ASSESSING VULNERABILITY TO EXTREME HEAT

IN SAN LUIS OBISPO COUNTY

A Senior Project

presented to

the Faculty of City and Regional Planning

California Polytechnic State University, San Luis Obispo

In Partial Fulfillment

of the Requirements for the Degree

Bachelor of Science in City & Regional Planning

by

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I. INTRODUCTION

Acknowledgements

This project was completed with technical assistance from Russell White, Data & GIS Specialist at Robert E. Kennedy Library, California Polytechnic University San Luis Obispo (Cal Poly). Additional guidance and technical support was attained from Jesse Carpentier, Cal Poly Masters of City and Regional Planning (MCRP). Ultimately, the project was reviewed and approved by senior project advisor Michael R. Boswell, PhD., Cal Poly Department Chair and Professor of City and Regional Planning.

Project Purpose

The purpose of this project is to assess populations in San Luis Obispo County that are vulnerable to extreme heat. Although there are various efforts in the State and County to address extreme heat, none specifically assess or prepare for vulnerable populations in San Luis Obispo County. This assessment can help visualize the spatial variation of extreme heat, guide future research, and support efforts in the County to improve emergency response and increase adaptive capacity in specific areas of need.

Relevance to Urban Planning

Social vulnerability assessments are becoming increasing prevalent in urban planning, particularly in hazard mitigation and climate action planning. Due to climate change's increasing impact on human life, especially disadvantaged communities, California local governments are now required to prepare and adapt to climate change impacts such as extreme heat. As of 2017, California Senate Bill 379 requires climate adaptation and resiliency strategies in county and city general plan safety elements. In 2018, CA SB 1000 will also require counties and cities adopt a general plan "environmental justice element" that sets objectives and policies to reduce health risks in disadvantaged communities.

To undertake these aforementioned efforts, planners must understand the disproportionate effect climate impacts have on certain populations. Social vulnerability assessments, like the one completed in this project, provide valuable information by identifying and localizing populations that have fewer resources or lack the capacity to resist the adverse health implications of extreme heat. With this information, cities, counties, and other stakeholders can best allocate resources to improve emergency response and increase adaptive capacity in specific areas of need.

II. LITERATURE REVIEW

Extreme Heat

Extreme heat is a natural hazard predicted to increase in frequency, intensity, and duration in future years (Cooley, 2012, pg. 4; California Multi-Hazard Mitigation Plan, 2013, pg. 342; Johnson et al, 2012, pg. 23; Luber et al, 2008, pg. 429; Weber, 2015, pg. 231). Extreme heat events (EHE), also called heat waves, are characterized by periods of extremely high ambient temperatures, relative to prevailing temperatures during a specific season at a specific location (Kravchenko et al, 2012, pg. 274). Cal-Adapt, a web portal and tool on California climate change research, defines extreme heat days as above the 98^{th} percentile maximum temperatures, using 1961-1990 data for the May to October warm season (California Natural Resources Agency, 2016, pg. 151). Extreme heat days are expected to increase due to climate change, urbanization, the urban heat island effect, and other physical and social factors (Luber et al, 2008, pg. 431; Weber, 2015, pg. 231).

Extreme heat is a significant public health concern across the nation. It is the leading cause of weather-related human mortality in the United States (and in California). In fact, it accounts for more deaths annually than hurricanes, lightning, tornadoes, floods, and earthquakes combined (California Multi-Hazard Mitigation Plan, 2013, pg. 342; Luber et al, 2008, pg. 429; Johnson et al, 2012, pg. 23; Weber, 2015, pg. 231). Besides death, extreme heat can cause other health impairments including heat stroke, heat cramps, dehydration and electrolyte disorders, and maternal hyperthermia in pregnant woman. It can also complicate diabetes, cardiovascular and cerebrovascular diseases, respiratory disorders, acute renal failure, neurologic conditions, and mental illnesses (Bao et al, 2015, pg. 7221; Kravchenko et al, pg. 276).

With relatively cooler maximum high temperatures compared to other regions, extreme heat may not seem like a significant threat to San Luis Obispo County. However, according to research, when extreme heat events do occur in historically cooler climates, illness or death can be as significant as warmer climates. In fact, during California's 2006 summer heat wave, the central coast had the greatest increase in emergency department visits for heat-related illness (Kravchenko, 2013, pg. 277-278). This significant increase is due to the fact that local residents acclimate physiologically and technologically to the certain conditions in which they live, so populations whom are unaccustomed to high temperatures are particularly unprepared to adapt to heat. For example, in SLO County particularly, many homes do have air conditioning to help mitigate the effects of unexpected heat waves (Cooley, 2012, pg. 4; Kravchenko, 2013, pg. 278).

Vulnerability

Social characteristics put certain populations at disproportionate risk to the negative effects of extreme heat. Those particularly vulnerable tend to have weak social connections, lack access to opportunities and services to prevent risk, and/or have certain health impairments (Kravchenko, 2013, pg. 277). These social factors call to attention the concept of social vulnerability, which can be defined as the extent a specific group or population will be harmed by exposure to a hazard (Weber et al, 2015, pg. 232). Vulnerability is generally described by the function of exposure, sensitivity, and adaptive capacity such that:

(1) Exposure + (2) sensitivity – (3) adaptive capacity = (4) vulnerability (Weber et al, 2015, pg. 232).

Therefore, a population's (4) vulnerability is the function of (1) exposure to abnormally high temperatures, intensified by (2) the population's sensitivity to extreme heat due to socioeconomic characteristics, and (3) moderated by certain physical or social factors that increase adaptive capacity (Weber et al, 2015, pg. 232).

Efforts to Mitigate Extreme Heat

Heat-related death and illness is preventable concern that constitutes a greater need for planning and mitigation. Programs to mitigate extreme heat can be included in general plans, local hazard mitigation plans, and heat response plans (Luber et al, 2008, pg. 432). In addition, public health agencies hold responsibility to properly prepare the community and activate protective measures in case of heat waves (such as heat alerts, providing information on cooling centers, and so on). Table 2 presents a review of plans and tools relevant to extreme heat.

Bridging the Gap in SLO County

Although there are various efforts in the State and the County to address extreme heat, none specifically assess or prepare for vulnerable populations in San Luis Obispo County. In addition, the County of San Luis Obispo itself does not have an extreme heat plan. This gap calls for an assessment that visualizes the spatial variation of heat vulnerability in SLO County. This assessment can help the County and other stakeholders best allocate resources to improve emergency response and increase adaptive capacity in the specific areas of need (Bao et al, pg. 7221; Chuang, 2015, pg. 605; Johnson et al, 2012, pg. 29; Kravchenko et al, 2013, pg. 278; Weber et al, 2015, pg. 235).

Table 2: Plans, Tools, and Initiatives Relevant to Extreme Heat

Plan/Tool/Initiative	Jurisdiction	Pertinent Information
Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards (2013)	Federal	- Presents specific mitigation ideas related to extreme heat (cited in California Multi-Hazard Plan, 2013, pg. 342).
Assessing Health Vulnerability to Climate Change: A Guide for Health Departments (2008)	Federal	- Presents the Building Resilience Against Climate Effects (BRACE) framework, developed by the Climate and Health Program at the Centers for Disease Control and Prevention (CDC), to help health departments prepare and respond to climate change (pg. 1). - Explains how health departments can undertake the first step of the BRACE framework, which is assessing health vulnerability (pg. 1).
California Multi-Hazard Mitigation Plan (2013)	State	- Provides general education on the temperatures where heat illness may occur, describes their complications, and first-aid steps to address them (pg. 342). - Notes the importance of "thoughtful social vulnerability analyses" and the need identify socially vulnerable populations (pg. 342)
Safeguarding California: Implementation Action Plans (2016)	State	- Notes the adverse impacts extreme heat has on crops and livestock production in the state (pg. 16). - Explains importance of effective emergency planning and outreach to reduce effects of natural disasters such as extreme heat (pg. 61). - Recommends expanding tree canopy to improve public health outcomes during extreme heat events (pg. 104). - Notes that "rural population centers throughout California will experience an average of 40 to 53 extreme heat days by 2050. This compares to a historical average of four per year" (pg. 150). - Describes CalEPA's Urban Heat Island Index (pg. 154). - Notes and explains the action/implementation measure of "low-carbon or net-zero emissions strategies for keeping people cool in extreme heat events" (pg. 165).
Preparing California for Extreme Heat: Guidance and Recommendations (2013)	State	- Provides and overview of current climate projects for increased temperature and extreme heat conditions for California. - Describes health effects of extreme heat. - Presents recommendations for state and local planners to reduce risks and promote resilience in local governments, emergency response efforts, and public health and health care institutions (pg. 1)
California Health in All Policies Task Force – Implementation Plans (2013)	State	- "Incorporates urban greening recommendations from Preparing California for Extreme Heat Guidance into action plans…" (California Natural Resource Agency, 2016, pg. 236).
Urban Heat Island Index for California (2015)	State	- Defines and examines characterizes of urban heat island (UHI), and pioneers an index to measure UHI (California Natural Resource Agency, 2016, pg. 154, 236).
Health Care Facility Preparedness	State	- Describes efforts to improve hospital and emergency preparedness for climate change impacts with private, public, and non-profit medical facilities (cited in California Natural Resource Agency, 2016, pg. 154, 236).

The California Adaptation Planning Guide: Planning for Adaptive Communities (2012)	State	- Presents adaptation strategies, recommendations, data tools (Cal-Adapt), and includes general strategies to address heat events (pg. 10).
The California Adaptation Planning Guide: Understanding Regional Characteristics (2012)		- Notes the disproportionate health effects extreme heat poses on vulnerable populations (particularly agricultural workers) and the threat heat can pose even in moderate climates like the Central (pg. 12, 69, 71).
Cal-Adapt Tool	State & Regional	- Provides information on California climate change research, by providing web-based tools to visualize, understand, and adapt to climate projections (cited in California Multi-Hazard Plan, 2013, pg. 343).
Contingency Plan for Excessive Heat Emergencies (2010)	State	- Designed primarily to guide preparedness and response activities. Also identifies mitigation actions to prevent life loss, by identifying vulnerable populations, establishing cooling centers, establishing advisories, and so on (cited in California Multi-Hazard Plan, 2013, pg. 342).
County of San Luis Obispo EnergyWise Plan (2011)	County	- Chapter seven of this county-wide Climate Action Plan includes a goal to "minimize potential risks from climate-related events that may compromise public health". Mitigation measures include: "mitigate the urban heat island effect through the planting of urban forests and the use of light-colored building and pavement materials" and " identify accessible and secure locations for public cooling centers during extreme heat events" (Chapter 7, p. 24).
County of San Luis Obispo Local Hazard Mitigation Plan (2014)	County	- Notes that extreme heat is a moderate planning consideration (pg.38). - Includes a planning goal to "Adopt strategies to enable the County to prepare for and adjust to impacts of climate change through collaboration with the incorporated cities" and a mitigation measure to "establish a countywide policy relating to cooling centers to be used during adverse weather events involving heat waves." (pg. 193).
Developing Adaptation Strategies for San Luis Obispo County (2012)	County	- Notes increased temperatures and extreme heat events in SLO County. - Discusses vulnerability due to age, occupation (people working outdoors), and social isolation (pg. 8, 13, 16).
Integrated Climate Change Adaptation Planning in San Luis Obispo County	County	- Notes that heat-related mortality and hospitalizations are expected to increase, particularly for vulnerable populations such as infants, elderly populations, and outdoor workers including farm workers (pg. 19). - Recommends strategies to "provide support for farm workers and employees of the agricultural tourism industry as the climate changes" (pg. 24).
OutsideIn SLO: We Take Health and Climate Change Personally	County	- Partnership between San Luis Obispo County Public Health Department and the California Department of Public Health. - Communicates health related effects of extreme heat and other climate change effects, especially to vulnerable populations. Also describes co-benefits of climate action.
County of San Luis Obispo: Public Health Alerts	County	- The San Luis Obispo County of Public Health periodically alerts the County of extreme heat events - Describes symptoms of heat illness, generally describes vulnerable populations, and provides heat protection tips.

III. METHODOLOGY

Choosing Vulnerability Indicators

An extensive literature review was conducted to identify vulnerability relative to extreme heat. Table 3.2 contains the vulnerability indicators used in this project, which include census block-group variables from the social vulnerability index (SoVI) and the heat vulnerability index (HVI). The SoVI index is the most common method to measure social vulnerability, while the HVI index includes a few variables specific to extreme heat (Bao et al, 2015, pg. 7229). When available, block-level data is considered a best practice for vulnerability studies (Moser & Ekstrom, 2012). See Appendix A for a complete table of variables and their corresponding values to each block group in SLO County. As listed in Table 3.2, hazard magnitude (observed and expected mean number of extreme heat days) is measured at the census tract level, since block-level data was not readily available from the sources used in Cal-Adapt (cited in Table 3.2). See Appendix E for hazard magnitude values for each block group in SLO County.

Creating a Social Vulnerability Index (SVI)

To formulate a social vulnerability index (SVI) score, a principle components analysis (PCA) was completed with IBM SPSS Statistics software. Before variables from Appendix A were entered into SPSS, a block group with population zero was removed and all observations were converted into percentages of each variable's respective universe (population employed, population, and households). See Appendix B for the resulting percent values. In SPSS, variables were standardized to Z-scores (mean = 0) and a PCA was conducted using varimax rotation with kaiser normalization. From the PCA, the scree plot was analyzed, and four components with the largest significant drop in (in the scree plot) were selected. These components, listed in Table 3.1, account for 49.8% of the variance in the data. The most significant variables in these components, which weighed greater than 50%, are listed as "highest factor loadings" in Table 3.1. See Appendix C for the PCA output, which includes the total variance explained, scree plot, component matrix, and rotated component matrix. The PCA also generated scores for each block group, which were entered into an additive model to calculate the SVI. All variables *except* air conditioning prevalence have a positive correlation with social vulnerability. As such, to sum the final SVI values, an absolute value was applied to components one, two and three, while a negative value was applied to component four (since air conditioning weighed highly on this component). Table 3.1 includes the four components with the highest factor loadings and their respective sign adjustment. See Appendix D for the complete table of component scores and summed SVI values for all block groups in SLO County.

Table 3.1: Components Used to Create a SVI

Component	Highest Factor Loadings (>50%)	Adjustment
(1) Race/ethnicity, education, & occupation	% Hispanic Latino (.871), % Foreign Born (.819), % Limited English Speaking Household (.819), % of Population > 25 without HS Diploma (.815), % Some Other Race (.748), % Farming, Fishing, and Forestry Occupations (.526)	Absolute Value
(2) Housing, transp., & socioeconomic st.	% Renter Occupied (.838), % Renter Living Alone (.833), % Very to Extremely Low Income (.821), % Occupied Housing Units with No Vehicle Ages 15-64 (.693)	Absolute Value
(3) Age & housing status	% Ages 65+ NonFamily Female Householder Living Alone (.866), % Ages 65+ (.812), % Owner Living Alone (.788), % Ages 65+ NonFamily Male Householder Living Alone (.627)	Absolute Value
(4) Race/ethnicity, age, & air condition.	Black or African American Alone (-.708), HH Owns Separate Room Air Conditioner (.585), % < 5 years old (.504)	Negative Value

Table 3.2: Vulnerability Indicators and Variables Used in SVI

Indicator / Type	Justification	Variables	Dataset	Sources
Hazard magnitude (Exposure)	The number of extreme heat days is one of the factors usually used as the exposure indicator in the construction of the HVI. The extent (frequency and duration) to which populations are exposed by heat directly correlates with vulnerability; this factor has the highest amount of supported and agreement among studies related to extreme heat vulnerability. According to Cal-Adapt, an extreme heat day is defined as "a day in April through October where the maximum temperature (Tmax) exceeds the 98th historical percentile of maximum temperatures based on daily temperature data between 1961-1990".	Observed mean number of extreme heat eat days (1950-2013)	Gridded Historical Observed Meteorological and Hydrological Data, 1950-2013: Computational Hydrology, University of Washington	Aubrecht & Özceylan Bao et al, 2015, pg. 7224; Weber et al, 2015, pg. 232; Vescovi et al, 2005, pg. 74.
		Expected mean number of extreme heat eat days (2018-2100) considering the low emissions scenario (RCP 4.5)	LOCA Downscaled Climate Projections for Temperature & Precipitation: Scrips Institution of Oceanography, University of California, San Diego	
		Expected mean number of extreme heat eat days in the future (2018- 2100) considering the high emissions scenario (RCP 8.5)		
Socioeconomic Status (Sensitivity)	Indicates higher sensitivity and lack of resources to cope with extreme heat. For example, air conditioning costs pose a significant factor on low-income populations and elderly on fixed-incomes, whom may decide to endure heat instead of paying higher utility bills.	Civilian labor force unemployed	ACS_2015_B23025	Cooley, 2012, pg. 19; Moser & Ekstrom, 2012, pg. 64
		Very & extremely low income status	ACS_2015_B19001	Cooley, 2012, pg. 2; Moser & Ekstrom, 2012, pg. 19
Race and Ethnicity (Sensitivity)	Indicates language and/or cultural barriers, higher sensitivity, as well as location of high-risk areas for extreme heat events.	Foreign born	ACS_2015_B99051	Eisenman et al., 2016, pg. 94; Moser & Ekstrom, 2012, pg. 19
		Hispanic/Latino population	ACS_2015_B03003	Bergstrand et al., 2014, pg. 399; Chuang & Gober, 2015, pg. 606; Eisenman et al., 2016, pg. 93; Johnson et al., 2012, pg. 25; Moser & Ekstrom, 2012, pg. 63; Reid et al., 2009, pg. 1731
		American Indian and Alaska Native	ACS_2015_B02001	Bergstrand et al., 2014, pg. 395; Cooley, 2012, pg. 5; Hondula et al., 2012, pg. 4; Moser & Ekstrom, 2012, pg. 24

		Native Hawaiian and Other Pacific Islander		Bergstrand et al., 2014, pg. 399; Hondula et al., 2012, pg. 4; Moser & Ekstrom, 2012, pg. 24
		African American population		Bergstrand et al., 2014, pg. 399; Cooley, 2012, pg. 7; Hondula et al., 2012, pg. 4; Johnson et al., 2012, pg. 25; Kravchenko et al., 2013, pg. 276; Moser & Ekstrom, 2012, pg. 19; Reid et al., 2009, pg. 1731
		Asian population		Bergstrand et al., 2014, pg. 399; Hondula et al., 2012, pg. 4; Johnson et al., 2012, pg. 25; Moser & Ekstrom, 2012, pg. 64
		Some other race		Cooley, 2012, pg. 18; Hodula et al. 2012, pg. 4; Johonson et al., 2012, pg. 25
		Limited English speaking household	ACS_2015_B16002	Aubrecht & Özceylan, 2013, pg. 66; Bergstrand et al., 2014, pg. 399; Cooley, 2012, pg. 18; Moser & Ekstrom, 2012, pg. 25
Age (Sensitivity)	Indicates lack of mobility and higher sensitivity to extreme heat effects. Young children and elderly are less able to adapt to weather changes and maintain thermoregulatory processes. People age 75 years or older account for more than 80% of the total excessive mortality during heat waves.	Population < 5 years old	ACS_2015_B01001	Bao et al, 2015, pg. 7224; California Multi-Hazard Mitigation plan, 2013, pg. 342; Cooley, 2012, pg. 6; Eisenman et al, 2016 pg. 90; Kravchenko, 2013, pg. 277-278; Johnson et al., 2012, pg. 26
		Population > 65 years old		Aubrecht & Özceylan, 2013, pg. 68; Bergstrand et al., 2014, pg. 399; Cooley, 2012, pg. 6; Eisenman et al., 2016, pg. 93; Hodula et al. 2012, pg. 4; Johonson et al., 2012, pg. 25; Kravchenko et al. 2013, pg. 277; Moser & Ekstrom, 2012, pg. 17; Reid et al., 2009, pg. 1731; Vescovi et al., 2005, pg. 73
Housing Status & Household Size (Sensitivity)	Indicates higher sensitivity and difficulty adapting to extreme heat events. Renters have less control over their buildings and therefore lack ability to insulate home against extreme heat. Those living alone are more likely to ignore heat risks and lack social support in extreme heat events.	Female householder, no husband present	ACS_2015_B11001	Bao et al, 2015, pg. 7225; Bergstrand et al., 2014, pg. 399; Eisenman et al., 2016, pg. 93; Johonson et al., 2012, pg. 25; Moser & Ekstrom, 2012, pg. 19
		Renter-occupied housing units	ACS_2015_B25003	Bao et al, 2015, pg. 7225; Bergstrand et al., 2014, pg. 395,399; Cooley, 2012, pg. 18; Eisenman et al., 2016, pg. 93; Moser & Ekstrom, 2012, pg. 27
		Renter living alone	ACS_2015_B25009	Aubrecht & Özceylan, 2013, pg. 69; Bao et al, 2015, pg. 7225; Cooley, 2012, pg. 6; Eisenman et al., 2016, pg. 93; Hondula et al., 2012, pg. 4; Reid et al., 2009, pg. 1731
		Owner living alone		
		65+ Householder Male Living alone	ACS_2015_B09020	Aubrecht & Özceylan, 2013, pg. 69; Bao et al, 2015, pg. 7225; Cooley, 2012, pg. 18; Eisenman et al., 2016, pg. 93; Hondula et

		65+ Householder Female Living alone		al., 2012, pg. 4; Johnson et al., 2012, pg. 25; Reid et al., 2009, pg. 1731; Weber et al., 2015, pg. 235
Occupation (Sensitivity)	Indicates higher exposure to extreme heat and potential for unemployment due to the hazard vulnerability. Heat can be exacerbated by occupational factors such as exhaust fumes, hot asphalt, and increased humidity environments. These laborers may have little choice or opportunity to reduce exposure and respond to impacts of extreme heat conditions. Farm workers may be at an increased heat exhaust risk due to personal protective clothing.	Farming, Fishing, and Forestry Occupations	ACS_2015_C24010	Cooley, 2012, pg. 19; Eisenman et al., 2016, pg. 93; ; Koopman, 2010, pg. 23; Moser & Ekstrom, 2012, pg. 16; Weber et al, 2015, pg. 232
		Construction & Extraction Occupations		Cooley, 2012, pg. 19; Eisenman et al., 2016, pg. 94; Moser & Ekstrom, 2012, pg. 16
Education level (Sensitivity)	Indicates socioeconomic status (lifetime earnings) and ability to adapt to extreme heat events. Those with lower educational attainment are more likely to have difficulty understanding emergency preparedness/response information and require more assistance in extreme heat events.	Population over 25 without high school diploma	ACS_2015_B15003	Aubrecht & Özceylan, 2013, pg. 69; Bao et al, 2015, pg. 7223-7226; Bergstrand et al., 2014, pg. 399; Cooley, 2012, pg. 7; Hondula et al., 2012, pg. 4; Johnson et al., 2012, pg. 25; Moser & Ekstrom, 2012, pg. 16; Reid et al., 2009, pg. 1733; Weber et al., 2015, pg. 235
Transportation (Sensitivity)	Indicates ability to respond to extreme heat events. Lack of transportation options is correlated to increased risk to adverse effects of heat waves, since those who have restricted mobility options have more difficulty accessing cooling centers or other preventive measures under extreme heat conditions.	Population using public transportation to get to work	ACS_2015_B08301	Cooley, 2012, pg. 4.; Luber et al., 2008, pg. 434
		Occupied housing units with no vehicle 15-64	ACS_2015_B25045	Cooley, 2012, pg. 4, 9; Eisenman et al., 2016, pg. 93
		Occupied housing units with no vehicle 65+		
Air Conditioning (Adaptive Capacity)	Indicates ability to adapt to extreme heat events. Air conditioning provides means of cooling, which prevent health risk during EHE events. Those who lack air conditioning are at significantly susceptible to heat related impairments and are at higher risk of death.	Household has central room air conditioner	ESRI_ 2016_ MP16030h_B	Bao et al, 2015, pg. 7224; Cooley, 2012, pg. 6; Eisenman et al, 2016, pg. 93; Kravchenko et al., 2014, pg. 277; Luber et al., 2008, pg. 434, Manangan et al, 2008, pg. 11; Moser & Ekstrom, 2012, pg. 17; Weber et al, 2015, pg. 235
		Household has separate room air conditioner	ESRI_2016_MP16022h_B	

Mapping Vulnerability with SVI Scores

A geospatial dataset (layer) of social vulnerability for SLO County was generated in Geographic Information Systems (GIS), by adding a field of the SVI values from Appendix D to the attributes of block group shapefiles for San Luis Obispo County (retrieved from the U.S. Census). A geospatial dataset (layer) of hazard magnitude (mean number of observed and expected extreme heat days) was also generated by adding a field of the hazard magnitude data from Appendix E to the attributes of block group shapefiles for SLO County. Five natural breaks were chosen in both cases, as it allows a straightforward "very-low, low, medium, high, very-high" relative SVI score and hazard magnitude classification. Normalization breaks by standard deviation would have been preferred, but a minimum of seven break values were required, which would have not allowed these logical 5-level classifications. The SVI Score layer was then overlapped to the conservative 4.5 RCP scenario of hazard magnitude[1], and areas of medium, high, and very-high SVI scores were spatialized[2]. See Section IV for the results of this geospatial assessment of social vulnerability, hazard magnitude, and their overlap.

IV. RESULTS

Social vulnerability to extreme heat in San Luis Obispo County is spatialized in Figure 4.1. The SVI scores are classified into five natural break classes as described in the methodology, with light purple corresponding to "very low" and dark blue corresponding to "very high" relative vulnerability. Since it is difficult to identify the areas of high vulnerability from Figure 4.1, additional higher resolution maps are depicted in Figures 4.5 to 4.8 for areas of medium, high, and very high social vulnerability, in relation to extreme heat exposure in the County.

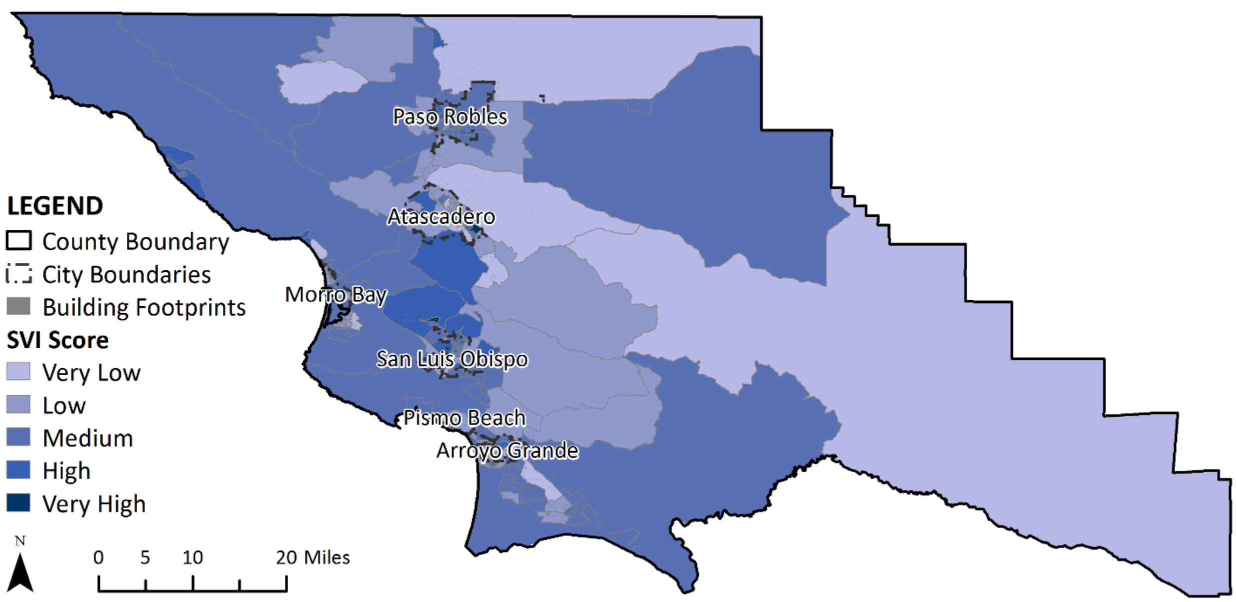

Figure 4.1: Social Vulnerability to Extreme Heat in San Luis Obispo County

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[1] The 4.5 Representative Concentration Pathways (RCP) is one of the possible trajectories adopted by the Intergovernmental Panel on Climate Change (IPCC) for climate modeling and research. This scenario predicts greenhouse gas (GHG) emissions peak around 2040, then decline in the 21st century. This scenario is one of the best-case scenarios for GHG emissions, where GHGs are contained within levels where global temperatures are likely to increase below the 2° C catastrophic threshold (IPCC, 2013).

[2] Areas of very low and low medium relative vulnerability (SVI Score) are listed in the legends of Figure 4.5 to 4.8, however they are not identifiable in the figures themselves, so attention is focused on areas of medium, high, and very high vulnerability.

Figures 4.2, 4.3, and 4.4 demonstrate the progression of exposure to extreme heat in SLO County. Figure 4.2 is the baseline of observed levels of extreme heat (1950-2013). Both the 4.5 and the 8.5 RCP Emissions Scenario are demonstrated in Figure 4.3 and 4.4 for comparison purposes. To demonstrate the progression of extreme heat, the color classifications in all three figures generally correspond to same range of extreme heat days (EHD).

Figure 4.2: Observed Mean Annual Number of Extreme Heat Days (1950-2013)

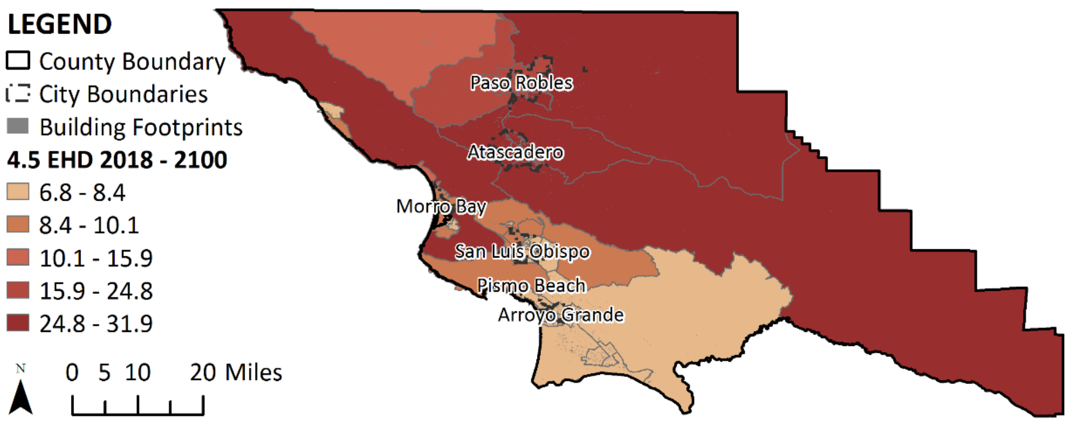

Figure 4.3: Expected Annual Number of Extreme Heat Days for RCP 4.5 (2018-2100)

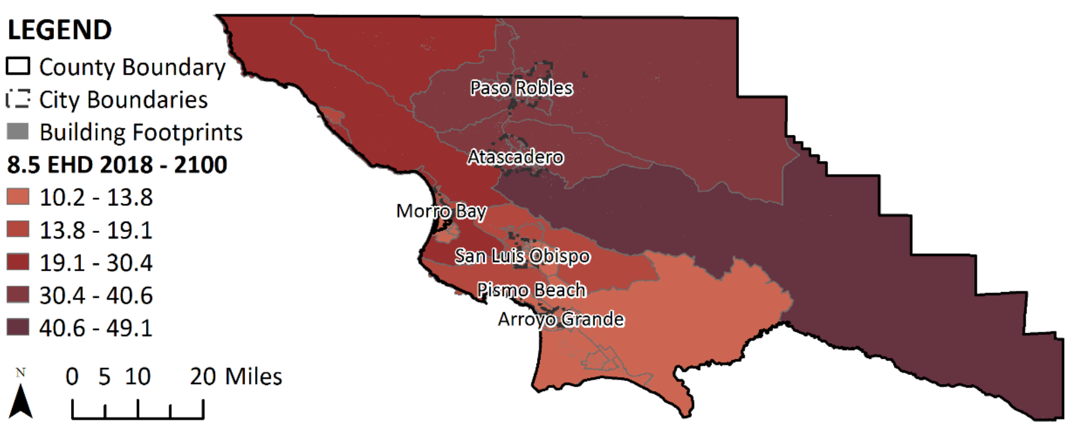

Figure 4.4: Expected Annual Number of Extreme Heat Days for RCP 8.5 (2018-2100)

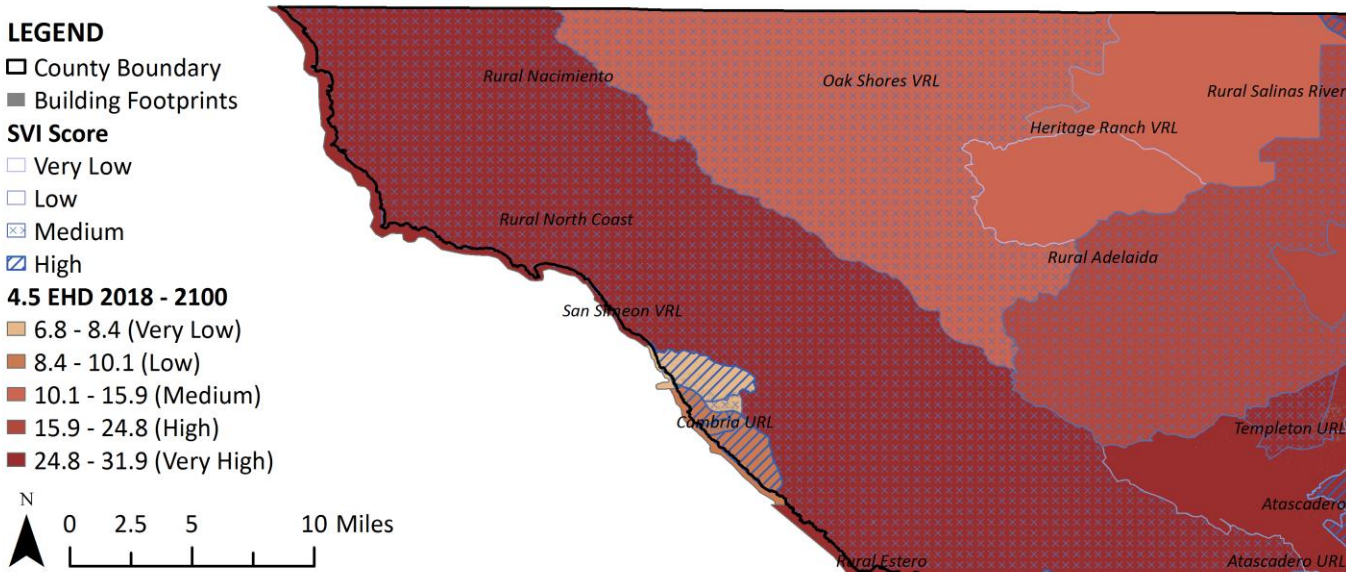

Figure 4.5: Area of Medium and High SVI in North Coast Planning Area

Figure 4.5 demonstrates the 4.5 RFP extreme heat days (EHD) scenario for 2018-2100 overlapped with medium and high SVI Scores in the North Coast Planning Area. In Cambria specifically, SVI is high (shown with blue cross hatches), however the area has low expected exposure to extreme heat in comparison to the rest of the County. Other areas along North Coast have very high expected exposure to extreme heat, but medium SVI.

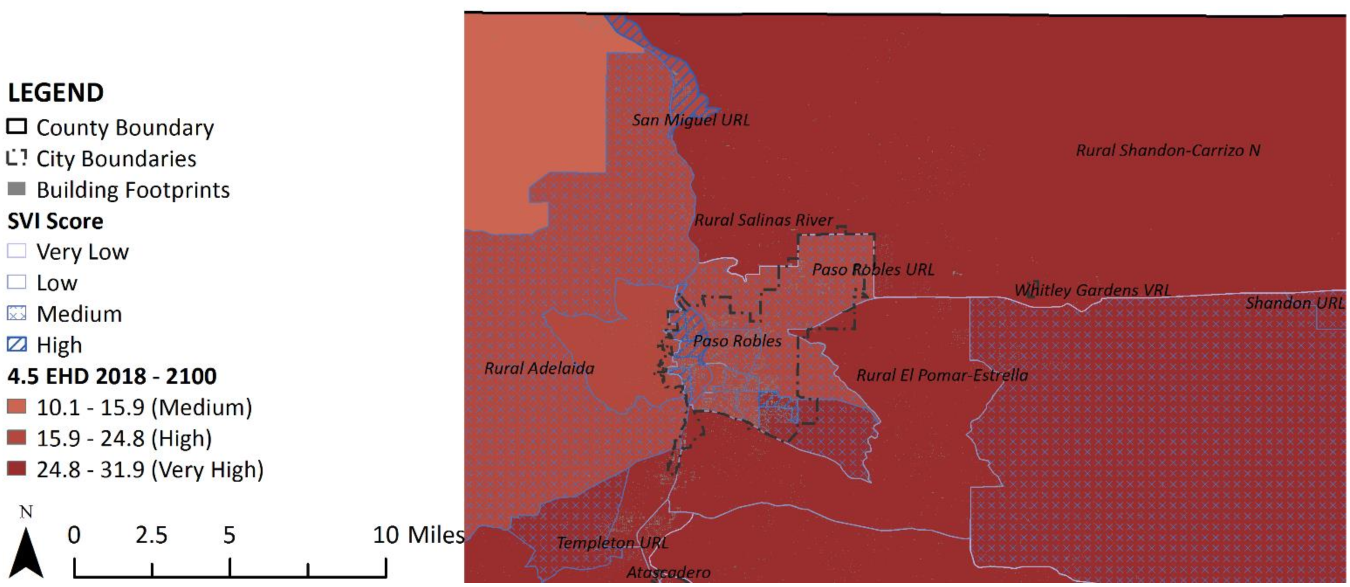

Figure 4.6: Area of Medium and High SVI in North County Planning Area

Figure 4.6 demonstrates the 4.5 RFP EHD scenario overlapped with medium and high SVI scores in the North County Planning Area. SVI is high in San Miguel and Paso Robles, and both areas are expected to have a medium amount of extreme heat days in the future (2018-2100) relative to other areas of San Luis Obispo County. Other areas of the North County Planning area, such as Templeton and Rural El Pomar-Estrella, have medium SVI and very high predicted EHD in the future.

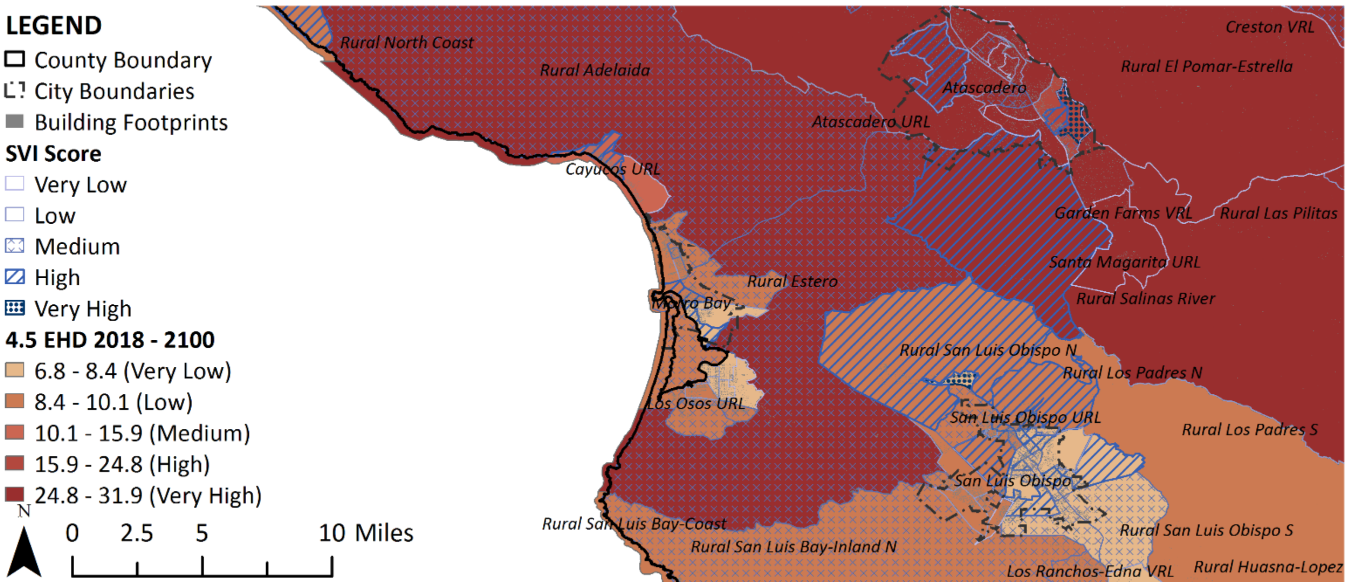

Figure 4.7: Area of Medium, High, and Very High SVI in Estero, San Luis Obispo, and North County Planning Areas

Figure 4.7 demonstrates the 4.5 RFP future scenario overlapped with medium, high, and very high SVI Estero, San Luis Obispo, and North County Planning Areas. In Rural San Luis Obispo County, there is an area of very high SVI with a very low expected EHD exposure. In Atascadero, there is an area of very high SVI with medium expected EHD. Cayucos, Morro Bay, and areas between Atascadero and SLO also have high SVI.

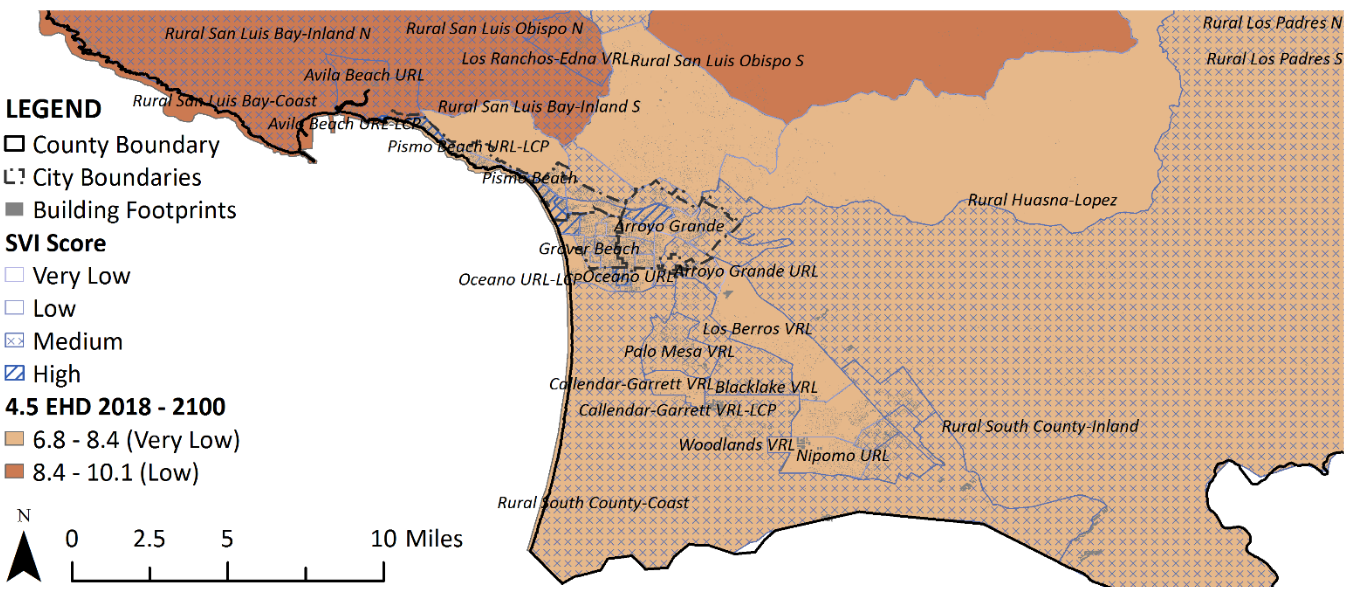

Figure 4.8: Area of Medium and High SVI in San Luis Bay Coastal, South County Coastal, and South County Inland Planning Areas

Figure 4.8 demonstrates the 4.5 RFP EHD scenario overlapped with medium and high SVI scores in San Luis Bay Coastal, South County Coastal, and South County Inland Planning Areas. SVI is high in certain areas of Pismo Beach and Arroyo Grande, and both areas are expected to have a very low relative EHD exposure in the future.

Table 4 summarizes the relative level of social vulnerability and extreme heat for communities and cities in San Luis Obispo County. Areas of relative medium, high, and very high social vulnerability (SVI) are listed in comparison to the relative amount extreme heat days (EHD).

Table 4: Summary of Areas in SLO County with Medium, High, and Very High SVI relative to Extreme Heat

EHD	SVI		
	Medium	High	Very High
Very Low	Central/South/East San Luis Obispo, South Central Grover Beach, North/South/West Arroyo Grande, Palo Mesa, Rural South County Inland, Blacklake, Woodlands, Callendar Garret, Rural South County Coast, Rural Los Padres, Rural Huasna Lopez	Cambria, Central/South/East San Luis Obispo, North Pismo Beach, South Pismo Beach, North Central Arroyo Grande, North West Grover Beach, North Oceano	South Rural San Luis Obispo
Low	Morro Bay, South West San Luis Obispo, Los Osos, Rural San Luis Bay Inland, Rural San Luis Bay Coast, Avila Beach, Los Ranchos Edna	Cambria, East Rural Estero, Rural San Luis Obispo, North West San Luis Obispo, North Morro Bay	
Medium	Rural Nacimiento, Oak Shores, West Rural Adelaida	North Cayucos	
High	East Rural Adelaida, San Miguel, Paso Robles, Central Atascadero, Central and West Paso Robles	West Paso Robles, South East Atascadero	South East Atascadero
Very High	Rural North Coast, San Simeon, West Rural Estero, Templeton, South East Paso Robles, Rural El Pomar Estrella	West Atascadero, area between Atascadero and Rural North San Luis Obispo, South East Paso Robles	

V. SUMMARY & CONCLUSION

Extreme heat is a natural hazard predicted to increase in frequency, intensity, and duration in future years. This hazard poses significant public health concerns across the nation, as it is the leading cause of weather-related human mortality in the United States and can significantly exacerbate other pre-existing health concerns. In addition, social characteristics put certain populations at disproportionate risk to extreme heat, calling to attention the concept of social vulnerability.

This project assesses San Luis Obispo County's social vulnerability to extreme heat by collecting block-level data of social vulnerability, generating an SVI score with SPSS software, and spatializing with GIS the resulting SVI values compared to a conservative future scenario of extreme heat (RCP 4.5). According to geospatial analysis, there are varying levels of social vulnerability to extreme heat in SLO County. See Section IV and Table 4 of this document for more detail on overlapping areas of relative medium, high, and very high social vulnerability in comparison to extreme heat exposure.

Although there are various efforts in the State and County to address extreme heat, none specifically assess or prepare for vulnerable populations in SLO County. This assessment can help visualize the spatial variation of extreme heat, guide future research, and support efforts in the County to improve emergency response and increase adaptive capacity in specific areas of need. As climate change is predicted to disproportionately harm those most vulnerable, these efforts notably allow stakeholders in San Luis Obispo County to mitigate harm to those whom have fewer resources or lack the capacity to resist the adverse health implications of extreme heat.

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APPENDIX A: Census Block Group Level Data (Raw)

GEO ID	Population Employed	Population	2015 Households	2016 Households	Farming, Fishing, and Forestry Occupations	Construction and Extraction	In Civilian Labor Force and Unemployed, Age 16+
60790100021	177	513	255	300	0	17	0
60790100022	908	3394	902	751	0	120	39
60790100023	228	452	180	225	0	39	4
60790100161	1381	2899	1134	1052	123	162	50
60790100162	1217	2461	730	749	184	68	187
60790101011	991	1793	747	764	21	53	42
60790101021	696	1684	570	522	37	18	51
60790101022	755	1569	515	503	92	64	84
60790101023	998	2137	734	568	44	0	179
60790101024	494	896	491	637	0	12	17
60790101025	511	1179	446	476	0	53	89
60790102011	1718	3786	1614	1585	171	169	149
60790102012	1724	3071	1034	1206	13	146	49
60790102021	680	1773	727	796	20	51	88
60790102022	1927	3855	1333	1142	113	57	57
60790102041	1310	2421	907	976	32	54	74
60790102042	1548	3558	1310	1078	78	78	194
60790102051	518	1204	521	487	17	0	31
60790102052	400	782	259	299	0	36	44
60790102053	1158	2238	690	678	10	116	118
60790103001	1105	2340	1136	1253	18	119	51
60790103002	1213	2458	921	1041	6	71	20
60790103003	586	1227	390	377	87	71	53
60790103004	1599	3356	1176	1119	17	99	97
60790104031	498	1361	674	652	0	0	59
60790104032	340	1141	575	585	0	7	18
60790104033	739	1576	675	632	26	50	6
60790104041	447	1280	627	617	0	31	24
60790104042	434	921	331	352	0	11	15
60790105031	626	1348	694	796	0	33	43
60790105032	1045	2059	1026	913	17	0	12
60790105033	408	960	407	494	0	0	44
60790105034	347	857	349	324	0	0	97
60790105041	285	553	329	331	0	0	12
60790105042	505	1225	487	509	0	94	10
60790105043	409	980	527	441	0	0	23
60790106021	476	1180	555	545	0	26	47
60790106022	672	1488	747	666	23	22	22
60790106023	692	1268	619	618	0	37	61
60790106031	309	541	301	395	0	0	46
60790106032	451	859	293	204	0	9	0
60790107011	723	1636	718	613	0	78	99
60790107012	1287	2565	887	732	13	48	87
60790107013	505	1028	484	509	0	27	52
60790107031	958	1868	786	662	0	0	94

60790107032	628	1454	642	667	0	117	62
60790107071	389	878	356	359	0	44	82
60790107072	1042	1950	813	707	0	17	38
60790107073	521	1171	520	480	0	12	43
60790107074	419	932	424	479	0	60	0
60790107075	445	1227	626	671	0	24	54
60790109011	626	3891	186	226	11	10	147
60790109012	1480	5591	680	642	45	12	298
60790109021	537	1142	280	303	0	4	0
60790109022	493	983	396	496	0	0	38
60790109023	1072	2102	708	662	0	13	83
60790110011	927	2098	790	748	0	29	42
60790110012	527	1183	416	499	0	0	47
60790110013	1021	1934	851	920	0	22	27
60790110021	1186	2012	778	828	0	29	57
60790110022	604	1329	479	497	0	0	37
60790111011	699	955	535	608	0	10	6
60790111012	867	1438	766	779	0	68	127
60790111013	625	1023	445	530	0	8	34
60790111021	678	1158	553	673	0	48	8
60790111022	697	1191	480	541	0	35	0
60790111023	685	1133	475	606	16	18	13
60790111024	1119	1886	761	803	0	10	80
60790111031	731	1479	578	524	0	29	125
60790111032	470	1054	613	916	0	11	45
60790112001	1191	2625	988	998	0	0	149
60790112002	411	1095	408	548	0	0	27
60790112003	243	617	210	270	0	0	22
60790112004	575	1637	716	788	0	0	103
60790112005	921	1488	497	405	0	59	0
60790113001	1655	3334	1252	1342	0	24	81
60790113002	1338	2419	798	852	4	38	75
60790113003	644	1314	462	505	0	30	75
60790113004	560	1025	289	283	0	44	68
60790114001	0	3690	0	6	0	0	0
60790115011	753	1668	707	873	3	36	44
60790115031	641	1534	506	585	0	6	38
60790115032	1086	2104	758	858	0	20	57
60790115041	298	628	300	211	21	78	5
60790115042	186	1284	102	35	11	0	0
60790116001	690	1814	736	612	0	0	19
60790116002	632	1142	657	795	0	0	18
60790116003	656	1326	503	511	0	19	21
60790117011	55	295	198	234	0	16	0
60790117012	830	1667	863	757	2	22	12
60790117013	568	1223	452	482	40	20	0
60790117014	492	1555	581	689	0	0	68
60790117041	507	781	378	520	0	19	45
60790117042	480	709	490	450	0	0	13
60790117043	658	1120	630	588	0	0	34
60790117044	145	497	259	351	0	0	14

60790118001	684	1399	532	579	0	29	71
60790118002	690	2011	728	669	0	34	43
60790118003	262	647	338	404	3	0	0
60790118004	347	681	208	331	0	27	0
60790118005	1074	2432	1030	1018	0	55	62
60790119011	612	1432	641	666	0	39	8
60790119012	891	1568	673	690	0	47	30
60790119021	754	1840	766	775	0	0	53
60790119022	970	2012	722	696	29	0	21
60790119023	543	960	407	625	0	0	19
60790119024	959	2490	773	641	30	58	127
60790119025	1006	1696	716	694	19	116	75
60790120001	822	1816	775	812	0	56	38
60790120002	227	718	371	358	0	62	0
60790120003	1100	2227	967	770	0	21	133
60790120004	1274	2659	932	979	0	19	111
60790121021	694	1377	704	599	0	18	120
60790121022	844	1599	649	788	0	84	52
60790121023	837	1777	636	552	36	64	73
60790121024	653	1272	437	345	0	139	15
60790122001	1076	2310	592	750	0	86	90
60790122002	192	546	351	261	0	54	11
60790122003	707	1806	658	763	12	14	30
60790122004	1139	2662	825	719	181	62	89
60790123021	1244	2852	1125	1120	0	78	58
60790123022	267	575	253	365	1	0	49
60790123023	669	1343	523	539	77	103	24
60790123041	985	2308	831	1244	44	82	134
60790123042	1301	3477	1294	1073	0	46	140
60790123043	405	1100	378	350	24	39	101
60790123044	801	1725	556	465	49	65	48
60790123045	467	1450	718	856	13	77	38
60790124011	648	1193	430	366	39	47	73
60790124012	1134	2249	696	674	0	65	42
60790124013	1713	3287	1038	975	34	166	170
60790124021	1338	3459	1234	1049	15	133	48
60790124022	1253	2460	975	1150	13	306	18
60790124023	1629	3503	1073	1098	32	101	160
60790125021	651	1267	569	600	9	54	50
60790125022	484	1168	438	401	0	27	76
60790125023	1274	2692	1021	990	25	96	129
60790125031	714	1712	581	528	0	120	55
60790125032	1653	2934	1238	1184	0	74	14
60790125033	369	1132	643	671	0	18	59
60790125051	913	1909	655	783	0	63	0
60790125052	578	1109	388	417	0	17	25
60790125053	1050	2144	802	721	0	53	77
60790126001	680	1516	630	660	0	57	30
60790126002	453	1167	499	551	9	39	23
60790126003	868	1554	537	526	0	29	11
60790126004	1094	1887	623	556	0	127	17

60790126005	834	1805	708	786	0	113	48
60790127021	557	1089	435	439	0	20	45
60790127022	561	1082	400	434	16	134	0
60790127023	706	1882	744	695	0	12	37
60790127024	381	831	319	344	0	0	0
60790127025	746	2196	679	775	0	8	130
60790127041	959	2555	1052	1074	0	30	39
60790127042	952	2196	770	649	0	57	0
60790127043	1213	2927	1171	1283	0	104	117
60790127044	431	1139	375	388	0	30	37
60790128001	46	344	55	44	18	0	1
60790129001	1134	2741	957	1006	10	114	137
60790129002	1434	2642	995	962	0	76	47
60790130001	481	1041	445	677	18	13	42
60790130002	869	1413	588	439	56	4	25

American Indian and Alaska Native alone	Native Hawaiian and Other Pacific Islander alone	Hispanic/Latino	Black or African American Alone	Asian	Some other race	< 5 years old	65+ years old
15	0	27	0	0	0	0	184
28	0	854	36	40	603	90	338
0	0	0	0	0	0	76	83
0	0	668	0	32	341	346	452
38	0	1255	0	8	564	325	96
0	0	278	0	9	38	97	338
0	0	1127	76	0	363	128	148
83	0	1428	15	0	94	113	28
0	0	1249	224	0	394	273	53
0	0	99	143	35	7	17	147
0	0	459	0	35	230	0	249
9	0	1252	0	26	232	206	756
84	0	479	55	118	19	211	393
0	0	753	0	31	200	123	417
0	0	1442	192	116	370	289	474
187	0	816	0	0	211	112	341
0	0	1621	88	212	411	354	497
0	0	443	43	10	73	29	182
0	0	274	18	16	42	95	71
23	0	851	15	1	212	132	231
16	0	167	0	14	49	29	619
3	0	419	130	0	194	70	512
0	20	432	47	4	12	119	78
4	5	893	17	5	101	326	464
13	0	185	0	12	8	53	606
0	0	117	0	52	25	0	646
54	0	380	0	0	91	38	478
0	0	116	7	42	56	18	668
0	0	473	0	0	146	46	210
0	0	296	0	0	0	135	339

0	0	202	0	0	47	128	327
0	0	30	167	20	0	0	204
0	0	150	0	0	0	53	188
0	0	80	0	18	0	0	206
0	0	145	0	98	0	118	341
9	0	18	0	20	0	6	405
85	0	378	0	0	84	106	320
9	0	162	0	66	10	19	506
14	0	254	0	21	46	38	262
0	0	203	0	11	4	8	129
0	0	67	5	84	12	23	204
21	0	170	7	0	9	116	292
23	0	315	0	90	60	122	423
48	0	150	30	0	52	21	222
0	0	259	0	173	80	65	162
0	0	233	0	104	0	132	298
14	0	26	0	0	13	27	230
0	0	238	0	92	10	110	362
45	0	65	0	0	0	28	243
0	0	152	0	9	25	11	258
0	0	181	0	25	87	34	568
17	15	466	52	506	154	0	0
10	0	864	51	848	282	0	3
0	0	129	79	5	48	13	84
0	0	138	30	74	117	9	25
0	0	466	53	133	51	43	32
0	0	358	19	145	84	104	383
0	0	26	14	76	0	95	280
11	0	130	0	113	30	175	413
0	0	369	0	16	250	70	255
0	0	152	0	195	0	0	11
0	0	81	19	41	8	0	68
0	0	367	8	41	88	45	144
0	0	167	59	98	18	38	81
0	0	254	91	16	37	17	182
0	0	207	0	33	56	48	21
57	0	112	35	7	0	36	118
0	0	292	115	105	47	31	193
0	0	367	0	87	109	89	105
26	0	179	8	16	12	29	329
0	0	465	174	174	94	75	101
0	0	0	0	79	0	46	355
0	0	0	0	22	0	0	61
0	0	137	0	58	10	21	296
0	0	224	11	18	12	71	138
7	0	1089	124	264	110	110	470
65	0	495	4	103	59	122	402
0	0	112	71	224	0	0	159
0	0	130	0	100	12	0	59
59	15	840	1636	117	726	0	186
0	0	399	11	198	31	86	280

0	0	150	45	22	19	116	191
0	0	287	122	46	48	100	228
0	0	151	0	12	0	57	104
20	0	272	69	132	87	5	75
0	0	47	0	6	0	70	583
0	0	6	0	74	0	0	376
0	0	96	9	2	82	23	176
0	0	15	0	0	0	0	210
0	0	131	73	94	0	77	324
0	0	0	0	0	0	162	235
0	0	77	42	11	60	131	498
0	0	32	0	12	7	19	152
0	0	132	0	20	31	38	78
0	0	23	0	0	0	11	217
15	0	13	8	0	0	0	236
0	0	298	1	117	12	84	124
0	0	12	0	0	0	22	572
0	0	11	2	26	0	47	221
0	0	91	0	14	0	36	153
0	0	131	0	122	45	131	697
0	0	95	0	94	0	54	546
2	0	310	9	50	96	106	295
0	0	160	15	339	27	127	343
22	0	641	0	166	38	109	287
34	0	183	0	115	80	100	195
0	0	1084	22	28	74	192	332
20	0	221	94	93	0	37	229
142	0	451	0	156	98	87	407
0	143	25	0	0	0	143	186
0	0	771	165	0	180	72	204
38	34	799	66	127	242	318	263
13	0	350	80	55	103	36	177
50	0	352	44	0	185	24	342
20	0	720	0	367	68	87	226
0	0	522	0	87	71	22	44
0	0	1946	0	59	664	127	293
0	0	201	0	0	0	52	245
0	0	444	0	0	121	18	555
0	0	1909	0	60	597	134	153
0	0	222	0	56	0	158	677
9	0	7	0	0	1	32	107
34	0	470	0	0	217	20	185
35	0	635	21	356	126	34	532
113	0	384	16	156	0	142	1088
0	0	213	20	63	33	13	176
0	0	328	0	2	3	92	342
0	0	159	5	116	0	19	789
0	0	487	27	10	0	99	86
7	0	1138	23	21	248	190	235
26	0	1489	53	58	162	108	399
24	0	847	56	149	24	249	816

36	0	816	18	102	83	69	470
18	0	1261	116	15	617	288	187
0	0	110	0	12	38	82	126
0	0	105	0	7	24	67	121
9	0	721	34	20	134	278	260
5	0	184	0	245	0	120	272
0	0	696	147	98	161	169	194
0	32	162	0	0	0	49	364
0	0	60	5	124	0	114	250
8	0	173	0	0	0	94	228
19	20	329	14	23	40	242	206
0	0	127	0	0	0	87	365
14	0	51	86	17	9	61	269
0	0	156	13	20	47	45	137
0	0	717	0	0	20	199	266
0	0	226	0	25	11	108	348
0	0	105	8	41	37	55	221
0	0	43	0	0	0	39	162
0	0	235	0	0	24	157	133
0	0	159	0	31	0	0	106
0	0	209	4	36	0	58	505
0	0	514	42	26	244	71	903
0	0	26	30	0	25	48	392
16	0	297	16	131	185	135	816
11	0	142	0	11	0	67	145
15	0	81	76	4	46	0	62
51	0	591	0	14	45	260	596
27	0	526	1	39	196	167	237
0	0	311	6	25	86	0	393
75	0	164	0	7	26	52	204

Uses public transportation	Population >25 without H.S. diploma	Foreign born	Limited English Speaking Household	Female householder, no husband present	Occupied housing units with no vehicle 15-64	Occupied housing units with no vehicle 65+	Renter living alone
0	8	13	0	13	0	0	0
18	78	28	14	39	25	9	111
0	23	18	0	0	0	9	19
0	237	439	114	54	8	6	121
1	438	718	154	63	8	8	6
0	114	120	24	18	10	0	58
0	412	644	97	157	47	13	61
0	418	662	119	123	19	0	84
0	288	709	138	101	11	0	48
12	46	26	0	38	19	0	105
13	244	312	88	81	0	0	73
0	298	401	20	126	0	86	54
0	119	195	0	46	0	0	0
17	270	404	56	58	0	51	42
51	320	709	66	89	0	9	77

17	161	371	74	92	0	15	100
139	443	875	51	173	75	13	148
0	67	154	11	22	12	0	68
0	90	122	0	29	0	0	11
0	95	247	12	118	9	0	27
16	78	58	35	63	16	30	145
0	138	210	16	38	20	0	14
0	230	199	32	62	2	0	25
0	271	187	51	14	34	0	69
0	45	144	10	37	0	0	97
0	48	143	9	28	7	23	74
0	175	167	62	78	18	9	35
0	65	140	8	24	6	11	23
0	174	228	35	48	16	6	38
0	73	102	0	16	0	0	212
13	107	327	41	49	19	11	347
0	80	50	24	44	44	0	34
0	34	52	10	61	28	27	111
31	41	62	0	0	10	20	99
0	66	97	0	53	10	0	21
10	34	59	0	42	0	12	71
6	188	232	71	52	33	17	167
26	29	170	16	76	0	9	94
0	56	110	22	18	0	9	84
0	79	151	0	34	59	14	131
20	60	71	10	21	7	0	21
0	161	60	0	57	37	0	156
18	44	137	11	43	10	0	38
0	43	72	12	65	32	12	72
0	110	280	30	114	12	7	139
0	160	149	33	25	31	0	136
0	38	43	0	15	0	12	0
0	42	132	0	25	0	0	59
0	85	25	21	60	0	17	54
0	73	37	0	19	0	0	15
0	75	169	28	6	9	34	62
10	0	149	0	0	7	0	43
11	0	183	0	0	141	0	484
2	5	80	4	5	3	0	0
26	5	45	0	10	39	0	85
22	3	183	25	8	43	0	117
64	149	165	59	64	34	76	154
0	22	21	0	54	0	0	0
3	44	118	28	66	19	143	323
31	88	164	0	42	21	13	113
51	0	66	0	46	13	0	69
62	0	69	0	36	59	7	258
61	61	145	14	59	122	61	392
63	39	103	6	6	7	7	117
24	33	72	0	49	21	96	203
0	0	174	0	94	0	21	139

0	0	58	0	23	20	0	82
0	97	305	62	60	38	31	245
0	160	271	83	73	64	16	55
35	91	30	16	59	44	43	156
17	25	342	25	31	141	13	225
0	16	97	0	12	0	26	23
0	0	13	0	26	0	13	0
18	54	121	0	0	0	109	244
0	34	29	0	0	26	0	26
39	326	635	176	196	42	0	148
165	108	397	42	21	0	0	27
0	0	158	14	47	10	0	0
0	0	11	0	14	0	0	0
0	1185	450	0	0	0	0	0
18	120	282	27	45	19	0	64
0	53	51	0	22	0	8	51
0	24	120	0	63	7	28	95
0	93	90	36	5	0	0	89
23	100	153	0	16	0	0	0
0	16	140	0	30	0	37	73
0	0	111	0	0	0	0	103
0	28	54	0	57	33	0	55
0	27	0	0	0	15	12	16
16	82	105	34	65	60	20	218
65	13	60	0	0	0	16	36
91	33	98	0	10	0	43	17
0	42	45	0	21	0	8	60
0	26	24	10	25	74	21	320
14	0	63	10	26	0	0	124
0	0	19	0	0	0	10	18
12	80	185	30	18	0	16	43
0	11	52	0	46	0	0	30
0	27	46	0	0	13	0	20
0	15	35	0	33	14	19	23
0	75	233	38	102	0	0	11
0	27	85	0	48	0	10	19
9	42	66	15	79	7	7	145
0	61	207	0	116	14	62	246
0	94	110	9	127	18	33	70
0	34	111	20	94	39	18	60
0	236	498	80	37	0	0	80
39	57	239	32	0	50	50	209
27	105	110	32	153	0	14	62
0	101	25	0	0	0	0	60
0	216	140	21	134	86	0	289
19	307	602	27	185	0	16	65
0	123	13	0	52	80	0	294
22	139	207	0	94	0	36	94
37	276	372	36	99	83	0	104
0	72	23	0	93	0	15	62
0	681	502	69	157	0	15	23

0	14	43	0	63	0	0	105
0	238	130	0	123	0	0	60
16	686	1101	167	158	71	0	136
0	28	86	11	64	0	19	122
0	40	9	0	15	0	0	16
0	54	222	19	10	0	0	25
0	64	325	18	170	0	0	34
0	149	230	0	198	0	29	13
39	33	143	0	55	18	0	24
18	190	128	14	56	0	0	28
0	39	94	0	13	0	40	52
0	88	230	13	54	0	0	0
9	457	417	71	128	20	24	38
0	381	447	45	60	6	0	88
0	82	408	14	31	0	0	136
53	284	275	0	13	30	0	56
0	318	476	109	269	49	0	83
19	5	29	0	63	25	0	100
0	34	46	0	135	9	0	27
17	235	156	30	170	68	14	180
32	183	164	0	20	9	0	70
0	280	391	113	213	58	0	361
45	22	10	0	51	31	40	234
0	129	129	0	59	7	15	23
0	47	23	0	18	9	0	7
6	71	114	12	81	14	0	112
0	57	28	0	89	13	17	28
9	50	91	0	17	77	0	129
14	15	78	0	23	7	0	13
16	57	79	0	52	0	0	19
17	0	30	0	124	0	62	77
0	49	162	49	59	0	10	37
0	70	0	0	29	0	0	10
0	130	108	12	57	21	11	34
0	18	0	0	0	17	13	0
15	155	221	0	65	0	12	12
15	142	326	0	149	0	0	53
0	33	63	0	109	0	0	36
26	154	286	11	146	0	131	122
0	18	89	0	20	0	0	17
1	155	3	0	5	11	5	23
0	142	181	43	24	29	0	46
14	122	191	0	99	0	0	105
2	73	140	39	30	5	0	50
0	90	109	89	10	0	0	55

Owner Living Alone	65+ Nonfamily Householder Male Living alone	65+ Nonfamily Householder Female Living alone	Renter-occupied	Very-Extremely Low Income	HH has Centeral Air Conditioner	HH Owns Separate Room Air Conditioner
24	16	0	9	94	119	37
128	35	40	212	231	183	128
30	19	17	56	27	55	38
142	59	77	458	364	490	116
81	0	8	367	374	231	65
78	9	56	268	239	340	117
8	0	13	444	366	52	106
18	0	28	497	351	62	34
34	0	0	546	265	145	99
22	0	65	367	122	138	73
16	0	44	295	169	122	83
479	81	251	332	537	387	270
64	24	0	215	112	537	185
225	33	206	170	337	343	101
139	26	74	339	317	445	136
51	37	53	371	198	381	116
123	26	96	727	737	303	114
109	11	46	251	167	150	42
10	0	0	98	69	125	28
47	0	28	288	187	283	64
211	112	43	204	355	306	214
104	0	0	208	164	463	159
34	12	3	188	124	116	33
153	83	34	252	307	273	191
122	85	39	221	242	305	80
140	25	136	127	181	274	72
163	46	106	214	240	296	78
187	62	101	90	153	288	76
36	6	51	157	153	86	60
95	22	170	444	405	224	84
136	69	89	503	395	376	120
77	25	68	89	165	231	61
34	13	36	221	230	133	42
81	0	81	162	166	119	51
28	10	18	169	108	124	87
158	56	89	123	213	206	54
47	50	57	405	228	153	57
161	36	121	309	285	292	100
110	59	57	284	246	151	105
29	14	39	242	187	32	54
25	0	10	131	83	95	25
114	20	115	366	293	252	80
129	29	37	223	163	236	145
130	20	46	131	213	92	90
75	25	9	423	450	119	117
54	27	16	268	206	275	87
19	0	0	104	48	167	39

57	0	39	333	272	173	121
115	9	61	129	229	207	61
123	30	75	117	141	223	53
178	44	121	118	262	314	82
0	0	0	186	182	60	29
10	0	0	663	629	171	83
13	5	2	174	119	73	41
31	0	13	337	311	132	64
21	0	0	672	564	177	86
109	44	113	443	200	211	79
34	0	17	51	37	232	55
94	30	227	551	440	259	97
76	21	54	389	249	256	112
0	0	0	429	327	133	64
15	8	38	506	294	147	82
13	49	39	720	439	188	104
84	32	7	310	182	128	71
30	34	49	422	310	162	90
0	0	0	382	205	122	37
58	9	31	175	154	188	82
22	41	22	610	357	194	108
55	14	28	357	294	162	71
160	13	154	333	359	258	97
60	9	13	832	788	267	129
117	12	72	70	111	255	60
37	25	12	129	129	65	36
49	61	137	507	478	190	106
71	0	0	221	76	98	54
119	21	83	736	508	324	180
51	12	36	362	207	206	114
57	14	35	184	125	235	56
11	11	0	179	148	68	38
0	0	0	0	0	0	0
185	7	60	243	290	246	92
32	0	28	163	128	191	81
82	14	58	221	181	280	118
34	5	5	115	108	98	23
0	0	0	25	20	14	5
125	21	114	152	237	285	67
174	55	93	204	157	372	98
54	0	0	191	105	238	56
86	14	75	16	85	85	14
117	49	13	530	295	271	116
134	15	29	142	64	173	74
102	0	48	114	219	321	76
49	24	19	141	101	161	70
22	22	37	446	335	127	47
163	37	28	315	220	211	90
86	10	76	44	75	163	39
84	16	53	182	122	277	73
59	14	45	89	139	311	74

105	16	30	20	85	188	44
28	0	27	103	90	81	56
212	67	118	55	373	474	112
190	63	139	101	269	292	100
116	26	54	293	338	284	90
37	42	152	403	265	278	118
116	13	31	335	264	287	91
34	27	35	123	159	215	48
135	47	46	341	242	264	84
26	50	98	463	309	239	54
126	26	59	379	288	146	144
64	0	28	208	88	113	65
72	79	0	745	580	197	134
91	16	56	425	310	176	174
17	0	17	486	388	247	78
64	0	15	175	168	192	134
15	15	31	407	299	141	96
0	0	0	342	161	88	60
40	8	11	277	207	75	152
97	51	60	180	231	73	28
58	50	24	249	204	334	114
94	0	28	508	495	221	62
100	39	77	309	291	521	123
39	12	8	81	72	119	50
37	18	19	215	107	251	59
27	13	35	304	141	579	137
169	0	126	308	378	499	118
0	0	13	153	41	156	54
28	28	28	267	179	113	79
147	51	148	174	222	400	105
69	0	46	126	171	126	28
85	32	44	254	253	191	64
62	32	34	188	285	276	93
229	13	172	237	479	488	115
189	54	78	149	257	281	196
153	11	79	595	400	490	64
85	0	57	232	195	206	46
41	0	0	207	125	167	38
89	7	40	611	493	341	76
71	52	0	167	213	220	50
96	12	26	849	397	407	91
114	36	186	398	421	189	71
105	16	41	104	171	191	133
43	0	8	84	58	186	64
35	7	16	396	236	228	131
107	32	59	164	211	294	101
31	48	33	207	291	227	72
31	0	14	151	154	166	96
12	0	0	334	84	229	73
61	28	76	255	269	192	134
107	54	37	145	159	107	75

40	10	10	71	171	106	74
121	11	12	260	359	170	118
34	0	23	0	105	160	38
60	0	34	109	183	345	119
103	81	75	124	375	500	118
75	0	74	151	91	302	71
173	102	113	252	402	313	219
58	0	30	48	75	197	51
4	0	4	47	30	10	3
142	24	78	205	364	246	171
67	35	31	376	270	375	115
118	38	52	150	179	165	115
129	0	86	259	187	143	61

APPENDIX B: Census Block Group Level Data for SPSS (Percent)

GEO ID	Farming, Fishing, and Forestry Occupations	Construction and Extraction	In Civilian Labor Force and Unemployed, Age 16+	American Indian and Alaska Native alone	Native Hawaiian and Other Pacific Islander alone	Hispanic/Latino
60790100021	0.00	0.10	0.00	0.03	0.00	0.05
60790100022	0.00	0.13	0.01	0.01	0.00	0.25
60790100023	0.00	0.17	0.01	0.00	0.00	0.00
60790100161	0.09	0.12	0.02	0.00	0.00	0.23
60790100162	0.15	0.06	0.08	0.02	0.00	0.51
60790101011	0.02	0.05	0.02	0.00	0.00	0.16
60790101021	0.05	0.03	0.03	0.00	0.00	0.67
60790101022	0.12	0.08	0.05	0.05	0.00	0.91
60790101023	0.04	0.00	0.08	0.00	0.00	0.58
60790101024	0.00	0.02	0.02	0.00	0.00	0.11
60790101025	0.00	0.10	0.08	0.00	0.00	0.39
60790102011	0.10	0.10	0.04	0.00	0.00	0.33
60790102012	0.01	0.08	0.02	0.03	0.00	0.16
60790102021	0.03	0.08	0.05	0.00	0.00	0.42
60790102022	0.06	0.03	0.01	0.00	0.00	0.37
60790102041	0.02	0.04	0.03	0.08	0.00	0.34
60790102042	0.05	0.05	0.05	0.00	0.00	0.46
60790102051	0.03	0.00	0.03	0.00	0.00	0.37
60790102052	0.00	0.09	0.06	0.00	0.00	0.35
60790102053	0.01	0.10	0.05	0.01	0.00	0.38
60790103001	0.02	0.11	0.02	0.01	0.00	0.07
60790103002	0.00	0.06	0.01	0.00	0.00	0.17
60790103003	0.15	0.12	0.04	0.00	0.02	0.35
60790103004	0.01	0.06	0.03	0.00	0.00	0.27
60790104031	0.00	0.00	0.04	0.01	0.00	0.14
60790104032	0.00	0.02	0.02	0.00	0.00	0.10
60790104033	0.04	0.07	0.00	0.03	0.00	0.24
60790104041	0.00	0.07	0.02	0.00	0.00	0.09
60790104042	0.00	0.03	0.02	0.00	0.00	0.51
60790105031	0.00	0.05	0.03	0.00	0.00	0.22
60790105032	0.02	0.00	0.01	0.00	0.00	0.10
60790105033	0.00	0.00	0.05	0.00	0.00	0.03
60790105034	0.00	0.00	0.11	0.00	0.00	0.18
60790105041	0.00	0.00	0.02	0.00	0.00	0.14
60790105042	0.00	0.19	0.01	0.00	0.00	0.12
60790105043	0.00	0.00	0.02	0.01	0.00	0.02
60790106021	0.00	0.05	0.04	0.07	0.00	0.32
60790106022	0.03	0.03	0.01	0.01	0.00	0.11
60790106023	0.00	0.05	0.05	0.01	0.00	0.20
60790106031	0.00	0.00	0.09	0.00	0.00	0.38
60790106032	0.00	0.02	0.00	0.00	0.00	0.08
60790107011	0.00	0.11	0.06	0.01	0.00	0.10
60790107012	0.01	0.04	0.03	0.01	0.00	0.12
60790107013	0.00	0.05	0.05	0.05	0.00	0.15
60790107031	0.00	0.00	0.05	0.00	0.00	0.14

60790107032	0.00	0.19	0.04	0.00	0.00	0.16
60790107071	0.00	0.11	0.09	0.02	0.00	0.03
60790107072	0.00	0.02	0.02	0.00	0.00	0.12
60790107073	0.00	0.02	0.04	0.04	0.00	0.06
60790107074	0.00	0.14	0.00	0.00	0.00	0.16
60790107075	0.00	0.05	0.04	0.00	0.00	0.15
60790109011	0.02	0.02	0.04	0.00	0.00	0.12
60790109012	0.03	0.01	0.05	0.00	0.00	0.15
60790109021	0.00	0.01	0.00	0.00	0.00	0.11
60790109022	0.00	0.00	0.04	0.00	0.00	0.14
60790109023	0.00	0.01	0.04	0.00	0.00	0.22
60790110011	0.00	0.03	0.02	0.00	0.00	0.17
60790110012	0.00	0.00	0.04	0.00	0.00	0.02
60790110013	0.00	0.02	0.01	0.01	0.00	0.07
60790110021	0.00	0.02	0.03	0.00	0.00	0.18
60790110022	0.00	0.00	0.03	0.00	0.00	0.11
60790111011	0.00	0.01	0.01	0.00	0.00	0.08
60790111012	0.00	0.08	0.09	0.00	0.00	0.26
60790111013	0.00	0.01	0.03	0.00	0.00	0.16
60790111021	0.00	0.07	0.01	0.00	0.00	0.22
60790111022	0.00	0.05	0.00	0.00	0.00	0.17
60790111023	0.02	0.03	0.01	0.05	0.00	0.10
60790111024	0.00	0.01	0.04	0.00	0.00	0.15
60790111031	0.00	0.04	0.08	0.00	0.00	0.25
60790111032	0.00	0.02	0.04	0.02	0.00	0.17
60790112001	0.00	0.00	0.06	0.00	0.00	0.18
60790112002	0.00	0.00	0.02	0.00	0.00	0.00
60790112003	0.00	0.00	0.04	0.00	0.00	0.00
60790112004	0.00	0.00	0.06	0.00	0.00	0.08
60790112005	0.00	0.06	0.00	0.00	0.00	0.15
60790113001	0.00	0.01	0.02	0.00	0.00	0.33
60790113002	0.00	0.03	0.03	0.03	0.00	0.20
60790113003	0.00	0.05	0.06	0.00	0.00	0.09
60790113004	0.00	0.08	0.07	0.00	0.00	0.13
60790114001	0.00	0.00	0.00	0.02	0.00	0.23
60790115011	0.00	0.05	0.03	0.00	0.00	0.24
60790115031	0.00	0.01	0.02	0.00	0.00	0.10
60790115032	0.00	0.02	0.03	0.00	0.00	0.14
60790115041	0.07	0.26	0.01	0.00	0.00	0.24
60790115042	0.06	0.00	0.00	0.02	0.00	0.21
60790116001	0.00	0.00	0.01	0.00	0.00	0.03
60790116002	0.00	0.00	0.02	0.00	0.00	0.01
60790116003	0.00	0.03	0.02	0.00	0.00	0.07
60790117011	0.00	0.29	0.00	0.00	0.00	0.05
60790117012	0.00	0.03	0.01	0.00	0.00	0.08
60790117013	0.07	0.04	0.00	0.00	0.00	0.00
60790117014	0.00	0.00	0.04	0.00	0.00	0.05
60790117041	0.00	0.04	0.06	0.00	0.00	0.04
60790117042	0.00	0.00	0.02	0.00	0.00	0.19
60790117043	0.00	0.00	0.03	0.00	0.00	0.02
60790117044	0.00	0.00	0.03	0.03	0.00	0.03

60790118001	0.00	0.04	0.05	0.00	0.00	0.21
60790118002	0.00	0.05	0.02	0.00	0.00	0.01
60790118003	0.01	0.00	0.00	0.00	0.00	0.02
60790118004	0.00	0.08	0.00	0.00	0.00	0.13
60790118005	0.00	0.05	0.03	0.00	0.00	0.05
60790119011	0.00	0.06	0.01	0.00	0.00	0.07
60790119012	0.00	0.05	0.02	0.00	0.00	0.20
60790119021	0.00	0.00	0.03	0.00	0.00	0.09
60790119022	0.03	0.00	0.01	0.01	0.00	0.32
60790119023	0.00	0.00	0.02	0.04	0.00	0.19
60790119024	0.03	0.06	0.05	0.00	0.00	0.44
60790119025	0.02	0.12	0.04	0.01	0.00	0.13
60790120001	0.00	0.07	0.02	0.08	0.00	0.25
60790120002	0.00	0.27	0.00	0.00	0.20	0.03
60790120003	0.00	0.02	0.06	0.00	0.00	0.35
60790120004	0.00	0.01	0.04	0.01	0.01	0.30
60790121021	0.00	0.03	0.09	0.01	0.00	0.25
60790121022	0.00	0.10	0.03	0.03	0.00	0.22
60790121023	0.04	0.08	0.04	0.01	0.00	0.41
60790121024	0.00	0.21	0.01	0.00	0.00	0.41
60790122001	0.00	0.08	0.04	0.00	0.00	0.84
60790122002	0.00	0.28	0.02	0.00	0.00	0.37
60790122003	0.02	0.02	0.02	0.00	0.00	0.25
60790122004	0.16	0.05	0.03	0.00	0.00	0.72
60790123021	0.00	0.06	0.02	0.00	0.00	0.08
60790123022	0.00	0.00	0.09	0.02	0.00	0.01
60790123023	0.12	0.15	0.02	0.03	0.00	0.35
60790123041	0.04	0.08	0.06	0.02	0.00	0.28
60790123042	0.00	0.04	0.04	0.03	0.00	0.11
60790123043	0.06	0.10	0.09	0.00	0.00	0.19
60790123044	0.06	0.08	0.03	0.00	0.00	0.19
60790123045	0.03	0.16	0.03	0.00	0.00	0.11
60790124011	0.06	0.07	0.06	0.00	0.00	0.41
60790124012	0.00	0.06	0.02	0.00	0.00	0.51
60790124013	0.02	0.10	0.05	0.01	0.00	0.45
60790124021	0.01	0.10	0.01	0.01	0.00	0.24
60790124022	0.01	0.24	0.01	0.01	0.00	0.33
60790124023	0.02	0.06	0.05	0.01	0.00	0.36
60790125021	0.01	0.08	0.04	0.00	0.00	0.09
60790125022	0.00	0.06	0.07	0.00	0.00	0.09
60790125023	0.02	0.08	0.05	0.00	0.00	0.27
60790125031	0.00	0.17	0.03	0.00	0.00	0.11
60790125032	0.00	0.04	0.00	0.00	0.00	0.24
60790125033	0.00	0.05	0.05	0.00	0.03	0.14
60790125051	0.00	0.07	0.00	0.00	0.00	0.03
60790125052	0.00	0.03	0.02	0.01	0.00	0.16
60790125053	0.00	0.05	0.04	0.01	0.01	0.15
60790126001	0.00	0.08	0.02	0.00	0.00	0.08
60790126002	0.02	0.09	0.02	0.01	0.00	0.04
60790126003	0.00	0.03	0.01	0.00	0.00	0.10
60790126004	0.00	0.12	0.01	0.00	0.00	0.38

60790126005	0.00	0.14	0.03	0.00	0.00	0.13
60790127021	0.00	0.04	0.04	0.00	0.00	0.10
60790127022	0.03	0.24	0.00	0.00	0.00	0.04
60790127023	0.00	0.02	0.02	0.00	0.00	0.12
60790127024	0.00	0.00	0.00	0.00	0.00	0.19
60790127025	0.00	0.01	0.06	0.00	0.00	0.10
60790127041	0.00	0.03	0.02	0.00	0.00	0.20
60790127042	0.00	0.06	0.00	0.00	0.00	0.01
60790127043	0.00	0.09	0.04	0.01	0.00	0.10
60790127044	0.00	0.07	0.03	0.01	0.00	0.12
60790128001	0.39	0.00	0.00	0.04	0.00	0.24
60790129001	0.01	0.10	0.05	0.02	0.00	0.22
60790129002	0.00	0.05	0.02	0.01	0.00	0.20
60790130001	0.04	0.03	0.04	0.00	0.00	0.30
60790130002	0.06	0.00	0.02	0.05	0.00	0.12

Black or African American Alone	Asian	Some other race	< 5 years old	65+ years old	Uses public transportation	Population >25 without H.S. diploma	Foreign born	Limited English Speaking Household	Female householder, no husband present
0.00	0.00	0.00	0.00	0.36	0.00	0.02	0.03	0.00	0.05
0.01	0.01	0.18	0.03	0.10	0.01	0.02	0.01	0.02	0.04
0.00	0.00	0.00	0.17	0.18	0.00	0.05	0.04	0.00	0.00
0.00	0.01	0.12	0.12	0.16	0.00	0.08	0.15	0.10	0.05
0.00	0.00	0.23	0.13	0.04	0.00	0.18	0.29	0.21	0.09
0.00	0.01	0.02	0.05	0.19	0.00	0.06	0.07	0.03	0.02
0.05	0.00	0.22	0.08	0.09	0.00	0.24	0.38	0.17	0.28
0.01	0.00	0.06	0.07	0.02	0.00	0.27	0.42	0.23	0.24
0.10	0.00	0.18	0.13	0.02	0.00	0.13	0.33	0.19	0.14
0.16	0.04	0.01	0.02	0.16	0.01	0.05	0.03	0.00	0.08
0.00	0.03	0.20	0.00	0.21	0.01	0.21	0.26	0.20	0.18
0.00	0.01	0.06	0.05	0.20	0.00	0.08	0.11	0.01	0.08
0.02	0.04	0.01	0.07	0.13	0.00	0.04	0.06	0.00	0.04
0.00	0.02	0.11	0.07	0.24	0.01	0.15	0.23	0.08	0.08
0.05	0.03	0.10	0.07	0.12	0.01	0.08	0.18	0.05	0.07
0.00	0.00	0.09	0.05	0.14	0.01	0.07	0.15	0.08	0.10
0.02	0.06	0.12	0.10	0.14	0.04	0.12	0.25	0.04	0.13
0.04	0.01	0.06	0.02	0.15	0.00	0.06	0.13	0.02	0.04
0.02	0.02	0.05	0.12	0.09	0.00	0.12	0.16	0.00	0.11
0.01	0.00	0.09	0.06	0.10	0.00	0.04	0.11	0.02	0.17
0.00	0.01	0.02	0.01	0.26	0.01	0.03	0.02	0.03	0.06
0.05	0.00	0.08	0.03	0.21	0.00	0.06	0.09	0.02	0.04
0.04	0.00	0.01	0.10	0.06	0.00	0.19	0.16	0.08	0.16
0.01	0.00	0.03	0.10	0.14	0.00	0.08	0.06	0.04	0.01
0.00	0.01	0.01	0.04	0.45	0.00	0.03	0.11	0.01	0.05
0.00	0.05	0.02	0.00	0.57	0.00	0.04	0.13	0.02	0.05
0.00	0.00	0.06	0.02	0.30	0.00	0.11	0.11	0.09	0.12
0.01	0.03	0.04	0.01	0.52	0.00	0.05	0.11	0.01	0.04
0.00	0.00	0.16	0.05	0.23	0.00	0.19	0.25	0.11	0.15

0.00	0.00	0.00	0.10	0.25	0.00	0.05	0.08	0.00	0.02
0.00	0.00	0.02	0.06	0.16	0.01	0.05	0.16	0.04	0.05
0.17	0.02	0.00	0.00	0.21	0.00	0.08	0.05	0.06	0.11
0.00	0.00	0.00	0.06	0.22	0.00	0.04	0.06	0.03	0.17
0.00	0.03	0.00	0.00	0.37	0.06	0.07	0.11	0.00	0.00
0.00	0.08	0.00	0.10	0.28	0.00	0.05	0.08	0.00	0.11
0.00	0.02	0.00	0.01	0.41	0.01	0.03	0.06	0.00	0.08
0.00	0.00	0.07	0.09	0.27	0.01	0.16	0.20	0.13	0.09
0.00	0.04	0.01	0.01	0.34	0.02	0.02	0.11	0.02	0.10
0.00	0.02	0.04	0.03	0.21	0.00	0.04	0.09	0.04	0.03
0.00	0.02	0.01	0.01	0.24	0.00	0.15	0.28	0.00	0.11
0.01	0.10	0.01	0.03	0.24	0.02	0.07	0.08	0.03	0.07
0.00	0.00	0.01	0.07	0.18	0.00	0.10	0.04	0.00	0.08
0.00	0.04	0.02	0.05	0.16	0.01	0.02	0.05	0.01	0.05
0.03	0.00	0.05	0.02	0.22	0.00	0.04	0.07	0.02	0.13
0.00	0.09	0.04	0.03	0.09	0.00	0.06	0.15	0.04	0.15
0.00	0.07	0.00	0.09	0.20	0.00	0.11	0.10	0.05	0.04
0.00	0.00	0.01	0.03	0.26	0.00	0.04	0.05	0.00	0.04
0.00	0.05	0.01	0.06	0.19	0.00	0.02	0.07	0.00	0.03
0.00	0.00	0.00	0.02	0.21	0.00	0.07	0.02	0.04	0.12
0.00	0.01	0.03	0.01	0.28	0.00	0.08	0.04	0.00	0.04
0.00	0.02	0.07	0.03	0.46	0.00	0.06	0.14	0.04	0.01
0.01	0.13	0.04	0.00	0.00	0.00	0.00	0.04	0.00	0.00
0.01	0.15	0.05	0.00	0.00	0.00	0.00	0.03	0.00	0.00
0.07	0.00	0.04	0.01	0.07	0.00	0.00	0.07	0.01	0.02
0.03	0.08	0.12	0.01	0.03	0.03	0.01	0.05	0.00	0.03
0.03	0.06	0.02	0.02	0.02	0.01	0.00	0.09	0.04	0.01
0.01	0.07	0.04	0.05	0.18	0.03	0.07	0.08	0.07	0.08
0.01	0.06	0.00	0.08	0.24	0.00	0.02	0.02	0.00	0.13
0.00	0.06	0.02	0.09	0.21	0.00	0.02	0.06	0.03	0.08
0.00	0.01	0.12	0.03	0.13	0.02	0.04	0.08	0.00	0.05
0.00	0.15	0.00	0.00	0.01	0.04	0.00	0.05	0.00	0.10
0.02	0.04	0.01	0.00	0.07	0.06	0.00	0.07	0.00	0.07
0.01	0.03	0.06	0.03	0.10	0.04	0.04	0.10	0.02	0.08
0.06	0.10	0.02	0.04	0.08	0.06	0.04	0.10	0.01	0.01
0.08	0.01	0.03	0.01	0.16	0.02	0.03	0.06	0.00	0.09
0.00	0.03	0.05	0.04	0.02	0.00	0.00	0.15	0.00	0.20
0.03	0.01	0.00	0.03	0.10	0.00	0.00	0.05	0.00	0.05
0.06	0.06	0.02	0.02	0.10	0.00	0.05	0.16	0.08	0.08
0.00	0.06	0.07	0.06	0.07	0.00	0.11	0.18	0.14	0.13
0.01	0.02	0.01	0.03	0.31	0.03	0.09	0.03	0.03	0.10
0.07	0.07	0.04	0.03	0.04	0.01	0.01	0.13	0.03	0.03
0.00	0.07	0.00	0.04	0.32	0.00	0.01	0.09	0.00	0.03
0.00	0.04	0.00	0.00	0.10	0.00	0.00	0.02	0.00	0.12
0.00	0.04	0.01	0.01	0.18	0.01	0.03	0.07	0.00	0.00
0.01	0.01	0.01	0.05	0.09	0.00	0.02	0.02	0.00	0.00
0.04	0.08	0.03	0.03	0.14	0.01	0.10	0.19	0.14	0.16
0.00	0.04	0.02	0.05	0.17	0.07	0.04	0.16	0.05	0.03
0.05	0.17	0.00	0.00	0.12	0.00	0.00	0.12	0.03	0.10
0.00	0.10	0.01	0.00	0.06	0.00	0.00	0.01	0.00	0.05
0.44	0.03	0.20	0.00	0.05	0.00	0.32	0.12	0.00	0.00

0.01	0.12	0.02	0.05	0.17	0.01	0.07	0.17	0.04	0.06
0.03	0.01	0.01	0.08	0.12	0.00	0.03	0.03	0.00	0.04
0.06	0.02	0.02	0.05	0.11	0.00	0.01	0.06	0.00	0.08
0.00	0.02	0.00	0.09	0.17	0.00	0.15	0.14	0.12	0.02
0.05	0.10	0.07	0.00	0.06	0.02	0.08	0.12	0.00	0.16
0.00	0.00	0.00	0.04	0.32	0.00	0.01	0.08	0.00	0.04
0.00	0.06	0.00	0.00	0.33	0.00	0.00	0.10	0.00	0.00
0.01	0.00	0.06	0.02	0.13	0.00	0.02	0.04	0.00	0.11
0.00	0.00	0.00	0.00	0.71	0.00	0.09	0.00	0.00	0.00
0.04	0.06	0.00	0.05	0.19	0.01	0.05	0.06	0.04	0.08
0.00	0.00	0.00	0.13	0.19	0.05	0.01	0.05	0.00	0.00
0.03	0.01	0.04	0.08	0.32	0.06	0.02	0.06	0.00	0.02
0.00	0.02	0.01	0.02	0.19	0.00	0.05	0.06	0.00	0.06
0.00	0.03	0.04	0.05	0.11	0.00	0.04	0.03	0.02	0.05
0.00	0.00	0.00	0.01	0.19	0.01	0.00	0.06	0.02	0.04
0.02	0.00	0.00	0.00	0.47	0.00	0.00	0.04	0.00	0.00
0.00	0.08	0.01	0.06	0.09	0.01	0.06	0.13	0.06	0.03
0.00	0.00	0.00	0.01	0.28	0.00	0.01	0.03	0.00	0.06
0.00	0.04	0.00	0.07	0.34	0.00	0.04	0.07	0.00	0.00
0.00	0.02	0.00	0.05	0.22	0.00	0.02	0.05	0.00	0.16
0.00	0.05	0.02	0.05	0.29	0.00	0.03	0.10	0.04	0.10
0.00	0.07	0.00	0.04	0.38	0.00	0.02	0.06	0.00	0.07
0.01	0.03	0.06	0.07	0.19	0.01	0.03	0.04	0.02	0.12
0.01	0.18	0.01	0.07	0.19	0.00	0.03	0.11	0.00	0.15
0.00	0.08	0.02	0.05	0.14	0.00	0.05	0.05	0.01	0.18
0.00	0.12	0.08	0.10	0.20	0.00	0.04	0.12	0.05	0.23
0.01	0.01	0.03	0.08	0.13	0.00	0.09	0.20	0.10	0.05
0.06	0.05	0.00	0.02	0.14	0.02	0.03	0.14	0.04	0.00
0.00	0.09	0.05	0.05	0.22	0.01	0.06	0.06	0.04	0.20
0.00	0.00	0.00	0.20	0.26	0.00	0.14	0.03	0.00	0.00
0.07	0.00	0.08	0.03	0.09	0.00	0.10	0.06	0.02	0.14
0.02	0.05	0.09	0.12	0.10	0.01	0.12	0.23	0.03	0.20
0.06	0.04	0.07	0.03	0.13	0.00	0.09	0.01	0.00	0.07
0.03	0.00	0.12	0.02	0.21	0.01	0.09	0.13	0.00	0.14
0.00	0.21	0.04	0.05	0.13	0.02	0.16	0.21	0.06	0.16
0.00	0.07	0.06	0.02	0.03	0.00	0.06	0.02	0.00	0.21
0.00	0.03	0.29	0.05	0.13	0.00	0.29	0.22	0.12	0.27
0.00	0.00	0.00	0.10	0.45	0.00	0.03	0.08	0.00	0.18
0.00	0.00	0.07	0.01	0.31	0.00	0.13	0.07	0.00	0.19
0.00	0.02	0.22	0.05	0.06	0.01	0.26	0.41	0.20	0.19
0.00	0.02	0.00	0.06	0.24	0.00	0.01	0.03	0.01	0.06
0.00	0.00	0.00	0.06	0.19	0.00	0.07	0.02	0.00	0.06
0.00	0.00	0.16	0.01	0.14	0.00	0.04	0.17	0.04	0.02
0.01	0.15	0.05	0.01	0.23	0.00	0.03	0.14	0.02	0.20
0.00	0.04	0.00	0.04	0.31	0.00	0.04	0.07	0.00	0.15
0.02	0.06	0.03	0.01	0.16	0.04	0.03	0.13	0.00	0.15
0.00	0.00	0.00	0.05	0.20	0.01	0.11	0.07	0.03	0.10
0.00	0.08	0.00	0.01	0.54	0.00	0.03	0.06	0.00	0.02
0.02	0.01	0.00	0.08	0.07	0.00	0.07	0.19	0.03	0.13
0.01	0.01	0.11	0.08	0.10	0.00	0.20	0.19	0.10	0.18
0.02	0.02	0.05	0.03	0.12	0.00	0.12	0.14	0.04	0.06

0.02	0.04	0.01	0.07	0.24	0.00	0.02	0.12	0.01	0.03
0.01	0.04	0.03	0.03	0.19	0.02	0.12	0.11	0.00	0.01
0.03	0.00	0.18	0.08	0.05	0.00	0.09	0.14	0.10	0.25
0.00	0.01	0.03	0.06	0.10	0.01	0.00	0.02	0.00	0.11
0.00	0.01	0.02	0.06	0.10	0.00	0.03	0.04	0.00	0.31
0.01	0.01	0.05	0.10	0.10	0.01	0.09	0.06	0.03	0.17
0.00	0.14	0.00	0.07	0.16	0.02	0.11	0.10	0.00	0.03
0.05	0.03	0.05	0.06	0.07	0.00	0.10	0.13	0.09	0.17
0.00	0.00	0.00	0.04	0.32	0.04	0.02	0.01	0.00	0.08
0.00	0.06	0.00	0.06	0.13	0.00	0.07	0.07	0.00	0.09
0.00	0.00	0.00	0.08	0.21	0.00	0.04	0.02	0.00	0.05
0.01	0.01	0.02	0.11	0.10	0.00	0.03	0.05	0.01	0.10
0.00	0.00	0.00	0.06	0.24	0.00	0.04	0.02	0.00	0.14
0.07	0.01	0.01	0.05	0.23	0.01	0.04	0.08	0.00	0.03
0.01	0.01	0.03	0.03	0.09	0.01	0.01	0.05	0.00	0.04
0.00	0.00	0.01	0.11	0.14	0.01	0.03	0.04	0.00	0.08
0.00	0.01	0.01	0.06	0.19	0.01	0.00	0.02	0.00	0.18
0.01	0.04	0.03	0.05	0.20	0.00	0.04	0.15	0.11	0.14
0.00	0.00	0.00	0.04	0.15	0.00	0.06	0.00	0.00	0.07
0.00	0.00	0.01	0.08	0.07	0.00	0.07	0.06	0.02	0.08
0.00	0.04	0.00	0.00	0.13	0.00	0.02	0.00	0.00	0.00
0.00	0.02	0.00	0.03	0.23	0.01	0.07	0.10	0.00	0.10
0.02	0.01	0.10	0.03	0.35	0.01	0.06	0.13	0.00	0.14
0.01	0.00	0.01	0.02	0.18	0.00	0.02	0.03	0.00	0.14
0.01	0.04	0.06	0.05	0.28	0.01	0.05	0.10	0.01	0.12
0.00	0.01	0.00	0.06	0.13	0.00	0.02	0.08	0.00	0.05
0.22	0.01	0.13	0.00	0.18	0.00	0.45	0.01	0.00	0.09
0.00	0.01	0.02	0.09	0.22	0.00	0.05	0.07	0.04	0.03
0.00	0.01	0.07	0.06	0.09	0.01	0.05	0.07	0.00	0.10
0.01	0.02	0.08	0.00	0.38	0.00	0.07	0.13	0.09	0.07
0.00	0.00	0.02	0.04	0.14	0.00	0.06	0.08	0.15	0.02

Occupied housing units with no vehicle 15-64	Occupied housing units with no vehicle 65+	Renter living alone	Owner Living Alone	65+ Nonfamily Householder Male Living alone	65+ Nonfamily Householder Female Living alone	Renter-occupied	Very-Extremely Low Income	HH has Centeral Air Conditioner	HH Owns Separate Room Air Conditioner
0.00	0.00	0.00	0.09	0.06	0.00	0.04	0.37	0.40	0.12
0.03	0.01	0.12	0.14	0.04	0.04	0.24	0.26	0.24	0.17
0.00	0.05	0.11	0.17	0.11	0.09	0.31	0.15	0.24	0.17
0.01	0.01	0.11	0.13	0.05	0.07	0.40	0.32	0.47	0.11
0.01	0.01	0.01	0.11	0.00	0.01	0.50	0.51	0.31	0.09
0.01	0.00	0.08	0.10	0.01	0.07	0.36	0.32	0.45	0.15
0.08	0.02	0.11	0.01	0.00	0.02	0.78	0.64	0.10	0.20
0.04	0.00	0.16	0.03	0.00	0.05	0.97	0.68	0.12	0.07
0.01	0.00	0.07	0.05	0.00	0.00	0.74	0.36	0.26	0.17
0.04	0.00	0.21	0.04	0.00	0.13	0.75	0.25	0.22	0.11
0.00	0.00	0.16	0.04	0.00	0.10	0.66	0.38	0.26	0.17
0.00	0.05	0.03	0.30	0.05	0.16	0.21	0.33	0.24	0.17
0.00	0.00	0.00	0.06	0.02	0.00	0.21	0.11	0.45	0.15
0.00	0.07	0.06	0.31	0.05	0.28	0.23	0.46	0.43	0.13

0.00	0.01	0.06	0.10	0.02	0.06	0.25	0.24	0.39	0.12
0.00	0.02	0.11	0.06	0.04	0.06	0.41	0.22	0.39	0.12
0.06	0.01	0.11	0.09	0.02	0.07	0.55	0.56	0.28	0.11
0.02	0.00	0.13	0.21	0.02	0.09	0.48	0.32	0.31	0.09
0.00	0.00	0.04	0.04	0.00	0.00	0.38	0.27	0.42	0.09
0.01	0.00	0.04	0.07	0.00	0.04	0.42	0.27	0.42	0.09
0.01	0.03	0.13	0.19	0.10	0.04	0.18	0.31	0.24	0.17
0.02	0.00	0.02	0.11	0.00	0.00	0.23	0.18	0.44	0.15
0.01	0.00	0.06	0.09	0.03	0.01	0.48	0.32	0.31	0.09
0.03	0.00	0.06	0.13	0.07	0.03	0.21	0.26	0.24	0.17
0.00	0.00	0.14	0.18	0.13	0.06	0.33	0.36	0.47	0.12
0.01	0.04	0.13	0.24	0.04	0.24	0.22	0.31	0.47	0.12
0.03	0.01	0.05	0.24	0.07	0.16	0.32	0.36	0.47	0.12
0.01	0.02	0.04	0.30	0.10	0.16	0.14	0.24	0.47	0.12
0.05	0.02	0.11	0.11	0.02	0.15	0.47	0.46	0.24	0.17
0.00	0.00	0.31	0.14	0.03	0.24	0.64	0.58	0.28	0.11
0.02	0.01	0.34	0.13	0.07	0.09	0.49	0.38	0.41	0.13
0.11	0.00	0.08	0.19	0.06	0.17	0.22	0.41	0.47	0.12
0.08	0.08	0.32	0.10	0.04	0.10	0.63	0.66	0.41	0.13
0.03	0.06	0.30	0.25	0.00	0.25	0.49	0.50	0.36	0.15
0.02	0.00	0.04	0.06	0.02	0.04	0.35	0.22	0.24	0.17
0.00	0.02	0.13	0.30	0.11	0.17	0.23	0.40	0.47	0.12
0.06	0.03	0.30	0.08	0.09	0.10	0.73	0.41	0.28	0.10
0.00	0.01	0.13	0.22	0.05	0.16	0.41	0.38	0.44	0.15
0.00	0.01	0.14	0.18	0.10	0.09	0.46	0.40	0.24	0.17
0.20	0.05	0.44	0.10	0.05	0.13	0.80	0.62	0.08	0.14
0.02	0.00	0.07	0.09	0.00	0.03	0.45	0.28	0.47	0.12
0.05	0.00	0.22	0.16	0.03	0.16	0.51	0.41	0.41	0.13
0.01	0.00	0.04	0.15	0.03	0.04	0.25	0.18	0.32	0.20
0.07	0.02	0.15	0.27	0.04	0.10	0.27	0.44	0.18	0.18
0.02	0.01	0.18	0.10	0.03	0.01	0.54	0.57	0.18	0.18
0.05	0.00	0.21	0.08	0.04	0.02	0.42	0.32	0.41	0.13
0.00	0.03	0.00	0.05	0.00	0.00	0.29	0.13	0.47	0.11
0.00	0.00	0.07	0.07	0.00	0.05	0.41	0.33	0.24	0.17
0.00	0.03	0.10	0.22	0.02	0.12	0.25	0.44	0.43	0.13
0.00	0.00	0.04	0.29	0.07	0.18	0.28	0.33	0.47	0.11
0.01	0.05	0.10	0.28	0.07	0.19	0.19	0.42	0.47	0.12
0.04	0.00	0.23	0.00	0.00	0.00	1.00	0.98	0.27	0.13
0.21	0.00	0.71	0.01	0.00	0.00	0.98	0.93	0.27	0.13
0.01	0.00	0.00	0.05	0.02	0.01	0.62	0.43	0.24	0.14
0.10	0.00	0.21	0.08	0.00	0.03	0.85	0.79	0.27	0.13
0.06	0.00	0.17	0.03	0.00	0.00	0.95	0.80	0.27	0.13
0.04	0.10	0.19	0.14	0.06	0.14	0.56	0.25	0.28	0.11
0.00	0.00	0.00	0.08	0.00	0.04	0.12	0.09	0.46	0.11
0.02	0.17	0.38	0.11	0.04	0.27	0.65	0.52	0.28	0.11
0.03	0.02	0.15	0.10	0.03	0.07	0.50	0.32	0.31	0.14
0.03	0.00	0.14	0.00	0.00	0.00	0.90	0.68	0.27	0.13
0.11	0.01	0.48	0.03	0.01	0.07	0.95	0.55	0.24	0.13
0.16	0.08	0.51	0.02	0.06	0.05	0.94	0.57	0.24	0.13
0.02	0.02	0.26	0.19	0.07	0.02	0.70	0.41	0.24	0.13
0.04	0.17	0.37	0.05	0.06	0.09	0.76	0.56	0.24	0.13

0.00	0.04	0.29	0.00	0.00	0.00	0.80	0.43	0.23	0.07
0.04	0.00	0.17	0.12	0.02	0.07	0.37	0.32	0.31	0.14
0.05	0.04	0.32	0.03	0.05	0.03	0.80	0.47	0.24	0.13
0.11	0.03	0.10	0.10	0.02	0.05	0.62	0.51	0.31	0.14
0.07	0.07	0.25	0.26	0.02	0.25	0.54	0.59	0.28	0.11
0.14	0.01	0.23	0.06	0.01	0.01	0.84	0.80	0.27	0.13
0.00	0.06	0.06	0.29	0.03	0.18	0.17	0.27	0.47	0.11
0.00	0.06	0.00	0.18	0.12	0.06	0.61	0.61	0.24	0.13
0.00	0.15	0.34	0.07	0.09	0.19	0.71	0.67	0.24	0.13
0.05	0.00	0.05	0.14	0.00	0.00	0.44	0.15	0.24	0.13
0.03	0.00	0.12	0.10	0.02	0.07	0.59	0.41	0.24	0.13
0.00	0.00	0.03	0.06	0.02	0.05	0.45	0.26	0.24	0.13
0.02	0.00	0.00	0.12	0.03	0.08	0.40	0.27	0.47	0.11
0.00	0.00	0.00	0.04	0.04	0.00	0.62	0.51	0.24	0.13
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.03	0.00	0.09	0.26	0.01	0.08	0.34	0.41	0.28	0.11
0.00	0.02	0.10	0.06	0.00	0.06	0.32	0.25	0.33	0.14
0.01	0.04	0.13	0.11	0.02	0.08	0.29	0.24	0.33	0.14
0.00	0.00	0.30	0.11	0.02	0.02	0.38	0.36	0.46	0.11
0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.20	0.40	0.14
0.00	0.05	0.10	0.17	0.03	0.15	0.21	0.32	0.47	0.11
0.00	0.00	0.16	0.26	0.08	0.14	0.31	0.24	0.47	0.12
0.07	0.00	0.11	0.11	0.00	0.00	0.38	0.21	0.47	0.11
0.08	0.06	0.08	0.43	0.07	0.38	0.08	0.43	0.36	0.06
0.07	0.02	0.25	0.14	0.06	0.02	0.61	0.34	0.36	0.15
0.00	0.04	0.08	0.30	0.03	0.06	0.31	0.14	0.36	0.15
0.00	0.07	0.03	0.18	0.00	0.08	0.20	0.38	0.47	0.11
0.00	0.02	0.16	0.13	0.06	0.05	0.37	0.27	0.31	0.13
0.15	0.04	0.65	0.04	0.04	0.08	0.91	0.68	0.28	0.10
0.00	0.00	0.20	0.26	0.06	0.04	0.50	0.35	0.36	0.15
0.00	0.04	0.07	0.33	0.04	0.29	0.17	0.29	0.46	0.11
0.00	0.03	0.08	0.16	0.03	0.10	0.34	0.23	0.48	0.13
0.00	0.00	0.04	0.08	0.02	0.06	0.12	0.19	0.46	0.11
0.04	0.00	0.06	0.31	0.05	0.09	0.06	0.25	0.47	0.11
0.07	0.09	0.11	0.13	0.00	0.13	0.50	0.43	0.24	0.17
0.00	0.00	0.01	0.21	0.07	0.11	0.05	0.36	0.47	0.11
0.00	0.02	0.03	0.30	0.10	0.22	0.16	0.42	0.44	0.15
0.01	0.01	0.22	0.17	0.04	0.08	0.44	0.50	0.41	0.13
0.02	0.08	0.32	0.05	0.05	0.20	0.53	0.35	0.36	0.15
0.02	0.05	0.10	0.16	0.02	0.04	0.46	0.37	0.41	0.13
0.10	0.04	0.15	0.08	0.07	0.09	0.30	0.39	0.34	0.08
0.00	0.00	0.10	0.17	0.06	0.06	0.44	0.31	0.41	0.13
0.07	0.07	0.29	0.04	0.07	0.14	0.65	0.43	0.34	0.08
0.00	0.02	0.08	0.16	0.03	0.08	0.49	0.37	0.18	0.18
0.00	0.00	0.16	0.17	0.00	0.08	0.56	0.24	0.32	0.18
0.09	0.00	0.30	0.07	0.08	0.00	0.77	0.60	0.26	0.17
0.00	0.02	0.07	0.10	0.02	0.06	0.46	0.33	0.18	0.18
0.11	0.00	0.42	0.02	0.00	0.02	0.69	0.55	0.41	0.13
0.00	0.06	0.14	0.10	0.00	0.02	0.27	0.26	0.24	0.17
0.13	0.00	0.16	0.02	0.02	0.05	0.64	0.47	0.26	0.17
0.00	0.03	0.14	0.00	0.00	0.00	0.78	0.37	0.26	0.17

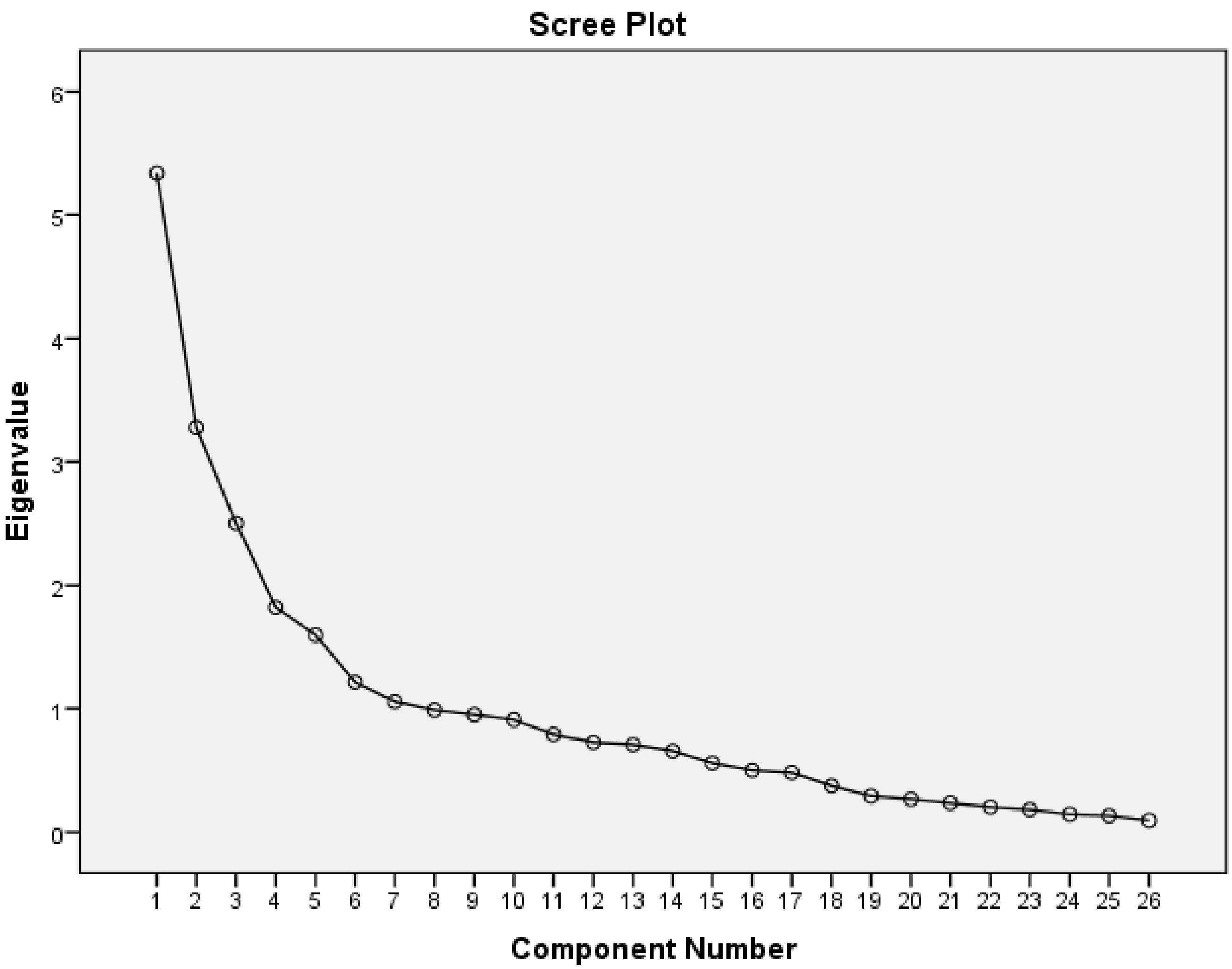
0.00	0.03	0.04	0.07	0.01	0.02	0.47	0.35	0.10	0.20
0.00	0.00	0.30	0.28	0.15	0.17	0.51	0.66	0.28	0.11
0.00	0.00	0.09	0.09	0.08	0.04	0.38	0.31	0.44	0.15
0.09	0.00	0.16	0.11	0.00	0.03	0.62	0.60	0.31	0.09
0.00	0.02	0.11	0.09	0.03	0.07	0.27	0.26	0.47	0.11
0.00	0.00	0.06	0.15	0.05	0.03	0.32	0.28	0.33	0.14
0.00	0.00	0.05	0.07	0.03	0.04	0.41	0.20	0.47	0.11
0.00	0.00	0.04	0.03	0.02	0.04	0.37	0.17	0.47	0.11
0.00	0.02	0.01	0.13	0.00	0.10	0.24	0.29	0.47	0.11
0.05	0.00	0.06	0.00	0.00	0.03	0.40	0.11	0.45	0.15
0.00	0.00	0.05	0.05	0.05	0.05	0.48	0.32	0.24	0.17
0.00	0.06	0.07	0.20	0.07	0.21	0.24	0.31	0.47	0.12
0.00	0.00	0.00	0.16	0.00	0.11	0.29	0.40	0.34	0.08
0.03	0.03	0.05	0.12	0.05	0.06	0.36	0.36	0.28	0.09
0.01	0.00	0.08	0.06	0.03	0.03	0.18	0.27	0.28	0.10
0.00	0.00	0.11	0.19	0.01	0.14	0.19	0.39	0.47	0.11
0.03	0.00	0.06	0.19	0.06	0.08	0.15	0.26	0.24	0.17
0.05	0.00	0.08	0.14	0.01	0.07	0.55	0.37	0.45	0.06
0.04	0.00	0.18	0.15	0.00	0.10	0.41	0.34	0.34	0.08
0.02	0.00	0.06	0.09	0.00	0.00	0.47	0.29	0.42	0.09
0.07	0.01	0.18	0.09	0.01	0.04	0.60	0.48	0.34	0.08
0.02	0.00	0.12	0.12	0.09	0.00	0.29	0.37	0.42	0.09
0.05	0.00	0.29	0.08	0.01	0.02	0.69	0.32	0.34	0.08
0.05	0.06	0.36	0.18	0.06	0.29	0.62	0.65	0.28	0.11
0.01	0.02	0.04	0.16	0.02	0.06	0.16	0.26	0.24	0.17
0.02	0.00	0.02	0.11	0.00	0.02	0.22	0.15	0.45	0.15
0.02	0.00	0.14	0.04	0.01	0.02	0.49	0.29	0.32	0.18
0.02	0.03	0.04	0.17	0.05	0.09	0.26	0.33	0.45	0.15
0.15	0.00	0.26	0.06	0.10	0.07	0.41	0.58	0.41	0.13
0.01	0.00	0.02	0.06	0.00	0.03	0.28	0.29	0.32	0.18
0.00	0.00	0.03	0.02	0.00	0.00	0.54	0.13	0.41	0.13
0.00	0.09	0.11	0.09	0.04	0.11	0.36	0.38	0.24	0.17
0.00	0.02	0.09	0.25	0.12	0.09	0.33	0.37	0.24	0.17
0.00	0.00	0.03	0.10	0.03	0.03	0.18	0.43	0.24	0.17
0.03	0.01	0.05	0.16	0.01	0.02	0.35	0.48	0.24	0.17
0.05	0.04	0.00	0.11	0.00	0.07	0.00	0.33	0.47	0.11
0.00	0.02	0.02	0.09	0.00	0.05	0.16	0.27	0.45	0.15
0.00	0.00	0.05	0.10	0.08	0.07	0.12	0.36	0.47	0.11
0.00	0.00	0.05	0.10	0.00	0.10	0.20	0.12	0.47	0.11
0.00	0.11	0.10	0.15	0.09	0.10	0.22	0.34	0.24	0.17
0.00	0.00	0.05	0.15	0.00	0.08	0.13	0.20	0.51	0.13
0.20	0.09	0.42	0.07	0.00	0.07	0.85	0.55	0.23	0.07
0.03	0.00	0.05	0.15	0.03	0.08	0.21	0.38	0.24	0.17
0.00	0.00	0.11	0.07	0.04	0.03	0.38	0.27	0.39	0.12
0.01	0.00	0.11	0.27	0.09	0.12	0.34	0.40	0.24	0.17
0.00	0.00	0.09	0.22	0.00	0.15	0.44	0.32	0.33	0.14

APPENDIX C: SPSS Output from Principle Components Analysis (PCA)

TOTAL VARIANCE EXPLAINED

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.342	20.544	20.544	5.342	20.544	20.544	4.426	17.024	17.024
2	3.280	12.617	33.161	3.280	12.617	33.161	3.553	13.666	30.690
3	2.502	9.623	42.785	2.502	9.623	42.785	3.065	11.787	42.477
4	1.820	7.002	49.787	1.820	7.002	49.787	1.901	7.310	49.787
5	1.596	6.140	55.927						
6	1.215	4.674	60.601						
7	1.055	4.058	64.659						
8	.986	3.794	68.453						
9	.950	3.652	72.105						
10	.908	3.493	75.599						
11	.791	3.042	78.640						
12	.727	2.796	81.437						
13	.709	2.725	84.162						
14	.658	2.530	86.692						
15	.559	2.150	88.842						
16	.500	1.923	90.766						
17	.481	1.849	92.614						
18	.374	1.439	94.053						
19	.291	1.120	95.173						
20	.266	1.022	96.195						
21	.235	.904	97.099						

22	.202	.777	97.876						
23	.182	.700	98.576						
24	.143	.551	99.127						
25	.133	.511	99.638						
26	.094	.362	100.000						



Component Matrix

	Component			
	1	2	3	4
Zscore(HispanicLatino) Hispanic/Latino	.795	-.341	.198	.134
Zscore(Someotherrace) Some other race	.695	-.327	.135	-.116
Zscore(Foreignborn) Foreign born	.693	-.329	.285	.129
Zscore(Populationgt25withoutH.S.diploma) Population >25 without H.S. diploma	.669	-.365	.326	-.221
Zscore(LimitedEnglishSpeakingHousehold) Limited English Speaking Household	.659	-.360	.312	.138
Zscore(@65yearsold) 65+ years old	-.636	-.137	.594	-.032
Zscore(Renteroccupied) Renter-occupied	.635	.617	-.001	.194
Zscore(HHhasCenteralAirConditioner) HH has Centeral Air Conditioner	-.545	-.234	-.024	-.157
Zscore(Femalehouseholdernohusbandpresent) Female householder, no husband present	.488	-.204	.015	.188
Zscore(FarmingFishingandForestryOccupations) Farming, Fishing, and Forestry Occupations	.458	-.200	.232	-.368
Zscore(InCivilianLaborForceandUnemployedAge16) In Civilian Labor Force and Unemployed, Age 16+	.351	.155	.064	.227
Zscore(Renterlivingalone) Renter living alone	.270	.759	.264	.060
Zscore(VeryExtremelyLowIncome) Very-Extremely Low Income	.397	.644	.318	.187
Zscore(Occupiedhousingunitswithnovehicle1564) Occupied housing units with no vehicle 15-64	.417	.600	.157	-.156
Zscore(Usespublictransportation) Uses public transportation	.030	.380	-.003	.020
Zscore(Asian) Asian	.066	.366	-.220	.025
Zscore(@65NonfamilyHouseholderFemaleLivingalone) 65+ Nonfamily Householder Female Living alone	-.413	.098	.763	-.022
Zscore(OwnerLivingAlone) Owner Living Alone	-.570	-.206	.598	.014
Zscore(@65NonfamilyHouseholderMaleLivingalone) 65+ Nonfamily Householder Male Living alone	-.359	.081	.513	.175
Zscore(Occupiedhousingunitswithnovehicle65) Occupied housing units with no vehicle 65+	-.089	.383	.476	.024
Zscore(BlackorAfricanAmericanAlone) Black or African American Alone	.281	.048	-.090	-.695

Zscore(HHOwnsSeparateRoomAirConditioner) HH Owns Separate Room Air Conditioner	-.068	-.001	-.170	.573
Zscore(lt5yearsold) < 5 years old	.154	-.377	-.046	.469
Zscore(ConstructionandExtraction) Construction and Extraction	-.122	-.332	.098	.348
Zscore(NativeHawaiianandOtherPacificIslanderalone) Native Hawaiian and Other Pacific Islander alone	-.048	-.099	-.039	.332
Zscore(AmericanIndianandAlaskaNativealone) American Indian and Alaska Native alone	.141	-.161	.155	-.246

Rotated Component Matrix[a]

	Component			
	1	2	3	4
Zscore(HispanicLatino) Hispanic/Latino	.871	.101	-.173	.077
Zscore(Foreignborn) Foreign born	.819	.084	-.051	.072
Zscore(LimitedEnglishSpeakingHousehold) Limited English Speaking Household	.819	.050	-.011	.086
Zscore(Populationgt25withoutH.S.diploma) Population >25 without H.S. diploma	.815	-.018	-.019	-.266
Zscore(Someotherrace) Some other race	.748	.009	-.197	-.152
Zscore(FarmingFishingandForestryOccupations) Farming, Fishing, and Forestry Occupations	.526	-.011	-.015	-.402
Zscore(Femalehouseholdernohusbandpresent) Female householder, no husband present	.497	.067	-.197	.161
Zscore(Renteroccupied) Renter-occupied	.214	.838	-.271	.030
Zscore(Renterlivingalone) Renter living alone	-.043	.833	.124	-.111
Zscore(VeryExtremelyLowIncome) Very-Extremely Low Income	.139	.821	.120	.011
Zscore(Occupiedhousingunitswithnovehicle1564) Occupied housing units with no vehicle 15-64	.094	.693	-.049	-.303
Zscore(HHhasCenteralAirConditioner) HH has Centeral Air Conditioner	-.334	-.466	.212	-.058
Zscore(Usespublictransportation) Uses public transportation	-.158	.345	-.013	-.040
Zscore(InCivilianLaborForceandUnemployedAge16) In Civilian Labor Force and Unemployed, Age 16+	.239	.338	-.088	.155
Zscore(Asian) Asian	-.208	.307	-.223	-.014

Zscore(@65NonfamilyHouseholderFemaleLivingalone) 65+ Nonfamily Householder Female Living alone	-.073	.054	.866	-.071
Zscore(@65yearsold) 65+ years old	-.202	-.277	.812	-.004
Zscore(OwnerLivingAlone) Owner Living Alone	-.114	-.299	.788	.044
Zscore(@65NonfamilyHouseholderMaleLivingalone) 65+ Nonfamily Householder Male Living alone	-.110	.053	.627	.145
Zscore(Occupiedhousingunitswithnovehicle65) Occupied housing units with no vehicle 65+	-.064	.390	.469	-.073
Zscore(BlackorAfricanAmericanAlone) Black or African American Alone	.125	.003	-.238	-.708
Zscore(HHOwnsSeparateRoomAirConditioner) HH Owns Separate Room Air Conditioner	-.089	.052	-.095	.585
Zscore(lt5yearsold) < 5 years old	.308	-.178	-.090	.504
Zscore(ConstructionandExtraction) Construction and Extraction	.120	-.251	.156	.392
Zscore(NativeHawaiianandOtherPacificIslanderalone) Native Hawaiian and Other Pacific Islander alone	.012	-.047	.001	.348
Zscore(AmericanIndianandAlaskaNativealone) American Indian and Alaska Native alone	.235	-.100	.063	-.247

Rotation Method: Varimax with Kaiser Normalization.[a]

APPENDIX D: Component Scores and SVI

GEO ID	Component Scores				Adjusted Component Scores				SVI
	1	2	3	4	1	2	3	4	
60790100021	-0.8763	-1.25161	0.1157	-0.43607	0.8763	1.25161	0.1157	0.43607	2.67968
60790100022	-0.0487	-0.51218	-0.44178	0.31008	0.0487	0.51218	0.44178	-0.31008	0.69258
60790100023	-0.41699	-0.63497	0.6659	1.76467	0.41699	0.63497	0.6659	-1.76467	-0.04681
60790100161	1.06708	-0.8597	0.18549	0.29543	1.06708	0.8597	0.18549	-0.29543	1.81684
60790100162	3.33793	-0.49995	-0.3591	-0.00415	3.33793	0.49995	0.3591	0.00415	4.20113
60790101011	-0.34168	-0.6582	-0.31948	0.2006	0.34168	0.6582	0.31948	-0.2006	1.11876
60790101021	3.49818	0.96359	-0.7438	0.9022	3.49818	0.96359	0.7438	-0.9022	4.30337
60790101022	4.28887	0.79537	-0.17357	-0.17504	4.28887	0.79537	0.17357	0.17504	5.43285
60790101023	2.76081	0.00229	-1.30352	0.75937	2.76081	0.00229	1.30352	-0.75937	3.30725
60790101024	-0.79831	0.39503	-0.89044	-1.65804	0.79831	0.39503	0.89044	1.65804	3.74182
60790101025	2.32076	0.33775	-0.19456	0.92403	2.32076	0.33775	0.19456	-0.92403	1.92904
60790102011	0.74679	-0.53911	1.20561	0.40046	0.74679	0.53911	1.20561	-0.40046	2.09105
60790102012	-0.59401	-1.3964	-1.05728	0.12955	0.59401	1.3964	1.05728	-0.12955	2.91814
60790102021	1.62499	-0.28188	2.21669	0.26906	1.62499	0.28188	2.21669	-0.26906	3.8545
60790102022	0.71819	-0.93967	-0.53189	-0.49806	0.71819	0.93967	0.53189	0.49806	2.68781
60790102041	0.97031	-0.77535	-0.12506	-0.55367	0.97031	0.77535	0.12506	0.55367	2.42439
60790102042	1.31654	0.74444	-0.27693	0.15621	1.31654	0.74444	0.27693	-0.15621	2.1817
60790102051	0.24659	-0.3021	0.01097	-0.96647	0.24659	0.3021	0.01097	0.96647	1.52613
60790102052	0.51795	-0.8649	-1.20837	0.4803	0.51795	0.8649	1.20837	-0.4803	2.11092
60790102053	0.52559	-0.75783	-0.88138	0.17642	0.52559	0.75783	0.88138	-0.17642	1.98838
60790103001	-0.49867	-0.29781	0.64234	0.48423	0.49867	0.29781	0.64234	-0.48423	0.95459
60790103002	-0.32699	-1.30379	-0.83367	-0.5248	0.32699	1.30379	0.83367	0.5248	2.98925
60790103003	1.56869	-0.72364	-0.56673	-0.11807	1.56869	0.72364	0.56673	0.11807	2.97713
60790103004	0.07371	-0.59492	-0.24926	0.934	0.07371	0.59492	0.24926	-0.934	-0.01611
60790104031	-0.36189	-0.42436	1.19796	0.09534	0.36189	0.42436	1.19796	-0.09534	1.88887
60790104032	-0.41262	-0.50027	2.06224	-0.61094	0.41262	0.50027	2.06224	0.61094	3.58607
60790104033	0.80425	-0.87784	1.44082	-0.5716	0.80425	0.87784	1.44082	0.5716	3.69451
60790104041	-0.28677	-1.05308	2.01428	-0.28534	0.28677	1.05308	2.01428	0.28534	3.63947
60790104042	1.95231	0.14343	0.4659	0.51178	1.95231	0.14343	0.4659	-0.51178	2.04986
60790105031	-0.14113	0.68009	0.9381	0.45154	0.14113	0.68009	0.9381	-0.45154	1.30778
60790105032	-0.18777	0.27264	0.3509	0.07131	0.18777	0.27264	0.3509	-0.07131	0.74
60790105033	-0.38713	-0.16372	0.53091	-2.04199	0.38713	0.16372	0.53091	2.04199	3.12375
60790105034	-0.06443	1.75041	0.60638	0.61212	0.06443	1.75041	0.60638	-0.61212	1.8091
60790105041	-0.71314	1.18397	1.61977	-0.46648	0.71314	1.18397	1.61977	0.46648	3.98336
60790105042	-0.39251	-0.62169	-0.6736	1.38178	0.39251	0.62169	0.6736	-1.38178	0.30602
60790105043	-0.72332	-0.33308	1.93606	-0.42083	0.72332	0.33308	1.93606	0.42083	3.41329
60790106021	1.66194	0.64508	1.12917	-0.1364	1.66194	0.64508	1.12917	0.1364	3.57259
60790106022	-0.4122	-0.16714	0.97853	-0.06427	0.4122	0.16714	0.97853	0.06427	1.62214
60790106023	-0.06281	0.17623	0.60797	0.74322	0.06281	0.17623	0.60797	-0.74322	0.10379
60790106031	0.81819	2.82023	0.80421	0.01229	0.81819	2.82023	0.80421	-0.01229	4.43034
60790106032	-0.80434	-0.35641	-0.75632	-0.44841	0.80434	0.35641	0.75632	0.44841	2.36548
60790107011	-0.21153	0.18601	0.432	0.30169	0.21153	0.18601	0.432	-0.30169	0.52785
60790107012	-0.64395	-0.65661	-0.56317	0.71643	0.64395	0.65661	0.56317	-0.71643	1.1473
60790107013	0.1812	0.19296	0.69511	-0.04238	0.1812	0.19296	0.69511	0.04238	1.11165
60790107031	-0.03822	0.92036	-0.86533	0.93962	0.03822	0.92036	0.86533	-0.93962	0.88429
60790107032	-0.02724	-0.07888	-0.23428	0.90462	0.02724	0.07888	0.23428	-0.90462	-0.56422
60790107071	-0.63162	-0.98546	-0.58793	-0.02591	0.63162	0.98546	0.58793	0.02591	2.23092

60790107072	-0.79438	-0.23916	-0.93442	0.58243	0.79438	0.23916	0.93442	-0.58243	1.38553
60790107073	-0.27987	-0.50521	0.63104	-0.45552	0.27987	0.50521	0.63104	0.45552	1.87164
60790107074	-0.34547	-1.04099	1.34659	-0.2077	0.34547	1.04099	1.34659	0.2077	2.94075
60790107075	0.15123	-0.38465	2.20638	-0.15365	0.15123	0.38465	2.20638	0.15365	2.89591
60790109011	-1.08556	2.0995	-1.54772	-0.14346	1.08556	2.0995	1.54772	0.14346	4.87624
60790109012	-1.14474	3.78103	-1.20815	-0.73613	1.14474	3.78103	1.20815	0.73613	6.87005
60790109021	-0.76131	-0.1595	-1.31738	-0.64936	0.76131	0.1595	1.31738	0.64936	2.88755
60790109022	-0.76268	1.88249	-1.14988	-0.5487	0.76268	1.88249	1.14988	0.5487	4.34375
60790109023	-0.63142	1.64851	-1.38605	0.01625	0.63142	1.64851	1.38605	-0.01625	3.64973
60790110011	-0.08097	0.80627	0.7465	-0.21146	0.08097	0.80627	0.7465	0.21146	1.8452
60790110012	-0.96097	-1.32142	-0.94709	-0.09054	0.96097	1.32142	0.94709	0.09054	3.32002
60790110013	-0.3653	1.66445	1.6786	0.03766	0.3653	1.66445	1.6786	-0.03766	3.67069
60790110021	-0.21324	0.09869	-0.44278	-0.04404	0.21324	0.09869	0.44278	0.04404	0.79875
60790110022	-1.31213	1.6751	-1.8082	0.06039	1.31213	1.6751	1.8082	-0.06039	4.73504
60790111011	-1.2563	2.53038	-0.75423	-0.49966	1.2563	2.53038	0.75423	0.49966	5.04057
60790111012	-0.16185	3.17273	0.09419	0.33673	0.16185	3.17273	0.09419	-0.33673	3.09204
60790111013	-0.81025	1.25998	-0.37682	-0.15533	0.81025	1.25998	0.37682	0.15533	2.60238
60790111021	-0.48495	1.964	0.75587	-0.53006	0.48495	1.964	0.75587	0.53006	3.73488
60790111022	-0.22231	0.73728	-1.25031	-0.04663	0.22231	0.73728	1.25031	0.04663	2.25653
60790111023	-0.63824	-0.29931	-0.44894	-0.86455	0.63824	0.29931	0.44894	0.86455	2.25104
60790111024	-0.01744	1.3971	-0.49275	-0.21462	0.01744	1.3971	0.49275	0.21462	2.12191
60790111031	1.03826	0.99331	-0.36831	0.66282	1.03826	0.99331	0.36831	-0.66282	1.73706
60790111032	-0.11072	1.29487	1.83973	-0.7237	0.11072	1.29487	1.83973	0.7237	3.96902
60790112001	-0.47034	2.06732	-1.03189	-0.50577	0.47034	2.06732	1.03189	0.50577	4.07532
60790112002	-0.87814	-0.63482	1.24345	-0.4458	0.87814	0.63482	1.24345	0.4458	3.20221
60790112003	-0.87297	0.75978	0.41362	0.327	0.87297	0.75978	0.41362	-0.327	1.71937
60790112004	-0.70036	2.21171	1.44156	0.12124	0.70036	2.21171	1.44156	-0.12124	4.23239
60790112005	-0.87873	-0.58488	-1.07914	-0.07014	0.87873	0.58488	1.07914	0.07014	2.61289
60790113001	0.80473	0.37875	-0.53899	0.12034	0.80473	0.37875	0.53899	-0.12034	1.60213
60790113002	-0.17499	0.03472	-0.71719	0.10261	0.17499	0.03472	0.71719	-0.10261	0.82429
60790113003	-0.82566	-0.2647	-0.7817	-0.49595	0.82566	0.2647	0.7817	0.49595	2.36801
60790113004	-0.99553	0.47222	-1.30721	0.51552	0.99553	0.47222	1.30721	-0.51552	2.25944
60790114001	0.91586	-2.05681	-2.03855	-6.17027	0.91586	2.05681	2.03855	6.17027	11.18149
60790115011	0.02752	-0.04865	0.0256	-0.00095	0.02752	0.04865	0.0256	0.00095	0.10272
60790115031	-0.772	-0.54944	-0.93139	0.00405	0.772	0.54944	0.93139	-0.00405	2.24878
60790115032	-0.65863	-0.37378	-0.54399	-0.3022	0.65863	0.37378	0.54399	0.3022	1.8786
60790115041	0.81149	-0.65452	0.05221	0.53957	0.81149	0.65452	0.05221	-0.53957	0.97865
60790115042	-0.24437	-0.90838	-1.73751	-1.13593	0.24437	0.90838	1.73751	1.13593	4.02619
60790116001	-0.85351	-0.63535	0.87158	-0.47888	0.85351	0.63535	0.87158	0.47888	2.83932
60790116002	-1.08155	-0.51824	1.07965	-0.47001	1.08155	0.51824	1.07965	0.47001	3.14945
60790116003	-0.75281	-0.60503	-0.96885	-0.6607	0.75281	0.60503	0.96885	0.6607	2.98739
60790117011	-0.24034	-0.61407	4.31863	-0.86342	0.24034	0.61407	4.31863	0.86342	6.03646
60790117012	-0.6776	0.57831	-0.22372	-0.11932	0.6776	0.57831	0.22372	0.11932	1.59895
60790117013	-0.77775	-0.6503	0.35772	0.37659	0.77775	0.6503	0.35772	-0.37659	1.40918
60790117014	-0.83041	-0.22314	0.43055	-0.36297	0.83041	0.22314	0.43055	0.36297	1.84707
60790117041	-0.66173	-0.1019	0.00389	0.20848	0.66173	0.1019	0.00389	-0.20848	0.55904
60790117042	-0.54114	2.7241	0.08348	-0.3998	0.54114	2.7241	0.08348	0.3998	3.74852
60790117043	-0.95264	0.04994	0.24791	0.17037	0.95264	0.04994	0.24791	-0.17037	1.08012
60790117044	-0.78049	-0.87198	2.34811	-1.22864	0.78049	0.87198	2.34811	1.22864	5.22922
60790118001	-0.19154	-0.38526	-0.11801	0.33436	0.19154	0.38526	0.11801	-0.33436	0.36045
60790118002	-1.10401	-1.22245	-0.29688	-0.45263	1.10401	1.22245	0.29688	0.45263	3.07597

60790118003	-0.8094	-1.16567	0.85585	-0.54702	0.8094	1.16567	0.85585	0.54702	3.37794
60790118004	-0.45727	0.56887	0.34108	0.57772	0.45727	0.56887	0.34108	-0.57772	0.7895
60790118005	-0.35552	-1.01479	0.67899	0.11028	0.35552	1.01479	0.67899	-0.11028	1.93902
60790119011	-0.67103	-0.62398	1.80503	0.32611	0.67103	0.62398	1.80503	-0.32611	2.77393
60790119012	-0.24734	0.09939	0.13018	0.39284	0.24734	0.09939	0.13018	-0.39284	0.08407
60790119021	-0.65107	1.16507	0.3174	0.45976	0.65107	1.16507	0.3174	-0.45976	1.67378
60790119022	-0.15175	-0.08193	-0.33408	-0.04906	0.15175	0.08193	0.33408	0.04906	0.61682
60790119023	0.40081	0.31583	0.17018	-0.30093	0.40081	0.31583	0.17018	0.30093	1.18775
60790119024	1.02498	-0.48158	0.20314	0.66687	1.02498	0.48158	0.20314	-0.66687	1.04283
60790119025	-0.31899	1.26753	0.55014	-0.88199	0.31899	1.26753	0.55014	0.88199	3.01865
60790120001	0.41001	-0.04598	0.01349	0.39258	0.41001	0.04598	0.01349	-0.39258	0.0769
60790120002	0.0551	-0.79252	-0.03764	4.40608	0.0551	0.79252	0.03764	-4.40608	-3.52082
60790120003	0.30575	1.41348	-0.5453	0.16221	0.30575	1.41348	0.5453	-0.16221	2.10232
60790120004	1.06687	-0.07417	-0.74841	1.3093	1.06687	0.07417	0.74841	-1.3093	0.58015
60790121021	-0.33149	1.45039	-0.93446	-0.7263	0.33149	1.45039	0.93446	0.7263	3.44264
60790121022	0.36932	-0.36426	-0.3154	-0.02085	0.36932	0.36426	0.3154	0.02085	1.06983
60790121023	0.71568	1.4053	-0.91052	0.49809	0.71568	1.4053	0.91052	-0.49809	2.53341
60790121024	-0.03831	0.38292	-1.462	1.29053	0.03831	0.38292	1.462	-1.29053	0.5927
60790122001	3.25136	-0.22661	-0.66943	1.37261	3.25136	0.22661	0.66943	-1.37261	2.77479
60790122002	0.53951	0.41622	2.41309	1.74768	0.53951	0.41622	2.41309	-1.74768	1.62114
60790122003	0.14961	-0.65503	0.07966	-0.03354	0.14961	0.65503	0.07966	0.03354	0.91784
60790122004	3.89592	0.35476	-0.06315	-0.72085	3.89592	0.35476	0.06315	0.72085	5.03468
60790123021	-0.86797	-0.7461	-0.13416	0.01728	0.86797	0.7461	0.13416	-0.01728	1.73095
60790123022	-0.58561	-0.45202	-0.2658	0.22648	0.58561	0.45202	0.2658	-0.22648	1.07695
60790123023	0.88589	-1.2448	-0.31185	-0.7769	0.88589	1.2448	0.31185	0.7769	3.21944
60790123041	0.07165	-0.65574	-0.91394	-0.16289	0.07165	0.65574	0.91394	0.16289	1.80422
60790123042	-0.39684	-0.93274	0.05722	-0.4032	0.39684	0.93274	0.05722	0.4032	1.79
60790123043	-0.28956	-0.12891	-1.21538	0.10589	0.28956	0.12891	1.21538	-0.10589	1.52796
60790123044	0.11134	-0.28677	-0.38251	0.62311	0.11134	0.28677	0.38251	-0.62311	0.15751
60790123045	-0.59383	-0.56205	2.00325	-0.09252	0.59383	0.56205	2.00325	0.09252	3.25165
60790124011	0.84546	-0.70912	-0.23894	-0.02379	0.84546	0.70912	0.23894	0.02379	1.81731
60790124012	1.79591	-0.38993	0.08982	0.17924	1.79591	0.38993	0.08982	-0.17924	2.09642
60790124013	0.67468	-0.71208	-0.52791	-0.20402	0.67468	0.71208	0.52791	0.20402	2.11869
60790124021	-0.25159	-0.83441	0.36817	-0.02851	0.25159	0.83441	0.36817	0.02851	1.48268
60790124022	0.16137	-0.68052	0.35127	0.61629	0.16137	0.68052	0.35127	-0.61629	0.57687
60790124023	1.51565	-0.43534	-0.43459	-0.36556	1.51565	0.43534	0.43459	0.36556	2.75114
60790125021	-0.59004	-0.0209	-0.37189	-0.17834	0.59004	0.0209	0.37189	0.17834	1.16117
60790125022	-0.25241	-0.43115	-1.17007	0.4162	0.25241	0.43115	1.17007	-0.4162	1.43743
60790125023	0.38013	0.39004	-0.59111	0.06514	0.38013	0.39004	0.59111	-0.06514	1.29614
60790125031	-0.55058	-0.1854	-0.20343	0.39421	0.55058	0.1854	0.20343	-0.39421	0.5452
60790125032	0.46901	0.21115	-0.88607	-0.5773	0.46901	0.21115	0.88607	0.5773	2.14353
60790125033	-0.56805	1.84675	1.9277	0.33798	0.56805	1.84675	1.9277	-0.33798	4.00452
60790125051	-0.65514	-0.6473	-0.41992	0.55912	0.65514	0.6473	0.41992	-0.55912	1.16324
60790125052	-0.71133	-1.20583	-0.78267	0.29373	0.71133	1.20583	0.78267	-0.29373	2.4061
60790125053	-0.34341	-0.15567	-1.1927	1.30248	0.34341	0.15567	1.1927	-1.30248	0.3893
60790126001	-0.57747	-0.64161	0.3702	0.56951	0.57747	0.64161	0.3702	-0.56951	1.01977
60790126002	-0.61847	0.86347	0.33576	-0.79694	0.61847	0.86347	0.33576	0.79694	2.61464
60790126003	-0.92775	-0.58222	-1.2498	0.30919	0.92775	0.58222	1.2498	-0.30919	2.45058
60790126004	-0.2944	-0.95709	-1.32023	0.88116	0.2944	0.95709	1.32023	-0.88116	1.69056
60790126005	-0.49808	0.24965	0.23896	1.23087	0.49808	0.24965	0.23896	-1.23087	-0.24418
60790127021	0.44242	-0.02543	0.96576	1.15828	0.44242	0.02543	0.96576	-1.15828	0.27533

60790127022	-0.57916	-0.8147	-0.49119	0.8765	0.57916	0.8147	0.49119	-0.8765	1.00855
60790127023	-0.32065	-0.1244	-0.66244	0.76476	0.32065	0.1244	0.66244	-0.76476	0.34273
60790127024	-1.16989	-0.77161	-0.40465	-1.05052	1.16989	0.77161	0.40465	1.05052	3.39667
60790127025	-0.55121	-0.7549	-0.50568	0.13174	0.55121	0.7549	0.50568	-0.13174	1.68005
60790127041	0.02863	-0.95812	0.4049	-0.33413	0.02863	0.95812	0.4049	0.33413	1.72578
60790127042	-0.90935	-1.35593	-0.55909	-0.51209	0.90935	1.35593	0.55909	0.51209	3.33646
60790127043	-0.0571	0.21312	1.04759	0.78911	0.0571	0.21312	1.04759	-0.78911	0.5287
60790127044	-0.65584	-1.25888	-0.42591	0.1414	0.65584	1.25888	0.42591	-0.1414	2.19923
60790128001	2.19339	1.22836	0.53164	-6.51774	2.19339	1.22836	0.53164	6.51774	10.47113
60790129001	0.10884	-0.45937	0.02873	0.97752	0.10884	0.45937	0.02873	-0.97752	-0.38058
60790129002	-0.22322	-0.62529	-0.80255	0.13902	0.22322	0.62529	0.80255	-0.13902	1.51204
60790130001	0.69469	-0.11159	1.30181	0.24924	0.69469	0.11159	1.30181	-0.24924	1.85885
60790130002	0.51874	-0.68383	0.41957	-0.72048	0.51874	0.68383	0.41957	0.72048	2.34262

APPENDIX E: Hazard Magnitude
(Mean Number of Observed and Expected Extreme Heat Days)

TRACK ID	LAT	LNG	OBS 1950-2013 EHD	EXP 2018-2100 EHD_4.5	EXP 2018-2100 EHD_8.5
6079010002	35.6862	-120.9486	3.3	15.9	30.4
6079010016	35.6624	-120.7977	3.9	21.0	35.4
6079010101	35.63676	-120.7263	4.3	23.4	35.9
6079010102	35.63733	-120.69204	4.4	23.8	35.2
6079010201	35.64488	-120.64893	4.3	24.3	36.1
6079010202	35.59442	-120.63113	4.9	26.8	36.7
6079010204	35.60689	-120.67425	4.4	24.4	35.4
6079010205	35.62203	-120.67193	4.3	24.8	35.6
6079010300	35.58239	-120.38949	4.5	26.5	39.1
6079010403	35.5357	-121.0805	4.2	10.0	22.2
6079010404	35.5734	-121.0973	3.9	7.1	16.3
6079010503	35.39647	-120.85691	8.1	9.4	15.3
6079010504	35.43704	-120.89486	9.4	13.5	27.5
6079010602	35.35403	-120.82918	7.0	8.4	12.5
6079010603	35.37568	-120.8325	8.3	9.3	14.6
6079010701	35.32505	-120.83398	7.0	8.4	12.5
6079010703	35.32052	-120.82062	7.0	8.4	12.5
6079010707	35.33269	-120.84489	7.4	8.7	13.7
6079010901	35.31435	-120.65127	4.2	9.4	16.3
6079010902	35.29193	-120.65563	3.7	7.7	12.7
6079011001	35.2749	-120.62459	3.7	7.7	12.7
6079011002	35.28343	-120.64218	3.7	7.7	12.7
6079011101	35.27786	-120.66305	3.7	7.7	12.7
6079011102	35.2673	-120.65583	3.7	7.7	12.7
6079011103	35.25816	-120.65873	3.7	7.7	12.7
6079011200	35.28899	-120.68825	4.5	8.8	15.2
6079011300	35.26906	-120.70174	4.1	8.9	14.6
6079011400	35.32269	-120.7044	4.8	8.1	14.8
6079011501	35.24422	-120.6797	4.1	8.6	14.4
6079011503	35.24321	-120.62912	3.9	8.2	13.8
6079011504	35.27775	-120.57231	4.7	10.1	19.1
6079011600	35.2105	-120.75672	4.8	9.2	16.5
6079011701	35.1569	-120.6503	4.5	7.2	11.1
6079011704	35.15281	-120.67564	4.5	7.2	11.1
6079011800	35.12766	-120.56674	4.3	7.9	13.0
6079011901	35.10876	-120.5757	4.2	8.0	12.6
6079011902	35.11719	-120.60053	4.4	7.8	12.4
6079012000	35.11873	-120.61218	4.4	7.8	12.4
6079012102	35.11992	-120.62616	4.4	6.8	10.2
6079012200	35.1088	-120.61425	4.1	7.4	11.5
6079012302	35.08888	-120.34986	3.6	8.0	13.7
6079012304	35.03545	-120.51581	3.8	7.3	11.9
6079012401	35.03479	-120.48037	3.8	7.8	12.8
6079012402	35.03097	-120.50819	3.7	7.3	12.2
6079012502	35.4958	-120.66276	4.8	26.0	37.8
6079012503	35.46856	-120.64506	5.7	24.8	38.7

6079012505	35.51001	-120.68145	5.1	25.8	38.2
6079012600	35.48461	-120.6724	6.2	26.7	40.6
6079012702	35.21201	-120.10617	5.0	31.9	49.1
6079012704	35.51995	-120.76712	6.0	26.3	40.6
6079012800	35.47195	-120.63491	5.7	24.8	38.7
6079012900	35.48784	-120.54728	4.8	25.6	37.8
6079013000	35.5166	-121.0246	4.6	25.7	25.7