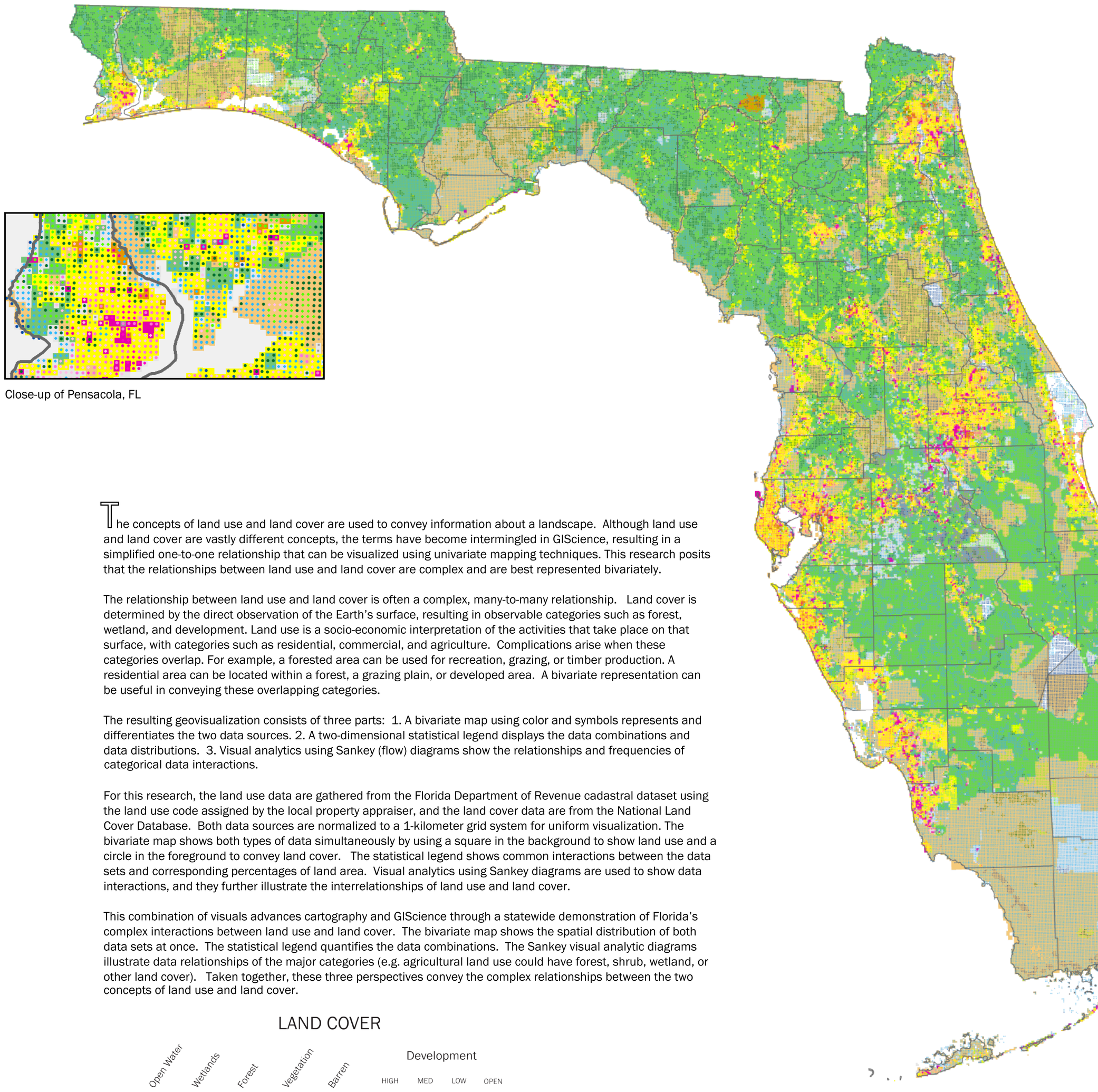
Land Use or Land Cover?

Visualizing Florida's Complex Landscape



Close-up of Pensacola, FL

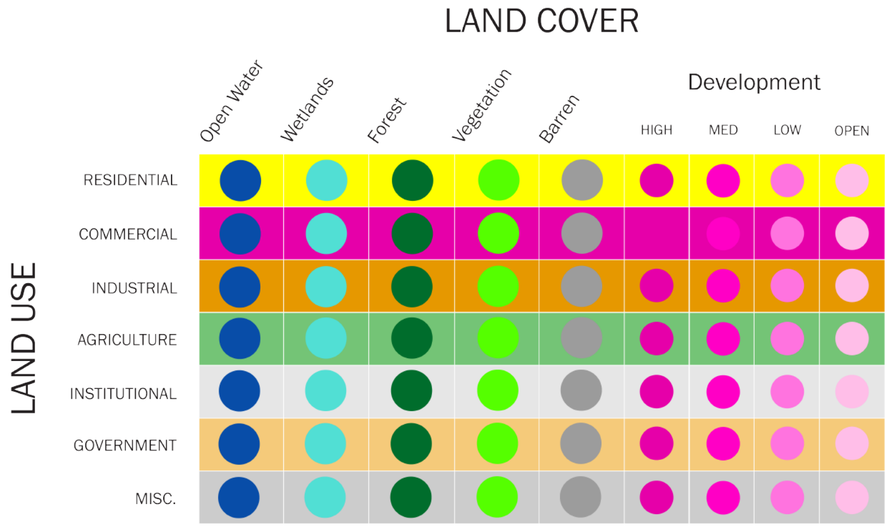
The concepts of land use and land cover are used to convey information about a landscape. Although land use and land cover are vastly different concepts, the terms have become intermingled in GIScience, resulting in a simplified one-to-one relationship that can be visualized using univariate mapping techniques. This research posits that the relationships between land use and land cover are complex and are best represented bivariately.

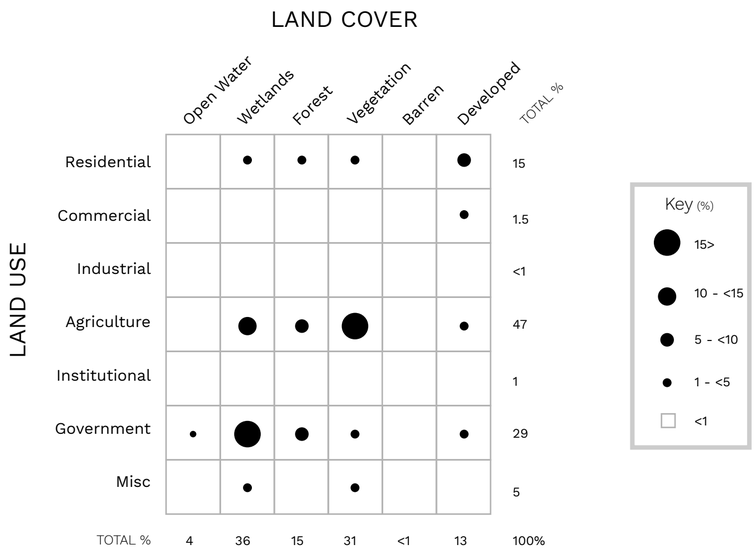
The relationship between land use and land cover is often a complex, many-to-many relationship. Land cover is determined by the direct observation of the Earth's surface, resulting in observable categories such as forest, wetland, and development. Land use is a socio-economic interpretation of the activities that take place on that surface, with categories such as residential, commercial, and agriculture. Complications arise when these categories overlap. For example, a forested area can be used for recreation, grazing, or timber production. A residential area can be located within a forest, a grazing plain, or developed area. A bivariate representation can be useful in conveying these overlapping categories.

The resulting geovisualization consists of three parts: 1. A bivariate map using color and symbols represents and differentiates the two data sources. 2. A two-dimensional statistical legend displays the data combinations and data distributions. 3. Visual analytics using Sankey (flow) diagrams show the relationships and frequencies of categorical data interactions.

For this research, the land use data are gathered from the Florida Department of Revenue cadastral dataset using the land use code assigned by the local property appraiser, and the land cover data are from the National Land Cover Database. Both data sources are normalized to a 1-kilometer grid system for uniform visualization. The bivariate map shows both types of data simultaneously by using a square in the background to show land use and a circle in the foreground to convey land cover. The statistical legend shows common interactions between the data sets and corresponding percentages of land area. Visual analytics using Sankey diagrams are used to show data interactions, and they further illustrate the interrelationships of land use and land cover.

This combination of visuals advances cartography and GIScience through a statewide demonstration of Florida's complex interactions between land use and land cover. The bivariate map shows the spatial distribution of both data sets at once. The statistical legend quantifies the data combinations. The Sankey visual analytic diagrams illustrate data relationships of the major categories (e.g. agricultural land use could have forest, shrub, wetland, or other land cover). Taken together, these three perspectives convey the complex relationships between the two concepts of land use and land cover.



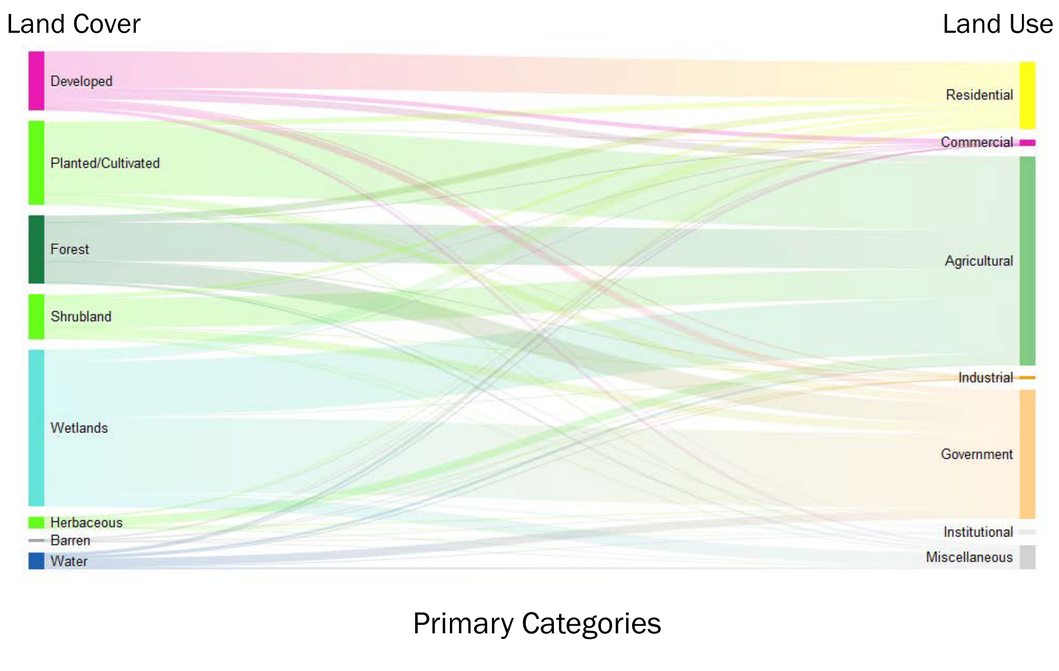


Data Sources:
Land Use - Florida Department of Revenue Cadastral 2014
Land Cover - National Land Cover Database 2011

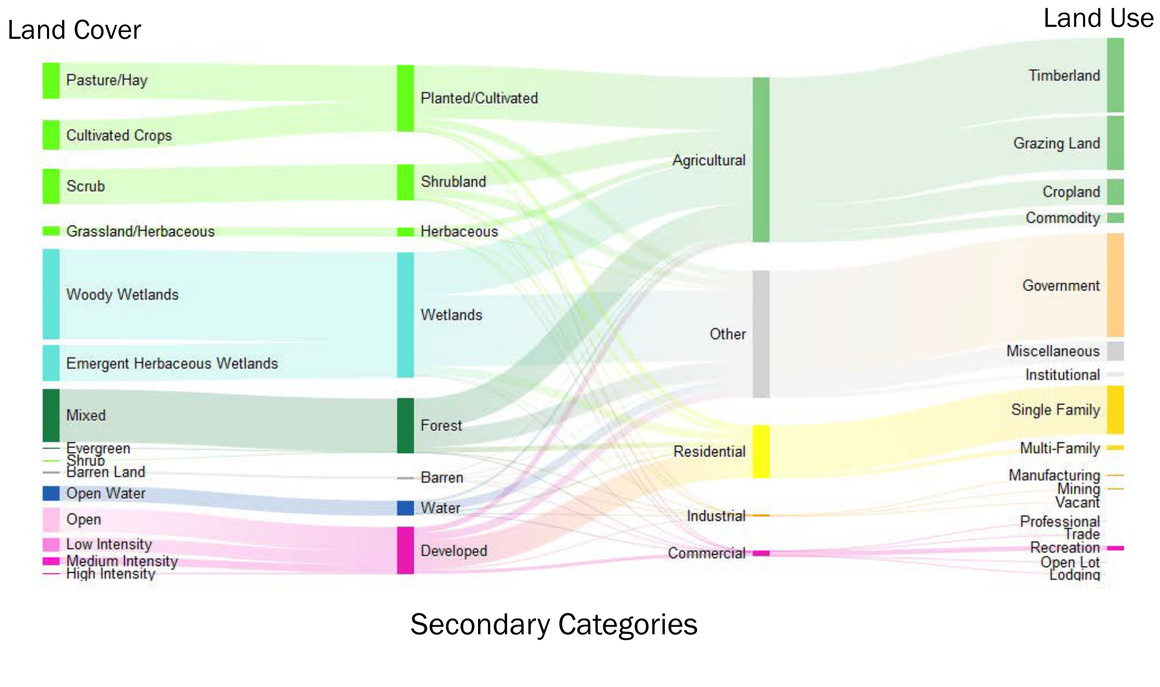
All data have been transferred to the 1-km U.S. National Grid.

Visualizing Complex Relationships

Sankey diagrams show relationships and frequencies of Florida's Land Use and Land Cover.



Primary Categories



Secondary Categories

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Download the poster and data here:
http://bit.ly/2sWqesX

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