2. SOCIAL VULNERABILITY

Background

The concept of vulnerability, or the potential for harm, first introduced into the hazards and disasters literature in the 1970s, provided a means for understanding the interactions between social and ecological systems. It also provided understanding on how such interactions give rise to hazards and disasters (O'Keefe et al., 1976). Vulnerability explains the differential impacts of shocks or stressors to natural systems and the ability of those systems to absorb and withstand impacts (biophysical vulnerability). A companion construct, social vulnerability, provides the societal context within which such stressors operate and highlights the uneven capacity for preparedness, response, recovery, and adaptation to environmental threats in and across social systems. Conceptually, vulnerability is understood to be inherent in the social system, independent of the hazard (Cutter et al., 2000 and 2003). However, to fully understand and characterize the hazards of places, measures of the physical characteristics of hazards and the environment (i.e., hazard exposure) must be combined with those social, economic, and demographic characteristics that influence a community's ability to prepare for, respond to, cope with, recover from, and ultimately adapt to environmental hazards (Cutter et al., 2000). Vulnerability is widely used in the hazards, disasters, and human dimensions of global change literature to describe the differential impacts of environmental threats on people and the places where they live and work (Pelling, 2003; Wisner et al., 2004; Adger, 2006; Birkmann, 2006; Eakin and Luers, 2006; Fussell, 2007; Polsky et al., 2007).

The Social Vulnerability Index (SoVI) is a quantitative measure of social vulnerability to environmental hazards. Originally developed in 2003 and applied to counties in the United States, SoVI provides a comparative metric that facilitates the geographic examination of differences in levels of social vulnerability across states and regions (Cutter et al., 2003). Based on extensive research literature focused on post-disaster response and recovery that now spans nearly a half century (NRC, 2006), SoVI includes those population characteristics known to influence the ability of social groups and communities to prepare for, respond to, and recover from disasters, especially coastal disasters (Heinz Center, 2002). The index synthesizes these socioeconomic variables into multiple dimensions, and sums the component values to produce the overall score for the particular spatial unit (e.g., county, census tract) of interest[19]. Conceptually, SoVI relates well to indices of social well-being, but its focus is on environmental hazards and the capacity of social groups to prepare for, respond to, and recover from disasters. For example, socioeconomic status (wealth or poverty) affects the ability of a community to absorb losses. Wealth enables communities to withstand the impact of losses more readily than those communities in poverty because of their access to capital, insurance, and so forth. Age is another characteristic that influences vulnerability, and this is normally recognized at the two extremes of the age continuum—children and older adults. These age cohorts need special care, are often more susceptible to harm, and may have mobility constraints, all of which influence the ability to get out of harm's way. Special needs populations (e.g., nursing home residents, infirmed) are another example of a highly vulnerable population as they are often difficult to identify. Gender, race, and ethnicity often impose language and cultural barriers, affect access to post-disaster recovery funding, and often constrain employment opportunities and access to

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[19] See methods section for more information on variables and construction of SoVI

education. Finally, housing type and tenure (e.g., manufactured housing and renters) influence vulnerability. Manufactured housing is not as reliable as a sheltering option in high wind environments, for example. Renters are more vulnerable than homeowners are because they live in temporary quarters, often do not have renters insurance to cover the loss of their personal property, and lack strong social ties to the community.

The project represents an improvement in the SoVI, which now only examines those specific social and demographic correlates of vulnerability, and is more reflective of social well-being. In the original formulation (Cutter et al., 2003), there were ten additional variables that measured aspects of the built environment (e.g., housing age) and county economic activity. We have now separated these into a companion Built Environment Index (BEVI), which is not included in this analysis. This new formulation of SoVI provides a more robust snapshot of those social group characteristics that are associated with vulnerability and known, based on the case study and empirical research literature, to either enhance or retard hazard preparedness, response, recovery, and mitigation/adaptation.

Methods

The original SoVI formulation used 42 variables (derived from the United States Census) for each county in the nation. The original computation included social and demographic characteristics as well as some measures of county economic productivity and growth. Because one could argue that economic productivity was more reflective of built environment indicators (e.g., the density of manufacturing establishments) rather than social indicators, these variables were deleted in this analysis. As a result, SoVI now reflects those characteristics of social groups that influence their differential capacity to prepare for and respond to environmental threats.

Twenty-eight variables were used in the SoVI-FL2010 computation (Table 2), based on the research literature described above. To facilitate comparisons across counties, all data were from the United States Census Decennial product (2010) and United States Census rolling 5-year American Community Survey (ACS) product (2006-2010). The Census 2010 data represent true counts of the population and their characteristics.

Table 2: Known correlates of social vulnerability and variables used to compute SoVI-FL2010.*

Population Characteristic and Specific Variables	Influence on Social Vulnerability
Race & ethnicity % African American % Native American % Asian or Pacific Islander % Hispanic	Imposes language and cultural barriers for disaster preparedness and response; affects access to pre and post-disaster resources; minority group tendency to occupy high hazard areas; non-white and non-Anglo populations are viewed as more vulnerable.
Socioeconomic Status Per capita income % households earning more than $200,000	Affects community ability to absorb losses; wealth enables communities to recover more quickly using insurance and personal resources; poverty makes communities less able to respond and

% poverty	recover quickly.
Gender % females in labor force % female population % female headed household, no spouse present	Women often have a more difficult time coping after disasters than men due to employment sector (personal services), lower wages, and family care responsibilities.
Age Age depended populations (% population under 5 years old and % population over 65) Median age	Age extremes increase vulnerability; parents must care for children when day care facilities are not available; older adults may have mobility or health problems.
Rural/Urban % urban population Population density	Rural residents may be more vulnerable due to lower wealth and dependence on locally based resource economy (farming); high-density urban areas complicate evacuations and sheltering.
Renters % renters Median Gross Rent	Renters are viewed as transient populations with limited ties to the community; they often lack shelter options when lodging becomes uninhabitable after disasters or too costly; lack insurance; often lack savings.
Residential property Median value of owner occupied housing % housing units that are mobile homes	The value, quality, and density of residential construction affect disaster losses and recovery; expensive coastal homes are costly to replace; mobile homes are easily damaged.
Occupation % employed in farming, fishing, forestry % employed in service occupations	Some occupations, especially those involving resource extraction (e.g.,fishing, farming), can be affected by disasters; service sector jobs suffer as disposable income declines; infrastructure employment (e.g., transportation, communications, utilities) is subject to temporary disruptions post-disaster.
Family Structure Average number of people per household % families	Families with large numbers of dependents or single parent households may be more vulnerable because of the need to rely on paid caregivers.
Employment % civilian labor force unemployed	Communities with high numbers of unemployed workers (pre-disaster) are viewed as more vulnerable. Because jobs are already difficult to obtain, this slows the recovery post-disaster.

Education % population over 25 with no high school diploma	Limited educational levels influence ability to understand warning information and likely disaster impacts; access to post recovery resources.
Population Growth % ESL (poorly or not at all)	New immigrant populations lack language skills and are unfamiliar with state and federal bureaucracies in how to obtain disaster relief; may not be permanent or legal residents; unfamiliar with range of hazards in area.
Social Dependency and Special Needs Populations % collecting social security benefits Per capita residents in nursing homes % no automobile	Residents totally dependent on social services for survival are often economically marginalized and thus more vulnerable; special needs populations (infirmed) require more time for evacuation and recovery is often difficult.

*Source: Heinz Center, 2002; Cutter et al., 2003.

The 28 variables were standardized and input into a principal components analysis (PCA) to reduce the number of variables into a smaller set of multi-dimensional attributes or components. Adjustments to the component's directionality were made to ensure that positive values were associated with increasing vulnerability, and negative values associated with decreasing vulnerability. If a factor included negative and positive values that both influenced vulnerability (such as older adults and the young), then the absolute value was used. Once the directionality was established, the components were added together to produce the final SoVI score for Florida (SoVI-FL2010).

Six distinct components explain 65.96% of the variance within the data for the SoVI-FL2010 (Table 3). This amount of explained variance falls in line with the results from most of the SoVI models ever implemented by the Hazards and Vulnerability Research Institute. Generally speaking, the more variables within the model, the more variance explained. However, it is important to also remove co-linearity in the dataset by a reduction of input variables. A by-product of this reduction is a lower variance explained. These components include class (percent living below poverty, percent with education less than 12th grade, percent employed in service industry) and race (percent Black), age (older adults), wealth (per capita income, percent rich, median house value), urban/female populations, ethnicity (percent Hispanic, percent English as a second language), and high occupancy households. These components and the level of explained variance are consistent with other SoVI studies for different regions and for the United States as a whole. There is considerable sensitivity testing of the SoVI metric to monitor its robustness at different spatial scales and in different places (Schmidtlein et al., 2008), and in different application domains (see http://sovius.org).

Table 3: Social Vulnerability Index-Florida (SoVI-FL2010)[20].

SoVI 2010 Component Read Me 28 Variables, Population > 0, Housing Units > 0 Florida Department of Health					HVRI
Component	*Cardinality*	*Name*	*% Variance Explained*	*Dominant Variables*	*Component Loading*
1	+	Class (Poverty), Race (Black)	16.46	QBLACK	0.815
				QPOVTY	0.798
				QNOAUTO	0.706
				QFHH	0.683
				QED12LES	0.586
				QRENTER	0.577
				QSERV	0.534
				QFAM	-0.641
2	+	Older Adults	12.88	QSSBEN	0.888
				QAGEDEP	0.841
				MEDAGE	0.770
				QCVLUN	0.629
				QASIAN	-0.596
3	-	Wealth	11.82	QRICH200K	0.888
				MDHSEVAL	0.875
				PERCAP	0.813
4	+	Urban, Females	8.70	QFEMALE	0.710
				QFEMLBR	0.564
				QURBAN	0.543
				QEXTRCT	-0.557
5	+	Ethnicity (Hispanic)	8.69	QHISP	0.846
				POPDENS	0.727
				QESL	0.582
6	+	High Occupancy Households	7.41	PPUNIT	0.850
				QFHH	0.436
				65.96		

State Summary

The social vulnerability scores, ranging from 9.85 indicating the most vulnerable tract (in Miami-Dade County) to -17.01, the least vulnerable tract (in the Dry Tortugas), were mapped using a three-class standard deviation method. The standard deviations preserve the underlying distribution of the data (mean of zero and one-half standard deviation on either side) (Figure 3). The moderate category represents the mean; the elevated category is greater than one-half standard deviation above the mean; and the low category is more than one-half standard deviation below the mean. This method permits the best balance between interpretation (three classes) and the identification and visualization of the extremes (high and low vulnerability that are of the most interest).

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[20] To learn more about SoVI or the variable naming conventions visit -
http://webra.cas.sc.edu/hvri/products/sovi_details_2006.aspx
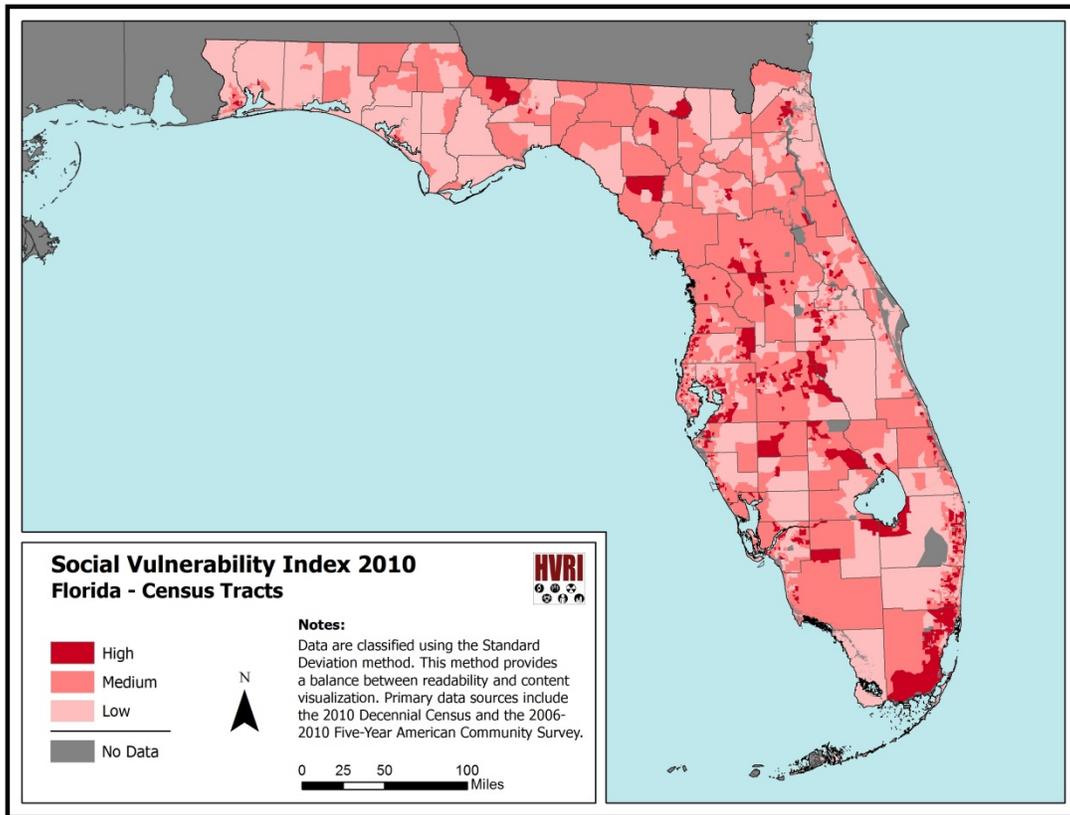
Figure 3: SoVI-FL2010 tract level social vulnerability for the state of Florida.

Overall, social vulnerability at the tract level for the state is driven by the place specific combination of underlying socioeconomic and demographic conditions present at the local level. These baseline conditions are teased out and merged into "components" through the factor analytic process. Mapping of each component provides a different view of the drivers of vulnerability across the state and may be useful for planning, exercise design, and the allocation of goods and services within the context of emergency management (Figure 3).

SoVI-FL2010 tract is comprised of the six factor components outlined above and detailed in Table 4 and Table 5.

Table 4 shows the percentage of each county's composite census tracts in reference to their SoVI classification. For instance, 67.86% of tracts in Alachua County are classified as having low vulnerability while only 7.14% of tracts contain high social vulnerability. Table 5 provides an actual count of populations within these same zones for comparative purposes. Here, one can easily see that although Table 4 shows nearly 56% of Gadsden County populations reside in areas with elevated vulnerability, this corresponds to 25,033 people (Table 5), while Palm Beach County's 34% located in the medium SoVI class represents more than 500,000 residents.

Using these tables in combination with the map above is the only accurate way to understand where clusters of vulnerability are occurring. Identification of and discussion about these areas of higher vulnerability can be found below in the discussion section.

Table 4: Census tract summary of SoVI class by county (SoVI-FL2010).

County Name	Social Vulnerability Index Rank			County Name	Social Vulnerability Index Rank		
	High	Medium	Low		High	Medium	Low
Alachua	7.14%	25.00%	67.86%	Lee	19.39%	53.33%	27.27%
Baker	-	50.00%	50.00%	Leon	8.82%	29.41%	61.76%
Bay	6.98%	37.21%	55.81%	Levy	-	88.89%	11.11%
Bradford	-	75.00%	25.00%	Liberty	-	-	100.00%
Brevard	5.41%	54.95%	39.64%	Madison	-	100.00%	-
Broward	30.75%	39.06%	30.19%	Manatee	24.36%	50.00%	25.64%
Calhoun	-	33.33%	66.67%	Marion	24.59%	67.21%	8.20%
Charlotte	13.16%	81.58%	5.26%	Martin	5.88%	55.88%	38.24%
Citrus	18.52%	81.48%	-	Miami-Dade	70.12%	16.21%	13.67%
Clay	3.33%	60.00%	36.67%	Monroe	-	16.67%	83.33%
Collier	20.55%	52.05%	27.40%	Nassau	-	41.67%	58.33%
Columbia	8.33%	75.00%	16.67%	Okaloosa	-	17.07%	82.93%
DeSoto	33.33%	33.33%	33.33%	Okeechobee	27.27%	54.55%	18.18%
Dixie	33.33%	33.33%	33.33%	Orange	24.27%	30.10%	45.63%
Duval	21.39%	38.15%	40.46%	Osceola	34.15%	46.34%	19.51%
Escambia	16.90%	42.25%	40.85%	Palm Beach	31.33%	34.64%	34.04%
Flagler	15.00%	80.00%	5.00%	Pasco	21.05%	63.16%	15.79%
Franklin	-	25.00%	75.00%	Pinellas	15.16%	50.41%	34.43%
Gadsden	55.56%	44.44%	-	Polk	33.77%	50.65%	15.58%
Gilchrist	-	60.00%	40.00%	Putnam	18.75%	75.00%	6.25%
Glades	-	66.67%	33.33%	Santa Rosa	4.00%	16.00%	80.00%
Gulf	-	33.33%	66.67%	Sarasota	13.83%	60.64%	25.53%
Hamilton	33.33%	33.33%	33.33%	Seminole	8.14%	45.35%	46.51%
Hardee	33.33%	66.67%	-	St. Johns	2.56%	25.64%	71.79%
Hendry	50.00%	33.33%	16.67%	St. Lucie	23.26%	72.09%	4.65%
Hernando	34.09%	59.09%	6.82%	Sumter	33.33%	50.00%	16.67%
Highlands	30.77%	57.69%	11.54%	Suwannee	14.29%	71.43%	14.29%
Hillsborough	23.10%	40.19%	36.71%	Taylor	-	75.00%	25.00%
Holmes	-	100.00%	-	Union	-	33.33%	66.67%
Indian River	17.24%	68.97%	13.79%	Volusia	15.93%	59.29%	24.78%
Jackson	-	63.64%	36.36%	Wakulla	-	50.00%	50.00%
Jefferson	-	66.67%	33.33%	Walton	-	18.18%	81.82%
Lafayette	-	50.00%	50.00%	Washington	-	57.14%	42.86%
Lake	16.07%	78.57%	5.36%	**State Total**	26.56%	42.84%	30.60%

Table 5: Census tract summary of population by SoVI class by county (SoVI-FL2010).

| County Name | Social Vulnerability Index Rank | | | County Name | Social Vulnerability Index Rank | | |
	High	Medium	Low		High	Medium	Low
Alachua	19,406	63,347	164,583	Lee	100,752	383,164	134,838
Baker	-	14,215	12,900	Leon	17,898	84,296	173,293
Bay	8,846	62,686	97,320	Levy	-	39,399	1,402
Bradford	-	22,193	6,327	Liberty	-	-	8,365
Brevard	20,847	319,227	203,295	Madison	-	19,224	-
Broward	549,548	731,748	466,770	Manatee	84,453	149,338	89,042
Calhoun	-	8,196	6,429	Marion	102,216	205,763	23,319
Charlotte	17,905	136,079	5,994	Martin	4,091	87,546	54,681
Citrus	23,598	117,638	-	Miami-Dade	1,900,621	367,572	224,934
Clay	5,311	86,946	98,608	Monroe	-	17,134	55,956
Collier	76,682	187,437	57,401	Nassau	-	32,436	40,878
Columbia	2,872	51,954	12,705	Okaloosa	-	34,692	146,130
DeSoto	13,900	8,849	12,113	Okeechobee	10,116	22,307	7,573
Dixie	7,331	4,101	4,990	Orange	252,348	355,711	537,897
Duval	150,426	336,831	377,006	Osceola	103,651	137,735	27,299
Escambia	39,923	132,277	125,419	Palm Beach	378,320	500,487	440,655
Flagler	15,884	76,595	3,217	Pasco	87,242	288,083	89,372
Franklin	-	2,804	8,745	Pinellas	132,662	484,182	299,698
Gadsden	25,033	21,356	-	Polk	219,460	301,041	81,594
Gilchrist	-	11,787	5,152	Putnam	10,480	60,285	3,599
Glades	-	9,136	3,748	Santa Rosa	6,115	18,226	127,031
Gulf	-	3,076	12,787	Sarasota	46,430	240,838	92,180
Hamilton	1,760	4,835	8,204	Seminole	25,901	197,548	199,269
Hardee	10,630	17,101	-	St. Johns	4,155	44,284	141,600
Hendry	21,846	11,716	5,578	St. Lucie	37,115	228,610	12,064
Hernando	62,301	101,941	8,536	Sumter	52,106	31,264	3,653
Highlands	35,116	62,607	1,063	Suwannee	7,016	32,732	1,803
Hillsborough	279,785	501,682	447,759	Taylor	-	14,693	7,877
Holmes	-	19,927	-	Union	-	4,495	11,040
Indian River	14,670	106,227	17,131	Volusia	83,236	297,516	113,841
Jackson	-	29,998	19,748	Wakulla	-	13,577	17,199
Jefferson	-	8,876	5,885	Walton	-	11,004	44,039
Lafayette	-	5,706	3,164	Washington	-	14,348	10,548
Lake	40,805	234,222	22,025	**State Total**	**5,110,809**	**8,232,846**	**5,447,271**

The pattern of elevated social vulnerability within the state of Florida (Figure 3) is concentrated in four main areas across the state. The first is within the urban areas in the southeast part of the state, north from Miami-Dade, through Broward, and into Palm Beach Counties where 76%, 31%, and 29% of the respective populations live in areas with high vulnerability (Table 5). Here, social vulnerability is a product of a diverse set of drivers particular to each enumeration unit. For example, the most vulnerable tracts (medium high and high SoVI) within these counties - while primarily driven by component four (Urban, Females) and component six (High Occupancy Households) in both cases is not solely an urban vs. rural phenomenon (Table 6). Of particular interest is the difference in overall vulnerability and its constituent parts between these areas of extreme vulnerability.

Table 6: Driving forces of the most vulnerable tracts in southeast Florida.

County	Tract	Total Population	Comp 1 - Class (Poverty), Race (Black)	Comp 2 - Age (Older Adults)	Comp 3 - Wealth	Comp 4 - Urban, Females	Comp5 - Ethnicity (Hispanic)	Comp 6 - High Occupancy Households	SoVI
Miami-Dade	12086009040	120	3.33	5.71	1.13	-1.58	1.54	-0.27	9.85
Palm Beach	12099980100	5	0.53	-0.78	1.37	3.82	-1.29	5.54	9.18
Miami-Dade	12086980800	3	0.90	-0.66	1.75	3.46	1.09	2.52	9.07
Miami-Dade	12086980700	964	4.60	0.44	1.51	0.25	-1.87	3.01	7.94
Miami-Dade	12086980100	18	0.64	-1.30	0.90	1.86	0.87	4.63	7.61
Miami-Dade	12086001501	3,479	5.02	0.23	-0.41	2.02	-0.59	1.08	7.35
Palm Beach	12099005939	1,162	1.17	4.21	0.77	2.44	-0.41	-1.34	6.85
Miami-Dade	12086001801	3,778	3.72	0.62	-0.10	1.22	-0.10	1.46	6.81
Broward	12011110335	7,569	-0.32	3.46	0.78	1.85	1.83	-1.04	6.56
Miami-Dade	12086009315	3,066	0.45	1.38	0.39	0.76	4.61	-1.07	6.53
Palm Beach	12099007747	2,792	1.07	4.33	0.08	2.52	0.22	-1.80	6.43
Miami-Dade	12086010001	6,465	1.64	0.49	0.10	1.37	0.21	2.61	6.42
Miami-Dade	12086009017	6,202	-0.35	0.97	1.38	-0.17	3.15	1.45	6.42
Miami-Dade	12086009022	2,118	-0.64	0.39	0.76	1.04	2.88	1.98	6.40
Miami-Dade	12086009021	4,729	0.44	0.65	0.49	0.10	3.62	1.06	6.36
Miami-Dade	12086008304	7,577	1.77	0.78	0.26	1.82	-0.06	1.79	6.36
Miami-Dade	12086011003	4,448	0.91	0.58	0.32	0.20	1.94	2.39	6.33
Palm Beach	12099007746	1,052	0.78	3.45	1.07	3.08	-0.34	-1.86	6.18
Miami-Dade	12086009314	3,942	0.64	0.88	0.58	0.20	4.16	-0.30	6.16
Miami-Dade	12086003100	4,416	4.30	0.34	-0.12	1.43	0.22	-0.04	6.14
Miami-Dade	12086010016	4,919	-0.44	0.35	0.31	1.12	2.21	2.52	6.07
Miami-Dade	12086000410	4,231	1.47	0.30	0.21	1.01	0.36	2.72	6.05
Palm Beach	12099005933	2,934	0.25	3.84	0.83	2.85	-0.30	-1.42	6.05
Miami-Dade	12086000901	8,227	0.06	0.75	0.53	-0.03	2.79	1.91	6.02
Broward	12011030401	3,017	2.17	0.82	-0.11	1.05	-0.21	2.23	5.96
Palm Beach	12099001403	2,863	3.69	0.23	0.09	1.84	-1.19	1.28	5.94
Miami-Dade	12086000706	7,688	-0.05	0.89	0.47	0.31	4.07	0.19	5.89
Miami-Dade	12086000601	5,412	-0.83	1.06	0.36	0.28	3.06	1.95	5.88
Miami-Dade	12086001502	3,926	4.25	0.28	-0.52	1.29	-0.56	1.11	5.85
Palm Beach	12099006802	3,069	2.40	0.65	-0.06	0.44	0.30	2.11	5.84

Vulnerability Driver   **Vulnerability Detractor**

The second area of elevated SoVI is comprised of tracts located on the I-4 corridor from Hillsborough County to Orange County and throughout the periphery of Orlando, FL in south-central Florida. Here, between 22% - 36% of the population resides in areas with the most extreme vulnerability scores in the state (Table 7). In Hillsborough County, nearly 280,000 individuals are situated within 73 census tracts characterized with medium high or high SoVI. Thirteen tracts in Osceola County containing nearly 97,000

people are characterized by high vulnerability. Nearly 250,000 people (more than 20%) reside within the most vulnerable tracts (49) in Orange County, while in Polk County more than 35% (213,000) of people live in the most socially vulnerable tracts. Overall, the I-4 corridor contains 837,000 people within 186 tracts characterized by high vulnerability. Again, the drivers of social vulnerability are diverse both within each county and between constituent tracts (Table 7). Component six (High Occupancy Households) serves to increase vulnerability in each of the 30 most vulnerable tracts within this zone while neither component two (Age-Older Adults) nor component three (Wealth) serve as major contributors. However, components four and five attenuate vulnerability in some of the most vulnerable places.

The third cluster of extreme social vulnerability exists in Southwest Florida, specifically in Lee and Collier Counties. Here, 46 census tracts containing 173,000 people, 24% and 15% from Lee and Collier Counties, respectively, are characterized by either medium high or high vulnerability (Table 8). Again, one of the main drivers of vulnerability in these tracts is component six (High Occupancy Households) (2.72 people per house compared to the mean of 2.47) and a mixture of components one, two, and five. Table 9 provides a breakdown of populations for the most vulnerable tracts within each county with respect to overall social vulnerability score.

Table 7: Driving forces of the most vulnerable tracts in central Florida.

County	Tract	Total Population	Comp 1 - Class (Poverty), Race (Black)	Comp 2 - Age (Older Adults)	Comp 3 - Wealth	Comp 4 - Urban, Females	Comp5 - Ethnicity (Hispanic)	Comp 6 - High Occupancy Households	SoVI
Hillsborough	12057003400	3,009	3.66	0.70	0.16	1.82	-0.31	1.64	7.66
Orange	12095014605	4,305	2.31	0.81	0.26	1.71	-0.63	1.71	6.17
Hillsborough	12057001900	2,831	2.72	0.19	0.15	1.59	-1.09	1.60	5.17
Osceola	12097042601	3,074	0.12	0.37	0.35	0.56	1.67	1.87	4.93
Hillsborough	12057012900	2,942	2.06	0.72	0.01	-0.09	0.62	1.47	4.79
Hillsborough	12057001800	4,129	2.92	0.20	-0.07	0.91	-0.74	1.35	4.56
Orange	12095014601	7,597	2.67	-0.61	0.14	1.31	-0.55	1.40	4.36
Hillsborough	12057003600	4,333	2.15	-0.08	0.26	1.13	-0.91	1.64	4.19
Polk	12105980000	3	1.76	-0.45	0.25	1.78	-2.23	3.03	4.14
Orange	12095012202	4,539	1.58	-0.52	0.40	0.96	-0.19	1.31	3.55
Orange	12095017001	2,889	1.42	0.02	0.50	1.07	-1.30	1.73	3.44
Polk	12105014502	3,651	0.71	0.91	0.73	-2.51	1.77	1.76	3.38
Orange	12095014908	5,979	0.53	-0.08	0.64	1.21	-0.31	1.37	3.35
Orange	12095012304	6,295	1.35	-0.69	0.09	1.08	-0.14	1.42	3.11
Hillsborough	12057013505	3,251	0.77	-0.20	0.31	0.40	0.03	1.64	2.96
Osceola	12097041300	13,009	0.30	-0.06	0.34	0.34	0.03	1.80	2.75
Polk	12105012602	5,778	0.61	0.32	0.35	-2.03	1.55	1.94	2.74
Osceola	12097041100	16,827	0.05	-0.33	0.49	0.51	0.37	1.63	2.71
Hillsborough	12057013914	4,531	0.34	0.78	0.88	-3.58	0.84	2.98	2.24
Orange	12095016806	12,476	0.01	-0.65	0.26	0.57	0.67	1.32	2.18
Orange	12095012306	3,193	0.39	-0.78	0.27	1.30	-0.73	1.53	1.99
Hillsborough	12057013913	5,195	0.11	0.40	0.43	-1.84	0.94	1.93	1.97
Hillsborough	12057013912	3,471	-0.27	0.81	0.96	-1.69	0.02	2.00	1.82
Polk	12105014501	8,295	0.11	0.59	0.97	-1.30	-0.06	1.49	1.79
Polk	12105015401	2,526	0.12	0.69	0.75	-0.51	-0.69	1.32	1.68
Orange	12095016807	17,017	-0.67	-1.09	0.42	0.71	0.65	1.42	1.44
Orange	12095012303	6,429	0.17	-0.95	0.21	1.22	-0.76	1.47	1.36
Polk	12105014902	7,268	-0.53	0.37	0.85	-2.32	1.09	1.90	1.36
Polk	12105014103	8,341	0.03	-0.50	0.46	-0.23	-0.31	1.84	1.29
Orange	12095017701	5,186	-0.58	-0.54	0.11	0.24	0.53	1.49	1.26

| | | | Vulnerability Driver | | | Vulnerability Detractor | | | |

Table 8: Driving forces of the most vulnerable tracts in southwest Florida.

County	Tract	Total Population	Comp 1 - Class (Poverty), Race (Black)	Comp 2 - Age (Older Adults)	Comp 3 - Wealth	Comp 4 - Urban, Females	Comp5 - Ethnicity (Hispanic)	Comp 6 - High Occupancy Households	SoVI
Lee	12071000502	3,417	3.75	0.92	0.20	0.98	0.35	1.28	7.47
Lee	12071000600	3,783	3.63	0.69	-0.07	1.01	-0.75	1.47	5.97
Collier	12021011302	5,920	1.22	1.02	0.72	-2.31	1.47	3.24	5.36
Lee	12071000503	3,832	1.51	-0.01	0.35	-0.02	0.55	1.95	4.33
Collier	12021011103	2,225	-0.08	2.23	1.28	-0.90	0.75	0.37	3.65
Collier	12021011301	6,369	0.67	0.34	0.74	-2.24	1.80	2.12	3.42
Collier	12021010420	6,012	0.58	-0.40	0.34	-0.78	2.22	1.14	3.11
Lee	12071040305	2,953	-0.19	0.57	0.70	0.47	0.77	0.77	3.09
Collier	12021011205	2,664	2.59	1.07	-0.03	-4.64	1.86	2.10	2.95
Collier	12021011204	4,807	2.33	0.87	-0.03	-4.61	2.73	1.44	2.74
Lee	12071040122	4,897	1.55	-0.57	-0.13	-0.62	1.20	1.22	2.66
Collier	12021011400	4,657	0.89	0.91	0.03	-4.20	2.11	2.82	2.57
Lee	12071040311	3,038	0.04	0.72	0.71	-0.22	1.14	0.09	2.48
Lee	12071040301	6,000	0.36	-0.64	0.69	0.25	0.38	1.42	2.47
Lee	12071020101	3,906	-0.88	2.98	0.65	0.71	-1.00	-0.12	2.34
Lee	12071040109	4,674	0.77	-0.19	0.08	0.66	0.19	0.75	2.26
Lee	12071000700	2,207	2.18	-0.19	0.36	-0.26	0.23	-0.19	2.11
Lee	12071040314	1,913	0.22	0.22	0.45	-0.64	-0.03	1.88	2.10
Collier	12021010802	10,208	0.75	0.42	-0.61	-0.73	0.93	1.13	1.88
Lee	12071001101	3,244	1.62	-0.41	0.35	-0.03	0.36	-0.04	1.85
Lee	12071040208	1,319	0.22	0.14	0.45	-0.79	-0.02	1.82	1.82
Lee	12071040303	4,540	0.08	-0.47	0.14	0.02	0.34	1.60	1.71
Lee	12071040313	1,338	-0.39	-0.67	0.90	0.84	-0.11	1.02	1.60
Lee	12071040210	2,087	0.23	0.00	0.55	-0.43	-0.18	1.29	1.46
Collier	12021010505	6,784	-0.07	-0.06	0.46	0.79	0.22	0.07	1.41
Collier	12021010410	8,157	0.53	-0.56	0.05	-2.02	2.46	0.93	1.39
Collier	12021010419	3,160	-0.17	-0.72	0.28	-0.68	1.71	0.90	1.32
Collier	12021010411	6,632	-0.34	-0.20	0.12	-0.28	1.14	0.84	1.27
Lee	12071040125	1,965	0.05	0.01	0.33	-0.31	0.49	0.68	1.25
Lee	12071010501	3,540	-0.83	0.32	0.34	0.48	0.51	0.42	1.23

	Vulnerability Driver		Vulnerability Detractor	

The final area of elevated SoVI extends from western Pasco County through Hernando and into Citrus, Marion, Sumter, and Lake Counties. Here, 73 tracts containing more than 347,000 people exhibit medium high and high social vulnerability. Component two (Age-Older Adults) is considerably more influential in this area than many of the other

SoVI components. Additionally, components four (Urban, Females) and five (Ethnicity-Hispanic) generally decrease vulnerability in this area, and component six is less influential here than in the other areas of increased SoVI across the state.

Table 9: Driving forces of the most vulnerable tracts in west central Florida.

County	Tract	Total Population	Comp 1 - Class (Poverty), Race (Black)	Comp 2 - Age (Older Adults)	Comp 3 - Wealth	Comp 4 - Urban, Females	Comp5 - Ethnicity (Hispanic)	Comp 6 - High Occupancy Households	SoVI
Marion	12083001800	1,750	3.36	0.54	0.23	1.84	-1.37	0.43	5.04
Sumter	12119911302	1,148	3.51	0.96	0.27	0.22	-1.87	1.24	4.33
Lake	12069030504	7,145	0.95	1.41	0.56	0.62	-0.03	0.05	3.56
Marion	12083001700	4,977	2.21	-0.16	0.45	0.95	-0.34	0.29	3.40
Marion	12083001204	5,957	0.81	-0.08	0.49	0.80	-0.15	1.20	3.08
Pasco	12101032601	3,466	1.65	0.49	0.21	-0.46	0.76	0.17	2.82
Pasco	12101032700	2,768	0.01	2.05	1.43	-0.65	-0.39	0.29	2.74
Pasco	12101031807	3,069	0.46	1.58	1.19	-0.26	-0.64	0.31	2.65
Pasco	12101031012	4,581	-0.44	1.13	0.83	0.80	0.23	-0.16	2.39
Marion	12083001004	12,236	0.14	0.65	0.52	-0.13	-0.07	1.07	2.18
Hernando	12053041204	3,147	-0.11	1.21	0.98	-0.07	0.30	-0.13	2.17
Lake	12069030206	4,024	0.71	0.17	0.81	0.14	-0.19	0.52	2.16
Marion	12083001401	5,006	1.33	-0.16	0.64	0.57	-0.77	0.43	2.04
Marion	12083001500	3,534	1.66	0.46	0.62	-0.17	-1.29	0.57	1.84
Pasco	12101033101	2,437	-0.61	2.86	1.26	-1.81	-0.69	0.80	1.79
Lake	12069030307	4,441	-0.85	1.19	1.09	0.64	-0.25	-0.09	1.74
Marion	12083001005	6,004	0.05	1.10	0.44	0.26	-0.90	0.76	1.70
Pasco	12101032500	5,289	0.12	0.44	0.68	-1.60	0.82	1.21	1.66
Pasco	12101031205	3,946	-0.30	1.50	0.94	-0.58	-0.13	0.18	1.62
Hernando	12053041006	6,310	-0.24	0.19	0.67	0.59	-0.01	0.42	1.62
Hernando	12053041103	3,959	-0.44	0.30	0.80	0.94	-0.25	0.18	1.53
Hernando	12053041402	5,269	-0.34	0.62	0.72	0.94	-0.47	0.05	1.52
Marion	12083001207	11,209	-0.14	-0.26	0.62	0.70	-0.14	0.74	1.52
Pasco	12101032402	3,409	0.53	0.70	0.89	-1.91	-0.14	1.40	1.47
Hernando	12053041004	6,378	-0.50	0.09	0.75	0.82	-0.06	0.36	1.46
Hernando	12053041401	5,779	-0.19	0.12	0.75	0.50	-0.07	0.29	1.40
Pasco	12101031007	4,915	0.39	0.30	0.50	0.36	-0.05	-0.14	1.36
Hernando	12053041203	4,029	-0.08	0.93	0.18	0.41	-0.08	-0.01	1.35
Lake	12069030503	1,492	1.08	-0.38	0.46	-0.58	-0.24	0.98	1.33
Hernando	12053040905	6,141	-0.75	1.43	0.32	0.68	-0.37	-0.09	1.23

Vulnerability Driver	Vulnerability Detractor

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