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January 27th, 2020

GEOG 461: Section AB

Acquiring and Mapping U.S. American Community Survey (ACS) Data

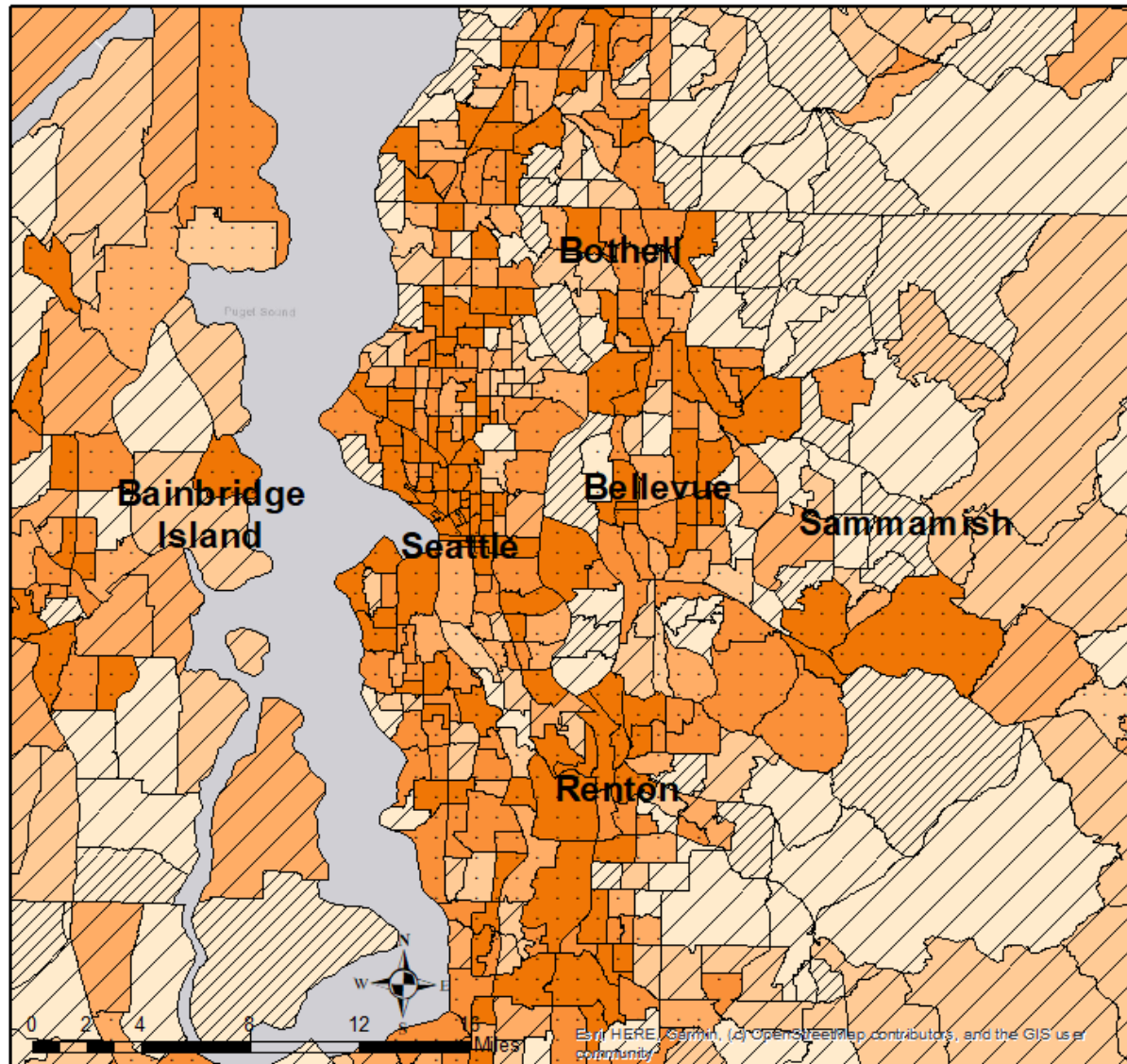
Introduction:

The American Community Survey (ACS) is now the primary source for detailed demographic, social, economic, and housing characteristics of the U.S. population, replacing the traditional long-form, decennial census that was previously implemented by the Census Bureau (Compass, page 1). Due to the continuous, on-going nature of its processes, ACS data holds many benefits, such as timeliness, comparability, and reliability of its data (Jacobsen and Mather, 1). One additional benefit includes the recognition of sampling errors, also known as margins of error, that are included in ACS datasets. Sampling errors are an inevitable byproduct of collecting sample data, and it is important both as the cartographer and the reader to be aware of the degree of error found within the data. The purpose of this assignment was to practice accessing and implementing census data, specifically from the ACS. From there, I have created various maps that display and analyze characteristics of the Hispanic population within Washington State tracts, and that of renters similarly found within the same state tracts as well.

Methodology:

2018 ACS data used to describe renter/owner household characteristics and the Hispanic population of all Washington State tracts were found within the platform provided by the U.S. Census Bureau online (*Data.census.gov*). Furthermore, the 2018 TIGER/Line shapefiles for all Washington State tracts used were also found within the U.S. Census Bureau online website (“TIGER/Line Shapefile, 2018, State, Washington”). Using these two data sources, maps were then produced to show the spatial distribution of Hispanics vs. non-Hispanics, as well as the variation in owner vs. renter household characteristics. I focused specifically on producing an analysis of the greater Seattle region, as I found this metropolitan area to be most relevant to our class studies. Using an ACS mapping extension found within the GIS program, I created and overlaid coefficient of variation (CV) values of the dataset over the maps. CV values are relative amounts of sampling error associated with the sample set, and are indicators of the reliability of the dataset’s estimates. Finally, after overlaying the maps with the corresponding CV values, I created a bivariate legend to help with interpreting patterns.

Renters Within Washington State Tracts in 2018



This map displays a visual estimate of the amount and spatial distribution of renters in the greater Seattle area using data from the 2018 American Community Survey (ACS). This map also includes the coefficient of variance for the renter's variable based on the ACS' margins of error to gauge the reliability of the survey data.

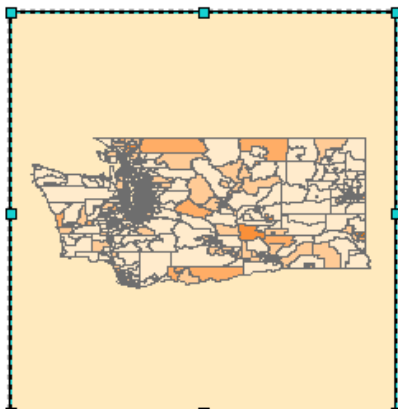
Data Sources: ACS 5-Year Estimates, 2018 TIGER/Line shapefile for WA State

CV Renter

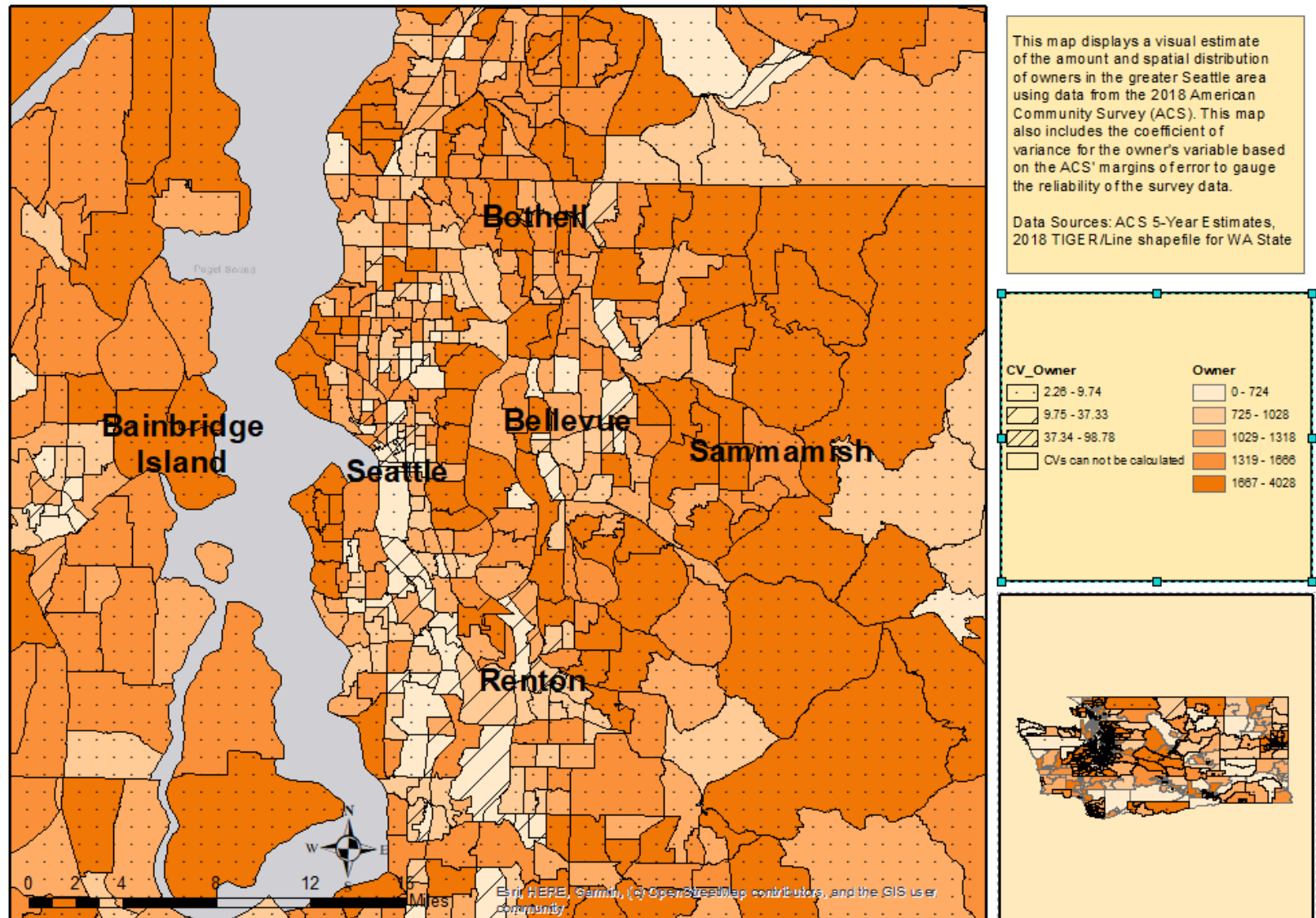
- 3.06 - 14.79
- 14.8 - 27.42
- 27.43 - 106.38
- CVs can not be calculated

Number of Renters

- 0 - 258
- 259 - 436
- 437 - 699
- 700 - 1083
- 1084 - 5538



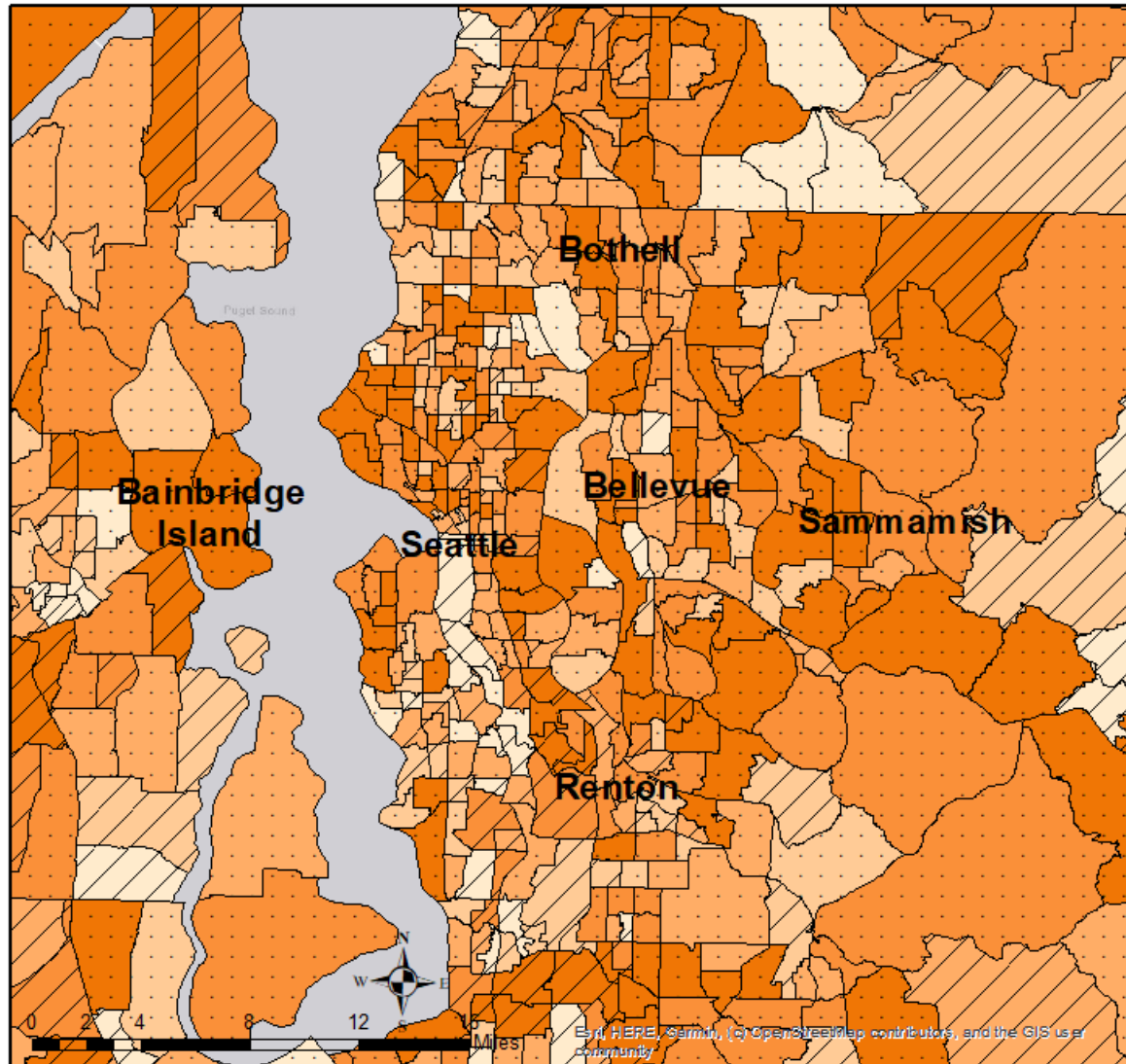
Owners Within Washington State Tracts in 2018



Tenure Analysis:

The two maps of this series show the comparison between two housing characteristics found within the greater Seattle region: renters and owners. Map 1 shows a significant number of renters found clustered near Seattle. As you move further away from Seattle mainly in the north, east, and west directions and into the suburban areas of Washington, the number of renters begin to decrease, and the number of renters becomes more prevalent. A logical hypothesis explaining why is due to the geographical location of the main colleges found within the Seattle region. The University of Washington, Seattle Pacific University, as well as various community colleges such as Seattle Central College are all located at or near downtown, and attract a demographic of younger population that are more inclined to rent to be closer to their colleges. As students become older and accumulate wealth, they are more able to afford to move away from the downtown regions, and eventually settle for home ownership rather than renting. When considering all the tracts found within Washington State, renters tend to be most prevalent in metropolitan areas while owner tend to accumulate outside of the metropolitan core. In the map showing the renting demographics of Washington, areas near Seattle tend to be areas with the lowest CV values, meaning their estimates are more reliable than areas with higher CV values, such as areas found in Sammamish. This may be due to the gap between populations of Seattle and Sammamish residents, as ACS data is collected and updated more frequently for areas with higher populations than for areas with lower populations (Jacobsen and Mather, 8). Thus, due to a larger and more frequent sampling size, less sampling errors are likely to occur, and the data collected can be of greater confidence level.

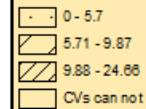
Non-Hispanics Within Washington State Tracts in 2018



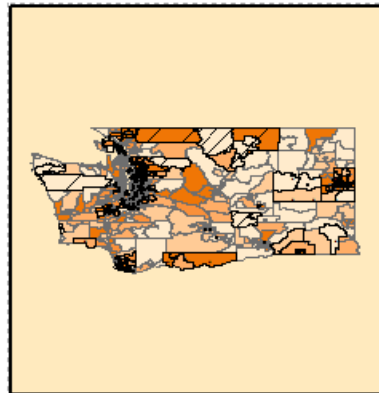
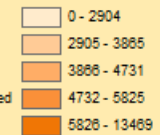
This map displays a visual estimate of the amount and spatial distribution of non-Hispanics in the greater Seattle area using data from the 2018 American Community Survey (ACS). This map also includes the coefficient of variance for the non-Hispanics variable based on the ACS' margins of error to gauge the reliability of the survey data.

Data Sources: ACS 5-Year Estimates, 2018 TIGER/Line shapefile for WA State

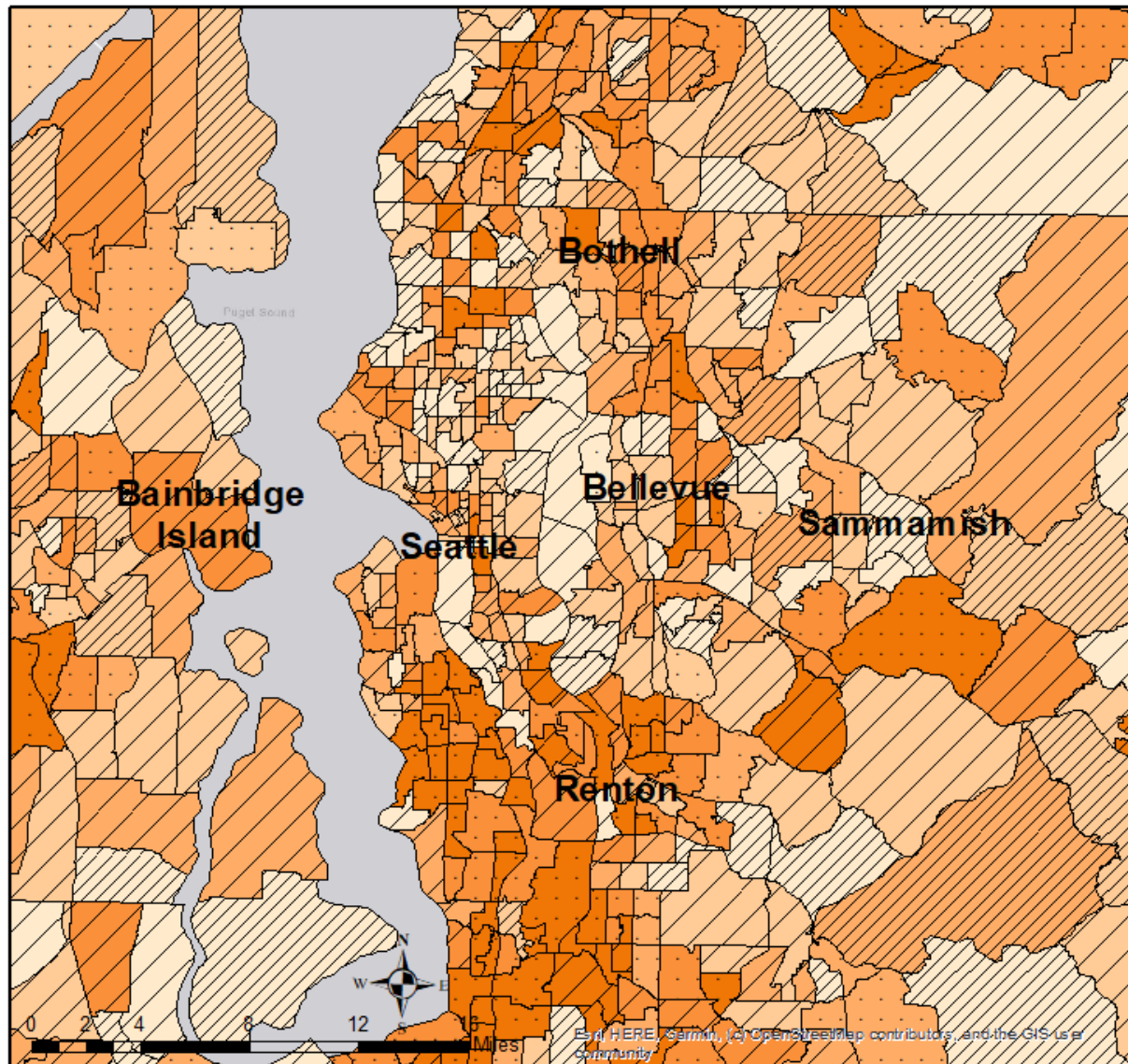
CV_Non_Hispan



Non_Hispan



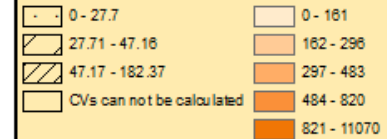
Hispanics Within Washington State Tracts in 2018



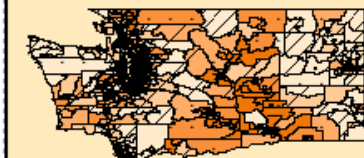
This map displays a visual estimate of the amount and spatial distribution of Hispanics in the greater Seattle area using data from the 2018 American Community Survey (ACS). This map also includes the coefficient of variance for the Hispanic's variable based on the ACS' margins of error to gauge the reliability of the survey data.

Data Sources: ACS 5-Year Estimates, 2018 TIGER/Line shapefile for WA State

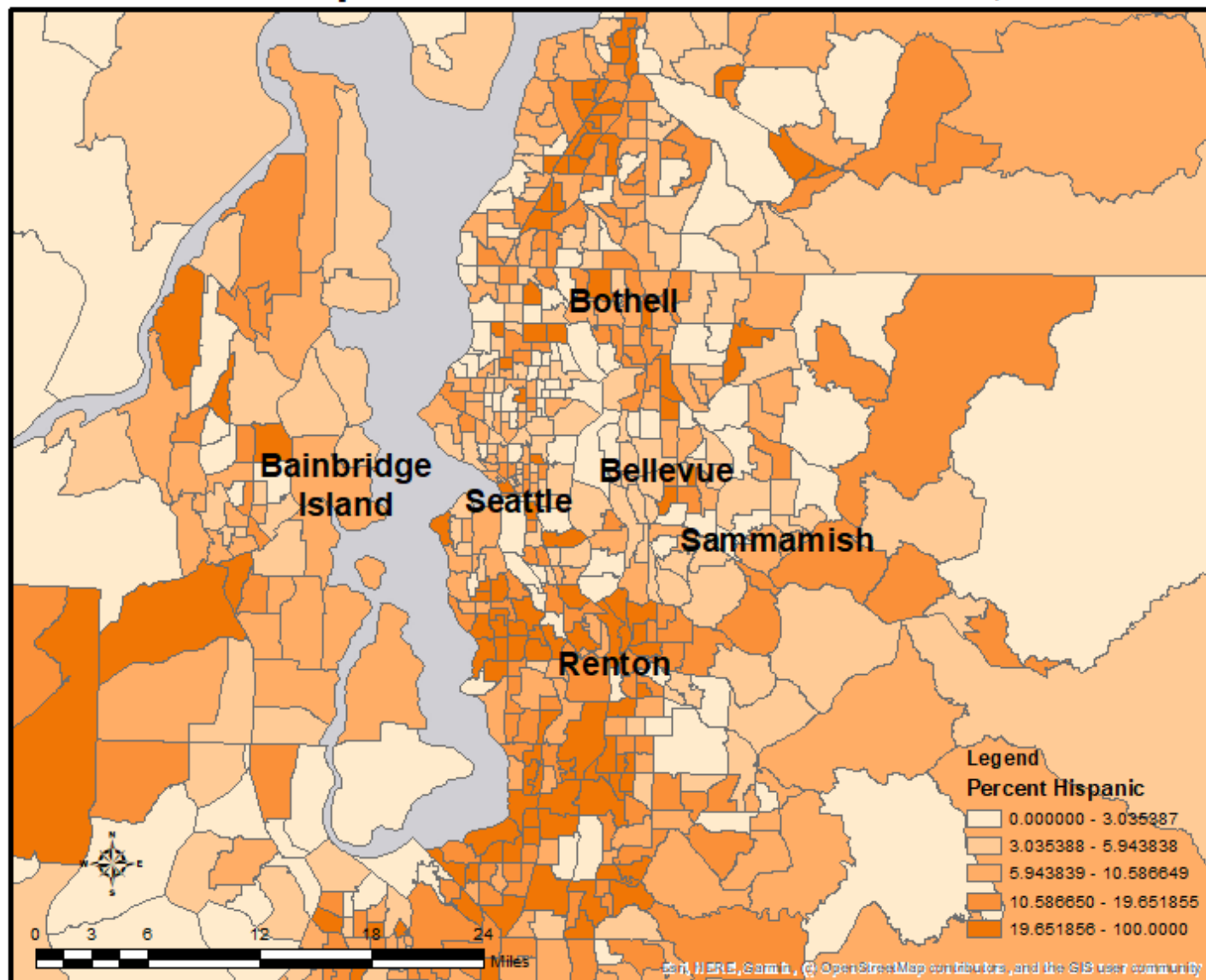
CV_Hispanic



Hispanic



Percent Hispanic in Greater Seattle Area, 2018



Map Creator: Jason Park
Creation Date: January 27, 2020

Projection: Lambert Conformal Conic
Data Date: ACS 2018
Data Source: ACS 5-Year Estimates,
2018 TIGER/Line WA Shapefile

Hispanic Population Analysis:

The first two maps of this series show a comparison between the Hispanic and non-Hispanic population found within the Washington State tracts, focusing specifically in the greater Seattle Region. Based on the maps presented, I observed that there is a largest clustering of Hispanic population tends to be found south of Seattle and towards the Renton area. On the other hand, the non-Hispanic population is shown largely to be spread out across Seattle rather than be clustered together. This makes sense as the non-Hispanic population accounts for a much larger sample size, as it includes every other ethnicity besides Hispanic. In relation to the housing characteristic maps previously described, the Hispanic population is found to be populating in areas where renters are also more prevalent. However, I do not feel that a definitive conclusion can be made between these two variables without further information: The map depicting the renter's within Washington State tracts did not account for race/ethnicity, and therefore, renters could also identify with other ethnicities besides Hispanic. The two maps were used to create the third map showing the percent Hispanic in the Seattle region for 2018, which shared many geographic characteristics with the Hispanics within Washington map. Like the housing characteristic maps, the lowest CV values were found in tracts closest to Seattle, where the population is largest. However, the data displaying the Hispanic population tended to be least accurate as you moved away from south Seattle/Renton, such as in Bellevue. I can hypothesize that since the population that identifies as being Hispanic tends to be less in areas east of Seattle resulted in an overall smaller sample size, and as a result, a higher CV value.

Challenges Mapping ACS Data:

While the ACS can be used as a source to provide more timely and accurate census data, the ACS data itself is not without challenges when it comes to mapping and displaying its dataset. Examples of conceptual problems that have come up amongst researchers using ACS data in the past include: the lack of standardization regarding acceptable margins of errors, the challenges in mapping data while taking into account margins of error, and other thematic and classification issues that come up when attempting to map ACS data (Francis et al., 5). The most challenging aspect of mapping ACS data that I encountered while I was learning how to map ACS data was editing and formatting the datasets so that they are ready to be imported into a GIS program, and from there, remain functional while mapping variables. For example, after downloading and opening the ACS dataset on Microsoft Excel, I learned that I had to change the geocodes into more easily interpreted variables based on the metadata, and also had to change the data types to make my tables join properly in the ArcMap platform. Finally, learning how to map ACS data meant that I also had to learn more about statistics, such as CV values, to fully interpret and map the ACS data. Regardless of the challenges that come about when mapping ACS data, I do believe that including the margins of error is one of the largest benefits that comes from using the American Community Survey. Because census data plays a large role in determining the allocation of funds and the direction of federal programs (Jacobsen and Mather, 2), it is important that the reliability of data should always be taken into consideration.

References:

Data.census.gov, data.census.gov/cedsci/.

Francis, Joe, et al. "Alternative Strategies for Mapping ACS Estimates and Error of Estimation." *Emerging Techniques in Applied Demography Applied Demography Series*, 2014, pp. 247–273., doi:10.1007/978-94-017-8990-5_16.

Jacobsen, Linda Alane., and Mark Mather. *A Compass for Understanding and Using American Community Survey Data*. U.S. Dept. of Commerce, Economics and Statistics Administration, U.S. Census Bureau, 2009.

"TIGER/Line Shapefile, 2018, State, Washington, Current Census Tract State-Based - TIGER/Line® Shapefiles." *Data.gov*, catalog.data.gov/dataset/tiger-line-shapefile-2018-state-washington-current-census-tract-state-based/resource/235e097c-7b30-4e1d-8550-3b32e05cd987.