Geographies of Poverty:

Improving the reliability and usability of spatial displays of small area data from the American Community Survey

Presented by:

Ben Horwitz

May 30, 2014

THE DATA CENTER

Independent Analysis for Informed Decisions in Southeast Louisiana

We already display the margin of error in our neighborhood profiles.

Central City Statistical Area, Neighborhood Statistical Area Data Profile

	Central City			Orleans Parish			United States		
Population in poverty	2000	2006-2010	MOE*	2000	2006-2010	MOE*	2000	2006-2010	MOE*
People living in poverty	49.8%	37.9%	+/- 7%	27.9%	24.4%	+/- 1%	12.4%	13.8%	+/- 0.1%
People living at or above poverty	50.2%	62.1%	+/- 6%	72.1%	75.6%	+/- 1%	87.6%	86.2%	+/- 0.1%

Source Citation: GNOCDC analysis of data from U.S. Census 2000 Summary File 3 (SF3) and 2006-2010 American Community Survey

Test Statistical Significance

1. Enter the percents (%) or dollar amounts ($) that you want to compare and the margin of error (MOE) for each.

Important: Only include numbers. Include a zero before the decimal point for numbers less than one. Do not include a comma, or $, % or +/-.

Percents (%) or dollar amounts ($):

Margins of error (MOEs):

2. Click here to calculate

3. Is the difference "statistically significant at the 90% confidence interval"?

4. Be sure to write down your results on a piece of paper.

Reset

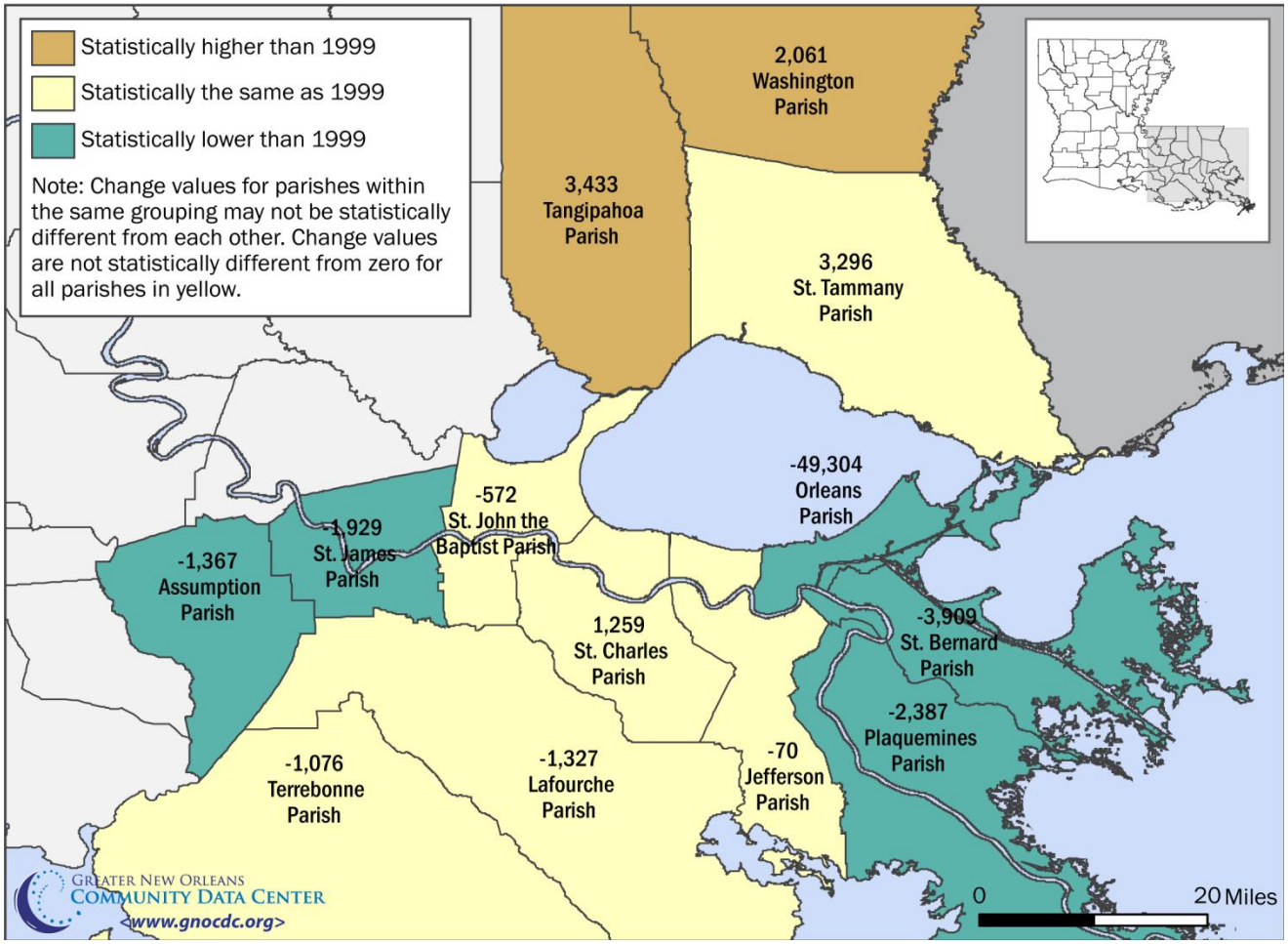
Another way to look at the margin of error is to explore the confidence interval.

Poverty rates and their 90% confidence interval by New Orleans neighborhood, 2006-2010

Source: The Data Center analysis of data from 2006-2010 American Community Survey

Researchers have produced several methods for mapping the margin of error.

Change in the population in poverty by parish, 1999 to 2008-10 (three-year average)



Source: Plyer, A. & Ortiz, E. (2012). Poverty in Southeast Louisiana post-Katrina. The Data Center.

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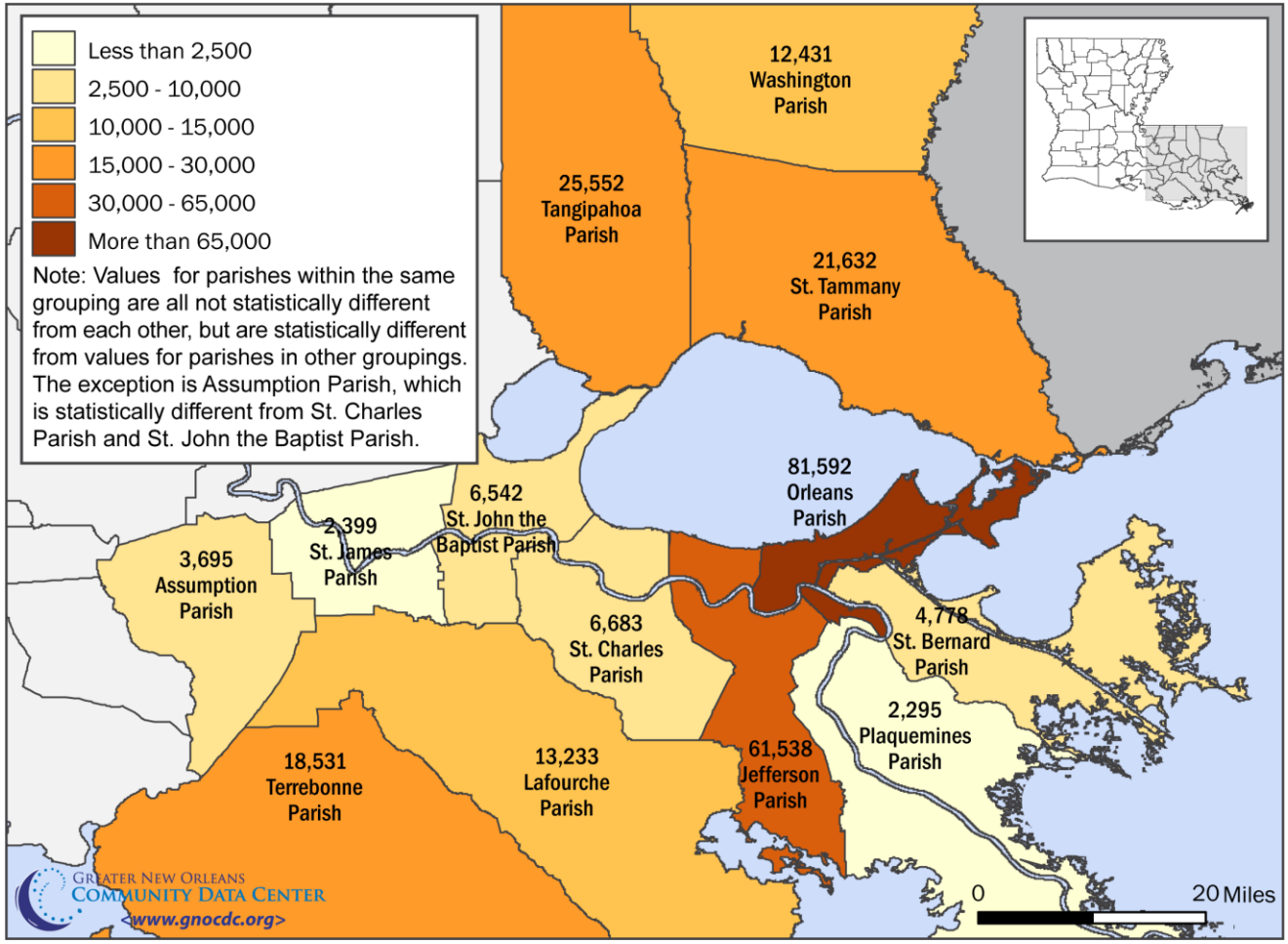
Population in poverty by parish, 2008-10 (three-year average)



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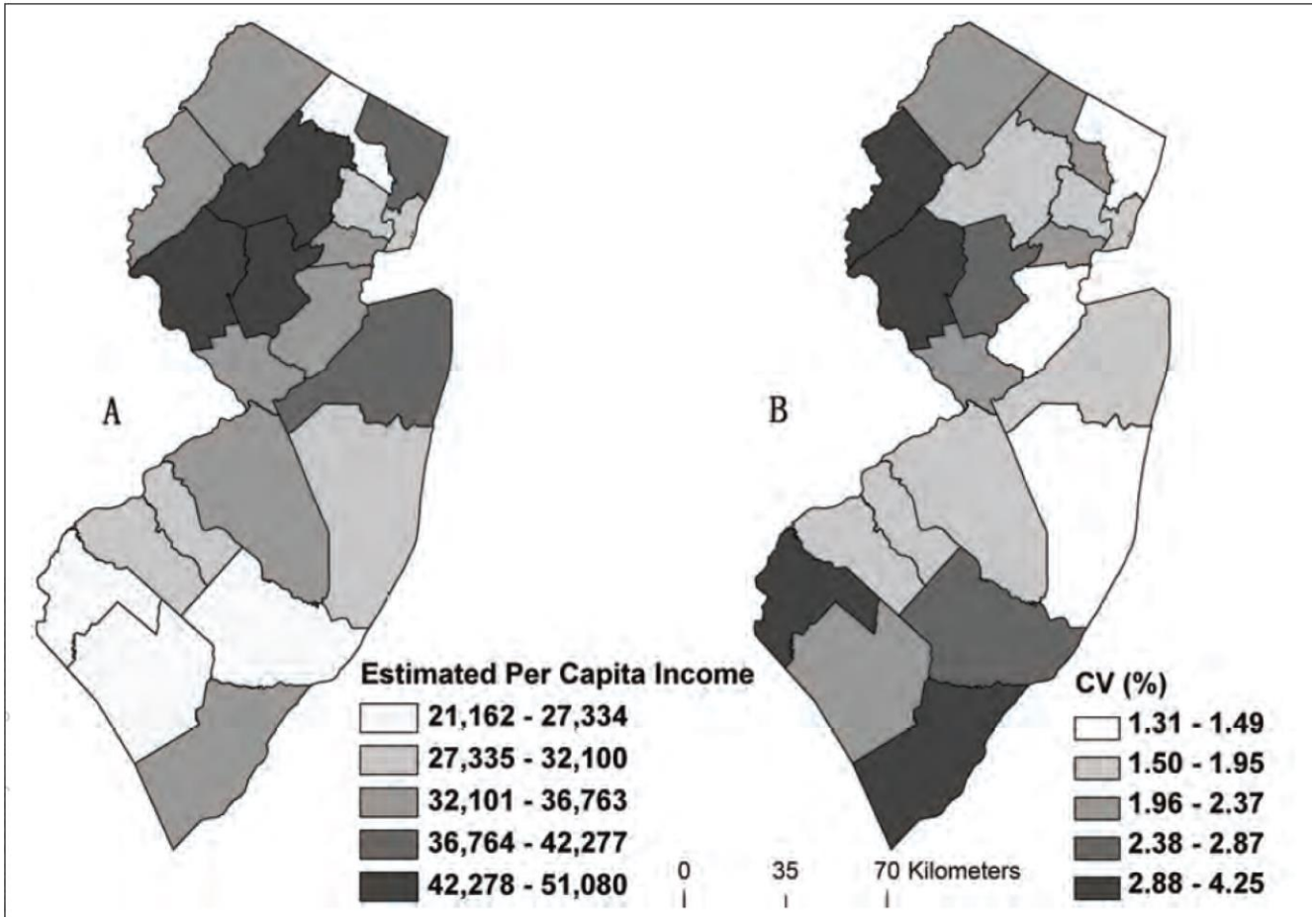
Example side-by-side maps.



Source: Sun, M. and D. W. S. Wong. (2010). Incorporating data quality information in mapping the American Community Survey data. Cartography and Geographic Information Science 37 (4): 285-300.

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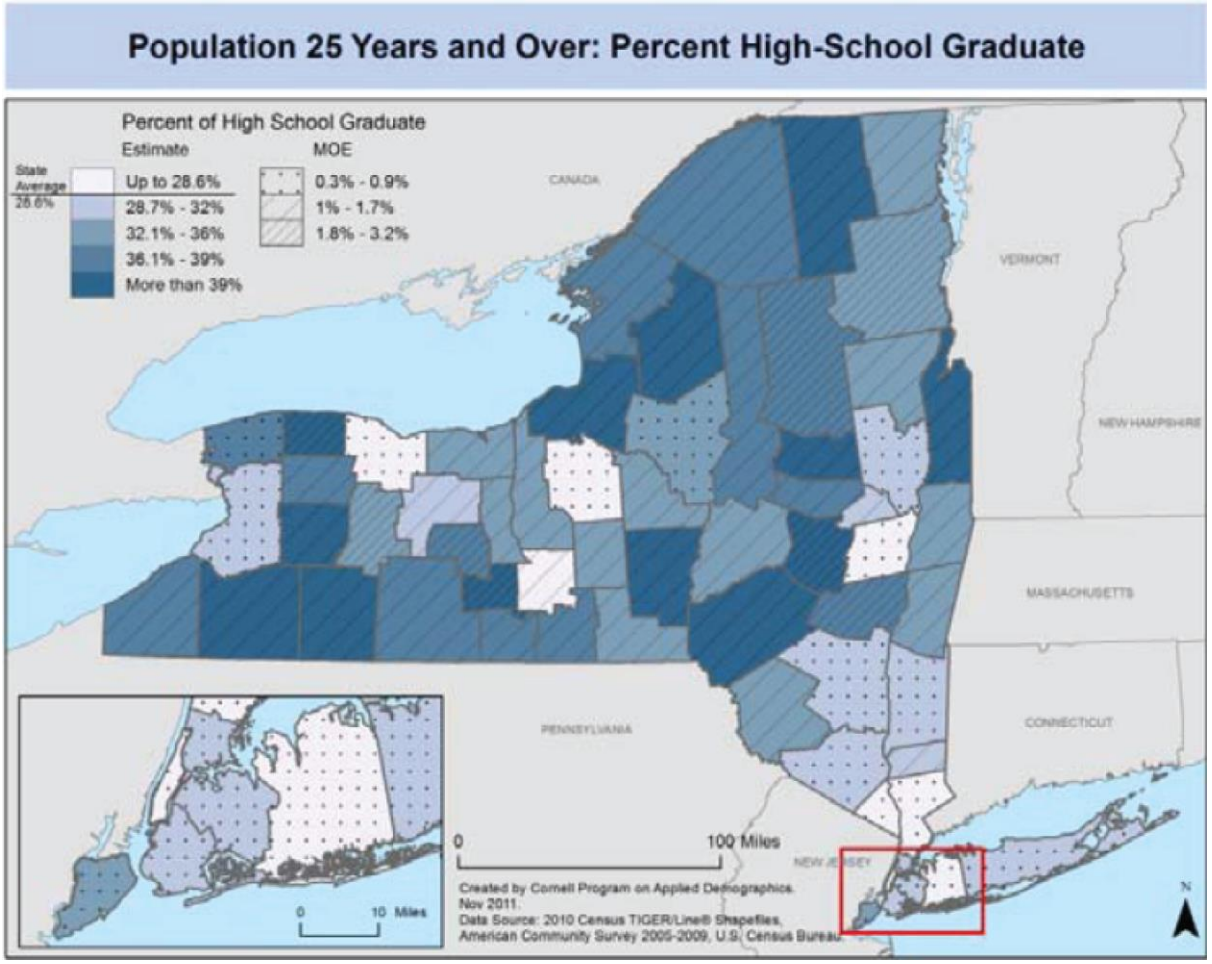
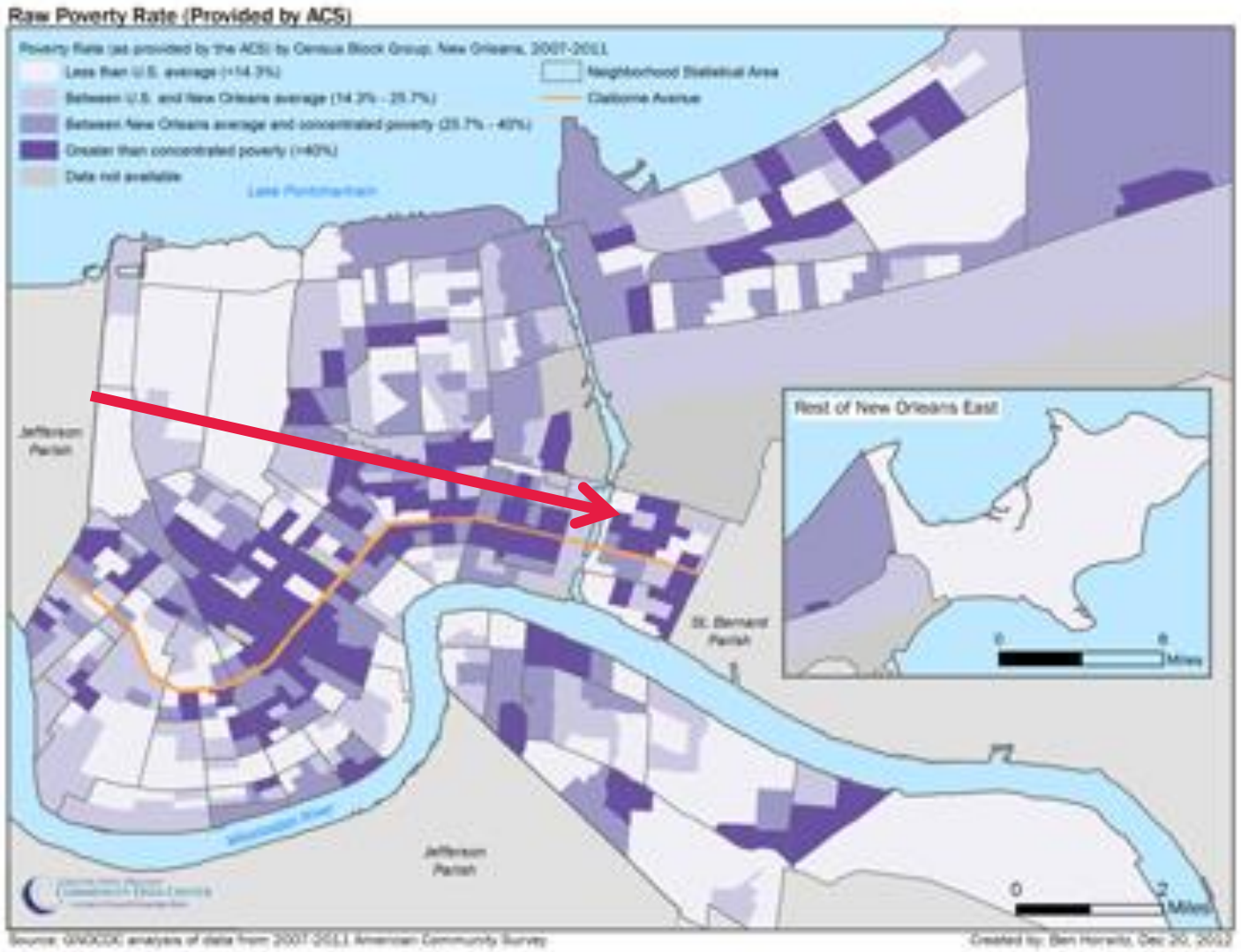
Example map featuring reliability overlay



Source: Francis, J., Vink, J., Tontisirn, N., Anantsuksomsri, S., & Zhong, V. (2012). Alternative strategies for mapping ACS estimates and error of estimation. Cornell University, Program on Applied Demographics

What does poverty look like in New Orleans as mapped by the ACS?



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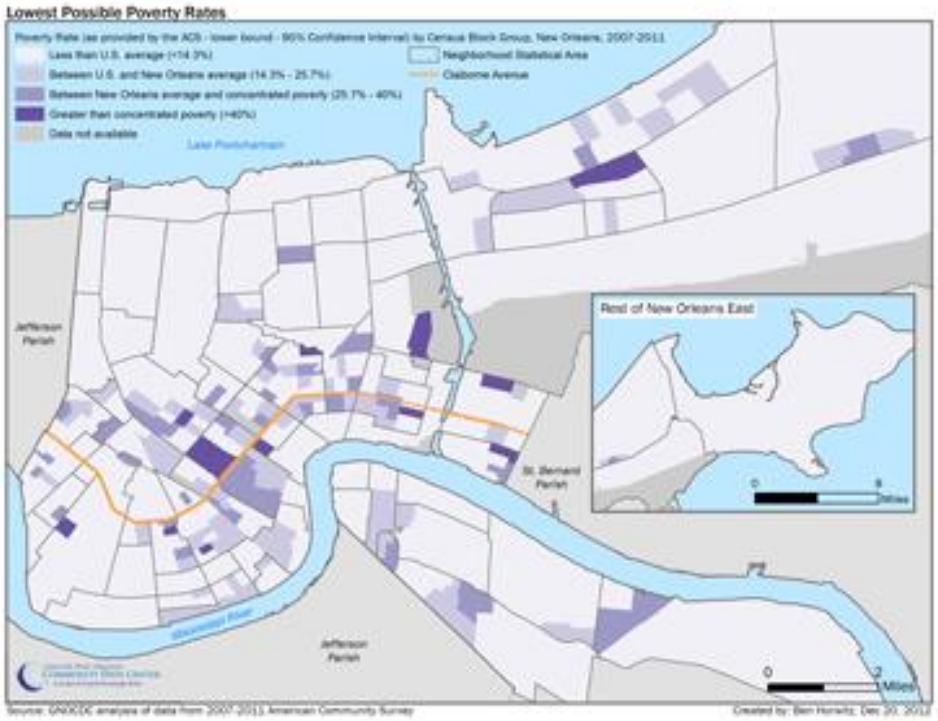

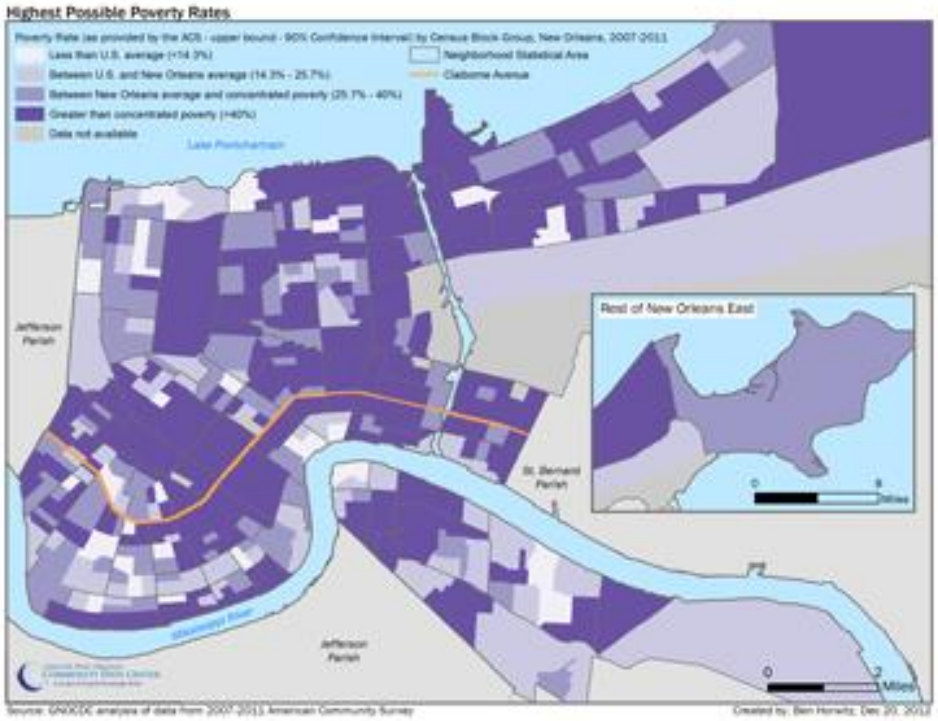

We produced a series of methodology that *might* produce a more accurate map.

1. An average of all neighboring block groups.

2. An average of all "true" neighboring block groups (considering geographic boundaries like the Mississippi River).

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3. A weighted average of the "true" neighbors with the weight applied evenly to all neighbors.

I. BG_x = Block Group of interest
II. W_x = number of unweighted household respondents to the ACS /100
III. BG_i = neighboring block groups

$$[BG_x * W_x] + [\sum_{i=0}^{i_n} \frac{(1 - W_x)}{i_n} * BG_i]$$

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1. An average of all neighboring block groups.

2. An average of all "true" neighboring block groups (considering geographic boundaries like the Mississippi River).

3. A weighted average of the "true" neighbors with the weight applied evenly to all neighbors.

4. A weighted average of the "true" neighbors with the weight applied proportionally to all neighbors.

I. BG_x = Block Group of interest
II. W_x = weight of block group of interest
III. BG_i = neighboring block groups
IV. Y_i = weight of neighboring block group

$$[BG_x * W_x] + [\sum_{i=0}^{i_n} BG_x * ((\frac{Y_i}{\sum_{i=0}^{i_n} Y_i}) * (1 - W_x))]$$

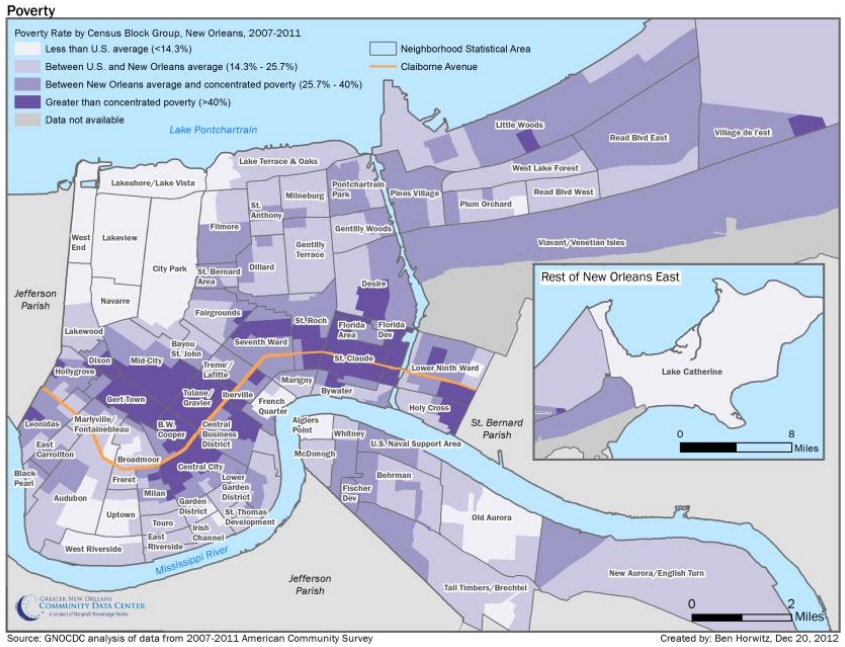
We found that averaging the "true" neighbors was the best approach.

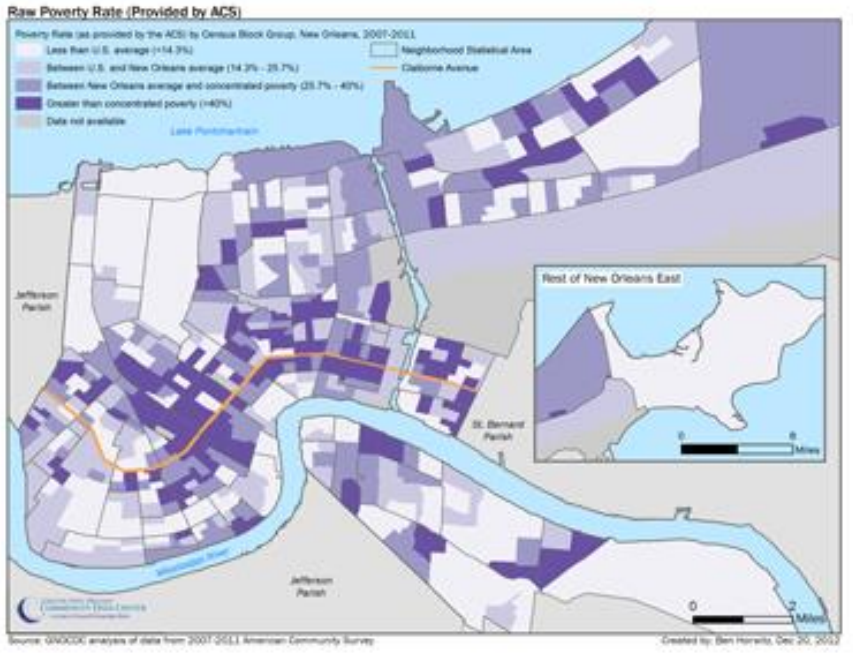
Table 1: Index of dissimilarity evaluation results – Household type by household size

ACS	ACS Average (method 1)	ACS Average - true neighbors (method 2)	ACS Weighted (method 3)	ACS Weighted all block groups (method 4)
27.7%	15.5%	15.4%	15.4%	15.9%

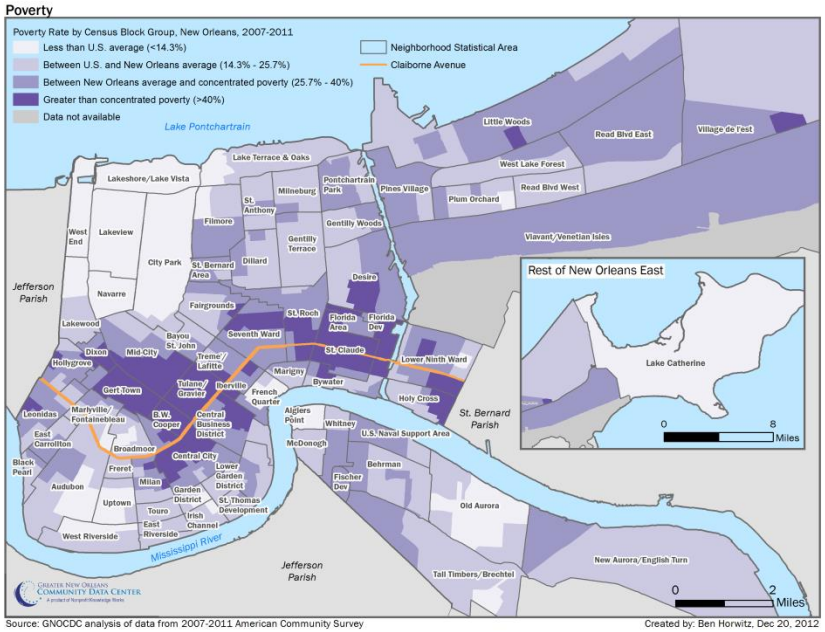
Source: Horwitz, B. (2012). Geographies of Poverty. The Data Center.

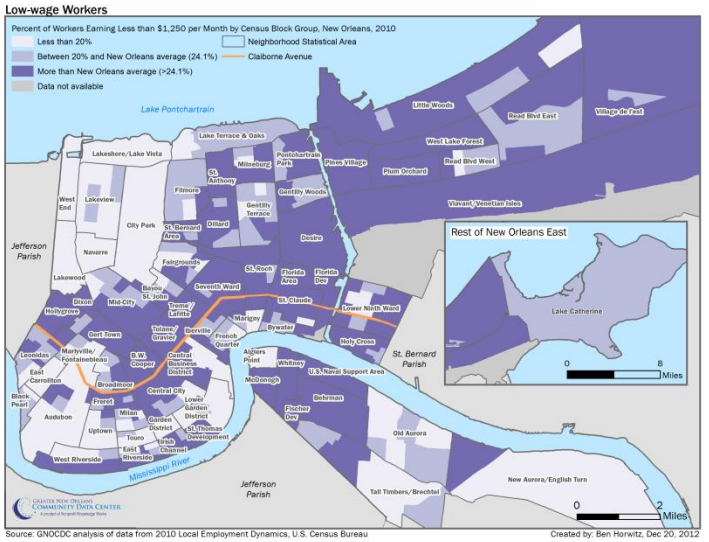
The averaging methodology produced a clearer picture of poverty in New Orleans.

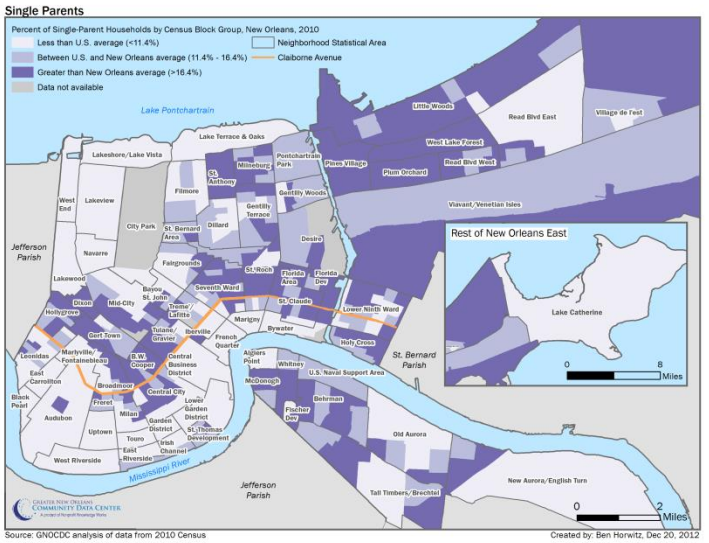




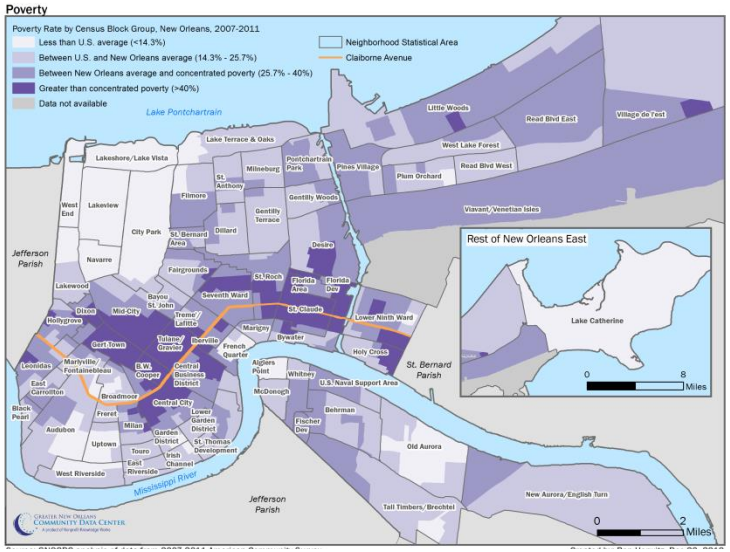
Comparing our ACS maps to LED or Census data helps "ground-truth" the results.

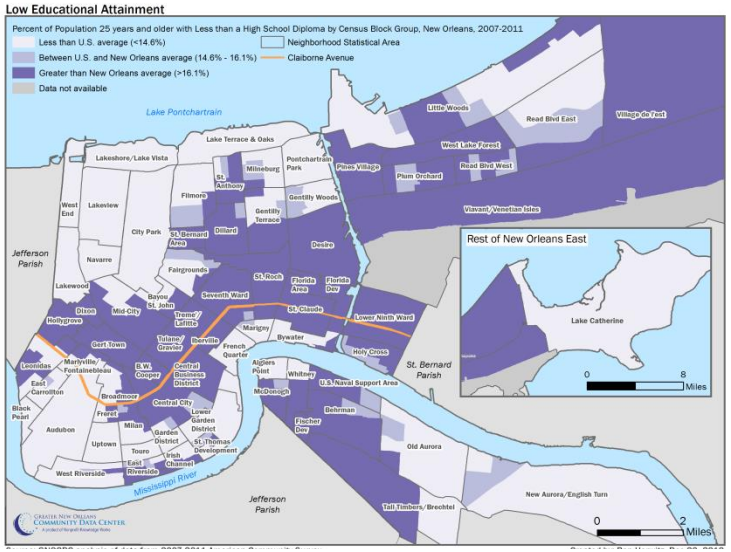


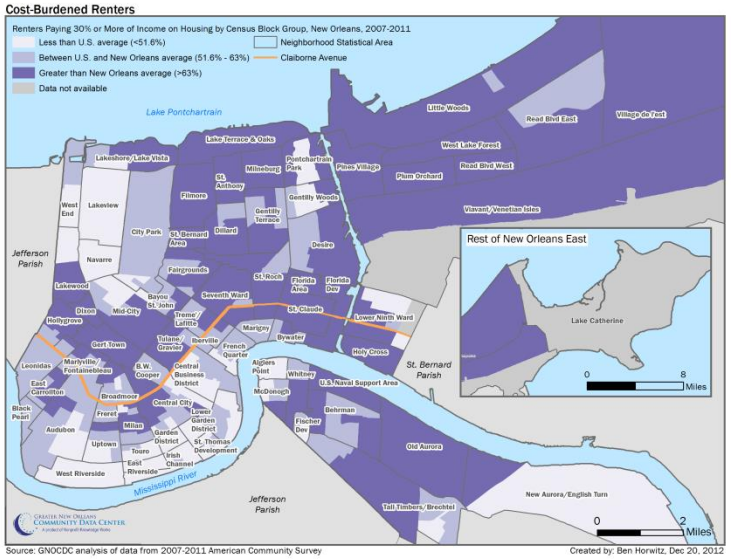


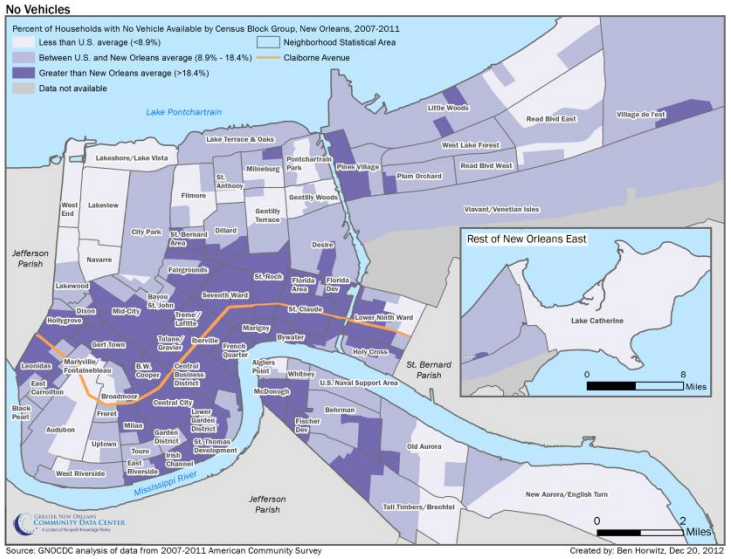


The geographies of poverty in New Orleans follow a consistent spatial pattern.









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