Tree Canopy Study Update

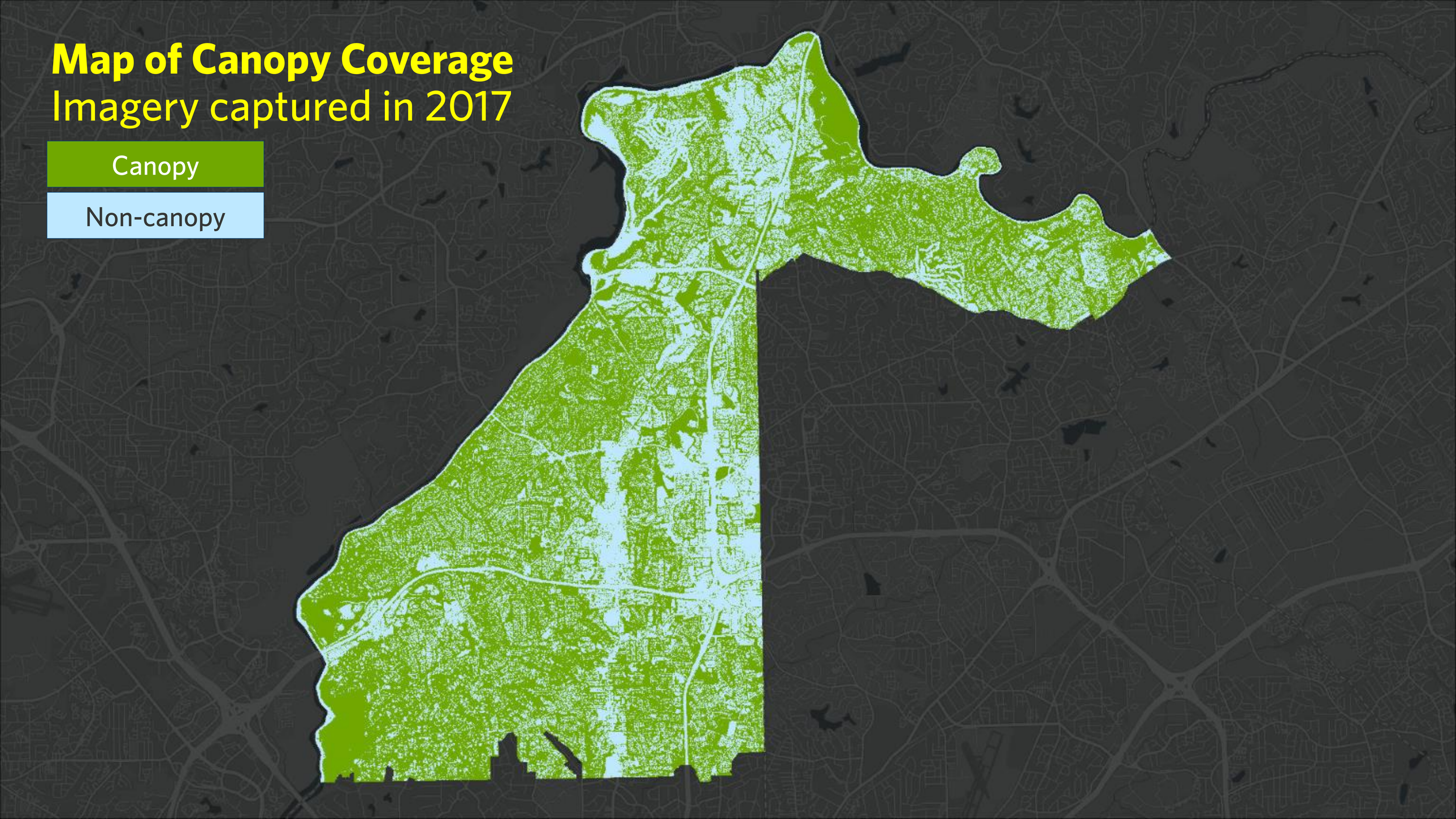
NAIP Imagery Sept. 2017

Presented December 18, 2018

SANDY SPRINGS™
GEORGIA

Map of Canopy Coverage

Imagery captured in 2017



Estimating Area of Canopy

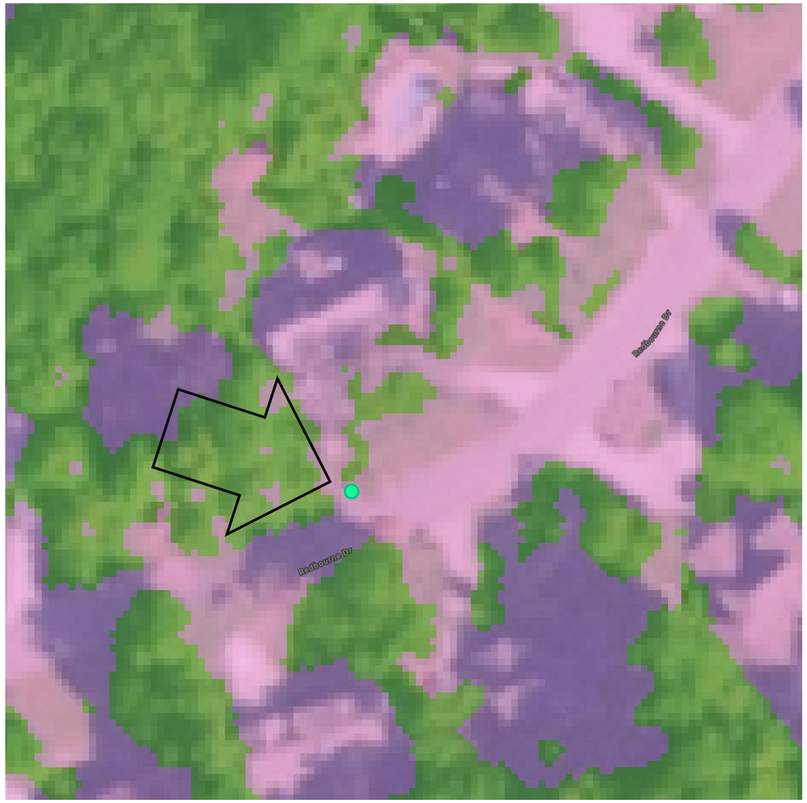
- Using statistical **sampling** instead of the raw map pixel counts
- Conforms to better practices*
  - Manual review of each sampled point is a higher accuracy than automated classifications
  - Reduces bias from the map model
- Advantages
  - Statistical principles can be applied
  - Confidence Level
  - Margin of Error
  - Enables **Accuracy Assessment of the model**

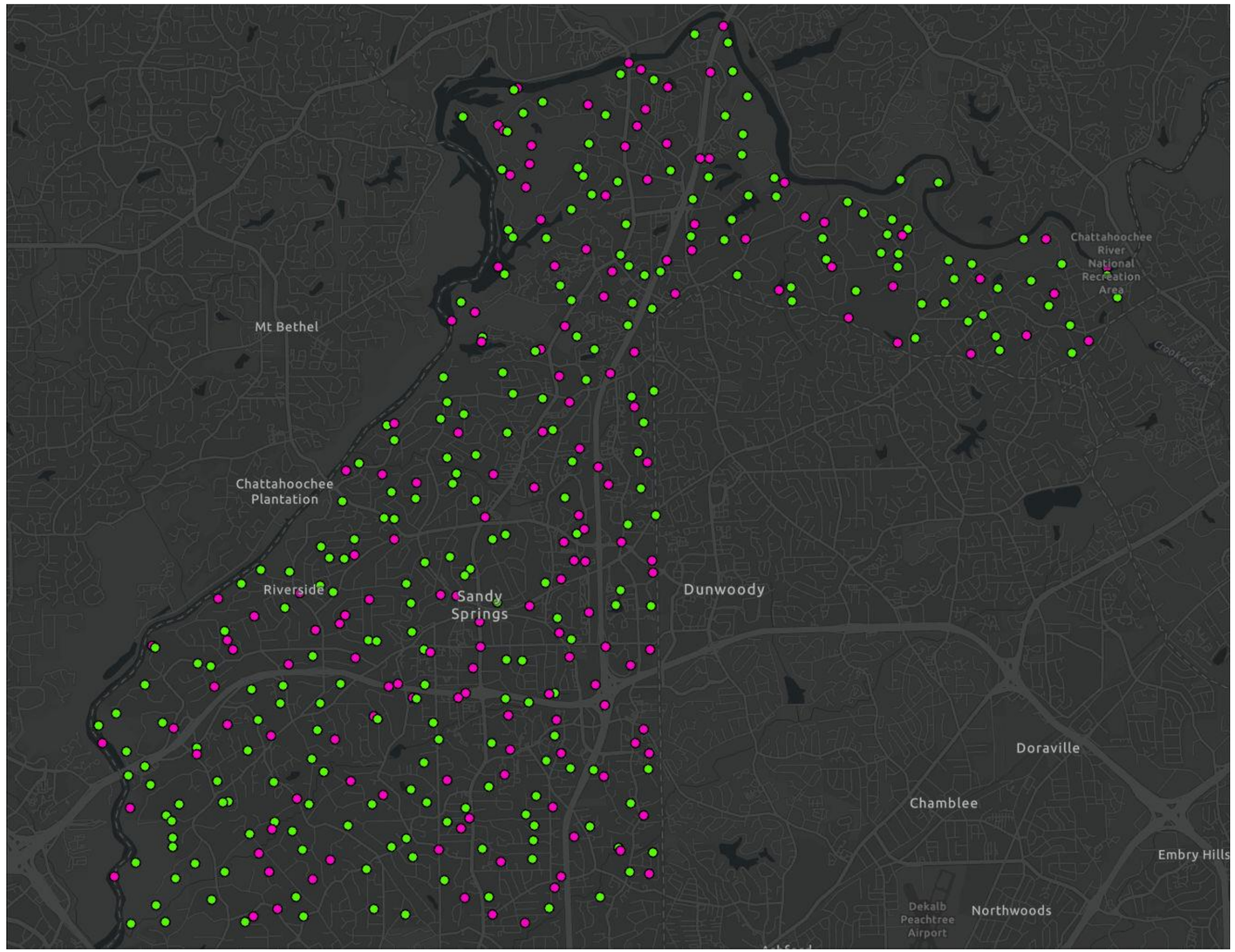
*Tested sample points against manual inspection using stratified random sampling following practices in

- Food and Agriculture Organization (FAO) of the United Nations. 2016. Map Accuracy Assessment and Area Estimation standards: A Practical Guide. National forest monitoring assessment working paper No 46/E. http://www.fao.org/3/a-i5601e.pdf
- Olofsson, P., Foody, G. M., Herold, M., Stehman, S. V., Woodcock, C. E., Wulder, M. A. 2014. Good practices for estimating area and assessing accuracy of land change. *Remote Sensing of Environment*, 148:42–57.

Illustration

- 400 sample points
- Stratified random sampling





2017 Canopy Area ≈ 60.3% ± 2.6%

Estimated Area of Canopy

- We estimate Tree Canopy area in 2017 is about 60.3% ± 2.6%
  - **We expect the true value to be between 57.7% and 62.9%***

  - Tree Canopy Area: 14,978.1 acres ± 648 acres
  - Non-Canopy Area: 9,876.1 ± 648 acres

2013		2015		2017	
Percent	Margin of Error	Percent	Margin of Error	Percent	Margin of Error
58.7%	±3.6%	**58.6%**	±3.1%	**60.3%**	±2.6%

* At the 95% confidence level. We are 95% certain the true value falls within that range.

Accuracy Assessment

- How well did the map perform at the inspected sample points?

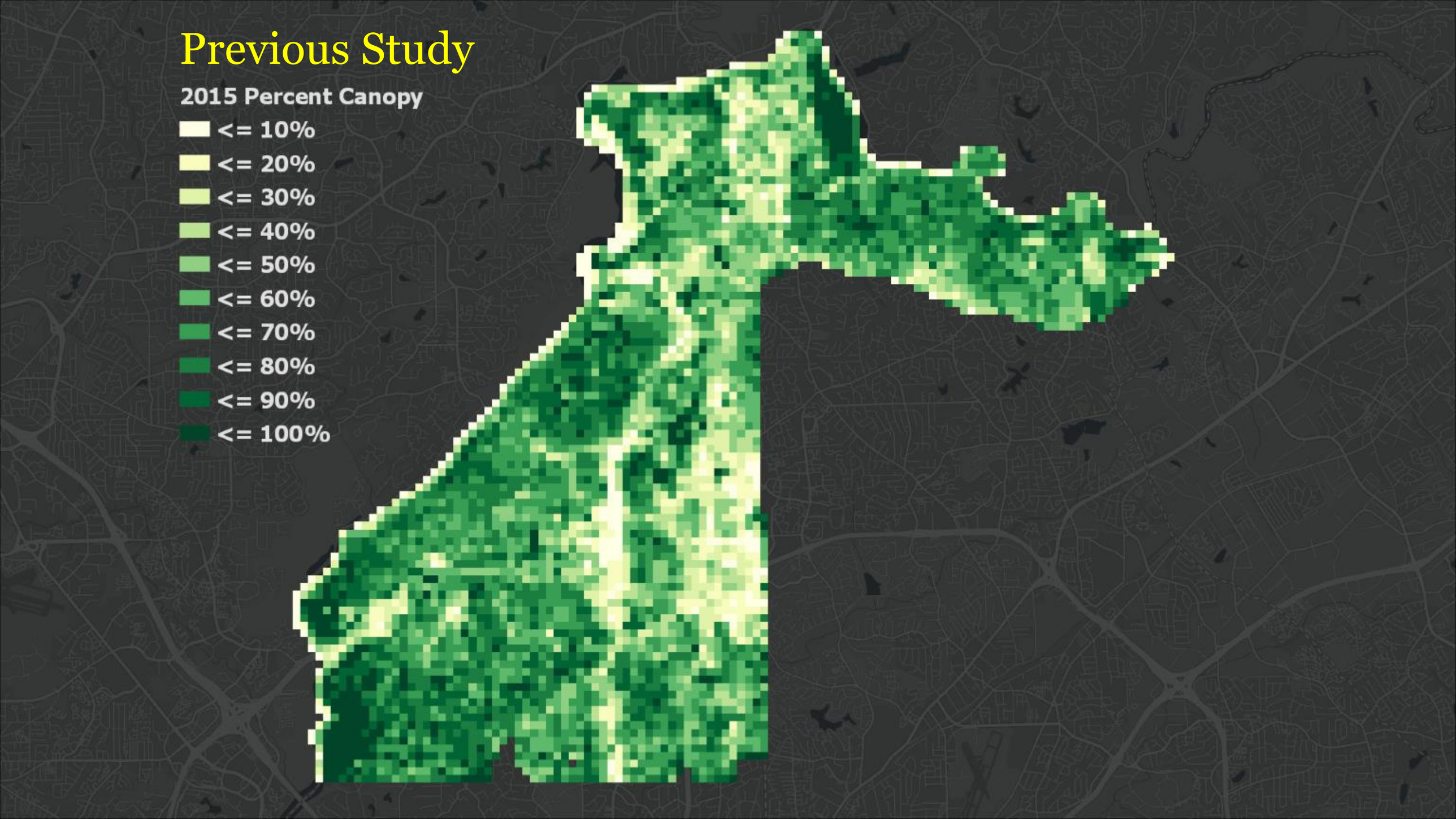
- Overall Model Accuracy

2013	2015	2017
83.8%	88.8%	92.3%

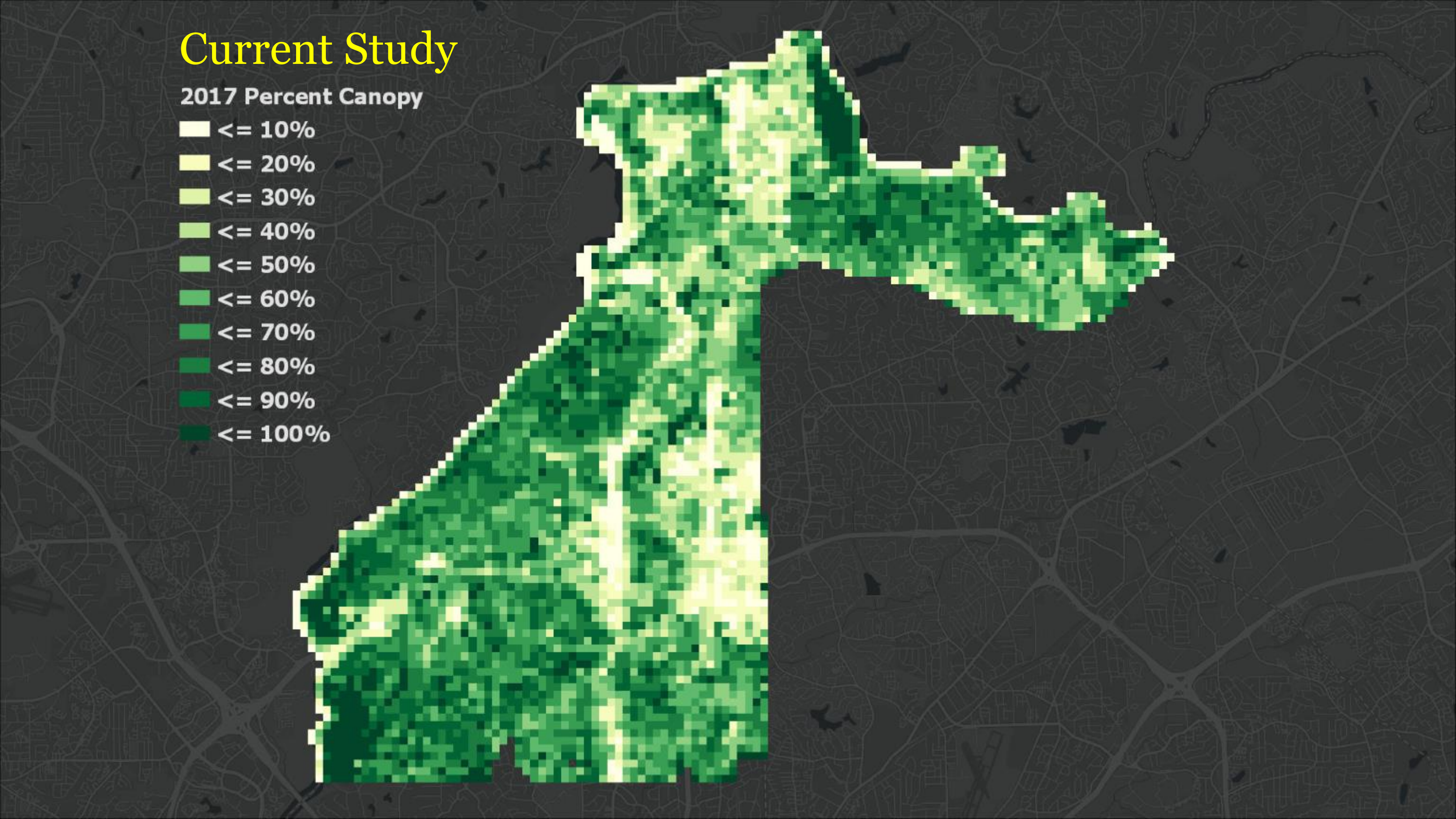
- Our methods are improving
  - Reducing errors of omission and commission
  - Smoothing method to reduce “salt & pepper” noise effect

Using the Map Layer

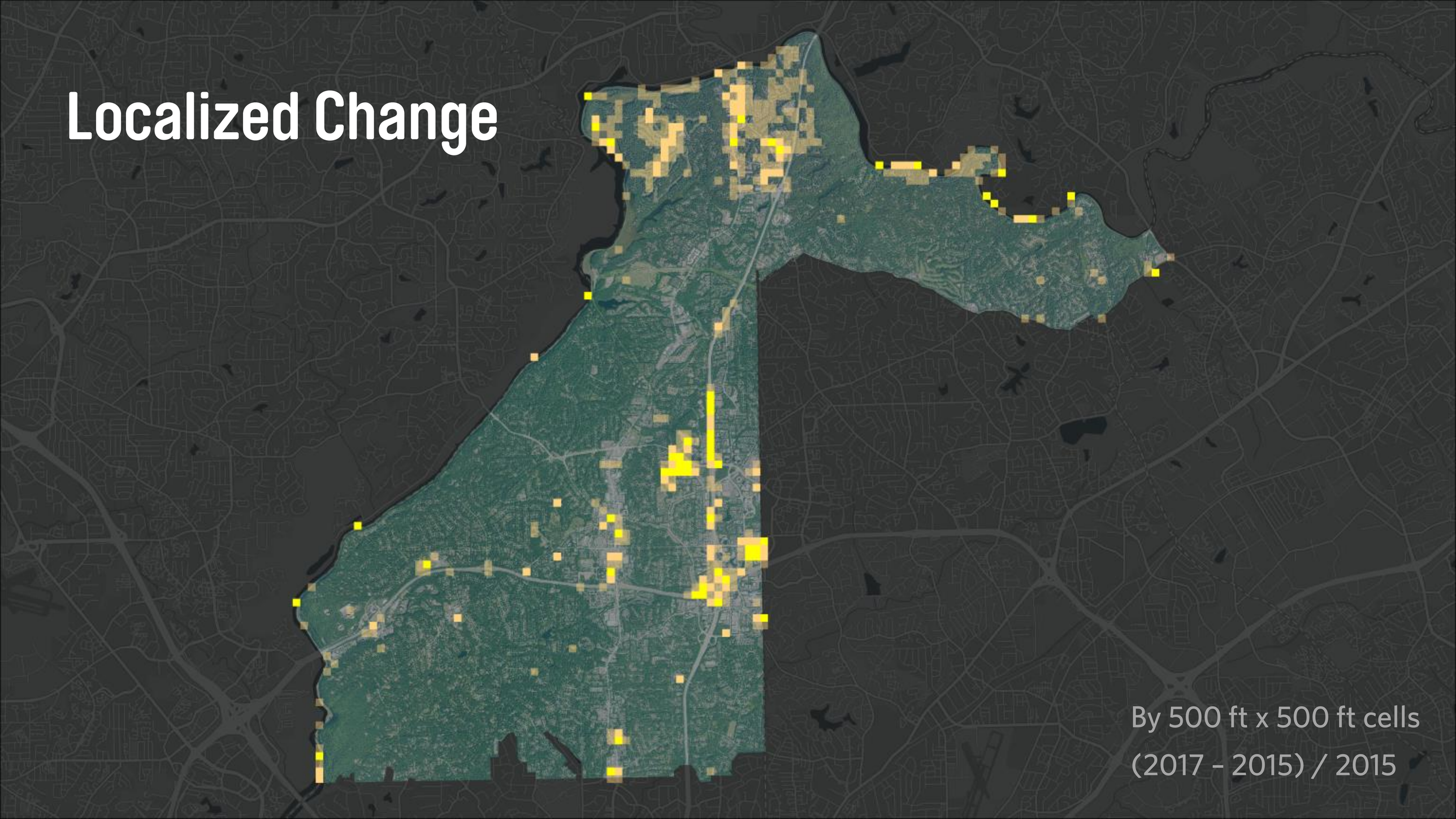
Previous Study



Current Study



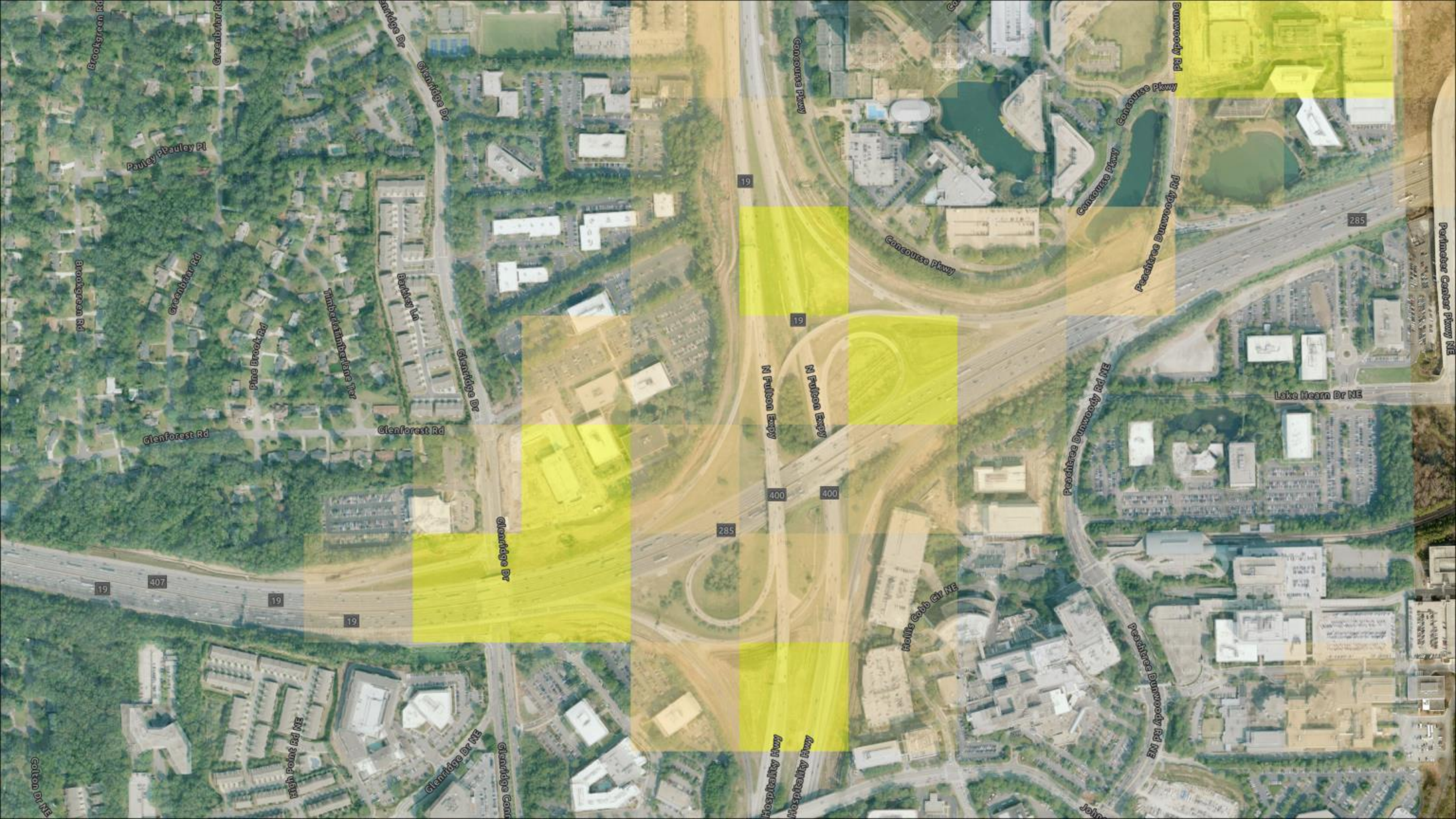
Localized Change



By 500 ft x 500 ft cells

(2017 – 2015) / 2015

North Fulton Tennis Center
Willow Heights Dr
Willow Creek Dr
Abernathy Rd
Williamson Dr
Glengate Cv
Glengate Pl
Glengate Pl
Heritage Way
Williamson Dr
Carriage Dr
Bridges Creek Trl
Encore Blvd
Encore Blvd
Candence Blvd
Artistan Aly
Aria Blvd
Abernathy Rd
Abernathy Rd
Glenlake Pkwy
Glenlake Pkwy
Mercedes-Benz Dr
Canopy Dr
Meridian Way
Glenridge Dr
Lucent Ln
Glenridge Close Dr
Charlot St
400
N Fulton Expy
N Fulton Expy
Abernathy Rd
Peachtree Dunwoody Rd
Peachtree Dunwoody Rd
Mt Vernon Hwy NE
400

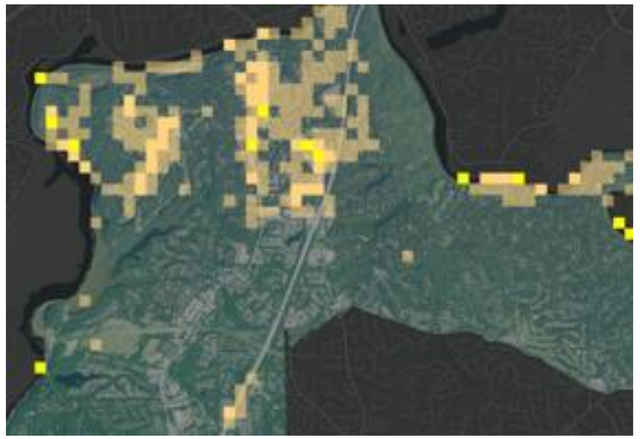


Brookgreen Rd
Greenbriar Rd
Glenridge Dr
Concourse Pkwy
Dunwoody Rd
Pauley Pl
Concourse Pkwy
Concourse Pkwy
Peachtree Dunwoody Rd
285
Perimeter Center Pkwy NE
Brookgreen Rd
Greenbriar Rd
Timberlaninberlane Ter
Barkley Ln
Pine Brook Rd
Glenridge Dr
N Fulton Expy
N Fulton Expy
Lake Hearn Dr NE
Glenforest Rd
Glenforest Rd
Peachtree Dunwoody Rd NE
400
400
285
Glenridge Dr
407
19
19
19
19
Hollis Cobb Cir NE
Peachtree Dunwoody Rd NE
High Point Rd NE
Glenridge Dr NE
Glenridge Conn
Hospitality Hwy
Hospitality Hwy
Colton Dr NE

Long Island Dr NE
Pine Lake Dr NW
Merlendale Ct NW
Forrest Lake Dr NW
Lake Forrest Dr NE
Kitty Hawk Dr NE
Roswell Rd NE
Franklin Rd NE
Franklin Pl NE
Franklin Rd NE
Kendallet
Lansbury Dr NE
Westfield Dr NE
Cherrywood Ln NE
Brinkley Ln NE
Huntley Dr NE
9
Mystic Pl NE
Mystic Dr NE
Tall Pines Dr NW
Windsor Pkwy NE
Carolwood Ln NE
Hedden Rd NE
Brookfield Dr NE
Dalmer Rd NE
Meadow Valley Dr NE
Lake Forrest Dr NW
Windsor Pkwy NE
Pine Forest Rd NEE
Pine Forest Rd NE
Old Creek Rd NE
Barbara Ln NW
Dudley Ln NW
Mystic Dr NE
Jolyn Pl NE
Meadowbrook Dr NE
Rd NE

Some noise in change detection exists

- Ex: Correction of shadows from 2015 data resulted in false “canopy loss” in some areas



Conclusion

- Two products are provided:
  - Estimated area of canopy coverage
  - A Map or “GIS Layer” of canopy
- Canopy Change:
  - Change is highly localized
  - Overall canopy estimates year to year are within the margin of error.
  - Estimation at the City-wide level is too large to detect localized change in this time period
- Next steps
  - Summarize data by custom areas, such as zoning districts
  - Utilize data for programs such as targeted tree planting

Thank you