



Virtual Tour

DNR Forestry and Permanent School Fund Commission

No Coach Buses, Subway Sandwiches, or Cool Logging Machinery



No Massive Explosions

**Fall 2013 PSFC
Field Tour –
MinnTac Mine**



Rather We'll Kick the Virtual Dirt and Have a Conversation



Today's Agenda

1. Sustainable Forest Management on School Trust Lands
 - A. Forest Sustainability
 - B. Pandemic Response
 - C. Market Forecast
2. Reforestation and Value to the Trust
3. Forest Cost Certification and Revenues
4. Carbon Offset and Lidar Projects



Sustainable Forest Management on School Trust Lands



Sustainable Forest Management on School Trust Lands

DNR has a Fiduciary Responsibility to the
Trust as a Trustee

Financial Return



Protecting Resources

Sustainable Forest Management on School Trust Lands



Sustainable Forest Management on School Trust Lands

Covid, the Market, and the DNR

CNN BUSINESS Markets Tech Media Success Perspectives Videos

MARKETS [see all](#) →

| | | | |
|-----------|-----------|---------|--------|
| ▲ DOW | 34,984.97 | +535.93 | +1.56% |
| ▲ S&P 500 | 4,428.01 | +63.37 | +1.45% |
| ▲ NASDAQ | 14,741.78 | +236.26 | +1.63% |

FEATURED

Cryptocurrency, explained
If you're a crypto novice, you might be wondering what all the fuss is about

LATEST

- Russia says Berlin could ease natural gas crisis by approving Nord Stream 2
- America's CEOs are losing confidence in the economy
- Rachel Maddow says she had surgery for skin cancer

New homes cost \$36,000 more because of an epic shortage of lumber

By [Matt Egan](#), CNN Business

Updated 7:47 AM ET, Thu May 6, 2021

LIVE LOCAL 3

HOME NEWS WEATHER SPORTS CORONAVIRUS COMMUNITY

WEATHER NOW
DAILY FORECAST EMAIL

SIGN UP HERE

GET YOUR PERSONAL FORECAST DELIVERED TO YOUR INBOX!

PROVIDED BY **LIVE LOCAL 3 DULUTH**

Verso to indefinitely idle Duluth paper mill, 'majority' of 225 employees to be laid off

NBC NEWS U.S. NEWS POLITICS COVID-19 WORLD OPINION BUSINESS HISPANIC HERITAGE MONTH WATCH NOW

ECONOMY

How the lumber industry misread Covid and ended up with a global shortage and sky-high prices

Sustainable Forest Management on School Trust Lands



The Future of Minnesota's Forest Based Economy Looks Positive



Reforestation and Value to the Trust

Statute Requirement
(MS 89.002 subd 2)

Forest Certification
Requirement



Citizen Expectation

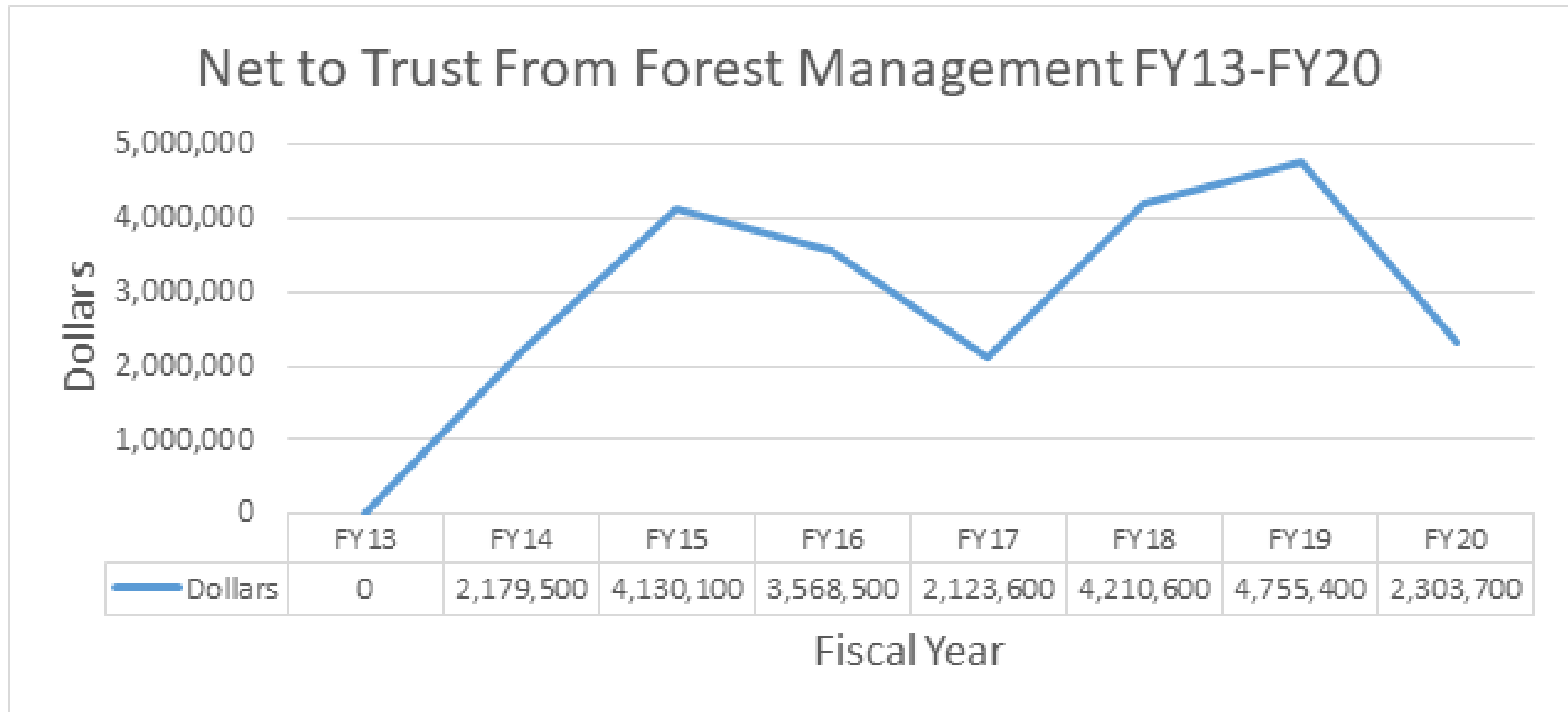
It's the Next Generation
of Forest

Reforestation and Value to the Trust

Bond Funds are the Best Funding Source for Maintaining Returns to the Corpus of the Trust



Forest Cost Certification and Revenues

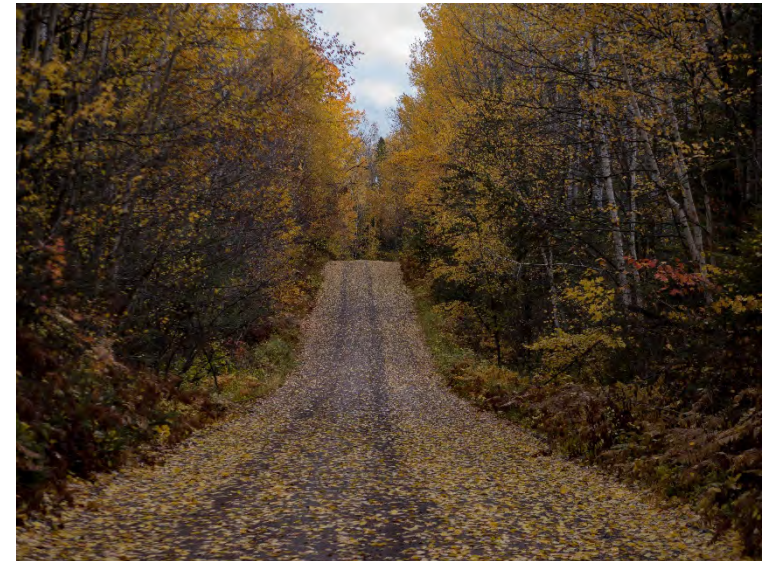


Forest Management Revenues and Rate of Return, 2011 to 2020

Forest Management

Activities on Trust Lands:

- Forest management (inventory, planning, treatment, and timber sales)
- Forest improvement (tree planting and regeneration surveys)
- Maintenance of state forest road network (2,400 miles of roads and 56 bridges)



Generating Revenue

Auction and Administer



Appraise Value



Generating Revenue



Scale the Volume

Wood the Mill



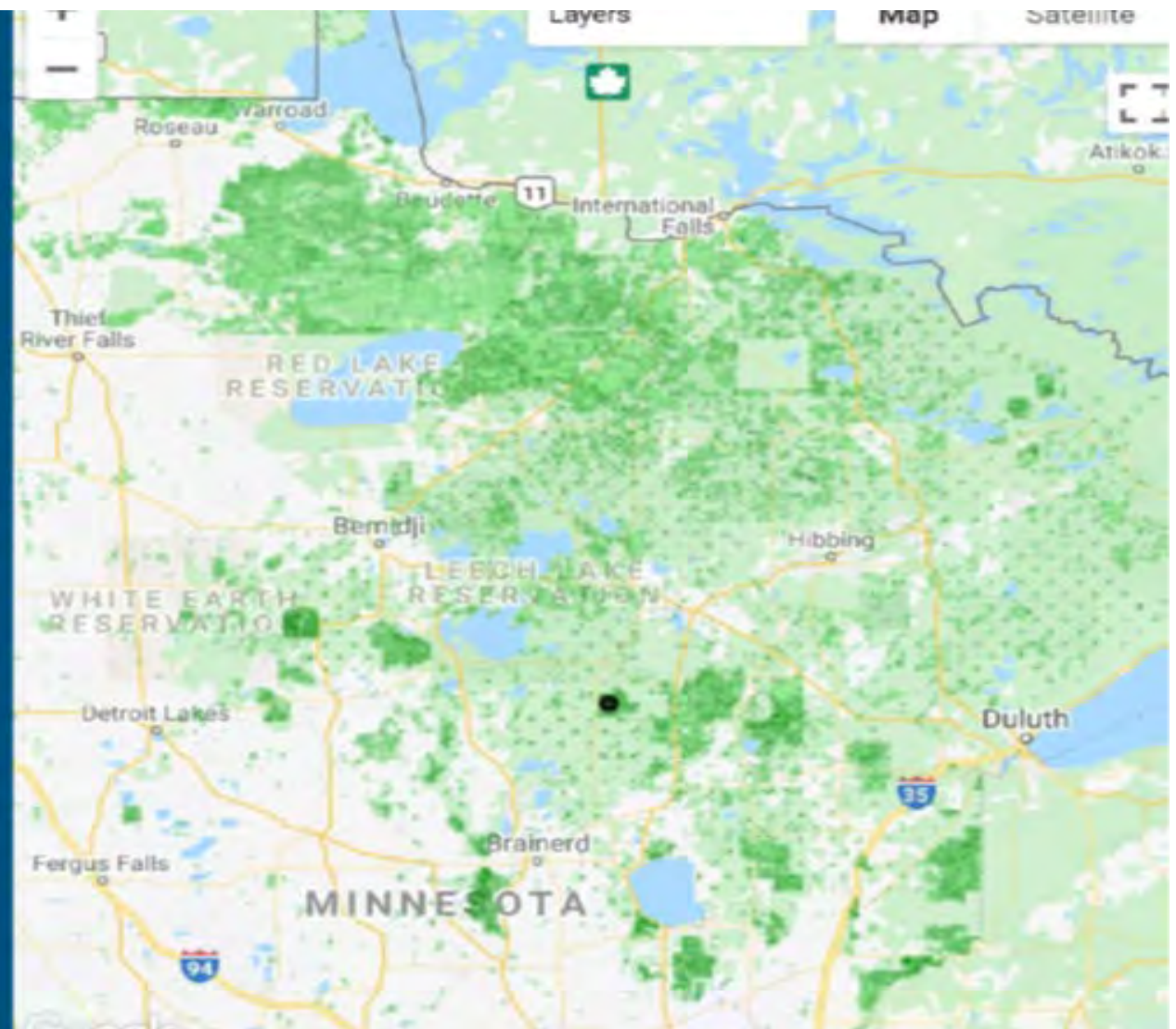
NCSA Grant – Carbon Potential

- 
- ❖ **Develop methodology to identify carbon opportunity areas**
 - ❖ **1-3 projects @ 20,000 acres each**
 - ❖ **Carbon stock opportunity assessment**

NCSA Grant – Carbon Potential

Preliminary data
from Minnesota

Carbon Opportunity Areas



Models developed and methods used

Pilot project to test forest carbon stock model methods for scaling in the U.S.

Field Data

- USFS Forest Inventory and Analysis (FIA)
- MN DNR Plot Based Inventory (PBI)



Remotely Sensed Data

- Satellite and aerial imagery
- Lidar derived canopy height



Open Source Software

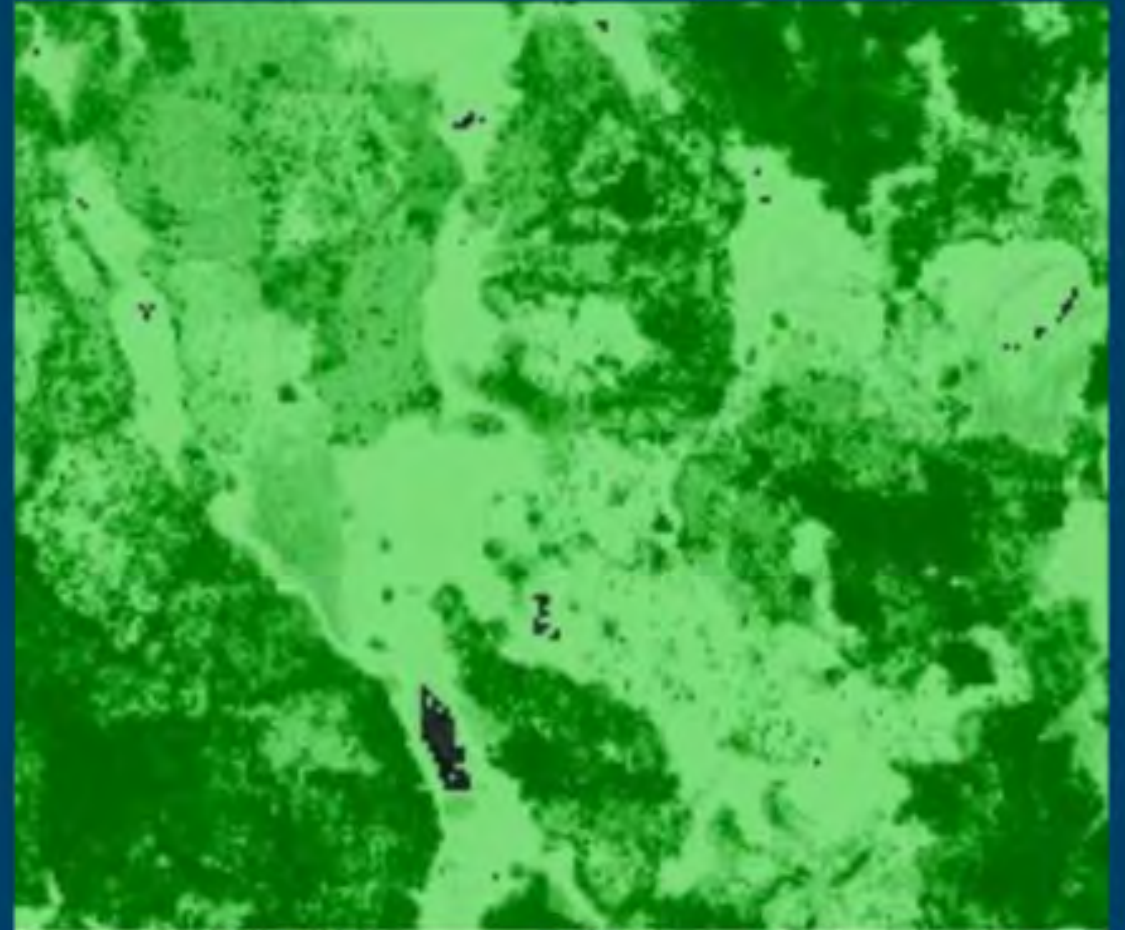
- Google Earth Engine
- Fusion
- R



Carbon Opportunity Assessment for State Trust Lands

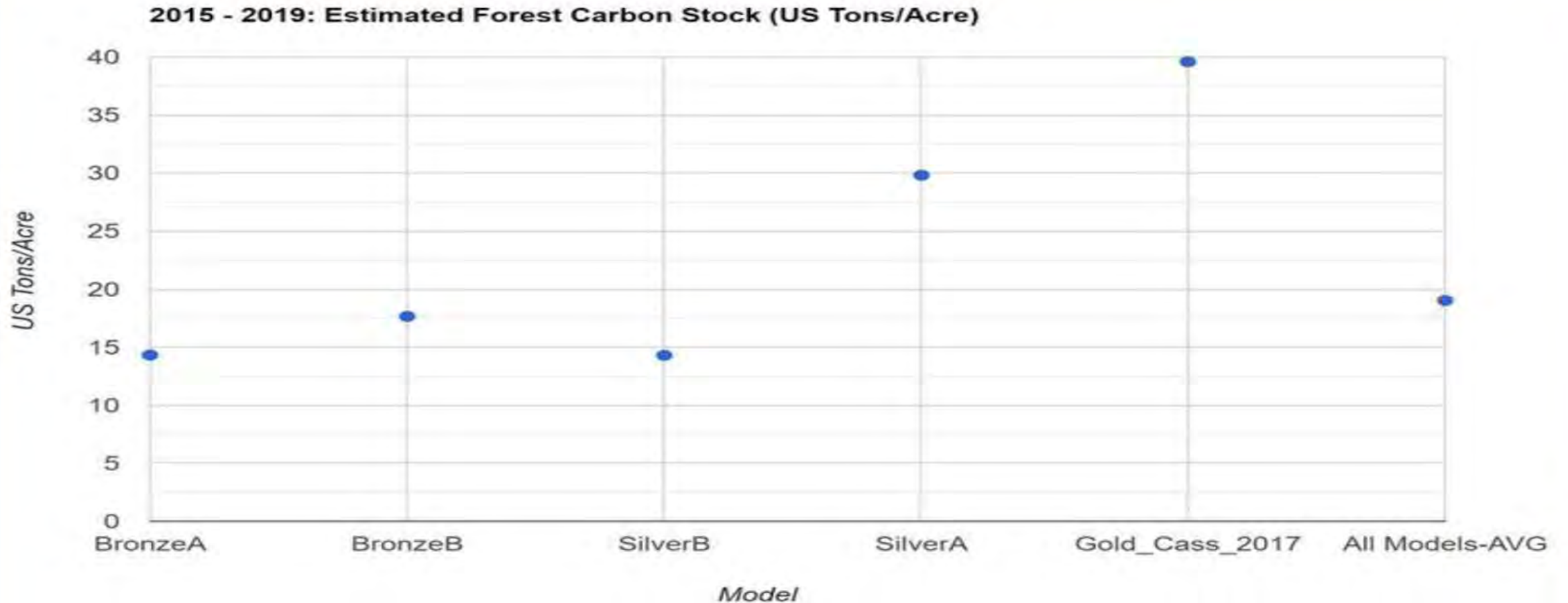


Summer 2019 Image (NAIP)



Gold Model (Imagery, High Density Lidar Height Metrics, and State Forest Inventory)

NCSA Grant – Carbon Potential



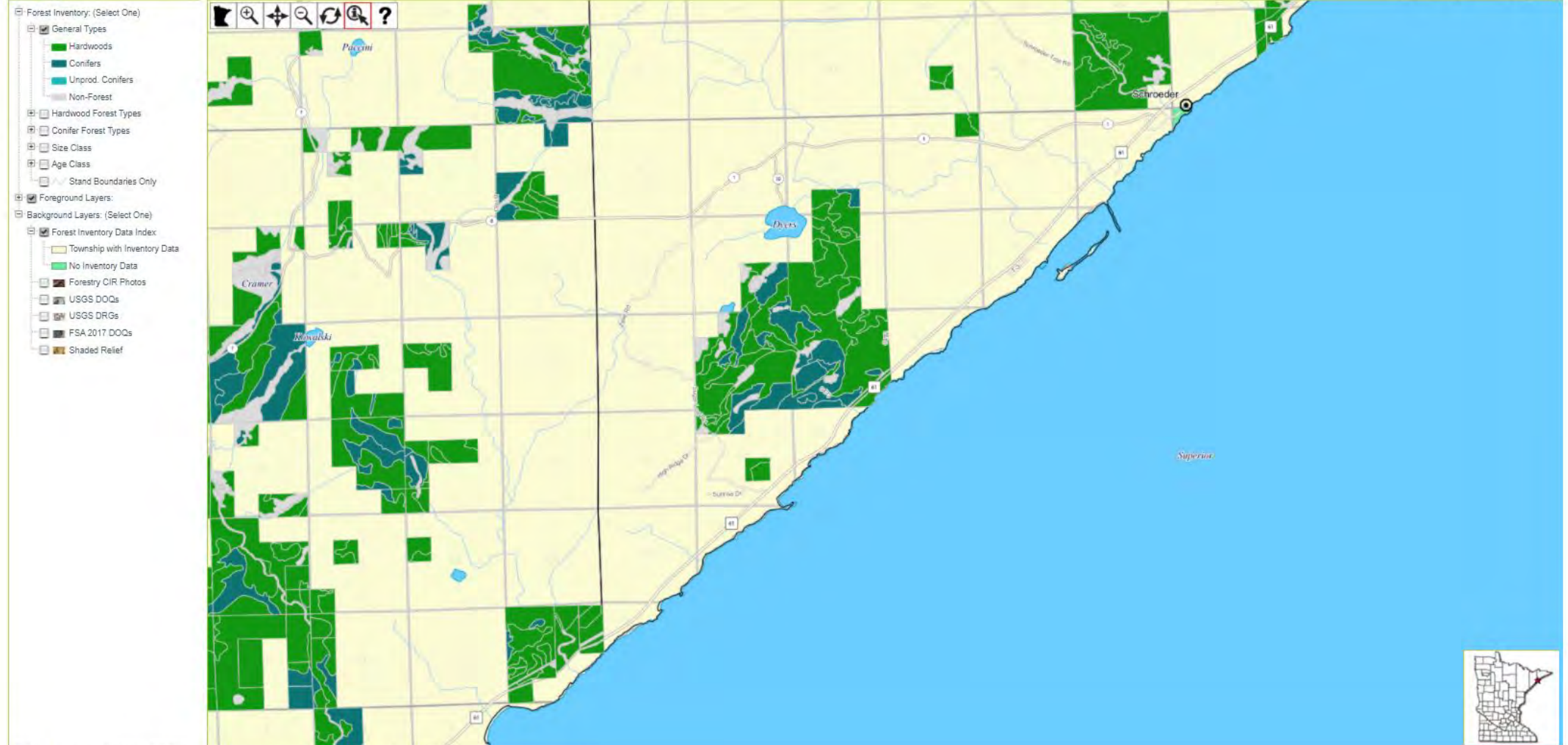
Just like any successful business, DNR has a complete inventory on 4.9 million acres of forestland



Forest Inventory

Forest Inventory Viewer

[how to use](#)



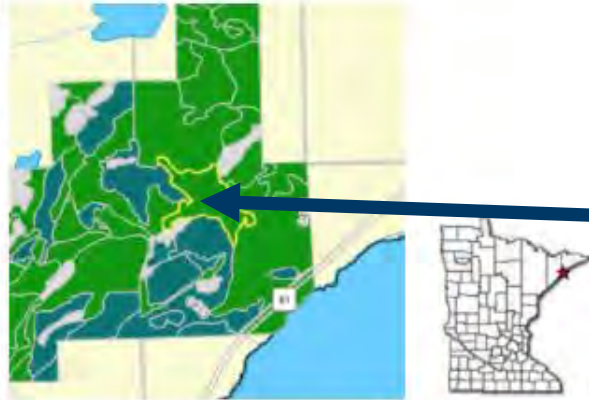
UTM Coordinates = x:642980, y:5267011, geographic coordinates = lat:47.540775, lon:-91.100026
Layers with greyed out names will become usable as you zoom in (watch for the text to darken).

Forest Inventory Stand Summary

Stand ID t05805w1170076

Forest Inventory

| Site Attributes | |
|---------------------|-------------------------------|
| County | Cook |
| DNR Forestry Area | Two Harbors Area |
| Site Index | 56 |
| Physiographic Class | Mesic Site |
| Topography | Rolling |
| Stand Acres | 90.6 |
| Management Status | Normal timber harvest allowed |



One of 188,000 forest stands in our forest inventory

| Stand Attributes | |
|-------------------------|---|
| Cover Type - Birch | |
| Year of Inventory | 2009 |
| Age at Inventory | 53 years |
| Average Diameter Class | 9 to 14.9 inches |
| Density Class | 12.5-17.5 cords per acre |
| Basal Area | 72 square feet per acre |
| Volume | 500 board feet plus 12.4 cords per acre |
| Condition Class | High Risk |
| Understory Type - Aspen | |
| Average Diameter Class | 0 to 0.9 inches |
| Density class | 1,750-2,250 stems per acre |

| Stand Composition By Major Tree Species | | | |
|---|-------------|-----------------|-----------------------|
| Main Species | | | |
| Species | Average DBH | Volume per acre | Height |
| Paper Birch | 9 inches | 10.6 cords | 59 feet |
| Other Species | | | |
| Species | Average DBH | Volume per acre | Distribution |
| Paper Birch | 16 inches | 300 board feet | Mod. well distributed |
| Balm of Gilead | 7 inches | 0.4 cords | Patchy |
| White Spruce | 11 inches | 1.4 cords | Mod. well distributed |
| Northern White Cedar | 19 inches | 200 board feet | Patchy |

Stands differ by species, age, volume

Forest Inventory



Key data

- 90.6 acres
- 53 years old
- 12.4 cords/acre

Birch

Balm of Gilead

Spruce & Cedar

How is this information used?

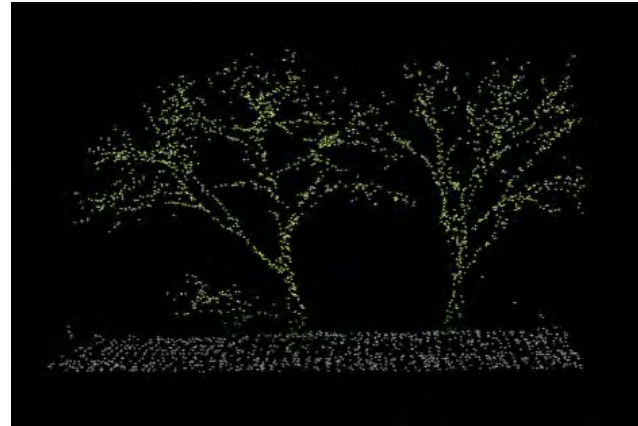
- Modeling outputs – 10, 50, & 100 years
- Planning harvest schedule
- Tracking stand development

Lidar Planning Statewide

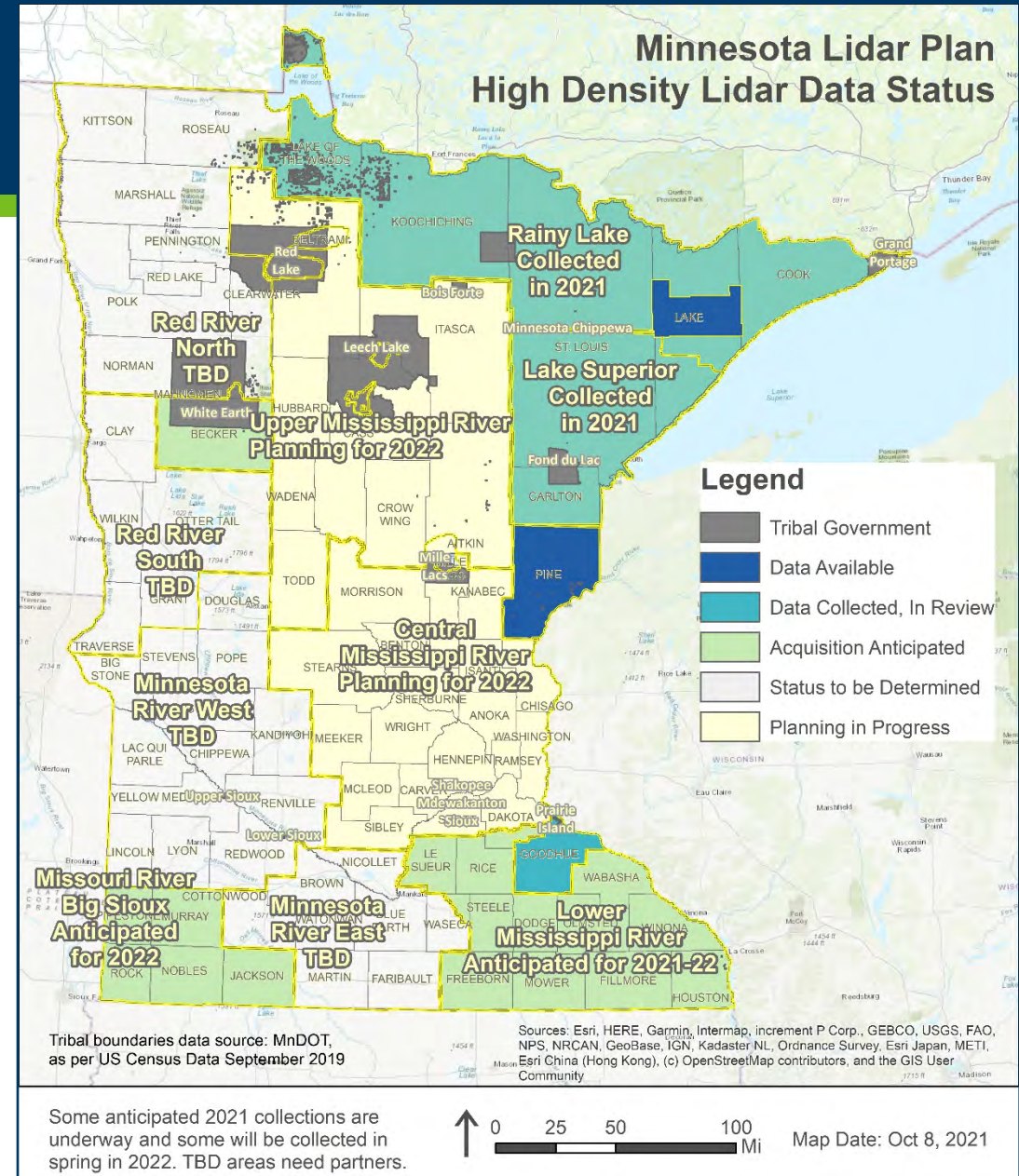
Low Density (<1ppm)



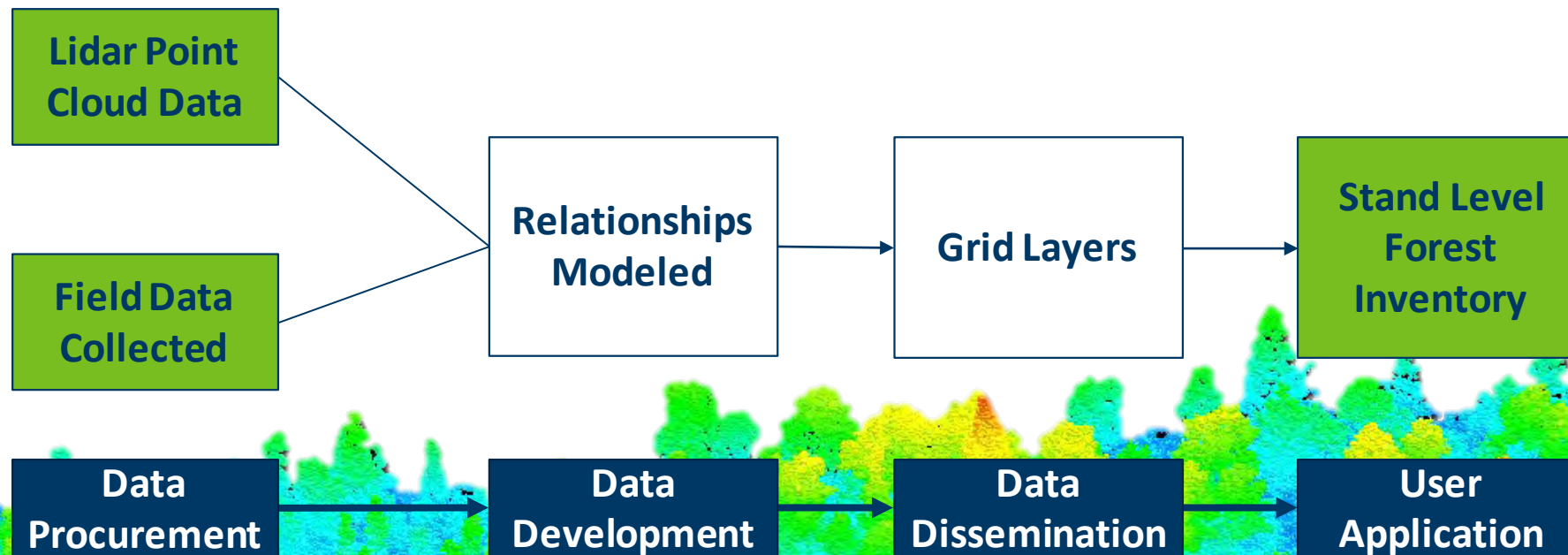
High Density (8+ppm)



High density lidar has more end uses and a higher return on investment

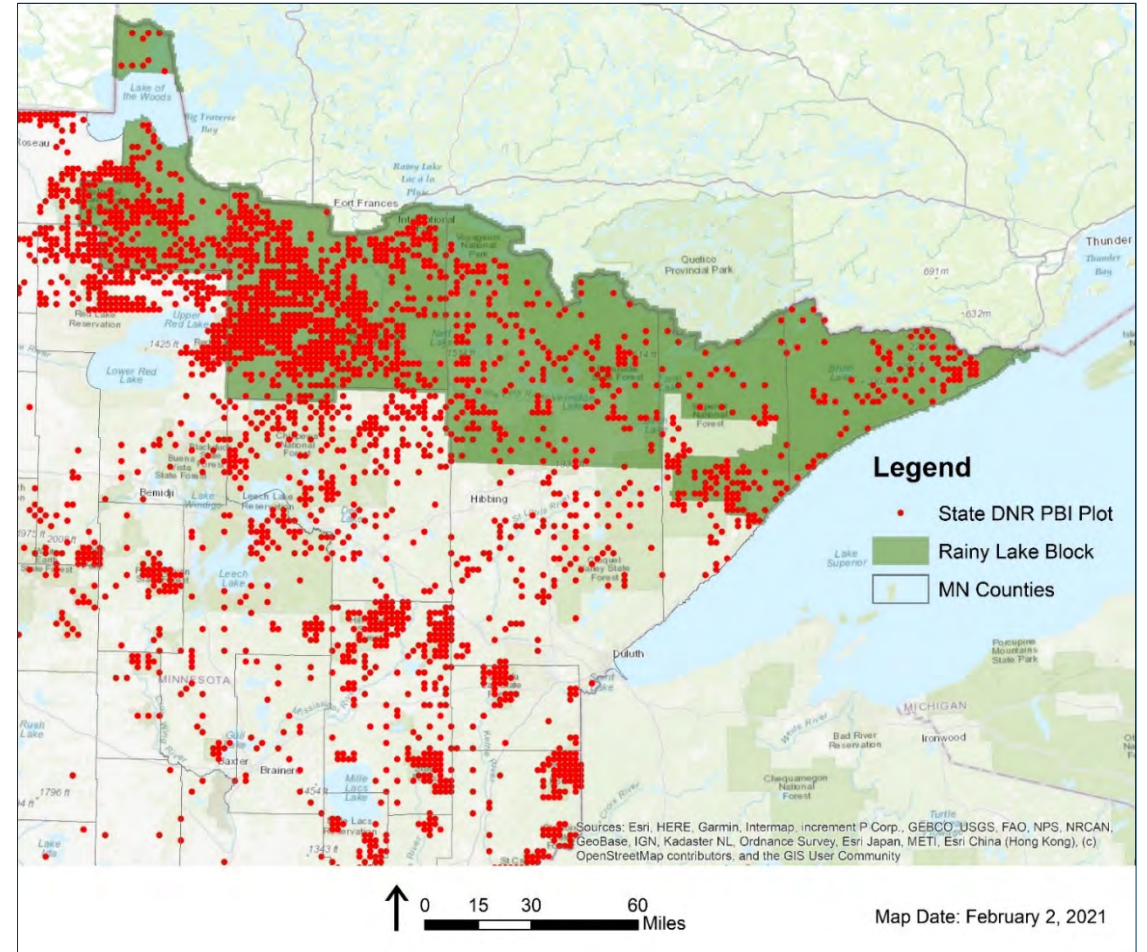
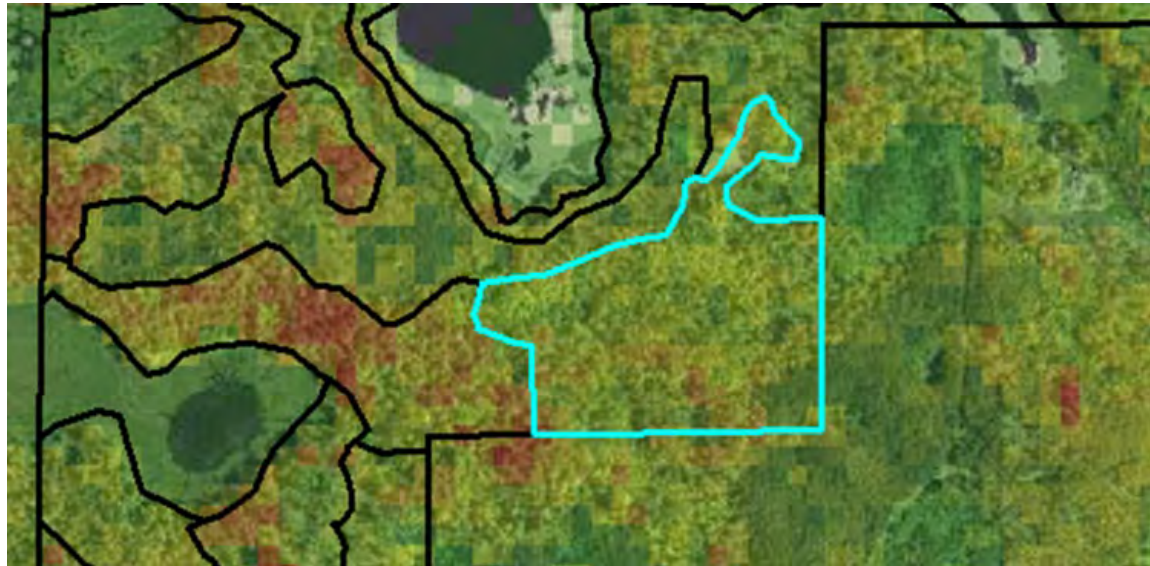


Foundational Data for Many Applications, Including Stand Level Forest Inventory



Transition to Plot Based Inventory (PBI)

| FID | Shape * | STAND_KEY | MN_CTYPE | SURVEY_YR | STAND_AGE | Field1 | STAND_KEY_1 | Grid_Cell_ | AGB_Lbs | BAWHT_Max | BA_Wt_weig | QMD_Inches | BA_SqFT_Pe | Site_Index | TPA | Volume_CuF | Age_2019 | Volume_Cor | Stand_Acre |
|------|---------|-----------|----------|-----------|-----------|--------|-------------|------------|----------|-----------|------------|------------|------------|------------|-----|------------|----------|------------|------------|
| 2908 | Polygon | 5374 | 1 | 1992 | 99 | 255 | 5374 | 164 | 91711.17 | 85.33 | 56.97 | 11.3 | 93.36 | 56.86 | 152 | 2230.88 | 126 | 28.24 | 16 |



We'll Have Full, Statewide Forest Inventory When Field Data Collection is Completed Across All Lands

Thank You!
Division of Forestry

