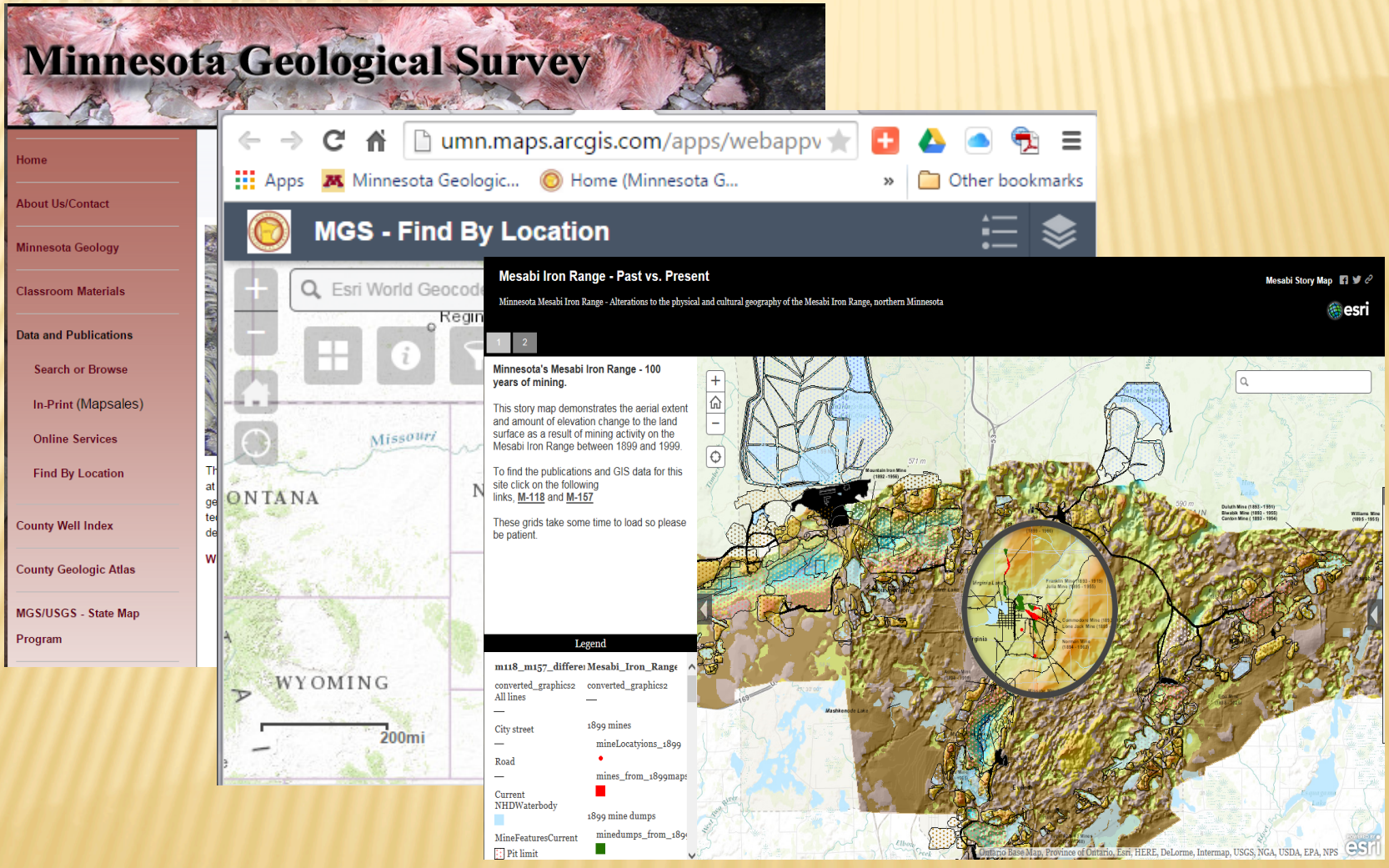
Jacqueline D. Hamilton

Minnesota Geological Survey – University of Minnesota

AGENDA

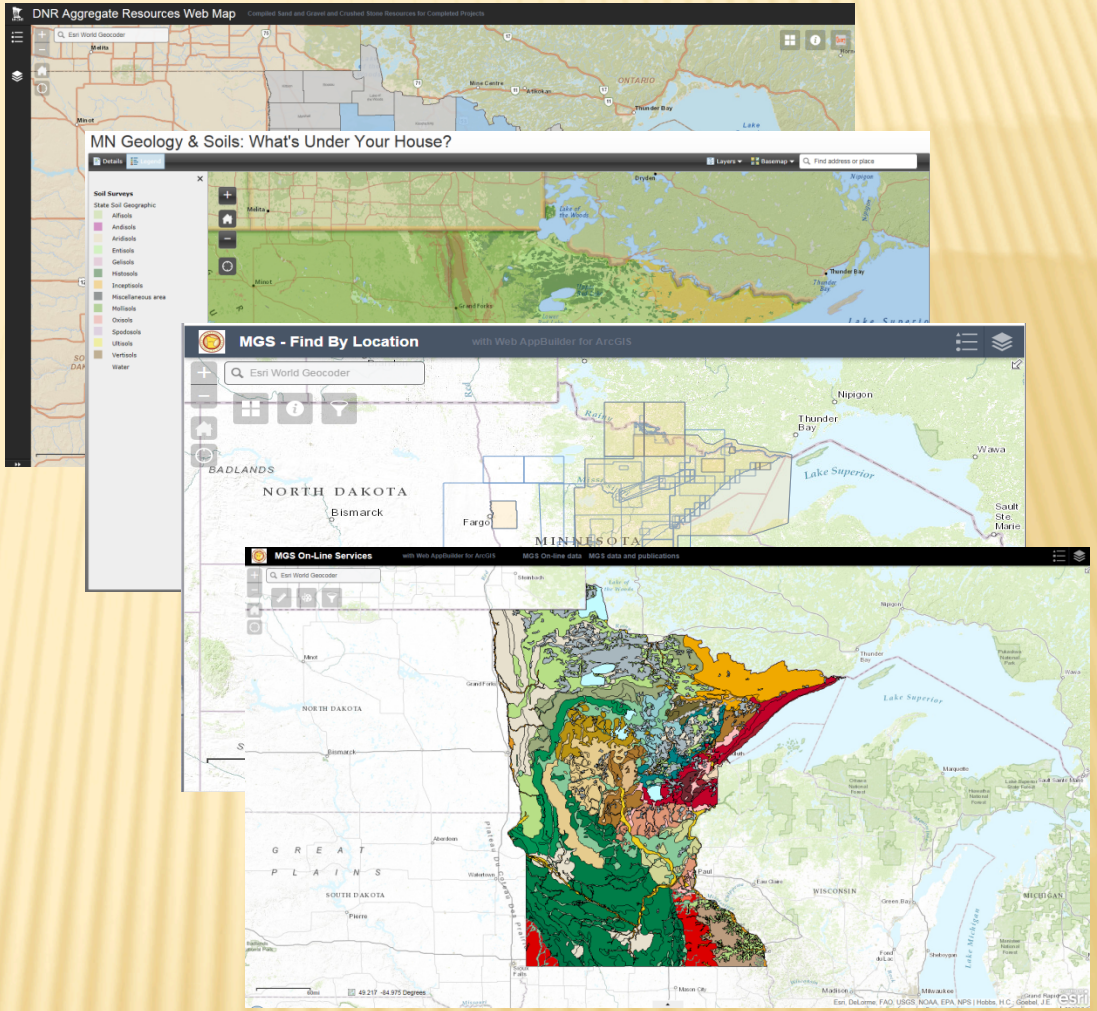
- Minnesota Geological Survey (MGS) – What do we really do.
- What is GIS and who is ESRI?
- How does the MGS use this technology?
- Story Map (Map Journal)- geological on-line data
- What GIS tools you can use to access MGS data.
  - Search or Browse – University Digital Conservancy
  - Find MGS On-line services with the Web App for ArcGIS
  - Find All MGS publications using the Find By Location Web App for ArcGIS
- What Can 4th Graders do?
- K12 GIS tools

MGS WEB PAGE HOSTS BOTH WEB APPS AND STORY MAPS



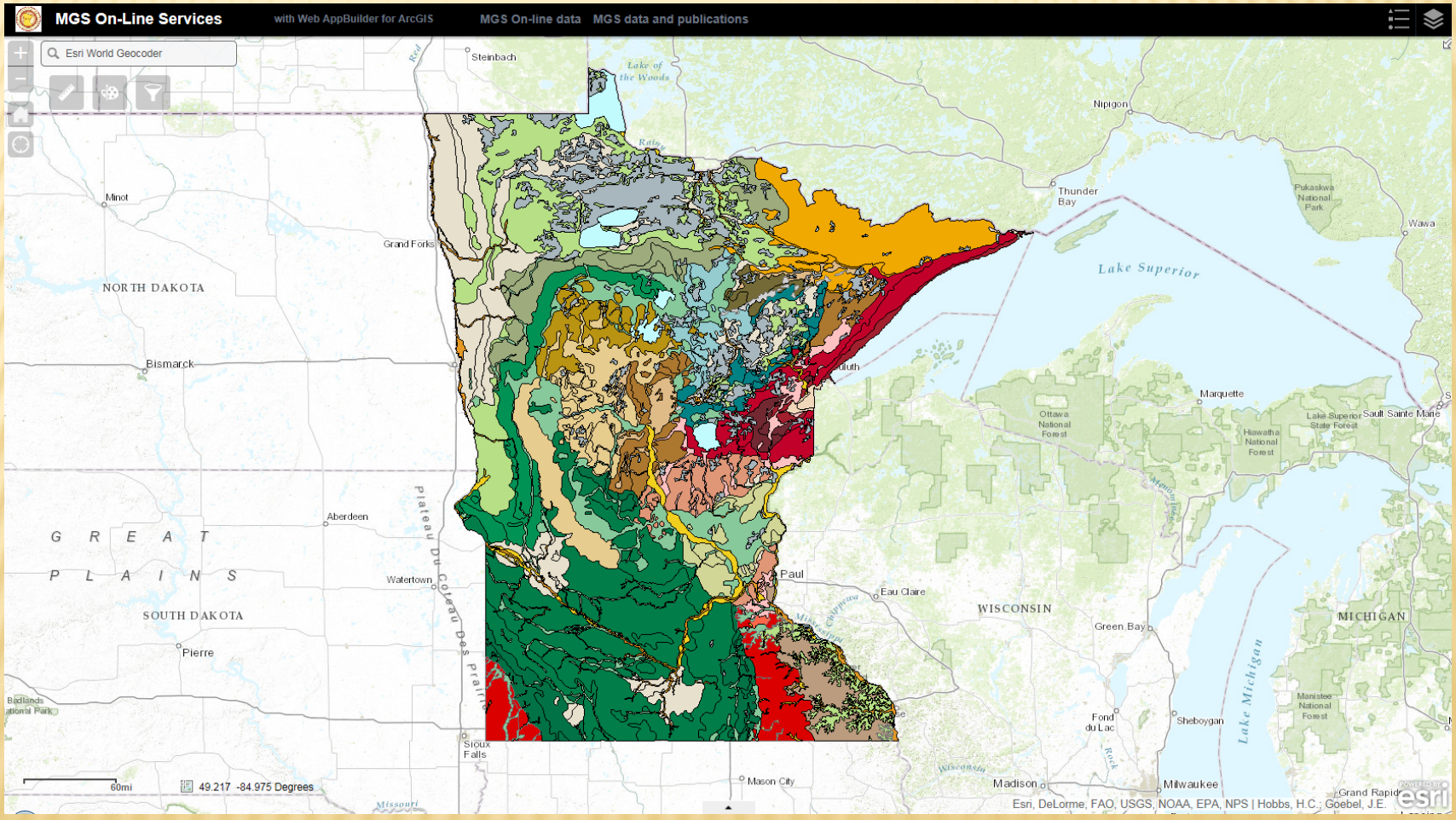
ESRI's
Web AppBuilder for
ArcGIS allows you to
customize your web
map.

- Easy configuration
- Import and export templates
- Build widgets & themes



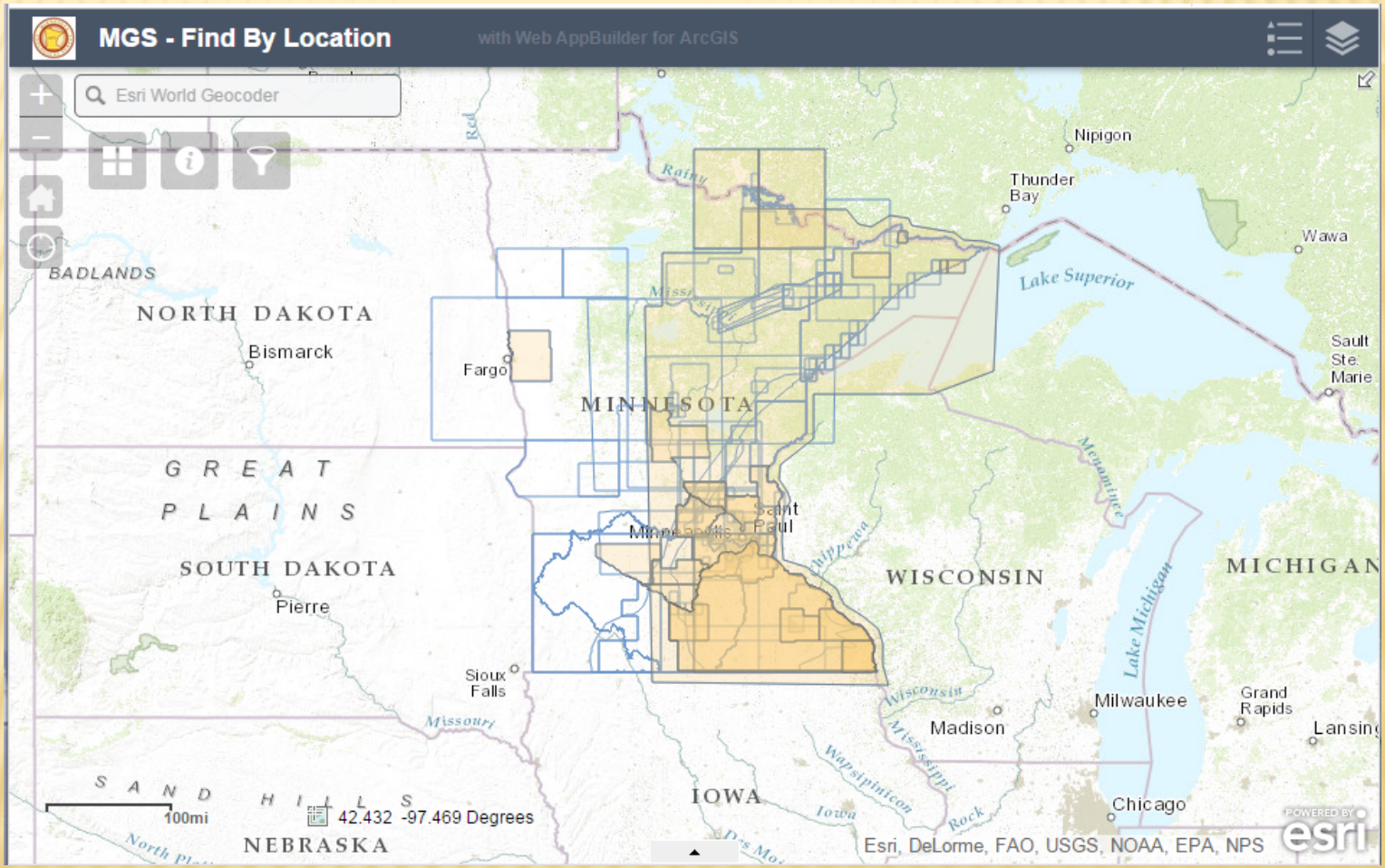
ARCGIS WEB APPBUILDER

MGS ON-LINE SERVICES



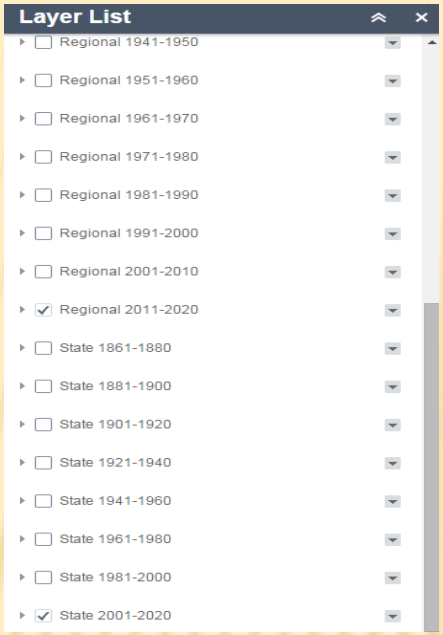
MGS On-Line Services link

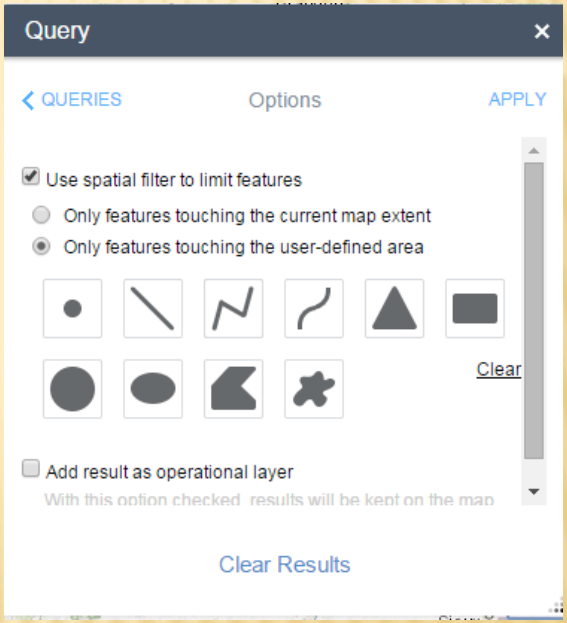
FIND BY LOCATION

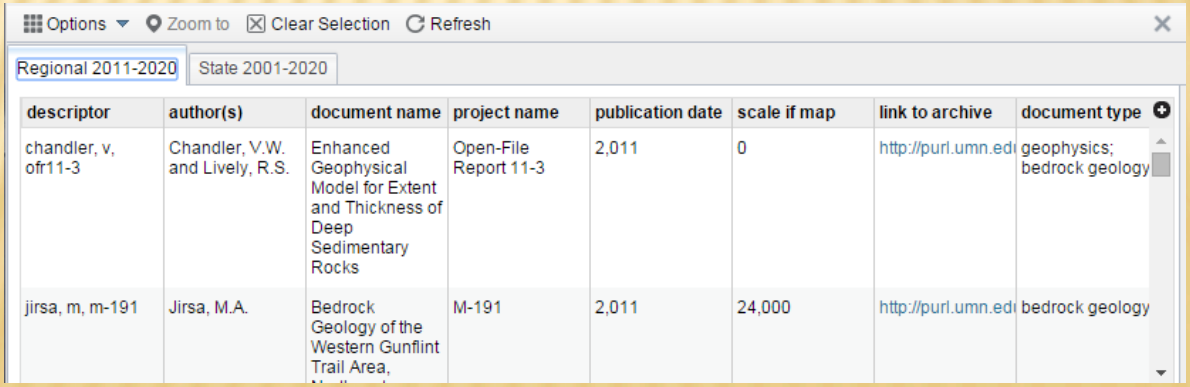


MGS – Find by Location link

WEB APP BUILDER TOOLS

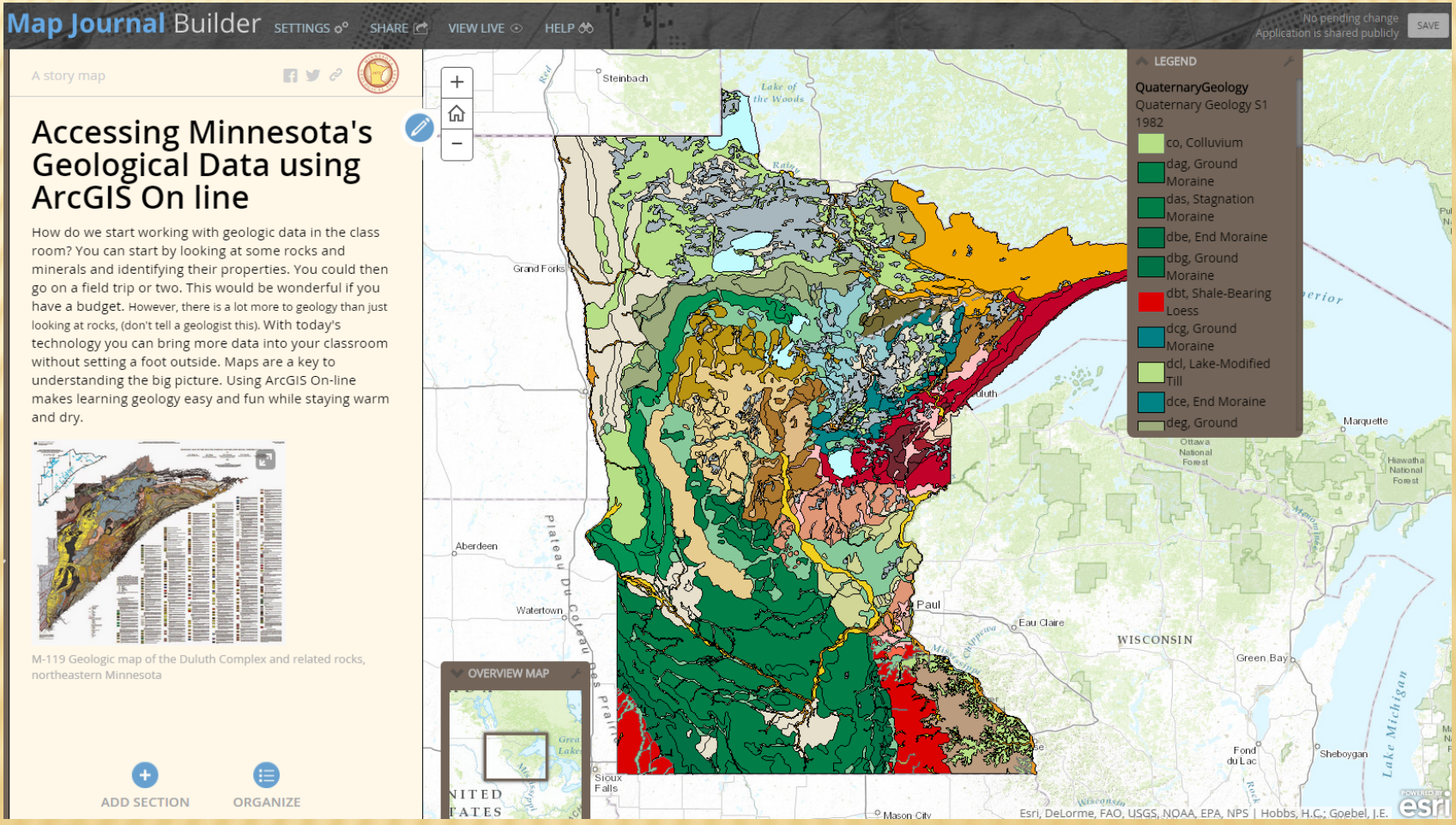






descriptor	author(s)	document name	project name	publication date	scale if map	link to archive	document type
chandler, v, ofr11-3	Chandler, V.W. and Lively, R.S.	Enhanced Geophysical Model for Extent and Thickness of Deep Sedimentary Rocks	Open-File Report 11-3	2,011	0	http://purl.umn.ed	geophysics; bedrock geology
jirsa, m, m-191	Jirsa, M.A.	Bedrock Geology of the Western Gunflint Trail Area,	M-191	2,011	24,000	http://purl.umn.ed	bedrock geology

ESRI'S MAP JOURNAL TELLS A STORY



MGS Map Journal link

MINNESOTA'S ON-LINE GEOLOGIC DATA SERVICES

A story map

Accessing Minnesota's Geological Data using ArcGIS On line

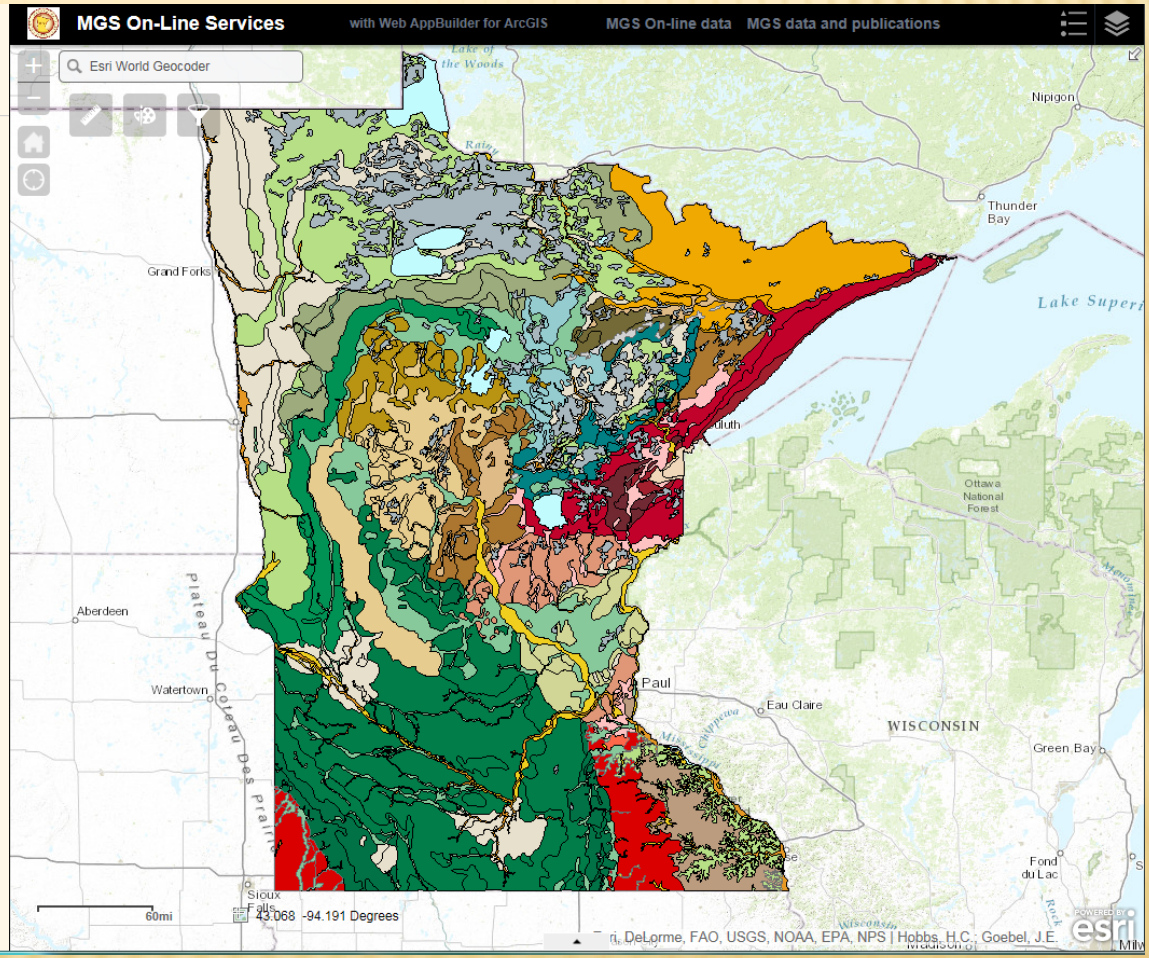
Minnesota's On-Line Geologic Data Service

The MGS host's a few on-line services that anyone can view. The data layers can be accessed by clicking the layer icon in the upper right corner of the map. There is also a legend Icon in the upper right corner. The layers that can be found are:

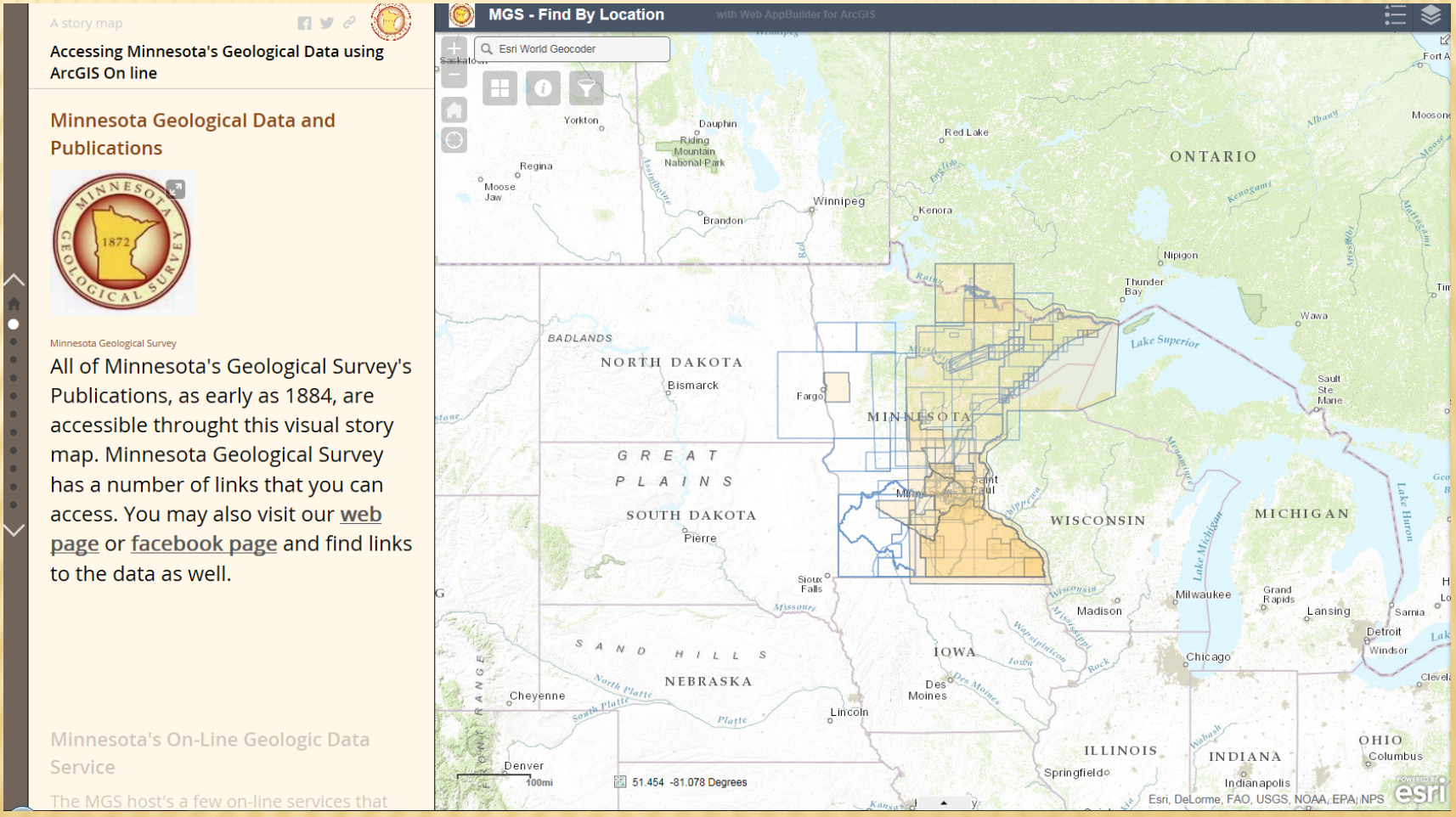
- Quaternary Geology (shown)
- County Atlas Service
- Surficial Geology Mosaic
- Bedrock Geology Mosaic
- Rock Properties
- Bedrock Topography and Glacial Drift Thickness
- Gravity Data
- Extent of Paleozoic and Mesozoic Rocks
- Bedrock Geology

All of this data is free and available for download from our MGS On-Line data link at the top of the page.

Aggregate Resource Mapping Web



MGS – FIND BY LOCATION



Find By Location Link

MINNESOTA DEPARTMENT OF NATURAL RESOURCES

A story map

Accessing Minnesota's Geological Data using ArcGIS On line

Aggregate Resource Mapping Web Map Services

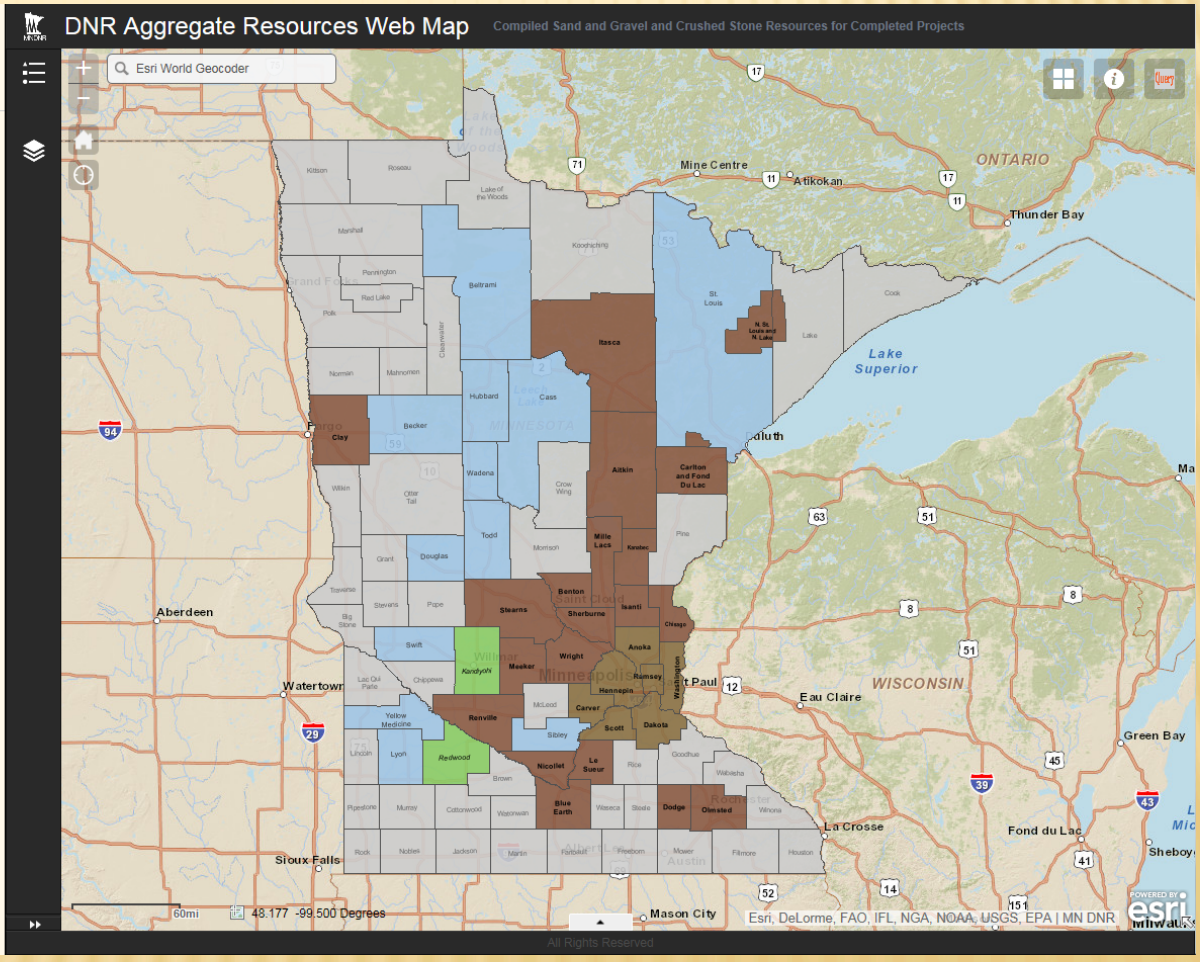
This **web map** application is based on a compilation of GIS aggregate resources (sand and gravel, crushed stone) data spanning **twenty-seven county projects** completed over a number of years (1987-present). Twenty of the projects have been completed by the DNR's Aggregate Resource Mapping Program (ARMP) and seven were completed by the Minnesota Geological Survey's (MGS) for the Aggregate Endowment of the 7-County Metropolitan Area (1999). The attribute data available varies as a result of the varied years of completion and changes in databases structure and verbiage over time. The past project GIS data has been loaded into the current file geodatabase used by the Aggregate Resource Mapping Program. Therefore the data from the most recent completed counties (Aitkin, Stearns, Kanabec, Olmsted) have the most complete attribute table, while the earlier mapped counties (Sherburne, Wright, Isanti) have limited attribute data. This web map application features 5 distinct GIS map services:

- Sand and Gravel Resource Potential
- Crushed Stone Resource Potential
- Identified Resources: Gravel Pits, Quarries, and Prospects
- Geologic Field Observations and Test Holes
- Status Map of Completed, In-Progress, and Requested Projects

What's under your house

Minnesota geologic & soil maps

Click on the drop down Layers tab to select the type of information you whish to view. You can also type in your address to see the geology near & below you.



DNR – MN GEOLOGY & SOILS

A story map

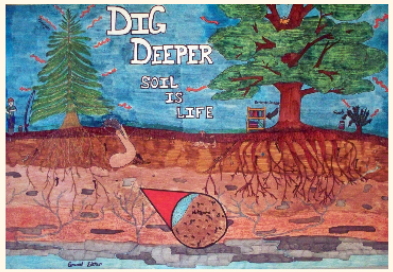
Accessing Minnesota's Geological Data using ArcGIS On line

What's under your house

Minnesota geologic & soil maps

Click on the drop down Layers tab to select the type of information you whish to view. You can also type in your address to see the geology near & below you.

Data sources from the Minnesota Geological Survey (MGS), Department of Natural Resources (DNR), and Natural Resources Conservation Service (NRCS). Hosted by the DNR.

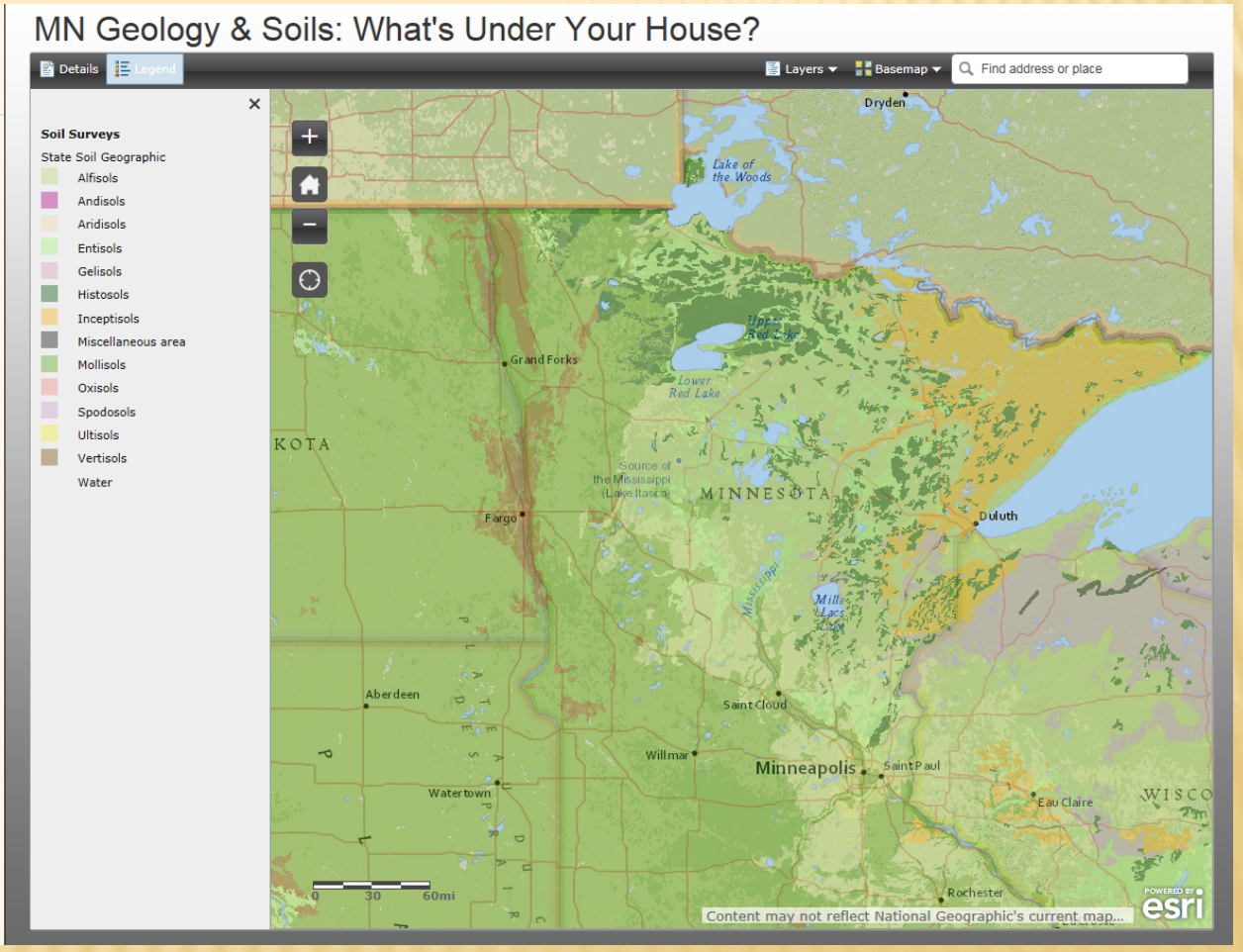


kathryn Ricke, 6th Grade, John Boise Middle School, Benton County, Missouri. Winner of the 2014 Soil & Water Conservation poster contest.

Minnesota's Drill Core Library

Minnesota's Drill Core Library.

This web map application displays the geographic distribution of drill core



DNR – MINNESOTAS DRILL CORE LIBRARY

A story map

Accessing Minnesota's Geological Data using ArcGIS On line

Minnesota's Drill Core Library

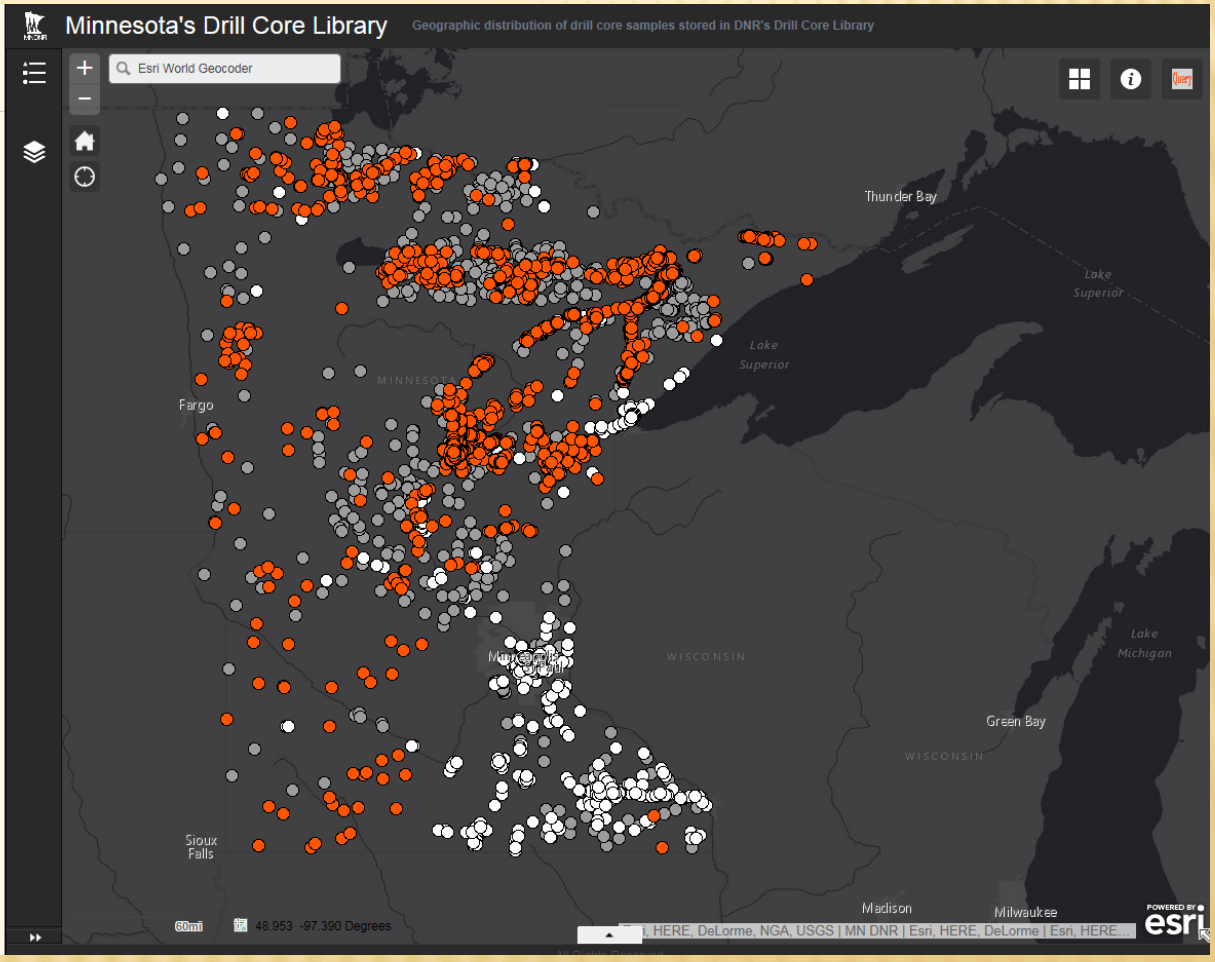
Minnesota's Drill Core Library.

This web map application displays the geographic distribution of drill core samples from DNR's Drill Core Library in Hibbing, Minnesota along with geologic maps and all state minerals leasing. This application is hosted by the MN Department of Natural Resources (DNR) with data sourced from the Minnesota Geological Survey (MGS), DNR, and the University of Minnesota-Duluth.

Elevation profiles

A web page map for creating elevation profiles.

Topographic profiles , or elevation profiles, is a cross-section view along a line that is drawn on a topographic map. ESRI, USGS, National Geographic and many others pulled together this terrain profiler tool to aid students, researchers and anyone who is interested in understanding topographic maps. Geologists use terrain analysis to analize numberouse geologic problems.



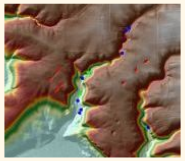
TERRAIN PROFILE TOOL

A story map

Accessing Minnesota's Geological Data using ArcGIS On line

Elevation profiles

A web page map for creating elevation profiles.



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Lake Superior - Born of Fire and Ice

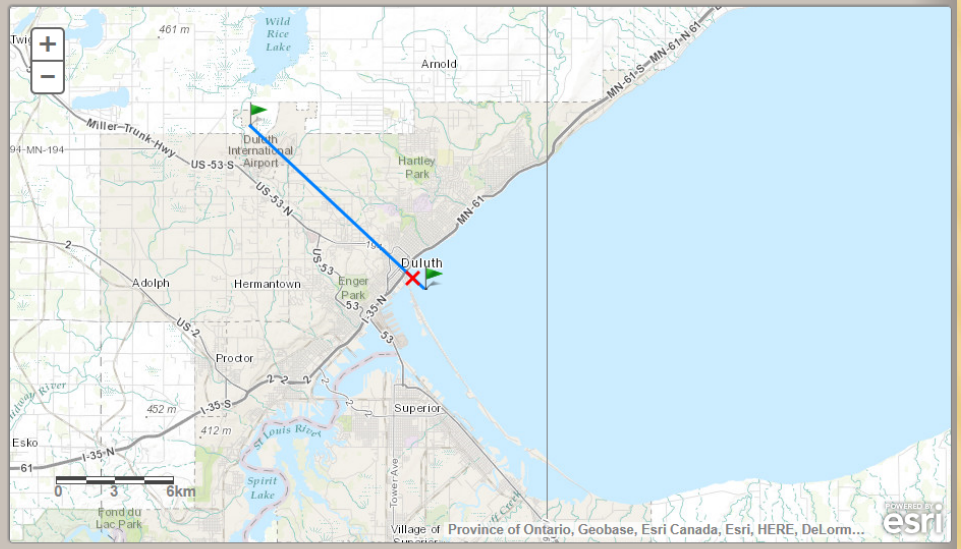
Terrain Profile - http://esriurl.com/elevation

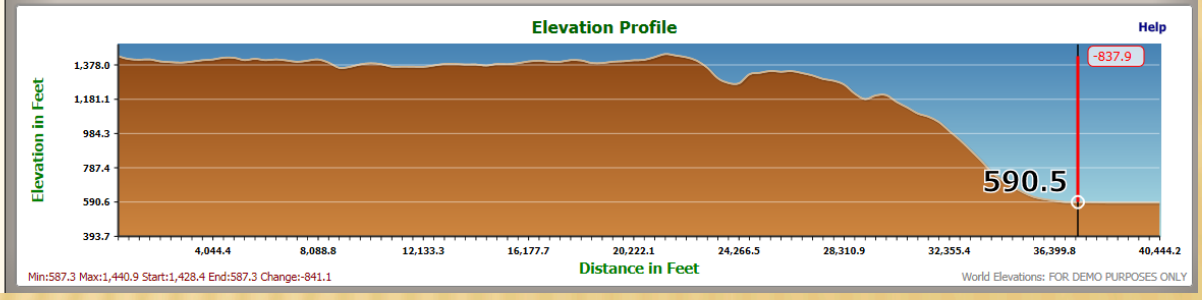
A map for creating elevation profiles at scales from global to local. Use Measure/ruler tool to plot a path.

Measure

This map lets you create an elevation or terrain profile, from global to neighborhood scale. Use the **Measure (ruler)** tool to plot a path (click-click-click; clickclick to end) and see it in the profile window. Hover the mouse along the profile to see corresponding locations in the map.

graticule





TETTEGOUCHE STATE PARK GEOLOGY

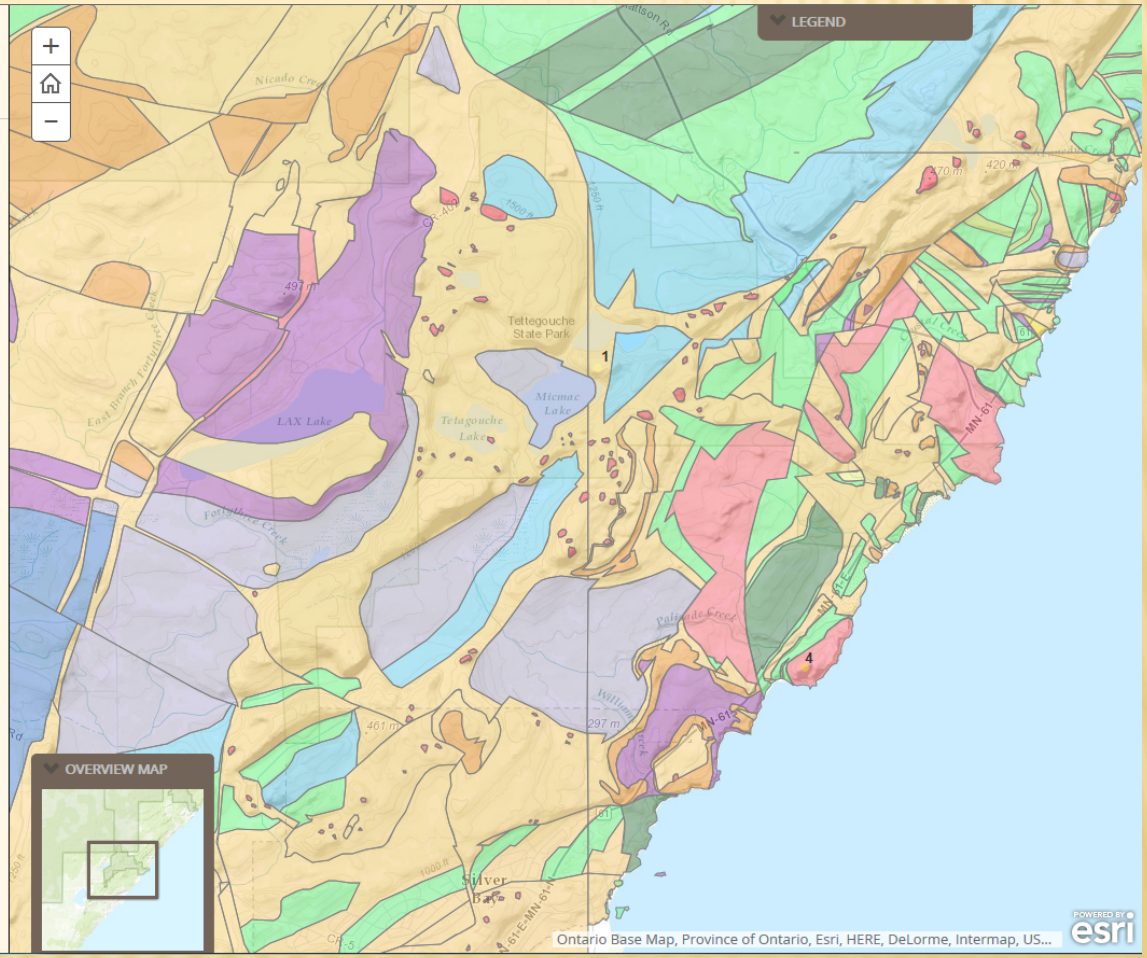
A story map

Accessing Minnesota's Geological Data using ArcGIS On line

Lake Superior - Born of Fire and Ice

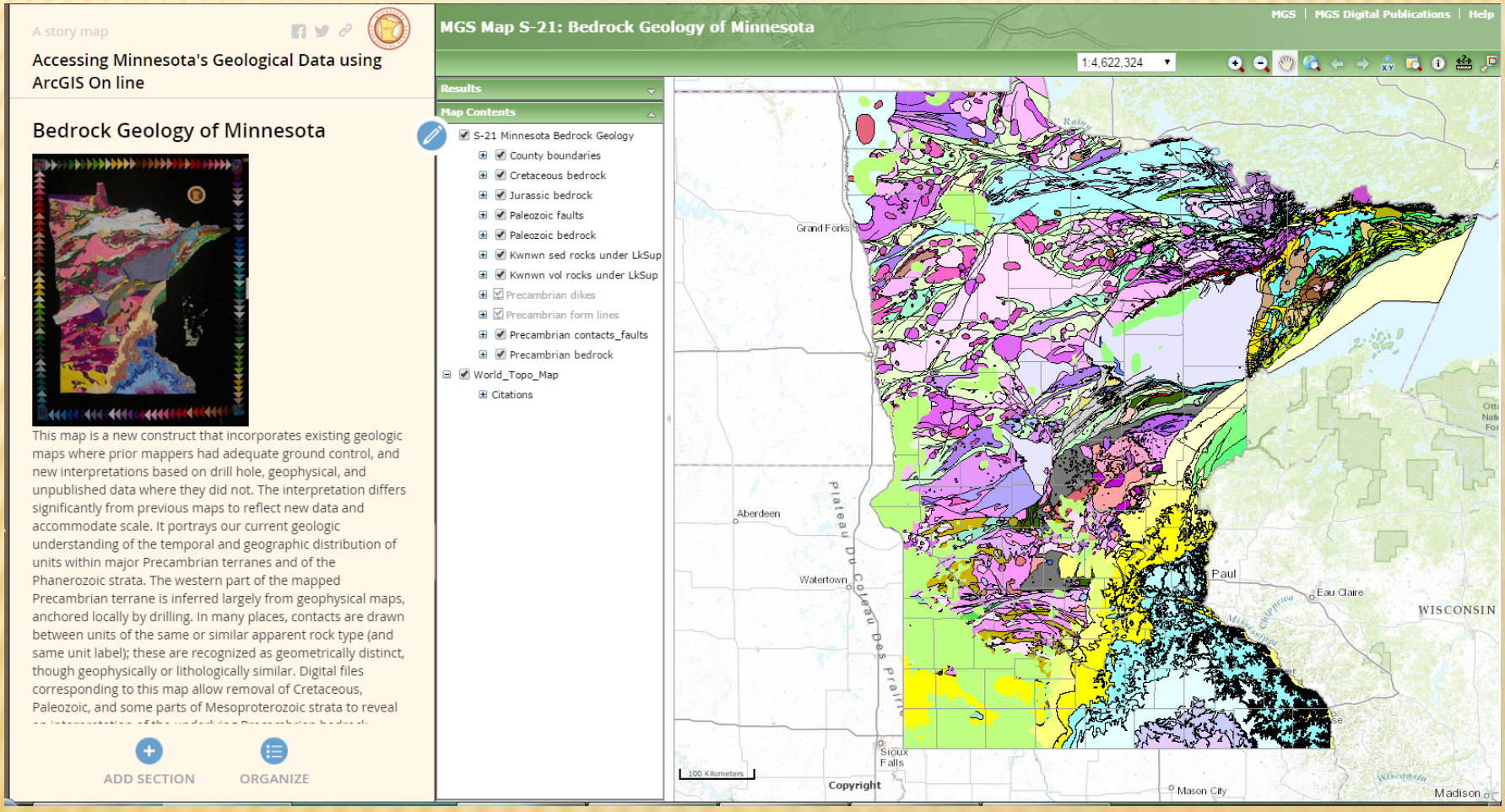
From this vantage point, the exceptionally rugged land surface of this part of the North Shore is apparent. This high relief is due to the large concentration of intrusive igneous rock and the contrasting erodability of this rock and the two main types of volcanic rock - basalt and rhyolite. Although the igneous activity that produced the rocks occurred about 1,100 million years ago during the formation of the Midcontinent Rift, sculpting of the present-day landscape was largely accomplished over the past 2 million years by glacial erosion. In a glacial environment, erosion is largely accomplished by abrasive action of sediment-laden

ice and by the prying action of freezing and thawing of



Born of Fire and Ice data link

MINNESOTA'S BEDROCK GEOLOGY MAP

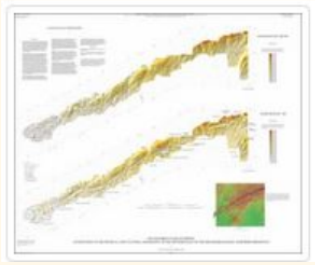


100 YEARS OF MINING

A story map

Accessing Minnesota's Geological Data using ArcGIS On line

One Hundred Years of Mining



Lively, R.S.; Morey, G.B.; Bauer, E.J. (Minnesota Geological Survey, 2002)

One Hundred Years of Mining

This is a snapshot in time. Taking field survey data that was collected from the USGS back in the 1800's and converting the data into electronic form gave way to a glimps of how the landscape has changed over time. This app takes time to load so please be patient.

The full publication and data for this project can be found in the University of Minnesota Digital Conservancy, M-118 and M-157.

Mesabi Iron Range - Past vs. Present

Mesabi Story Map

Minnesota Mesabi Iron Range - Alterations to the physical and cultural geography of the Mesabi Iron Range, northern Minnesota

esri

1 2

Minnesota's Mesabi Iron Range - 100 years of mining.

This story map demonstrates the aerial extent and amount of elevation change to the land surface as a result of mining activity on the Mesabi Iron Range between 1899 and 1999.

To find the publications and GIS data for this site click on the following links, M-118 and M-157

These grids take some time to load so please be patient.

Legend

m118_m157_differe Mesabi_Iron_Range

converted_graphics2
All lines

converted_graphics2

City street

Road

Current NHDWaterbody

MineFeaturesCurrent

Pit limit

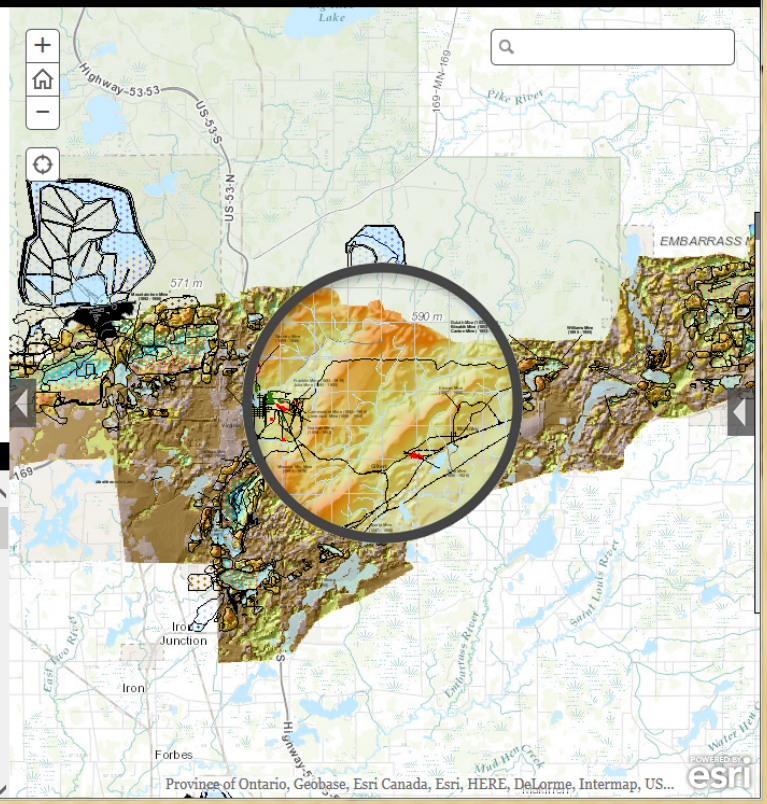
1899 mines

mineLocatyions_1899

mines_from_1899maps

1899 mine dumps

minedumps_from_189



SONORA ELEMENTARY SCHOOL – ESRI USER CONFERENCE – 2014

A story map

Accessing Minnesota's Geological Data using ArcGIS On line

Sonora Elementary in Springdale, Arkansas

Charlie Fitzpatrick and Jack Dangermond introduce the amazing work by students as Sonora Elementary in Springdale, Arkansas. Here they introduce three projects that the elementary school worked on through out the year using ESRI products.

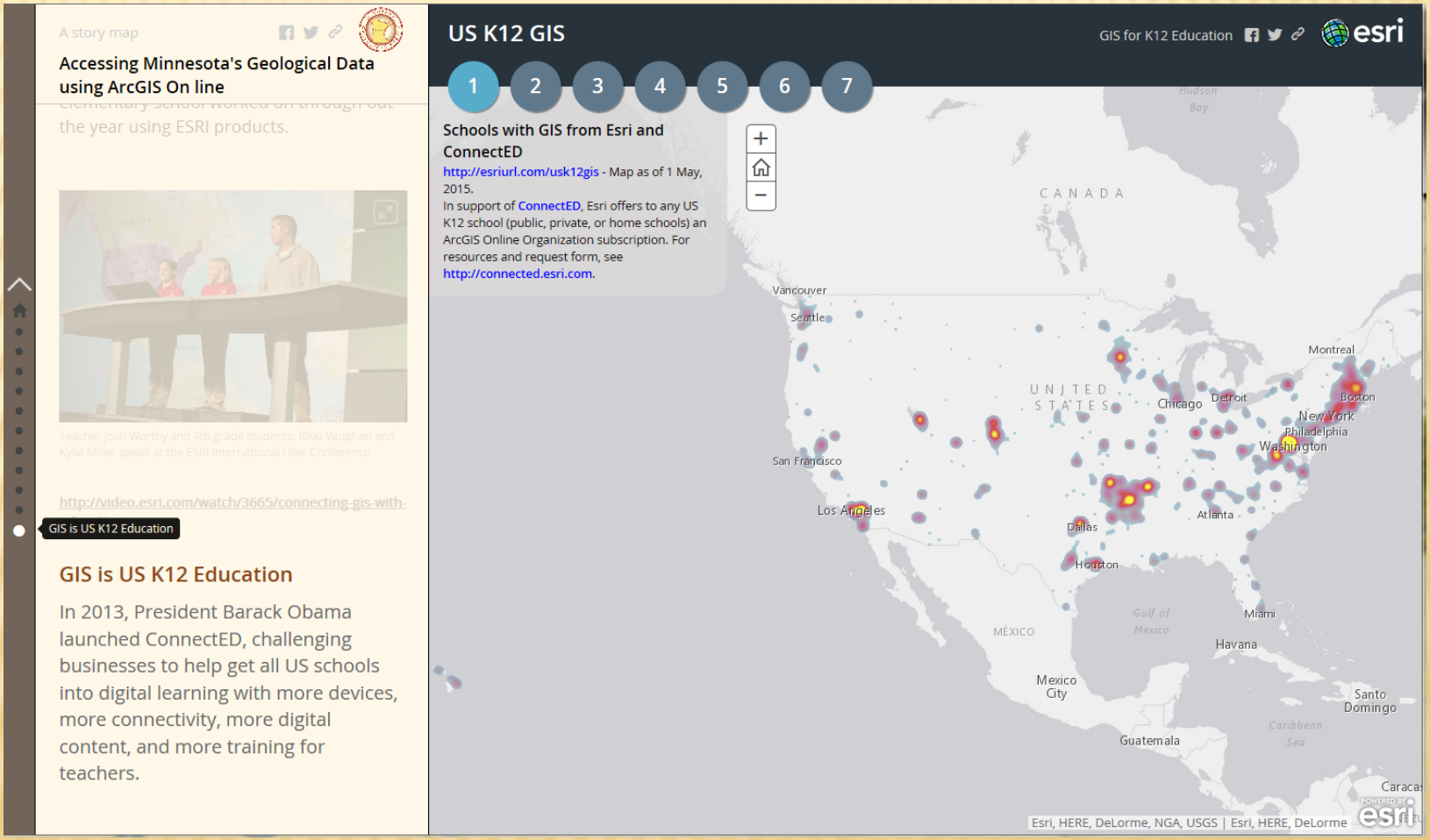
Teacher Josh Worthy and 4th grade students, Rikki Vaughan and Kylie Miller speak at the ESRI International User Conference

http://video.esri.com/watch/3665/connecting-gis-with-education

GIS is US K12 Education

In 2013, President Barack Obama

US K12 GIS


A story map
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Teacher Josh Worthy and 4th grade students, Rikki Vaughan and Kylie Miller speak at the ESRI International User Conference
http://video.esri.com/watch/3665/connecting-gis-with-
GIS is US K12 Education
GIS is US K12 Education
In 2013, President Barack Obama launched ConnectED, challenging businesses to help get all US schools into digital learning with more devices, more connectivity, more digital content, and more training for teachers.
US K12 GIS
GIS for K12 Education
esri
1
2
3
4
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7
Schools with GIS from Esri and ConnectED
http://esriurl.com/usk12gis - Map as of 1 May, 2015.
In support of ConnectED, Esri offers to any US K12 school (public, private, or home schools) an ArcGIS Online Organization subscription. For resources and request form, see http://connected.esri.com.
CANADA
UNITED STATES
MÉXICO
Vancouver
Seattle
San Francisco
Los Angeles
Chicago
Detroit
Montreal
Boston
New York
Philadelphia
Washington
Atlanta
Dallas
Houston
Miami
Havana
Mexico City
Guatemala
Santo Domingo
Gulf of Mexico
Caribbean Sea
Esri, HERE, DeLorme, NGA, USGS | Esri, HERE, DeLorme

THANK YOU

- Questions?

- Jacqueline Hamilton
- Minnesota Geological Survey
- stub0035@umn.edu