



NASA CARBON RESEARCH PROGRAM MULTI-STATE WORKING GROUP QUARTERLY MEETING



Meeting Focus: “Scaling Up the High Resolution Carbon Monitoring and Modeling Products to the Northeast U.S.: Science Overview & Lessons Learned from Stakeholders”

Edil Sepulveda Carlo, NASA Goddard Space Flight Center

Friday, May 20, 2018



Meeting Goals & Discussion Topics

- Discuss Science Team progress, plans, and timelines for developing the following products for the NE states:
 - 30m aboveground biomass maps with uncertainty
 - 0.5 and 1m canopy cover maps
 - 1m canopy height maps
 - 90m ecosystem modeling based maps of carbon sequestration potential
- Provide stakeholders with the opportunity to discuss data needs, challenges, and interests, as well as updates of policies, programs, and initiatives that could benefit from CMS carbon data products
- Learn about the uses and applications of CMS data products for stakeholders in the area of Maryland
- Discuss further lessons learned on potential applications of carbon products, identify common needs and solutions, and make progress in incorporating science into policy and decision making
- Identify action items and next steps & plan for future meetings

More information: <http://carbonmonitoring.umd.edu>

Multi State Working Group Webpage: https://carbon.nasa.gov/multistate_wg

To Download MD data: <http://dx.doi.org/10.3334/ORNLDAAC/1320>

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Stakeholder Feedback – Discussion Questions

- What are your carbon data needs and interests?
- Are you using satellite or other remote sensing data for your work / decision-making?
- What other carbon science information (e.g. land cover change maps, methane flux estimates, coastal wetland carbon stocks and fluxes, etc.) do you need/want to support your agency/organization's decision framework?
- What are the lessons learned you can share from using NASA CMS products?
- Are there any improvements that can be made short term? Accessibility, time domain, spatial scale, and frequency of data updates?
- When and how should the carbon science information be delivered?

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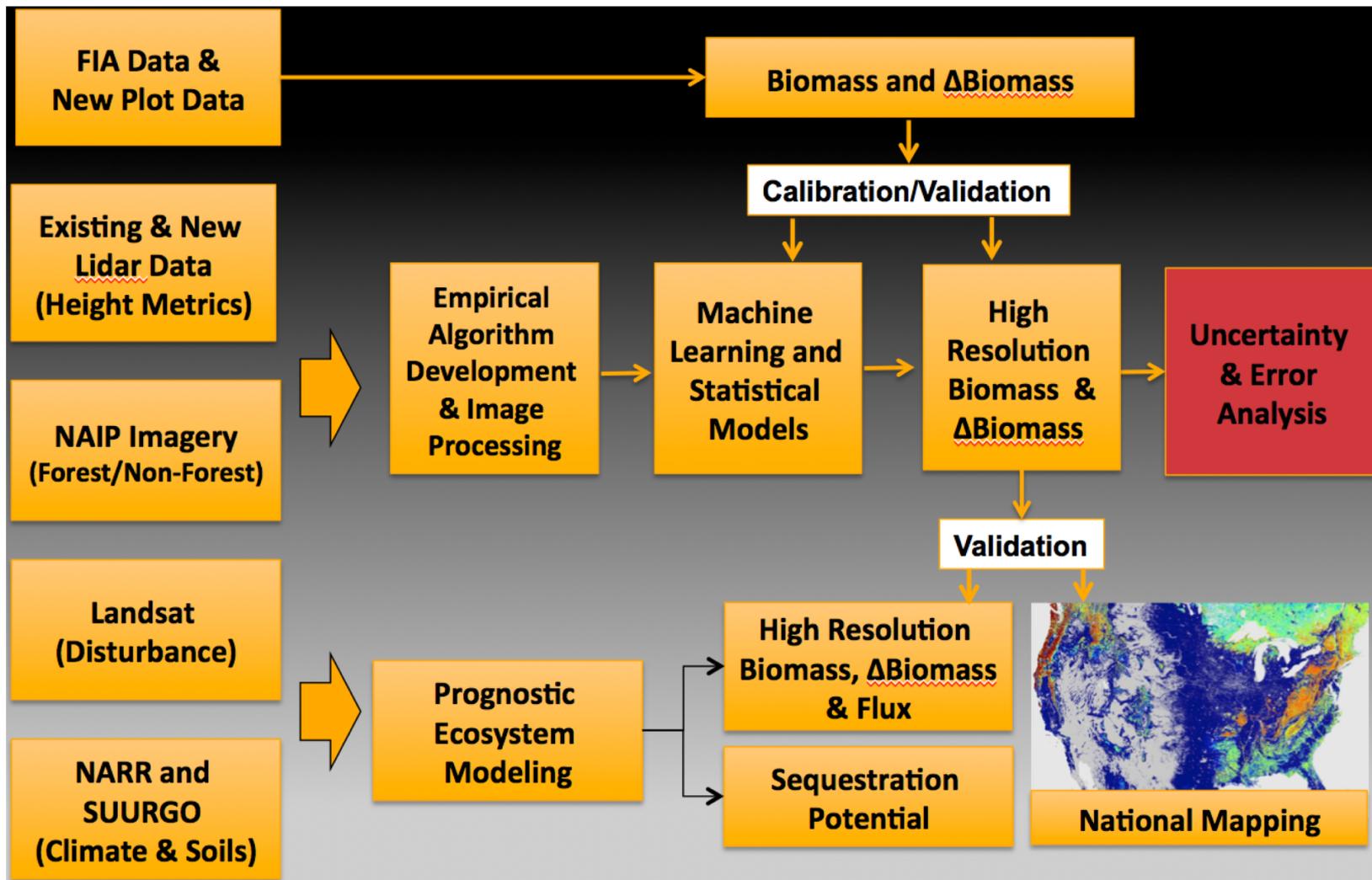


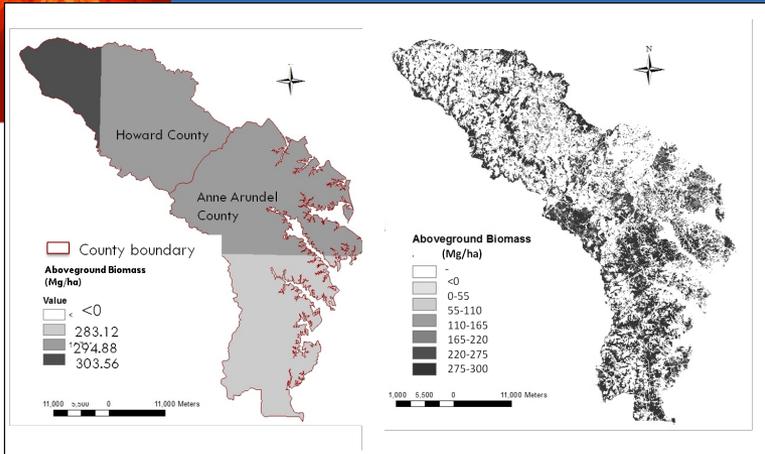
Multi-State Working Group Announcements

- Multi-State Working Group Webpage
 - Science Information: Links to Data, Metadata
 - Quarterly Meetings: Agenda, Report, Presentation
 - List of Upcoming Events
 - NASA ARSET Trainings
 - 2018 ForestSAT: Entering a New Era in Forest Observations and Analysis
 - 2018 AGU Fall Meeting
- Stakeholder Workshop in 2019
- Next WG Quarterly Meeting – July/August 2018

For Questions or to be included in the WG Mailing List:

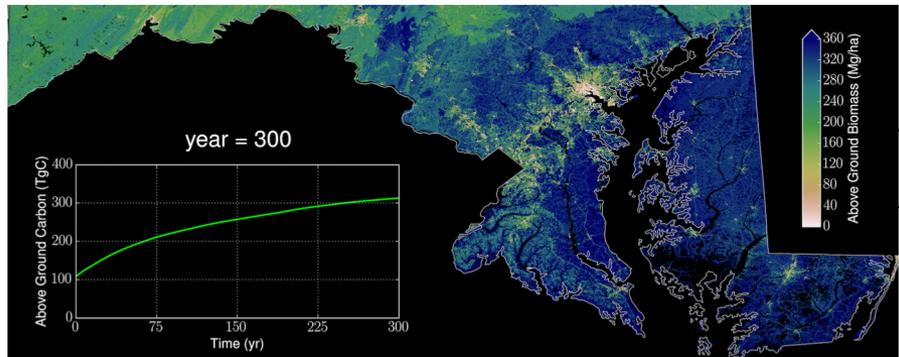
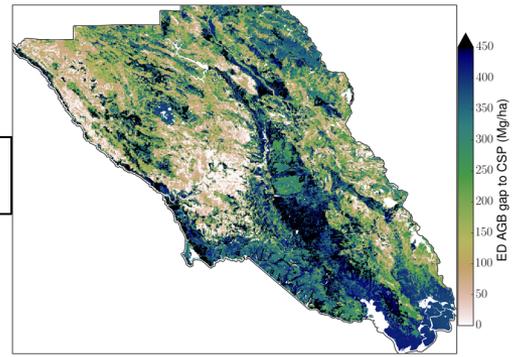
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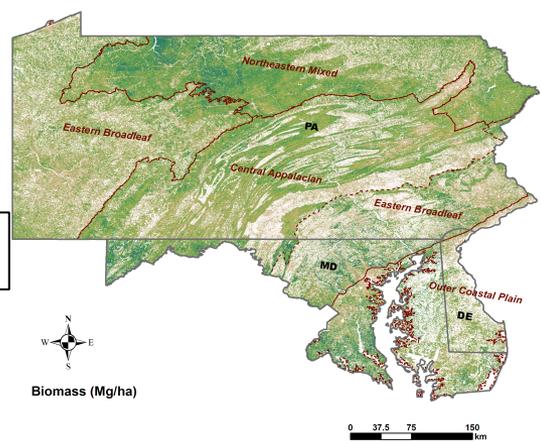
Phase 1: 2,181 km²/ 218,100 ha

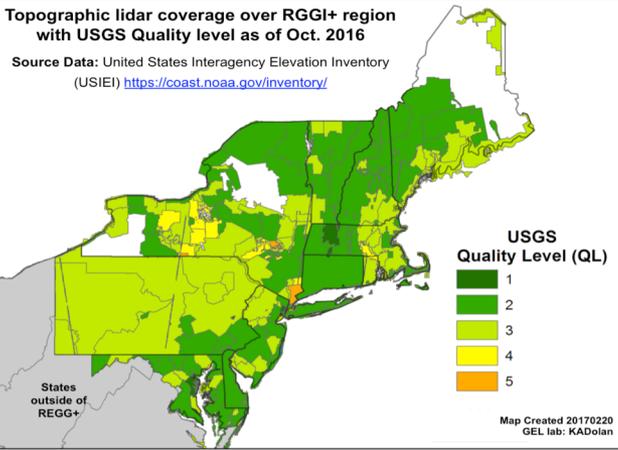
Phase 2b: 4,579 km²/ 457,900 ha



Phase 2a: 32,133 km²/ 3,213,300 ha

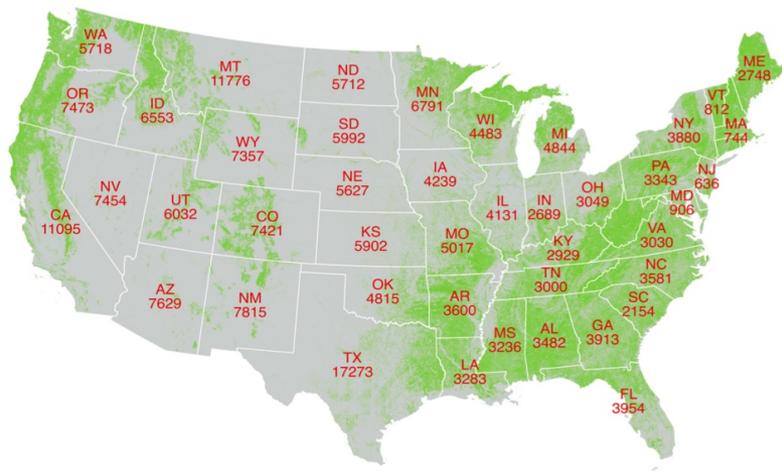
Phase 2c: 157,868 km²/ 15,786,800 ha





RGGI+: 507,424 km²/ 50,742,400 ha

National (Coterm): 7,663,941 km²
*****Prototype 1km using GEDI**



GEDI
High Resolution Laser Ranging
of Earth's Forests & Topography
On ISS

Global* NASA GEDI MISSION





Select References

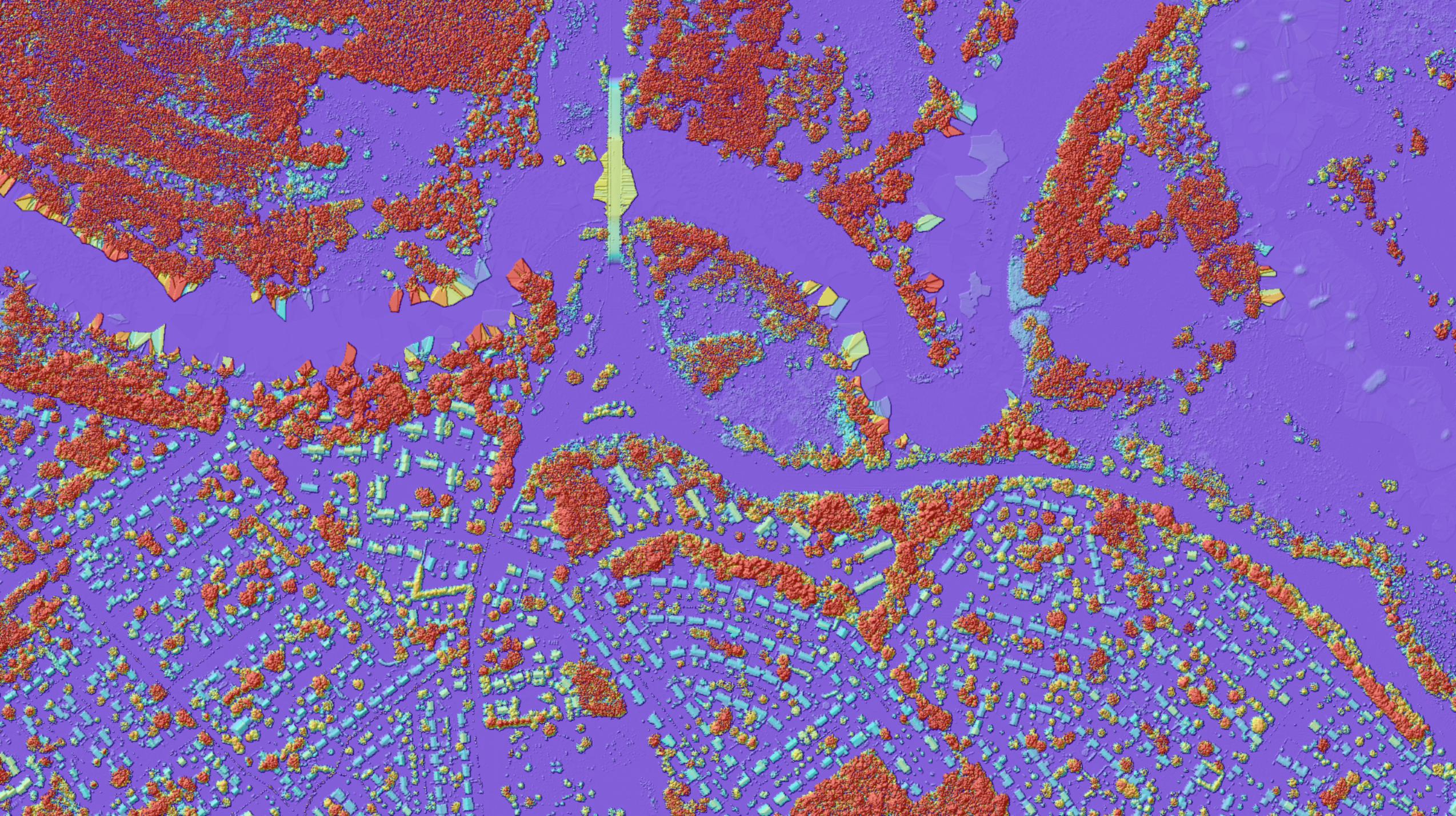
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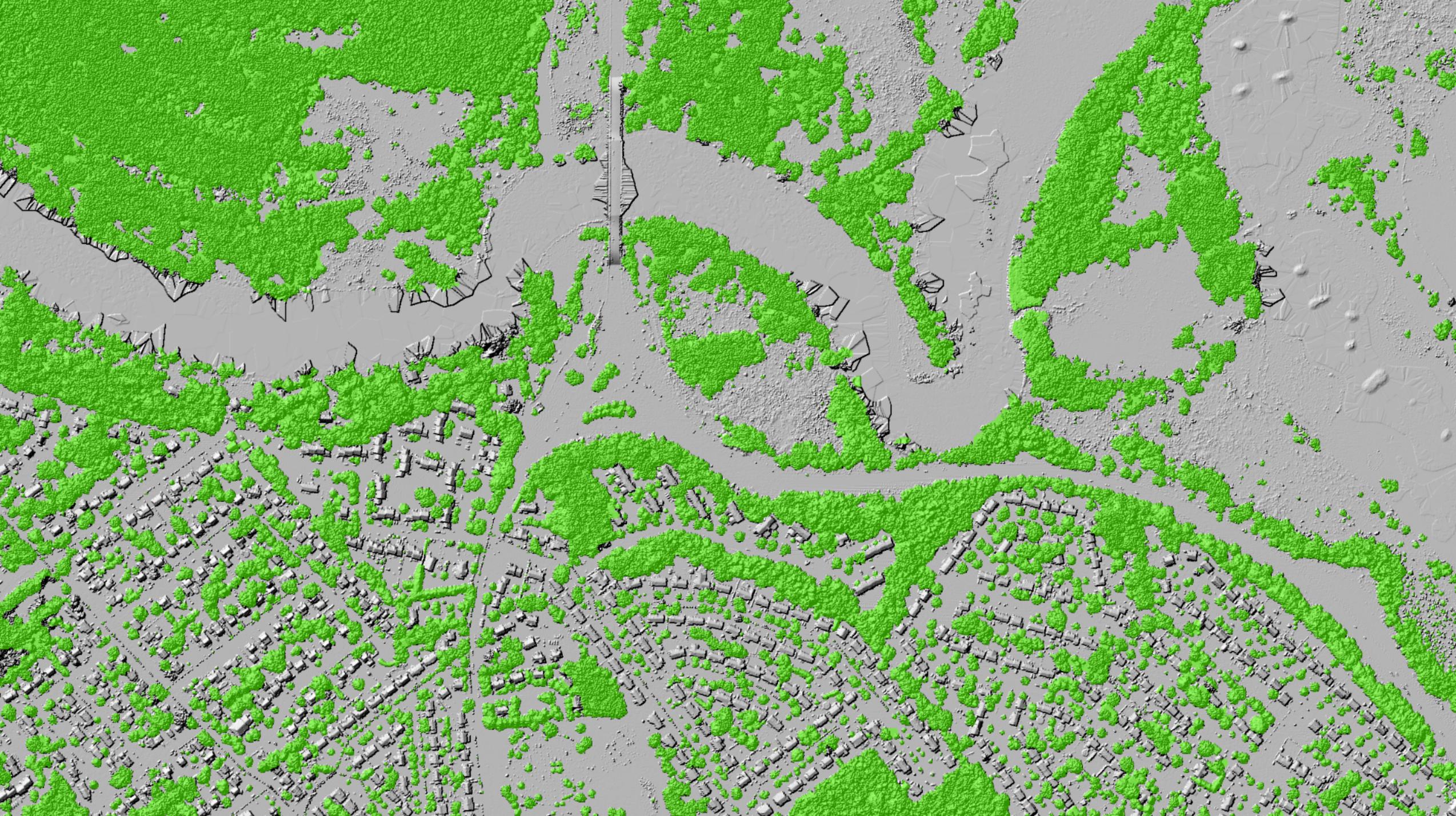
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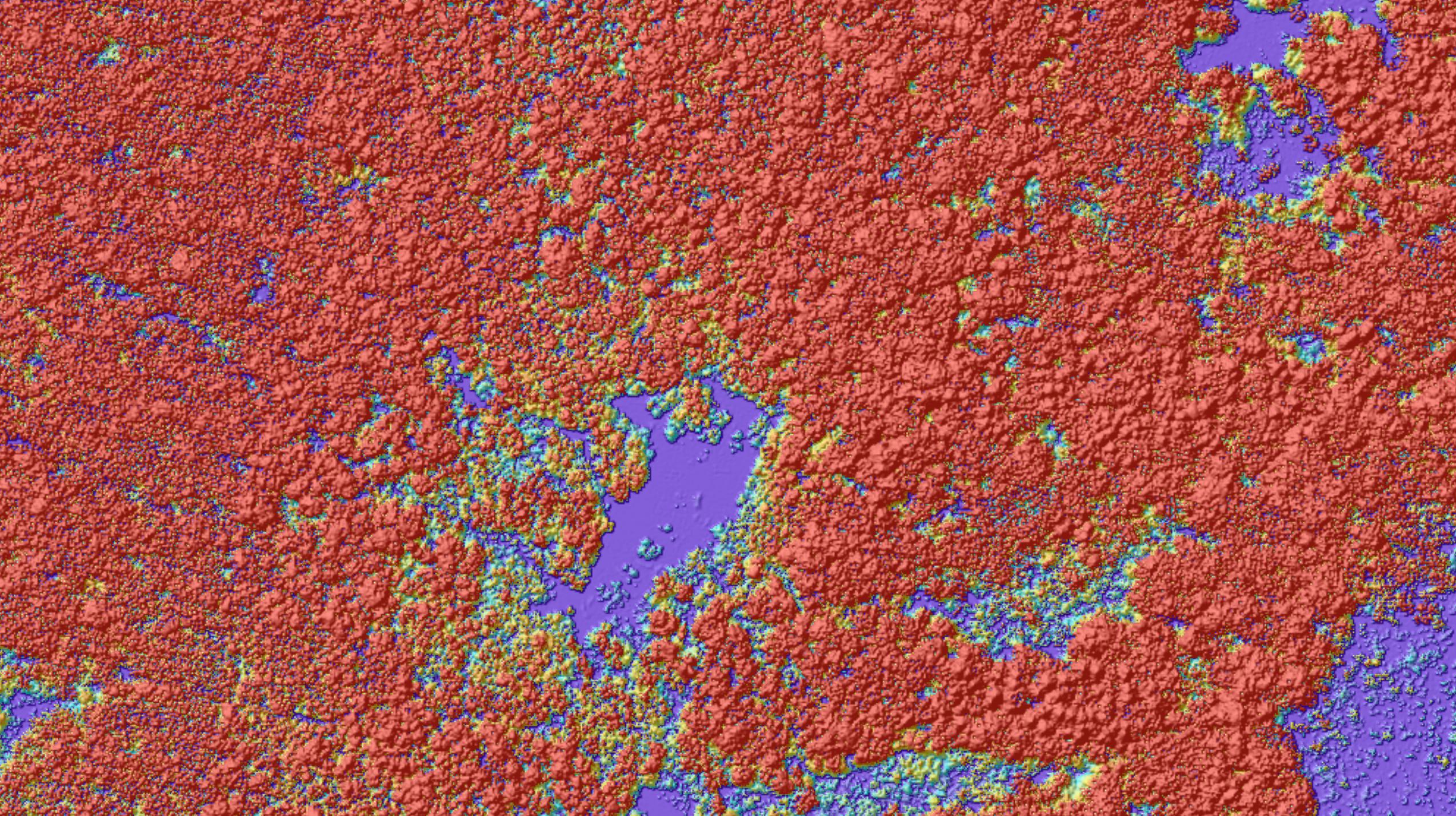


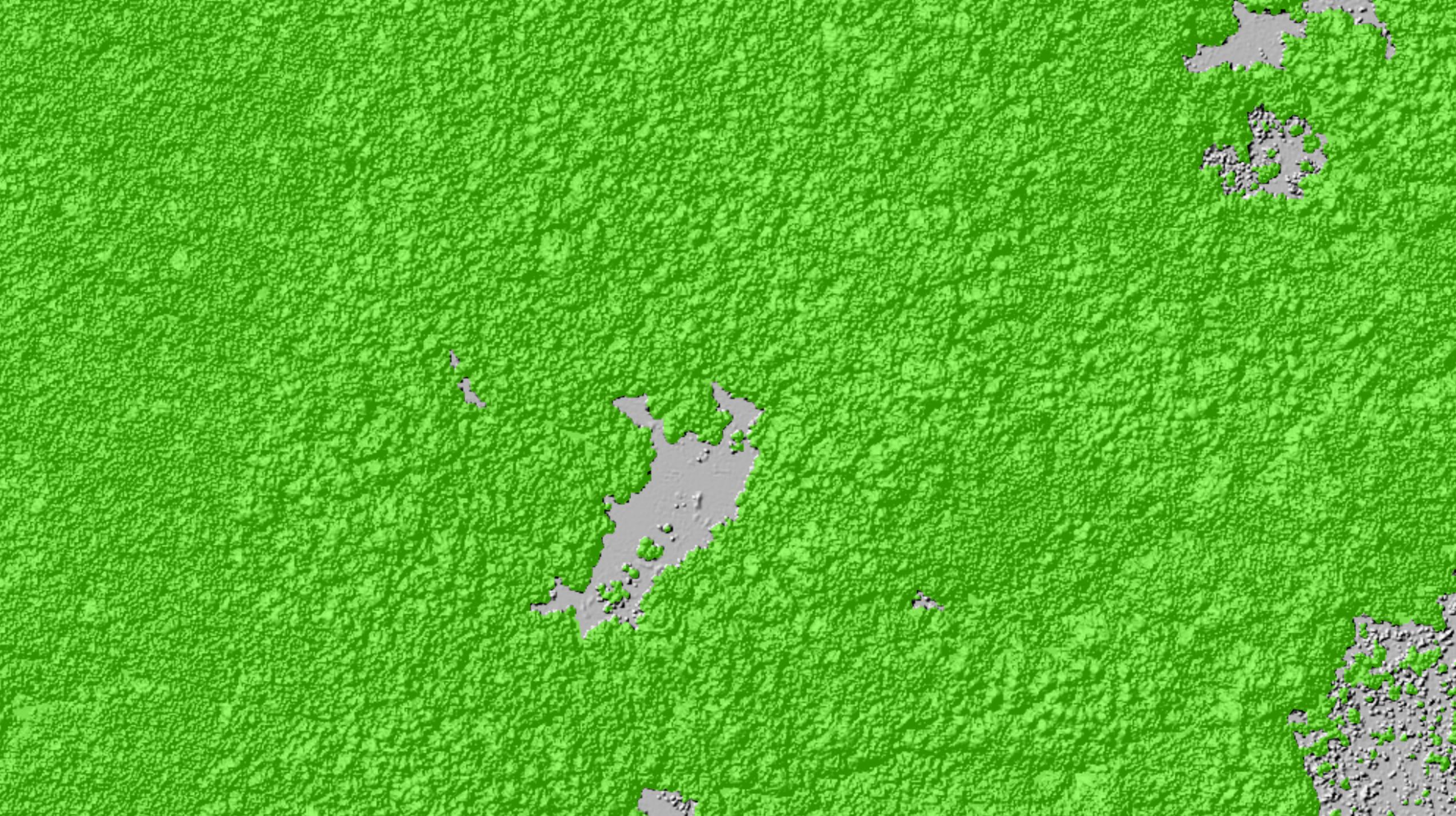




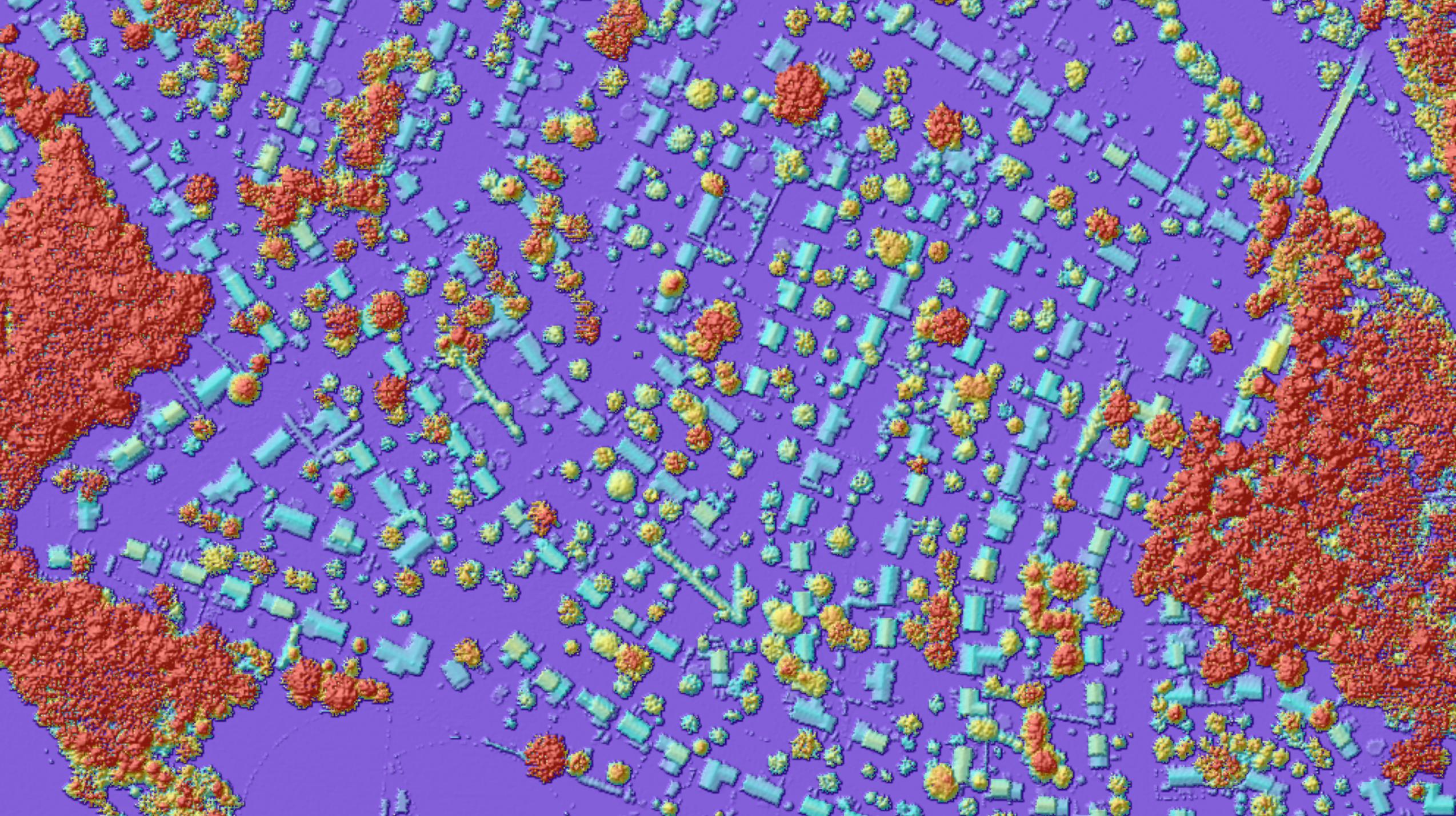


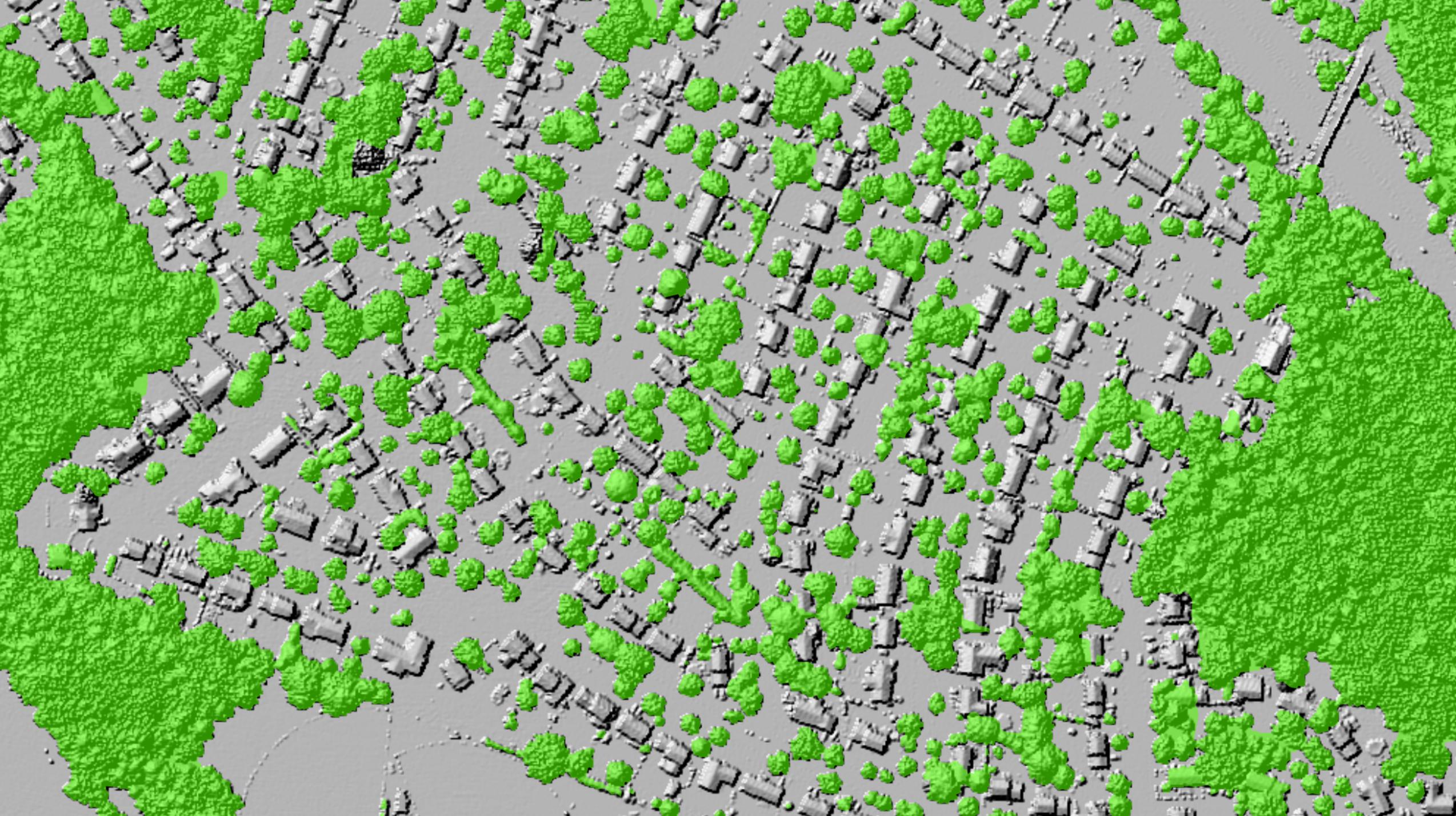


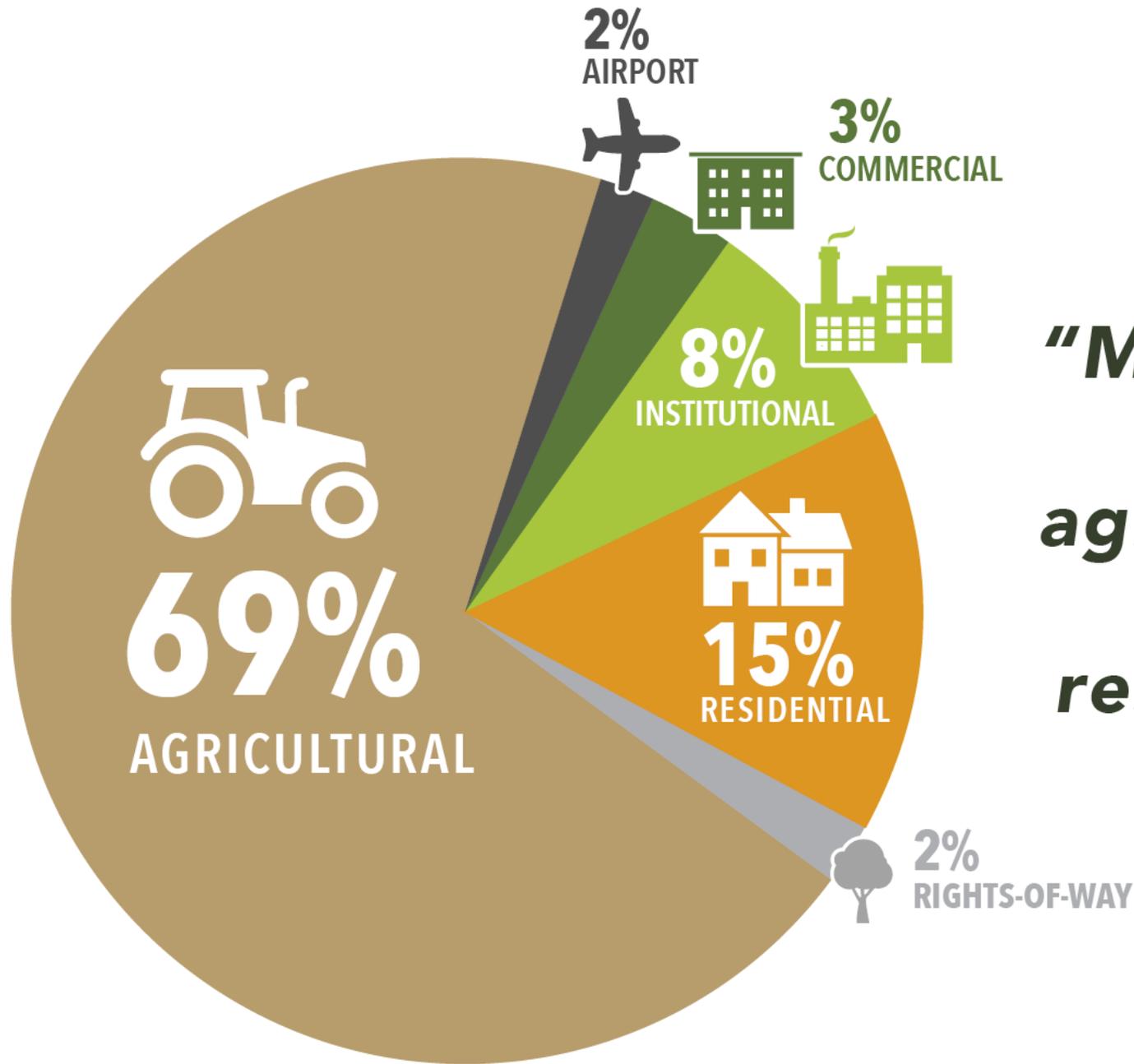










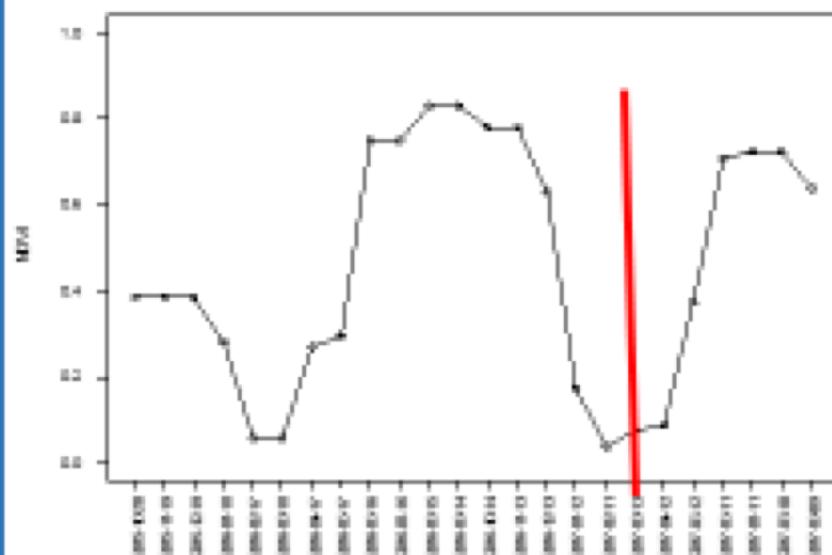


“Majority of trees outside of agricultural areas are on residential land.”

Operational use of high res carbon maps for monitoring

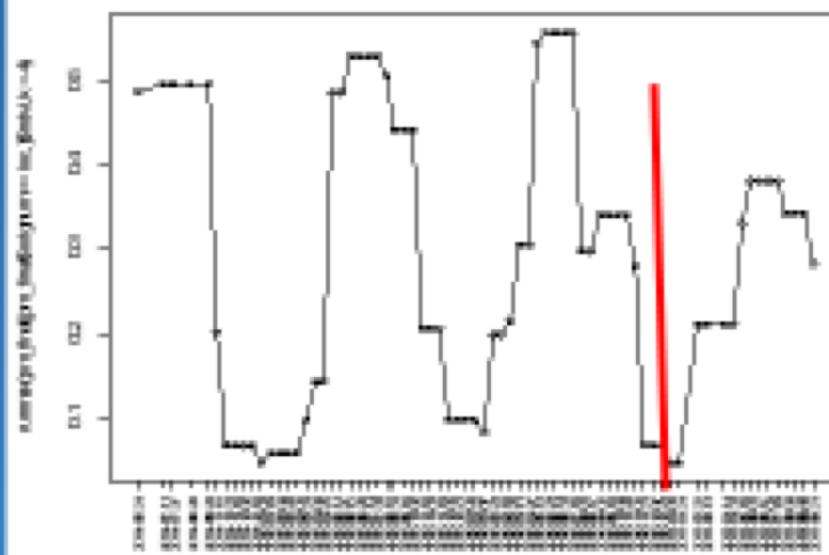
Sentinel

447-1-1/31/2017 0:00:00-Final overstory remo



Landsat 8

447 - Final overstory remo - 1/31/2017 0:00:00

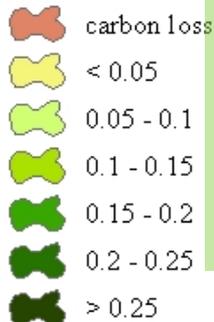


- Identify baseline carbon density at point locations using modeled C estimates
- Develop training data – C (dependent variable) vs. Temporal profile indices (independent variables)
- Develop machine learning models to estimate carbon loss at points based on temporal profile perturbations.

Update on Using NASA CMS Data Products for the Maryland Greenhouse Gas Reduction Act

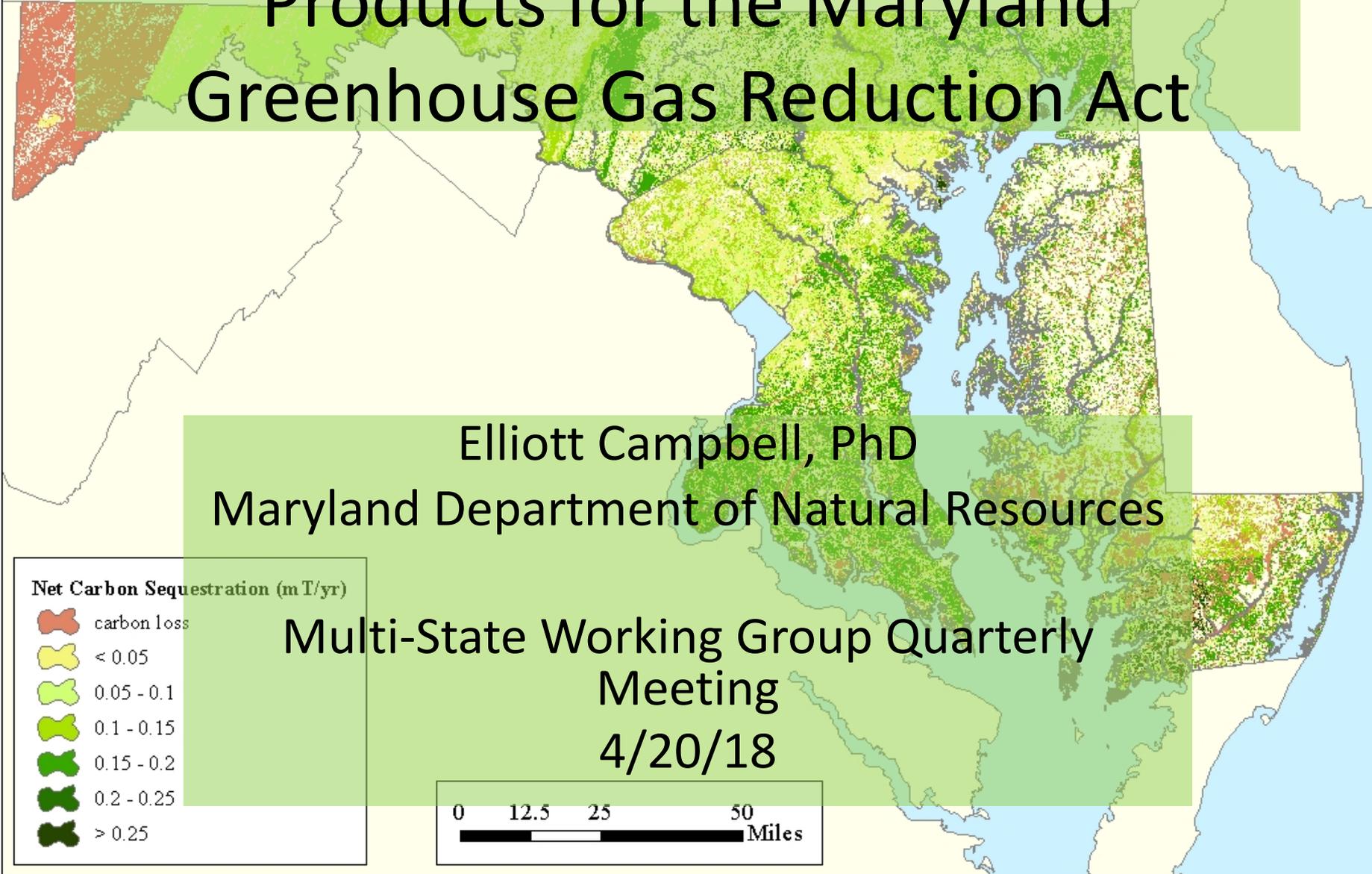
Elliott Campbell, PhD
Maryland Department of Natural Resources

Net Carbon Sequestration (mT/yr)



Multi-State Working Group Quarterly
Meeting
4/20/18

0 12.5 25 50
Miles



April/May Work Plan

- Estimates of carbon sequestration goals from Maryland forests considered in the Maryland GGRA 2020-2030 will be sourced from the UMD/NASA CMS data
- UMD is calculating carbon that will be sequestered by existing forests and range of expected carbon sequestered at current rate of forest plantings by 2030
- DNR is assessing the land available for forestation given constraints (ownership, farmland, impervious area, etc.)

Future Work

- Impact of carbon pricing on forest conversion
 - State or regional carbon market
- Use NASA/CMS to QA/QC prior forest plantings and management actions
- Net GHG from wetlands in Maryland
- Still need to work out exactly how to credit land-based carbon sinks- Meeting with Maryland Dept. of Environment next week, presenting update to MWG May 31st

Maryland Ecosystem Service Assessment

- Mapped 7 ecosystem services across Maryland
- Used UMD NASA/CMS forest cover
- Data will be released online soon
- Viewer:
<http://geodata.md.gov/greenprint/>
- Learn More:
<http://dnr.maryland.gov/ccs/Pages/Ecosystem-Services.aspx>
- Thank you!

NASA Carbon Research Program
Multi-State Working Group
Quarterly Meeting
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Conservation efforts in Maryland using NASA CMS Products





The mission of The Nature Conservancy is to conserve the lands and waters on which all life depends.

Maryland/DC Chapter

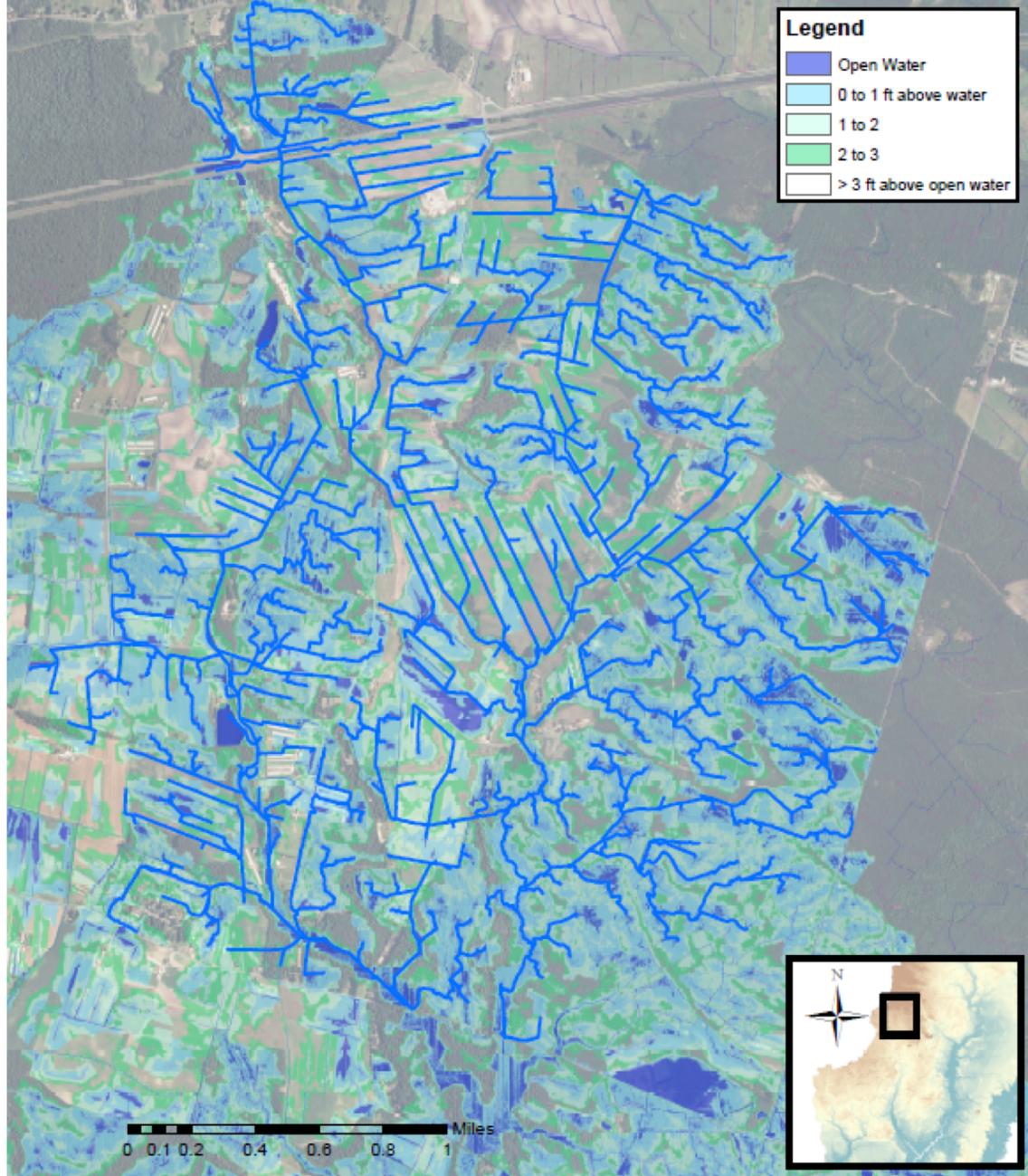
Acres owned : >22,000

Total acres protected : >75,000

3 offices: Bethesda, Easton & Cumberland

Priorities: Clean Water & Climate Resilience



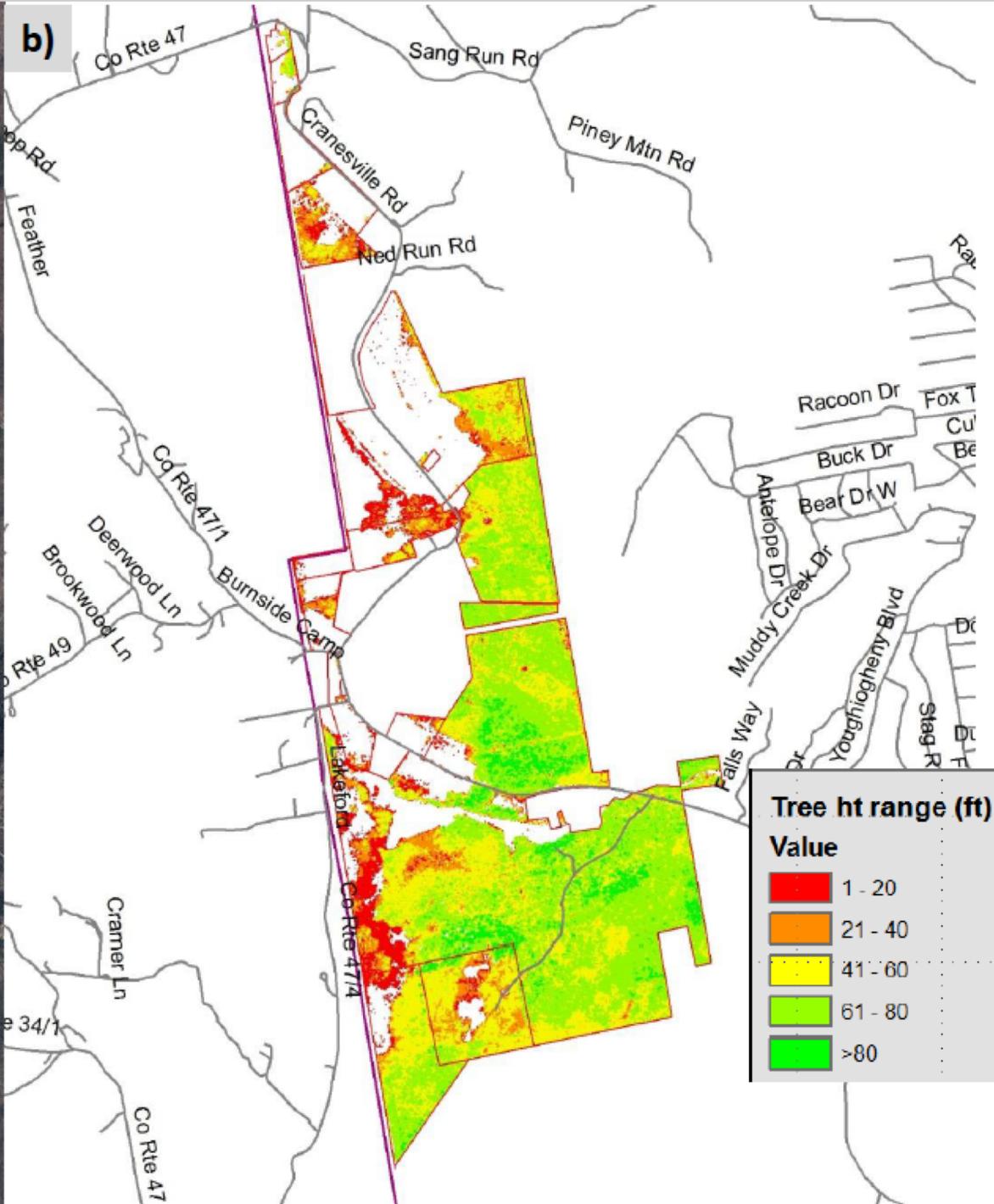


Nassawango River Watershed BMP Prioritization:
Potential Nutrient and Sediment Storage

Clean Water: Sustainable Agriculture

GOAL: Keep nutrients on farms and out of streams and rivers

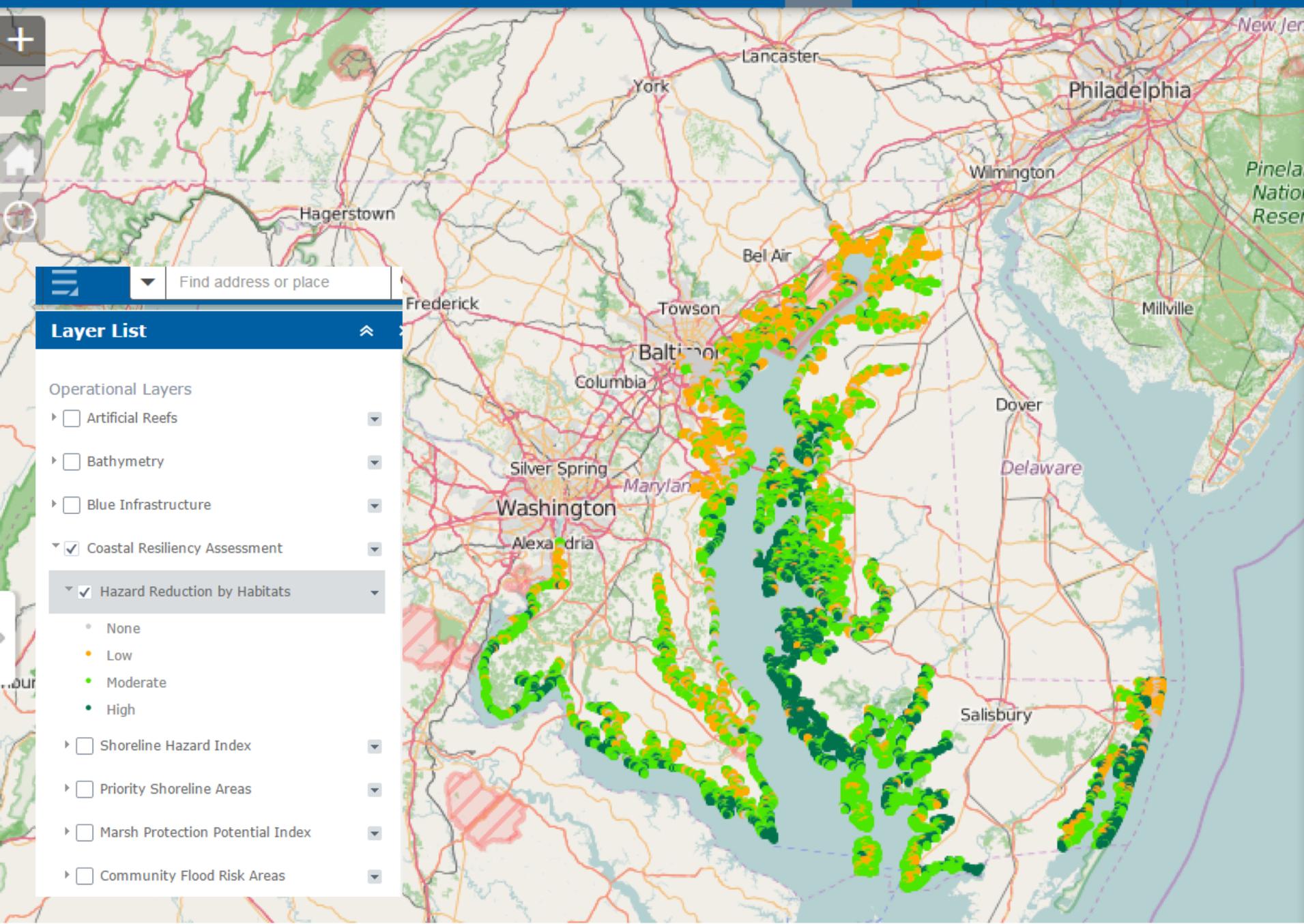
CMS tree cover data used to model the accumulation of nutrients along streams, and identify places where restoration can best intercept runoff



Climate Resilience: Forests

GOAL: Conserve healthy, connected forests

CMS tree cover and canopy height used to map 'mature' forest, prioritize locations for forest inventory and inform restoration projects



Climate Resilience: Coasts

GOAL: Expand the use of natural and nature-based solutions

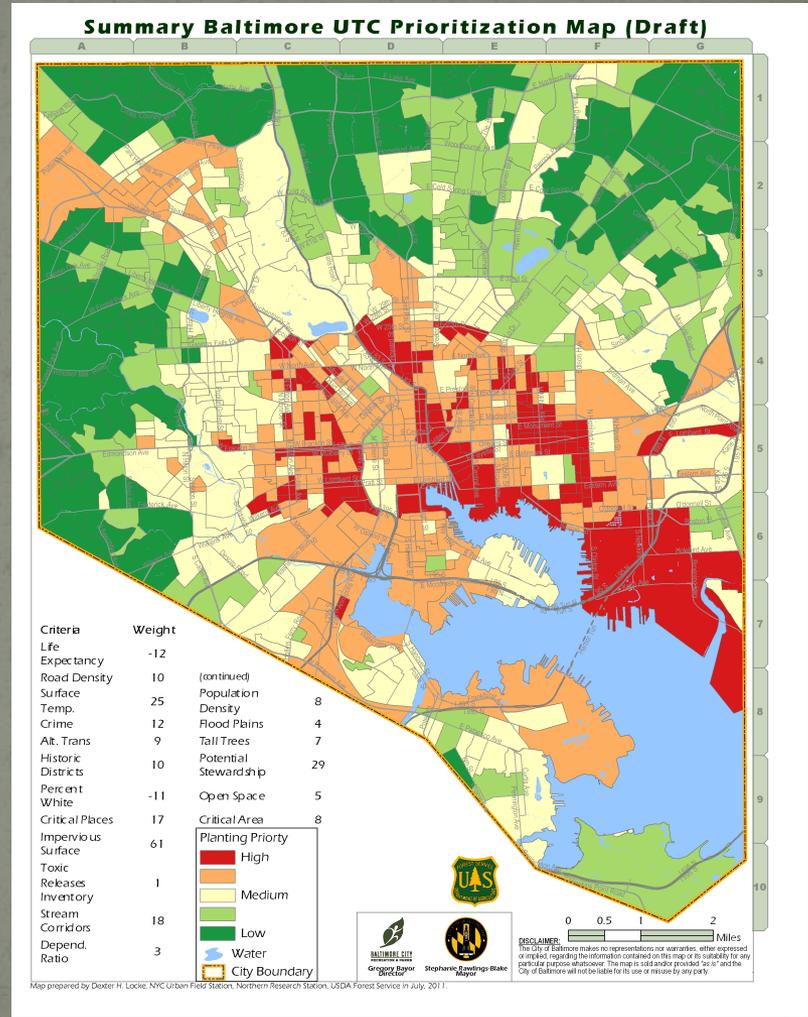
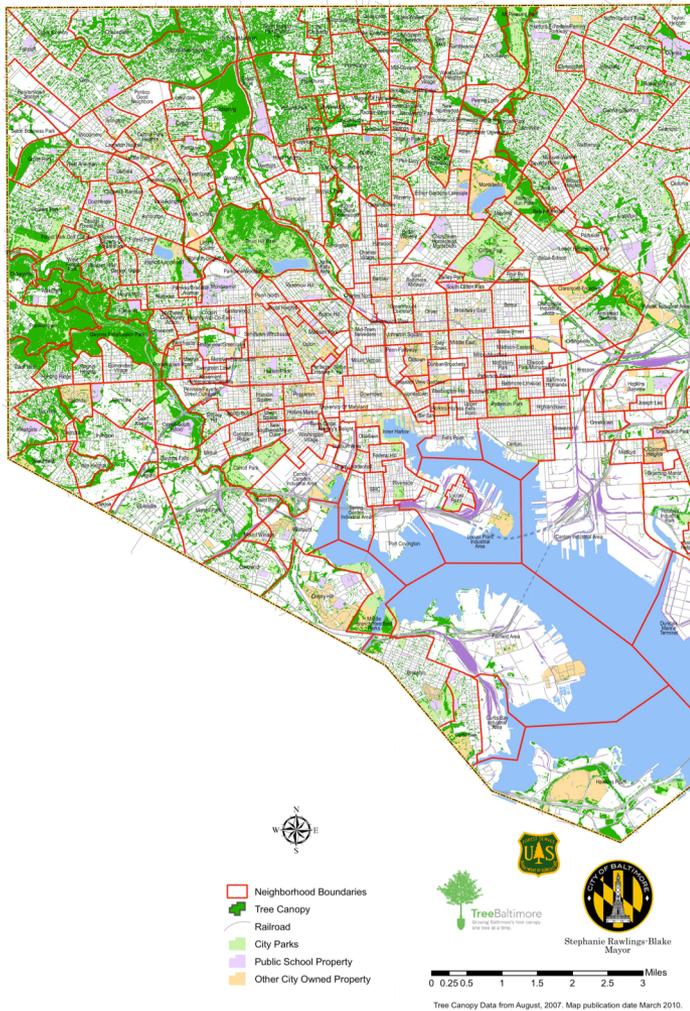
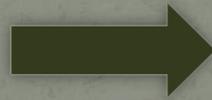
CMS tree cover data used to Identify areas where habitats buffer people from coastal flooding and erosion

Desired future data:

- Tree cover & canopy height updated on a 5-10 year interval, useful for:
 - Monitoring compliance with MD's forest conservation law
 - Estimating the contribution of forests to MD's greenhouse gas plan
- Data to support blue carbon assessments



UTC LEAD TO PRIORITY MAP

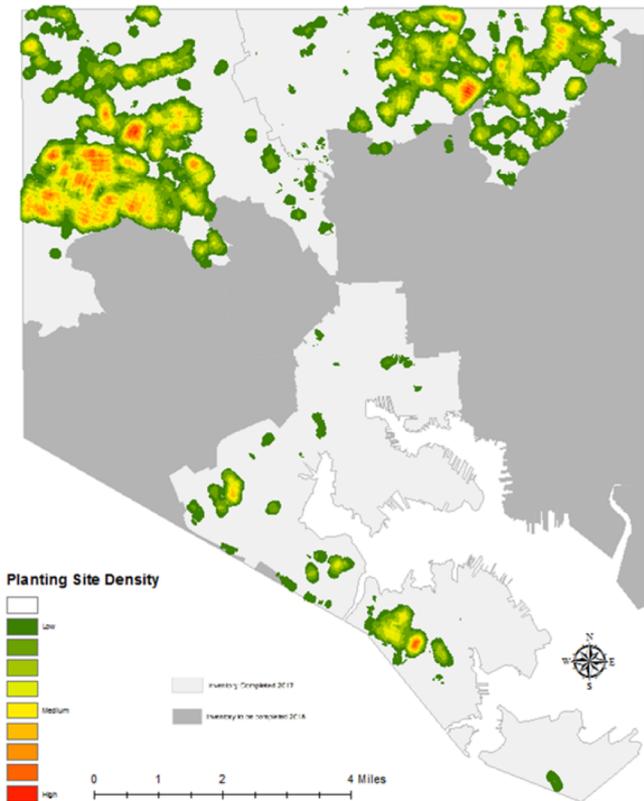


Canopy Change in Baltimore



Baltimore City Tree Inventory

Vacant Planting Sites by Density



The Baltimore Street Tree Inventory 2017 Data

