MINNESOTA IT SERVICES

Geospatial Information Office

2020 Annual Report
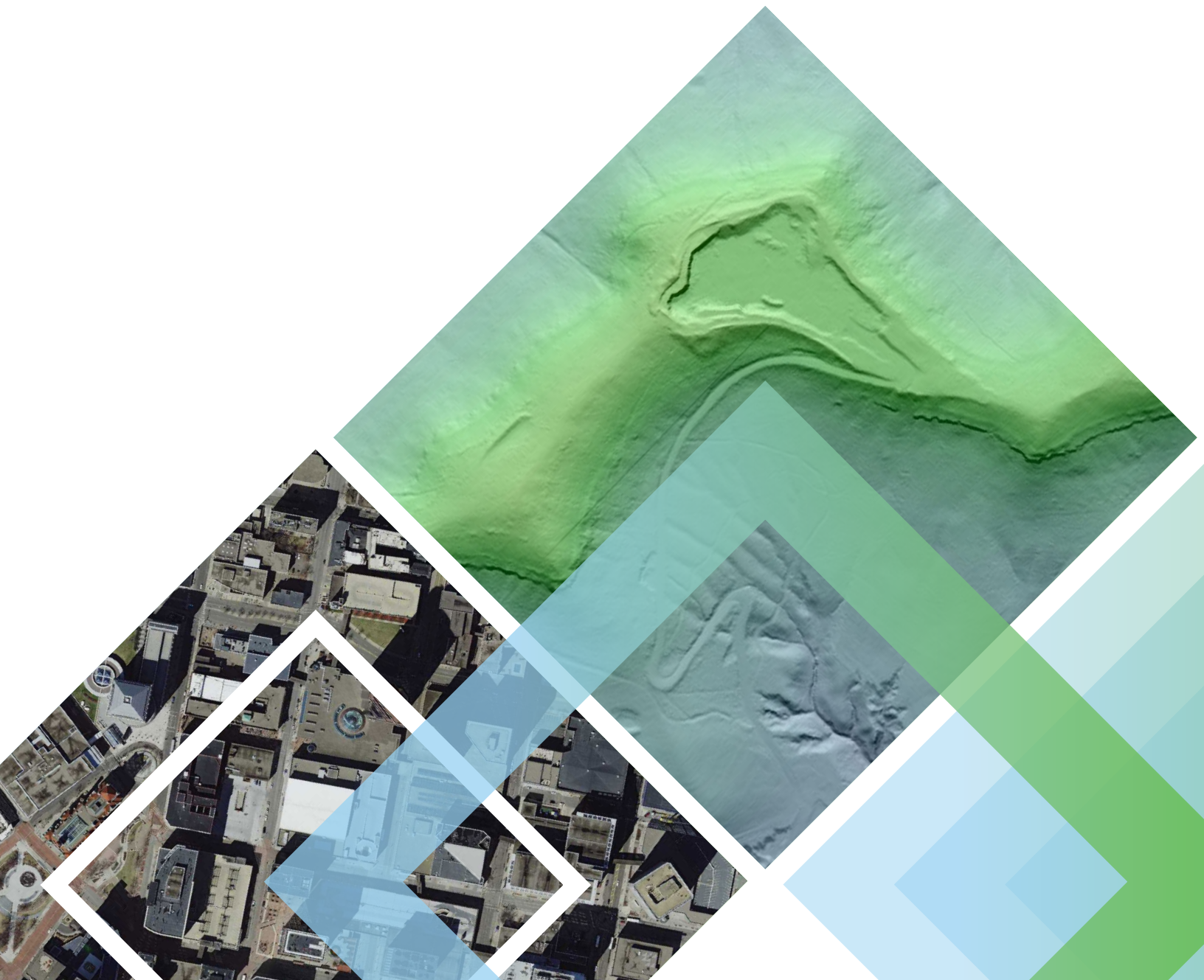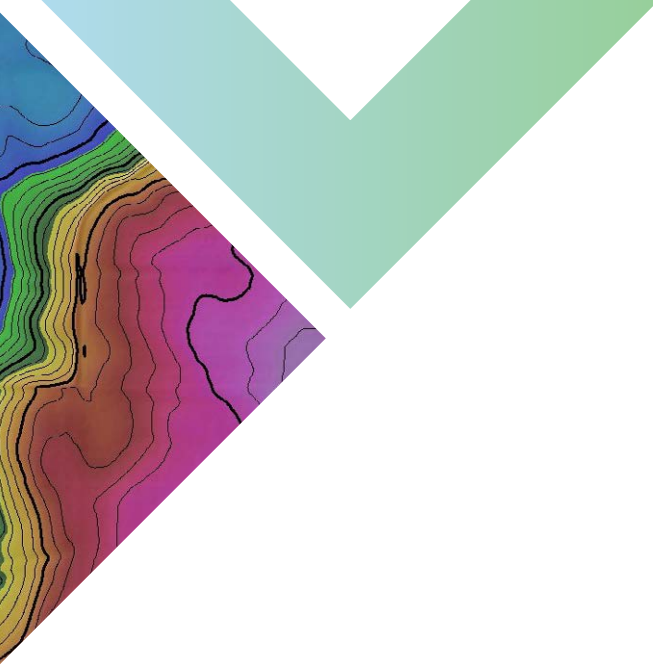
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About Minnesota's Geospatial Information Office

The Minnesota Geospatial Information Office (MnGeo) is an office within Minnesota IT Services (MNIT), the state's IT agency. MnGeo provides coordination, guidance, and leadership for the state's use of geographic information systems (GIS). MnGeo is led by the state of Minnesota's Chief Geospatial Information Officer, Dan Ross.

GIS is the practice of creating, managing, and analyzing geospatial data to better inform decision makers and improve outcomes around public safety, transportation planning, access to health services, preservation of resources, and more.

The Geospatial Information team supports state agency and geospatial community efforts ranging from a public geospatial collaboration website to testing and vaccination maps for the state's COVID-19 response.

2020 by the numbers

29
Number of geospatial applications supported and hosted

897
Total resources on the Geospatial Commons

98,374,608
Number of hits on the geospatial image server

23
Number of agencies and boards supported by MnGeo

Goals and priorities

As part of Minnesota IT Services, the Geospatial Information Office aligns its work with Governor Walz's One Minnesota goals and MNIT's Strategic Plan, seeking to create an innovative digital government that works for all. MnGeo produces or improves geospatial services and systems that benefit the statewide community.

MnGeo priorities, as defined in the office's Strategic Plan, include:

1	**2**	**3**
Improve access to statewide foundational spatial data.	**Lead coordination and communication for Minnesota's spatial community.**	**Provide outstanding technical support for statewide spatial technologies.**

1 Improve access to statewide foundational spatial data
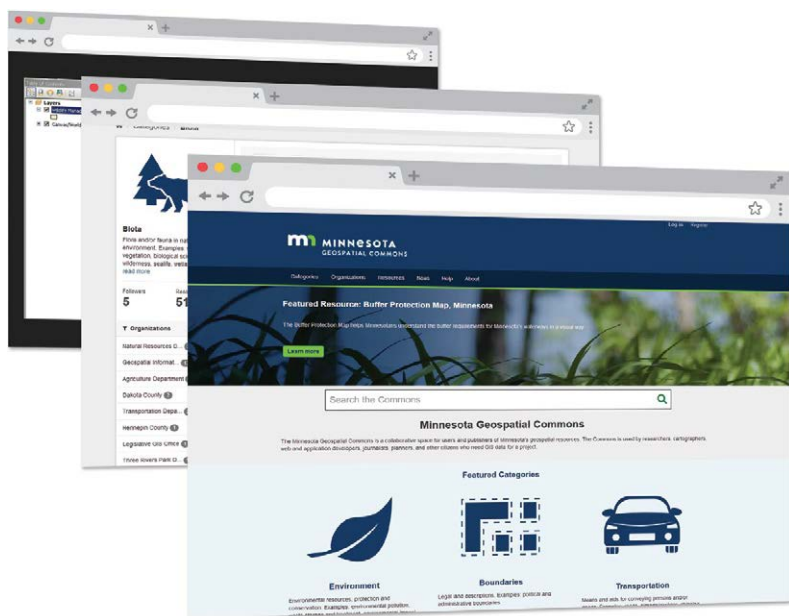
Minnesota Geospatial Commons

MnGeo and a cross-agency collaboration team support the Minnesota Geospatial Commons, a collaborative space for users and publishers of Minnesota's geospatial resources. The Commons is used by researchers, cartographers, web and application developers, journalists, planners, and others who need GIS data for their projects. Currently the Commons has 45 publishers and includes almost 900 geospatial resources. The Geospatial Commons allows users of its data and web services to provide feedback and help to identify additional needs and improvements for data resources.
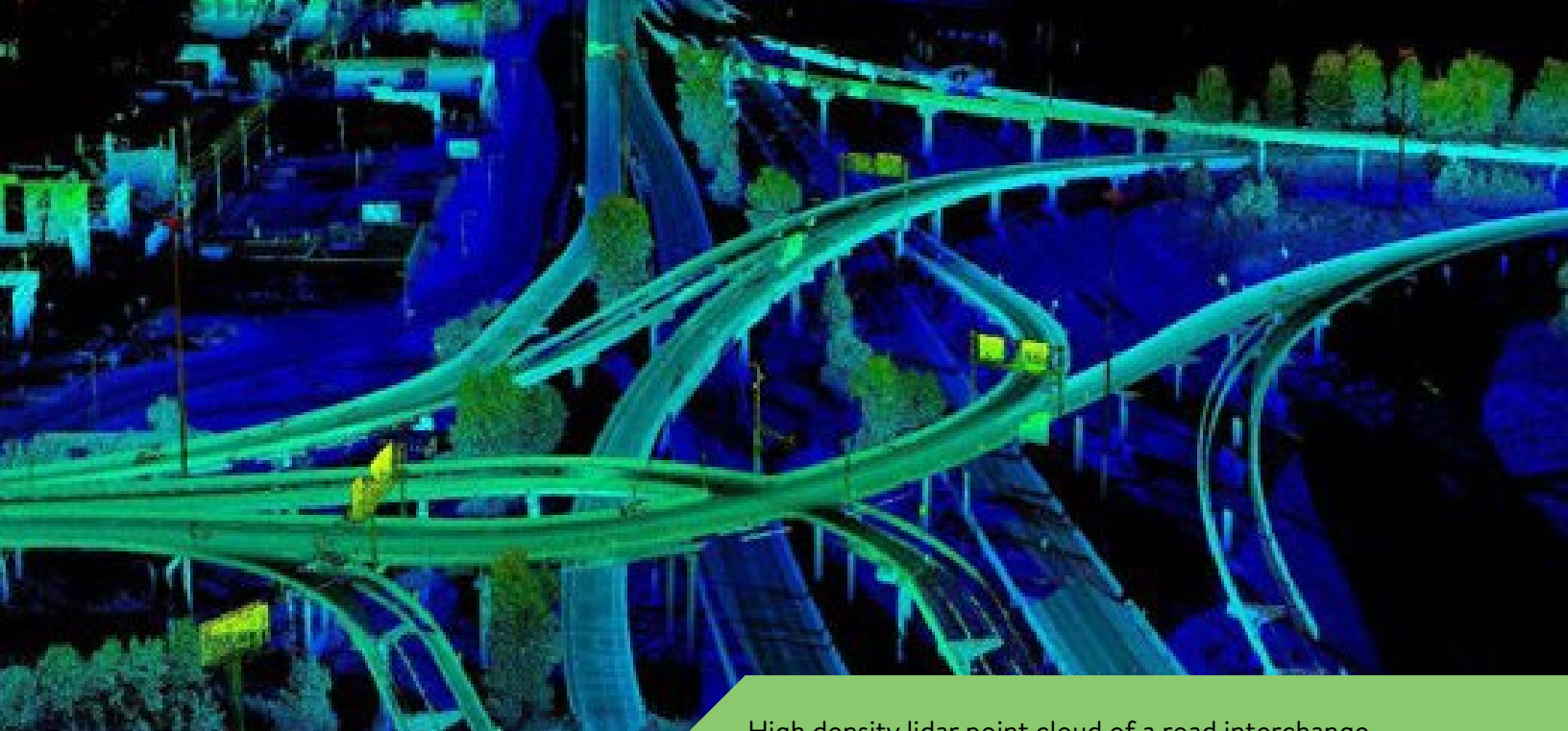
High density lidar point cloud of a road interchange

Master aerial and lidar contract

MnGeo partnered with the Minnesota Department of Administration (Admin) and subject matter experts from the Minnesota Department of Natural Resources (DNR), the Minnesota Department of Transportation (MnDOT), and the Metropolitan Council to complete a master contract for aerial imagery and lidar. Lidar sensors utilize light pulses to create a point cloud of data which provides a three-dimensional rendering off all the surfaces encountered by the pulses.

Our state relies on accurate elevation information for data-driven decision making, and current lidar data and the methodology with which it was collected is outdated. Heavy rain events, flooding, forest fires, new land use management practices, development and modification of roads and utilities, and new construction have all fundamentally changed the landscape.

The new contract shares the lidar data with the public, supporting MnGeo's goal of improving statewide foundational datasets. The contract also pre-qualifies lidar vendors to meet the growing need for lidar across local jurisdictions.

Parcel data

Parcel data has many operational uses in Minnesota and is identified as a core data layer for the state. MnGeo continues to obtain parcel data from counties quarterly, convert the data to a common data model, and aggregate the data into a statewide dataset. The resulting data is shared with all state agencies and the University of Minnesota, thus reducing the number of data requests to counties from state agencies and boards. In 2021, MnGeo will work with the Geospatial Advisory Council's (GAC) Parcels and Land Records Committee to make progress towards sharing a public version of the aggregated parcel data for the counties that provide free and open data.

3

Address points and road centerlines

In 2020, Minnesota produced the first statewide data set for both address points and road centerlines. The effort is part of MnGeo's collaboration with the Minnesota Department of Public Safety Emergency Communication Networks (DPS-ECN) and local partners to obtain, normalize, and aggregate data for Next Generation 911 (NG911). DPS-ECN intends to make the data available for the statewide geospatial community in the future.

Geocoder

Geocoding transforms a description of a location such as an address, or name of a place, to a location on the earth's surface that can be represented on a map. MnGeo maintains a geocoder for Minnesota state agencies which utilizes address points, street centerlines, and parcel data from counties, MnDOT-maintained city, township, and unorganized territory data, and U.S. census ZIP code data.

2020 Census

In preparation for the 2020 Census, MnGeo worked with Admin's Demographic Center to make sure that address locations accurately represented each residence in Minnesota. The team obtained, standardized, and compared address information provided by Minnesota counties and the United States (U.S.) Census Bureau. Good address locations allowed the U.S. Census Bureau to not only identify those that had responded to the census, but to also clearly identify address locations where they had not received a response. Addresses that did not respond could be targeted for an in-person visit, allowing a better census response for the state of Minnesota. This work added or corrected 4,029 addresses, part of the overall effort to help Minnesota retain its eighth Congressional seat by less than 100 individuals.

2 Lead coordination and communication for Minnesota's spatial community

Regional coordination

MnGeo collaborates with regional groups whenever possible, including MetroGIS, a regional geographic information systems initiative serving Minnesota's Minneapolis-St Paul metropolitan area. MnGeo staff attend, participate in, and present at regional GIS user group meetings.

MnGeo also facilitates bimonthly meetings with the Arrowhead Collaborative, which includes Cook, Lake, St. Louis, Carlton, and Itasca counties, as well as the U.S. Forest Service and DNR. The Arrowhead Collaborative is creating a common database for Public Land Survey section corners and is aligning parcel and administrative boundaries between state, federal, and local governments.

Culture of collaboration

To further collaboration across the state, MnGeo publishes Minnesota GIS News, an e-newsletter that shares updates from MnGeo, Minnesota state agencies, and the Minnesota Geospatial Advisory Council. Over 1,800 subscribers receive monthly updates on geospatial data sets, services, activities, and meetings.

The State Agency GIS Collaborative, a group of state agency and MnGeo staff, plans, promotes, and facilitates communication and collaboration for state employees interested in geospatial topics and technology. The collaborative provides education, networking opportunities, and technical resources. Through the collaborative, MnGeo can better understand state agency needs and allocate resources and attention for priority efforts. In 2020, the collaborative led a successful GIS Day training event for over 250 participants during 10 virtual learning sessions.

At the annual Minnesota GIS/LIS conference, a professional development event of over 600 geospatial professionals, Dan Ross, Minnesota's Chief Geospatial Information Officer, speaks with the Minnesota geospatial community and highlights statewide GIS accomplishments.

Minnesota GIS News

News from the Minnesota Geospatial Information Office

Lidar Proposals Recommended for Funding

In November 2020, the Geospatial Advisory Council's 3D Geomatics Committee prepared and submitted two grant applications to the U.S. Geological Survey's 3D Elevation program (USGS 3DEP) on behalf of many partners including cities, counties and state agencies.

Both proposals were recommended for funding. The first proposal was for the Lake Superior lidar acquisition block in northeast Minnesota and the second proposal included several counties in southeastern and southwestern Minnesota (see maps linked below). The committee is currently working to finalize lidar funding agreements and data acquisition plans with local partners and USGS. We expect lidar data and lidar-derived products to be publicly available one year after acquisition.

To learn more about Minnesota's lidar plan, including maps of the acquisition areas, see:

- Lidar StoryMap
- Minnesota Lidar Plan

State and national committees

MnGeo participates in the broader geospatial community to align work across state, federal, and local agencies.

National States Geographic Information Council

As members of the National States Geographic Information Council, MnGeo participates in several ongoing initiatives. Over the past three years, MnGeo took part in NSGIC's Geo-Enabled Elections project, which leverages spatial thinking and techniques to enhance elections. Two geo-enabled election projects in Minnesota improved coordination between the Office of the Minnesota Secretary of State and MnGeo, examined the use of other geospatial data sets to improve elections data, and improved visualization of election data. The first project, completed in 2019, geocoded, or located on a map, all registered Minnesota voters and compared that information with voting precinct boundaries to assess whether individuals were in the correct precinct. In 2020, MnGeo mapped precinct voting locations because a spatial dataset was not available.

Minnesota Geospatial Advisory Council

The Geospatial Advisory Council is the statewide coordinating body for the Minnesota geospatial community. It represents a cross-section of organizations that include counties, cities, universities, business, nonprofit organizations, federal and state agencies, tribal government surveyors, and other stakeholder groups that benefit from geospatial technology. MnGeo facilitates the GAC with logistical support, web content, and collaboration sites for committee work. MnGeo programs are guided and complemented by work with the Geospatial Advisory Council.

Over the last 18 months MnGeo worked closely with the GAC 3D Geomatics Committee to facilitate lidar data acquisition for Minnesota. The partnership produced and published the [Minnesota Statewide Lidar Plan](#) and [associated story map](#). The committee's Data Acquisition Workgroup applied for U.S. Geological Survey grant funds for lidar acquisition, which have provided over $3 million in federal matching funds. Lidar data acquisition in Minnesota will continue over the coming years.

Other committee efforts include working towards providing public standards-based parcel data with the GAC Parcels and Land Records Committee and local partners, and working with the GAC Image Service Sustainability Committee to improve the imagery web services for users in the broad geospatial community. The entire state, the 7-county metro area, Carlton County, and Dakota County added new imagery over the past year.

3 Provide outstanding technical support for statewide spatial technologies

MnGeo supports MNIT's mission: partnering with other state agencies to deliver secure, reliable technology solutions to improve the lives of all Minnesotans. In the past year, MnGeo supported 23 different agencies, boards, and councils with over 29 different efforts.

Next Generation 911

Working with the Department of Public Safety Emergency Communication Networks and local government partners, MnGeo produced standards-based statewide data that will be used to route 911 calls to emergency services. Data sets will help emergency responders:

- Share information with emergency support organizations. Rapid Deploy routes 911 calls to the correct Public Safety Answering Point (PSAP), ambulance companies, Minnesota State Patrol, and Local 911 dispatch centers.

- Support text to 911.

- Improve access to FirstNet, an emergency communication network dedicated to the emergency response community.

Metropolitan Council aerial imagery

In partnership with the Metropolitan Council, MnGeo collected and distributed 30cm aerial imagery for the 7-county Twin Cities metro area in April 2020. The Metropolitan Council uses this data to understand and determine changes in land use designation, for regional planning, and other purposes. As part of this project, MnGeo also worked with Ramsey County to purchase and upgrade to 15cm aerial photography for that specific county. The data is shared with the public through the MnGeo Image Web Service.
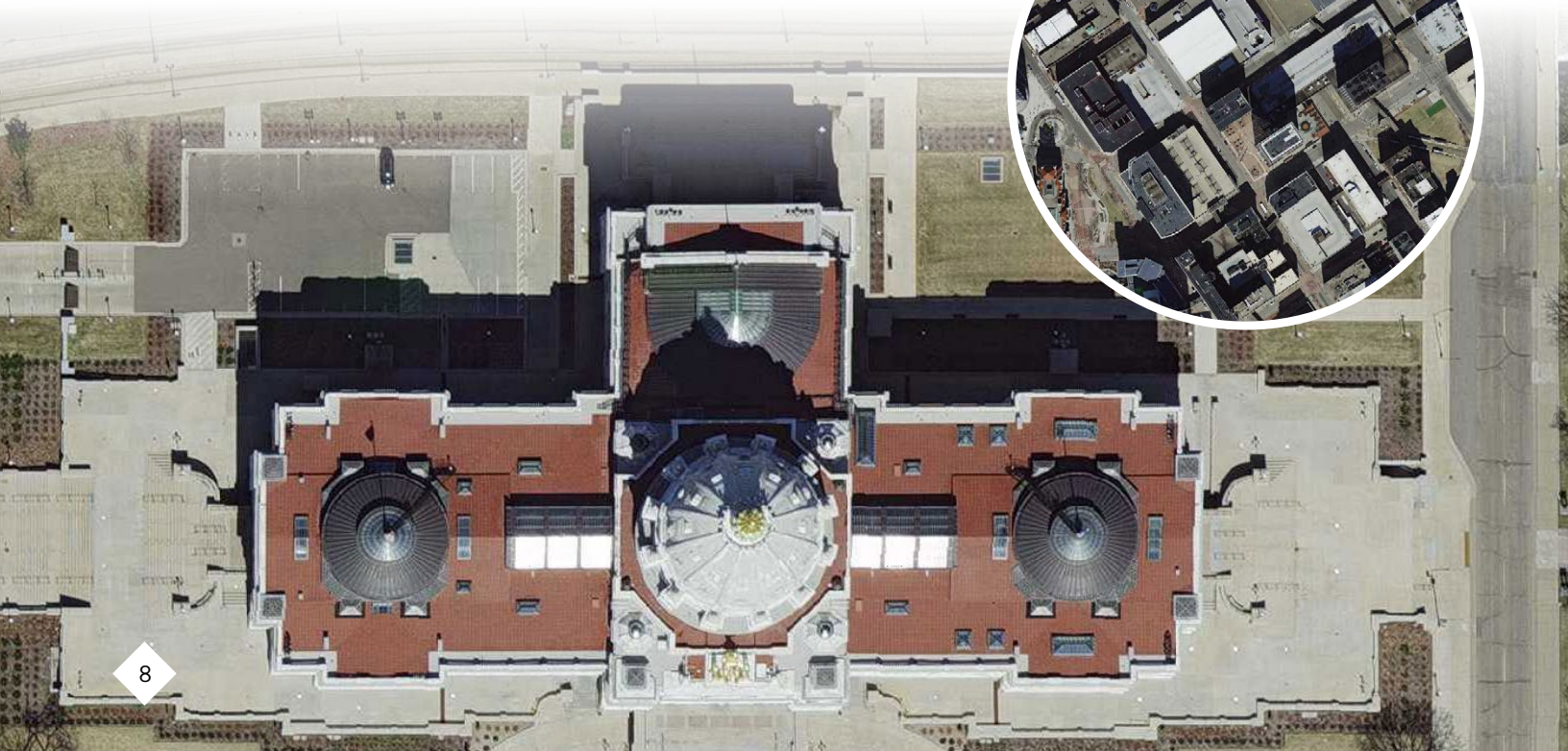
Crash mapping with MnDOT

The MnDOT Crash Mapping, Analysis and Reporting Tool (CrashMART) allows users to view, filter and download crash data for the past 10 years plus the current year. In 2020, MnGeo built several enhancements for the MnDOT Office of Traffic Engineering (OTE) CrashMART application and OTE Portal, which help OTE make better decisions on traffic safety:

- MnGeo added a trunk highway sections data set which is updated annually to enable OTE to review traffic crashes and traffic safety improvement data based on defined comparison groups. This allows them to determine where crashes are occurring and where safety improvement could help to reduce crashes.

- MnGeo provided updated intersections that include turn lanes, which provide a more realistic picture of how an intersection is influenced by traffic moving through that intersection. The data can be added to the CrashMART application using a new function that allows analysts to add other data to the app.

- MnDOT route information tool reports road data on routes. This tool was available in many MnDOT applications and is now available in CrashMART.

- Toolkit reports contain crash rates, critical rates, and critical index for intersections.

Cultural resource inventory

MnGeo is developing the third phase of the Cultural Resource Information System (CRIS III) application for MnDOT's Cultural Resource Unit (CRU). The effort modernizes how the CRU tracks, records, manages, reviews, and reports its findings of potential cultural impacts related to MnDOT projects. CRIS III refines and enhances functionality to fit the current CRU business workflow. It also integrates web map services and other cultural resource data including Office of the State Archaeologist's (OSA) Sites Inventory, Minnesota Indian Affairs Council (MIAC) spatial layers, and the MIAC-OSA review application.

The project will result in a pooled inventory of cultural resources data maintained and hosted by each respective agency. This saves MnDOT time and money, boosts confidence in CRU review assessments, and enhances financial effectiveness for all agencies involved.

CRIS III went live in October 2020 with most of the tools and data layers needed to allow CRU employees to do their current CRIS business process in the new application. The remaining functionality was completed by June 2021.
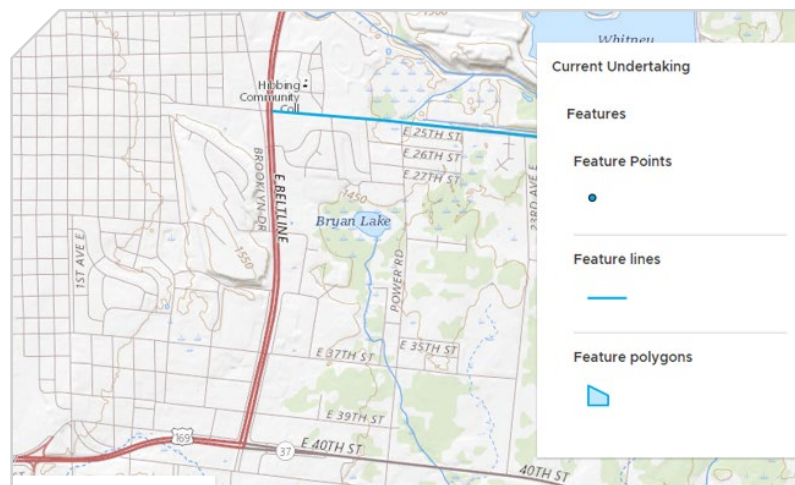
Ongoing state agency support

Department of Commerce

MnGeo updates telephone service area boundaries and maps high voltage transmission lines.

The Office also updates and manages Minnesota wind turbine locations as part of a national dataset.

Department of Public Safety

Ongoing support for the MNCrash system, which allows law enforcement officers to click on a map to retrieve route, city, county, and other basic mapping information to auto-populate a crash report.

The DWI Dashboard project for the Bureau of Criminal Apprehension automatically geolocates addresses for further analysis.

Office of the State Archaeologist

Provides access to the archaeological site inventory and Minnesota Indian Affairs Council's archaeological and cultural sites for all of Minnesota and the Minnesota Statewide Archaeological Predictive Model (MnModel).

Public Utilities Commission

MnGeo continues to provide mapping updates for the Minnesota Public Utilities Commission as electric service utility providers change service areas.

Department of Natural Resources

Parks and Trails' web application, Minnesota Great Outdoors, shares information about public recreation opportunities with Minnesotans.

Application hosting

MnGeo provides geospatial application hosting for the Minnesota Department of Transportation, Board of Animal Health, Department of Agriculture, Department of Labor and Industry, Department of Human Services, Iron Range Resources and Rehabilitation Board, and others.
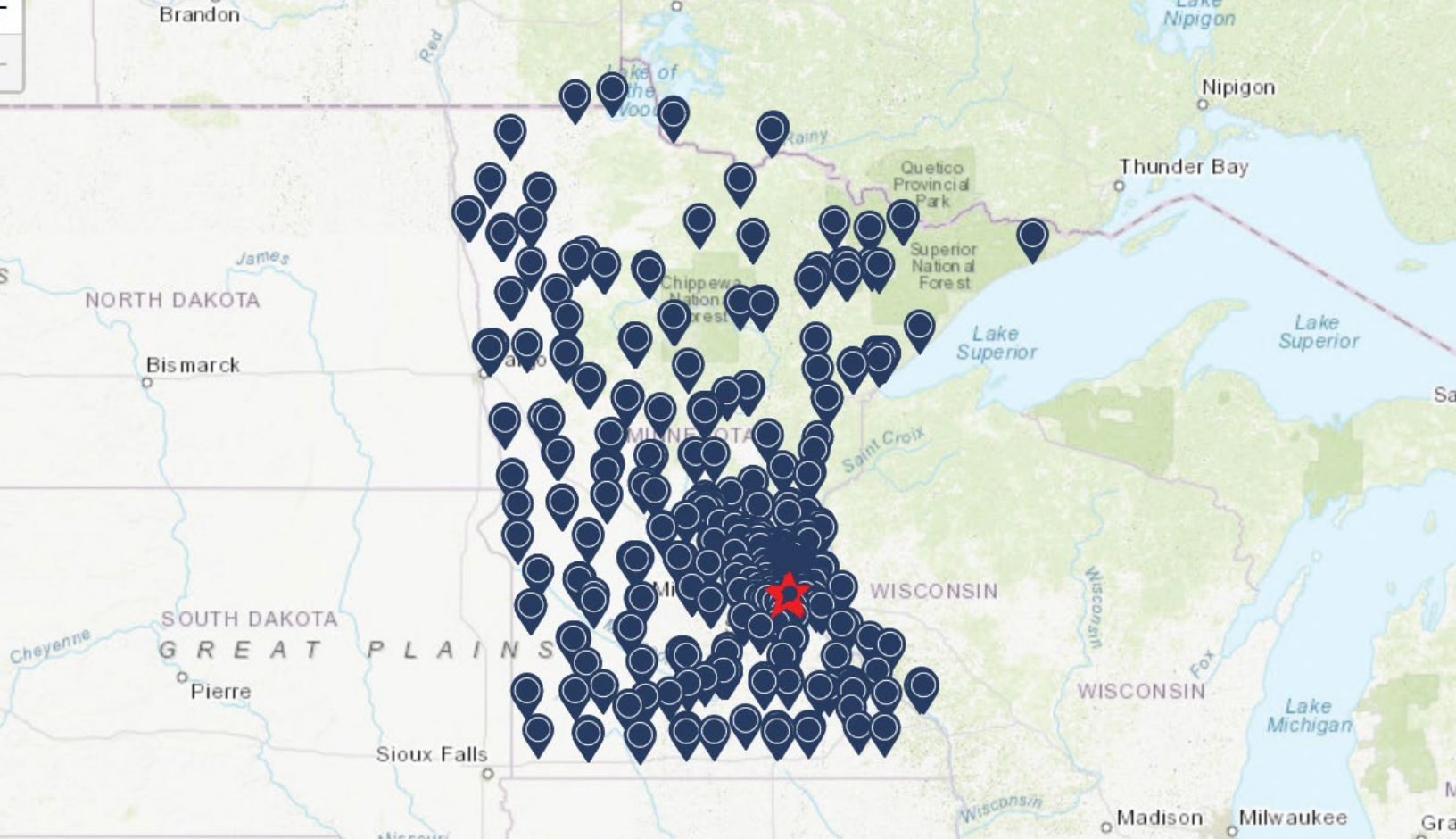
COVID-19 response

Geospatial maps and technology are an essential part of the COVID-19 response to inform citizens about locations of test and vaccine sites, identify vulnerable populations for equitable vaccine distribution, and track where vaccines have been provided.

COVID-19 testing and vaccine sites

Throughout the COVID-19 response, the state focused on finding new and better ways to communicate critical information to Minnesotans. After the initial launch of the COVID-19 testing location information webpage in April 2020, MnGeo helped overhaul the page. On December 30, 2020, MnGeo helped to automate how the information was pulled into the webpage, and added more user-friendly filters.

The improvements allowed Minnesotans to find the information they needed and created a more efficient process for the state to share updates quickly. To make the page accessible, the testing site information in the interactive map was provided in informational cards for each testing provider. Soon after launch, the team repurposed the testing location site to create a Vaccine Locator Map to help Minnesotans more easily find and connect with local vaccine providers in their area.
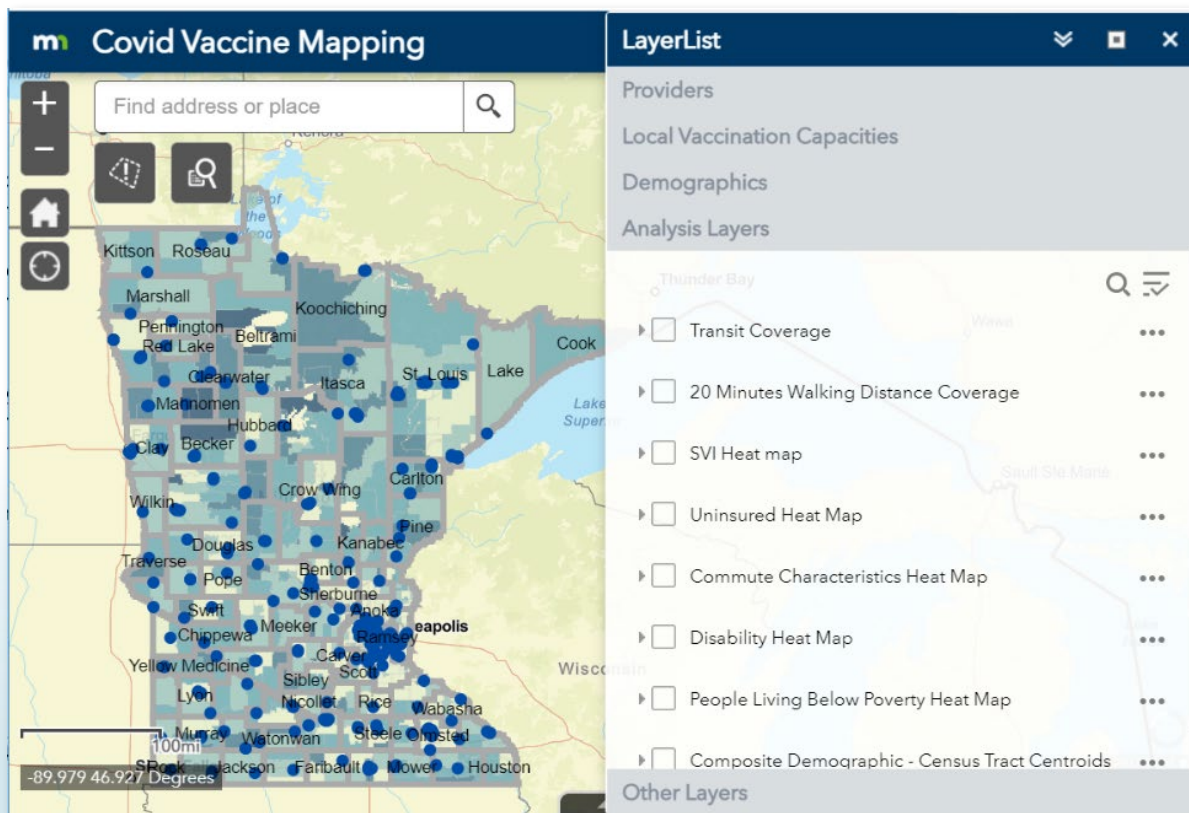
COVID-19 mapping

To understand the equity of vaccine distribution, especially for those who live in areas with a high social vulnerability index, MDH needed to collect three types of data:

- Demographics to show where socially vulnerable populations live.

- Active vaccine sites.

- Modes of transportation available to Minnesotans.

MnGeo created an interactive web map with dozens of mapping layers where MDH could see proximity of vaccine locations to socially vulnerable census tracts.

MnGeo created several tools in the COVID Vaccine Map to help MDH target outreach, community vaccine sites, and additional collaboration with local communities to improve equitable access to vaccines:

- 20 minute walk-time, 30 minute drive-time from vaccine sites, and a 20 minute walk time from transit stops in the metro area shows gaps or service deserts.

- Situational awareness tool focuses on total populations within a certain distance.

- Query tool helps users search for population sizes of individual focus communities.

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