

A satellite map of the Oklahoma City area, showing the city and surrounding regions. The map is overlaid with a grid and a scale bar. The text is centered on the map.

Linking land use and management,
water resources, and human
wellbeing in Oklahoma City

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12.3 km

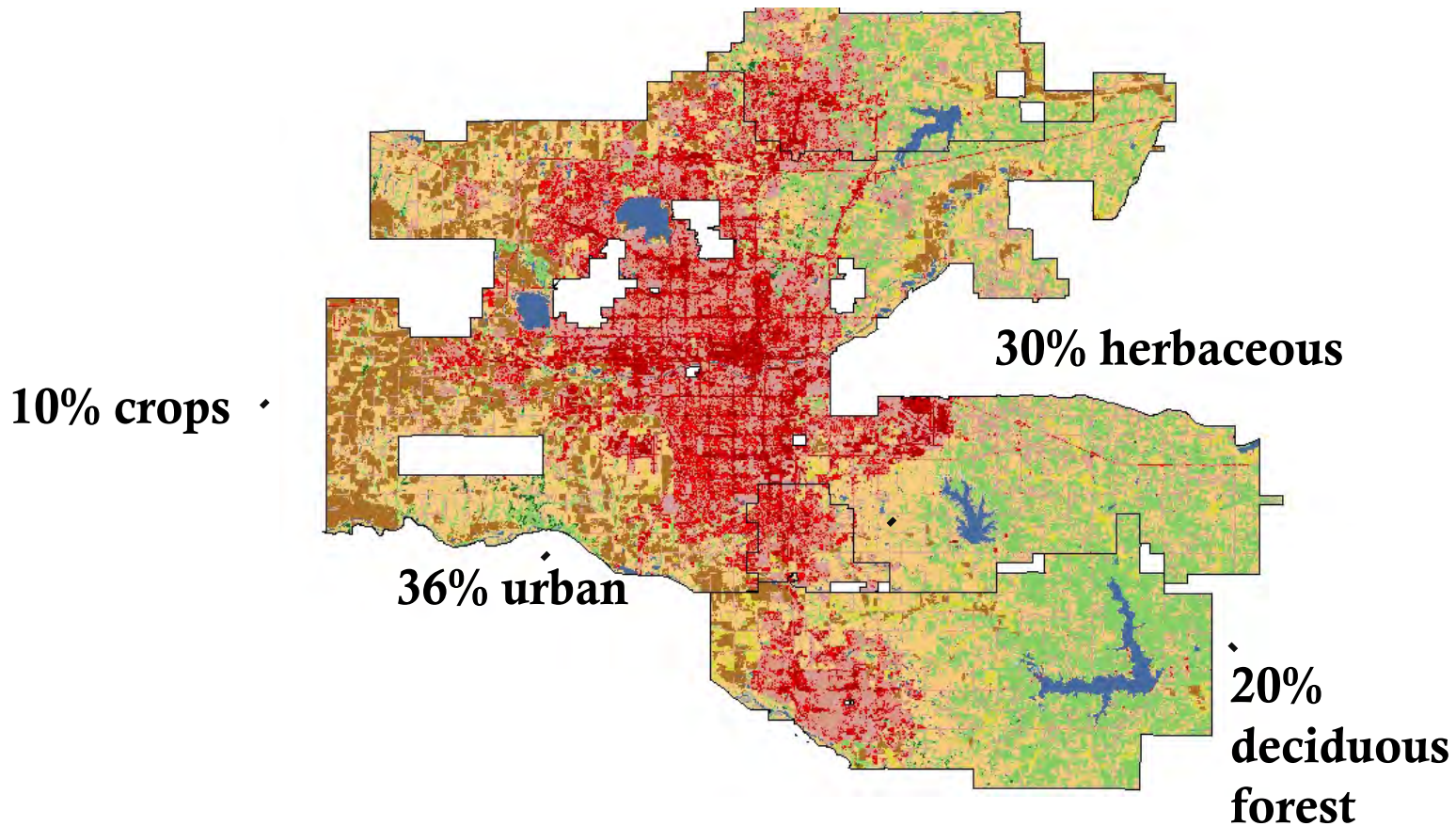
Google earth

Team:

- **Beth Caniglia**, *Sociology*, **OSU**
- **Tracy Boyer**, *Agricultural Economics*, **OSU**
- **Garey Fox**, *Biosystems and Agricultural Engineering and Oklahoma Water Resources Center*, **OSU**
- **Jack Friedman**, *Center for Applied Social Research*, **OU**
- **Jennifer Koch**, *Geography and Environmental Sustainability*, **OU**
- **Renee McPherson**, *Geography and Environmental Sustainability*, **OU**
- **Xiangming Xiao**, *Microbiology and Plant Biology*, **OU**

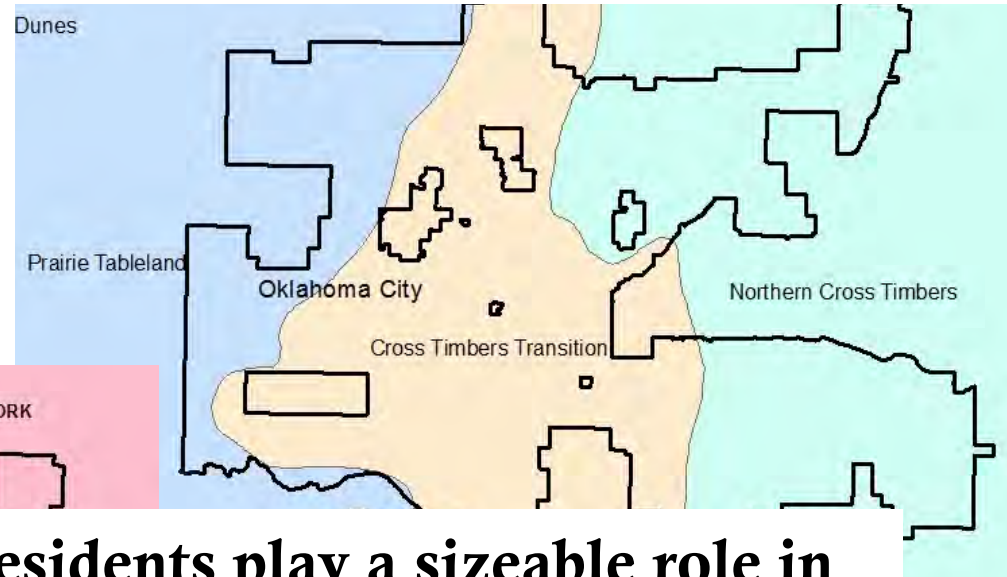
Setting: Oklahoma City Metro

2011 land cover (NLCD)

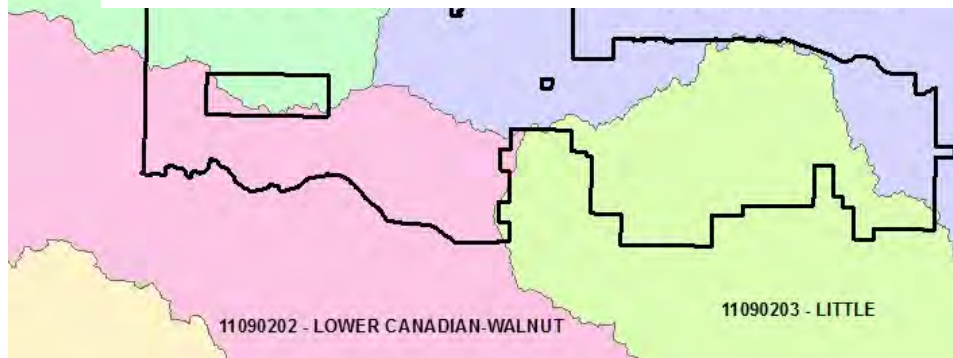


Oklahoma City conforms to social and political rather than watershed boundaries. Its large geographical area spans:

- 4 counties
- 6 watersheds
- 3 major ecoregions



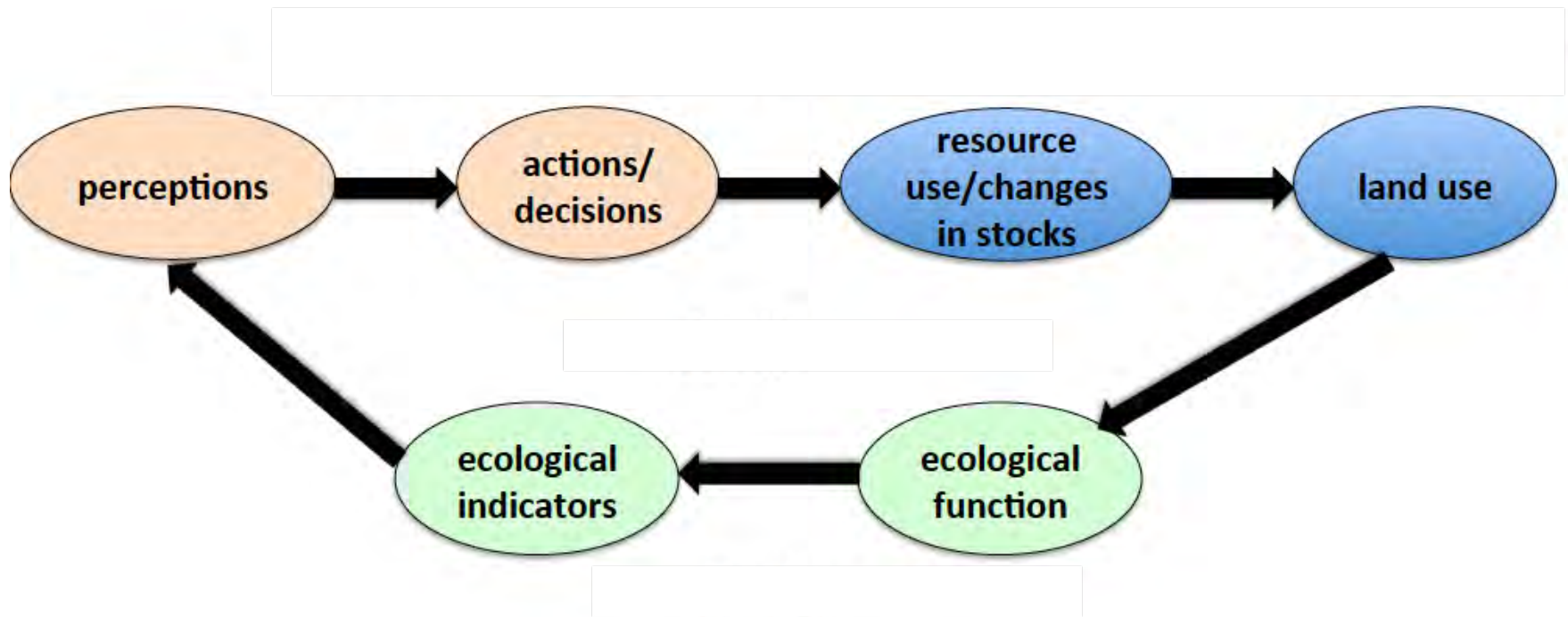
Oklahoma City and its residents play a sizeable role in decision making and resource use in Central Oklahoma and throughout the state.



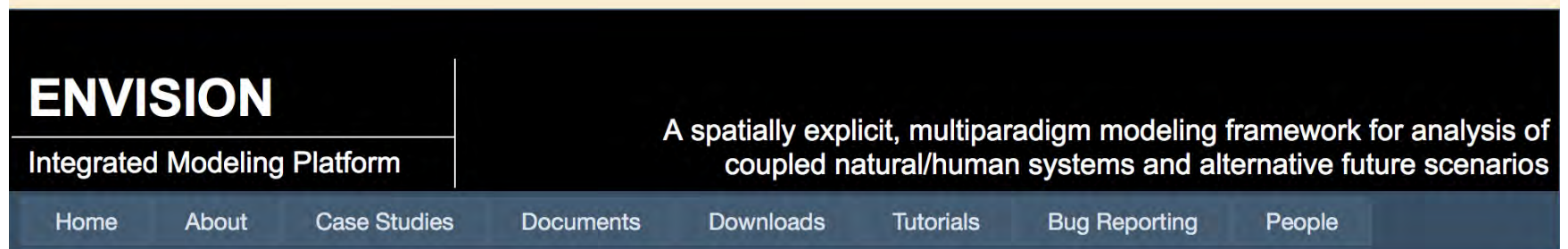
diverse actor groups

Overarching questions:

- How do changes in land use, land management and water resource use feed back to impact human wellbeing?
- What ecological metrics or indicators do people perceive and respond to?



Tools: ENVISION



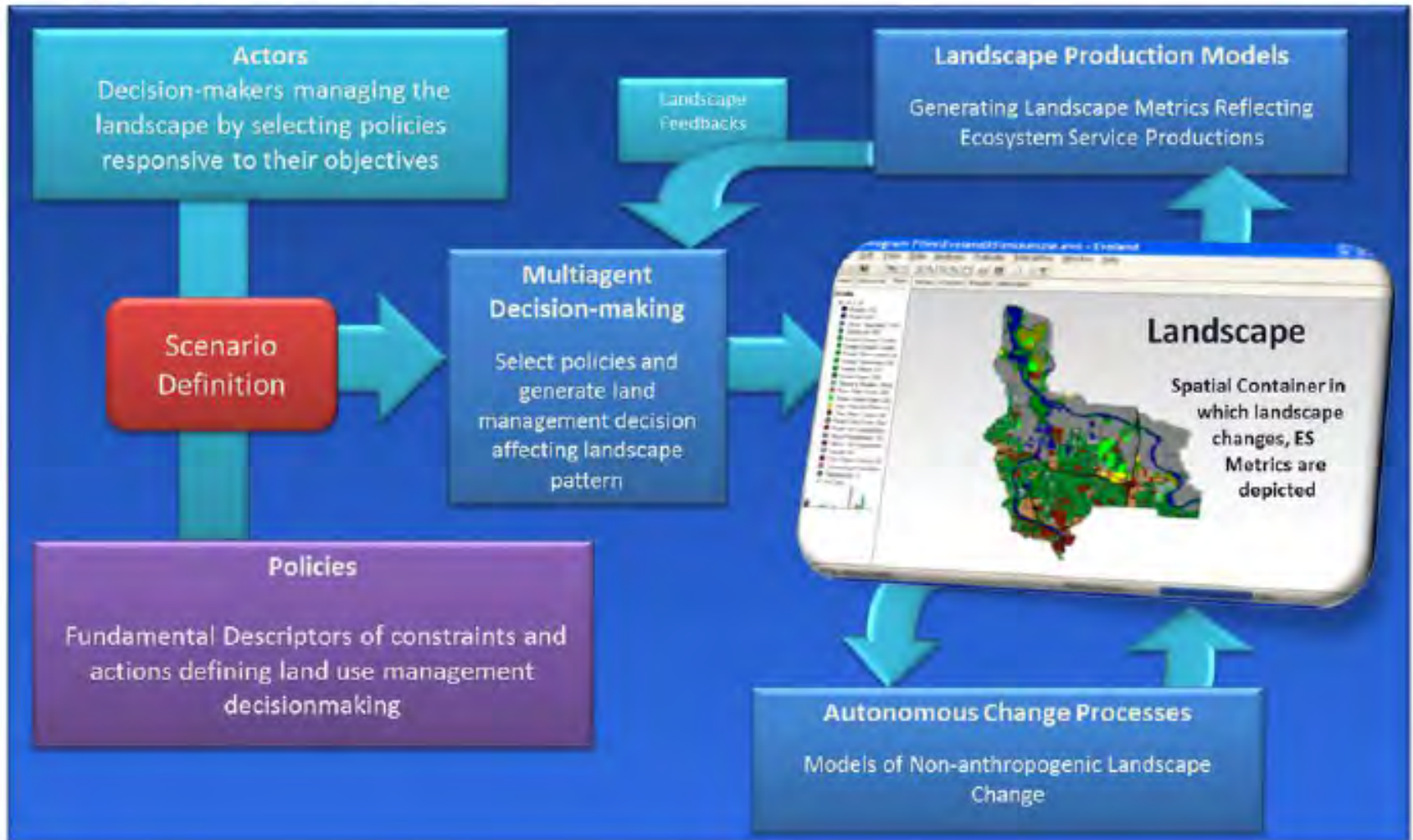
The screenshot shows the top navigation bar of the ENVISION website. On the left, the word "ENVISION" is displayed in large white letters, with "Integrated Modeling Platform" written below it in smaller white text. To the right of this, a dark blue banner contains the text "A spatially explicit, multiparadigm modeling framework for analysis of coupled natural/human systems and alternative future scenarios" in white. Below the banner is a dark blue navigation menu with white text for "Home", "About", "Case Studies", "Documents", "Downloads", "Tutorials", "Bug Reporting", and "People".

Characteristics:

- GIS-based tool
- Open-source, freely available
- Analysis and simulation of actor decision making in parallel with landscape change
- Alternative futures analyses
- Adaptable to a variety of geographic locations and application domains

Tools: ENVISION

Conceptual Framework:



Identified data needs:

- Remote sensing data of land cover and fluxes, at varying spatial resolutions (very fine – 1m to relatively fine – 30m)
- Basic demographic data (census block data)
- Data on water costs, policies, and regulations
- Metrics on human wellbeing
- Understanding of municipal and household decision making regarding water resources
- Water budget (including human infrastructure and local hydrology)
- Quantification of ecosystem services provided by urban landscapes

Examples of available data:

household water use and adoption of water conservation measures

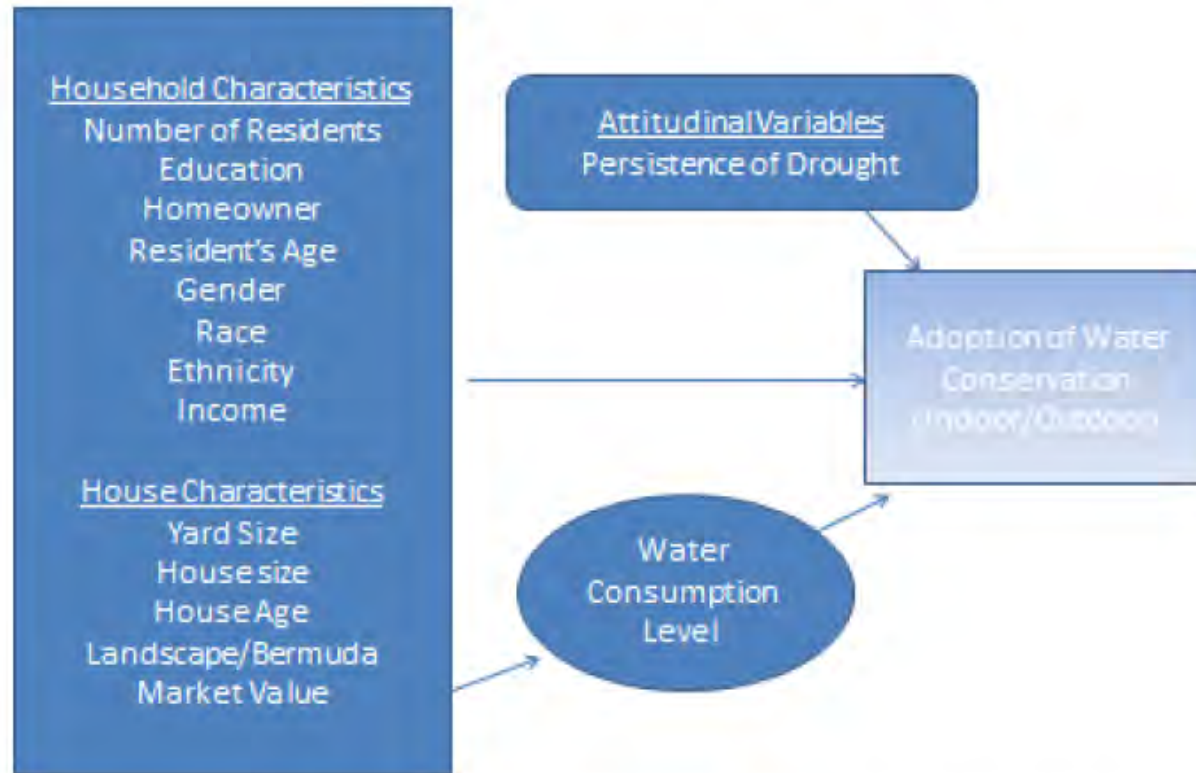
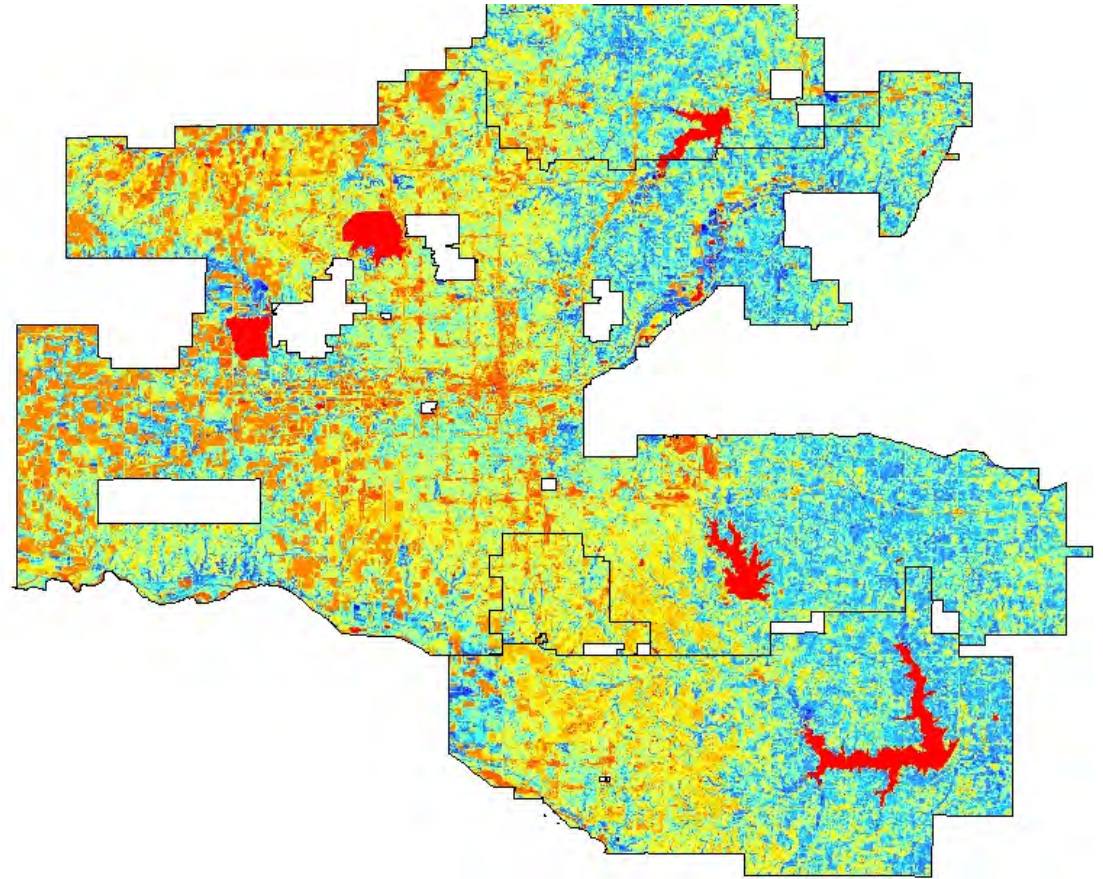


Figure 1. Hypothesized Influence of Independent Variables on Indoor and Outdoor Adoption of Conservation Measures

Examples of available data:

remotely sensed land cover, greenness, primary productivity, evapotranspiration



**Landsat 30m
Enhanced
vegetation index
(EVI)**

Xiangming Xiao

Examples of available data:

*access to greenspaces,
influence of policies to
increase access*

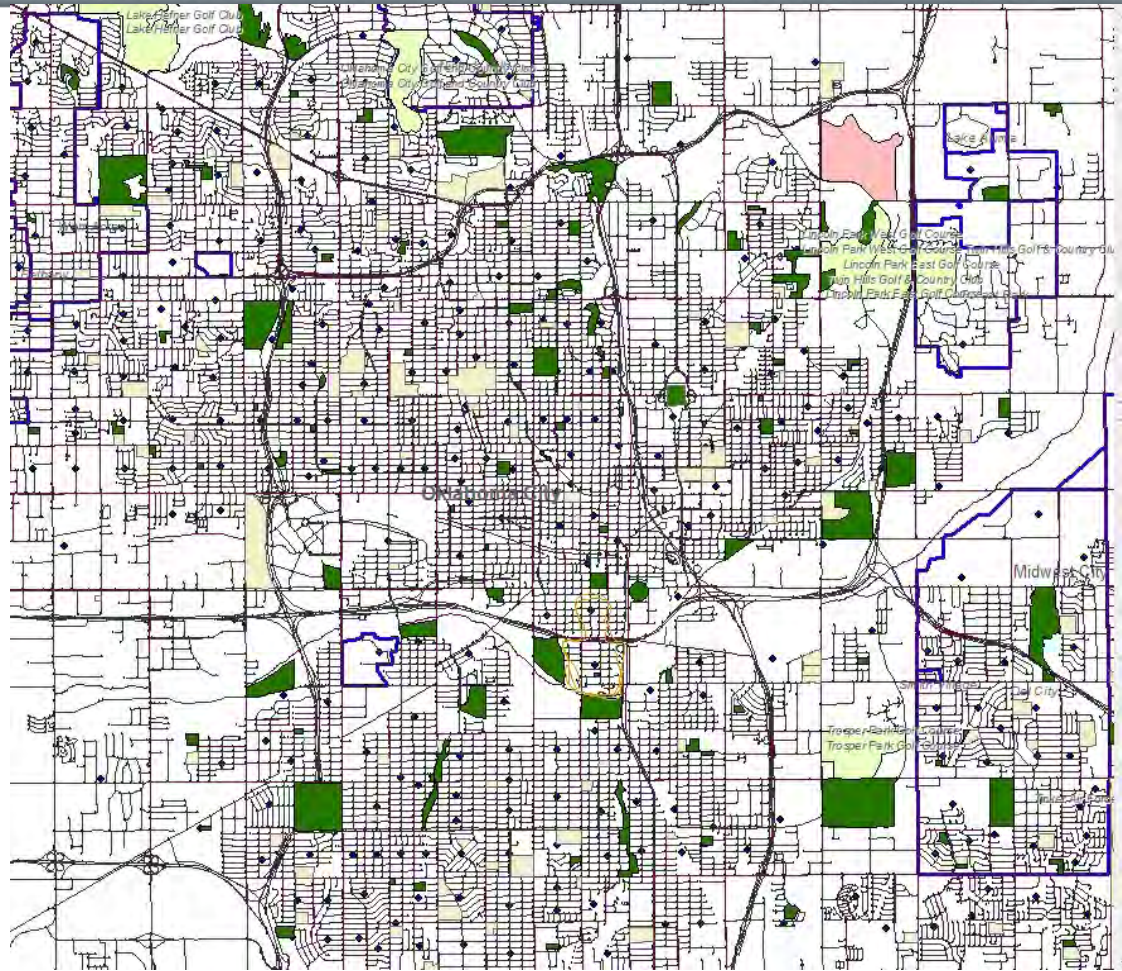
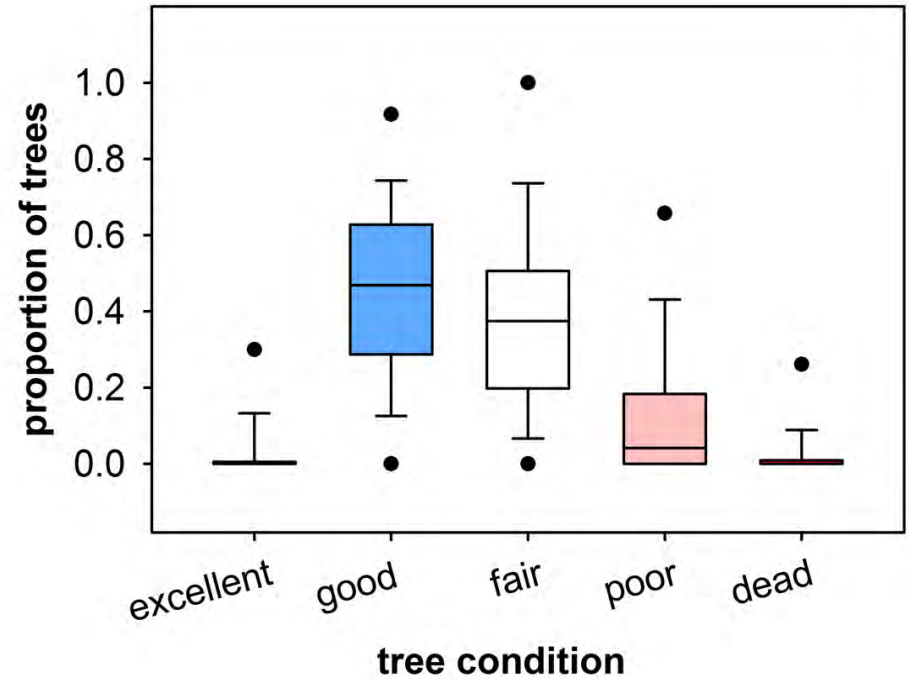
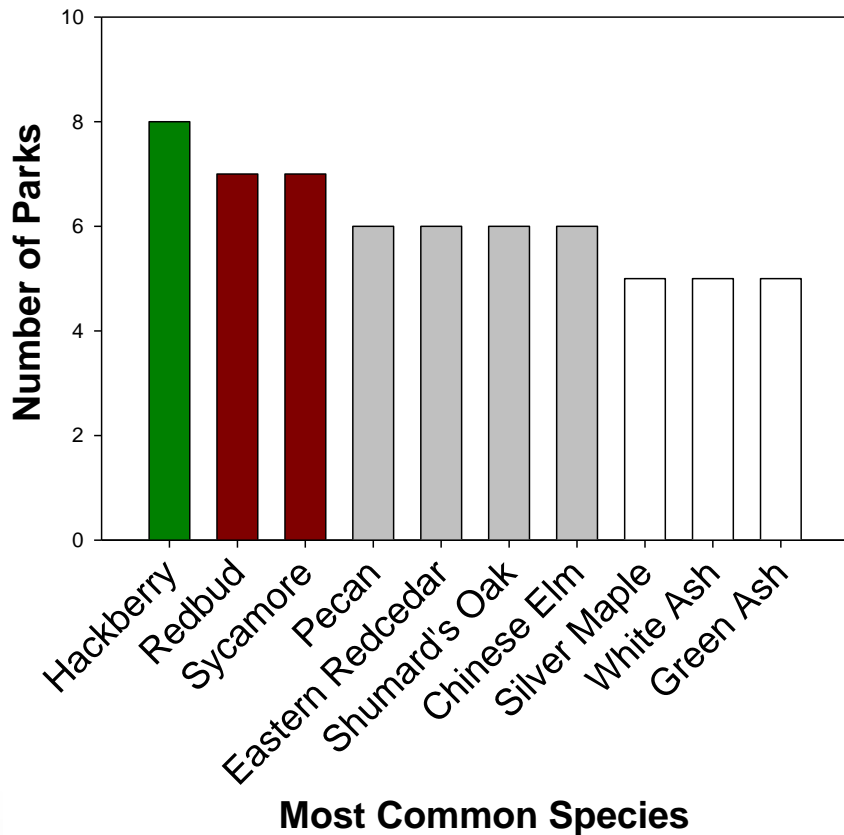


Figure 6: Smaller Green Spaces in the Inner City Area

Daisha Delano, MA thesis (advisor: Beth Caniglia)

Examples of available data:

urban forest composition, condition, growth, mortality



Heather McCarthy

What next?

- Compile additional (relevant) information
- Determine appropriate scenarios
- Begin model construction

Conceptual Framework:

