

Social Vulnerability Index Technical Documentation

Senate Bill 762 Wildfire Risk Mapping

NOTE: The SVI dataset within the Oregon Explorer tool underwent an update on February 5, 2024 to rectify inaccuracies in the original data. The initial SVI layer computations omitted data pertaining to the indicator "adults over age 65." We strongly recommend individuals who downloaded SVI data prior to this update revise their records accordingly.

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1. Overview: Senate Bill 762 & Social Vulnerability Mapping

Oregon's omnibus wildfire bill, Senate Bill 762 (SB 762), directed Oregon State University to conduct a wildfire risk assessment and develop a series of publicly available maps that quantify wildfire risk, the wildland urban interface, and socially vulnerable communities to help inform decisions and allocate resources related to state wildfire prevention, response, and recovery. This document provides technical information on the social vulnerability index (SVI) dataset created to map socially vulnerable communities as required under SB 762. This dataset was completed in June 2022 and is archived at OSU Scholars Archive (<https://doi.org/10.7267/z890s265n>). All map layers developed for SB 762, including the socially vulnerability map layer, can be accessed through the Oregon Wildfire Risk Explorer: <https://oregonexplorer.info/wildfirerisk>

Social vulnerability refers to the social, economic, and cultural factors that influence access to resources and influence the ability of individuals, households, or communities to prevent, respond to, and recover from events such as wildfire (Coughlan et al., 2019; Cutter et al., 2003). Some examples of social, economic, or cultural factors that may influence social vulnerability to wildfire include income, language proficiency, cultural and psychological relationships to fire and land management, and level of trust in government (Coughlan et al., 2019). The SVI map layer developed for SB 762 identifies areas in the state that may be more vulnerable to the impacts of wildfire following the methodologies of the Centers for Disease Control (CDC) and Agency for Toxic Substances and Disease Registry (ATSDR) Social Vulnerability Index (SVI) (Centers for Disease Control Social Vulnerability Index 2018 Documentation, 2022) which was initially developed by Flanagan et al. (2011) for disaster risk management.

For more information and frequently asked questions on the wildfire risk assessment map layers see the SB 762 website: <https://osuwildfireriskmap.forestry.oregonstate.edu>

For questions related to the SVI dataset contact osuwildfirerisk@oregonstate.edu.

1.1 SVI Dataset

The SVI dataset is comprised of the following data and documents and can be accessed through OSU's Scholars Archive: <https://doi.org/10.7267/z890s265n>

1. SVI data tables: Three csv files containing social vulnerability data for Oregon block groups (BG), tracts, and county subdivisions (CCD).
 - a. Filenames: OR_SVI_CCD_2020.csv, OR_SVI_TRACT_2020.csv, OR_SVI_BG_2020.csv
2. R Code: Three R files containing the code used to extract data from the US Census and produce the csv files needed for mapping social vulnerability at the block group (BG), tract, and county subdivision (CCD) levels of geography.
 - a. Filenames: CCD_SVI_2020.R, TRACT_SVI_2020.R, BG_SVI_2020.R
3. Technical Information: A readme.txt file and this document provide methods and technical information.

- a. readme.txt
- b. Technical_Information_SVI_SB762.pdf

These data were curated using funding from the State of Oregon and can be used without additional permissions or fees. If you use these data in a publication, presentation, or other research product please use the following citation: Reilley, C. & Crandall, M. (2022) Social Vulnerability for the State of Oregon [Data set]. Oregon State University. <https://doi.org/10.7267/z890s265n>

2. Methods

2.1 Indicators & Themes

There are 15 variables or “indicators” included in the overall social vulnerability score as well as four themes used to group related indicators (Table 1). SVI themes and overall SVI scores were tabulated at the US Census block group, tract, and county subdivision levels of geography. For information on US Census geographies see the OSU SVI FAQ.

Indicators	Block Group	Tract/County Subdivision	Themes	= Overall Social Vulnerability
Poverty	X*	X	Socioeconomic Status	
Unemployment Rate	X*	X		
Per Capita Income	X*	X		
Less than High School	X*	X		
Over Age 65	X*	X	Household Composition & Disability	
Under Age 18	X*	X*		
Disability	NA	X*		
Single Parent Households	X*	X*		
Minority Population	X*	X*	Minority Status & Language	
Limited English Language	X*	X*		
Multi Unit Structures	X*	X*	Housing Type & Transportation	
Mobile Homes	X*	X		
Household Crowding	X*	X*		
No Vehicle Access	NA	X		
Group Quarters	NA	X*		

Table 1. Indicators and themes included in SVI. *Denotes estimates and margins of error were derived from ACS Base Tables (tables codes start with letter B in Table 2 and Table 3). All others were available from the ACS Subject Tables or Data Profile tables as percentages with their associated margins of error provided by the ACS (table codes begin with the letters S or DP in Table 2 and Table 3). “NA” denotes data that was not available at block group level.

2.2 Data Generation

The American Community Survey (ACS) 2016-2020 5-year estimates were used to calculate the 15 indicators that make up the overall social vulnerability score (Table 1). All data were acquired from the US Census website using the tidycensus package in R (R version 4.1.2 (2021-11-01)).

The data are available as csv files which can be imported into most spreadsheet applications (e.g. Microsoft Excel). Data can be visualized in mapping programs (e.g. ArcGIS Pro) by joining the data files with the US Census Tiger Line boundary files for the state of Oregon using the “GEOID” columns. US Census boundary files are available here: <https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.html>

2.3 Data Analysis

When calculating the indicators, themes and overall SVI scores at all levels of geography, units with a total population of 0 were excluded from analysis and added back in afterwards for mapping with all indicator columns filled with “NA” values.

- N=0 county subdivisions had a population of zero.
- N=9 tracts had a population of 0.
- N=14 block groups had a population of 0.

N=3 block groups had populations greater than 0, but were missing 2020 ACS data (GEOIDs 410670325012, 410419515003, 410030107022). Those block groups are included in the datasets with “NA” values for SVI scores.

The data dictionaries (Tables 2 and 3) provide detailed descriptions of variables used to calculate SVI. Table 4 contains descriptions of calculations used for the themes and overall SVI score, and Table 5 provides detailed explanations of the thresholds used for the data reliability columns.

Table 2. Tract and County Subdivision Data Dictionary. Descriptions of the columns and calculations contained in the final data tables for tracts and county subdivisions.

Variable Name	ACS Data Table	Variable or Calculation	Intermediary Variable used/descriptions	Description
GEOID	NA	NA	NA	geographic entity codes (GEOIDs) are used to tie census data to boundary files for mapping
NAME	NA	NA	NA	Name of the tract or county subdivision
E_TOTPOP	S0601	S0601_C01_001	S0601_C01_001 Estimate!!Total!!Total population	Total Population
E_TOTHH	DP02	DP02_0001	DP02_0001 Estimate!!HOUSEHOLDS BY TYPE!!Total households	Total Households
E_TOTHU	DP04	DP04_0001	DP04_0001 Estimate!!HOUSING OCCUPANCY!!Total housing units	Total Housing Units
Socioeconomic Status				
EP_POVPOP	S0601	S0601_C01_049	S0601_C01_049 Estimate!!Total!!POVERTY STATUS IN THE PAST 12 MONTHS!!Population for whom poverty status is determined!!Below 100 percent of the poverty level	Percentage of population in poverty
EP_UNEMPL	DP03	DP03_0009P	DP03_0009P	Percentage of population over age 16 unemployed

			Percent!!EMPLOYMENT STATUS!!Civilian labor force!!unemployment rate	
EP_PCI	B19301	B19301_001	B19301_001 Estimate!!Per capita income in the past 12 months (in 2020 inflation-adjusted dollars)	Per Capita Income. Not a percentage. Has an inverse relationship with vulnerability.
EP_NOHS	S0601	S0601_C01_033	S0601_C01_033 Estimate!!Total!!EDUCATIONAL ATTAINMENT!!Population 25 years and over!!Less than high school graduate	Percentage of population over age 25 with no high school diploma
Household Composition				
EP_AGE65	S0101	S0101_C02_030	Percent!!Total population!!SELECTED AGE CATEGORIES!!65 years and over	Percentage of population 65 years and older
EP_AGE17	B09001	(B09001_001/E_TOTPOP)*100	B09001_001 Estimate!!Total:POPULATION UNDER 18 YEARS BY AGE	Percentage of population under age 18
EP_DISABL	DP02	DP02_0072P	DP02_0072P Percent!!DISABILITY STATUS OF THE CIVILIAN NONINSTITUTIONALIZED POPULATION!!Total Civilian Noninstitutionalized Population	Percentage of population with a disability not institutionalized
EP_SNGPNT	B11003	(B11003_010 + B11003_016/E_TOTHH)*100	B11003_010 Estimate!!Total:!!Other family:!!Male householder, no spouse present:!!With own children of the householder under 18 years: B11003_016	Percentage of single parent households (male or female householder) with children under 18

			Estimate!!Total:!!Other family:!!Female householder, no spouse present:!!With own children of the householder under 18 years:	
Minority and Language				
EP_MNRTY	B01001H_001	$((E_TOTPOP - B01001H_001) / E_TOTPOP) * 100$	B01001H_001 Estimate!!Total:SEX BY AGE (WHITE ALONE, NOT HISPANIC OR LATINO)	Percentage of the population that is non white. Minority population includes those who identify as white, but identify as hispanic or latino ethnicity.
EP_LIMENG	C16002	$((C16002_004 + C16002_007 + C16002_010 + C16002_013) / E_TOTHH) * 100$	C16002_004 Estimate!!Total:!!Spanish:!!Limited English speaking household C16002_007 Estimate!!Total:!!Other Indo-European languages:!!Limited English speaking household C16002_010 Estimate!!Total:!!Asian and Pacific Island languages:!!Limited English speaking household C16002_013 Estimate!!Total:!!Other languages:!!Limited English speaking household	Percentage of limited English Speaking Households
Transportation and Housing				
EP_MUNIT	DP04	$((DP04_0012 + DP04_0013) / E_TOTHU) * 100$	DP04_0012 Estimate!!UNITS IN STRUCTURE!!Total housing units!!10 to 19 units	Percentage of housing units that are apartments with more than 10 units

			DP04_0013 Estimate!!UNITS IN STRUCTURE!!Total housing units!!20 or more units	
EP_MOBILE	DP04	DP04_0014P	DP04_0014P Percent!!UNITS IN STRUCTURE!!Total housing units!!Mobile home	Percentage of housing units that are mobile homes
EP_CROWD	DP04	EP_CROWD = (DP04_0078+DP04_0079/DP04_0002)*100	DP04_0078 Estimate!!OCCUPANTS PER ROOM!!Occupied housing units!!1.01 to 1.50 DP04_0079 Estimate!!OCCUPANTS PER ROOM!!Occupied housing units!!1.51 or more DP04_0002 Estimate!!HOUSING OCCUPANCY!!Total housing units!!Occupied housing units	Percentage of occupied households with more people than rooms
EP_NOVH	DP04	DP04_0058P	DP04_0058P Percent!!VEHICLES AVAILABLE!!Occupied housing units!!No vehicles available	Percentage of occupied households with no vehicle available
EP_GRPQ	B26001_001	(B26001_001/E_TOTPOP)*100	B26001_001 Estimate!!Total:GROUP QUARTERS POPULATION	Percentage of population in group quarters (i.e nursing homes, college dorms, prisons)

Table 3. Block Group SVI Data Dictionary. Descriptions of the columns and calculations contained in the final data tables for block groups.

Variable Name	ACS Data table	Variables or Calculation	Variables used/descriptions	Notes
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GEOID	NA	NA	NA	geographic entity codes (GEOIDs) are used to tie census data to boundary files for mapping
NAME	NA	NA	NA	Name of the block group
E_TOTPOP	B01003_001	B01003_001	B01003_001 Estimate!!Total:TOTAL POPULATION	Total Population
E_TOTHH	B11012_001	B11012_001	B11012_001 Estimate!!Total:HOUSEHOLDS BY TYPE	Total Households
E_TOTHU	B25001_001	B25001_001	B25001_001 Estimate!!Total:HOUSING UNITS	Total Housing Units
Socioeconomic Status				
EP_POVPOP	C17002	$((C17002_002 + C17002_003) / C17002_001) * 100$	C17002_002 Estimate!!Total:!!Under .50 C17002_003 Estimate!!Total:!! .50 to .99 C17002_001 Estimate!!Total:	Percentage of population in poverty
EP_PCI	B19301	B19301_001	B19301_001 Estimate!!Per capita income in the past 12 months (in 2020 inflation-adjusted dollars)	Not a percentage. Has an inverse relationship with vulnerability
EP_UNEMPL	B23025	$(B23025_005 / B23025_003) * 100$	B23025_005 Estimate!!Total:!!In labor force:!!Civilian labor force:!!unemployed	Percentage of population over age 16 unemployed

			B23025_003 Estimate!!Total:!!In labor force:!!Civilian labor force:	
EP_NOHS	B15003	(B15003_001-(B15003_017+B15003_016+B15003_019+B15003_020+B15003_021+B15003_022+B15003_023+B15003_024+B15003_025)/B15003_001)*100	B15003_017 Estimate!!Total:!!Regular high school diploma B15003_018 Estimate!!Total:!!GED or alternative credential B15003_019 Estimate!!Total:!!Some college, less than 1 year B15003_020 Estimate!!Total:!!Some college, 1 or more years, no degree B15003_021 Estimate!!Total:!!Associate's degree B15003_022 Estimate!!Total:!!Bachelor's degree B15003_023 Estimate!!Total:!!Master's degree B15003_024 Estimate!!Total:!!Professional school degree B15003_025 Estimate!!Total:!!Doctorate degree B15003_001 Estimate!!Total:	Percentage of population with no high school diploma
Household Composition (NOTE: no disability indicator at block group level)				
EP_AGE65	B09021	((B01001_020+B01001_021+B01001_022)/B01001_001)*100	B01001_020 Estimate!!Total:!!Male:!!65 and 66 years	Percentage of population over age 65

		$\frac{2+B01001_023+B01001_024+B01001_025+B01001_044+B01001_045+B01001_046+B01001_047+B01001_048+B01001_049}{E_TOTPOP} * 100$	<p>B01001_021 Estimate!!Total:!!Male:!!67 and 69 years</p> <p>B01001_022 Estimate!!Total:!!Male:!!70 and 74 years</p> <p>B01001_023 Estimate!!Total:!!Male:!!75 and 79 years</p> <p>B01001_024 Estimate!!Total:!!Male:!!80 and 80 years</p> <p>B01001_025 Estimate!!Total:!!Male:!!85 years and older</p> <p>B01001_044 Estimate!!Total:!!Female:!!65 and 66 years</p> <p>B01001_045 Estimate!!Total:!!Female:!!67 and 69 years</p> <p>B01001_046 Estimate!!Total:!!Female:!!70 and 74 years</p> <p>B01001_047 Estimate!!Total:!!Female:!!75 and 79 years</p> <p>B01001_048 Estimate!!Total:!!Female:!!80 and 80 years</p> <p>B01001_049 Estimate!!Total:!!Female:!!85 years and older</p>	
EP_17AGE	B01001	$\frac{((B01001_003+B01001_004+B01001_005+B01001_006+B01001_027+B01001_028+B01001_029+B01001_030)}{E_TOTPOP} * 100$	<p>B01001_003 Estimate!!Total:!!Male:!!Under 5 years</p> <p>B01001_004 Estimate!!Total:!!Male:!!5 to 9 years</p> <p>B01001_005 Estimate!!Total:!!Male:!!10 to 14 years</p> <p>B01001_006</p>	Percentage of population under age 18

			Estimate!!Total:!!Male:!!15 to 17 years B01001_027 Estimate!!Total:!!Female:!!Under 5 years B01001_028 Estimate!!Total:!!Female:!!5 to 9 years B01001_029 Estimate!!Total:!!Female:!!10 to 14 years B01001_030 Estimate!!Total:!!Female:!!15 to 17 years	
EP_SNGPNT	B11003	$\frac{(B11003_010 + B11003_016/E_TOTHH)}{100}$	B11003_010 Estimate!!Total:!!Other family:!!Male householder, no spouse present:!!With own children of the householder under 18 years: B11003_016 Estimate!!Total:!!Other family:!!Female householder, no spouse present:!!With own children of the householder under 18 years:	Percentage of single parent households male or female with children under 18
Minority and Language				
EP_MNRTY	B03002_003	$\frac{(E_TOTPOP - B03002_003)}{E_TOTPOP} * 100$	B03002_003 Estimate!!Total:!!Not Hispanic or Latino:!!White alone	Percentage of the population that is non white. Minority population includes those who identify as white, but of hispanic or latino ethnicity.
EP_LIMENG	C16002	$\frac{(C16002_004 + C16002_007 + \dots)}{E_TOTPOP} * 100$	C16002_004 Estimate!!Total:!!Spanish:!!Limited English	Percentage of limited English Speaking

		C16002_010+C16002_013)/E_TOTHH)*100	speaking household C16002_007 Estimate!!Total:!!Other Indo-European languages:!!Limited English speaking household C16002_010 Estimate!!Total:!!Asian and Pacific Island languages:!!Limited English speaking household C16002_013 Estimate!!Total:!!Other languages:!!Limited English speaking household	Household
Transportation and Housing (NOTE: vehicle and group quarters not available at block group level)				
EP_MUNIT	B25024_007	((B25024_007+B25024_008+B25024_009)/E_TOTHU)*100	B25024_007 Estimate!!10 to 19 units B25024_008 Estimate!!Total:!!20 to 49 B25024_009 Estimate!!Total:!!50 or more	Percentage of housing units that are apartments with more than 10 units
EP_MOBILE	B25024_010	(B25024_010/E_TOTHU)*100	B25024_010 Estimate!!Total:!!Mobile home	Percentage of housing units that are mobile homes
EP_CROWD	DP04	EP_CROWD = (B25014_005+B25014_006+B25014_007+B25014_011+B25014_012+B25014_013)/(B25014_002+B25014_008)*100	B25014_005 Estimate!!Total!!Owner occupied!!1.01 to 1.50 occupants per room B25014_006 Estimate!!Total!!Owner occupied!!1.51 to 2.00 occupants per room	Percentage of occupied households with more people than bedrooms

			B25014_007 Estimate!!Total!!Owner occupied!!2.01 or more occupants per room B25014_011 Estimate!!Total!!Renter occupied!!1.01 to 1.50 occupants per room B25014_012 Estimate!!Total!!Renter occupied!!1.51 to 2.00 occupants per room B25014_013 Estimate!!Total!!Renter occupied!!2.01 or more occupants per room B25014_002 Estimate!!Total!!Owner occupied: B25014_008 Estimate!!Total!!Renter occupied:	
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The four individual SVI themes are calculated by summing the percent ranks of the indicators included in the themes (Table 1) and then taking a final percent ranking. The overall SVI score is computed by taking the percent rank of the sum of the percentiles of all four themes:

1. Socioeconomic - “RPL_THEME1”
2. Household composition & disability - “RPL_THEME2”
3. Minority and Language - “RPL_THEME3”
4. Housing type & transportation - “RPL_THEME4”

Table 4. Calculations used for SVI themes and overall SVI score at all levels of geography. Descriptions of the themes and SVI columns and calculations contained in the final data tables for block groups, tracts, and county subdivisions. Note that some indicators were not available at the block group level.

Variable Name	Calculations and Intermediary variables	Description
RPL_THEME1	SPL_THEME1 = percent_rank(EP_POVPOP)+	The socioeconomic theme (RPL_THEME1) is composed

	percent_rank(EP_UNEMPL)+ percent_rank(EP_NOHS)+ percent_rank(-E_PCI) RPL_THEME1 = percent_rank(SPL_THEME1)	of poverty, unemployment, high school diploma, and per capita income. NOTE: inverse ranking used for per capita income as it has the opposite relationship with social vulnerability
RPL_THEME2	SPL_THEME2 = percent_rank(EP_AGE65)+ percent_rank(EP_AGE17)+ percent_rank(EP_DISABL)+ percent_rank(EP_SNGPNT) RPL_THEME2 = percent_rank(SPL_THEME2)	The household composition and disability theme (RPL_THEME2) is composed of age 65 and over, age 17 and under, disability, and single parent households. NOTE: at the block group level disability was not available and not included in theme or SVI calculations.
RPL_THEME3	SPL_THEME3 = percent_rank(EP_MNRTY)+ percent_rank(EP_LIMENG) RPL_THEME3 = percent_rank(SPL_THEME3)	The minority and language theme (RPL_THEME3) is composed of minority and limited English language.
RPL_THEME4	SPL_THEME4 = percent_rank(EP_MUNIT)+ percent_rank(EP_MOBILE)+ percent_rank(EP_CROWD)+ percent_rank(EP_GRPQ)+ percent_rank(EP_NOVH) RPL_THEME4 = percent_rank(SPL_THEME4)	The housing type & transportation theme (RPL_THEME4) is composed of multi-unit structures, mobile home, crowding, no vehicle, and group quarters indicators. NOTE: at the block group level group quarters and households with no vehicle were not available and not included in calculations.
SVI	SVI = percent_rank (SPL_THEME1+SPL_THEME2+SPL_THEME3+SPL_THEME4)	The overall SVI score is computed by taking the percent rank of the sum of the percentiles of all of the individual indicators. This is the same as summing the four themes, done here.

2.4 Data Reliability

The Coefficient of Variation (CV) was calculated to assess reliability of data at the various levels of geography. CV measures the relative amount of sampling error associated with a sample estimate and allows you to compare reliability across estimates. The CV is the ratio of the standard error for an estimate to the estimate itself and is expressed as a percentage. A small CV indicates a high level of reliability, or that a data user can be more confident that the estimate is close to the true population value. There are no hard and fast rules for acceptable CV's. This dataset uses thresholds recommended by an [ESRI whitepaper on the American Community Survey \(Table 6.\)](#) (McKay, 2018)

The following formulas from the [ACS user handbook](#) (Dillingham et al., 2020) were used to calculate the margin of error and coefficient of variation needed to calculate CV and assess reliability of data at the three levels of geography. Data users looking to recreate or explore this data may find this ACS document with [worked examples](#) useful (Worked Examples for Approximating Standard Errors Using American Community Survey Data, 2019).

1. Margin of Error (MOE) for Derived *Estimates* (Dillingham et al., 2020, pg 60):

$$\text{MOE}(\hat{X}_1 + \hat{X}_2 + \dots + \hat{X}_n) = \pm \sqrt{[\text{MOE}(\hat{X}_1)]^2 + [\text{MOE}(\hat{X}_2)]^2 + \dots + [\text{MOE}(\hat{X}_n)]^2}$$

NOTE: "Users should note that this method for calculating the MOE and SE for aggregated count data is an approximation, and caution is warranted because this method does not consider the correlation or covariance between the component estimates." Dillingham et al., 2020, pg 60). All indicators that were derived from base tables (those indicators noted with an "*" in Table 1) have less precise MOEs because of this.

2. Margin of Error (MOE) for Derived *Percentage* (Dillingham et al., 2020, pg. 64):

If we define the proportion as $\hat{P} = \hat{X}/\hat{Y}$, then the MOE of this proportion is approximated as:

$$\text{MOE}(\hat{P}) = \frac{1}{\hat{Y}} \sqrt{[\text{MOE}(\hat{X})]^2 - (\hat{P}^2 * [\text{MOE}(\hat{Y})]^2)}$$

NOTE: This formula was multiplied 100 as we used a percentage not a proportion. Again, the ACS handbook warns "the MOEs in the published collapsed tables will be more accurate than those users can approximate using this formula." (Dillingham et al., 2020, p. 61). This formula was only used when the published collapsed tables were not available for an indicator (those indicators noted with an "*" in Table 1).

3. Standard Error (SE) and Coefficient of Variation (CV) (Dillingham et al., 2020, pg 64):

$$\text{SE} = \frac{\text{MOE}}{1.645}$$

$$\text{CV} = \frac{\text{SE}}{\text{Estimate}} * 100$$

Table 5. Calculations for Reliability. Descriptions of the data reliability columns contained in the final data tables for block groups, tracts, and county subdivisions. Total indicators were 15 for the county subdivision and tract levels, and 12 at the block group level. This dataset uses thresholds recommended by an [ESRI whitepaper on the American Community Survey \(Table 6.\)](#) (McKay, 2018)from (McKay, 2018)

Variable Name	Descriptions	Calculation
PCT_L_RLBTY	The percentage of total indicators used to calculate overall SVI that are low reliability. Low Reliability: CV >40% - sampling error is large relative to the estimate and the estimate is considered very unreliable	$PCT_L_RLBTY = (\text{total indicators with } CV > 40 / \text{total indicators}) * 100$
PCT_M_RLBTY	The percentage of total indicators used to calculate SVI that are medium reliability. Medium Reliability: 12% - 40% - use with caution	$PCT_M_RLBTY = (\text{total indicators with } CV \geq 12 \text{ \& } \leq 40 / \text{total indicators}) * 100$
PCT_H_RLBTY	The percentage of total indicators used to calculate SVI that are high reliability High Reliability: CV < 12% - Small CVs indicate that the sampling error is small relative to the estimate and the estimate is reasonably reliable	$PCT_H_RLBTY = (\text{total indicators with } CV \geq 0 \text{ \& } < 12 / \text{total indicators}) * 100$
PCT_NA_RLBTY	The percentage of total indicators used to calculate SVI that could not be calculated. NA Reliability: Some estimates do not indicate reliability. In these cases, either the estimate or MOE is missing, the estimate is zero, or a CV value could not be calculated because the calculation involved taking the square root of a negative number.	$PCT_NA_RLBTY = (\text{total indicators with } CV = "NA" / \text{total indicators}) * 100$

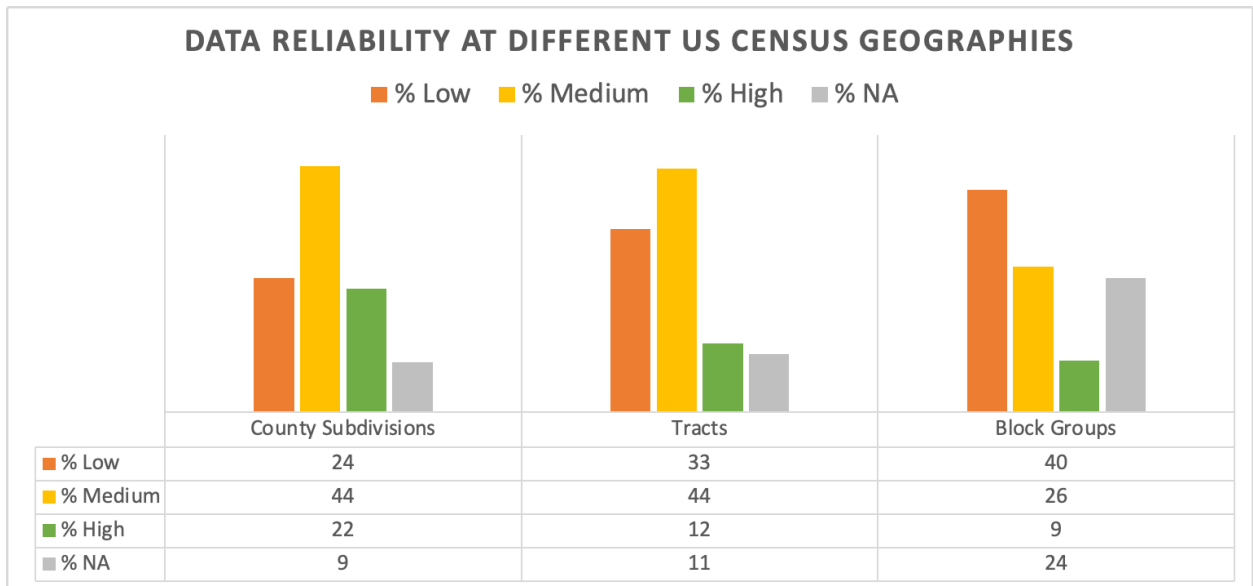


Figure 1. Percentage of indicators used to calculate SVI that are low, medium, high reliability at block group, tract, and county subdivision levels of geography. Low Reliability: CV >40% - sampling error is large relative to the estimate and the estimate is considered very unreliable, Medium Reliability: 12% - 40% - use with caution, High Reliability: CV < 12% - small CVs indicate that the sampling error is small relative to the estimate and the estimate is reasonably reliable. (McKay, 2018)

3. Summary Statistics

Table 7. Summary statistics for Oregon SVI indicators by US Census block groups

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
E_TOTPOP	2,970	1,406.2	636.6	-	944.0	1,781.0	5,132.0
E_TOTHH	2,970	553.1	230.5	-	383.2	691.0	1,669.0
E_TOTHU	2,970	602.3	255.5	-	424.0	748.8	4,506.0
EP_POVPOP	2,955	12.8	11.6	-	4.6	17.3	81.5
EP_UNEMPL	2,955	5.6	5.9	-	1.5	8.0	95.7
EP_PCI	2,954	\$ 35,722	\$ 15,934	\$ 6,004	\$ 25,032	\$ 42,664	\$ 155,748
EP_NOHS	2,956	7.2	8.1	-	1.6	10.1	71.3
EP_AGE65	2,956	18.4	11.5	-	10.2	24.2	100.0
EP_17AGE	2,956	19.5	8.8	-	13.9	25.2	56.3
EP_SNGPNT	2,955	7.6	7.8	-	1.8	11.3	55.2
EP_MNRTY	2,956	23.4	16.9	-	10.8	32.2	97.4
EP_LIMENG	2,955	2.3	5.2	-	-	2.5	61.9
EP_MUNIT	2,955	11.2	18.9	-	-	14.9	100.0
EP_MOBILE	2,955	8.0	12.8	-	-	12.4	100.0
EP_CROWD	2,955	3.2	5.2	-	-	4.5	60.8

Table 8. Summary statistics for Oregon SVI indicators by US Census tracts

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
E_TOTPOP	1,001	4,172.2	1,592.9	-	3,046.0	5,251.0	9,296.0
E_TOTHH	1,001	1,640.9	576.5	-	1,245.0	2,031.0	3,369.0
E_TOTHU	1,001	1,787.1	608.2	-	1,367.0	2,203.0	4,506.0
EP_AGE65	992	18.5	8.7	0.6	12.4	23.2	84.4
EP_NOHS	992	8.7	6.6	-	4.1	11.5	56.4
EP_POVPOP	992	12.7	9.0	-	6.6	16.4	70.2
EP_DISABL	992	20.0	6.4	-	16.5	23.9	41.1
EP_UNEMPL	992	5.5	3.6	-	3.1	7.2	27.8
EP_MOBILE	992	8.0	9.9	-	-	13.3	49.3
EP_NOVH	992	7.1	8.2	-	2.0	9.5	83.8
EP_PCI	992	\$ 35,823	\$ 13,913	\$ 8,718	\$ 26,284	\$ 42,463	\$ 127,994
EP_AGE17	992	20.0	6.4	-	16.5	23.9	41.1
EP_SNGPNT	992	7.6	5.0	-	3.9	10.4	40.0
EP_MNRTY	992	23.9	14.0	1.7	13.3	31.0	95.3
EP_LIMENG	992	2.3	3.5	-	-	3.2	25.8
EP_MUNIT	992	12.1	17.0	-	0.8	16.1	99.5
EP_CROWD	992	4.2	5.6	-	-	5.8	48.1
EP_GRPQ	992	2.2	6.9	-	0.1	1.6	90.6

Table 9. Summary statistics for Oregon SVI indicators by US Census County Subdivisions

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
E_TOTPOP	212	19,699.7	58,299.2	106.0	2,114.8	12,557.5	512,484.0
E_TOTHH	212	7,748.0	23,004.7	34.0	849.0	4,752.5	207,625.0
E_TOTHU	212	8,438.0	24,070.5	115.0	994.0	5,653.2	217,699.0
EP_AGE65	212	23.6	7.8	8.2	18.0	28.7	48.7
EP_NOHS	212	10.2	5.7	-	6.5	12.0	35.4
EP_POVPOP	212	13.0	7.0	0.7	8.3	16.5	65.4
EP_DISABL	212	19.8	5.8	-	16.3	23.1	38.7
EP_UNEMPL	212	5.7	3.4	-	3.6	7.3	20.7
EP_MOBILE	212	16.6	9.3	-	9.8	22.9	44.2
EP_NOVH	212	4.1	3.6	-	1.5	6.0	21.7
EP_PCI	212	\$ 30,698	\$ 7,436	\$ 6,865	\$ 26,266	\$ 34,622	\$ 64,211
EP_AGE17	212	19.8	5.8	-	16.3	23.1	38.7
EP_SNGPNT	212	6.4	3.8	-	3.6	8.6	22.3
EP_MNRTY	212	18.1	14.3	-	9.7	20.8	95.3
EP_LIMENG	212	1.1	1.9	-	-	1.5	10.0
EP_MUNIT	212	3.4	5.5	-	-	4.9	49.8
EP_CROWD	212	4.4	6.2	-	1.4	5.5	66.7
EP_GRPQ	212	2.6	8.7	-	0.1	1.9	87.3

4. R Code:

The following version of R was used for all code:

R version 4.1.2 (2021-11-01) -- "Bird Hippie"

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Platform: x86_64-apple-darwin17.0 (64-bit)

To open and run the R code will require installation of R or R studio:

<https://www.rstudio.com/products/rstudio/download/> and an API key to the Census website:

http://api.census.gov/data/key_signup.html.

Follow the instructions in the code to install the necessary R packages and run the script. Running the code will produce and save the csv files in this dataset with the columns described in Tables 2-5 of this document.

Running the R code will also produce a datatable in R called "svi" with estimates, percentages, margins of error, and coefficient of variation for all 15 indicators with the following prefixes for data users interested in doing their own analysis in R:

- Estimates start with "E_"
- Margins of Error for estimates start with "M_"
- Estimate Percentages start with "EP_"
- Margins of Error for percentages start with "MP_"
- Coefficient of Variation starts with "CV_"

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