THE UNIVERSITY of EDINBURGH
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# Scott Ogletree

## Quantity and Quality in Greenspace Studies

EDINBURGH SCHOOL OF ARCHITECTURE & LANDSCAPE ARCHITECTURE | ESALA | PUBLIC LECTURE SERIES 21/22

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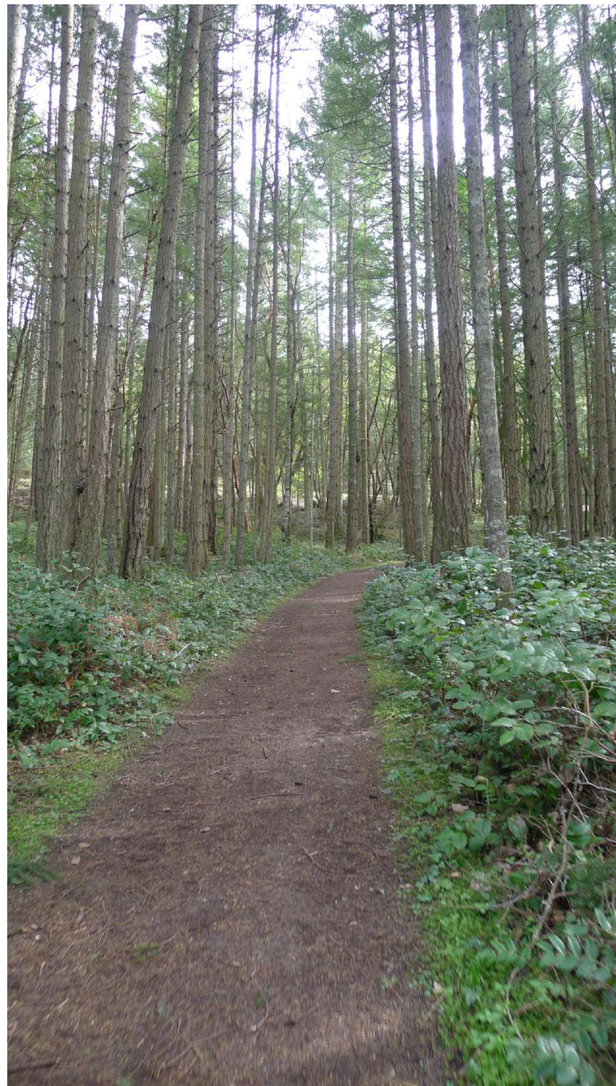
# About me

- Research Fellow at OPENspace Research Center
- Resource Management (University of Georgia), MLA and PhD (Clemson University)
- Postdoc at North Carolina State
- Research interest
  - Environment & Social interaction, Spatial data science

# Some terminology

- ‘Green space’, ‘greenspace’, ‘park’, ‘open space’, ‘garden’, ‘vacant lot’



- Greenspace and a myriad of benefits
  - Physical activity, mental health, cardiovascular disease, student performance, behavior, quality of life, gun violence, stress reduction, restoration, cooler temperatures, reduced air pollution, birth weight, social capital, mortality, obesity, stormwater, climate change
  - Fields with greenspace interests - geography, public health, epidemiology, conservation, biodiversity, sustainability, urban planning, landscape architecture, forestry, parks and recreation, psychology

# Learning about greenspace

- Two sources of information about greenspace
  - Quantity
  - Quality
- Some examples to illustrate

# Quantity

- How much?
- Where?
- How does the amount and location relate?
- Is the amount and location fair?

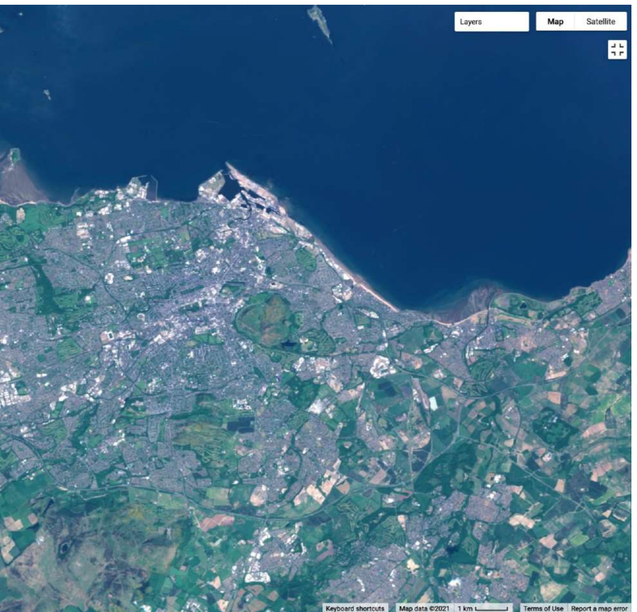
# Quantity

- From above, via airplanes and satellites
  - Has become easier
  - Can be done often and inexpensively
  - Use computers to measure what we ‘see’
- From administrative data (land use)

# Quantity

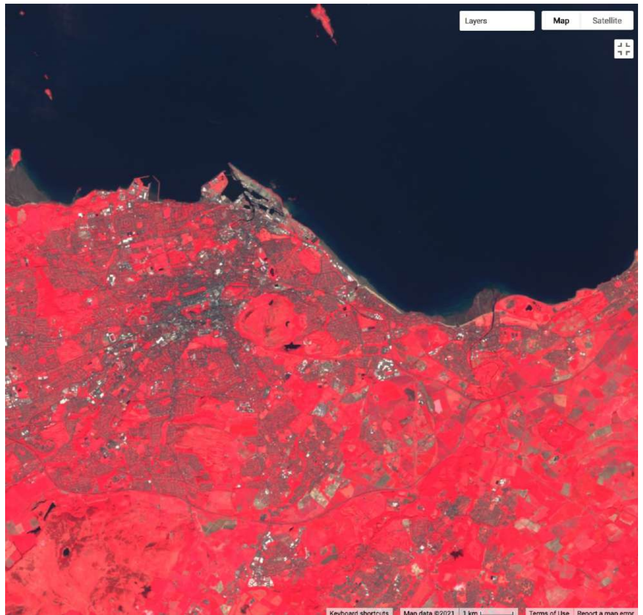
- Vegetation indices from aerial or satellite images
- Can tell ‘where’ it is green

Color Image




NDVI

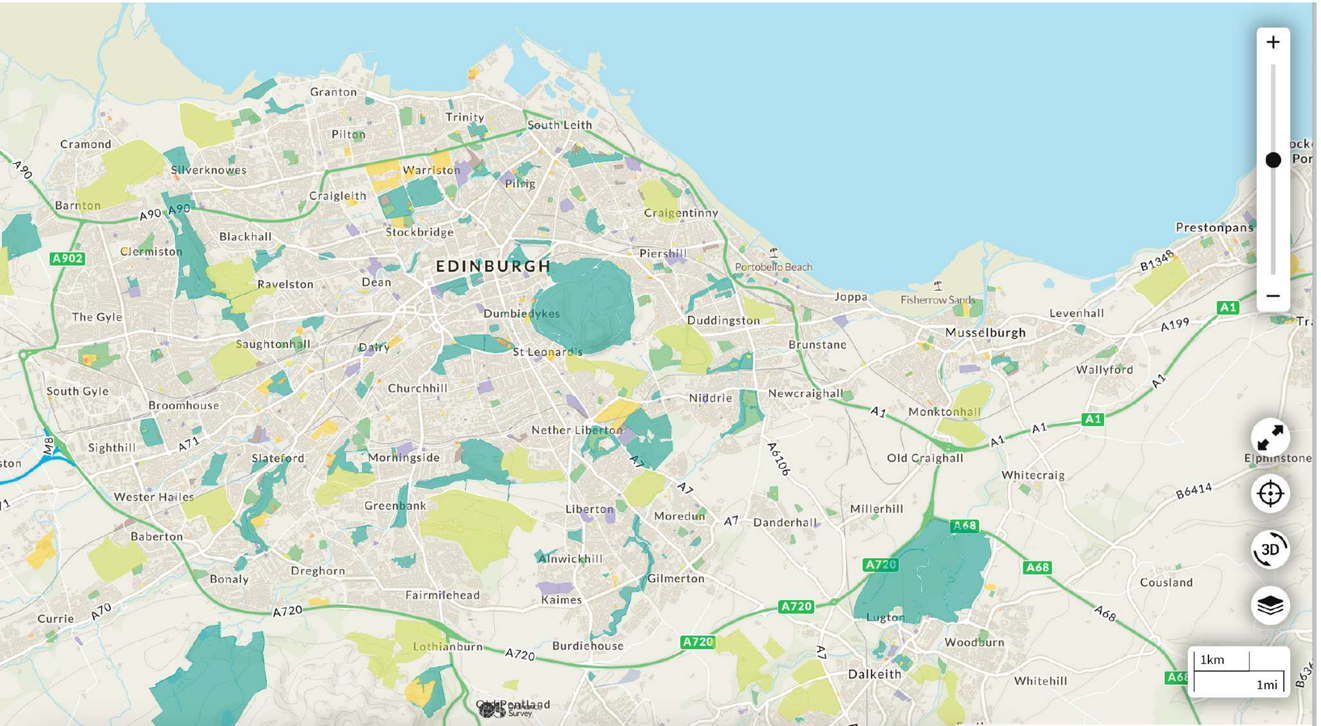

False Color Image



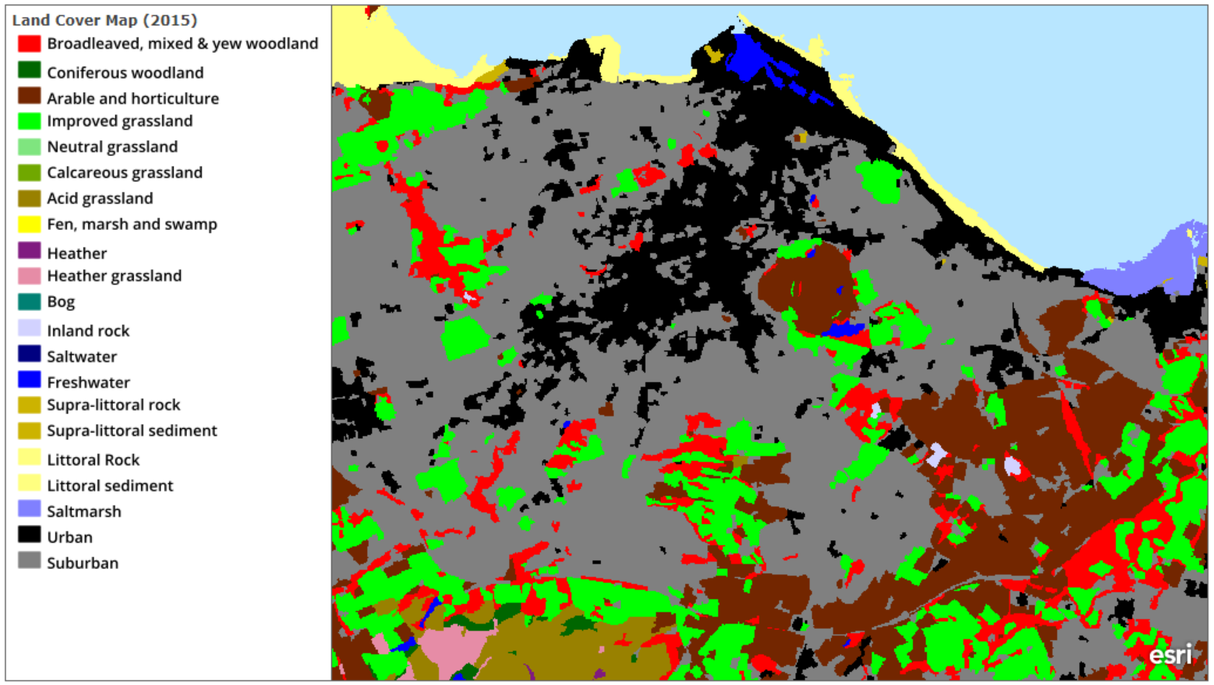

EVI

# Quantity

- Administrative data - Land classification
- Begins to communicate intent, but remains inconsistent across agencies




- Administrative data - Land use
- Based on images of the land

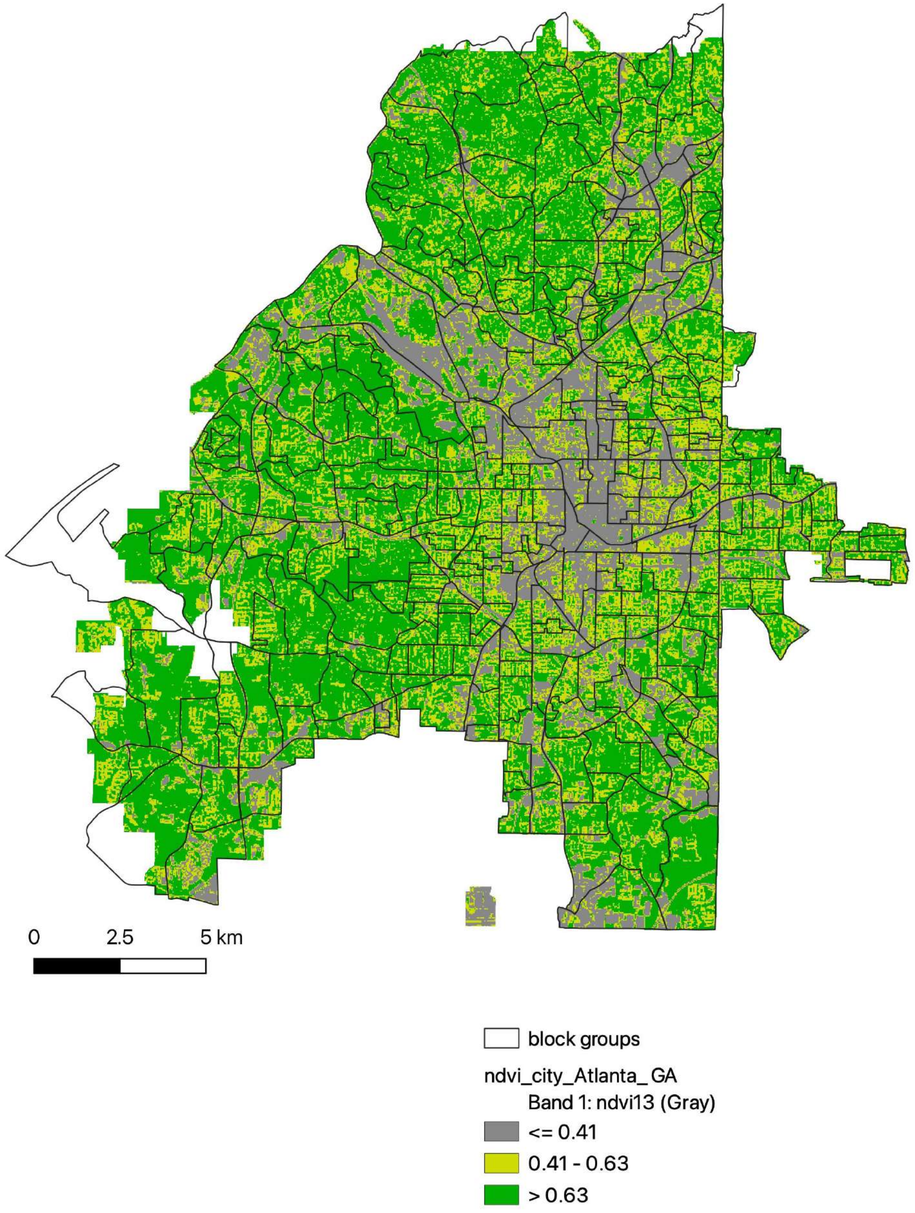



Esri, Intermap, NASA, NGA, USGS | Esri, USDA Farm Service Agency | Esri UK, Esri, HERE, Garmin, METI/NASA, USGS

# Quantity

## Example

- Greenspace and Crime
  - Green is using these ‘from above’ measures
  - To look broadly
  - Found greater greenspace related to lower crime risk in 301 cities in the United States




Ogletree, S., Larson, L., Powell, R., White, D., & Brownlee, M. (In revision). More greenspace linked to lower crime risk across 301 major U.S. cities. *Cities*.

# Quantity

## Example

- Greenspace and Telomeres
  - Telomeres - end component of DNA that determine cell replication
  - Thought to play a role in biological aging, diseases
  - Using greenness from NDVI
  - Association with neighborhood greenspace exposure

Ongoing research, Ogletree, S., Hipp, J., Huang, J., Reif, D., & Yang, L., (2021-2022). *Investigating the impact of environmental greenspace exposure on telomere length.* Center for Human Health and the Environment-NC State

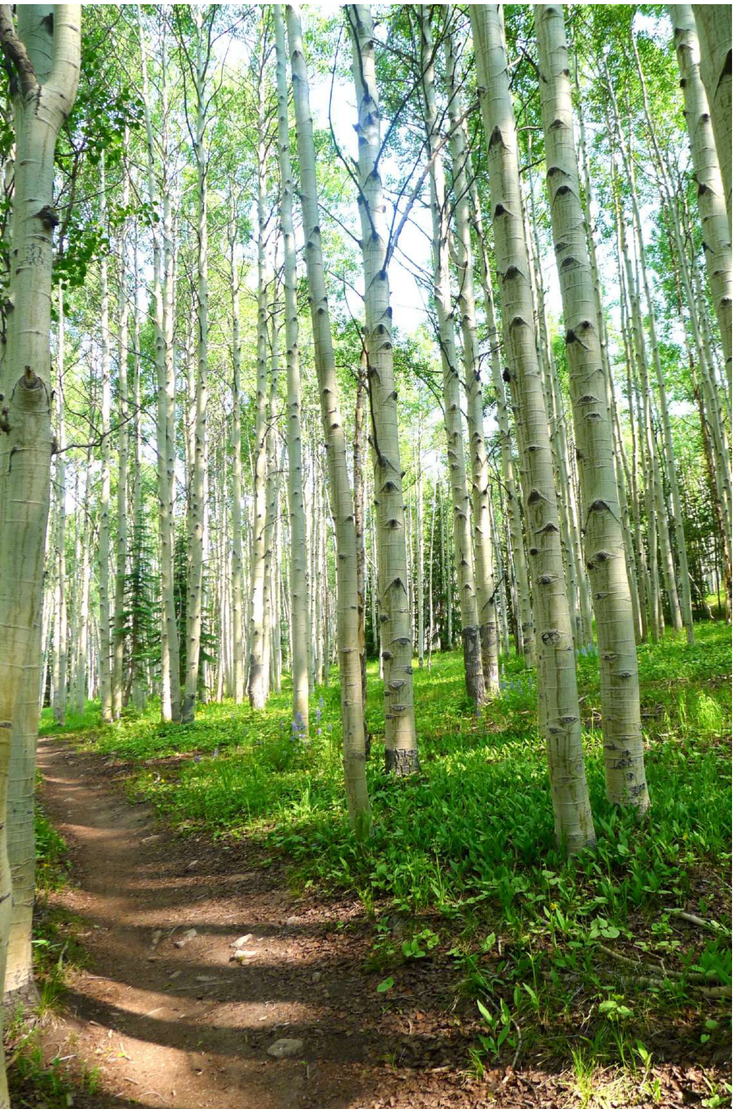
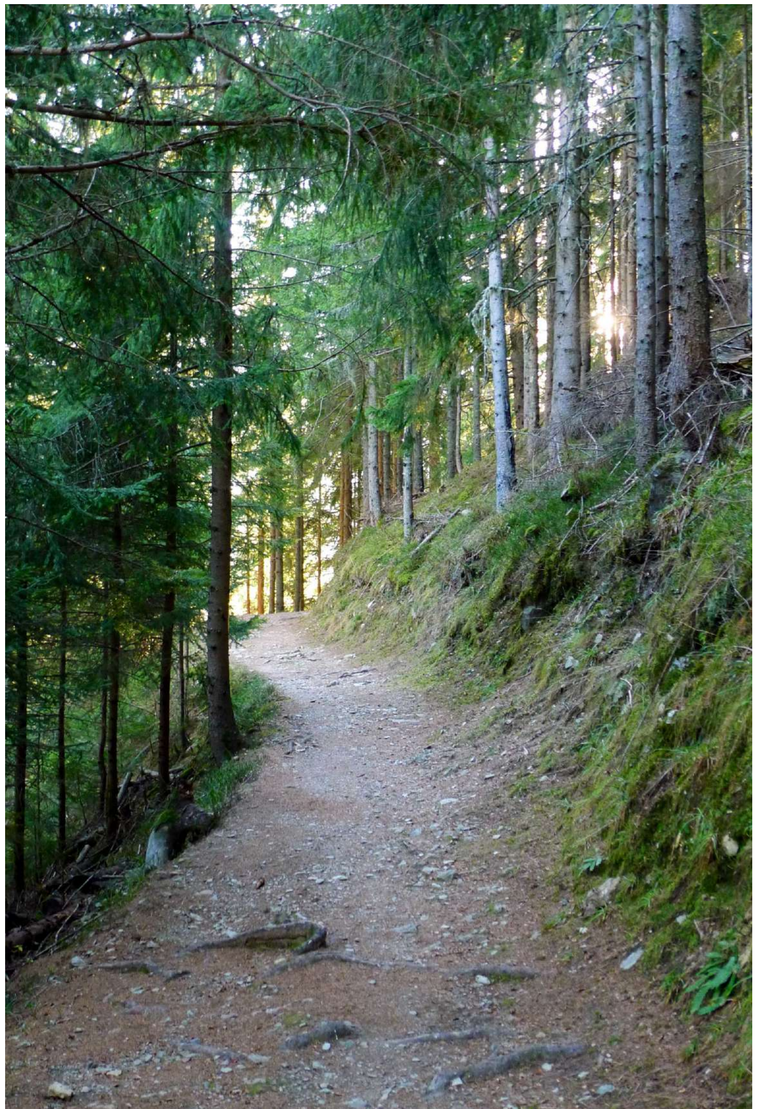
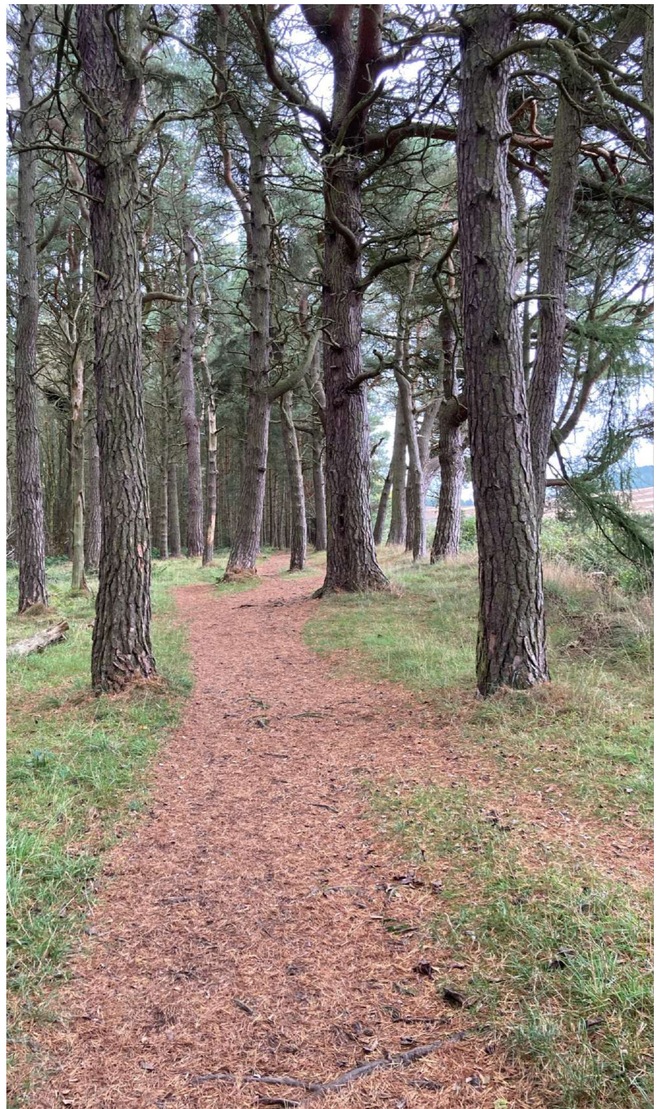
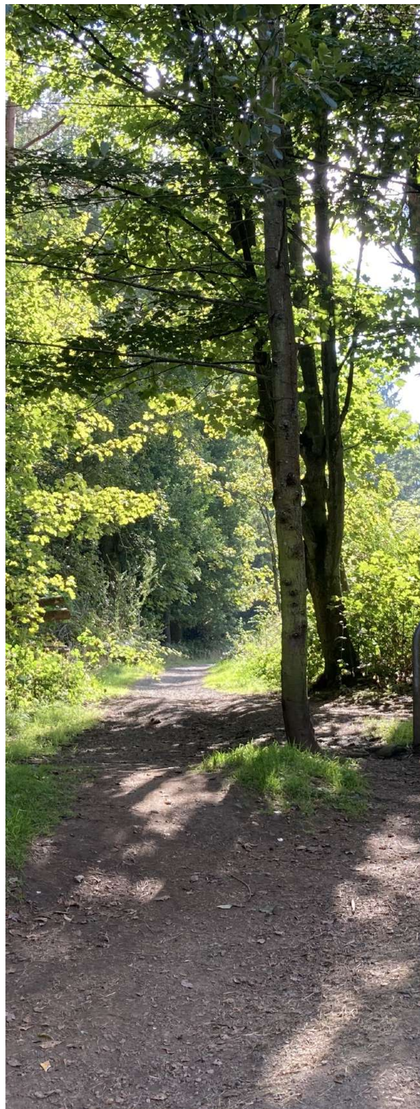
# Quantity

- Quantity is important part of understanding the impacts of our environment
- But…
  - Doesn’t capture the experience and feeling
  - Can be rather coarse, a broad paint brush
- While we learn where it is green, we lack knowledge on how that impacts individuals
- We then need information on the Quality of greenspaces…

# Quality

- How good is it?
- What makes it nice? What makes it unpleasant?
- How does it connect to people? Feelings of enjoyment, relaxation, positive emotions, safety
- How can a ‘green’ space become a place?

# Quality

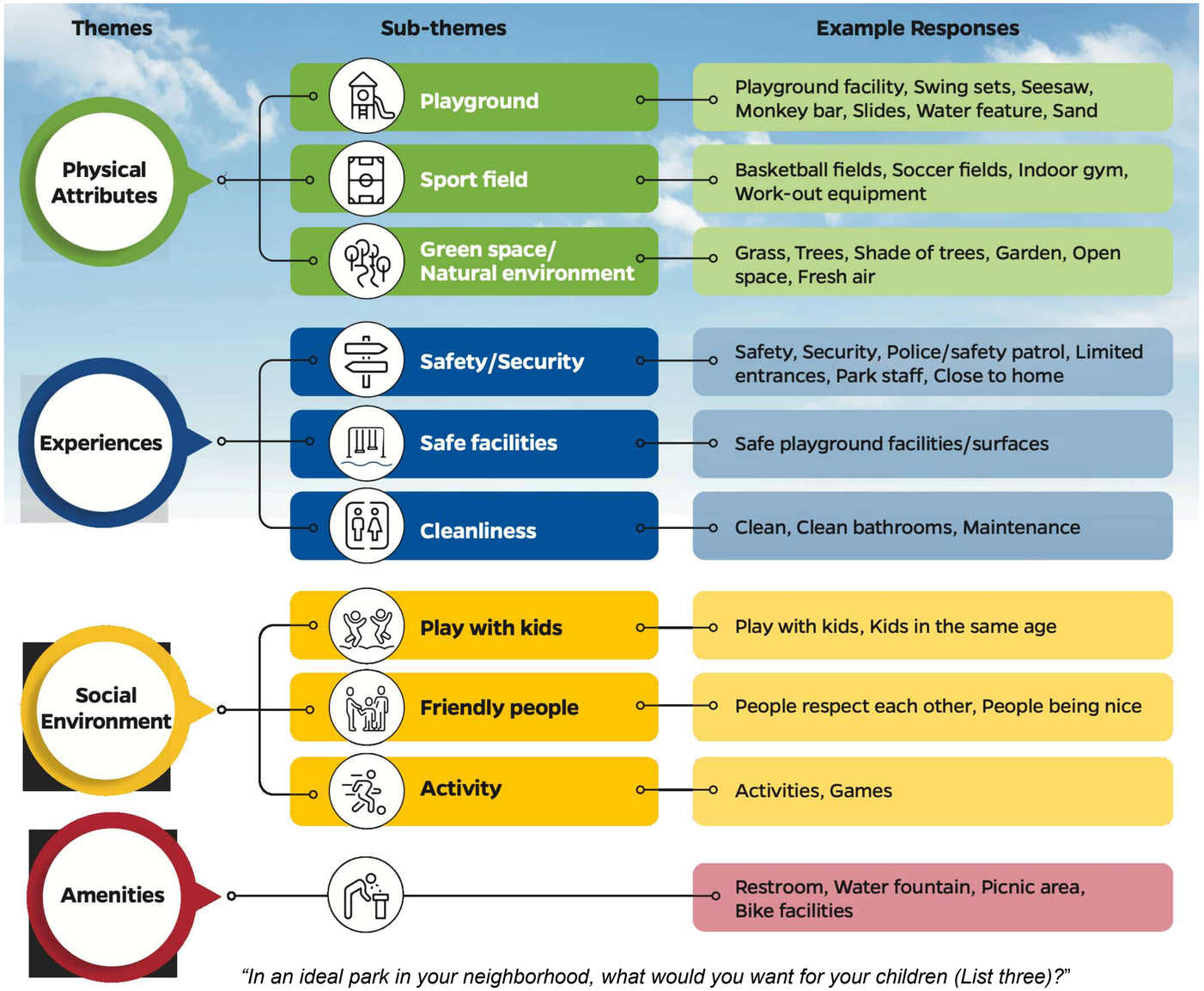
# Quality

- Surveys or interviews
- Audits
- Ground-level imagery
- Combine with other in-place measurements - observations, sensors

# Quality

## Example

- Parental preference
  - We can ask people
  - Survey parents of children in the park
  - Found: highest preference for quality play features, second for safety

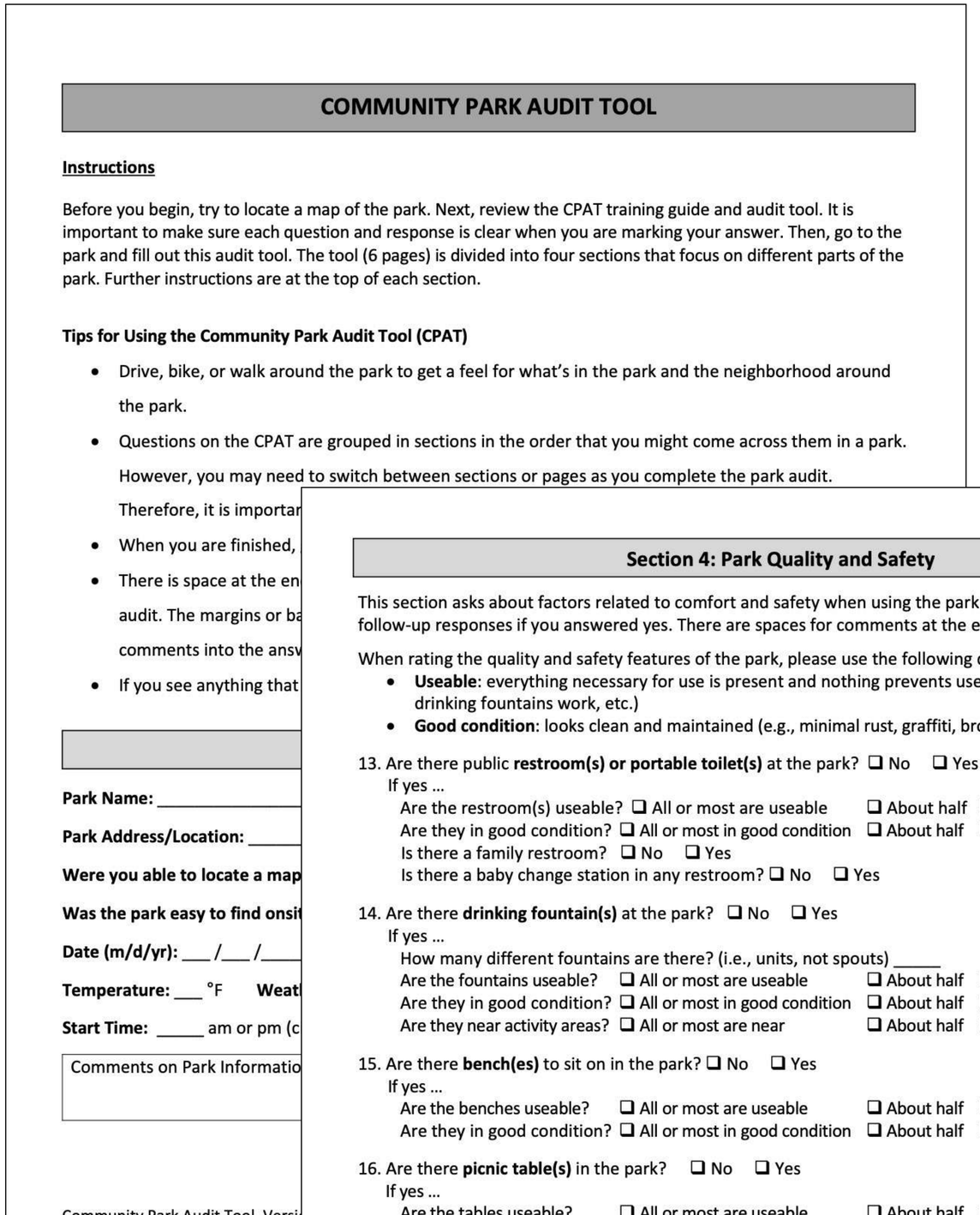



*"In an ideal park in your neighborhood, what would you want for your children (List three)?"*

Ogletree, S., Huang, J-H., Alberico, C., Marquet, O., Floyd, M., & Hipp, J. (2020). Parental preference for park attributes related to children's use of parks in low-income, racial/ethnic diverse neighborhoods. *Journal of Healthy Eating and Active Living*. 1(1), 6-15.

# Quality

- Audits
  - Community Park Audit Tool
    (Kaczynski, A., Stanis, S., & Besenyi, G. (2012). Development and testing of a community stakeholder park audit tool. *American Journal of Preventive Medicine*, *42*(3), 242–249.)
  - Natural Environment Scoring Tool
    (Gidlow, C. et al. (2017). Development of the Natural Environment Scoring Tool (NEST). *Urban Forestry & Urban Greening*.)
  - Bedimo-Rung Assessment Tools
    (Bedimo-Rung, A., Gustat, J., Tompkins, B., Rice, J., & Thomson, J. (2006). Development of a Direct Observation Instrument to Measure Environmental Characteristics of Parks for Physical Activity. *Journal of Physical Activity & Health*, 3(s1), S176–S189.)



**COMMUNITY PARK AUDIT TOOL**

**Instructions**

Before you begin, try to locate a map of the park. Next, review the CPAT training guide and audit tool. It is important to make sure each question and response is clear when you are marking your answer. Then, go to the park and fill out this audit tool. The tool (6 pages) is divided into four sections that focus on different parts of the park. Further instructions are at the top of each section.

**Tips for Using the Community Park Audit Tool (CPAT)**

- Drive, bike, or walk around the park to get a feel for what's in the park and the neighborhood around the park.
- Questions on the CPAT are grouped in sections in the order that you might come across them in a park. However, you may need to switch between sections or pages as you complete the park audit. Therefore, it is importar
- When you are finished,
- There is space at the en audit. The margins or ba comments into the ansv
- If you see anything that

**Park Name:** _____

**Park Address/Location:** _____

**Were you able to locate a map**

**Was the park easy to find onsit**

**Date (m/d/yr):** ___/___/____

**Temperature:** ___ °F **Weat**

**Start Time:** _____ am or pm (c

Comments on Park Informatio

**Section 4: Park Quality and Safety**

This section asks about factors related to comfort and safety when using the park. Several questions include follow-up responses if you answered yes. There are spaces for comments at the end of the section.

When rating the quality and safety features of the park, please use the following definitions:

- **Useable**: everything necessary for use is present and nothing prevents use (e.g., can get into restrooms, drinking fountains work, etc.)
- **Good condition**: looks clean and maintained (e.g., minimal rust, graffiti, broken parts; etc.)

13. Are there public **restroom(s) or portable toilet(s)** at the park? ❑ No ❑ Yes
    If yes …
    Are the restroom(s) useable? ❑ All or most are useable ❑ About half ❑ None or few are useable
    Are they in good condition? ❑ All or most in good condition ❑ About half ❑ None or few in good condition
    Is there a family restroom? ❑ No ❑ Yes
    Is there a baby change station in any restroom? ❑ No ❑ Yes

14. Are there **drinking fountain(s)** at the park? ❑ No ❑ Yes
    If yes …
    How many different fountains are there? (i.e., units, not spouts) _____
    Are the fountains useable? ❑ All or most are useable ❑ About half ❑ None or few are useable
    Are they in good condition? ❑ All or most in good condition ❑ About half ❑ None or few in good condition
    Are they near activity areas? ❑ All or most are near ❑ About half ❑ None or few are near

15. Are there **bench(es)** to sit on in the park? ❑ No ❑ Yes
    If yes …
    Are the benches useable? ❑ All or most are useable ❑ About half ❑ None or few are useable
    Are they in good condition? ❑ All or most in good condition ❑ About half ❑ None or few in good condition

16. Are there **picnic table(s)** in the park? ❑ No ❑ Yes
    If yes …
    Are the tables useable? ❑ All or most are useable ❑ About half ❑ None or few are useable

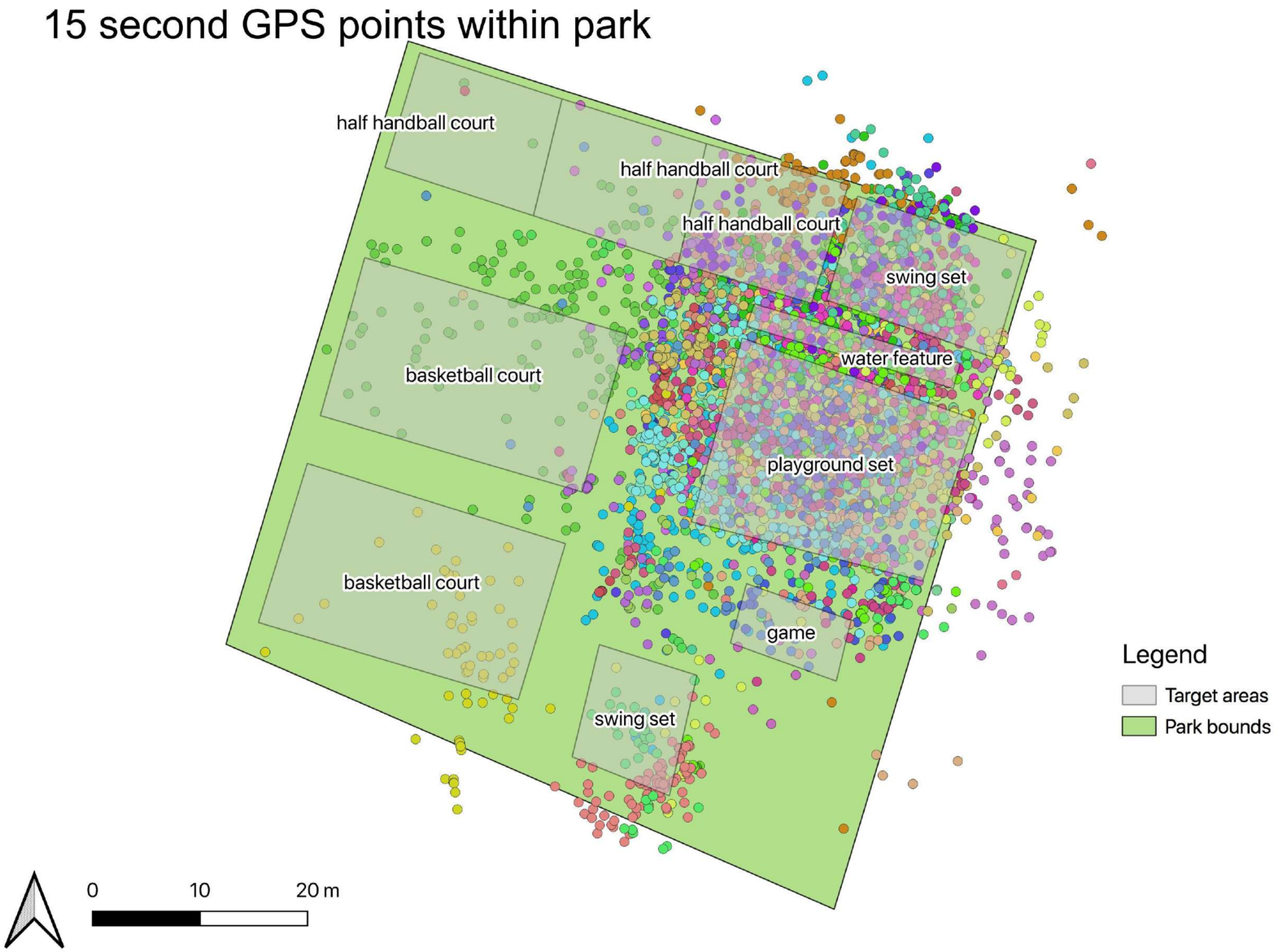
# Quality

- Images from ground-level
- Google streetview most common
- Computer vision or human evaluators

# Quality

## Example

- Sensors
  - GPS + Accelerometers
- Observational tools
  - System for Observing Play and Recreation in Communities (SOPARC)




Robert Wood Johnson Foundation 2016. “Park Use and Physical Activity Among Children in Low Income and Racial and Ethnic Minority Communities” PARC3.
PI: Aaron Hipp; Myron Floyd

# Quality

## Example

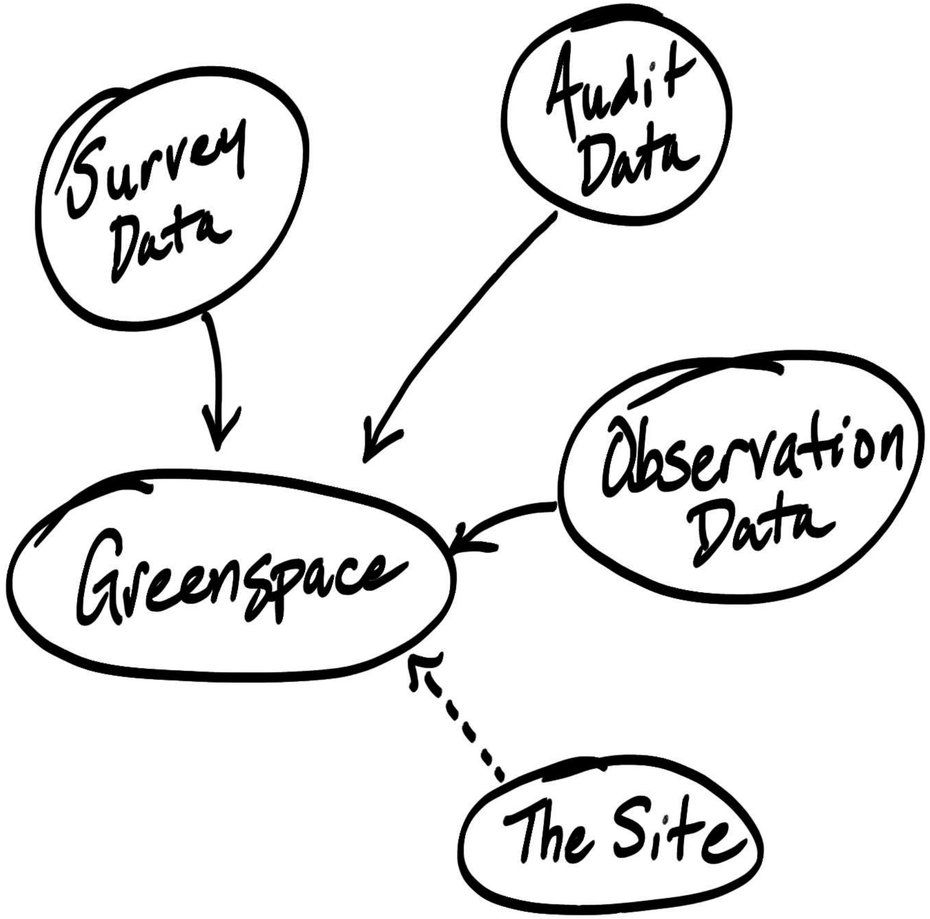
- Woods in and Around Town (WIAT)
  - Aiming for more specific information on the features of woodlands
  - Prior work and our continuing project, look broadly but with detailed data
  - Combining with health data

# Quality

- Measuring the quality is hard
- Quality is important to both making greenspaces that benefit people and ensuring that those benefits are distributed equally

# Quality

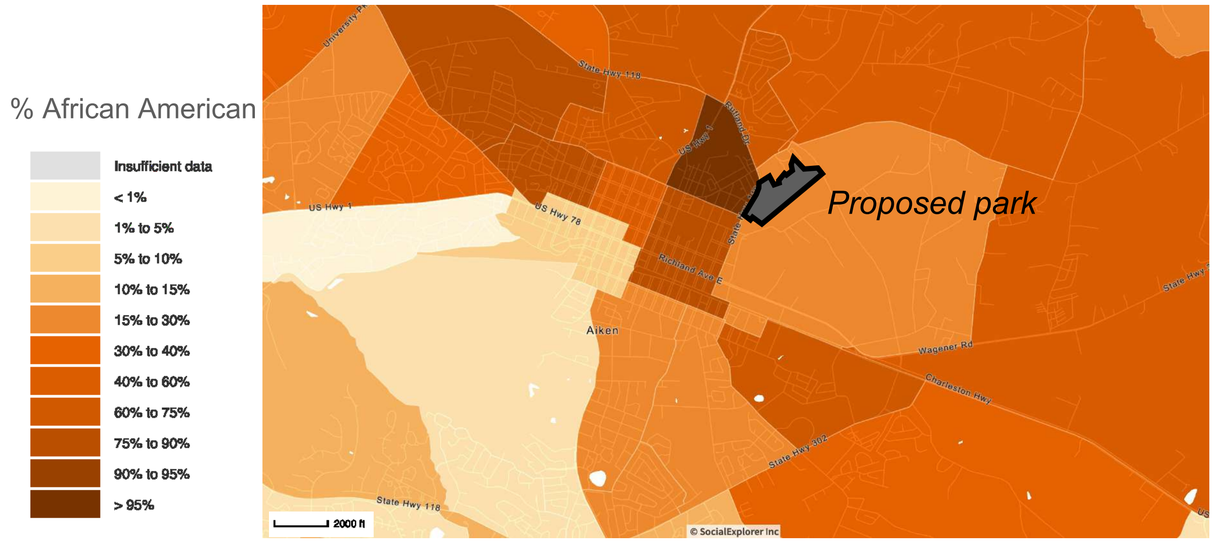
- The role of design
  - The place can be green already
  - But green alone doesn’t meet peoples’ needs

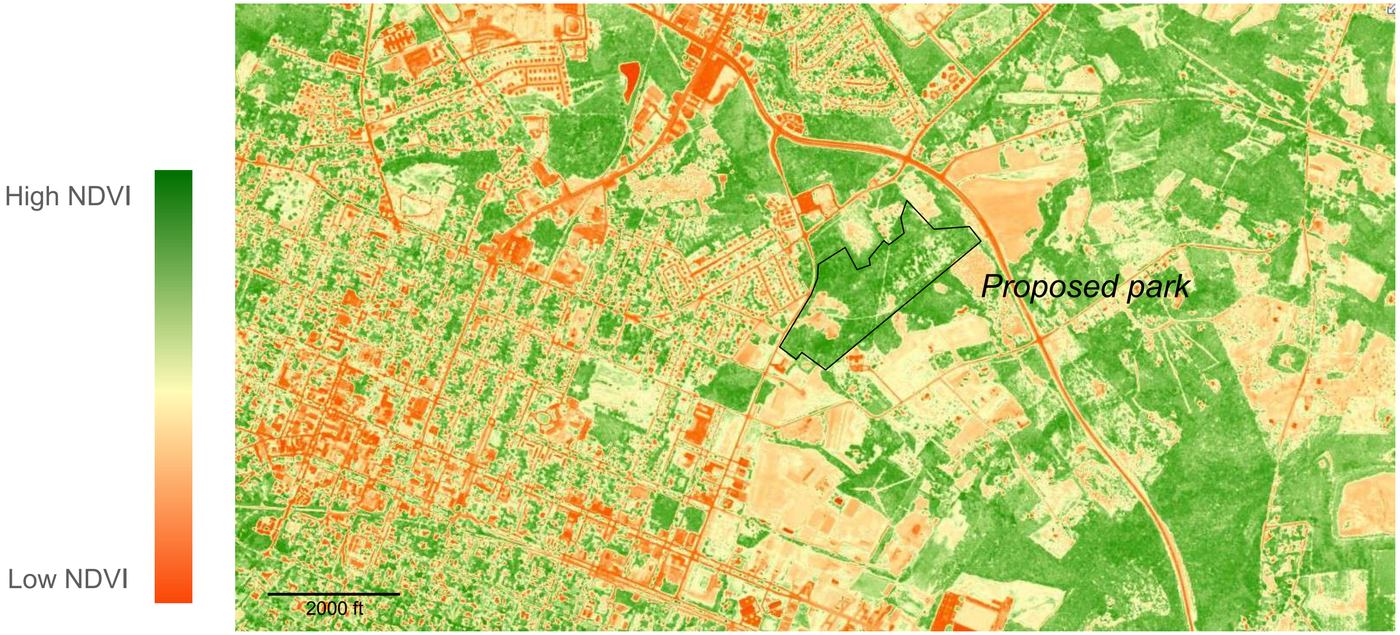


# Quality

## Example

- Northside Park, Aiken, SC, USA
  - Was green, but not available
  - Imagining the possibilities

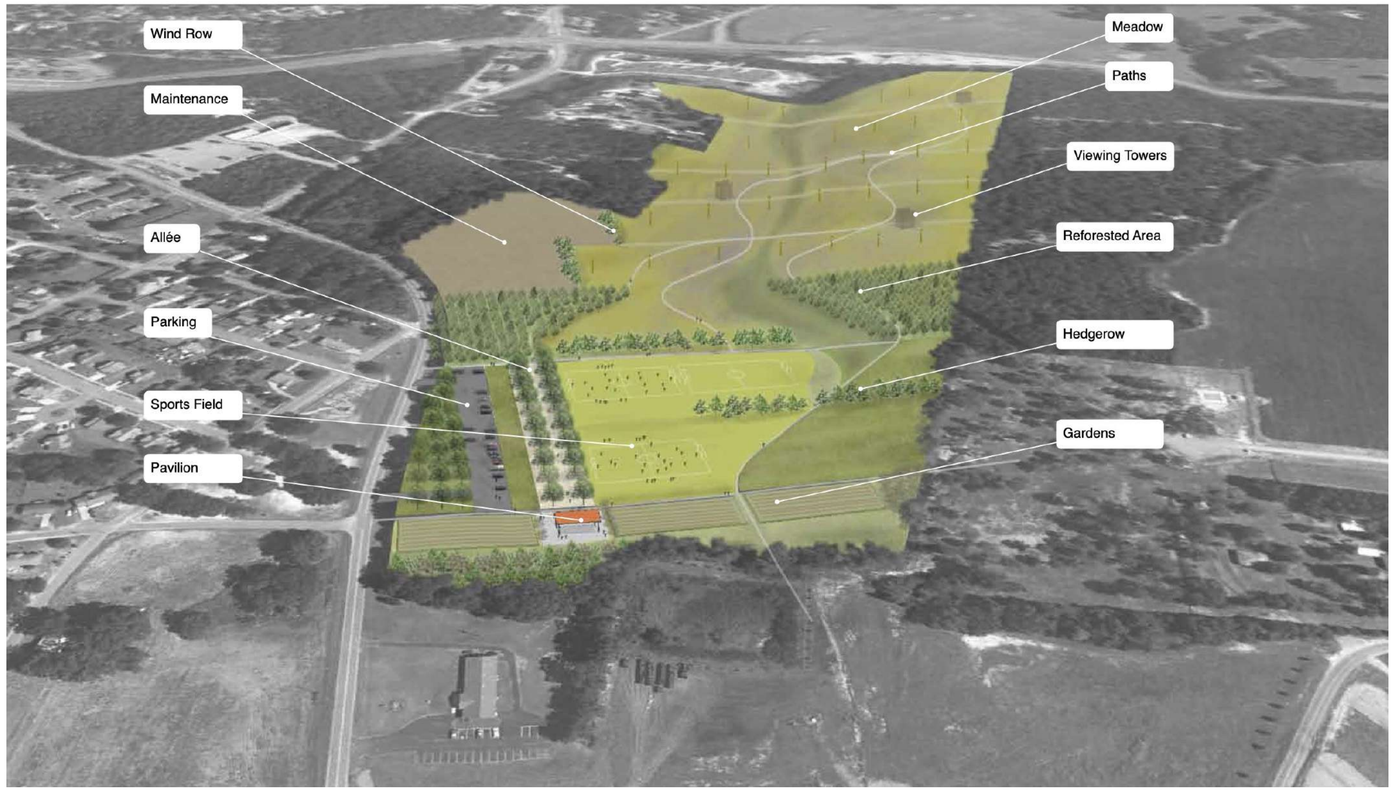


# Quality

## Example

- Northside Park, Aiken, SC, USA
  - Constraints of site + Needs of community
- Move from measuring to creating, both quantity and quality




https://worldlandscapearchitect.com/northside-park-aiken-usa-pearson-russell-design-associates/

# Summary

- Quantifying greenspaces, parks and open spaces is a starting point. Reveals patterns but difficult to understand ‘why’
- Monitoring quantity can be a way to assess change, objective measure
- It is the quality that means something for people. Makes a connection between them and the place
- The design professions have known this and know what quality greenspace looks like, have worked with people to shape parks and open spaces
- Looking forward, combining design knowledge with quantitative measure to better inform our understanding of where and how to create meaningful greenspaces

# Thank you!

Scott Ogletree

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