

Operational fuels assessments/mapping

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Geospatial data for vegetation, fuels and burn severity mapping

- Characterize landscape composition comprehensively over large areas – regional to national scale
- Provide consistent (i.e., comparable) data/products over space (and time)
- Promote understanding of regional and temporal trends



Challenges

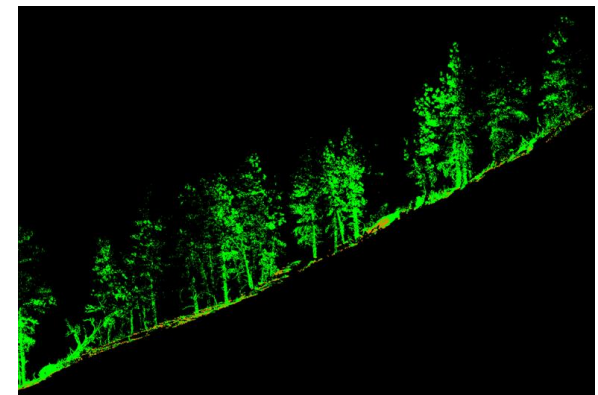
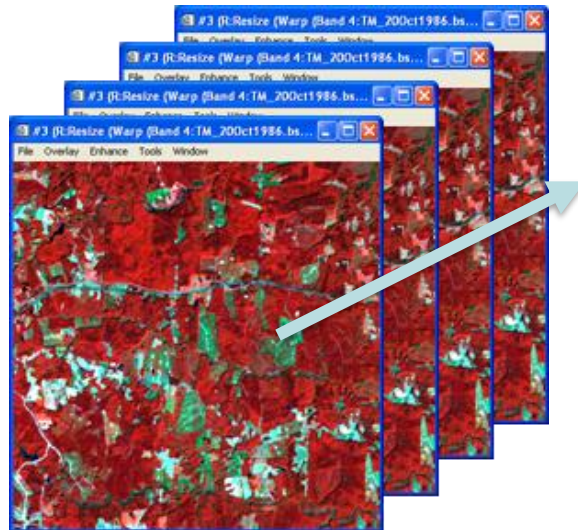
- Determining how best to mine data sources to capture metrics most meaningful to product users – simplicity is key
- Maintaining currency of data products over a constantly changing landscape
 - Capture change (e.g., disturbance or transitions) in the landscape in a timely fashion
 - Explore integration of newest data and new data sources



Remote sensing

- Remotely sensed data drive EROS data products
 - Sensors provide consistent, repeatable and current data
 - Allow monitoring over space (i.e., “all lands”) and time
 - Explore how to derive **information needed** from **data provided**
 - Incorporate other data sources as needed (e.g., field observations)

Landsat
Imagery
Time
Series



Lidar point cloud

LANDFIRE

Objectives

- Assess vegetation, fuel and ecosystem conditions on national scale
- Implement national wildland fire policies

24 primary data products, 30 m nominal resolution nationwide

- Vegetation type, structure, and succession
- Fuels (surface and canopy)
- Fire regime conditions

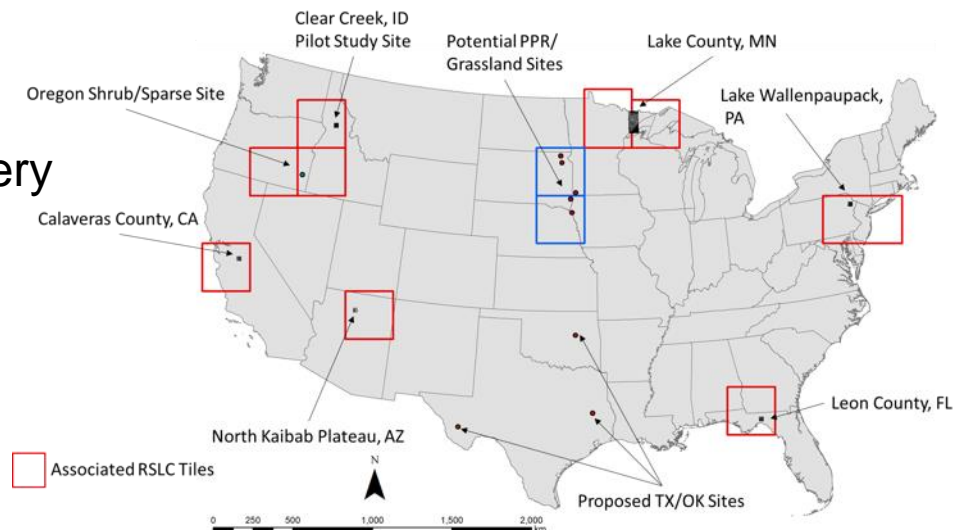
Intended applications

- Fire hazards
- Fuel reduction
- Incident planning
- National strategic planning
- Ecosystem restoration
- Other environmental/ resource management applications



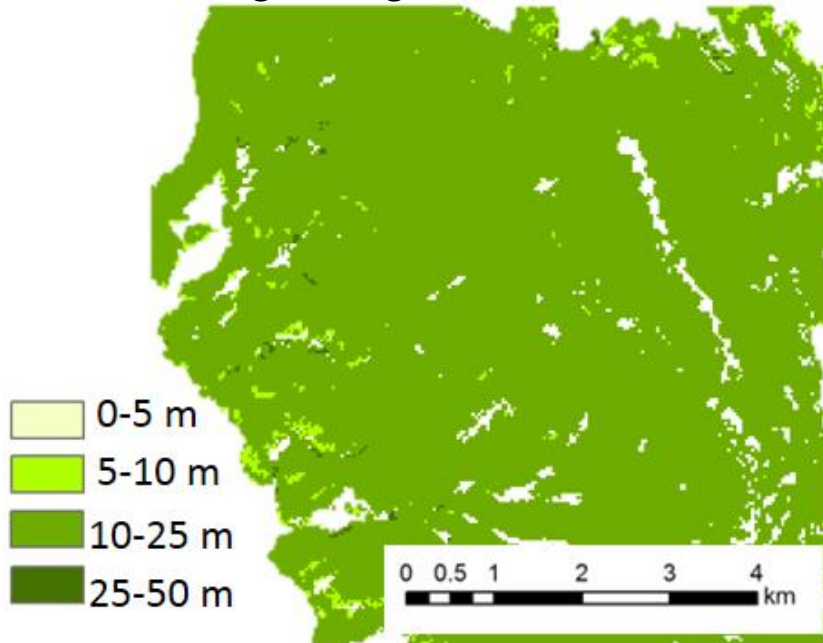
LANDFIRE

- Initial Base Map circa 2001
- Biennial Update Products
- LANDFIRE Remap – new base map to represent current status
 - Prototyping results informing production effort
 - Addressing user concerns
 - Still driven by Landsat imagery and vast database of field observed data
 - Incorporating new data and techniques

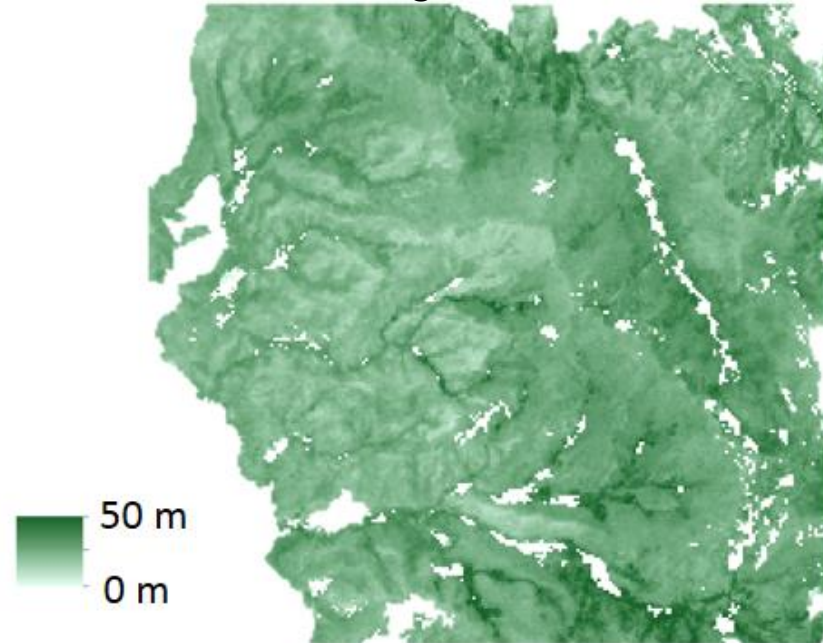


Mapping structure with lidar

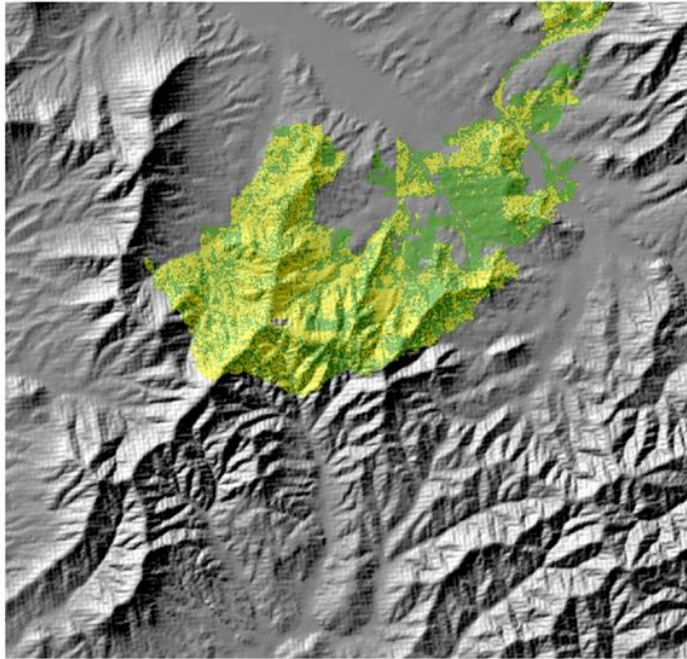
Current LANDFIRE Forest Height Legend



Continuous Lidar-Based Forest Height Product



Impact of vegetation structure on fire behavior modeling

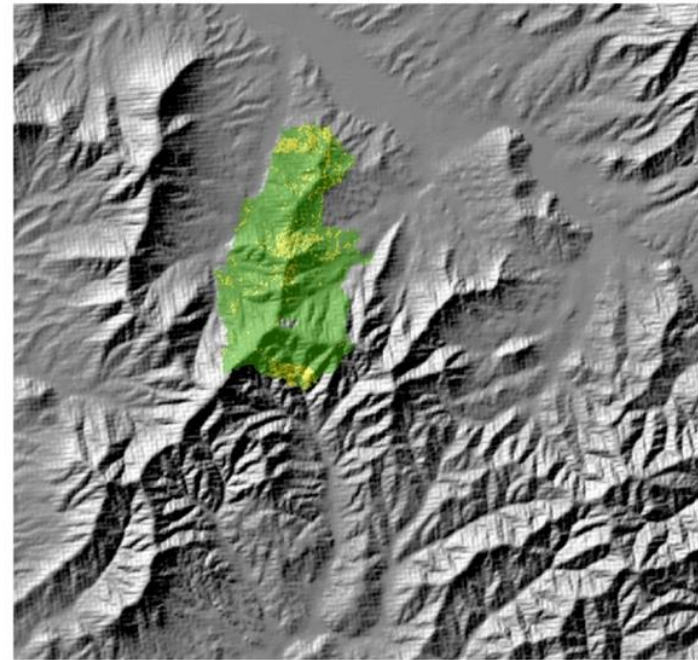


Simulation using LANDFIRE data

Fire Type

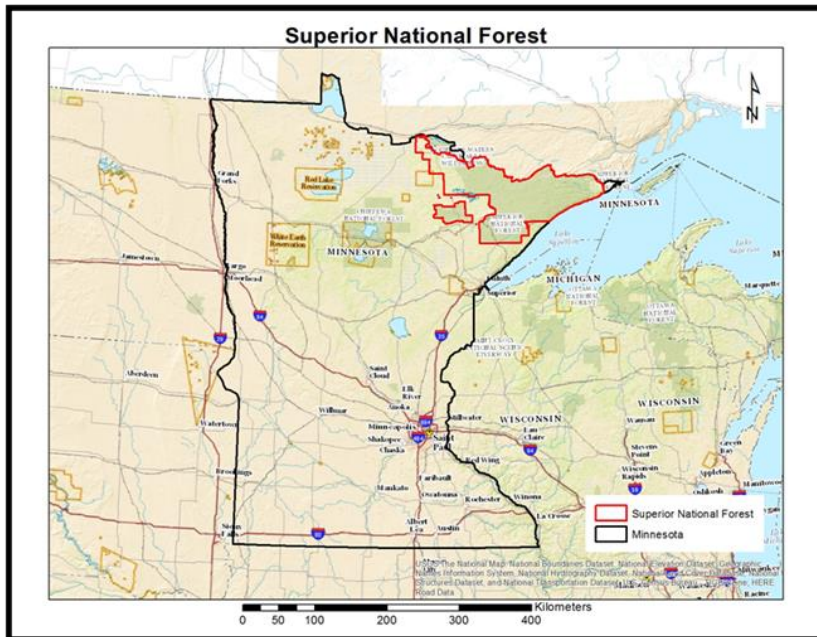
- Surface
- Torching
- Crowning

Simulation using CHISLIC data

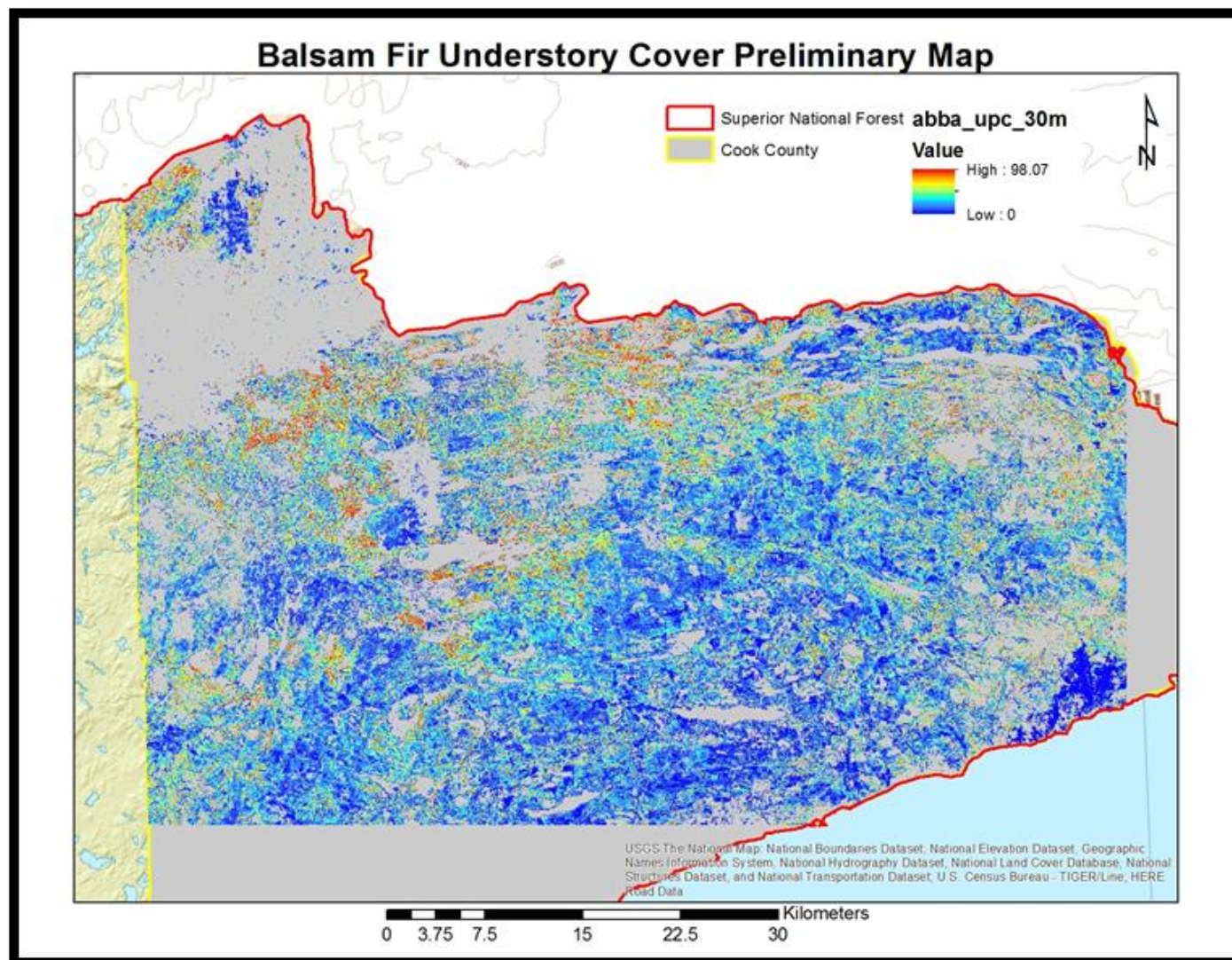


Wildland fuels mapping

- Understory fuels mapping in Superior National Forest
 - Balsam fir encroachment
 - Ladder fuel
 - Susceptible to Spruce budworm
 - Lack of good maps showing Balsam fir in understory

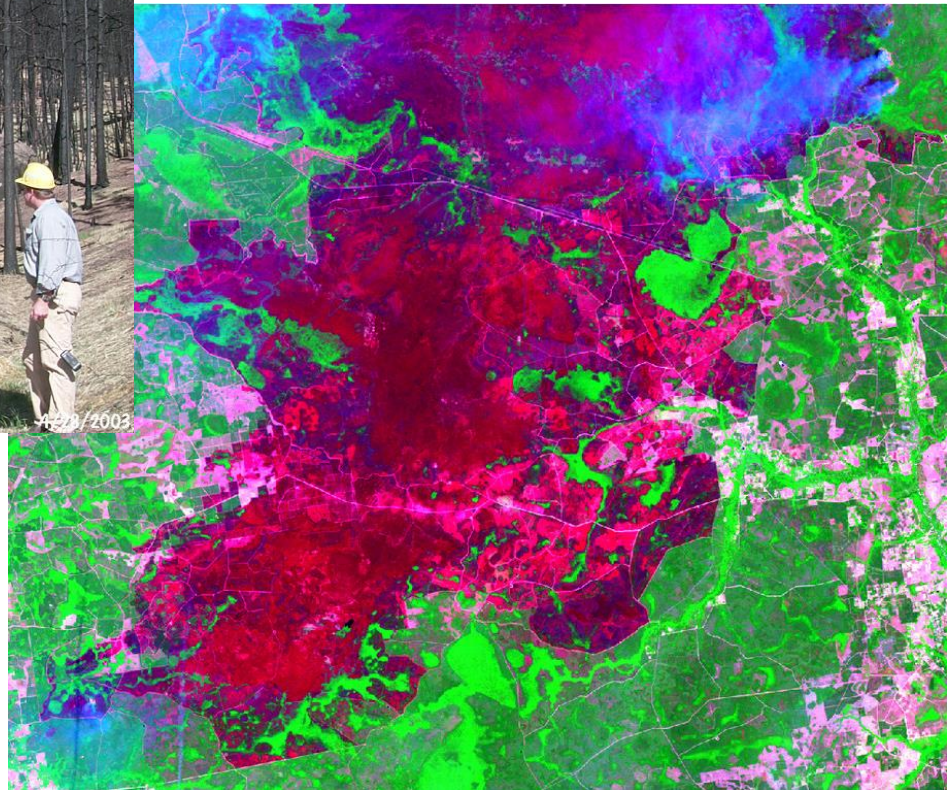


Balsam fir understory cover

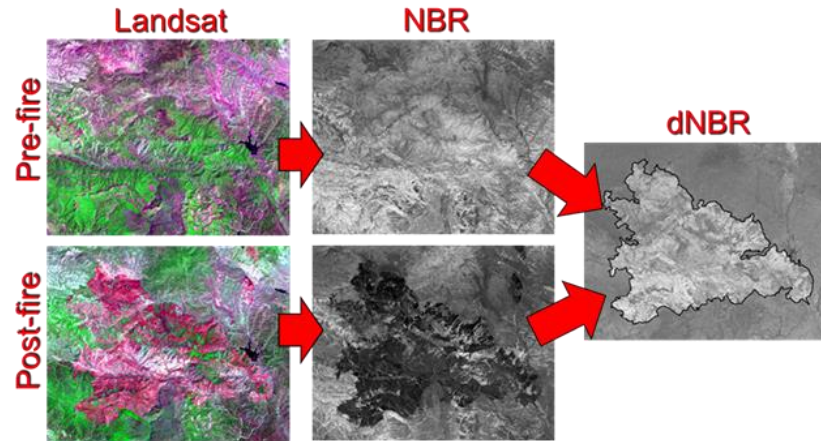


Burn severity

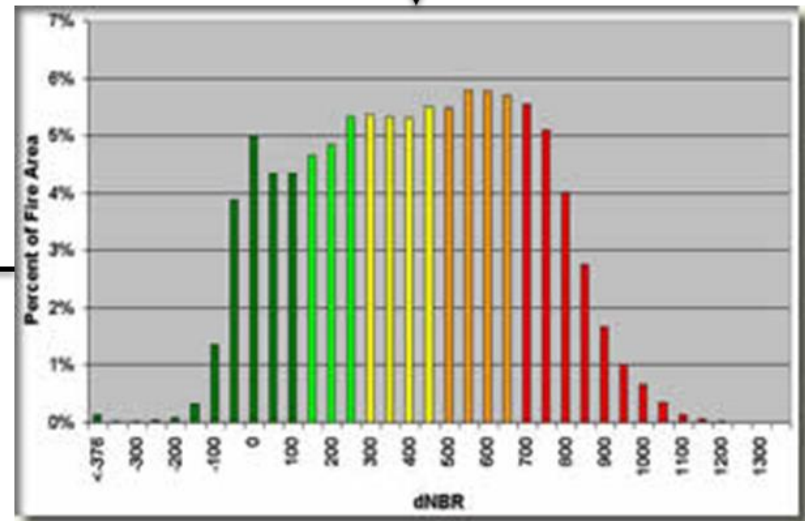
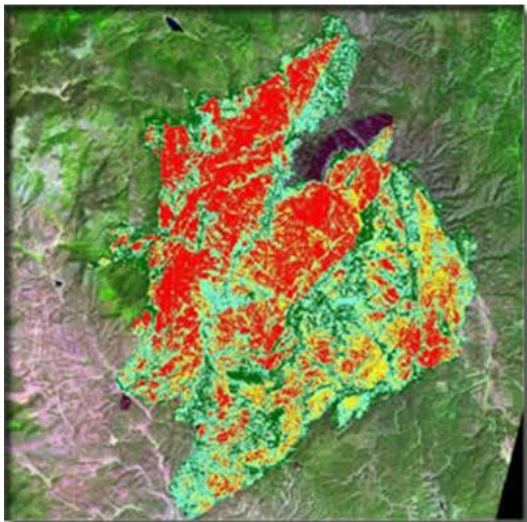
- Monitoring from the ground and from above



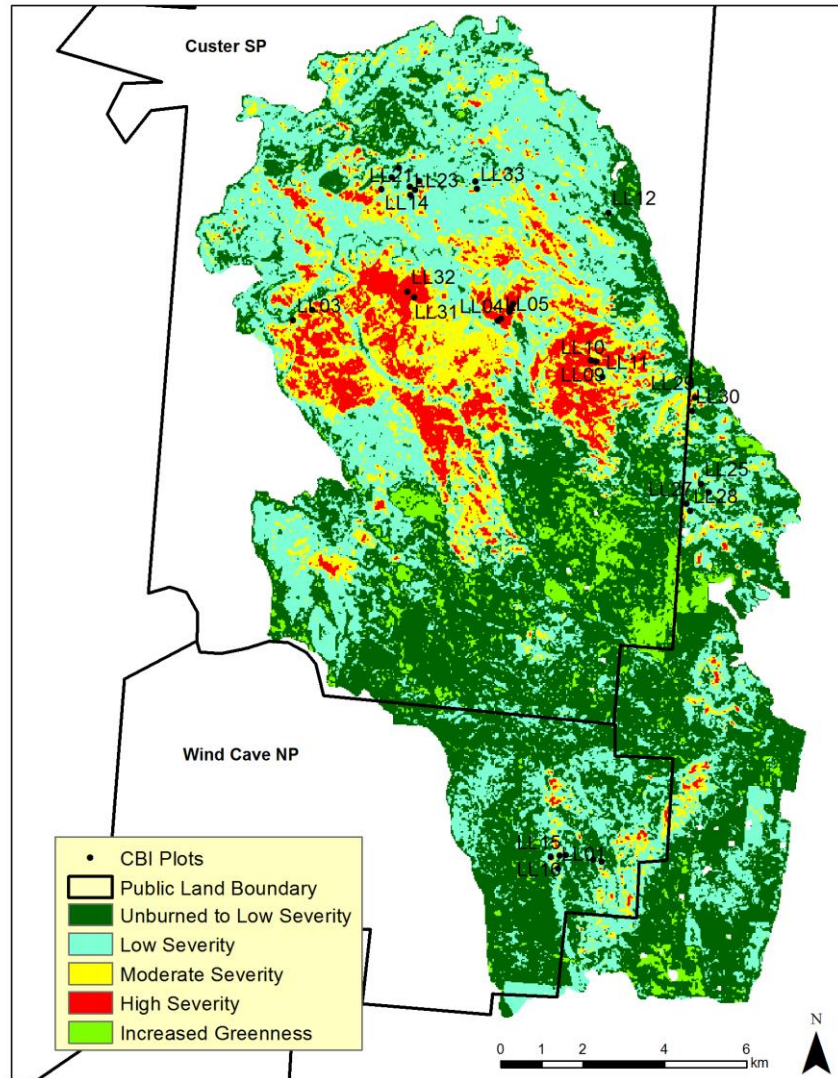
Operational burn severity mapping



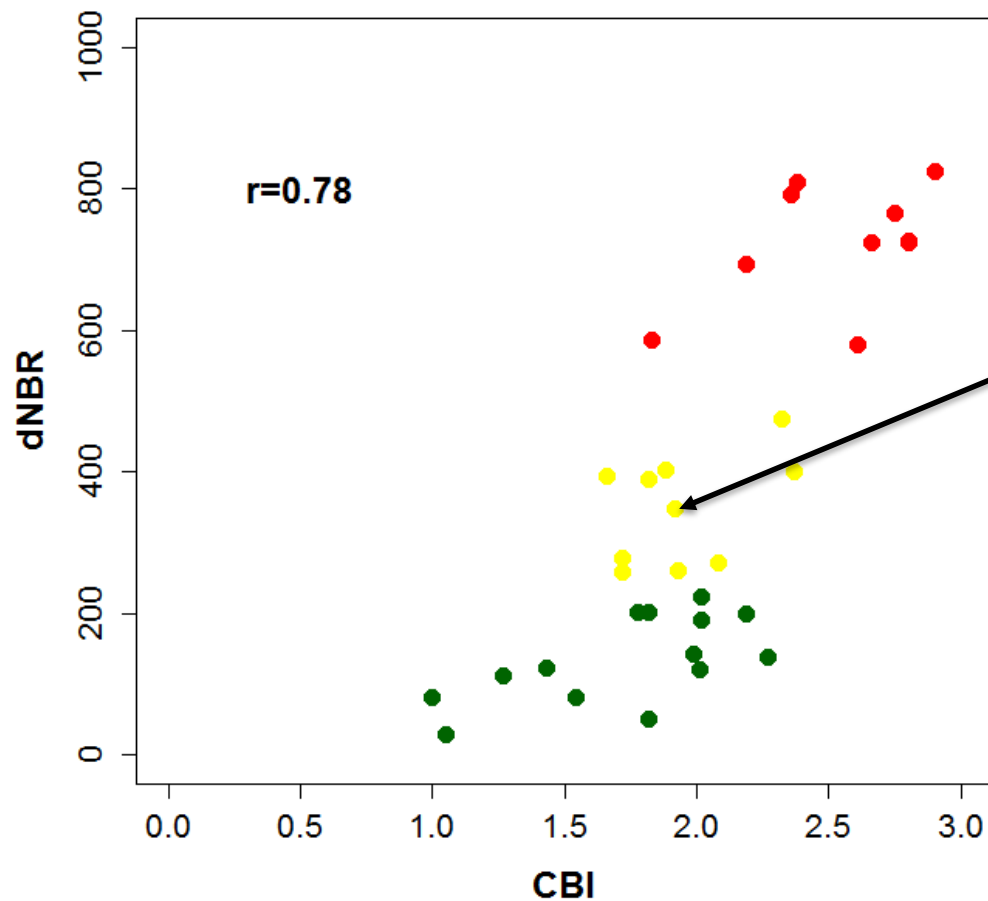
Differenced Normalized Burn Ratio (dNBR)
 $dNBR = \text{Pre NBR} - \text{Post NBR}$



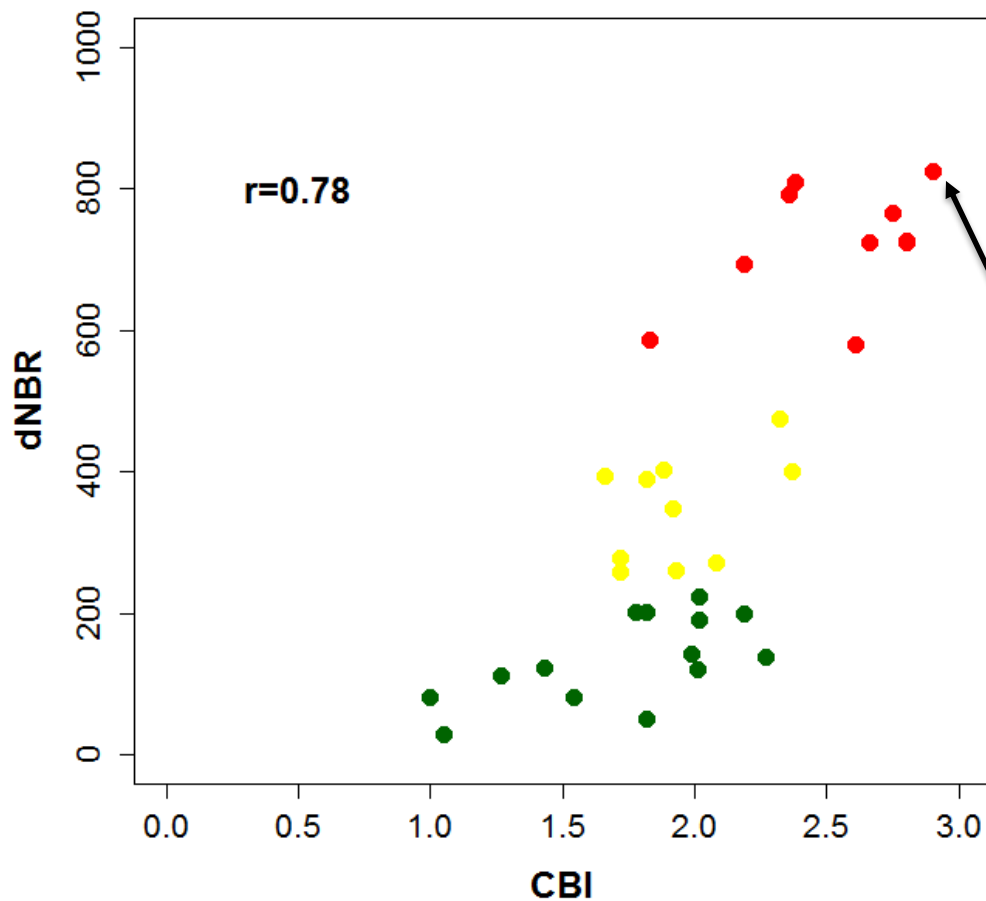
Legion Lake fire – classified burn severity



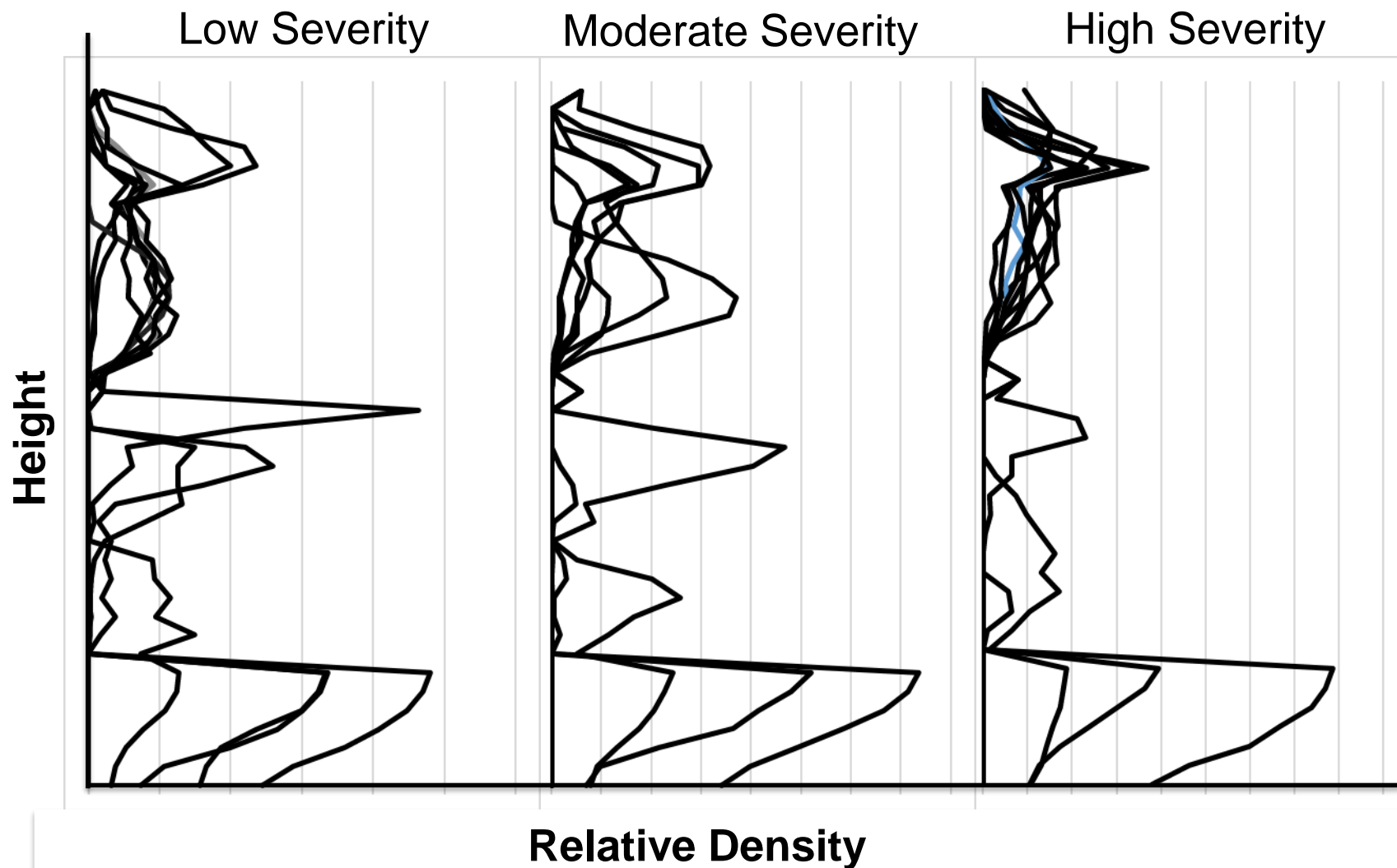
CBI vs dNBR – Thematic resolution



CBI vs dNBR – Thematic resolution



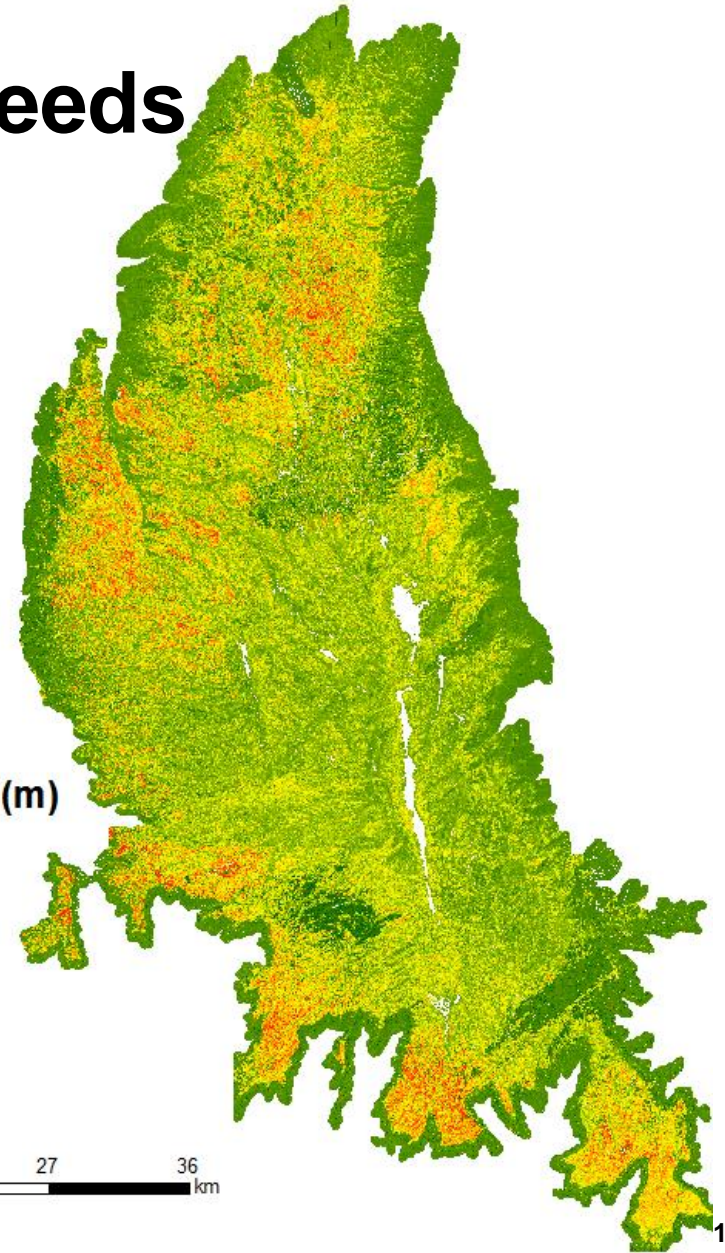
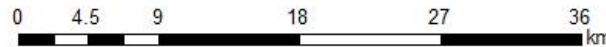
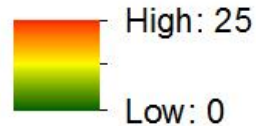
Lidar profiles



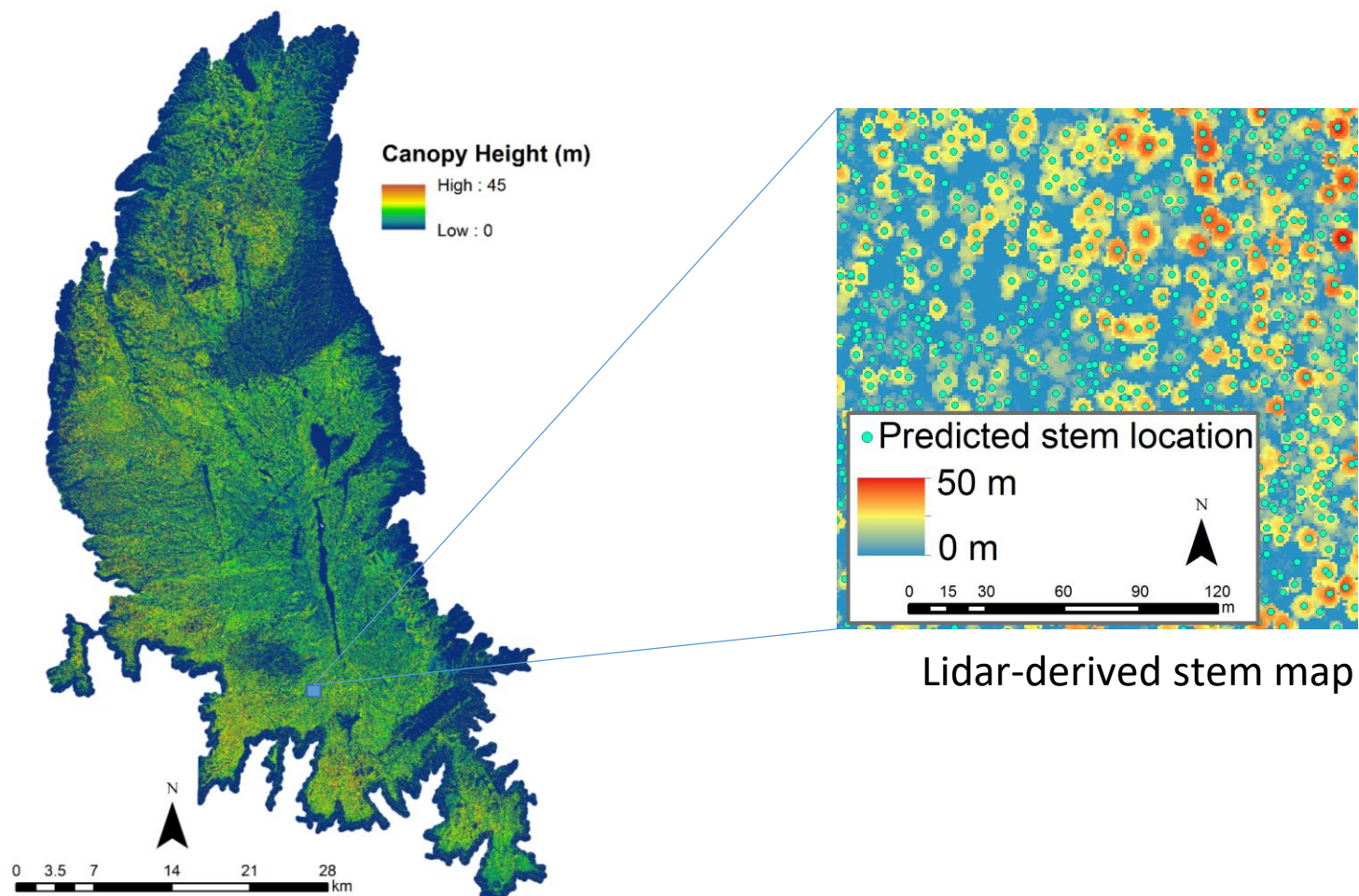
GRCA – Integrated data needs

- Structure-based metrics for fuels
 - Canopy height
 - Canopy cover
 - Canopy base height
 - $CBH = \text{Mean Ht} - \text{Stand. Dev.}$
 - Canopy bulk density

Canopy Base Height (m)



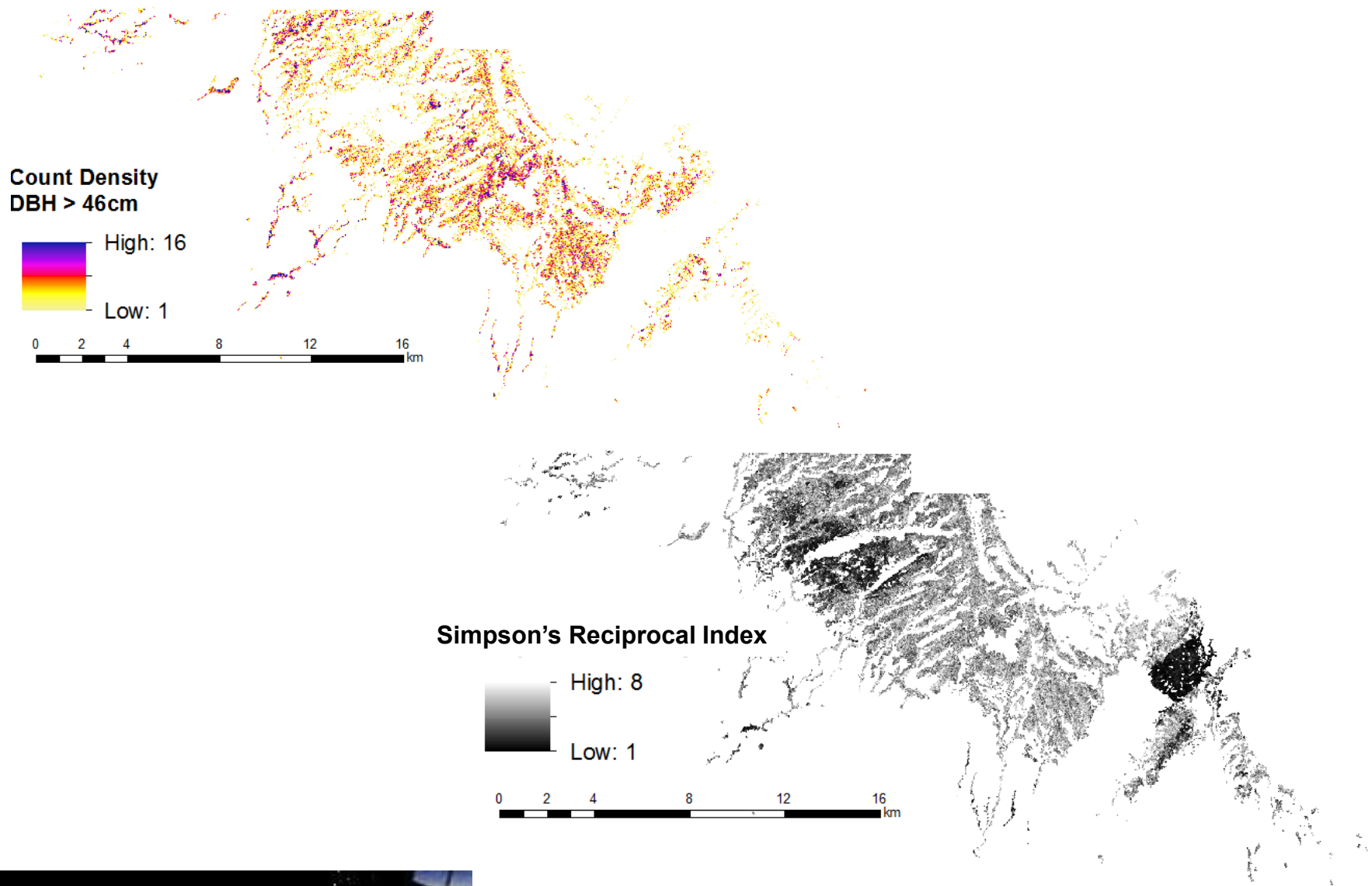
Methods



Lidar-derived canopy height map

Lidar-derived stem map

Results



Thank you

