

DIGITAL MAPPING TECHNIQUES 2017

The following was presented at DMT'17
(May 21-24, 2017 - Minnesota Geological
Survey, Minneapolis, MN)

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2017)

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

Enhanced Online Public Access to Minnesota Minerals and Geology Data Using ArcGIS Online Web Maps

By Kevin Hanson

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The Minnesota Department of Natural Resources (DNR) uses Esri's ArcGIS Online to facilitate public access to GIS data through web map applications, which are replacing or supplementing printed maps and GIS data downloads as sources of geological and minerals data. One DNR web map application focuses on the potential for construction aggregate resources across the state. A second identifies the locations of exploratory boreholes and areas of metallic mineral exploration. Supplemental map layers, such as Minnesota Geological Survey's GIS data, add additional value to these web maps, which can be used by the public without need of GIS software.



Enhanced Online Public Access to Minnesota Minerals and Geology Data Using ArcGIS Online Web Maps

Kevin Hanson – GIS Analyst and Division Web Coordinator

Division of Lands and Minerals

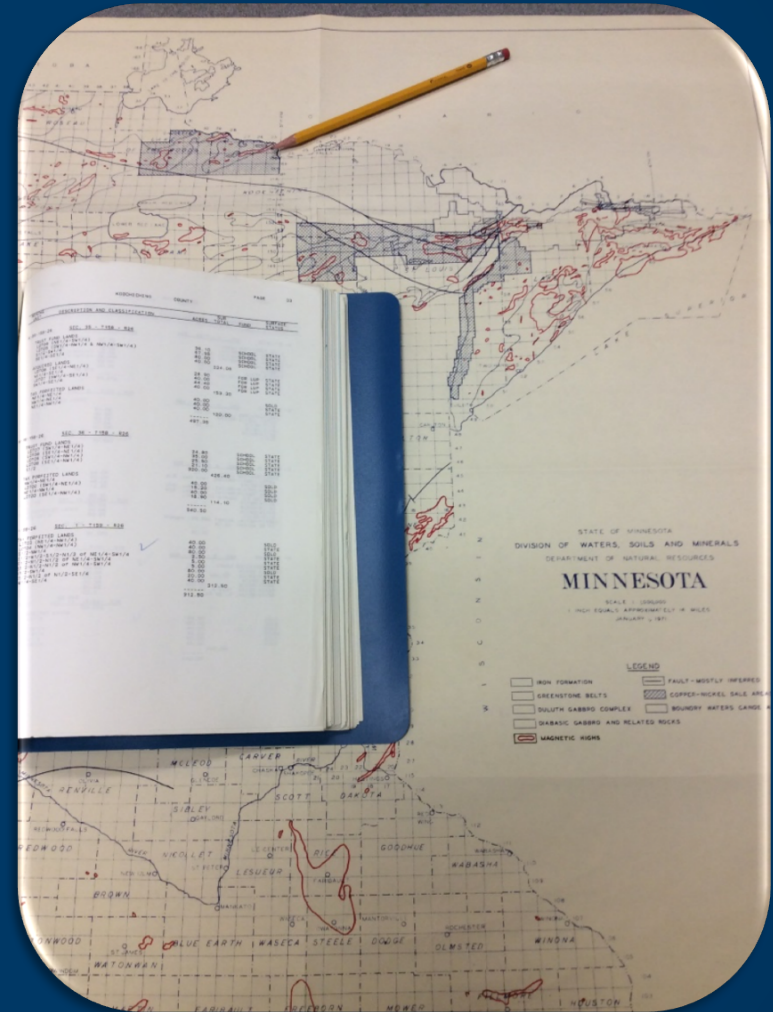
DMT Conference 2017 – Minneapolis, Minnesota

May 23, 2017

History of Data Access and Distribution

The 1970s

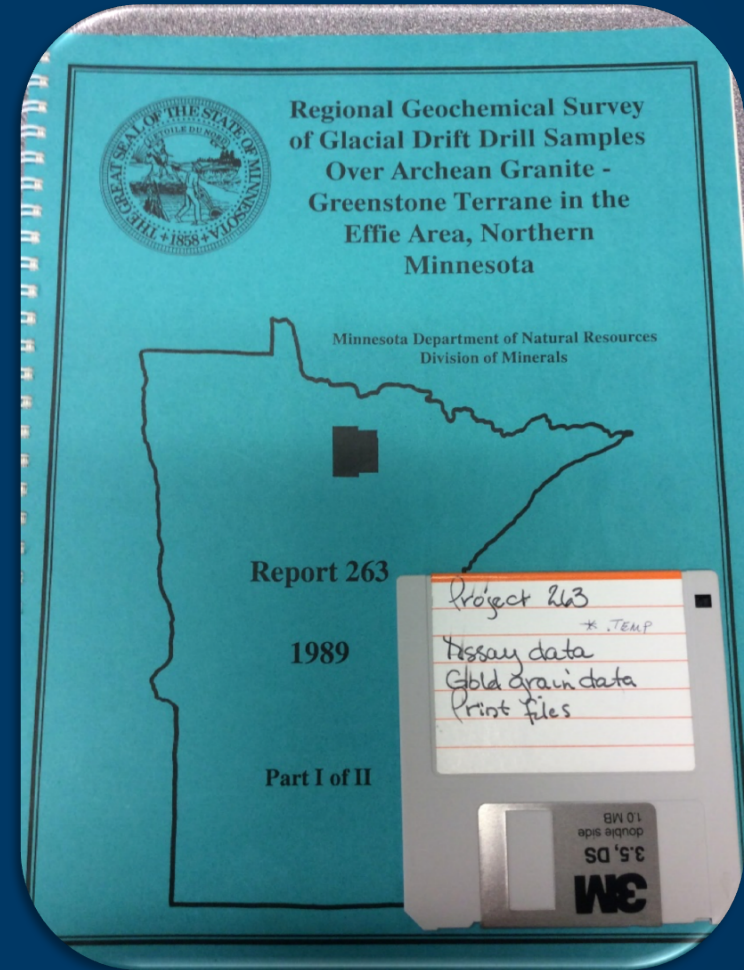
- Paper
- Typewriters and cartographic press
- Mail or Site visits



History of Data Access and Distribution

The 1980s

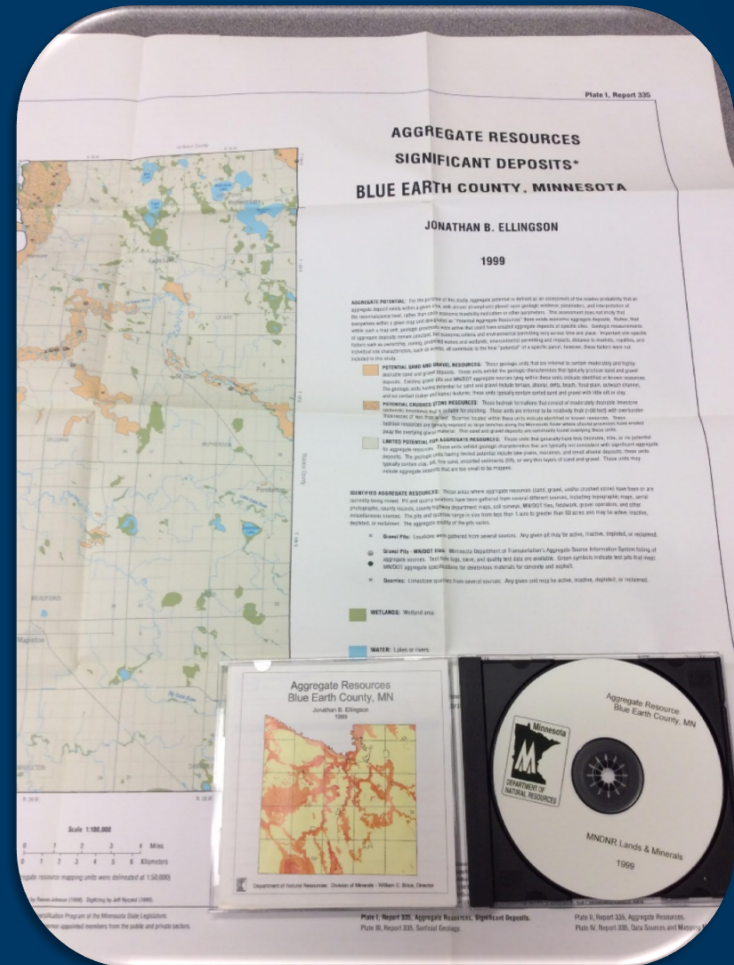
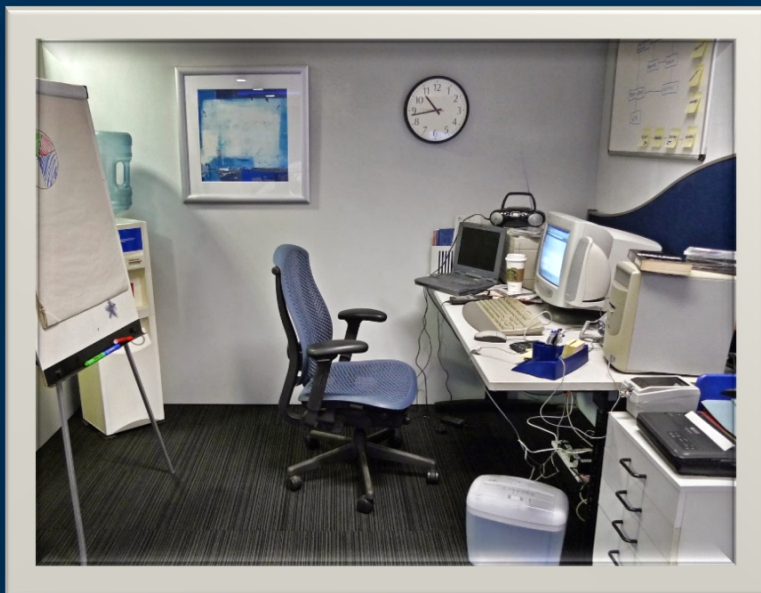
- Paper
- PC + Floppy Disks
- Mail or Site visits



History of Data Access and Distribution

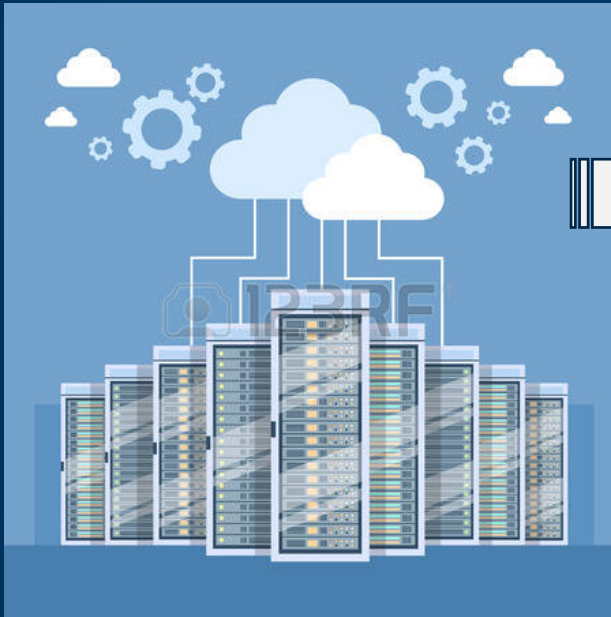
The 1990s

- Paper
- PC + CD-ROMS with GIS Data and PDF maps
- Internet and email infancy



History of Data Access and Distribution 2000s to Today

- Cloud data servers
- High-speed web
- Mobile Devices
- Data Downloads
- Web maps
- Email notices



Minnesota DNR – Lands and Minerals Easy Access to GIS Data and Digital PDF Maps

Home > Lands & Minerals > GIS Data and Print Maps >

Publications and Data

Publications

GIS Data & Maps

Web Maps

Reclamation Research

Aggregate Maps

Land Sales

Mineral projects & data releases

Drill Core Library

Lehmann Exploration Collection

Minarchive

Underground Mine Mapping

Division of Lands & Minerals

Main page

Contacts

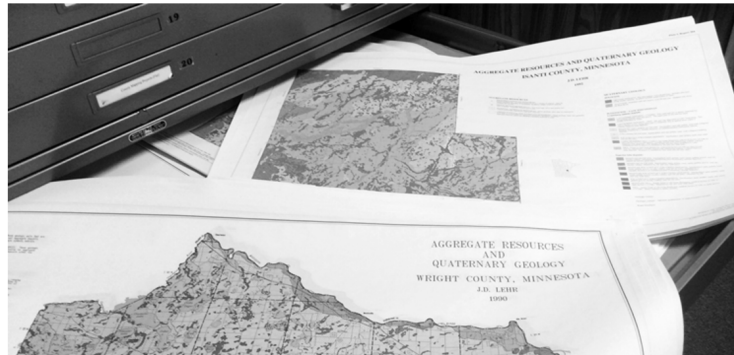
News

Publications

FAQs

Regional Operations

Lands and Minerals List of GIS Data, Digital Print Maps, & Web Maps



The Lands and Minerals Division has a history of creating, maintaining, and sharing spatial datasets and digital print maps. Provided here is an extensive list of publicly available GIS datasets, digital print maps, web map services, and associated web map applications authored by the Minnesota DNR's Lands and Minerals Division. The information has been separated out into tables by subject matter shown below.

- [Aggregate Resource Mapping Program](#)
- [Dimension Stone Inventory](#)
- [Drill Core Library](#)
- [Mineral Exploration Collections](#)
- [Mineral Exploration Plan Summary Reports and Maps](#)
- [Mineral Potential Projects](#)
- [Mining Sites in Minnesota from DNR](#)
- [Overview Maps of Iron Mining and Nonferrous Mineral Exploration Activity in Northern Minnesota](#)
- [Peat Inventory Project](#)
- [Public Land Survey Data](#)
- [Regional Operations Contacts Map](#)

Minnesota DNR – Lands and Minerals Types of GIS Data and Maps Available

- Sand and Gravel & Crushed Stone Potential Maps
- State Mineral Leasing
- Drill Core Library
- Mineral Potential Projects
- Dimension Stone Inventory
- Mineral Exploration Collections

Mineral Exploration Collections

Minarchive and Lehmann Family Fund Collections

Date	Name	GIS Data	Digital Print Maps	Web Map Service	Web Map Application
2016-2017	Spatial (GIS) footprints that connect to more than 2,000 scanned mineral exploration documents from the Lehmann Family Fund Collection (including the Polaris Joint Venture). Web Page	GIS Data	PDF Map / PDF Lookup by Spatial Area	Web Map Service	Drill Core Library Web Map
1999-2001; 2015-2017	Spatial (GIS) footprints that connect to more than 10,000 scanned mineral exploration documents indexed by the Minnesota DNR's Lands and Minerals Division between 1999-2001. Also included are footprints of selected Minarchive exploration documents georeferenced by the DNR between 2014-2016 and vector data from selected georeferenced maps. Minarchive Web Site (1999-2001)	GIS Data	PDF Lookup by Spatial Area	Web Map Service	Drill Core Library Web Map

Lands & Minerals Data to Geospatial Commons


Minnesota GIS Data Repository

Mineral Exploration Collections

Minarchive and Lehmann Family Fund Collections

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Resources Organizations Categories News Help

Home / Organizations / Natural Resources Department / Mineral Exploration Document ...

Mineral Exploration Document Areas - Lehmann Family Fund Collection

Followers: 0



Natural Resources Department

Working with citizens to conserve and manage the state's natural resources. read more

Social: Google+, Twitter, Facebook










License: License not specified

Resource Categories Activity Stream

Mineral Exploration Document Areas - Lehmann Family Fund Collection

Spatial (GIS) footprints that connect to more than 2,000 scanned mineral exploration documents from the Lehmann Family Fund Collection (including the Polaris Joint Venture). The GIS polygon data includes URL links to view or download the document(s) for a mineral exploration area. Please read the lineage and accuracy sections of this form for details on GIS data creation and accuracy.

For information on the Lehmann Exploration Collection inventory please visit the DNR's webpage at: http://www.dnr.state.mn.us/lands_minerals/polaris/index.html

-  **Static Preview - Sample Image** [View](#)
-  **Shapefile** [Download](#)
-  **OGC GeoPackage** [Download](#)
-  **Collection as PDF Report** [View](#)
-  **Collection as Excel File** [View](#)
-  **Collection as Web Map App (see layer 'DNR Mineral ...)** [View](#)
-  **Collection as Map Service** [View](#)
-  **ESRI File Geodatabase** [Download](#)
-  **Full Metadata Record** [View](#)

exploration lands and minerals lehmann collection metallic minerals minarchiver

mineral exploration... minerals polaris joint venture

Minnesota DNR – Lands and Minerals Minnesota Geospatial Commons

- Core Samples Stored in Drill Core Library
- Mineral Exploration Document Areas – Minarchive
- Mineral Exploration Document Areas – Lehmann Family Fund
- DNR Mineral Potential Project Footprints
- Aggregate Resource Mapping Program Compiled GIS Data
- Coming soon...State Mineral Leasing Data

The screenshot displays the Minnesota Geospatial Commons website interface. At the top, the logo 'm MINNESOTA GEOSPATIAL COMMONS' is visible, along with navigation links for Resources, Organizations, Categories, News, and Help, and a search bar. The main content area shows a search for 'minerals and geology and drilling' resulting in 14 resources. The results are organized into sections: 'DNR Mineral Potential Section Projects Since 1976', 'Mineral Exploration Document Areas - Lehmann Family Fund Collection', 'Mineral Exploration Document Areas - Minarchive', 'Aggregate Resource Mapping Program', and 'Exploration, Scientific, and Engineering Boring Hole Locations Stored in the ...'. Each section includes a brief description and a list of available file formats (e.g., JPEG, HTML, fgdb, gpkg, SHP). On the left side, there is a sidebar with a map and filters for Organizations (Minnesota Geologica... (8), Natural Resources D... (6)), Categories (Geoscientific (14), Environment (1), Boundaries (1)), and Tags (surficial geology (8), bedrock geology (8), bedrock topography (7), depth to bedrock (6), wells (5), mineral resources (5), quaternary stratigr... (4), minerals (3)).

Minnesota DNR – Lands and Minerals Mineral ArcGIS Online and other Web Map Applications

- DNR Drill Core Library and Mineral Exploration Collections
- Areas Offered for the June 2017 State Metallic Mineral Lease Sale
- Aggregate Mapping Program - Sand and Gravel & Crushed Stone Potential Maps
- Aggregate Finder
- What's Under Your House?

DEPARTMENT OF NATURAL RESOURCES

RECREATION DESTINATIONS NATURE EDUCATION LICENSES, PERMITS & REGULATIONS EVENTS CALENDAR ABOUT DNR

Home > Lands & Minerals > Web Maps >

Lands & Minerals Web Maps

- Metallic Mineral Lease Sale
- Aggregate Mapping
- Aggregate Finder
- Land Sale
- What's Under Your House
- Lehmann Family Fund Collection

Publications and Data




- Publications
- GIS Data & Maps
- Web Maps
- Restoration Research
- Aggregate Maps
- Land Sales
- Mineral property State releases
- Drill Core Library
- Lehmann Exploration Collections
- Mapviewer
- Underground Mine Mapping

Lands and Minerals Web Maps

- Aggregate Mapping Program**
View and interact with the copyrighted GIS Data from 27 completed aggregate resource mapping project areas.
[Web Map >](#)
[Reference Site](#)
[View Aggregate Mapping Program Online Map >](#)
- Drill Core Library and Mineral Exploration Document Collections**
View an interactive map displaying the geographic distribution of core and other samples stored at the drill core library. Additionally, search and view DNR's mineral exploration collections for both the Mineral Core Collection and Lehmann Family Fund Collection.
[Web Map >](#)
[Reference Sites](#)
[Drill Core Library >](#)
[Mineral Core Collection >](#)
[Lehmann Collection >](#)
- 2017 State Metallic Mineral Lease Sale**
Web map showing the areas under consideration for the 2017 state nonferrous metallic mineral lease sale.
[2017 State Metallic Mineral Lease Sale Web Map >](#)
- School Trust Aggregate Finder Map**
Launch the web map to view high aggregate resource potential on School Trust Lands.
[Aggregate Finder Web Map >](#)
- Land Sale**
View current land available for sale or recently sold from the DNR.
[Land Sale Web Map >](#)
- What's Under Your House?**
Take a deep-down peek under your foundation using a web map that identifies glacial sediment and bedrock at any spot in the state. Visit the webpage to access the web map and learn more.
[What's Under Your House Web Page >](#)

DEPARTMENT OF NATURAL RESOURCES

Questions?
Call 651-296-6137 or 888-MINNDNR (646-6267)
Mon-Fri: 9 a.m. to 5 p.m., Sat: 9 a.m. to 1 p.m.
Email us: info@dnr.state.mn.us

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Sign up for email updates
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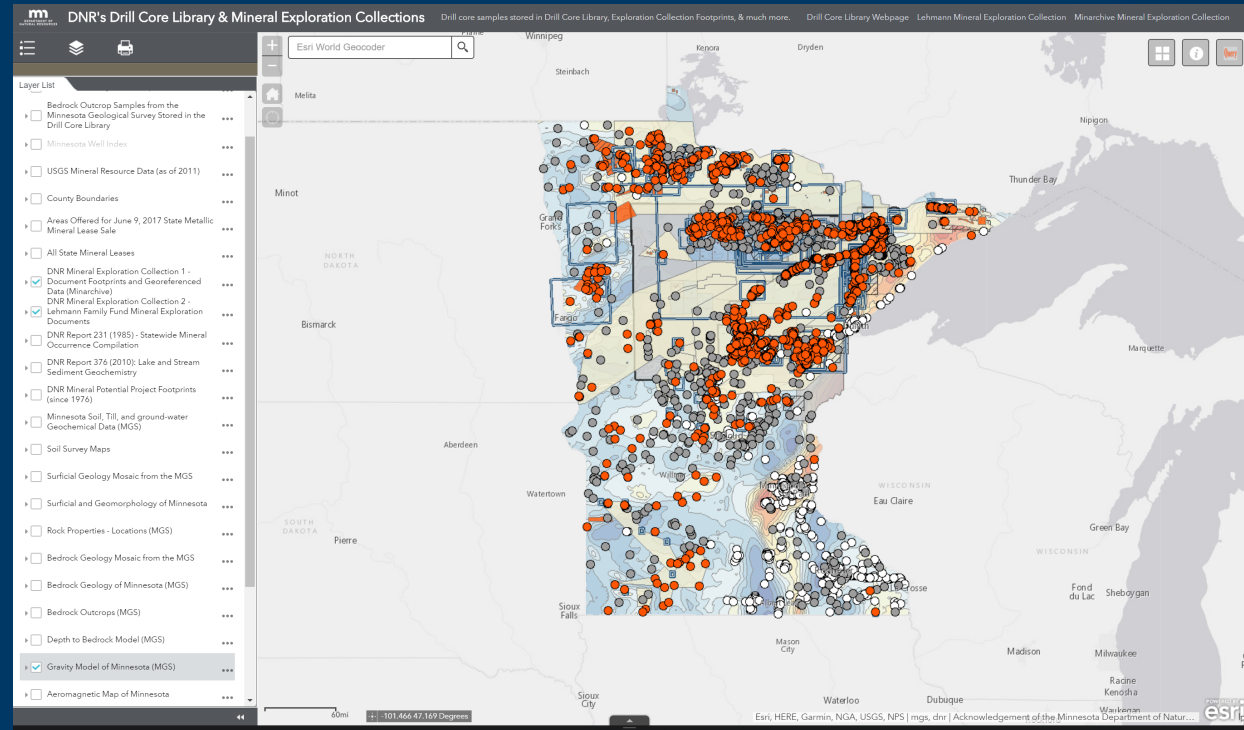
Minnesota DNR – Lands and Minerals Drill Core Library & Mineral Exploration Collections Web Map

DNR GIS Data

- Drill Core and other Samples in Library
- State Mineral Leasing
- Mineral Exploration Collections
- DNR Mineral Potential Projects
- Lease Sale Areas

Minnesota Geological Survey GIS Data

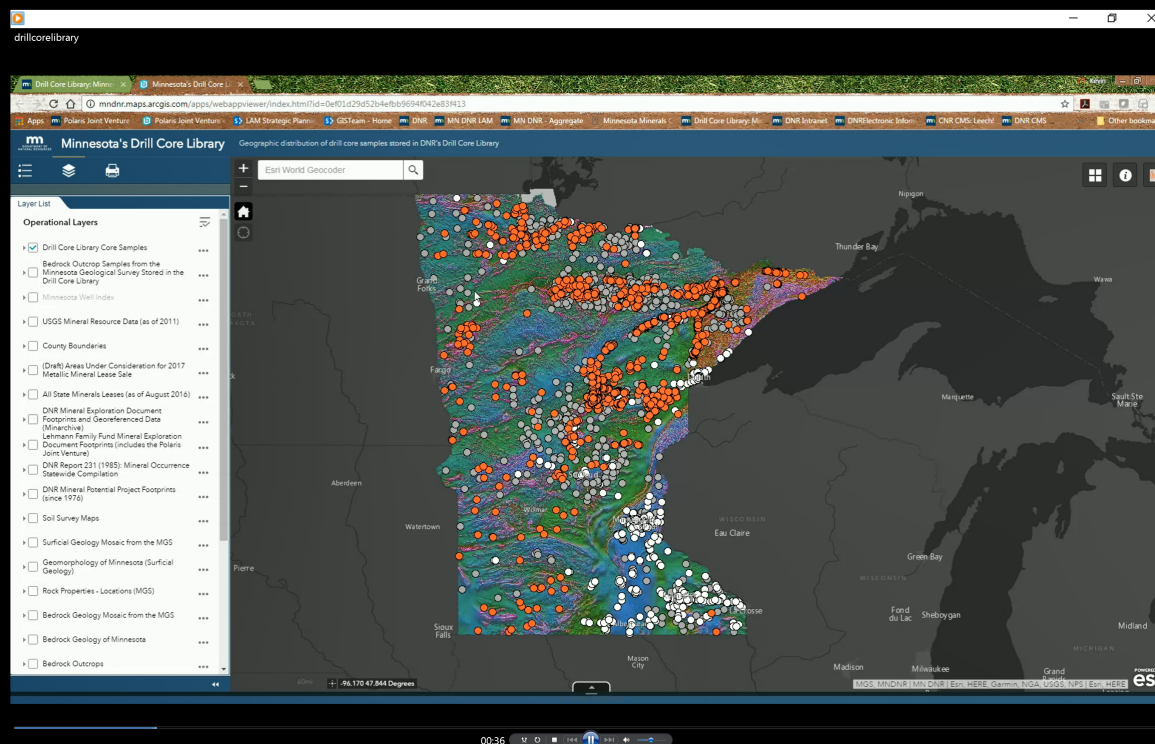
- Bedrock Geology
- Bedrock Outcrops
- Aeromagnetic
- Gravity
- Depth to Bedrock
- Surficial Geology
- Rock Properties
- Well Index
- MGS Project Footprints
- USGS Mineral Resources Data & USDA Soil Data
- 10 Online Basemaps
- Selectable Queries



Drill Core Library and Mineral Exploration Collection Web Map-
DNR Lands and Minerals |

<http://mndnr.maps.arcgis.com/apps/webappviewer/index.html?id=0ef01d29d52b4efbb9694f042e83f413>

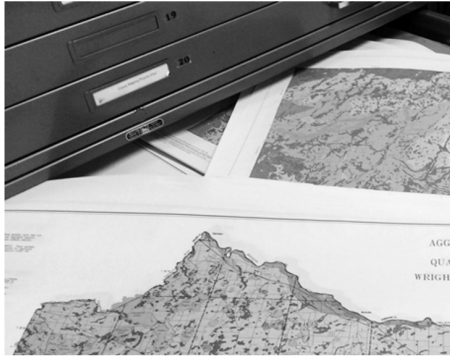
Minnesota DNR – Lands and Minerals Video Tour of Drill Core Library Web Map App



Minnesota DNR – Lands and Minerals

Where to Find the New Mineral Exploration Georeferenced Data?

Lands and Minerals List of GIS Data, Digital Print M

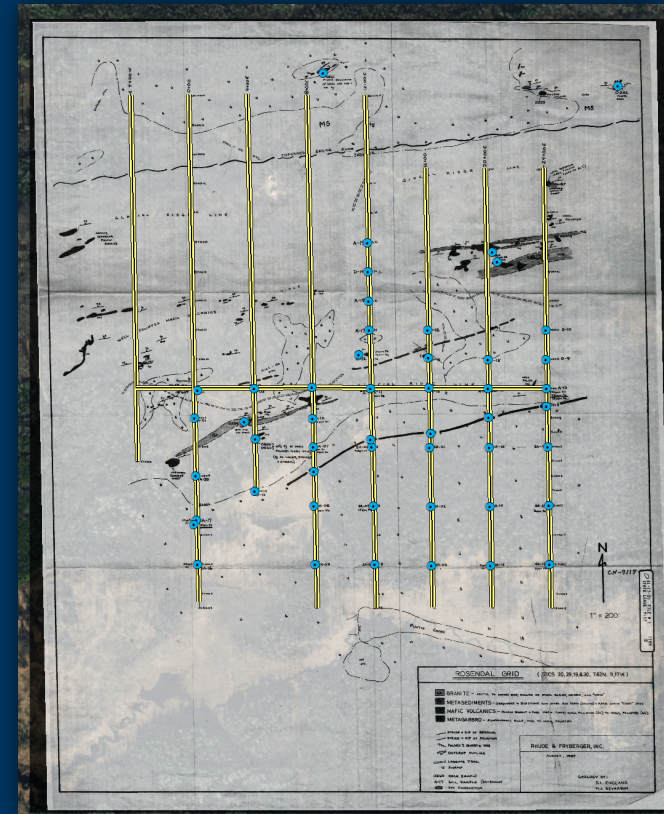


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- [Public Land Survey Data](#)
- [Regional Operations Contacts Map](#)
- [State Aggregate Leasing on School Trust Lands](#)
- [State Land for Sale](#)

Mineral Exploration Collections Minarchive and Lehmann Family Fund Collections

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Website References

DNR Lands and Minerals GIS Data & Maps

http://www.dnr.state.mn.us/lands_minerals/gis_data_maps/index.html

DNR Lands and Minerals Web Maps

http://www.dnr.state.mn.us/lands_minerals/webmaps/index.html

MGS Online Web Map Services

<http://www.mnrgs.umn.edu/service.htm>

MGS Publication and Data Search

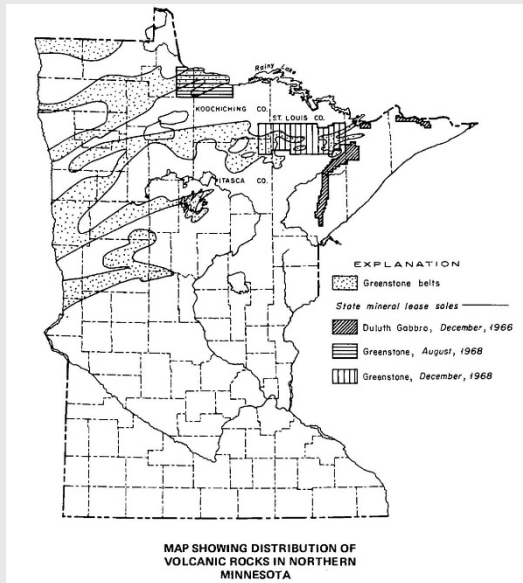
<https://conservancy.umn.edu/handle/11299/708>

Minerals Coordinating Committee (MCC) Website

<http://mcc.mn.gov/resources.html>



A lot more paper left to digitize. Please visit our Hibbing Drill Core Library and Mineral Exploration Collections



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George Austin and Glenn Morey examining one of the drill
cores from the Mesabi range deep drilling project