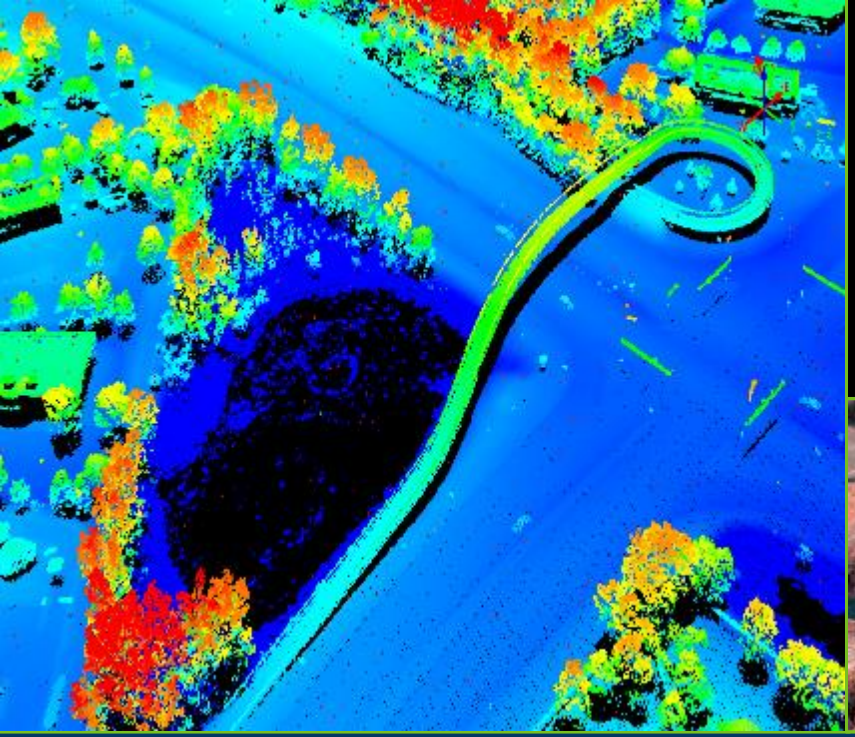
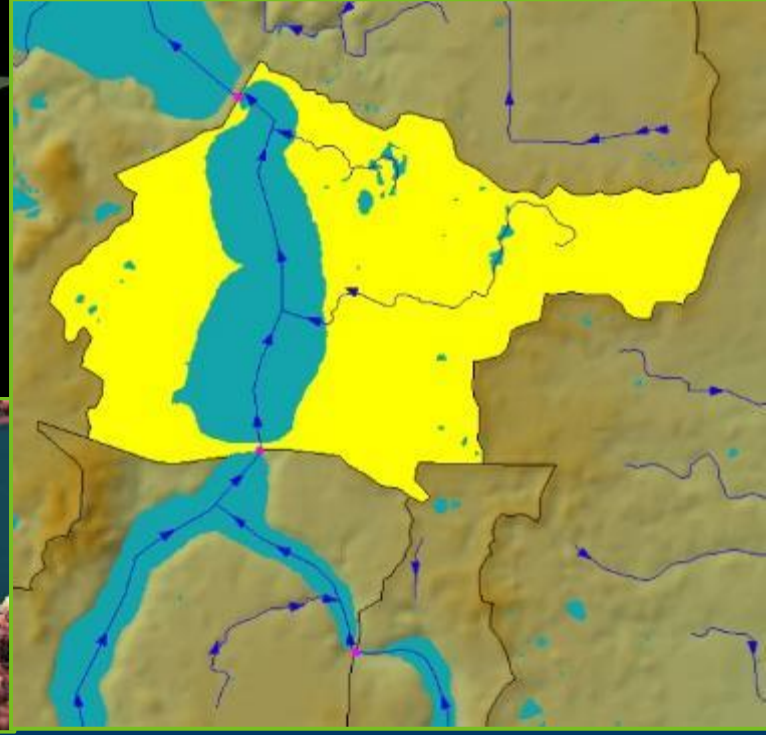


3DGeo Stakeholder Coordination: MN Lidar Plan

SW Missouri-Big Sioux LAB - USGS 3DEP Grant Application Discussion

Wednesday June 16, 2021 - 11:00 – 12:00

Hosted by the Geospatial Advisory Council (GAC) - 3D Geomatics Committee's Data Acquisition Workgroup

MINNESOTA GEOSPATIAL ADVISORY COUNCIL

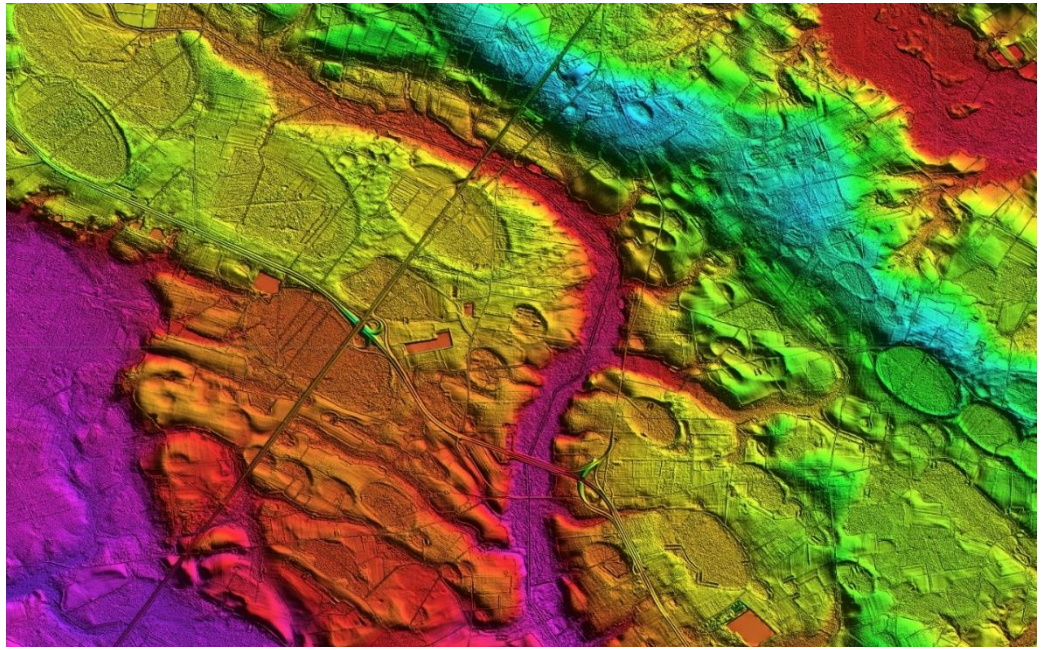
Dan Ross
Sean Vaughn
Jennifer Corcoran
With other 3DGeo members attending

Please stand by as other participants join, we will get started soon.
Thank you

Welcome!

Thank you for joining us today

- We are excited to meet with you today to discuss lidar acquisition planning efforts in Minnesota.
- Members of the 3D Geomatics Committee Lidar Acquisition Workgroup will be introducing 3DGeo, sharing updates, and information about lidar collects for Minnesota.
- We welcome your input today and going forward.

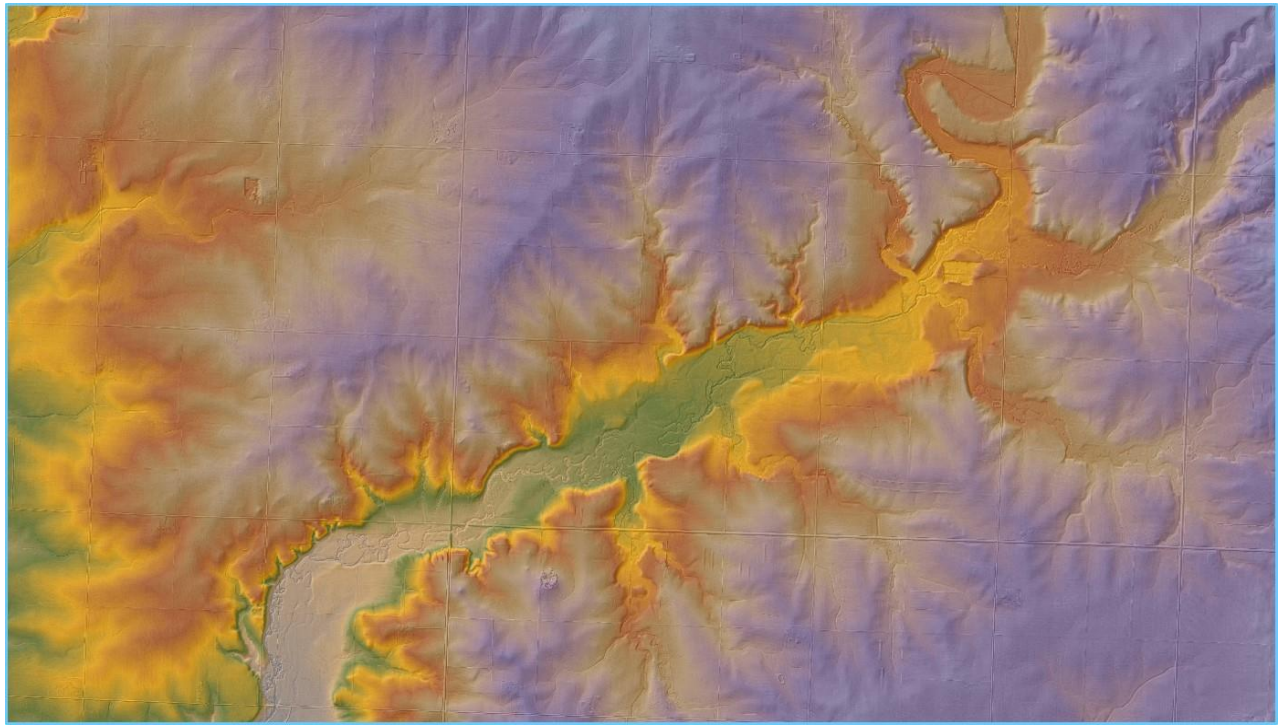


Meeting Housekeeping

- Please **mute** your microphone if you're not speaking
- Slides can be shared after the meeting if requested
- Type in questions into the **chat window**, and we'll address them during the Q&A section (not recorded)

Goals for today

- Quick Reintroduction to:
  - Who is 3D Geomatics (**3DGeo**)?
  - What is the **Minnesota Lidar Plan**?
  - What is the funding opportunity USGS 3D Elevation Program (**3DEP**)?
  - Where are 3DEP **lidar acquisitions** going currently and planned?
- Current Funding for this LAB
  - Existing funding partners and status
  - Identify new funding partners
  - MnGeo will be the Fiscal Agent
- What are the **next steps**?
  - Partner Roles



Acronyms

✓ 3DGeo	3D Geomatics
✓ 3DEP	USGS 3D Elevation Program
✓ BAA	Broad Agency Announcement
✓ IGCE	Independent Cost Estimate

Coordinating Minnesota's Lidar Acquisition

3DGeo - Data Acquisition Workgroup

Mission:

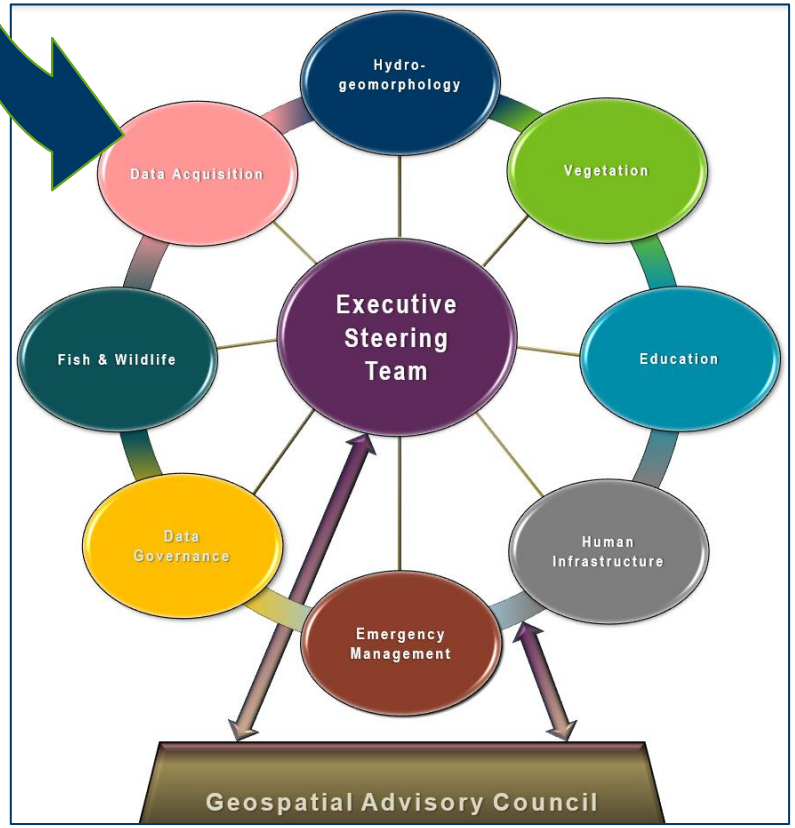
- The Data Acquisition Workgroup promotes procurement of foundational 3D data for Minnesota.

Co-Chairs

- Sean Vaughn, Alison Slaats, and Gerry Sjerven

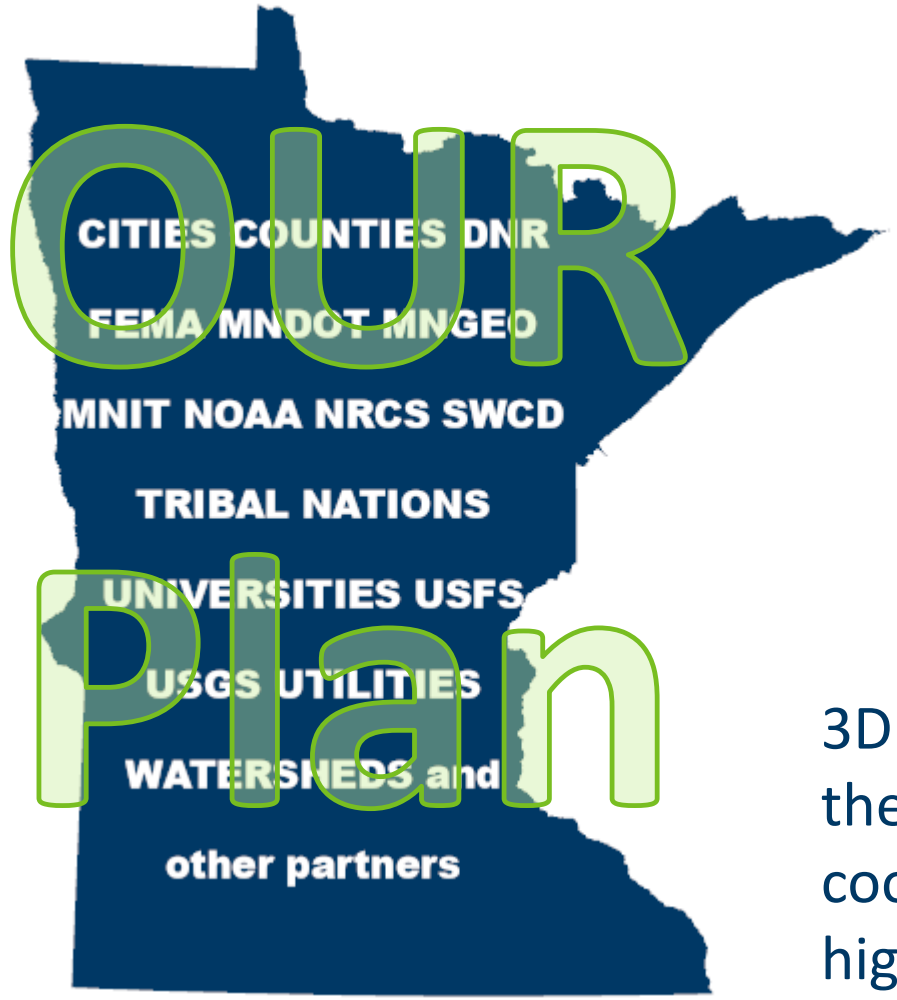
Lidar Acquisition Subgroup:

- Alison Slaats (MnGeo), Sean Vaughn (MNIT DNR), Gerry Sjerven (MN Power), Dan Ross (MnGeo), Jennifer Corcoran (DNR), Colin Lee (MnDOT), Matt Baltes (NRCS), Joel Nelson (U of MN), Joe Sapletal (Dakota Co), Mark Reineke (Widseth), and Brandon Krumwiede (NOAA), Jeff Weiss (DNR).



Minnesota Lidar Plan

Minnesota Lidar Plan - Our Plan – Your Plan – One Plan

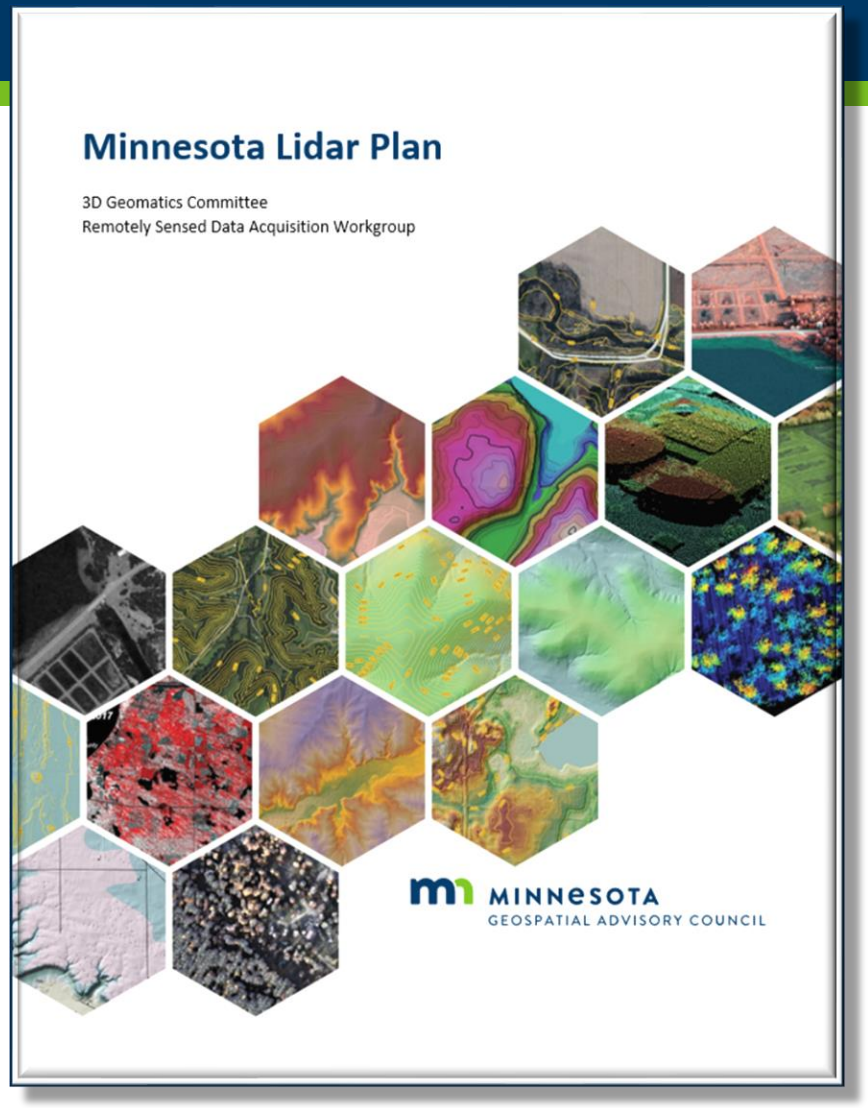


The Minnesota Lidar Plan

- **One** plan for Minnesota
- **Committee** led plan, not a state agency plan
- **Collaboration** of the geospatial community
- **Coordination** of lidar acquisition in Minnesota leverages federal match dollars

3DEP grant success is built on a guiding plan that pulls the community together to foster collaboration and coordinate funding to achieve the common goal of high density lidar acquisition across Minnesota

Minnesota Lidar Plan and StoryMap



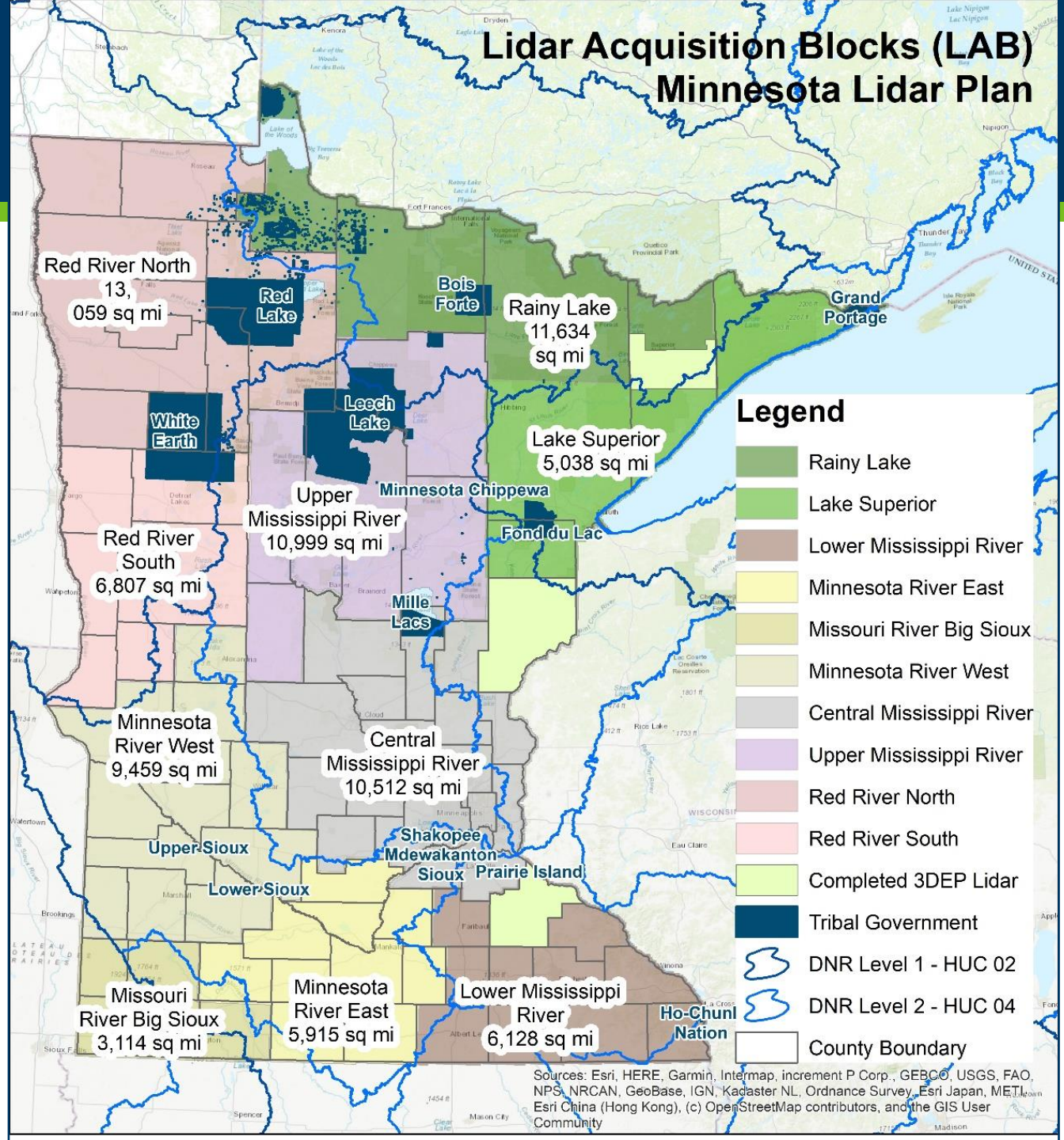
https://www.mngeo.state.mn.us/committee/3dgeo/acquisition/Minnesota_State_Lidar_Plan.pdf

http://bit.ly/MnLidarPlanStoryMap

Lidar Planning – Background

- Lidar acquisitions are coordinated by the GAC's **3DGeo Committee**
- Minnesota's Lidar Plan divides up the state into **lidar acquisition areas** (LAA) based on political (county) and watershed boundaries
- **Grant funds** are available from USGS for lidar acquisition because there is a local-to-national scale need for a seamless nationwide DEM elevation layer
- 3DGeo is working to coordinate lidar acquisition with local, federal, and state **partnerships**
  - Leveraging **USGS federal funding opportunity**
- **Economies of scale** are achieved when partners collaborate across landscapes
  - The bigger the collection footprint, the lower the cost

Lidar Acquisition Areas and Blocks of Interest



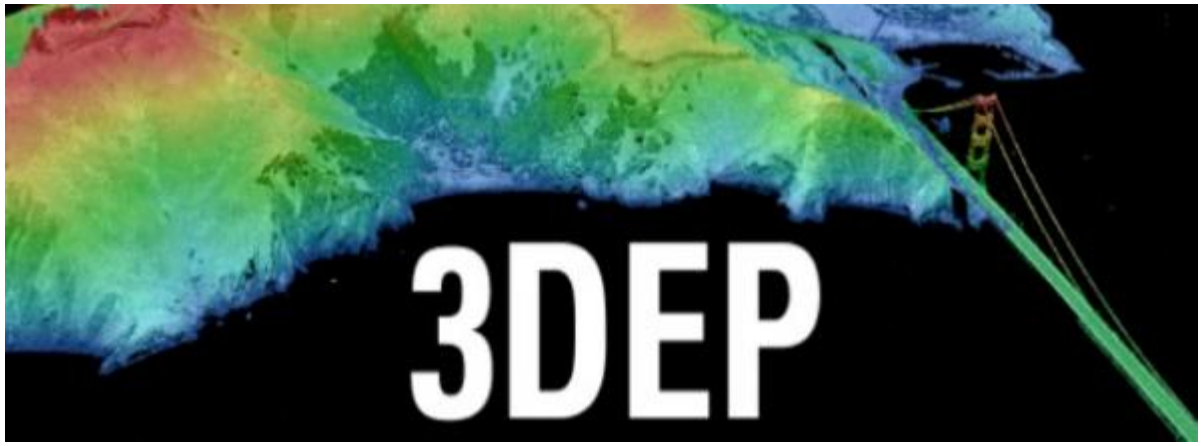
3DEP

(Federal Coordination and Grant)

USGS 3D Elevation Program (3DEP)

3D Elevation Program (3DEP)

- **Systematically** guiding the collection of 3D elevation data in the form lidar data for the United States, and the U.S. territories
- Goal: elevation dataset for the nation **by 2023**
- The first-ever national baseline of **consistent** high-resolution elevation data
    - Both bare earth and 3D point clouds – collected in a timeframe of less than a decade.



USGS 3D Elevation Program (3DEP) - BAA

3DEP uses Broad Agency Announcement (BAA)

- **Grant coordinating** mechanism 3DEP, Guides partnerships between the USGS and other Federal
- Grants through "BAA" process – **deadlines** are every fall (Oct/Nov)

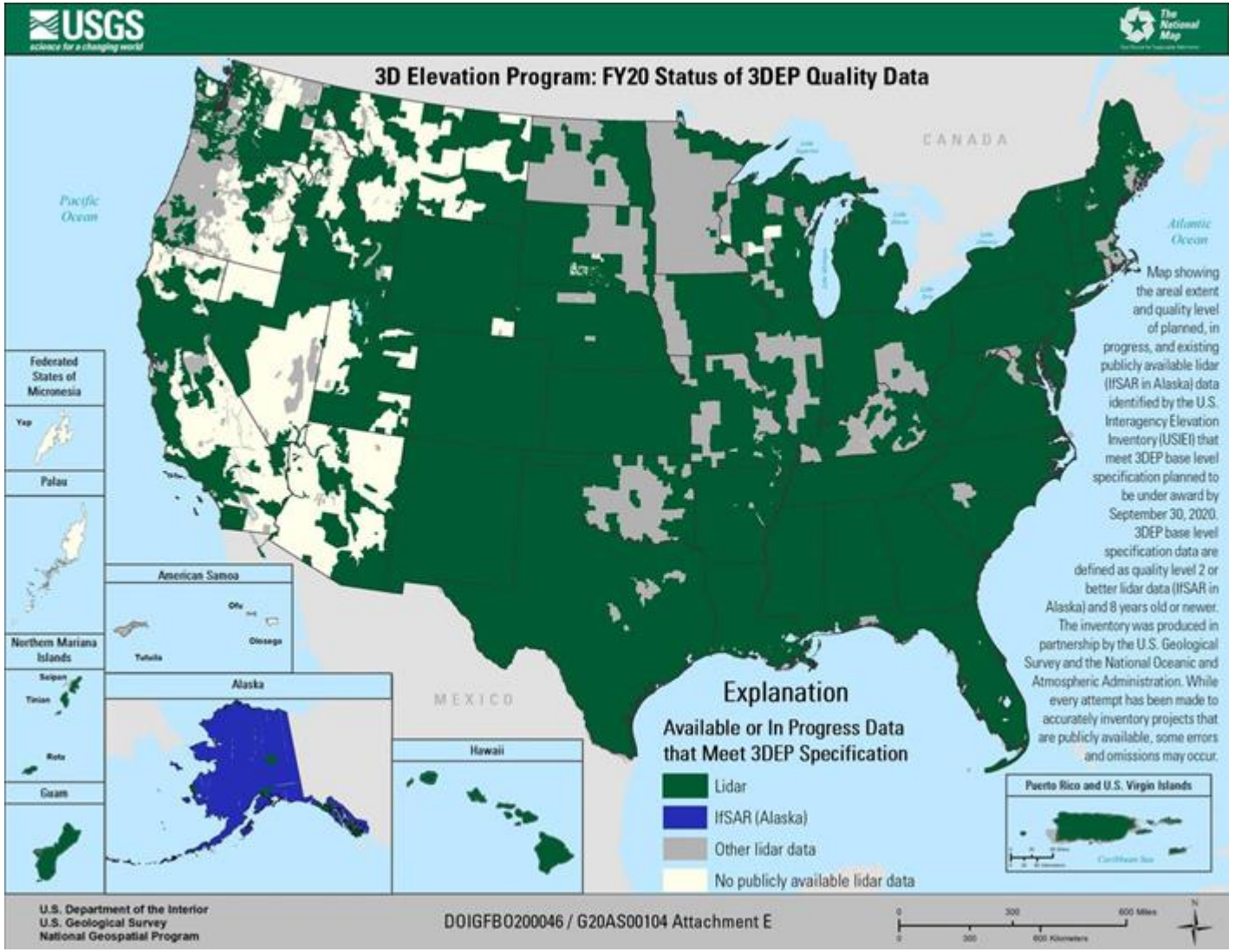
USGS Cost-sharing

- Contributing 60% to 75% to our efforts

Contributions to Minnesota (millions)

- Minnesota Partners: $3.15
- USGS 3DEP: $6.18
- Other Federal $0.448

Total: $**9.77**M



3DGeo Funding Timeline

3DGeo timeline for 3DEP funding is:

- **October**
  - Counties and other partners indicate their interest and fill out an “Attachment D” form to indicate the funds they are willing to contribute.
- **November**
  - Grant request (BAA) submitted (assuming enough partners participate to make a grant proposal feasible)
- **Late December/January**
  - USGS notifies the team whether the grant application was successful
- **January/February**
  - JFAs/JPAs are organized and signed (ideally USGS would like JFAs/JPAs to be complete 90 days before lidar acquisition occurs)
- **February onwards:**
  - Invoices are sent and partners send funds.

What is lidar?

Lidar stands for light detection and ranging

- It is a **mapping technology** that uses a **pulsed laser** to measure the time it takes for emitted light to travel from a sensor to the ground or other objects and back.
- The sensor can **pulse** a laser beam hundreds of thousands of times per second
- Millions of returns ("**points**") are captured, resulting in a "point cloud" of three-dimensional measurements.

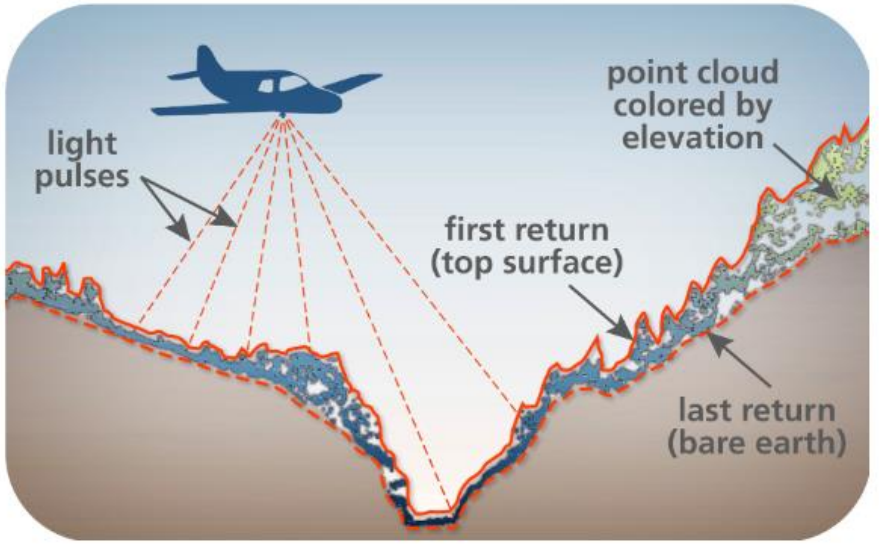
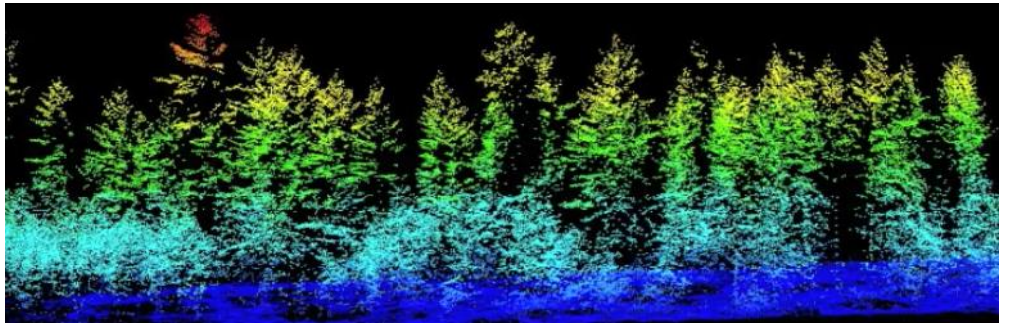
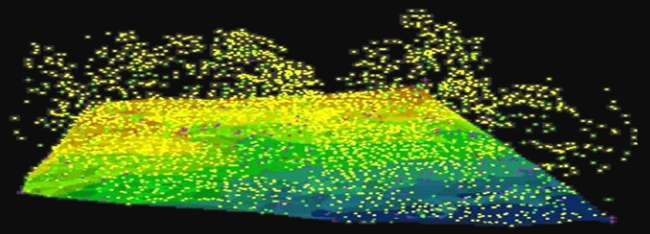


Image from the Washington Geological Survey

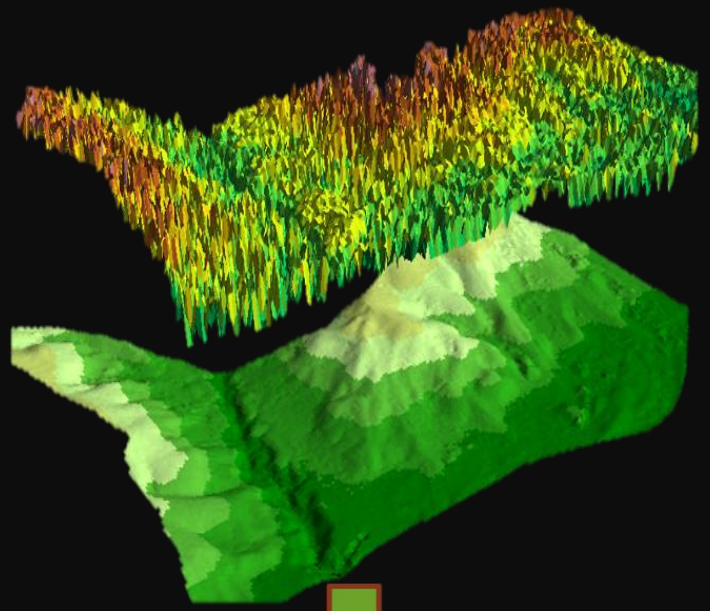


Lidar Acquisition → Point Cloud → Classification → DEM

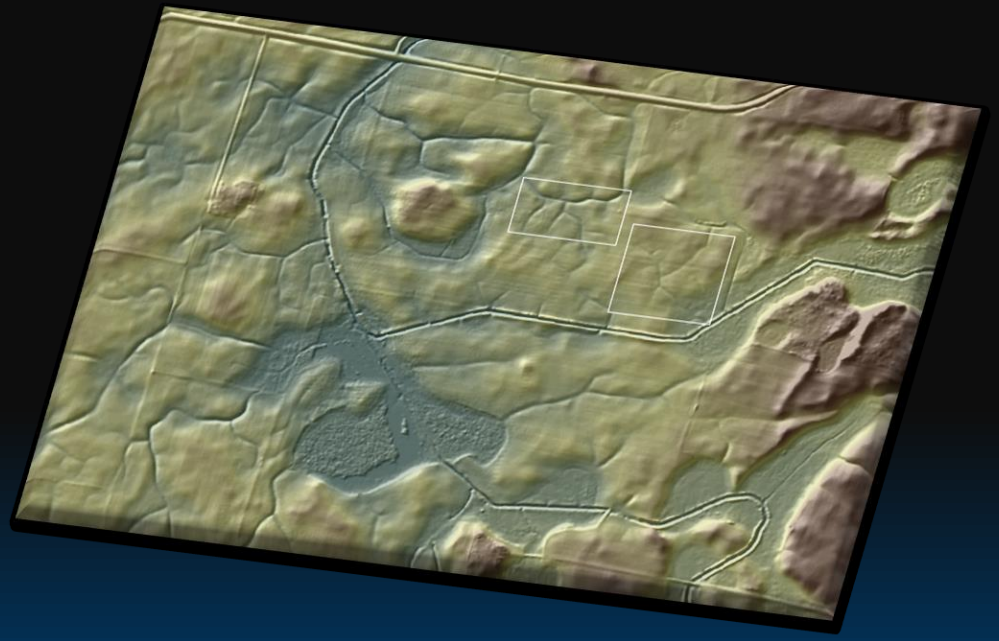


Lidar 3D Point Cloud

- Point Cloud Classification – Feature Identification and Separation of Data for Sector Application

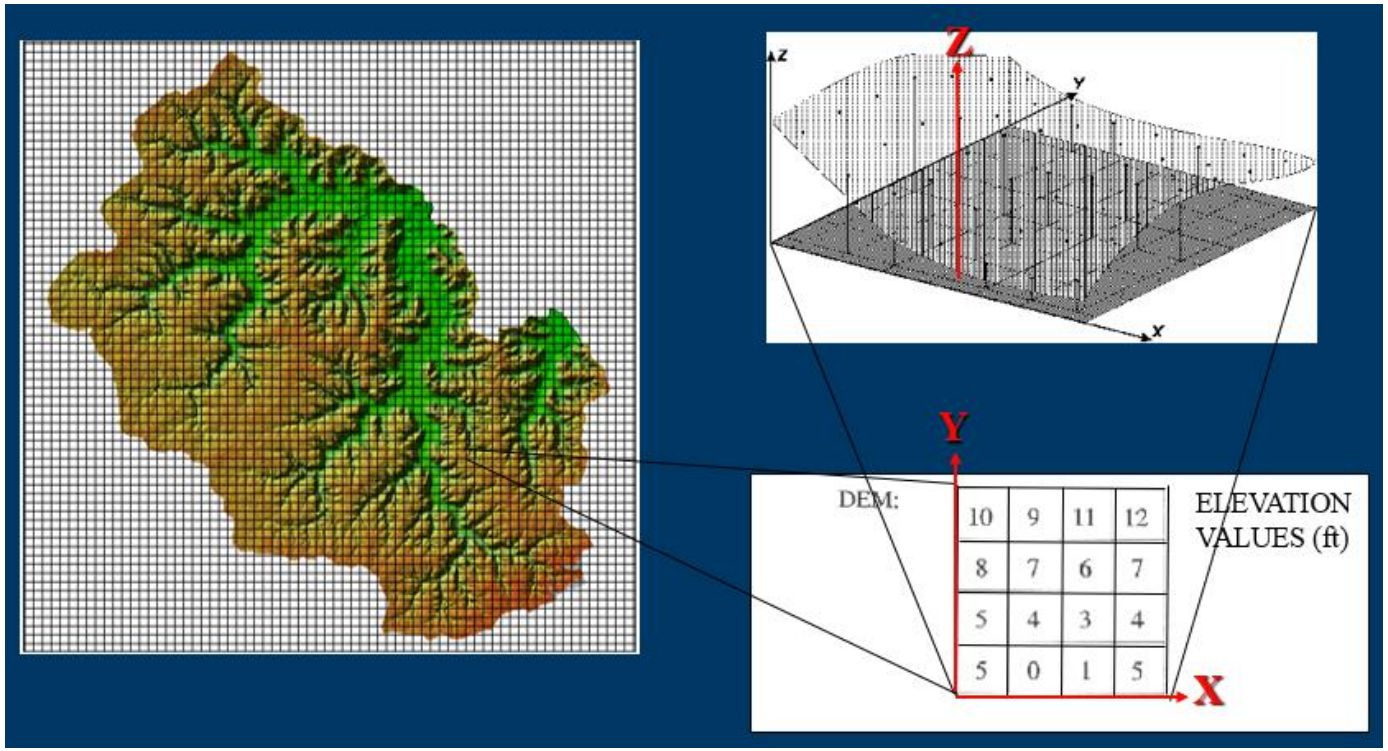


LiDAR-derived 3D Digital Elevation Model (DEM)



What is a DEM?

- **DEM** stands for digital elevation model
- A **digital representation** of the land surface.
- The DEM is a **derived product**
  - Represented as a gridded tessellation of the landscape built from Lidar-derived points with **elevation values** (Z).



What is Lidar?

To Some Lidar Is:

- A 3D Point Cloud

To Some:

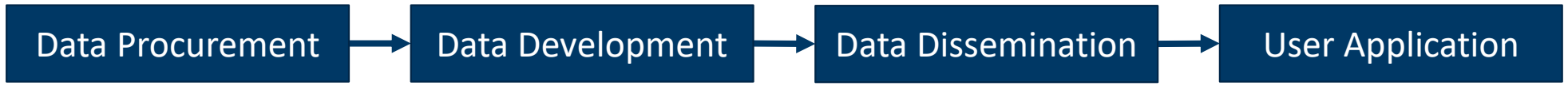
- 2-ft Contours
- Digital Elevation Model (DEM)

Note: The two most downloaded authoritative lidar-derived products from MnTOPO are the 2-ft Contours and the DEM.

To Some:

- Hydro-modified DEM & Hydrography
- 1-ft contour Dataset
- Vegetation and Buildings
- Intensity Imagery
- Digital Surface Model (DSM)
- And Many other products

Regardless what lidar is to you and your business needs, “lidar” begins with **collection of the lidar data** as part of a data procurement project, within a 3D Geomatics lidar acquisition block (LAB).



What is: High-density Lidar

What is High Density Lidar?

High-Density lidar is defined by **two measures:**

1. Pulse Spacing
2. Pulse Density

3DGeo Committee Minimum →

3DEP Base Specification Minimum →

Current Minnesota Data Holdings →

LiDAR BASE SPECIFICATION (LBS)	**LBS Table 1** Minimum Net Pulse Density and Spacing for a Single lidar Collection Mission	
Quality Level (QL)	**Aggregate Nominal Pulse Spacing (ANPS)** [m]	**Aggregate Nominal Pulse Density (ANPD)** [pulse/m^2]
QL-0	≤ 0.35	≥ 8.0
QL-1	≤ 0.35	≥ 8.0
QL-2	≤ 0.71	≥ 2.0
QL-3	≤ 1.41	≥ 0.5

4X

16X

These two HD technical measures relate to flight **mission** and lidar **platforms** affecting:

1. Point Density of the lidar Point Cloud
2. Derived Products

(shown in next slide)

Increased Density = Improved Detail

- **QL1 = 8+ pulses per 1 square meter**
- **QL3 = 1 pulse per 2 square meters**

That's 16+ QL1 pulses per the same 2m area of QL3

Potential Costs of Lidar in Minnesota

	Quality Level (QL)	Average Cost per mi2*
	QL-0	$440
3DGeo Recommendation →	QL-1	$330
USGS Base Specification →	QL-2	$200
Current Statewide Lidar →	~~QL-3~~	~~$175~~

**Please note the following, regarding the above cost estimates:*

- *These estimates where obtained in 2020.*
- *These average estimates are based on a series of USGS 3DEP Independent Government Cost Estimate (IGCE) quotes. Actual cost estimates are subject to change based on a proposed area of interest.*
- *The 3DGeo Committee advocates for QL1 lidar and will assist partners to explore acquiring upgrades and additional derived products in their area of interest (e.g., QL0). An upgrade to point density or additional derived products will increase costs and will be the responsibility of the requesting partner(s).*
- *QL3 no longer meets USGS Base Specification, it is crossed out because it would not be purchased under this Lidar Plan.*

3DEP Program – Lidar Data

3DEP Standard Deliverables

- **Point Cloud** (classified to minimum level – meets most needs; data hosted online)
- Digital Elevation Model (**DEM**/Bare-Earth Surface Raster)
- Lidar Swath Polygon
- **Hydro**-breaklines
- Metadata & Reports

3DEP Program – Lidar Data and Derived Products

Possible Added Deliverables

- **Possible deliverables not funded by 3DEP, but can be part of the 3DEP contract as additional products and services with the 3DEP contract vendor at an additional cost**
  - Higher density Point Cloud
    - 3DGeo advocates for QL1, **partners may upgrade areas to QL0**
  - Improved hydrographic products
    - ✓ Advanced **hydro-modified DEM** (Conditioned DEM), and/or hydro-flattening
  - Bare Earth point cloud
  - Additional Point Classification
    - ✓ High vegetation and **buildings**
  - **Intensity** imagery, GeoTIFF

State Agency Lidar Derived Products

Foundational Derived Products

- **Publicly available data served as authoritative products from state agency distribution portals**
  - 1-ft **Contour** Dataset
  - **Hillshaded** DEM
  - **Canopy Height** Model (CHM)
  - Other products to come?

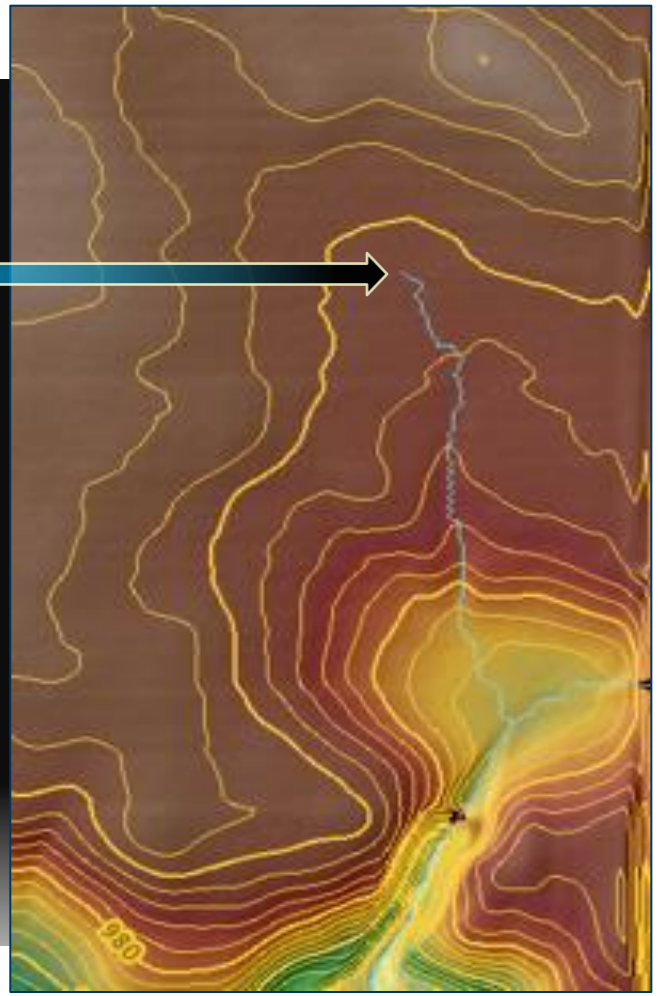
HD Lidar – Derived Products - Hydrography Example

WATER CONVEYANCE LANDFORMS

Mapping the Unmapped Hydrography

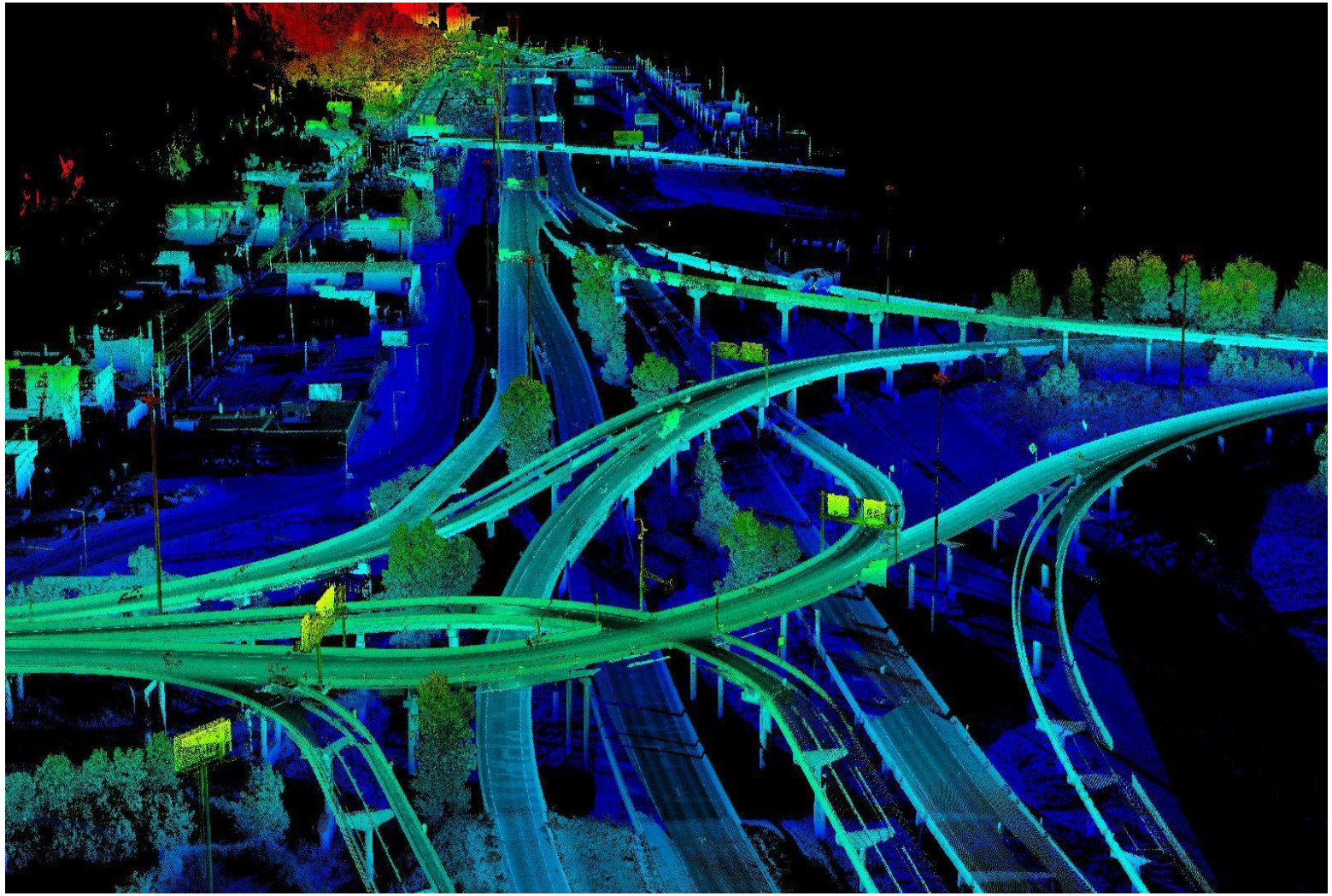
- Features of hydrologic Significance.
  - Nickpoint
  - Fluvial Processes
  - Soil Degradation
- Where does the watercourse begin ?
  - Where concentrated flow begins. LiDAR captures these landform.

We Model this with DEMs



HD Lidar Examples: MnDOT Infrastructure

- Transportation
  - 3d Design
  - Traffic operations
  - Signing and striping
  - Highway safety
  - Maintenance
  - Asset management
- Energy
  - Traditional
  - Renewable/Alternative
- Cultural/Historical Resources



The I-35/Highway 53 interchange in Duluth, MN (known locally as the "Can of Worms")

HD Lidar Examples: Floodplain Mapping
(Hydro, Infrastructure & Forest)

2021 - Progressive Approach

- New high density lidar not only maps this area of flood inundation but it **maps all the infrastructure assets** in the image.
- We have an opportunity to be **proactive** and map this entire scene.

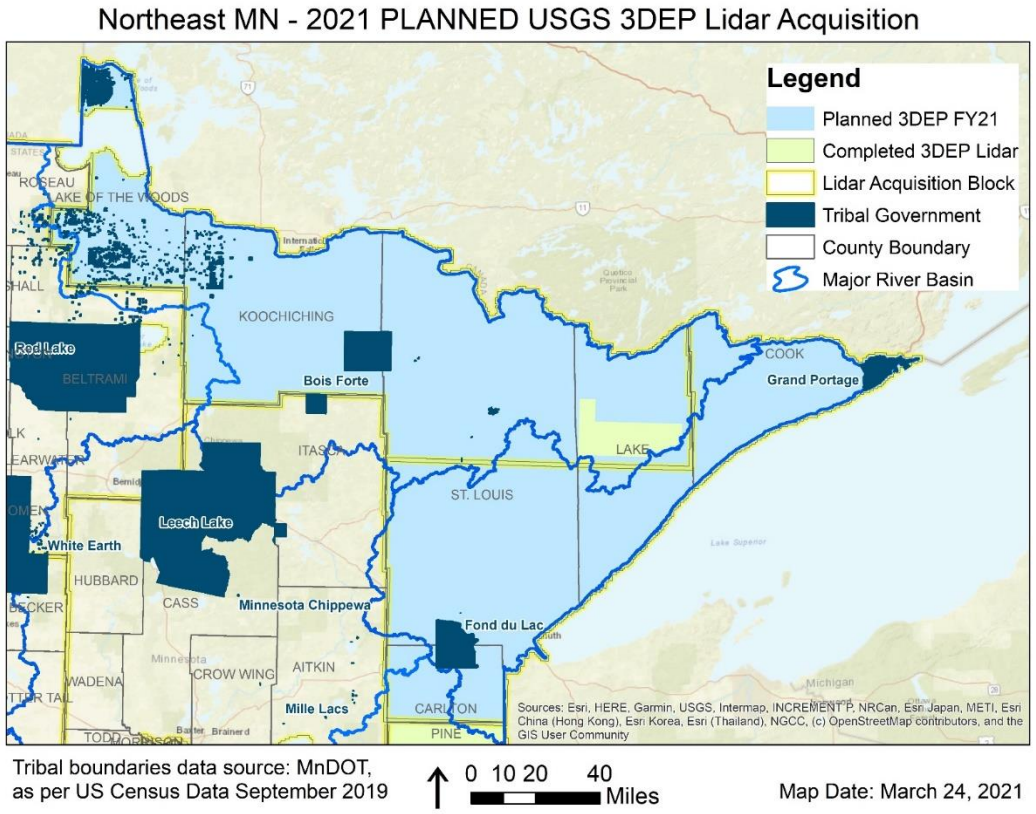
Next

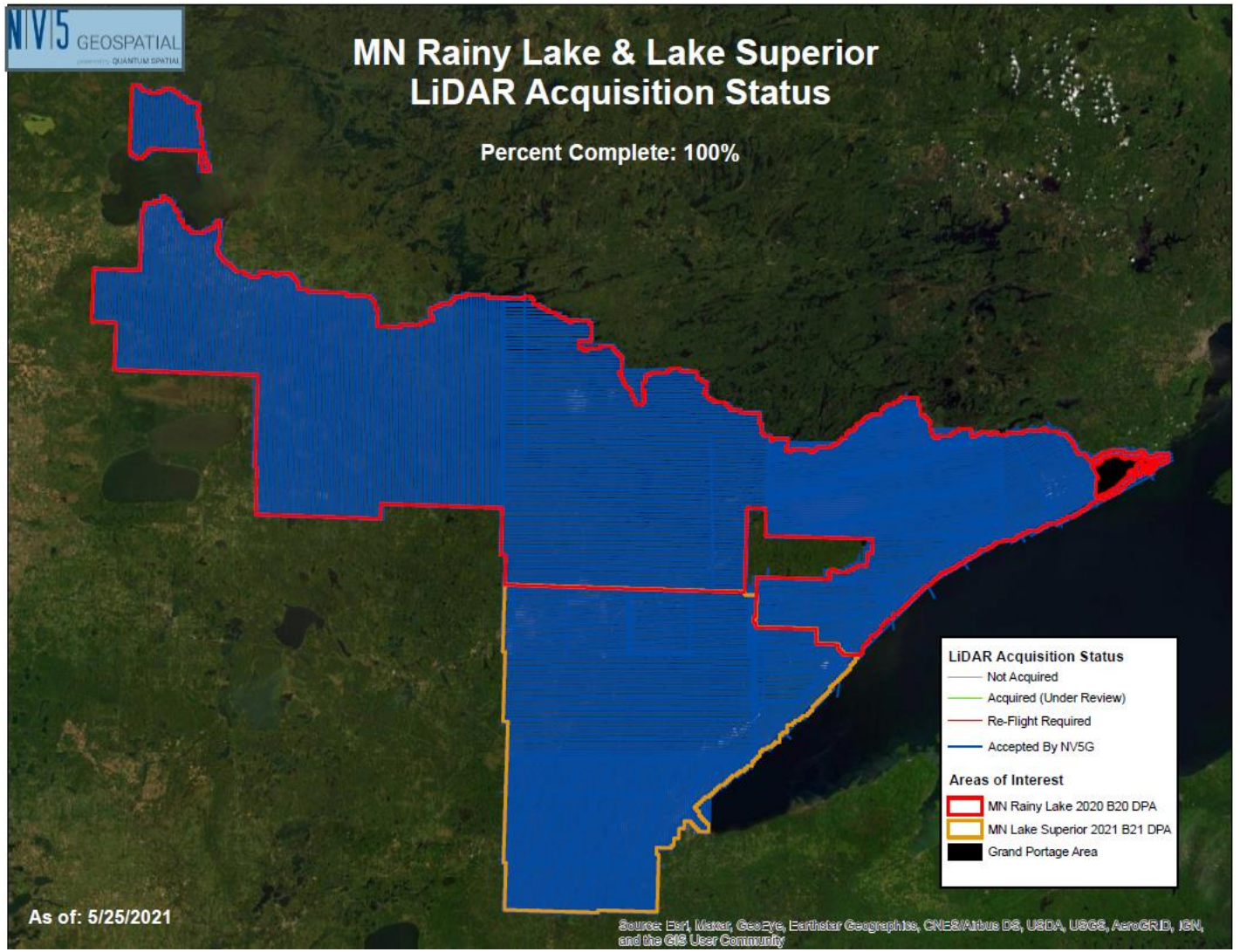
Jennifer Corcoran…


Next: Lidar
Collect

Lidar Acquisition: *Northeast – Rainy Lake & Lake Superior Block*

- Rainy Lake and Lake Superior Block data collections are complete!





Partner Contributions: *Northeast – Rainy Lake & Lake Superior Block*

Organization	Amount
USGS 3DEP	$4,582,895
DNR Forestry	$615,000
US Forest Service	$488,561
NRCS	$339,000
Office of School Trust Lands	$100,000
MnGeo	$60,000
DNR Fish and Wildlife	$50,000
St Louis County	$50,000
City of Duluth	$30,000
DOT	$25,000
Lake County	$20,000
Koochiching County	$10,000

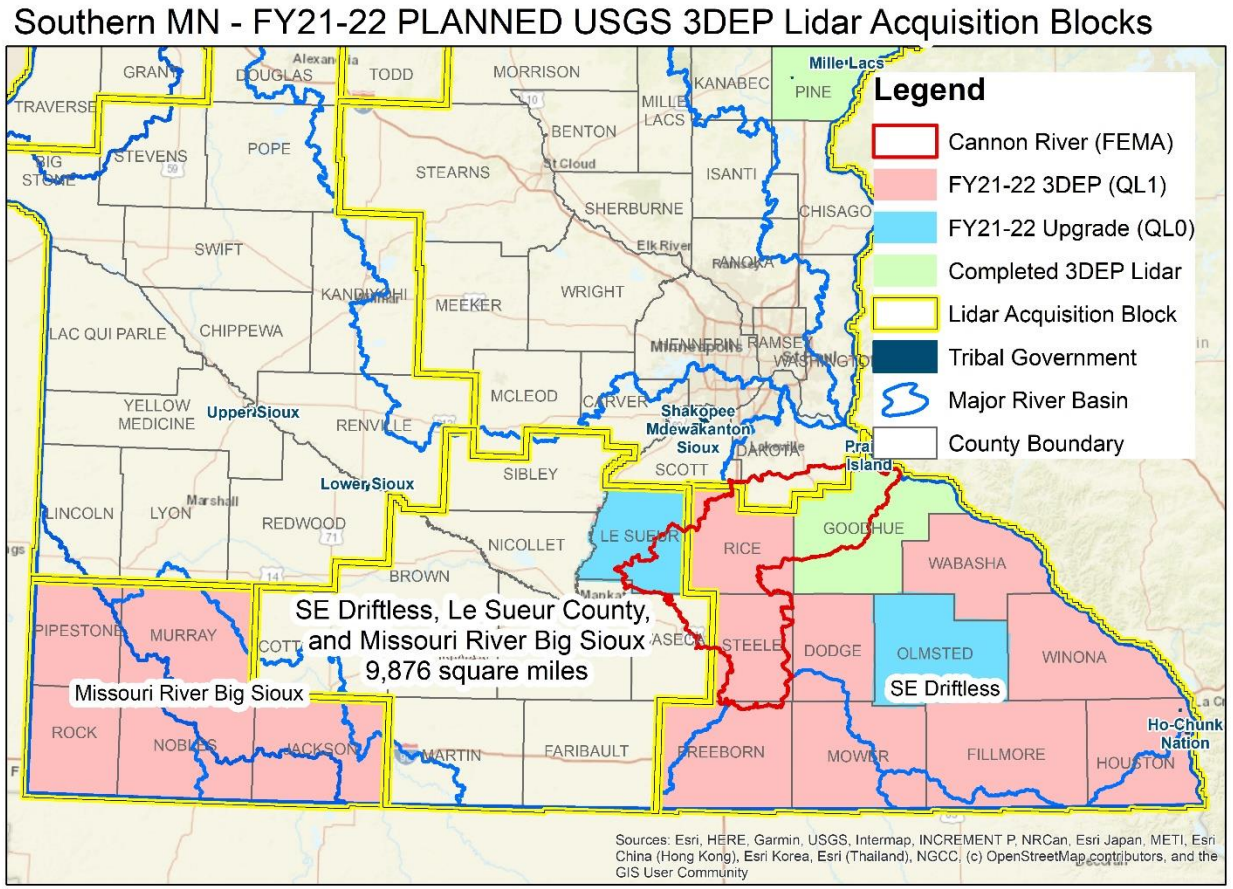
Total Area = 16,672 square miles (10,670,080 acres)

Total Cost per square mile = $382 ($0.59/acre)

Grand Total Cost = $6,370,456

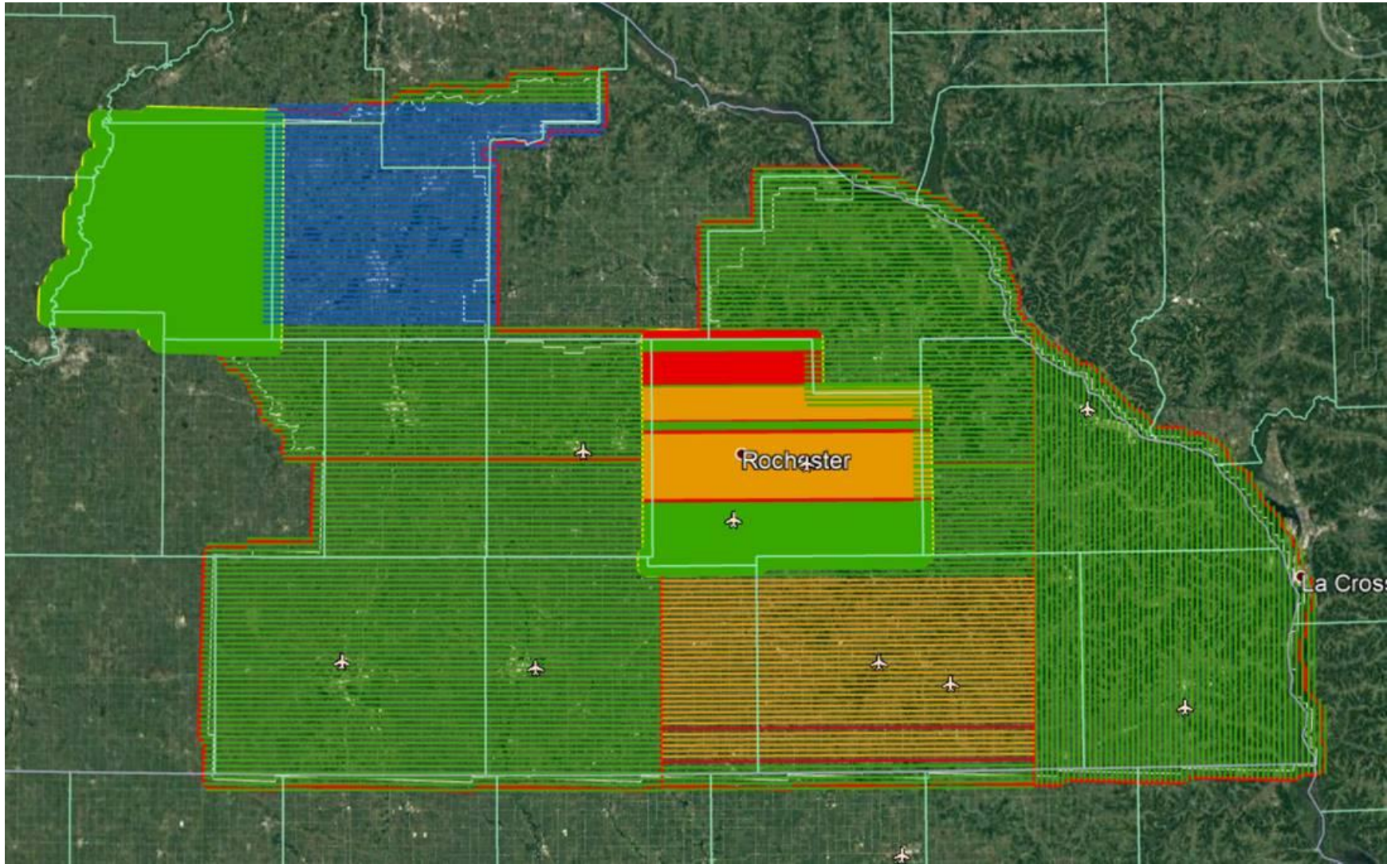
Lidar Acquisition: *Southern BAA – Missouri Big Sioux & SE Driftless Blocks*

- BAA (west and east) split between two vendors and two JFA's.
  - Partners: USGS, NRCS State and Federal Offices, MnDOT, MnGeo, and Nobles, Le Sueur, Olmsted (included City of Rochester), and Winona (included City of Winona) Counties
- Lidar collection occurring now in SE Driftless LAA
- Missouri River Big Sioux block set for a Spring 2022 collection
  - Additional partnerships are requested!!



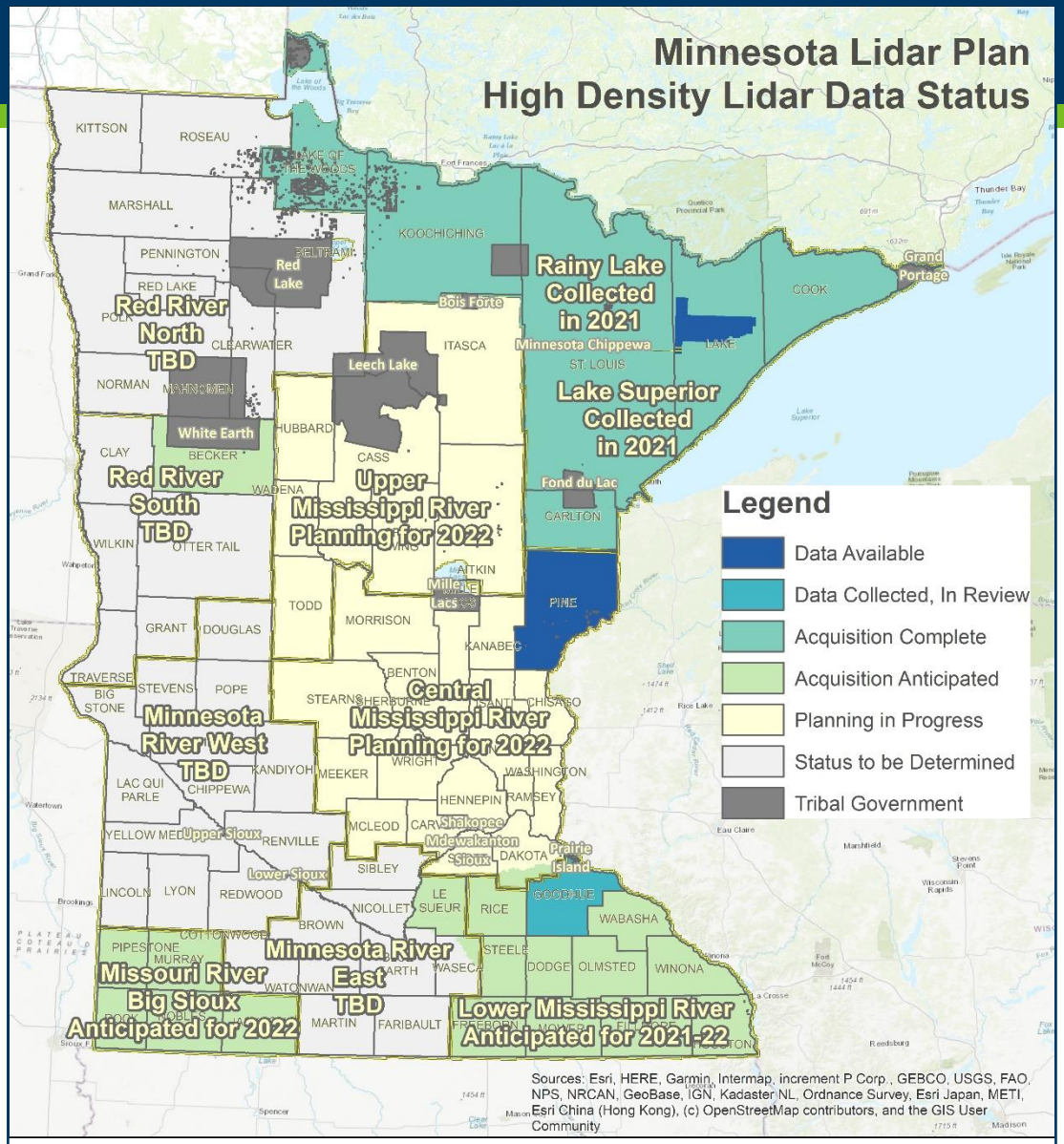
Lidar Acquisition: *Southern BAA – Missouri Big Sioux & SE Driftless Blocks*

- ORANGE=Not flown
- BLUE= Flown/Awaiting QC
- GREEN = QC accepted
- RED = re-flight needed
- First priority is getting the QL0 reflights done in Le Sueur Co, then the QL1 flight blocks.




Planning in Progress

Lidar Acquisition Areas and Blocks of Interest

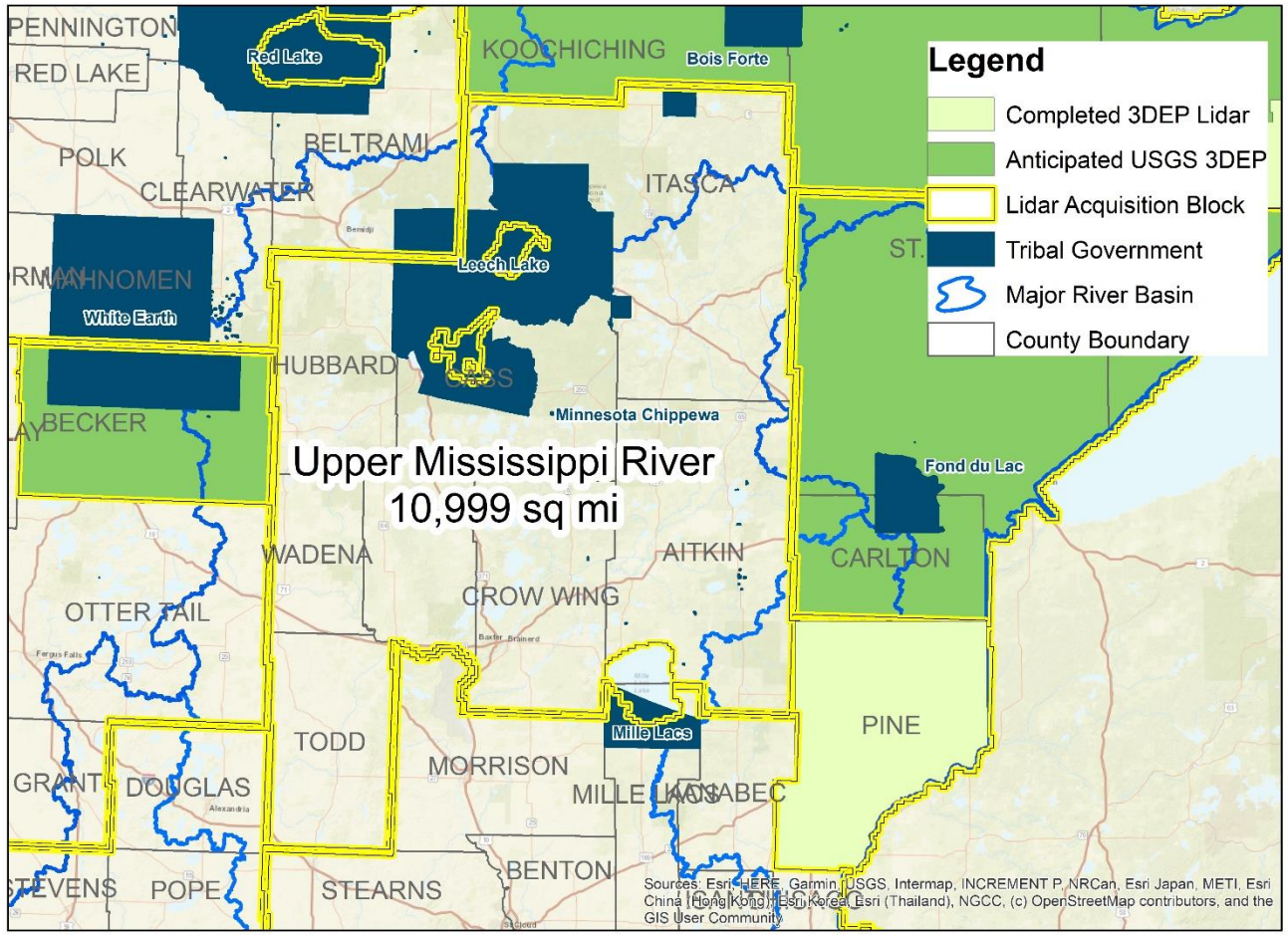


Some anticipated 2021 collections are underway and some will be collected in spring in 2022. TBD areas need partners.

0 25 50 100 Mi

Map Date: May 24, 2021

3DGeo Outreach: *Upper Mississippi River (Central Lakes) Block*



Tribal boundaries data source: MnDOT, as per US Census Data September 2019

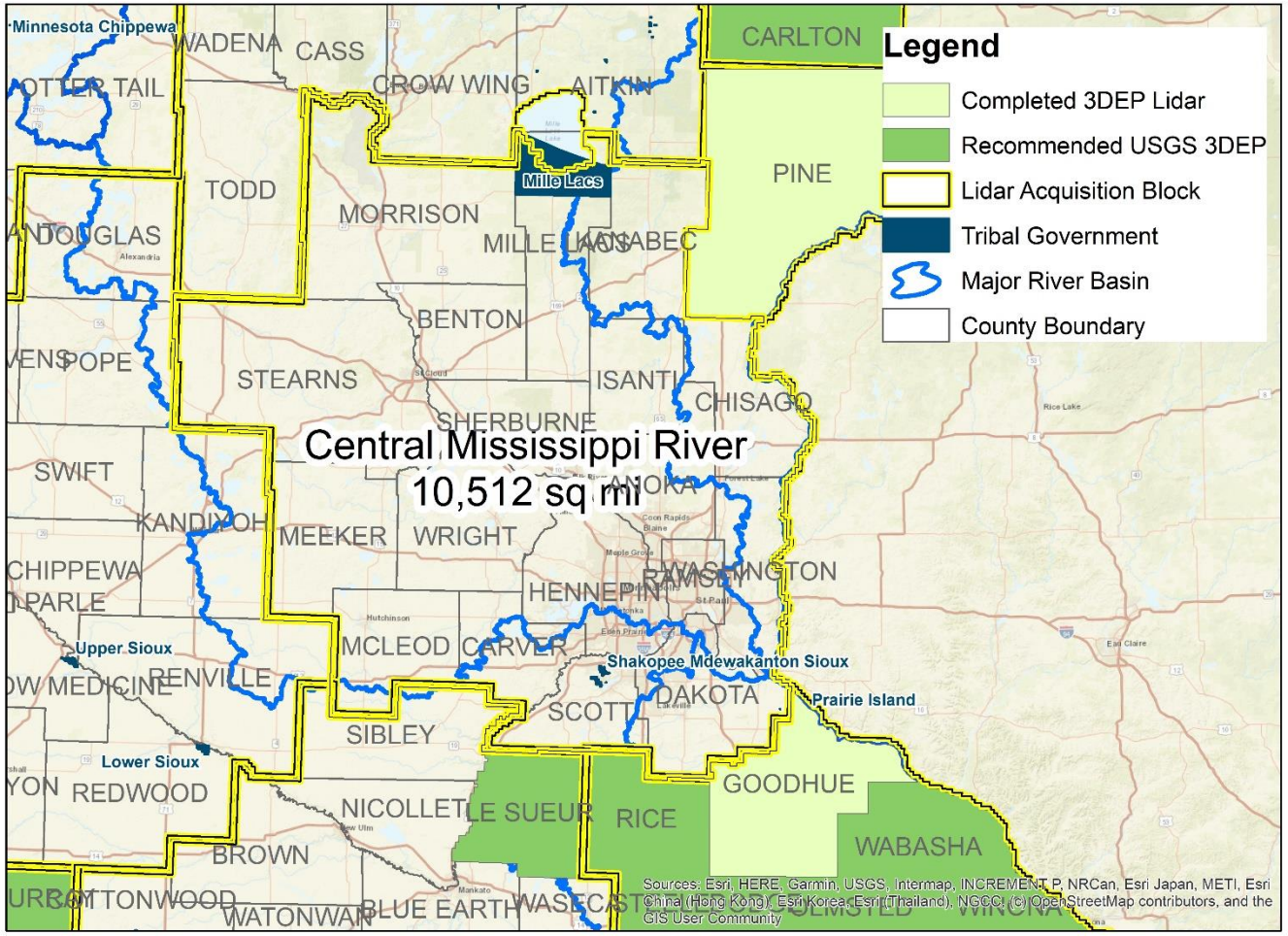
Map Date: April 27, 2021

3DGeo stakeholder **outreach** presentation held two weeks ago…

Estimated USGS 3DEP Contribution		Total Partner Contributions Needed	
%	$	%	$
40%	$1,451,868	60%	$2,177,802

10,999 square miles Estimated at **$330** per square mile
= **$3,629,670** TOTAL

3DGeo Outreach: *Central Mississippi River (Metro) Block*



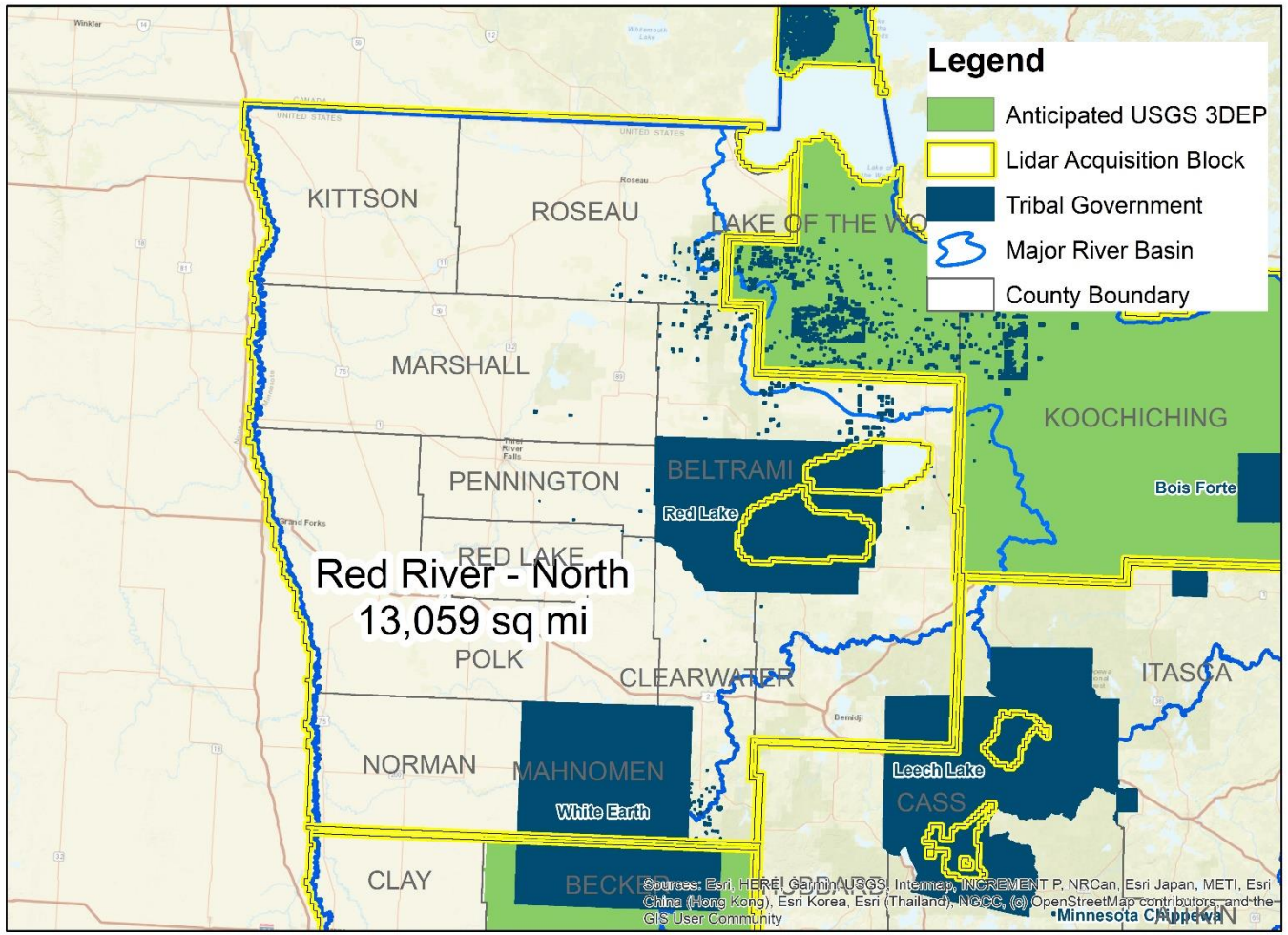
3DGeo stakeholder **outreach** Central Mississippi/Metro LAB

- 8th Metro Meeting held on last week on May 20th

Estimated USGS 3DEP Contribution		Total Partner Contributions Needed	
%	$	%	$
40%	$1,387,584	60%	$2,081,376

10,512 square miles at **$330** per square mile = **$3,468,960** TOTAL

3DGeo Outreach: Red River - North Block



Tribal boundaries data source: MnDOT, as per US Census Data September 2019

0 10 20 40 Mi

Map Date: April 26, 2021

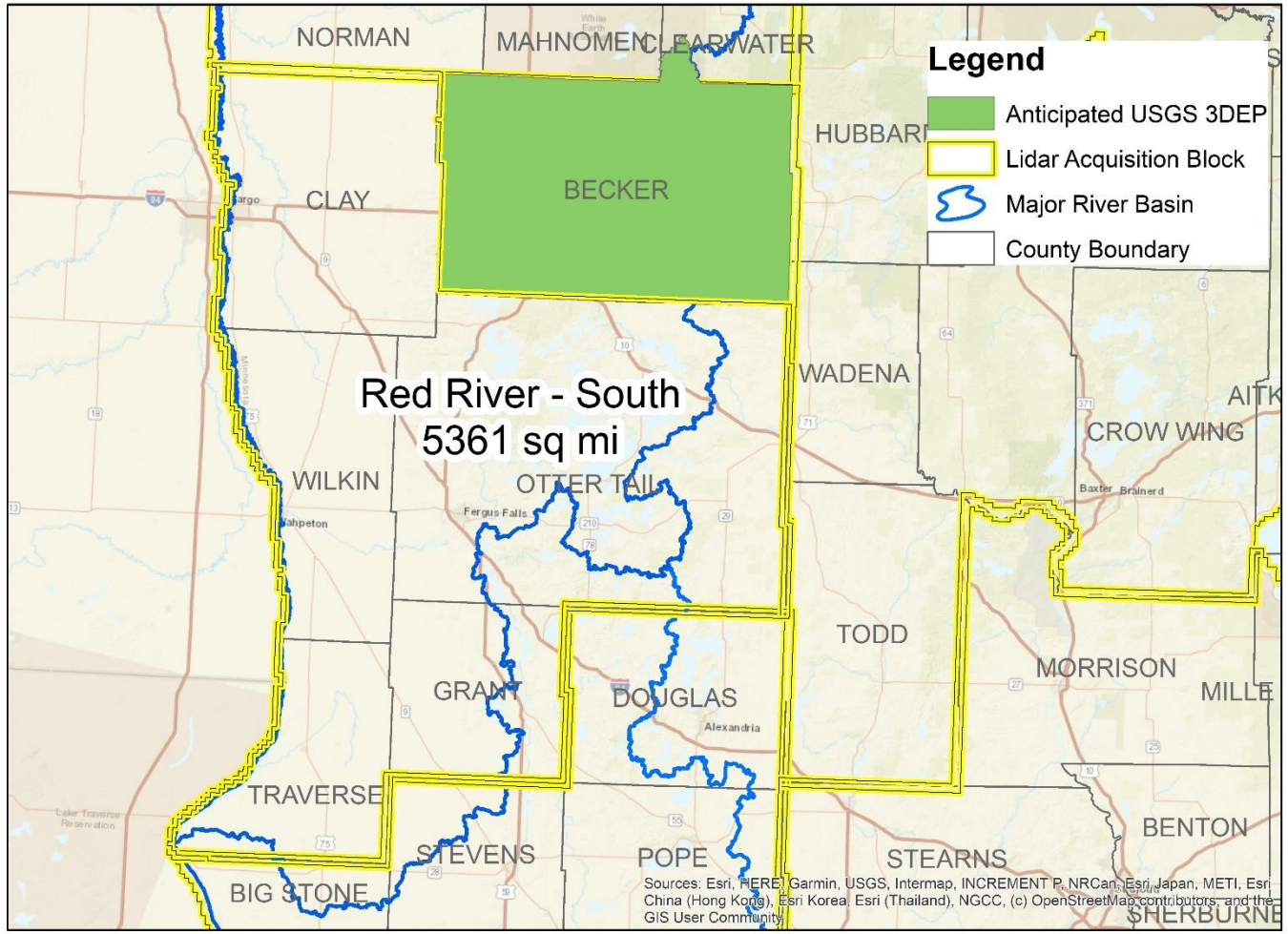
3DGeo stakeholder **outreach** has started in the Red River North LAB

- Next meeting: TBD (June)

Estimated USGS 3DEP Contribution		Total Partner Contributions Needed	
%	$	%	$
40%	$1,723,788	60%	$2,585,682

13,059 square miles Estimated at **$330** per square mile = **$4,309,470** TOTAL

3DGeo Outreach: Red River - South Block



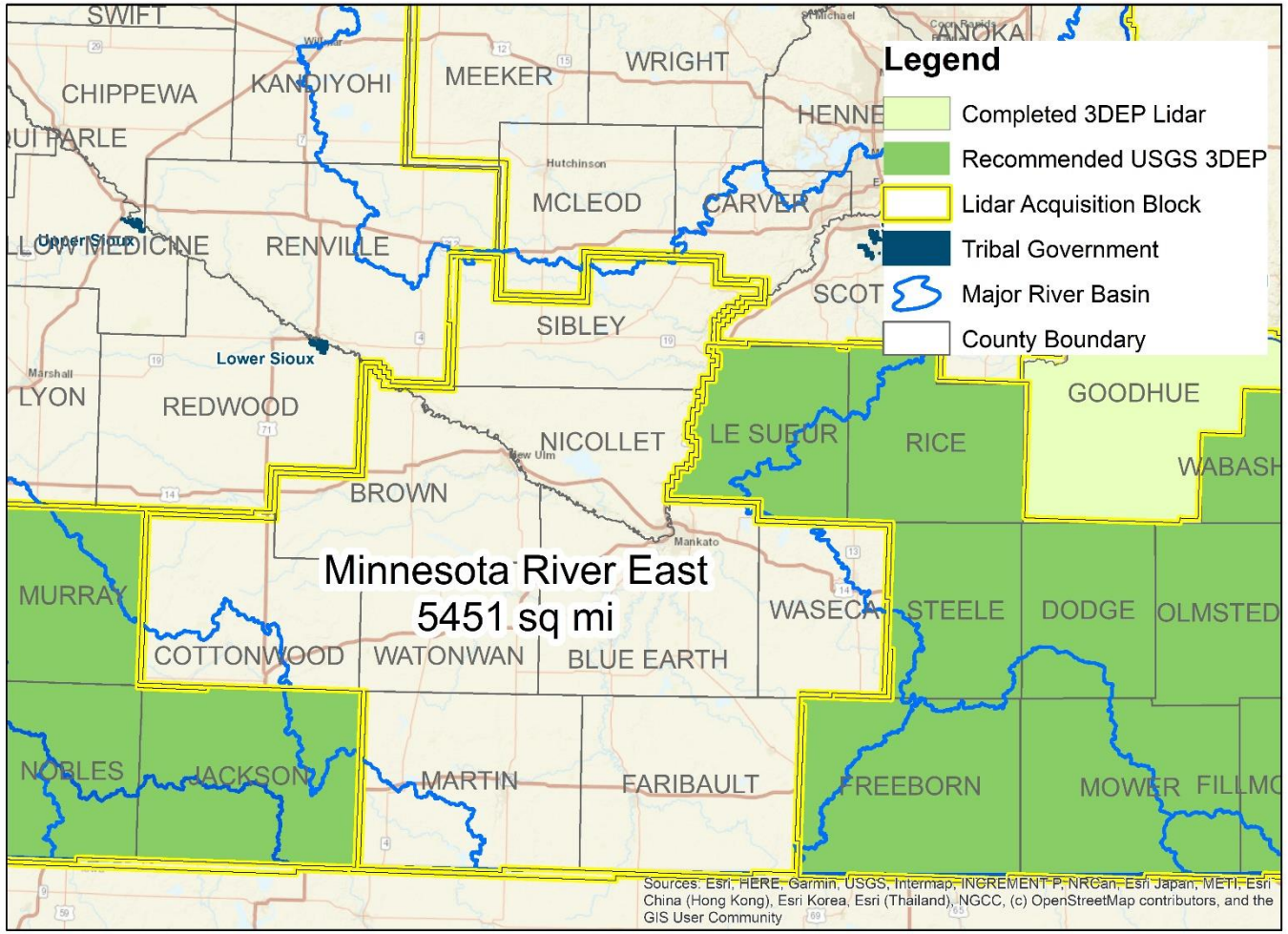
3DGeo stakeholder **outreach** has started in the Red River South LAB

- Next meeting: TBD (June)

Estimated USGS 3DEP Contribution		Total Partner Contributions Needed	
%	$	%	$
40%	$707,652	60%	$1,061,478

5,361 square miles Estimated at **$330** per square mile = **$1,769,130** TOTAL

3DGeo Outreach: Minnesota River - East Block



Tribal boundaries data source: MnDOT, as per US Census Data September 2019

0 10 20 40 Mi

Map Date: April 26, 2021

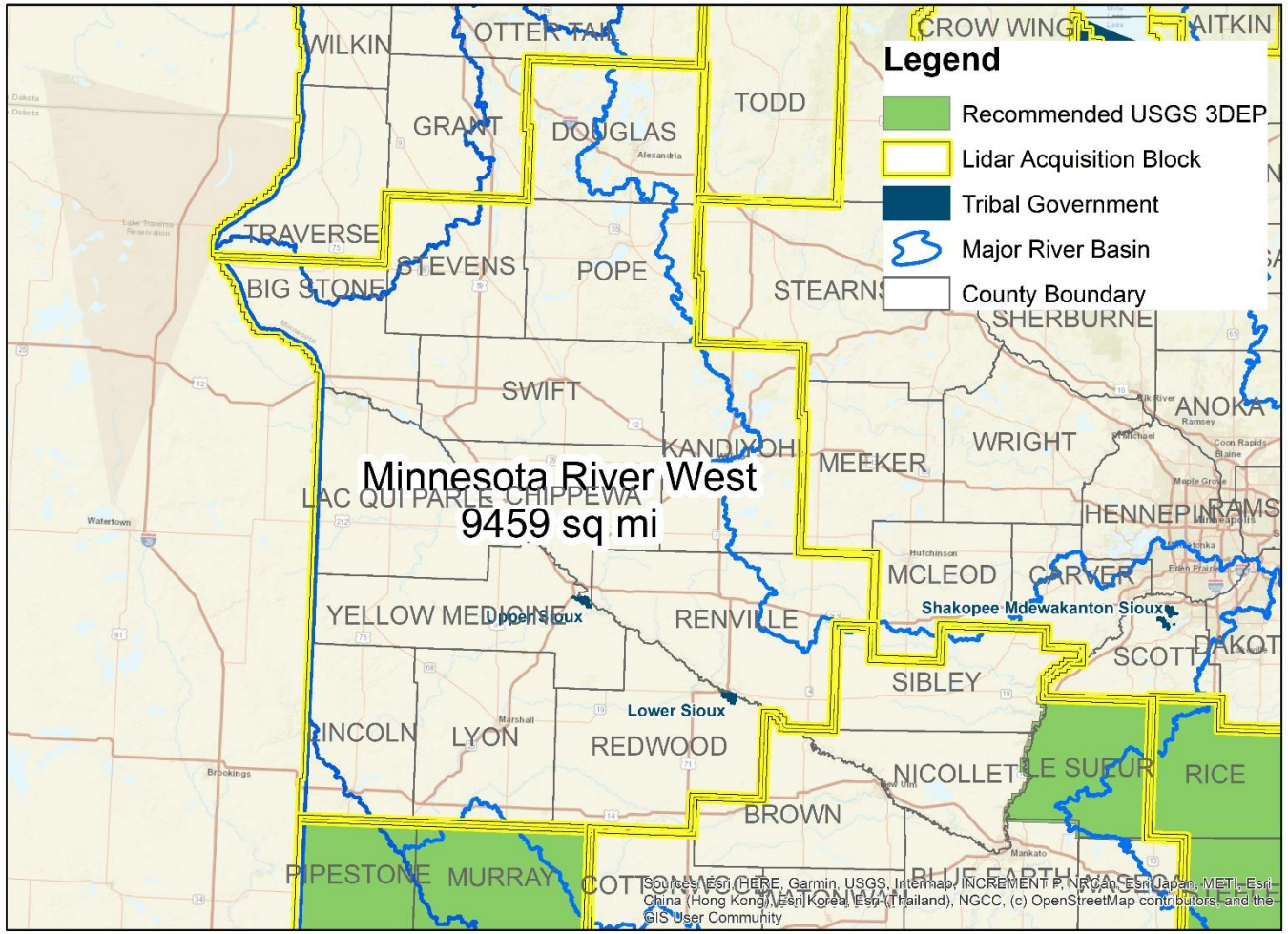
3DGeo stakeholder **outreach** has started in the MN River East Block

- Next meeting: May 25, 2PM

Estimated USGS 3DEP Contribution		Total Partner Contributions Needed	
%	$	%	$
40%	$719,532	60%	$1,079,298

5451 square miles Estimated at **$330** per square mile = **$1,798,830** TOTAL

3DGeo Outreach: Minnesota River - West Block



Tribal boundaries data source: MnDOT, as per US Census Data September 2019

0 10 20 40 Mi

Map Date: April 27, 2021

3DGeo stakeholder **outreach** has started in the MN River West Block

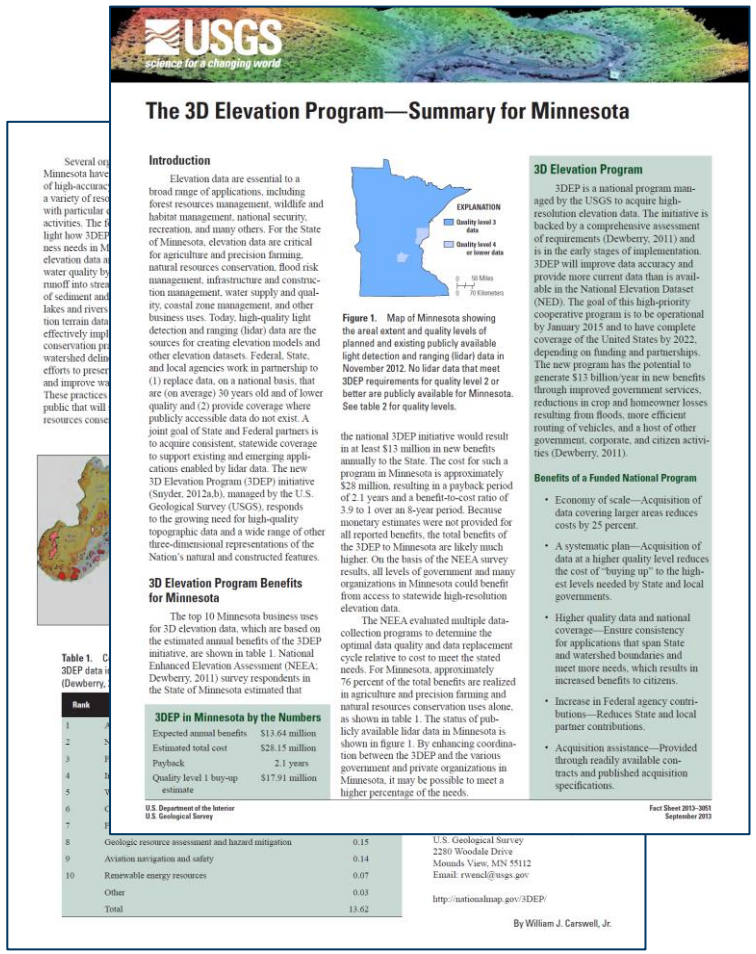
- Next meeting: May 25, 2PM

Estimated USGS 3DEP Contribution		Total Partner Contributions Needed	
%	$	%	$
40%	$1,248,588	60%	$1,872,882

9,459 square miles Estimated at **$330** per square mile = **$3,121,470** TOTAL

How:
You can Help

Outreach and Educational Materials



USGS science for a changing world

The 3D Elevation Program—Summary for Minnesota

Introduction

Elevation data are essential to a broad range of applications, including forest resources management, wildlife and habitat management, national security, recreation, and many others. For the State of Minnesota, elevation data are critical for agriculture and precision farming, natural resources conservation, flood risk management, infrastructure and construction management, water supply and quality, coastal zone management, and other business uses. Today, high-quality light detection and ranging (lidar) data are the sources for creating elevation models and other elevation datasets. Federal, State, and local agencies work in partnership to (1) replace data, on a national basis, that are (on average) 30 years old and of lower quality and (2) provide coverage where publicly accessible data do not exist. A joint goal of State and Federal partners is to acquire consistent, statewide coverage to support existing and emerging applications enabled by lidar data. The new 3D Elevation Program (3DEP) initiative (Snyder, 2012a,b), managed by the U.S. Geological Survey (USGS), responds to the growing need for high-quality topographic data and a wide range of other three-dimensional representations of the Nation's natural and constructed features.

3D Elevation Program Benefits for Minnesota

The top 10 Minnesota business uses for 3D elevation data, which are based on the estimated annual benefits of the 3DEP initiative, are shown in table 1. National Enhanced Elevation Assessment (NEEA; Dewberry, 2011) survey respondents in the State of Minnesota estimated that the national 3DEP initiative would result in at least $13 million in new benefits annually to the State. The cost for such a program in Minnesota is approximately $28 million, resulting in a payback period of 2.1 years and a benefit-to-cost ratio of 3.9 to 1 over an 8-year period. Because monetary estimates were not provided for all reported benefits, the total benefits of the 3DEP to Minnesota are likely much higher. On the basis of the NEEA survey results, all levels of government and many organizations in Minnesota could benefit from access to statewide high-resolution elevation data.

The NEEA evaluated multiple data-collection programs to determine the optimal data quality and data replacement cycle relative to cost to meet the stated needs. For Minnesota, approximately 76 percent of the total benefits are realized in agriculture and precision farming and natural resources conservation uses alone, as shown in table 1. The status of publicly available lidar data in Minnesota is shown in figure 1. By enhancing coordination between the 3DEP and the various government and private organizations in Minnesota, it may be possible to meet a higher percentage of the needs.

3DEP in Minnesota by the Numbers

Expected annual benefits	$13.64 million
Estimated total cost	$28.15 million
Payback	2.1 years
Quality level 1 buy-up estimate	$17.91 million

Figure 1. Map of Minnesota showing the areal extent and quality levels of planned and existing publicly available light detection and ranging (lidar) data in November 2012. No lidar data that meet 3DEP requirements for quality level 2 or better are publicly available for Minnesota. See table 2 for quality levels.

3D Elevation Program

3DEP is a national program managed by the USGS to acquire high-resolution elevation data. The initiative is backed by a comprehensive assessment of requirements (Dewberry, 2011) and is in the early stages of implementation. 3DEP will improve data accuracy and provide more current data than is available in the National Elevation Dataset (NED). The goal of this high-priority cooperative program is to be operational by January 2015 and to have complete coverage of the United States by 2022, depending on funding and partnerships. The new program has the potential to generate $13 billion/year in new benefits through improved government services, reductions in crop and homeowner losses resulting from floods, more efficient routing of vehicles, and a host of other government, corporate, and citizen activities (Dewberry, 2011).

Benefits of a Funded National Program

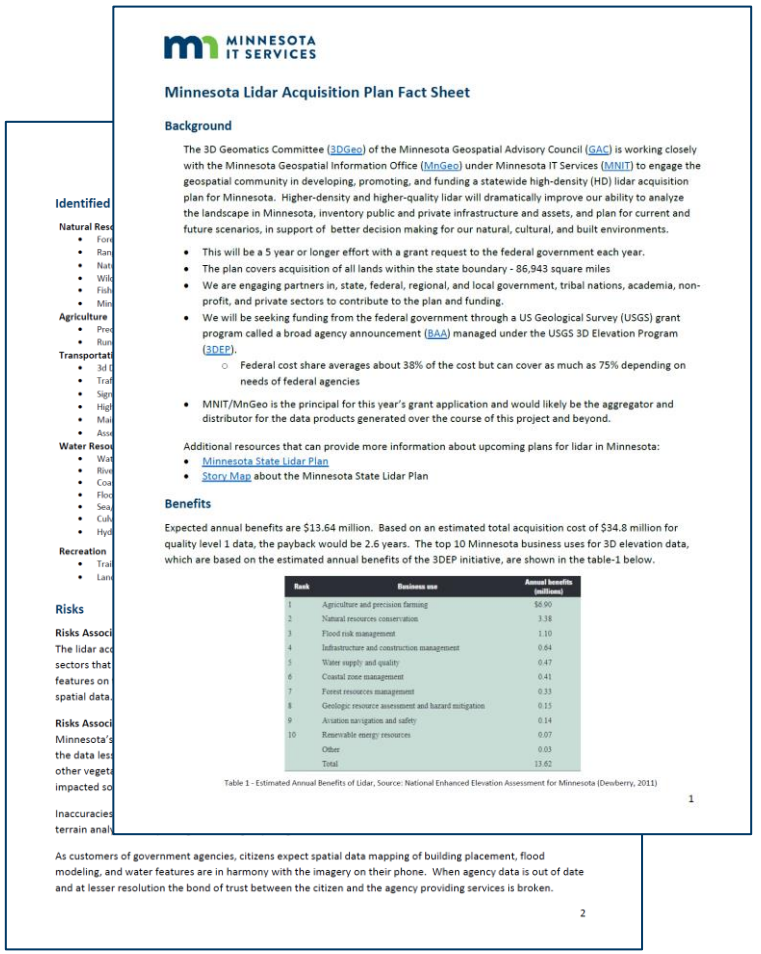
- Economy of scale—Acquisition of data covering larger areas reduces costs by 25 percent.
- A systematic plan—Acquisition of data at a higher quality level reduces the cost of "buying up" to the highest levels needed by State and local governments.
- Higher quality data and national coverage—Ensure consistency for applications that span State and watershed boundaries and meet more needs, which results in increased benefits to citizens.
- Increase in Federal agency contributions—Reduces State and local partner contributions.
- Acquisition assistance—Provided through readily available contracts and published acquisition specifications.

U.S. Geological Survey
2280 Woodale Drive
Mounds View, MN 55112
Email: rwencl@usgs.gov

http://nationalmap.gov/3DEP/

By William J. Carswell, Jr.

Rank		
8	Geologic resource assessment and hazard mitigation	0.15
9	Aviation navigation and safety	0.14
10	Renewable energy resources	0.07
	Other	0.03
	Total	13.62



MINNESOTA IT SERVICES

Minnesota Lidar Acquisition Plan Fact Sheet

Background

The 3D Geomatics Committee (3DGeo) of the Minnesota Geospatial Advisory Council (GAC) is working closely with the Minnesota Geospatial Information Office (MnGeo) under Minnesota IT Services (MNIT) to engage the geospatial community in developing, promoting, and funding a statewide high-density (HD) lidar acquisition plan for Minnesota. Higher-density and higher-quality lidar will dramatically improve our ability to analyze the landscape in Minnesota, inventory public and private infrastructure and assets, and plan for current and future scenarios, in support of better decision making for our natural, cultural, and built environments.

- This will be a 5 year or longer effort with a grant request to the federal government each year.
- The plan covers acquisition of all lands within the state boundary - 86,943 square miles
- We are engaging partners in, state, federal, regional, and local government, tribal nations, academia, non-profit, and private sectors to contribute to the plan and funding.
- We will be seeking funding from the federal government through a US Geological Survey (USGS) grant program called a broad agency announcement (BAA) managed under the USGS 3D Elevation Program (3DEP).
  - Federal cost share averages about 38% of the cost but can cover as much as 75% depending on needs of federal agencies
- MNIT/MnGeo is the principal for this year's grant application and would likely be the aggregator and distributor for the data products generated over the course of this project and beyond.

Additional resources that can provide more information about upcoming plans for lidar in Minnesota:

- Minnesota State Lidar Plan
- Story Map about the Minnesota State Lidar Plan

Benefits

Expected annual benefits are $13.64 million. Based on an estimated total acquisition cost of $34.8 million for quality level 1 data, the payback would be 2.6 years. The top 10 Minnesota business uses for 3D elevation data, which are based on the estimated annual benefits of the 3DEP initiative, are shown in the table-1 below.

Rank	Business use	Annual benefits (millions)
1	Agriculture and precision farming	$8.90
2	Natural resources conservation	3.38
3	Flood risk management	1.10
4	Infrastructure and construction management	0.64
5	Water supply and quality	0.47
6	Coastal zone management	0.41
7	Forest resources management	0.33
8	Geologic resource assessment and hazard mitigation	0.15
9	Aviation navigation and safety	0.14
10	Renewable energy resources	0.07
	Other	0.03
	Total	13.62

Table 1 - Estimated Annual Benefits of Lidar, Source: National Enhanced Elevation Assessment for Minnesota (Dewberry, 2011)

As customers of government agencies, citizens expect spatial data mapping of building placement, flood modeling, and water features are in harmony with the imagery on their phone. When agency data is out of date and at lesser resolution the bond of trust between the citizen and the agency providing services is broken.

MINNESOTA

Minnesota State Lidar Plan – Announcement

Overview

The Minnesota 3D Geomatics Committee and the State Geospatial Information Office, MnGeo, have developed a draft Lidar Plan for the State of Minnesota that will help guide the acquisition of new statewide lidar data over the next five years.

The State Lidar Plan seeks to outline collection timelines, standards, end user needs, products, and storage/dissemination methods.

Call to Action

Please contact us for more on the State Lidar Plan.

- Identify and share requirements and business use cases
- Provide your desired areas of interest and product needs
- Let us know if you can help provide matching funds
- Check out the draft State Lidar Plan and StoryMap on the web

Get involved: Contact
https://www.mngeo.state.

Need for Lida

Lidar data prov
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infrastructure,
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a multitude of

Funding Oppo

The USGS 3D E
data and creat
Nationwide. This program has been successful in our region, but our current lidar data does not meet the new specifications.

Every fall, the USGS has a call for proposals to apply for grant funding to match local partnerships. To receive federal funding, we must provide a non-federal funding match. We are currently reaching out to
high quality lid
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State Lidar Plan

MINNESOTA

The Minnesota 3D Geomatics Committee and the State Geospatial Information Office, MnGeo, have developed a 5-year draft plan to help guide the acquisition of new statewide lidar data.

Deliverables proposed include a lidar point cloud, digital elevation model, canopy height model, and more depending on stakeholder needs and funding.

www.mngeo.state.mn.us/committee/3dgeo/

Get Involved!

- Let us know if you can help
- Share requirements and business use cases
- Provide areas of interest and product needs

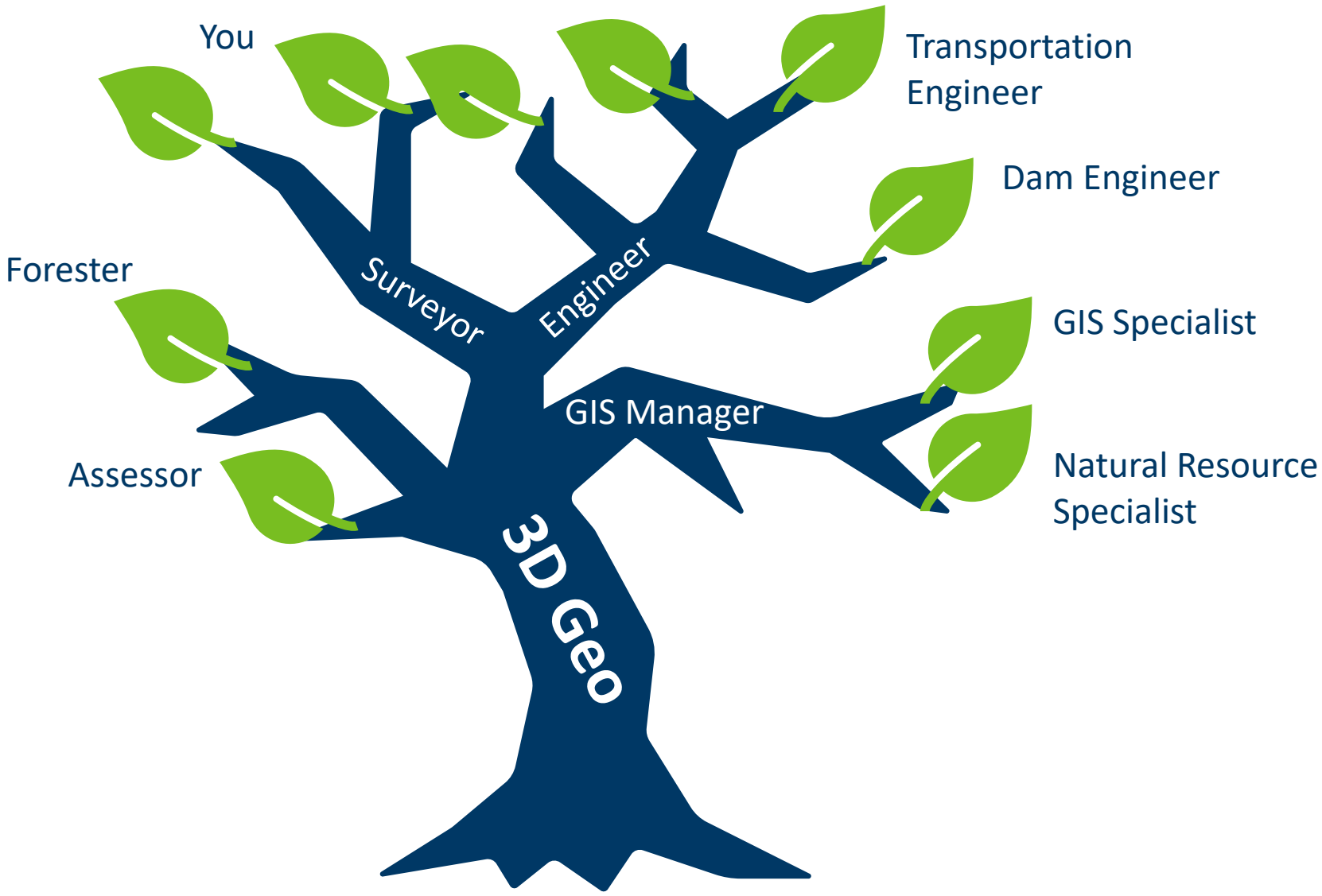
http://bit.ly/MnLidarPlanStoryMap

Next steps

You don't have to have money or be a decision maker to be a stakeholder . . .

You can be a voice of support . . .

A collaborator



3D Geomatics Committee

The State (MnGeo) will serve as the fiscal agent with Minnesota partners

- MnGeo will establish funding agreements with funding partners
- MnGeo will establish funding agreement(s) with the USGS 3DEP

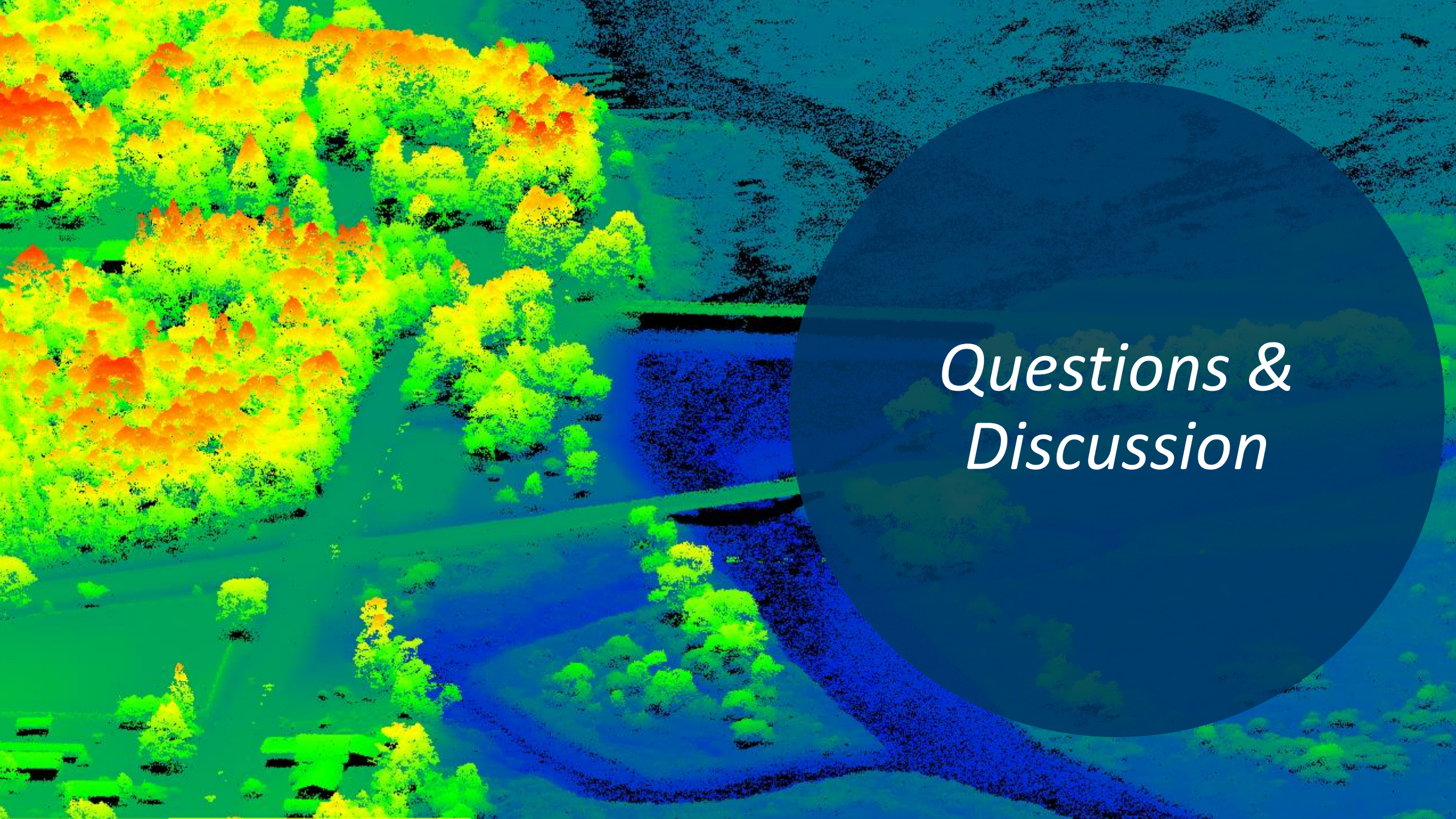
Currently we have commitment from Nobles and MN DNR but no actual agreements in place as we are waiting to see about additional possible partners

- We are currently seeking partnerships from others

- **Stakeholders in the region and 3DGeo are supporting a Spring lidar collection**
  - ✓ Do all partners support a spring only collection window?
- **County partners can play additional roles**
  - ✓ For example, Q/A
  - ✓ County staff outreach

Next steps

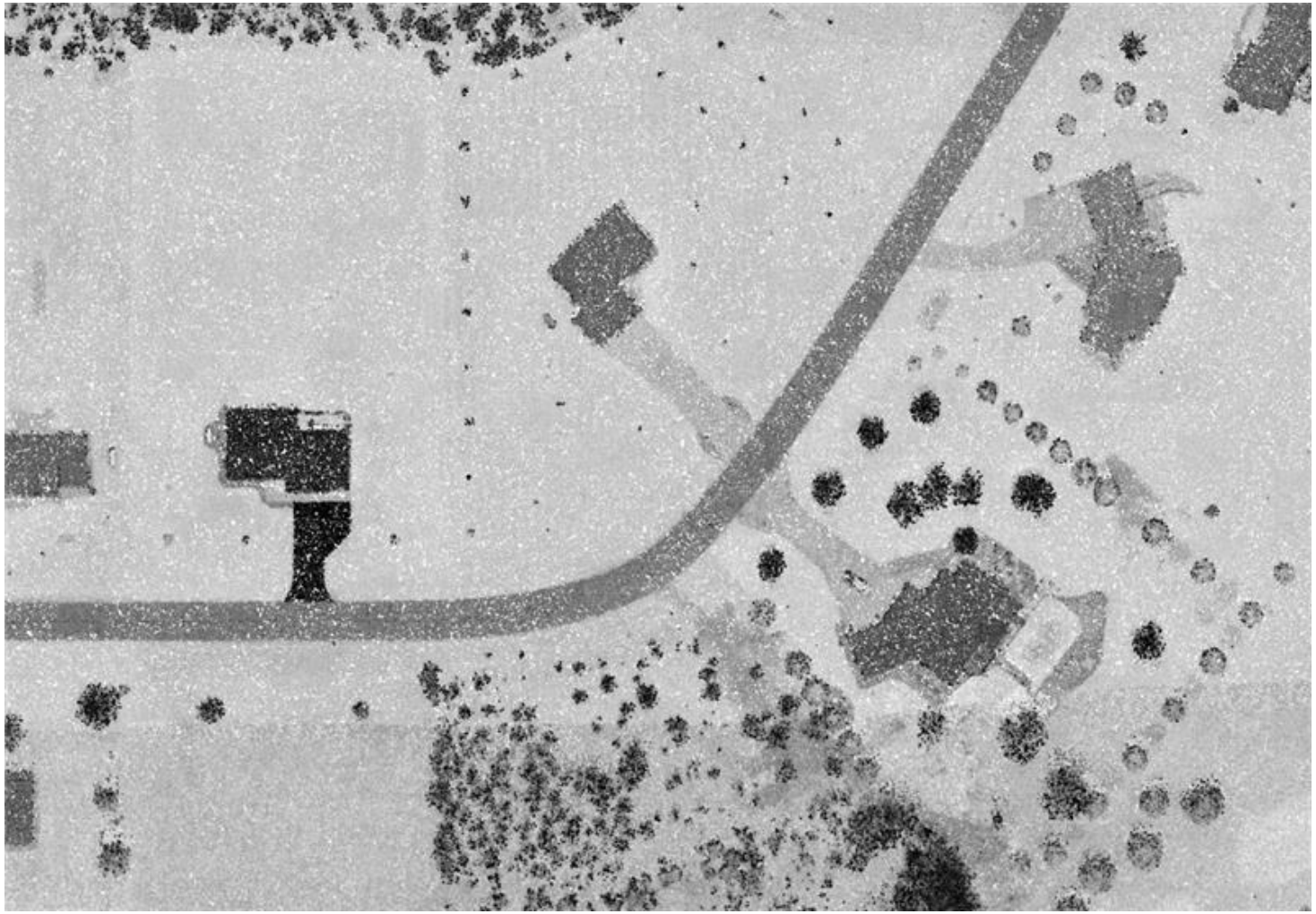
- Partners are NEEDED to help fund lidar acquisition!!
- Check out the Lidar Plan & StoryMap
- Stay in touch
  - Email us: lidar@state.mn.us
  - Get on GovDelivery list: www.mngeo.state.mn.us/newsletter.html
  - Join a 3DGeo Workgroup!


Questions &
Discussion

HD Lidar Examples – Lidar Intensity

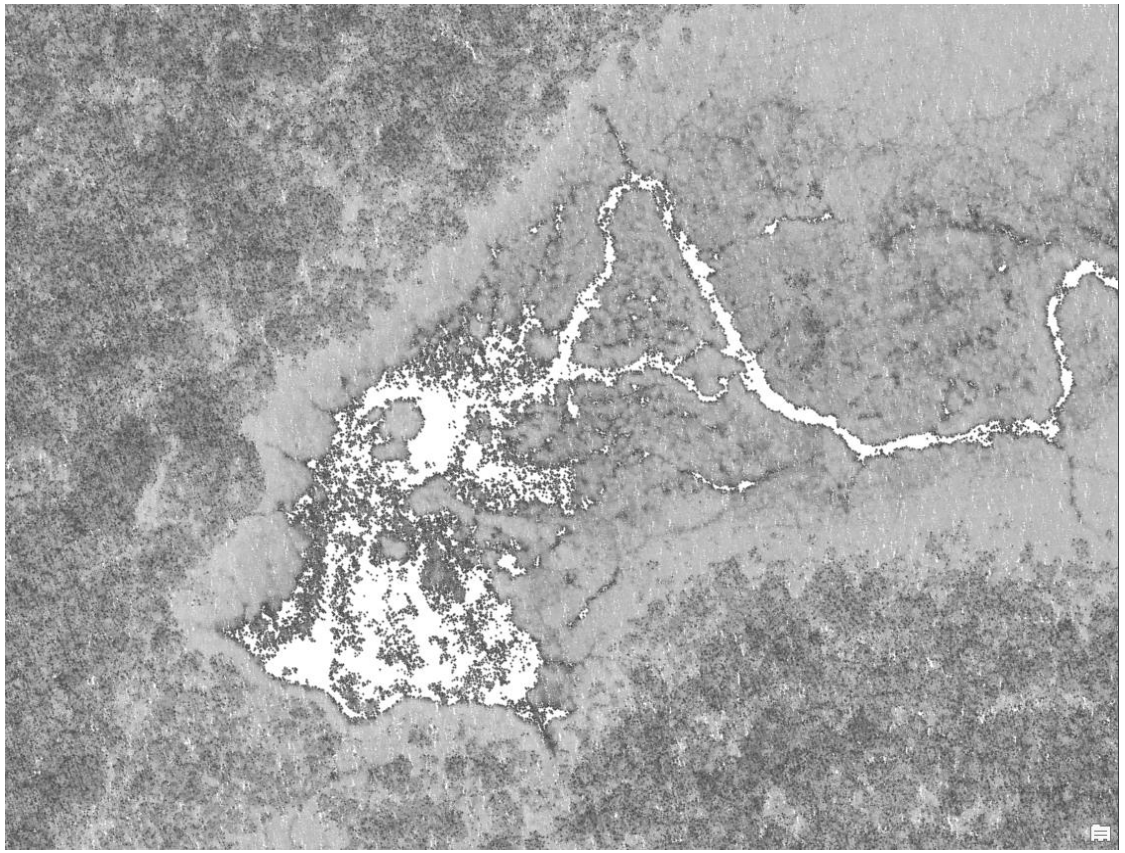
High Density QL0 (30pts/m^2)

QL0 1-foot DEM HPI



HD Lidar Examples - Lidar Intensity

NE Forested LAA, **QL1 Lidar Intensity** - **Hydrography Capture**



HD Lidar Examples - Lidar Intensity

NE Forested LAA, **QL1 Lidar Intensity** - **Infrastructure Capture**