U.S. Census Bureau: Community Resilience Estimates

Baltimore Metropolitan Council

R. Chase Sawyer

Social, Economic, and Housing Statistics Division
United States Census Bureau

United States® Census Bureau

What is Resilience?

- Community resilience is a measure of the capacity of individuals and households within a community to cope with the external stresses of the impacts of a disaster.

- Research shows that resilience can be predicted by individual and household characteristics.

United States® Census Bureau

Why should Census measure resilience?

- Other measures of population resilience / risk / vulnerability use publicly available Decennial Census and / or American Community Survey data.
  - Currently available measures do not conduct analysis on granular data and can lack precision.

- Using ACS restricted microdata retains correlation of individual risks.
  - Ideal for identifying most vulnerable populations to ensure equitable distribution.
  - Unavailable to the public.

United States® Census Bureau

The Census Bureau and COVID-19

- COVID-19 pandemic reiterated the need for timely, precise, and customizable information about the population.
- Many groups reached out to the Census Bureau for data.
- Overwhelming need for a single, easy to understand metric.

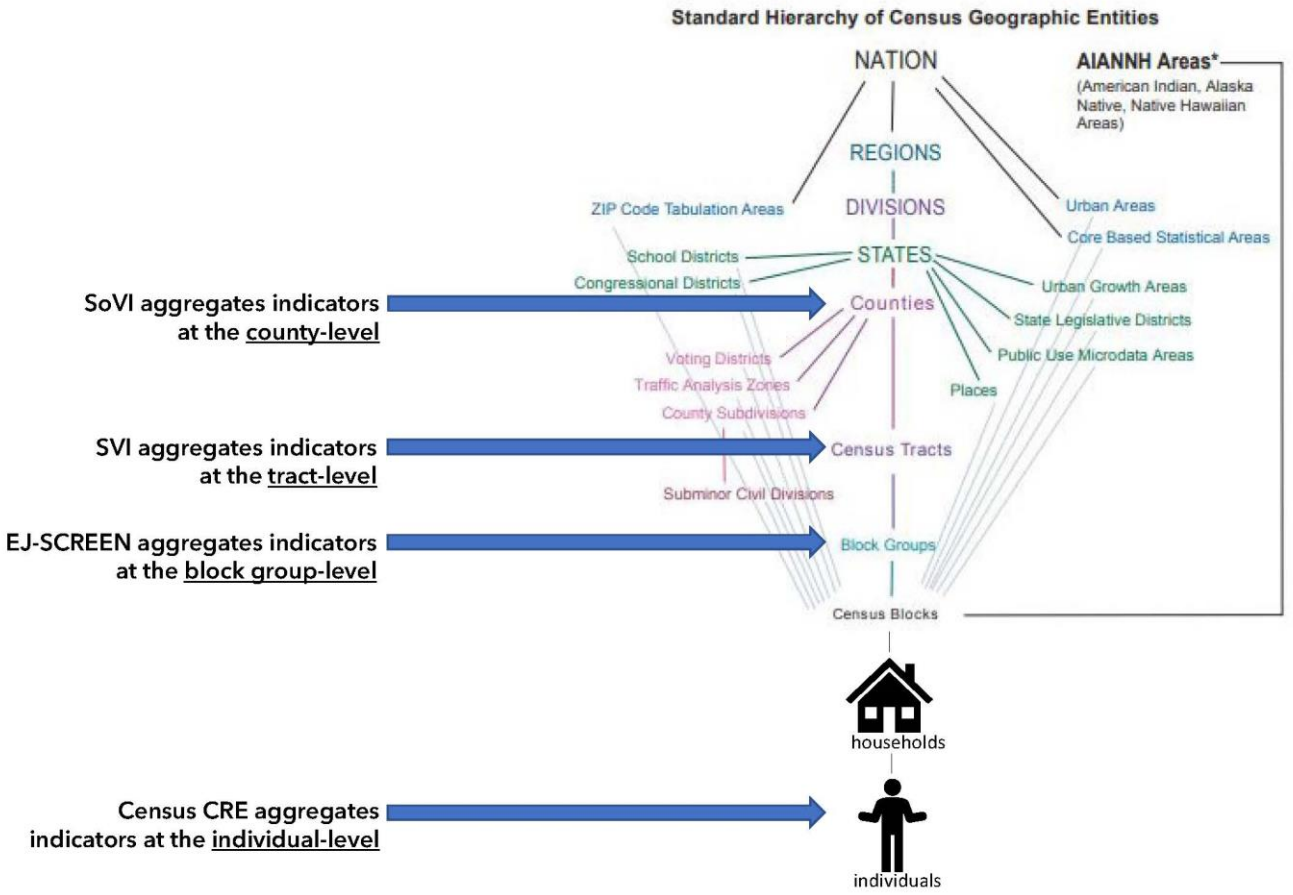
United States® Census Bureau

The Need for the Community Resilience Estimates (CRE)

- The purpose of the CRE is create data products from the vast quantities of Census Bureau data that are:
  - Relevant
  - Precise
  - Timely
  - Granular

United States® Census Bureau

Granular Estimates



United States® Census Bureau

What is the 2019 CRE?

- The CRE are modeled estimates of social vulnerability in the population.

- Uses data from the:
  - American Community Survey
  - Population Estimates

United States® Census Bureau

Individual Risk Flags

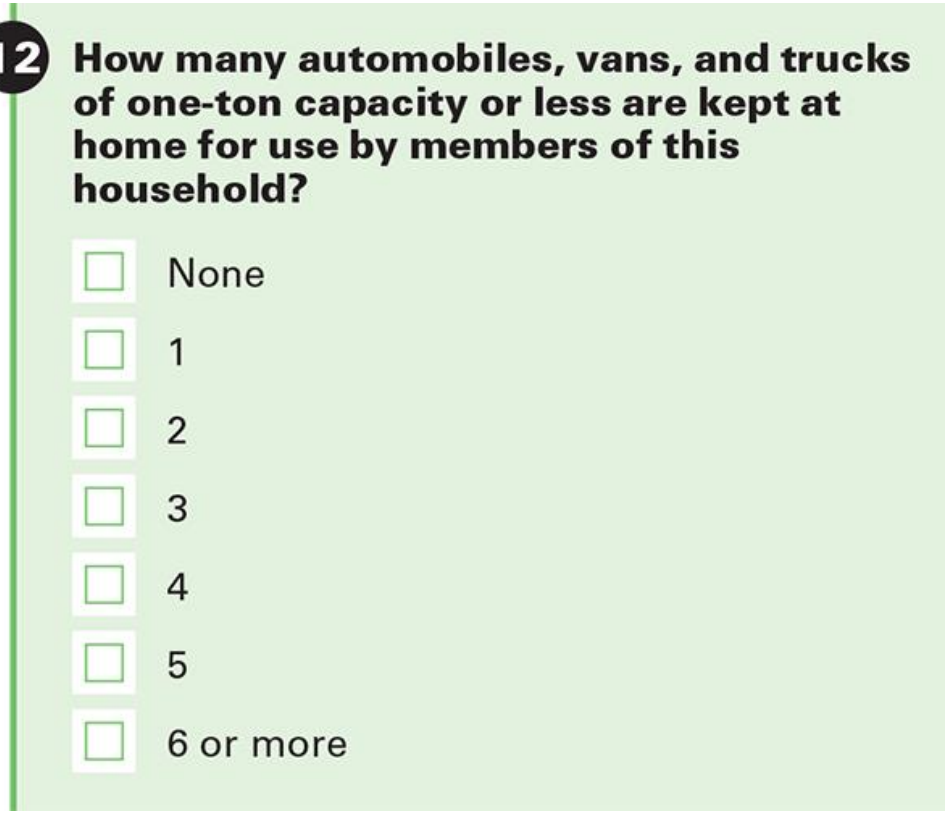
Risk Flags:

- Income-to-Poverty Ratio more than 130 percent
- Single or zero caregiver household
- Unit-level crowding with >= 0.75 persons per room
- Communication Barrier defined as:
  - No one in the household has received a high school diploma
  - No one in the household speaks English “very well”
- Aged 65 years or older
- No one in the household is employed full-time, year-round
- Disability
- No health insurance coverage
- No vehicle access
- Households without broadband internet access

United States® Census Bureau

Without Vehicle Access Example

- CRE starts its analysis by looking at the individual and household responses to determine if an individual is at risk.
- If risk factor is found, the flag is marked and tabulated.
- Small area modeling techniques are applied to create estimates.

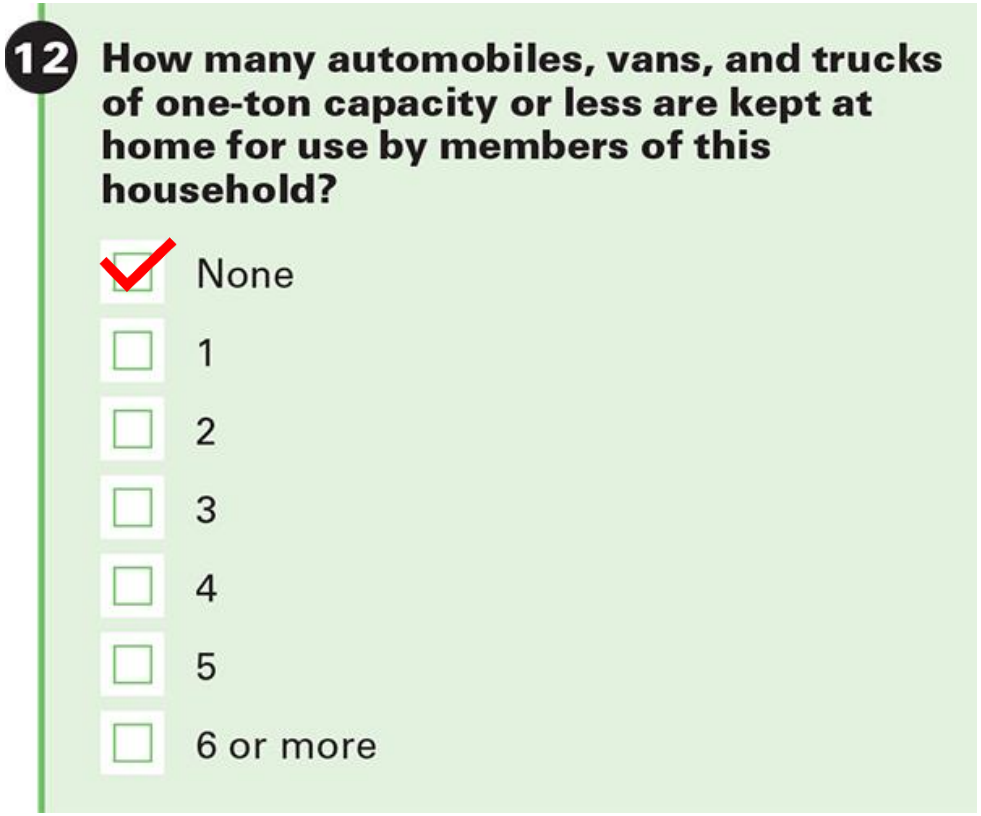


12 **How many automobiles, vans, and trucks of one-ton capacity or less are kept at home for use by members of this household?**

- ☐ None
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6 or more

United States® Census Bureau

Without Vehicle Access Example



- Review response to vehicle question on ACS.
- If household does not have a vehicle available, a risk factor flag is applied to all individuals in the household.
- If household has at least one vehicle, the household is not flagged.

United States® Census Bureau

Community Resilience Estimates

- The result is an estimate of the number of individuals and the number of risk factors they are living with, categorized into three groups:
  - Zero flagged risk factors.
  - One to two flagged risk factors.
  - Three or more risk factors.
    - The most “at-risk”.

United States® Census Bureau

Output Differences

CRE

- Number of people
- Percentage of population
- Margin of error

Other measures of social vulnerability

- Indexed values
  - ACS estimates used to create those values

United States® Census Bureau

National 2019 CRE Estimates

0 Risk Factors	1-2 Risk Factors	3+ Risk Factors
111,716,399 *(+/-1,961,236)*	141,759,292 *(+/-2,157,338)*	69,731,558 *(+/-1,800,578)*
34.6% *(+/-0.6%)*	43.9% *(+/-0.7%)*	21.6% *(+/-0.6%)*

United States® Census Bureau

CRE Releases

- June 2020 (Experimental Data)
  - Released experimental data product using 2018 ACS data.
- August 2021
  - Released iteration using 2019 ACS data.
- September 2021
  - Released Equity Supplement using 2019 CRE Data, 2015-2019 ACS data, and Census Planning Database data.

United States® Census Bureau

CRE for Equity

- Dataset of Estimates from Multiple Programs

- Provide context for:
  - CRE Estimates/Social Vulnerability
  - Discussions About Equity

United States® Census Bureau

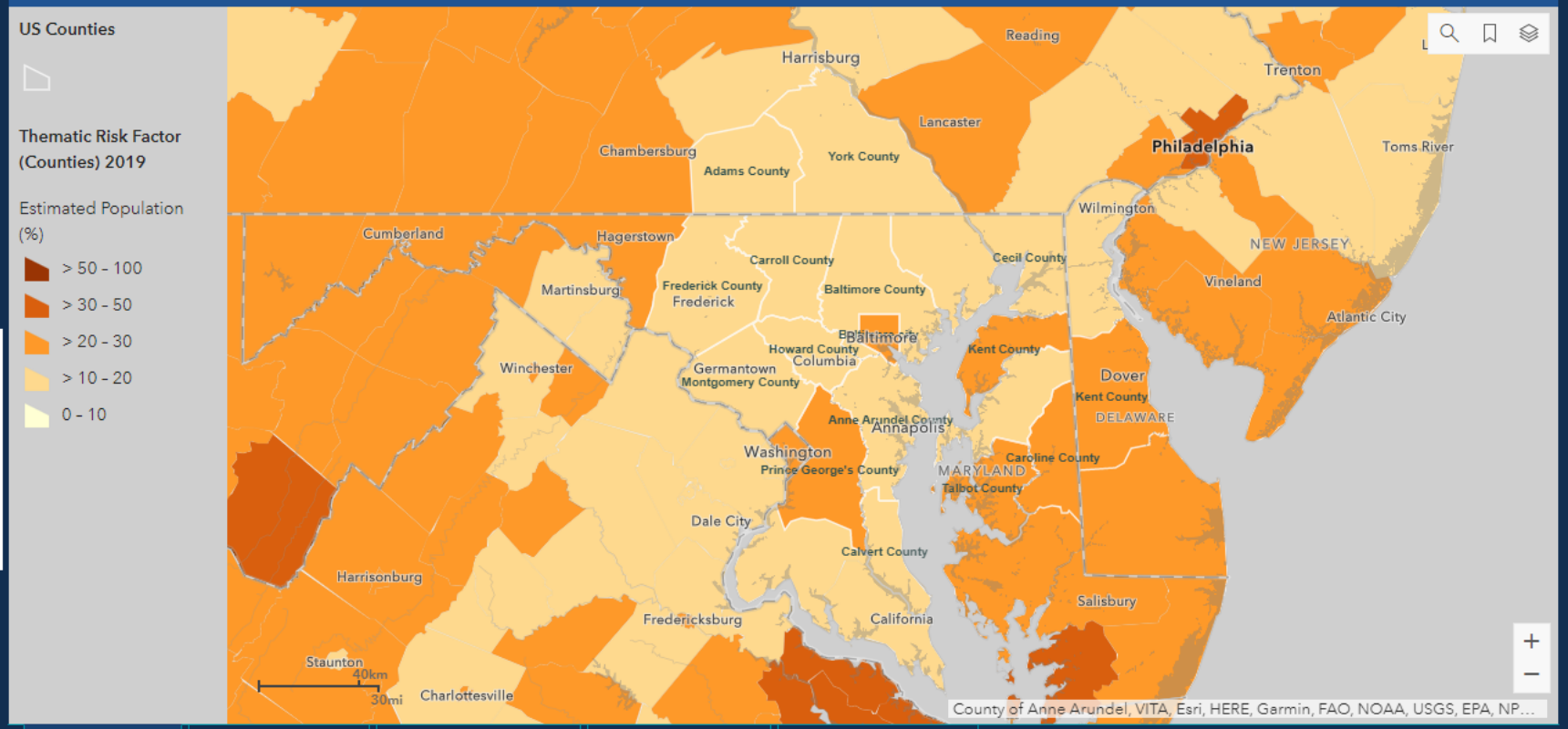
Ways to Access the Data

- CRE for Equity Dashboard
- CSV file download
- Shapefiles
- Reach out to our staff

United States® Census Bureau

Thematic Risk Factor (RF) based on the risk factor selected above

Use Layer List below to turn on and off supplemental layers



Thematic Risk map | Predominant Risk map | Thematic Risk w/Pop map | Flag Variable Risk map | COVID-19 Impact Report

Community Resilience Estimates

40.8%
Est. Pop with 0 Risk Factors

40.7%
Est. Pop with 1-2 Risk Factors

18.6%
Est. Pop with 3+ Risk Factors

Showing Statistics for: **Maryland** for 7 County(s): Anne Arundel County, Maryland

Population

Households Below the Poverty Level
9.9%
103,674 Total

Households Without Vehicle
10.8%
113,338 Total

Households w/Pop 65+ Living Alone
11.2%
117,859 Total

Households with Disability
23.6%
248,300 Total

Female Householder no spouse*
5.8%
60,744 Total

Households with Broadband Internet
85.6%
898,550 Total

Male Householder no spouse*
1.2%
12,743 Total

*Householder, no spouse present, with own children of the householder under 18 years

Key Facts | Race & Ethnicity | Health Insurance | Age & Sex | Language

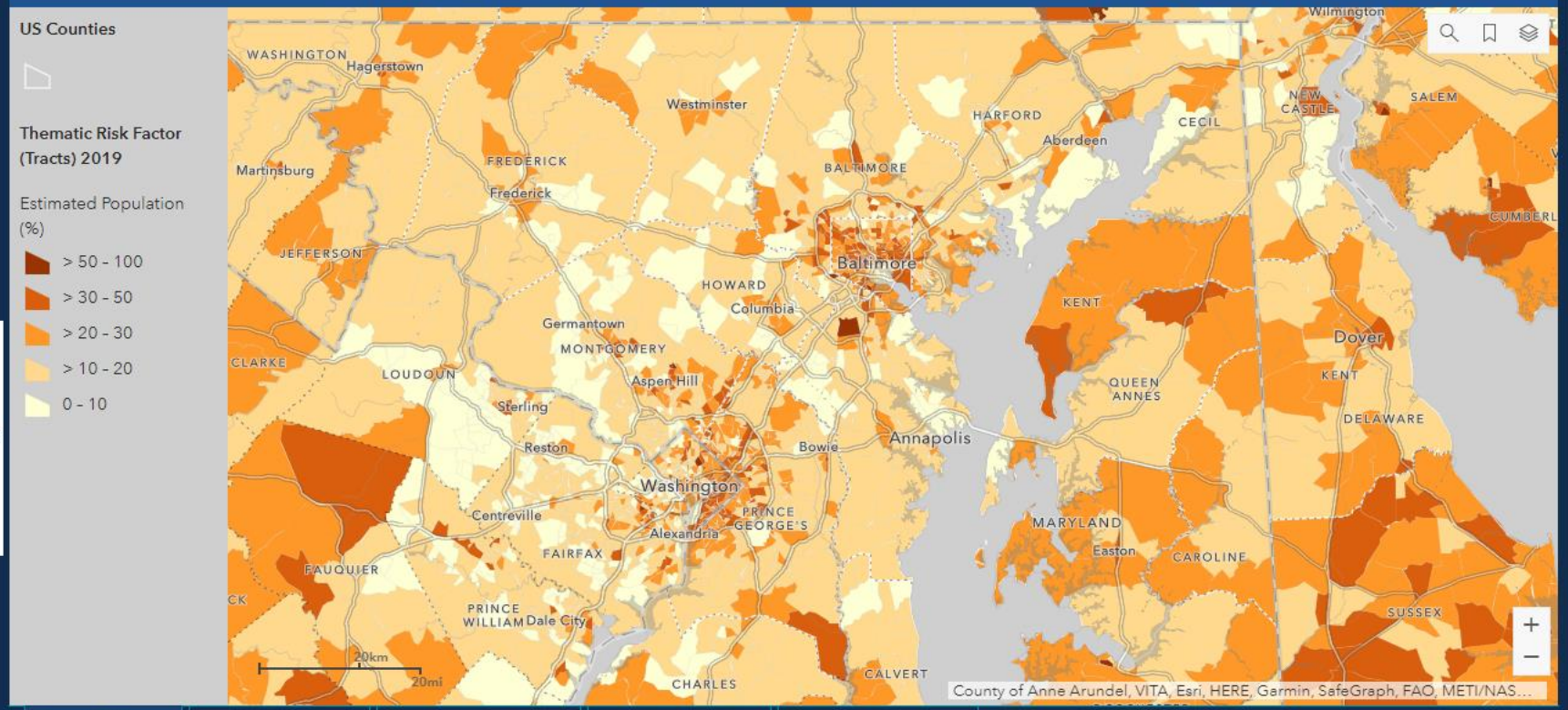
United States® Census Bureau

2019 Community Resilience Estimates for Equity and Disasters

Select State: Maryland | Select County: Filter options | Select Risk Factor: 0RF | 1-2RF | 3PLRF

Thematic Risk Factor (RF) based on the risk factor selected above

Use Layer List below to turn on and off supplemental layers



Thematic Risk map | Predominant Risk map | Thematic Risk w/Pop map | Flag Variable Risk map | COVID-19 Impact Report

Community Resilience Estimates

40.8%
Est. Pop with 0 Risk Factors

40.7%
Est. Pop with 1-2 Risk Factors

18.6%
Est. Pop with 3+ Risk Factors

Showing Statistics for: **Maryland** for 7 County(s): Anne Arundel County, Maryland

Population

Households Below the Poverty Level
9.9%
103,674 Total

Households Without Vehicle
10.8%
113,338 Total

Households w/Pop 65+ Living Alone
11.2%
117,859 Total

Households with Disability
23.6%
248,300 Total

Female Householder no spouse*
5.8%
60,744 Total

Households with Broadband Internet
85.6%
898,550 Total

Male Householder no spouse*
1.2%
12,743 Total

*Householder, no spouse present, with own children of the householder under 18 years

Key Facts | Race & Ethnicity | Health Insurance | Age & Sex | Language

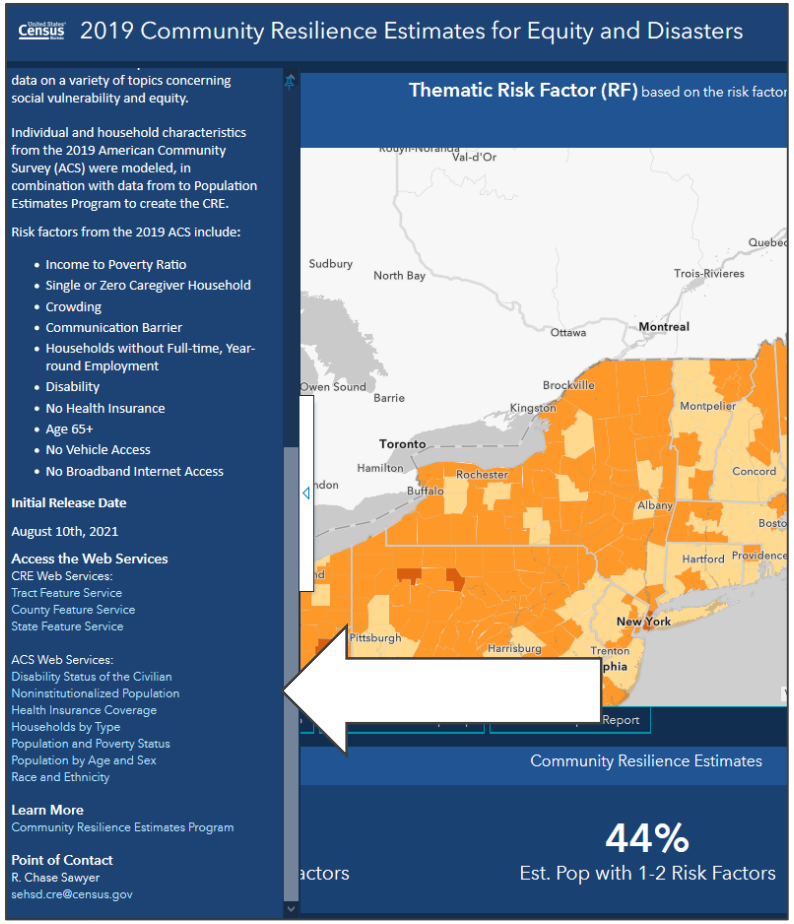
United States® Census Bureau

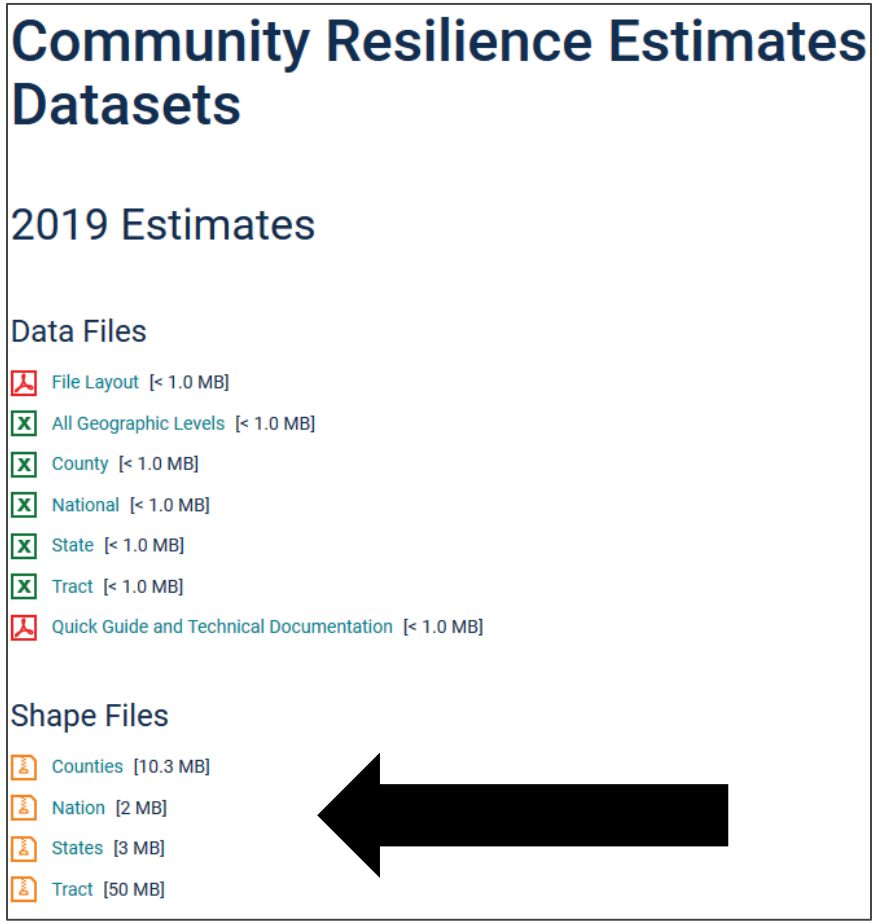
CSV File Download

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	geoid	state	county	tract	stname	stabrev	ctname	geo_level	popuni	prednum_	prednum_	predrt_0	predrt_0_	prednum_	prednum_	predrt_12	predrt_12	prednum_	prednum_	predrt_3	predrt_3_moe	
2	1	1			Alabama	AL		State	4807130	1328762	65290.87	27.64	1.36	2192123	75799.27	45.6	1.58	1286245	66020.89	26.76	1.37	
3	1001	1	1		Alabama	AL	Autauga C	County	55420	17545	4022.9	31.66	7.26	24796	4320.5	44.74	7.8	13079	3606.6	23.6	6.51	
4	1E+09	1	1	20100	Alabama	AL	Autauga C	Tract	1921	495	170.7	25.77	8.89	902	188.6	46.95	9.82	524	163	27.28	8.49	
5	1E+09	1	1	20200	Alabama	AL	Autauga C	Tract	2130	779	213.4	36.57	10.02	899	231.8	42.21	10.88	452	195.2	21.22	9.16	
6	1E+09	1	1	20300	Alabama	AL	Autauga C	Tract	3467	1237	328.9	35.68	9.49	1454	343.8	41.94	9.92	776	280.4	22.38	8.09	
7	1E+09	1	1	20400	Alabama	AL	Autauga C	Tract	4522	1632	407.8	36.09	9.02	1642	428.9	36.31	9.48	1248	374.9	27.6	8.29	
8	1E+09	1	1	20500	Alabama	AL	Autauga C	Tract	10844	4023	1021	37.1	9.42	4722	1053	43.54	9.71	2099	822.1	19.36	7.58	
9	1E+09	1	1	20600	Alabama	AL	Autauga C	Tract	3763	1061	334.2	28.2	8.88	1647	375.6	43.77	9.98	1055	329.7	28.04	8.76	
10	1E+09	1	1	20700	Alabama	AL	Autauga C	Tract	2953	702	281.2	23.77	9.52	1442	293	48.83	9.92	809	235.3	27.4	7.97	
11	1E+09	1	1	20801	Alabama	AL	Autauga C	Tract	3083	887	305.5	28.77	9.91	1318	335.3	42.75	10.88	878	288.3	28.48	9.35	
12	1E+09	1	1	20802	Alabama	AL	Autauga C	Tract	10461	3335	953.9	31.88	9.12	5044	1047	48.22	10.01	2082	892.6	19.9	8.53	
13	1E+09	1	1	20900	Alabama	AL	Autauga C	Tract	5697	1688	501.4	29.63	8.8	2871	550.9	50.39	9.67	1138	473.9	19.98	8.32	
14	1E+09	1	1	21000	Alabama	AL	Autauga C	Tract	2960	787	269.3	26.59	9.1	1386	301.2	46.82	10.18	787	265.5	26.59	8.97	
15	1E+09	1	1	21100	Alabama	AL	Autauga C	Tract	3619	919	295.1	25.39	8.15	1469	355	40.59	9.81	1231	332.1	34.01	9.18	
16	1003	1	3		Alabama	AL	Baldwin C	County	216666	64652	12923.3	29.84	5.96	98449	14098.3	45.44	6.51	53565	12300.2	24.72	5.68	
17	1E+09	1	3	10100	Alabama	AL	Baldwin C	Tract	4479	1146	398.8	25.59	8.9	2042	451.3	45.59	10.08	1291	409.2	28.82	9.14	
18	1E+09	1	3	10200	Alabama	AL	Baldwin C	Tract	3433	1214	335.1	35.36	9.76	1424	369.4	41.48	10.76	795	321.1	23.16	9.35	
19	1E+09	1	3	10300	Alabama	AL	Baldwin C	Tract	8772	3041	736.2	34.67	8.39	4046	822	46.12	9.37	1685	734.7	19.21	8.38	
20	1E+09	1	3	10400	Alabama	AL	Baldwin C	Tract	5593	1577	490.2	28.2	8.76	2899	535.8	51.83	9.58	1117	461.3	19.97	8.25	
21	1E+09	1	3	10500	Alabama	AL	Baldwin C	Tract	5205	1226	441.7	23.55	8.49	2566	500.4	49.3	9.61	1413	460.7	27.15	8.85	
22	1E+09	1	3	10600	Alabama	AL	Baldwin C	Tract	3836	801	339.1	20.88	8.84	2027	397.5	52.84	10.36	1008	354.8	26.28	9.25	
23	1E+09	1	3	10701	Alabama	AL	Baldwin C	Tract	9446	3117	791.5	33	8.38	4601	820	48.71	8.68	1728	677.7	18.29	7.17	
24	1E+09	1	3	10703	Alabama	AL	Baldwin C	Tract	15518	5678	1275	36.59	8.22	7735	1300	49.85	8.38	2105	973.5	13.56	6.27	
25	1E+09	1	3	10704	Alabama	AL	Baldwin C	Tract	6022	2137	568.1	35.49	9.43	2879	584.8	47.81	9.71	1006	460.6	16.71	7.65	
26	1E+09	1	3	10705	Alabama	AL	Baldwin C	Tract	9918	3943	839	39.76	8.46	3782	868	38.13	8.75	2193	692.1	22.11	6.98	
27	1E+09	1	3	10800	Alabama	AL	Baldwin C	Tract	8158	2572	711.8	31.53	8.73	3929	756.9	48.16	9.28	1657	663.4	20.31	8.13	
28	1E+09	1	3	10903	Alabama	AL	Baldwin C	Tract	5495	1574	427.4	28.64	7.78	2626	472	47.79	8.59	1295	408.6	23.57	7.44	
29	1E+09	1	3	10904	Alabama	AL	Baldwin C	Tract	8103	2189	702	27.01	8.66	3782	770.2	46.67	9.51	2132	671.3	26.31	8.28	
30	1E+09	1	3	10905	Alabama	AL	Baldwin C	Tract	9452	3412	783.1	36.1	8.29	3938	861.4	41.66	9.11	2102	741.5	22.24	7.84	
31	1E+09	1	3	10906	Alabama	AL	Baldwin C	Tract	5070	1525	412.1	30.08	8.13	2157	456.3	42.54	9	1388	406.1	27.38	8.01	
32	1E+09	1	3	11000	Alabama	AL	Baldwin C	Tract	5144	1194	410.7	23.21	7.98	2373	461.4	46.13	8.97	1577	415	30.66	8.07	
33	1E+09	1	3	11101	Alabama	AL	Baldwin C	Tract	10120	3129	830.2	30.92	8.2	3763	870.9	37.18	8.61	3228	751.1	31.9	7.42	
34	1E+09	1	3	11102	Alabama	AL	Baldwin C	Tract	4400	1574	370.9	35.77	8.43	2025	407.4	46.02	9.26	801	353.9	18.2	8.04	
35	1E+09	1	3	11201	Alabama	AL	Baldwin C	Tract	5191	1684	451.8	32.44	8.7	2030	521.9	39.11	10.05	1477	500	28.45	9.63	
36	1E+09	1	3	11202	Alabama	AL	Baldwin C	Tract	6230	1708	540.3	27.42	8.67	2506	632.5	40.22	10.15	2016	600.6	32.36	9.64	

United States® Census Bureau

Shapefiles





United States® Census Bureau

Reach out to our staff

- Examples of Success Stories
  - FEMA Mobile Vaccination Units
  - Austin Public Health

United States® Census Bureau

Flexibility

- CRE output allows for flexibility in how data is analyzed and interpreted.

- Partners can work with the Census Bureau to adjust risk factors as needed.

United States® Census Bureau

Benefits of Using the CRE

- To identify most at-risk populations for the equitable distribution of resources, use the CRE.
  - The CRE is the timeliest, most statistically precise, and granular measure of vulnerability.
  - Small area methodologies are proven.
  - Open to discussions about data products that meet user needs.

United States® Census Bureau

Thank you!

R. Chase Sawyer

Survey Statistician / Team Lead – Community Resilience Estimates

Small Area Modeling and Development Branch

sehsd.cre@census.gov

United States® Census Bureau

Additional Information

Community Resilience Estimates Website

Community Resilience Estimates Technical Documentation

Community Resilience Estimates Datasets

CRE for Equity Webpage

CRE for Equity ESRI Dashboard

United States® Census Bureau