PLANNING

Improving Population Estimates

A population estimation for every land parcel in Florida

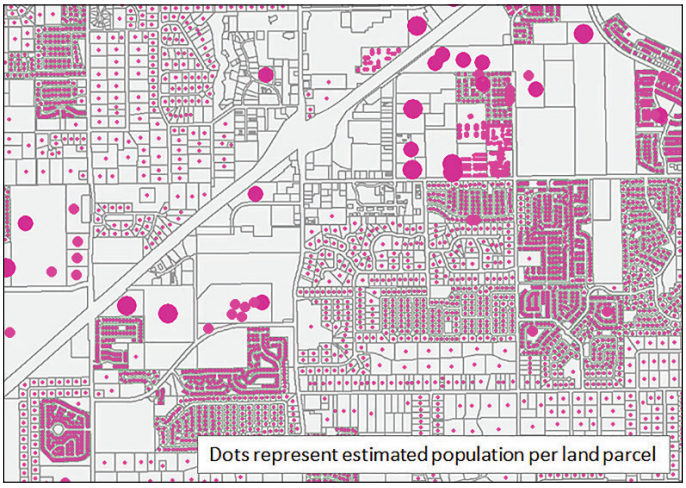
by Georgianna Strode
Florida State University

Population estimates are important for formulating policies on urban planning, crime, socioeconomic welfare, health care, emergency services and assessing risks of exposure to environmental hazards and natural disasters.

Data from the U.S. Census Bureau are most commonly used, as they are widely available and relatively inexpensive. But there are drawbacks to using census data: Census boundaries are arbitrary and bear little relation to the actual landscape. Population is assumed to be spread evenly across an area – even in lakes and highways. And census records can mask data patterns.

However, **dasymetric** (pronounced DAY-sym-met-ric) population estimation methods combine census data with other types of locally maintained data, such as night-time lights, land cover, address points, electricity hookups and property tax information, resulting in more realistic population patterns. Property appraiser information is a respected component of dasymetric mapping because of its high precision and detailed information.

The property appraiser database contains information useful to predicting residency, such as land use codes and number of residences on a property. The following image shows an example of the results: The pink dots represent an estimated population for each parcel. Larger dots could represent apartments, nursing homes or other group-living areas, while smaller dots might reflect individual houses. Parcels with no dots have a population estimate of zero.



Although there are several methods for determining population counts, they are not equal. However, for many

areas of public policy, accurate population counts are vital. For example, with a more targeted knowledge of the numbers and locations of persons at risk, first responders can better prepare for disasters.

One method for determining population counts uses interpolation to estimate population based on the proportion of the risk area to the full census area. In other words, if an area at risk covers 40 percent of the census area, then the population at risk is assumed to be 40 percent of the census totals.

While this method is commonly used, studies suggest it often results in a population undercount that can leave public officials unprepared. The interpolation method assumes people are evenly dispersed across geographic areas when, in reality, people tend to live in clusters.

The parcel-based dasymetric method is another way to determine population counts. It assigns population estimates to the finest level of resolution – the land parcel. In short, interpolation divides a large area, while parcel-based estimation reflects a group of smaller areas (parcels).

The example below demonstrates a fictitious area of risk and the population affected calculated using two methods: First, by splitting census boundaries; and second, by parcel-based dasymetric methods. The census splitting method undercounted the at-risk population by 3,688 people, or 29 percent. The dasymetric method calculated 5,267 people.

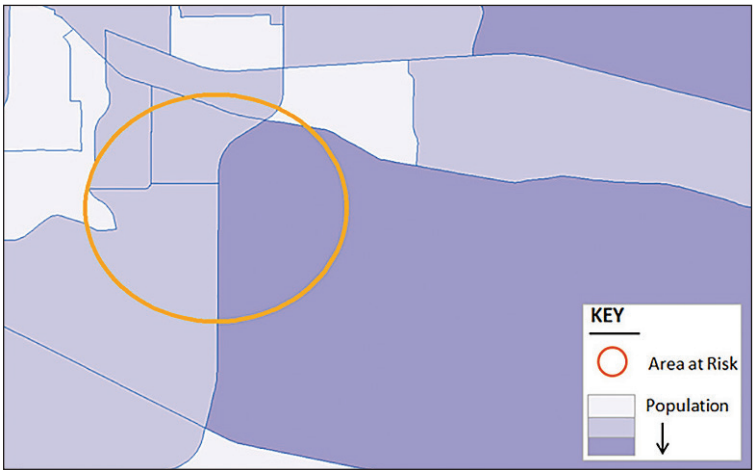
The explanation is that census data assume an even distribution of people across area, even across uninhabitable areas, when in reality people tend to live in groups and neighborhoods. Parcel-based mapping gives a more precise and realistic view of where people live and provides more accurate numbers to officials working for the public good.

THE FREAC'S POPULATION ESTIMATES

The **Florida Resources and Environmental Analysis Center** (FREAC) at Florida State University has calculated population estimates for each of Florida's 9 million land parcels. This method is relatively new and Florida is the first state in the United States to have this information statewide.

Could your city benefit from this high-resolution population data? Potential uses could be future land planning, water usage projections, infrastructure expansion, emergency response and more. Contact the FREAC today with questions or ideas for your city.

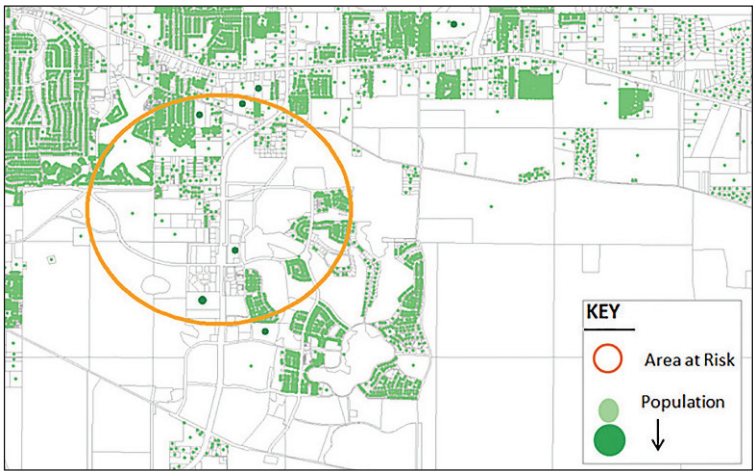
Georgianna Strode is an application developer at the Florida Resources and Environmental Analysis Center at the Florida State University. Contact her at *gstrode@fsu.edu* or (850) 644-5886. QC



CENSUS BLOCK GROUP DATA

Population is assumed to be spread evenly across an area. Calculating the number of people at risk in an event is done through the ratio of the size of the risk area and the size of the census area (e.g. 20% of the land area and area assumes 20% of population).

Population at Risk in this example: 3,688



DASYMETRIC PARCEL-BASED ESTIMATIONS

Population is estimated for each land property parcel. Calulating the number of people at risk in an event is done by summing the estimates for all parcels within the area at risk.

Population at Risk in this example: 5,267