Virginia Department of Emergency Management

HAZARD RISK & VULNERABLE POPULATIONS

2021 HAZARD MITIGATION ASSISTANCE GRANTS EQUITY WORKSHOPS

The Deloitte Health360 Solution informs population vulnerability and enables a data-driven approach to operationalizing equity in mitigation projects. It is broken down into two components: Population Vulnerability and Hazard Risk. Both components are added together to identify potential priority areas to support future mitigation projects.

POPULATION VULNERABILITY

Provides a people-focused metric that can be combined with infrastructure, elevation, and financial metrics to support a holistic approach to mitigation planning.

HAZARD RISK

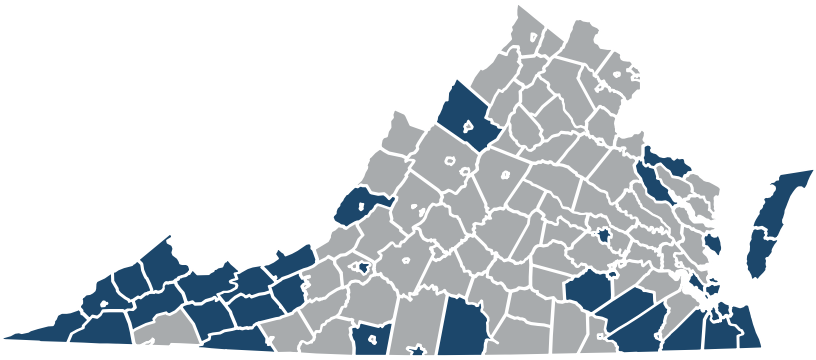
Reflects the number of households in each flood or hurricane zone weighted by risk severity to provide a people-focused risk metric.

PRIORITIZED CENSUS TRACTS

Combining population vulnerability and hazard risk at a sub-locality level can identify potential priority areas to support with future mitigation projects.

SERIES OBJECTIVES

1. Interpret data from the Deloitte Analysis and identify flooding risk in these areas.
2. Understand and explore potential solutions to hazard risk areas and vulnerable populations.
3. Educate stakeholders on funding programs such as FEMA hazard mitigation grants, CDBG grants, and the new CFP fund.
4. Discuss next steps, technical assistance needs, and training.



40 Localities Identified Scoring Over 70%

REGISTRATION https://odu.co1.qualtrics.com/jfe/form/SV_dd549WZWcIKVz3E

QUESTIONS? vdemgrants@vdem.virginia.gov

HAZARD RISK & POPULATION VULNERABILITY

Virginia Department of Emergency Management

SUBREGIONAL WORKSHOP

August 3, 2021 from 10am to 12pm

- Buchanan
- Dickenson
- Russell
- Tazewell

POPULATION VULNERABILITY

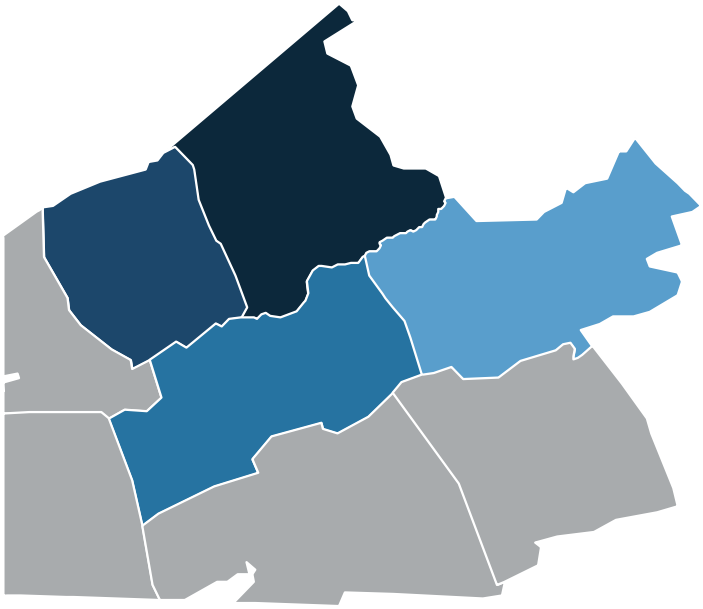
Provides a people-focused metric that can be combined with infrastructure, elevation, and financial metrics to support a holistic approach to mitigation planning.

HAZARD RISK

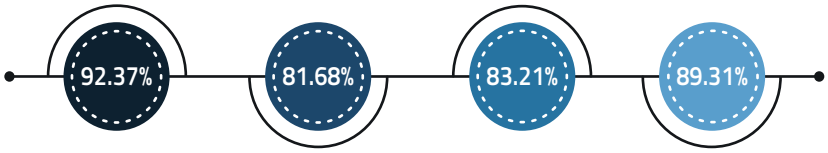
Reflects the number of house-holds in each flood or hurricane zone weighted by risk severity to provide a people-focused risk metric.

PRIORITIZED CENSUS TRACTS

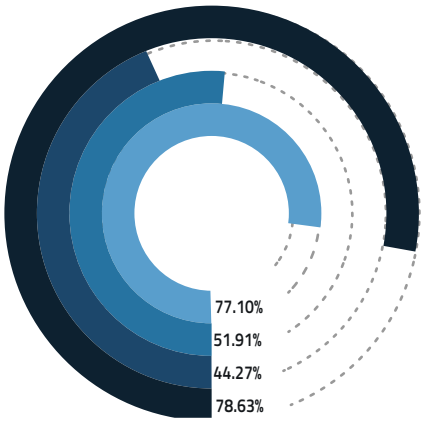
Combining population vulnerability and hazard risk at a sub-locality level can identify potential priority areas to support with future mitigation projects.



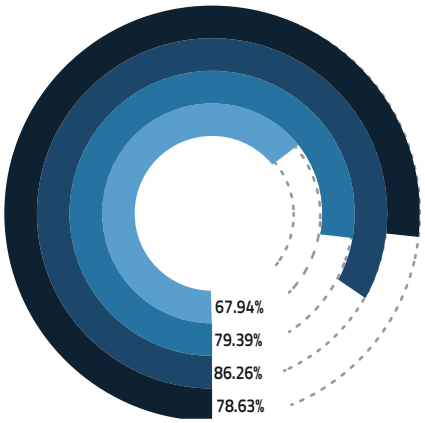
OVERALL PERCENTILE



HAZARD RISK PERCENTILE



POPULATION VULNERABILITY PECENTILE



FACILITATED BY The Virginia Modeling, Analysis, and Simulation Center

COVID-19 Unified Command/VEST Health Equity Working Group

MITIGATION PROJECTS ANALYSIS
TAZEWELL COUNTY

NOVEMBER 2020

Topics

The analysis provides **Tazewell County** with information to support planning and preparation of projects for the Building Resilient Infrastructure and Communities (BRIC) grant application with an equity focus.

- ❑ Introduction to Data-Driven Approach
- ❑ Hazard Risk
- ❑ Population Vulnerability
- ❑ Prioritization
- ❑ FEMA Funding and Past Projects
- ❑ Considerations for Next Steps

This analysis ***expands the scope of population vulnerability*** to provide a ***data-driven equity lens*** for disaster mitigation project design

Data-Driven Approach

The Health360 platform informs population vulnerability and enables a data-driven approach to operationalizing equity in mitigation projects.

Powered By Health360

230M+
U.S. Adults Scored

Data updated every
1 Month

Contains over
1,500+
variables on Social Determinants of Health and other metrics

150+
Advanced predictive algorithms

400+
Variables used in the mortality predictive algorithm

Provides 360° view of a person

Algorithms rebuilt every 2 years

40+
Clients served

What is hazard risk and how is it calculated?

Household Hazard risk reflects the number of households in each flood or hurricane zone, weighted by severity.

Hazard Risk

Number of households in each zone:

Flood zones
- 100 year coastal
- 100 year riverine flood way
- 100 year riverine
- 500 year riverine

Hurricane zones
- Segmented A, B, C, D

- Households that reside in the flood and hurricane zones are considered to be **at-risk for environmental disasters**
- Hazard Risk reflects **the number of households located in Flood and Hurricane Zones**
- Hazard Risk is not a measure of **infrastructure, elevation, or financial risks**, but is a measure of the number of at-risk households in an area, weighted by the severity of the risk, to **provide a people-focused risk metric**

Note: Severity of the risk per household is captured on an ordinal scale from 1 – least severe (Hurricane Zone D, 500 Year Riverine) to 4 – most severe (Hurricane Zone A, 100 Year Coastal)

Hazard Risk = (# of Households in Particular Hurricane or Flood Zones) X (Specified Zone Risk Level (1 through 4 depending on risk severity))

Hazard Risk in Your Locality

The figures below indicate how your locality's hazard risk[1] compares to others in Virginia as well as how many households reside in each flood or hurricane zone.

Hazard Risk[1] Percentile

77th

Your locality has more households in more severe flood/hurricane zones than 77% of other Virginia localities

Hazard Risk[1] Rank

31st

Your locality's Hazard Risk score is ranked 31st out of 132 Virginia localities

Households in Flood Zones & Locality Rank

← Severity			
100 Year Coastal	100 Year Riverine Floodway	100 Year Riverine	500 Year Riverine
0	101	834	270
N/A out of 132 Localities	13th out of 132 Localities	20th out of 132 Localities	26th out of 132 Localities

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk

Households in Hurricane Zones & Locality Rank

← Severity			
Zone A	Zone B	Zone C	Zone D
0	0	0	0
N/A out of 132 Localities	N/A out of 132 Localities	N/A out of 132 Localities	N/A out of 132 Localities

Evacuation zones designated as A through D are in place across coastal Virginia

1. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
2. Note that the total sum of households may be more than the households in your locality because some are located in both flood and hurricane zones

What is population vulnerability and how is it calculated?

The Population Vulnerability score provides a people-focused metric that can be combined with infrastructure, elevation, and financial metrics to support a holistic approach to mitigation planning.

Population Vulnerability

Prevalence of:

1. Communities of color
2. Elevated health risk
3. Low income
4. # of people in household
5. # of children in household
6. Unemployment risk
7. Age (older adults)
8. Lack of vehicle access

- Population Vulnerability **expands upon the 2018 Virginia Hazard Mitigation plan definition** of population vulnerability (density and percentage of total population)
- Population Vulnerability **only considers localities with households in flood or hurricane zones (132 localities)**
- Population Vulnerability **identifies the locality and census tracts/census blocks** with the most vulnerable individuals/households on average
- Population Vulnerability should be interpreted as a **household's ability to safely respond** to an environmental disaster

Population Vulnerability in Your Locality

The figures below indicate how your locality's population vulnerability[1] score and composite attributes compare to other localities in Virginia.

Population Vulnerability[1] Percentile

68th

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 68% of other Virginia localities

Population Vulnerability[1] Rank

43rd

Your locality's Population Vulnerability score is ranked 43rd out of 132 Virginia localities

How TAZEWELL COUNTY Compares to Other Localities Across the Eight Vulnerability Attributes

Low Income	Elevated Health Risk	Age	Communities of Color
85th percentile	**39th** percentile	**47th** percentile	**27th** percentile

# of Children in Household	# of People in Household	Unemployment Risk	Lack of Vehicle Access
56th percentile	**50th** percentile	**73rd** percentile	**82nd** percentile

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones

Using Population Vulnerability & Hazard Risk to Prioritize Census Tracts

Combining population vulnerability and hazard risk at a sub-locality level can identify potential priority areas to support with future mitigation projects.

Population Vulnerability

Prevalence of:

1. Communities of color
2. Elevated health risk
3. Low income
4. # of people in household
5. # of children in household
6. Unemployment risk
7. Age (older adults)
8. Lack of vehicle access

+

Hazard Risk

Number of households in each zone:

Flood zones

- 100 year coastal
- 100 year riverine floodway
- 100 year riverine
- 500 year riverine

Hurricane zones

- Segmented A, B, C, D

=

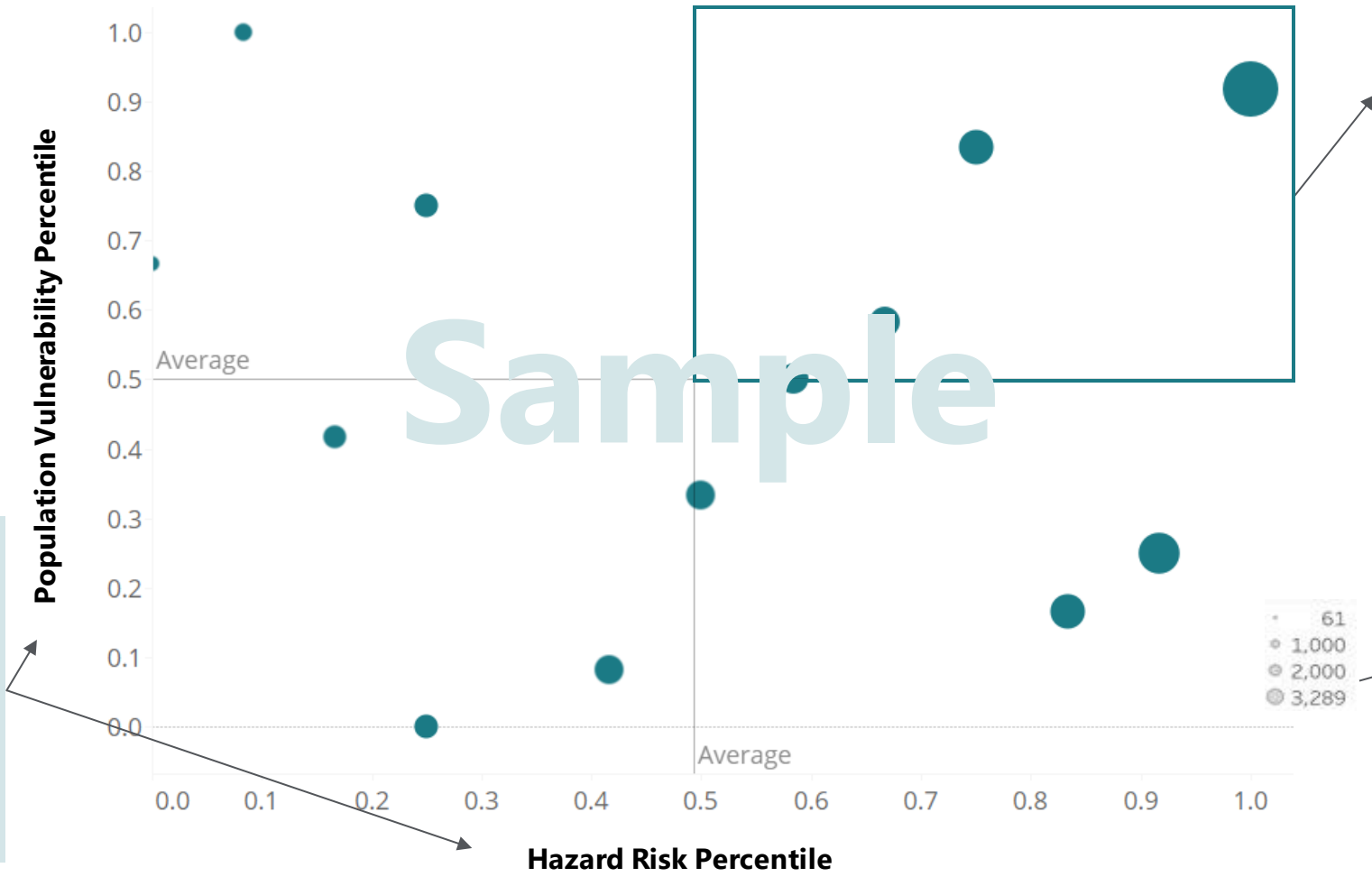
Prioritized Census Tracts

- High Population Vulnerability
- High Hazard Risk

Census tracts with both more households in severe flood/hurricane zones AND households with more vulnerable occupants

How to interpret the Census Tract plots

The chart below represents a *sample* locality and offers guidance on how to interpret the information when planning mitigation efforts.



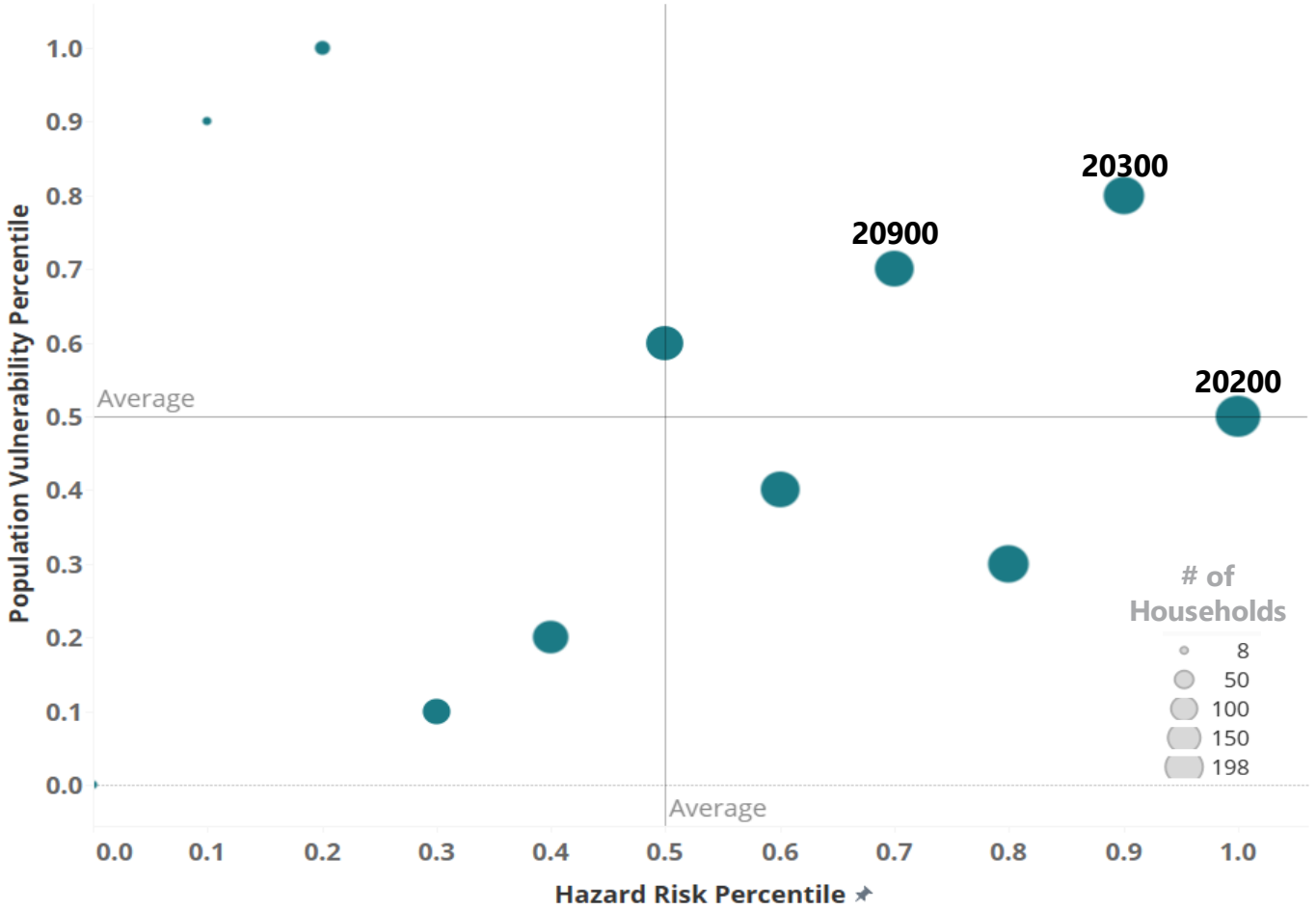
Circles in the upper right quadrant represent areas that you might consider prioritizing due to high population vulnerability and hazard risk

The x- and y-axes measure the percentiles of hazard risk and population vulnerability for each area

Size of the circle indicates the number of households in each area

Prioritizing Census Tracts in Tazewell County

Areas with the most vulnerable populations and households in severe flood and hurricane zones present prioritization opportunities for mitigation projects.



Priority Areas in Flood and Hurricane Zones

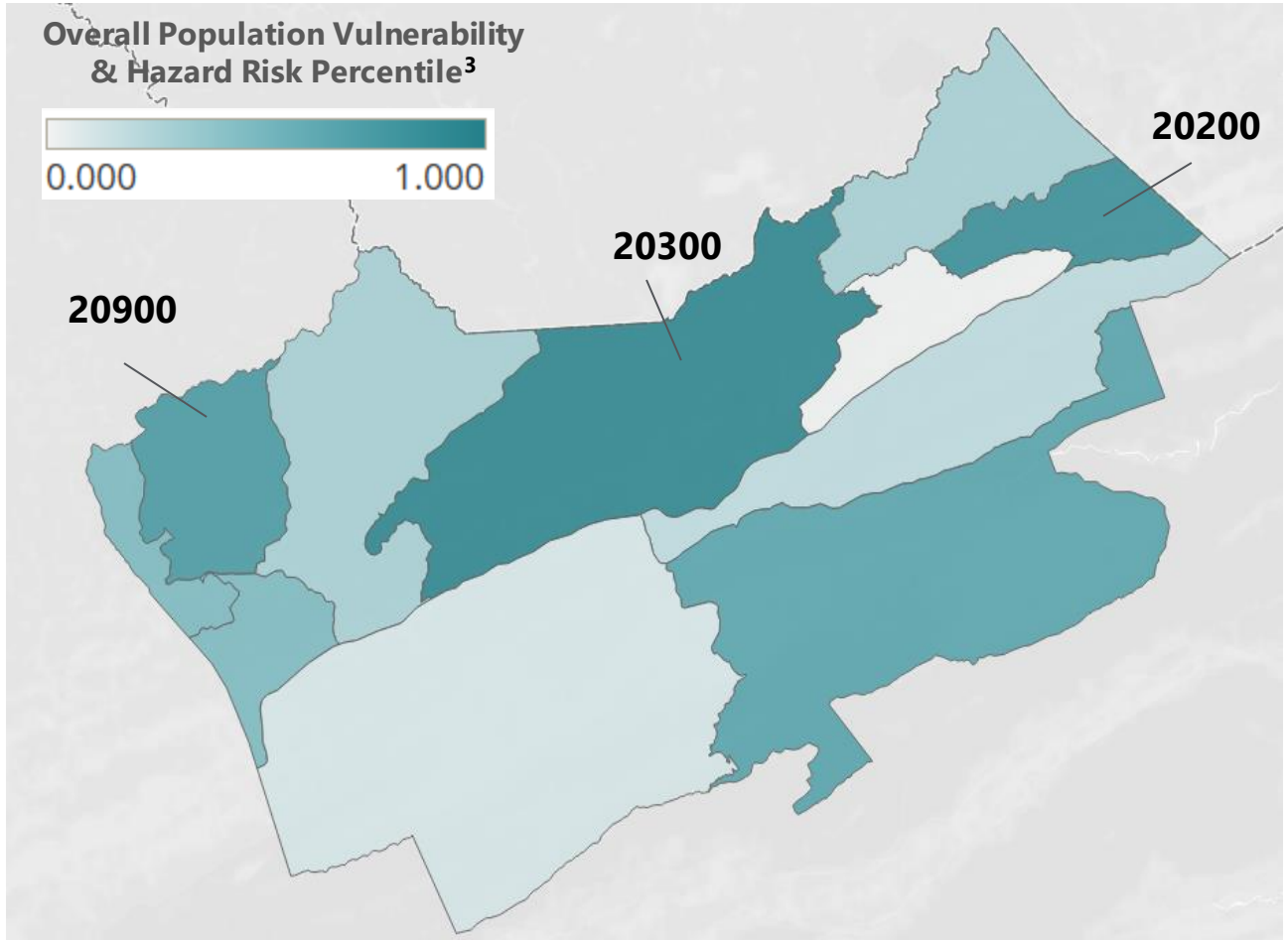
#	Area	# of Households	Within-Tazewell County Percentiles: Overall Percentile	Within-Tazewell County Percentiles: Population Vulnerability[1] Percentile	Within-Tazewell County Percentiles: Hazard Risk[2] Percentile
1	20300	171	100th	80th	90th
2	20200	198	90th	50th	100th
3	20900	150	80th	70th	70th
4	20700	23	70th	100th	20th
5	21000	164	50th	30th	80th
6	20500	137	50th	60th	50th
7	20400	144	30th	40th	60th
8	20100	9	30th	90th	10th

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity

Prioritizing Census Tracts in Tazewell County continued

Areas with the most vulnerable populations and households in severe flood and hurricane zones present prioritization opportunities for mitigation projects.

Potential Priority Areas in Tazewell County



Priority Areas in Flood and Hurricane Zones

			Within-Tazewell County Percentiles		
#	Area	# of Households	Overall Percentile	Population Vulnerability[1] Percentile	Hazard Risk[2] Percentile
1	20300	171	100th	80th	90th
2	20200	198	90th	50th	100th
3	20900	150	80th	70th	70th
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1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
3. Sub-localities at the 0th percentile (areas in white) do not have households in Flood or Hurricane Zones

Priority Census Tracts Summary

When evaluating future mitigation project opportunities, it may be helpful to consider the underlying attributes of population vulnerability and the number of houses in each flood/hurricane zone.

			Within-Tazewell County Percentiles										
#	Census Tract	# of Households	Overall	Population Vulnerability[1]	Communities of Color	Elevated Health Risk	Low Income	# of People	# of Children	Unemployment Risk	Age	Lack of Vehicle Access
1	**20300**	**171**	**100th**	**80th**	80th	70th	70th	80th	50th	10th	60th	50th
2	**20200**	**198**	**90th**	**50th**	90th	20th	40th	60th	70th	50th	40th	70th
3	**20900**	**150**	**80th**	**70th**	50th	80th	50th	30th	10th	40th	90th	100th

			W/I-Tazewell County Percentiles		Tazewell County Household Counts[3]							
#	Census Tract	# of Households	Overall	Hazard Risk[2]	100 Year Coastal	100 Year Riverine FW	100 Year Riverine	500 Year Riverine	Hurr. Zone A	Hurr. Zone B	Hurr. Zone C	Hurr Zone D
1	**20300**	**171**	**100th**	**90th**	0	7	122	42	0	0	0	0
2	**20200**	**198**	**90th**	**100th**	0	23	125	50	0	0	0	0
3	**20900**	**150**	**80th**	**70th**	0	6	101	43	0	0	0	0

1. Population Vulnerability should be interpreted as an average household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
3. Note that the total sum of households may be more than the households in your locality because some are located in both flood and hurricane zones

Review of FEMA Funding & Past Mitigation Projects

Review of Mitigation Projects In Your Locality

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.

Total Exclusive Project Funding[1]

$2,966,833

This is the total amount of federal funding alloted to mitigation projects solely owned by your locality from 1990-2019

Total Shared Project Funding[1]

$95,526

This is the total amount of federal funding allotted to mitigation projects owned by your locality and at least 1 other from 1990-2019

Exclusive Projects

11

Average Project Size

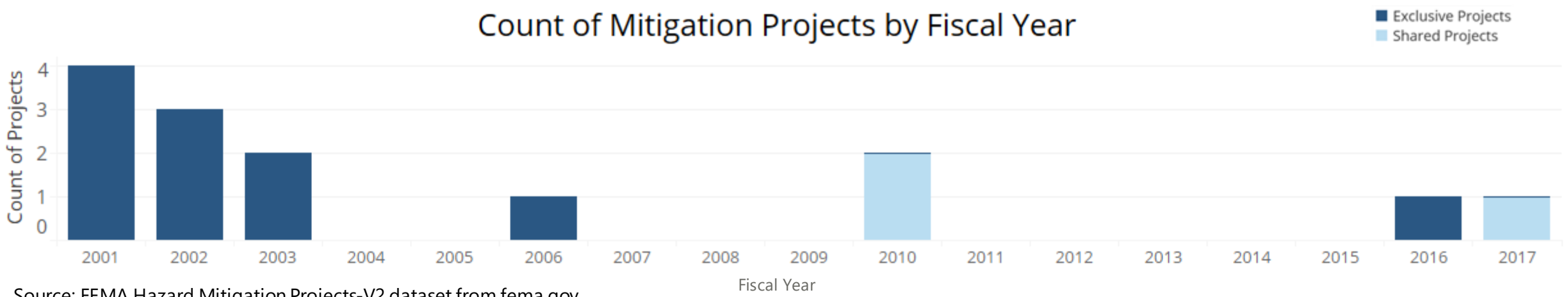
$270K

Shared Projects

3

Average Counties Per Project

3.3

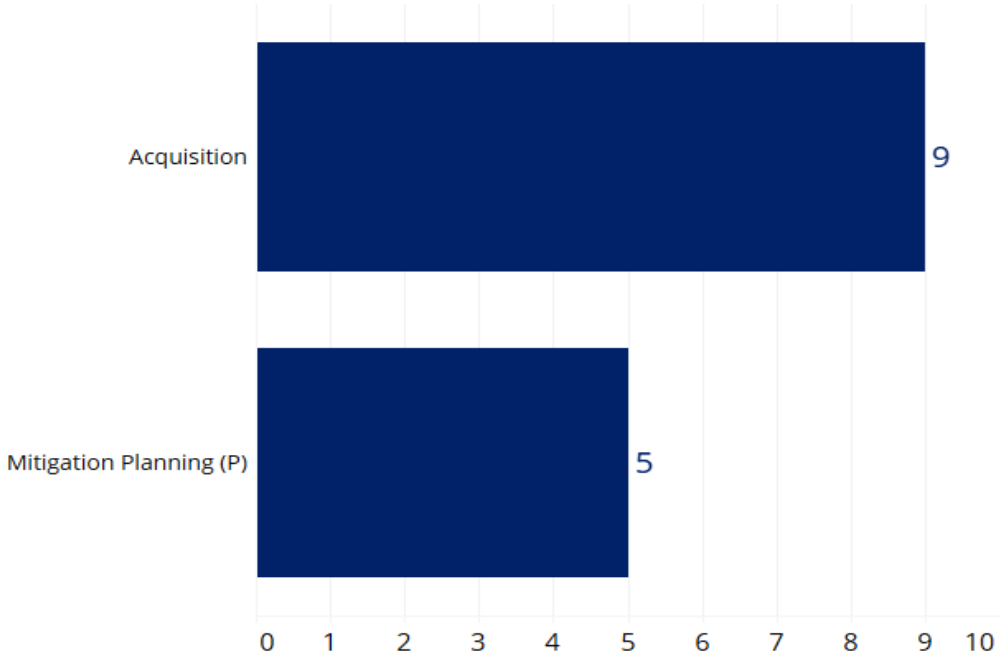


1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

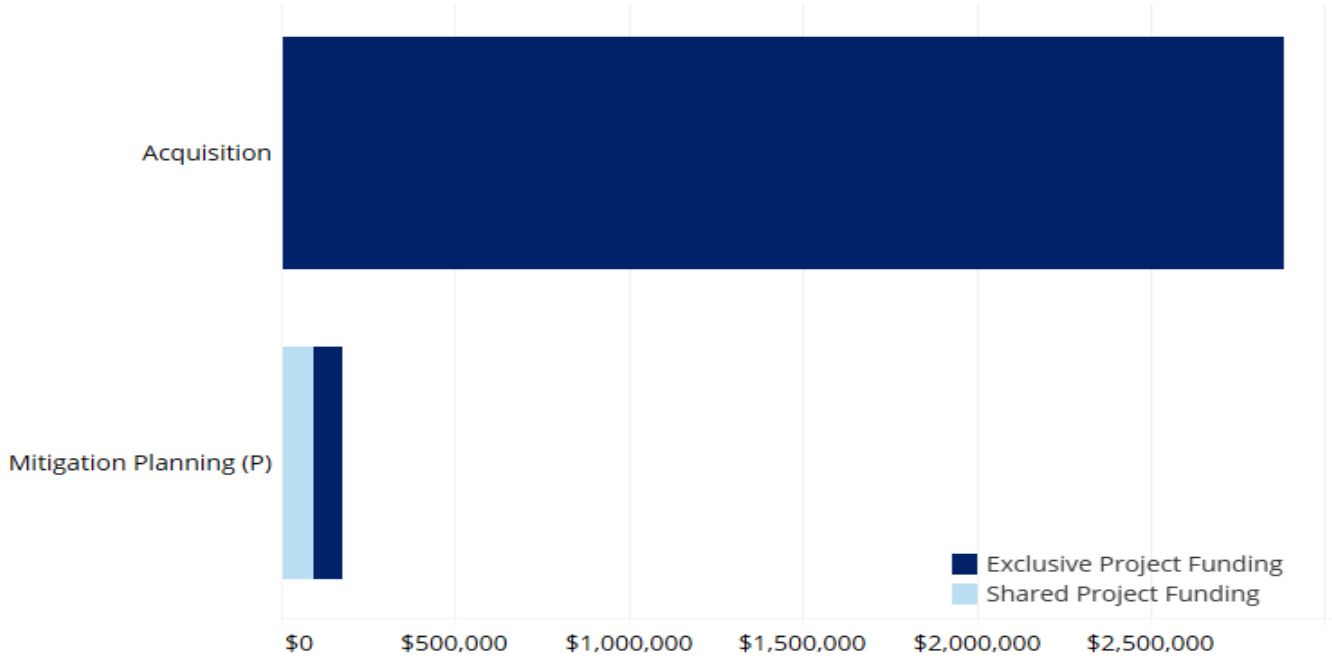
Past Mitigation Projects – Top Project Types

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.

Mitigation Project Types Since 1990[1]



Funding by Mitigation Project Type Since 1990[1]



1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

COVID-19 Impacts

COVID-19 In Your Locality

Since the beginning of the COVID-19 Pandemic, Tazewell County has experienced the following:

Cases[1]

Total	Per 100k
502	**1,193**
65th out of 133 localities[2]	**105th** out of 133 localities

Hospitalizations[1]

Total	Per 100k
23	**55**
84th out of 133 localities	**114th** out of 133 localities

Deaths[1]

Total	Per 100k
2	**5**
112th out of 133 localities	**126th** out of 133 localities

1. COVID-19 case, hospitalization, and death figures are sourced from the Virginia Department of Health as of **10/26/2020**
2. COVID-19 Impact rankings are for all 133 Virginia localities, rather than the 132 included in the BRIC analysis for having at least one household in a flood or hurricane zone

Considerations for Next Steps

Considerations for Next Steps

When evaluating future mitigation project opportunities, the population vulnerability and hazard risk metrics can supplement existing measures to design mitigation projects with an equity lens.

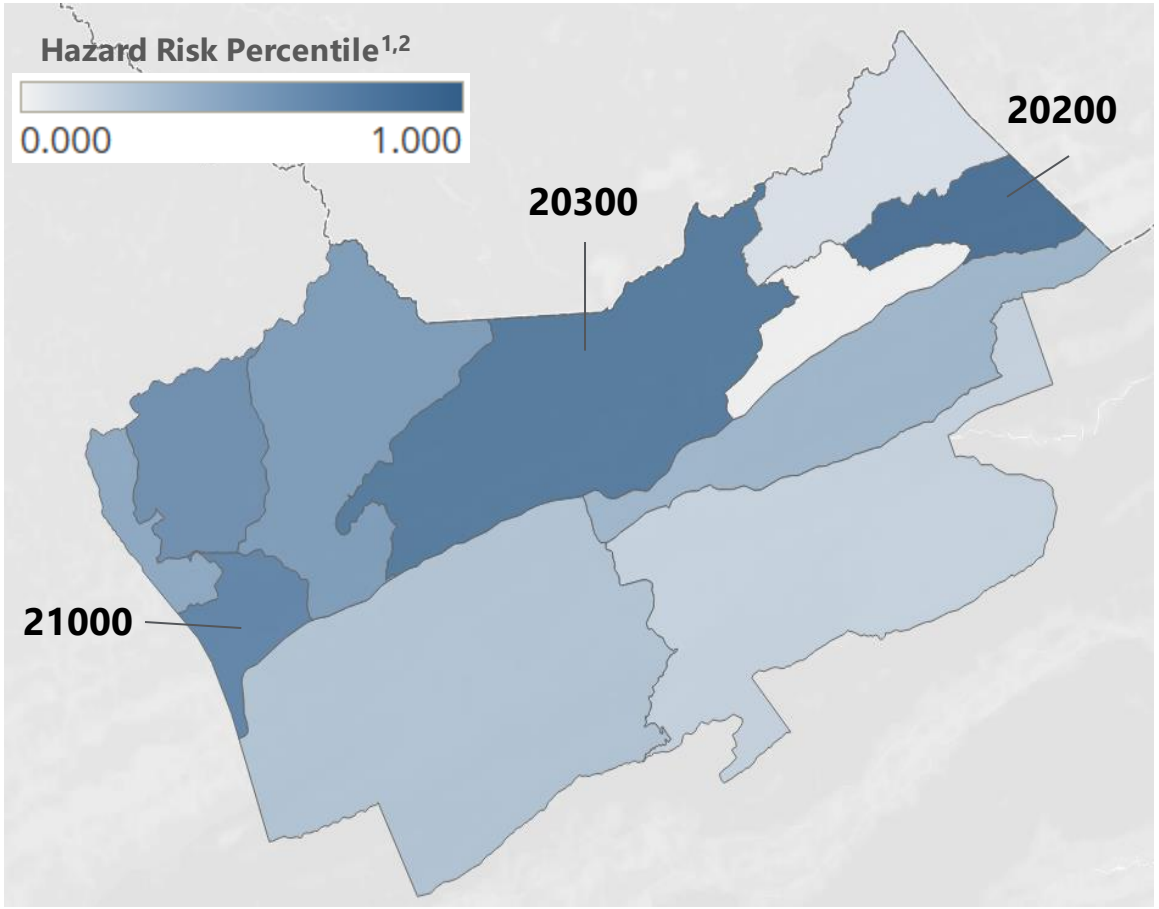
- Consider targeting **priority areas** when designing future mitigation projects
- Consider analysis at the **census tract/block level** to understand population vulnerability and hazard risks at a granular level to support decisions on mitigation projects
- Consider **supplementing these people-focused metrics** with existing infrastructure, elevation, and financial analysis for a holistic mitigation planning approach that includes equity considerations
- Consider **past project types** and **prior funding** in the overall mitigation strategy

Appendix

What areas in your locality have the greatest hazard risk?

When designing mitigation projects, it may be helpful to consider specific census tracts that have the greatest number of households residing in the more severe flood and/or hurricane zones.

Hazard Risk[1] in Tazewell County



Top-5 Census Tracts for Hazard Risk[1]

				Tazewell County Household Counts							
#	Census Tract	# of House-holds	Hazard Risk Percentile	100 Year Coastal	100 Year Riverine FW	100 Year Riverine	500 Year Riverine	Hurr. Zone A	Hurr. Zone B	Hurr. Zone C	Hurr. Zone D
1	**20200**	**198**	**100th**	0	23	125	50	0	0	0	0
2	**20300**	**171**	**90th**	0	7	122	42	0	0	0	0
3	**21000**	**164**	**80th**	0	13	109	42	0	0	0	0
4	**20900**	**150**	**70th**	0	6	101	43	0	0	0	0
5	**20400**	**144**	**60th**	0	13	91	40	0	0	0	0

Note: see the appendix for a complete data table for all Census Tracts

1. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
2. Census tracts at the 0th percentile (areas in white) do not have households in Flood or Hurricane Zones

What is population vulnerability and how is it calculated? *continued*

The vulnerability score for each Virginia household reflects an estimate of the household's ability to safely respond in the event of an environmental disaster.

Population Vulnerability

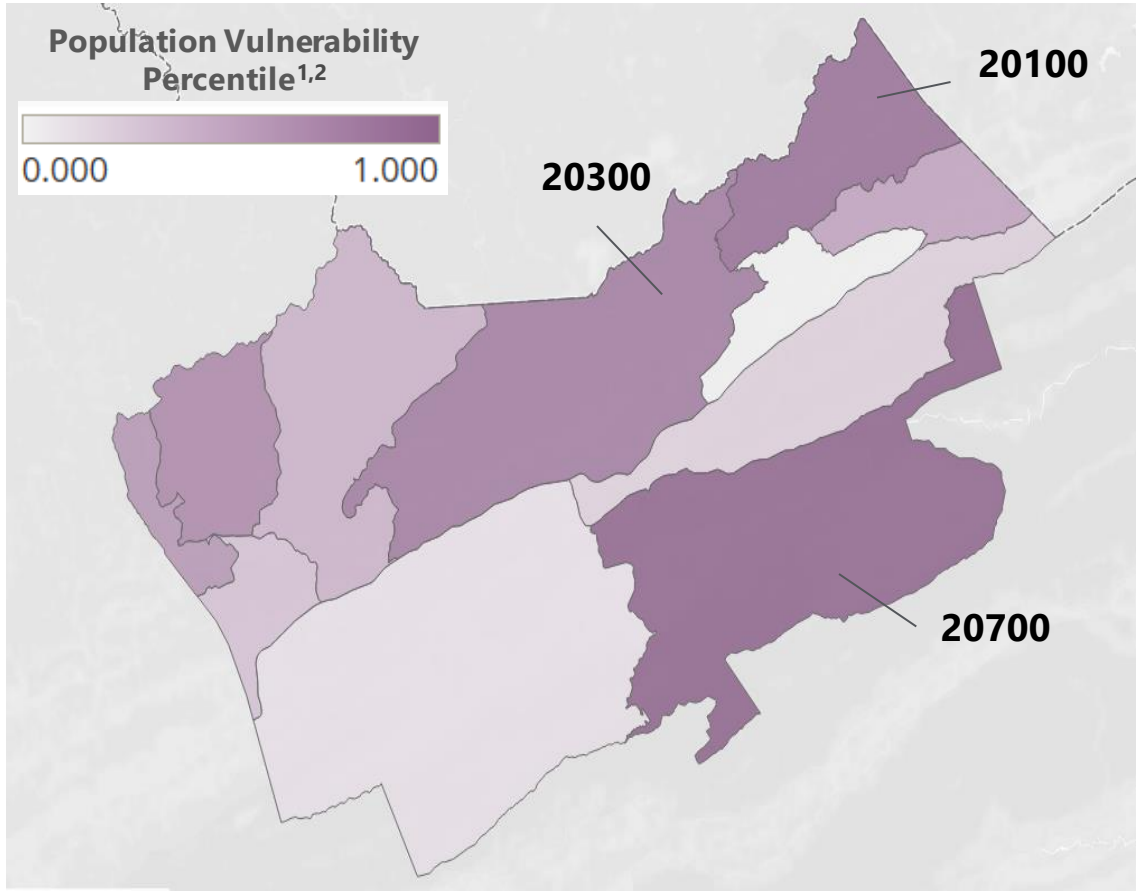
Attribute[1]	Weighting[2]	Description (in a household)
Low Income	18%	Number of adults with income less than $30,000
Elevated Health Risk	17%	Number of adults with one or more serious health conditions
Age (Older Adults)	15%	Number of adults who are age 65 and older
Communities of Color	13%	Number of Black or African American or Hispanic or Latino adults
# of Children in Household	12%	Number of children
# of People in Household	10%	Number of adults and children
Unemployment Risk	8%	Number of adults at high risk of unemployment
Lack of Vehicle Access	6%	Does the household lack access to a motor vehicle?

1. Two attributes - English as a Primary Language and Prevalence of Mobile Housing - were dropped from consideration based on the 8/20/2020 BRIC Working Group Session
2. Attribute contributions to Population Vulnerability were weighted as a result of the BRIC Working Group Session on 8/20/2020

What areas in your locality have the greatest population vulnerability?

When designing mitigation projects, it may be helpful to consider specific census tracts that are home to the most vulnerable individuals in the event of an environmental disaster.

Population Vulnerability[1] in Tazewell County



Top-5 Census Tracts for Population Vulnerability[1]

			Within-Tazewell County Percentiles								
#	Census Tract	# of House-holds	Pop. Vul.	Comm. of Color	Elevated Health Risk	Low Income	# of People	# of Children	Unem. Risk	Age	Vehicle Access
1	**20700**	**23**	**100th**	60th	100th	10th	100th	100th	20th	100th	0th
2	**20100**	**9**	**90th**	0th	90th	100th	90th	90th	0th	20th	60th
3	**20300**	**171**	**80th**	80th	70th	70th	80th	50th	10th	60th	50th
4	**20900**	**150**	**70th**	50th	80th	50th	30th	10th	40th	90th	100th
5	**20500**	**137**	**60th**	40th	60th	80th	40th	30th	90th	50th	90th

Note: See the appendix for a complete data table for all census tracts

1. Population Vulnerability should be interpreted as an average household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Census tracts at the 0th percentile (areas in white) do not have households in Flood or Hurricane Zones

Data table | Population Vulnerability & Hazard Risk

			Percentiles										Within-locality Household Counts							
#	Census Tract	# of Households	Overall	Population Vulnerability	Communities of Color	Elevated Health Risk	Low Income	# of People	# of Children	Unem-ployment Risk	Age	Lack of Vehicle Access	Hazard Risk	100 Year Coastal	100 Year Riverine FW	100 Year Riverine	500 Year Riverine	Hurr. Zone A	Hurr. Zone B	Hurr. Zone C	Hurr Zone D
1	20300	171	100th	80th	80th	70th	70th	80th	50th	10th	60th	50th	90th	0	7	122	42	0	0	0	0
2	20200	198	90th	50th	90th	20th	40th	60th	70th	50th	40th	70th	100th	0	23	125	50	0	0	0	0
3	20900	150	80th	70th	50th	80th	50th	30th	10th	40th	90th	100th	70th	0	6	101	43	0	0	0	0
4	20700	23	70th	100th	60th	100th	10th	100th	100th	20th	100th	0th	20th	0	0	23	0	0	0	0	0
5	21000	164	50th	30th	20th	40th	90th	20th	80th	70th	10th	80th	80th	0	13	109	42	0	0	0	0
6	20500	137	50th	60th	40th	60th	80th	40th	30th	90th	50th	90th	50th	0	16	90	31	0	0	0	0
7	20400	144	30th	40th	70th	50th	60th	50th	20th	80th	70th	20th	60th	0	13	91	40	0	0	0	0
8	20100	9	30th	90th	0th	90th	100th	90th	90th	0th	20th	60th	10th	0	1	6	2	0	0	0	0
9	21100	125	20th	20th	100th	10th	30th	10th	0th	60th	80th	40th	40th	0	22	86	17	0	0	0	0
10	20600	76	10th	10th	30th	30th	20th	70th	60th	30th	30th	30th	30th	0	0	75	1	0	0	0	0
11	20800	8	0th	0th	0th	0th	0th	0th	40th	100th	0th	0th	0th	0	0	6	2	0	0	0	0

1. Note: These figures only account for census areas that have households in flood and/or hurricane zones

Data table | FEMA Funding[1]

Grantee	Year of Fiscal Year	Exclusive vs Shared	Subgrantee	Project Counties	Project Type(s)	Federal Funds Obligated
TAZEWELL COUNTY	2017	Shared	Cumberland Plateau Plann..	BUCHANAN; DICKENSON; RUSSELL; TAZEWELL	91.5: Local Multijurisdictional Multihazard Mitigation Plan - U..	$30,000
	2016	Exclusive	Southwest Virginia Com..	TAZEWELL	91.3: Local Multihazard Mitigation Plan - UPDATE	$41,250
	2010	Shared	Cumberland Plateau Plann..	BUCHANAN; DICKENSON; RUSSELL; TAZEWELL	91.1: Local Multihazard Mitigation Plan	$30,000
			Statewide	RUSSELL; TAZEWELL	91.1: Local Multihazard Mitigation Plan	$35,526
	2006	Exclusive	Town of Bluefield	TAZEWELL	200.1: Acquisition of Private Real Property (Structures and Land) ..	$250,283
	2003	Exclusive	Bluefield	TAZEWELL	200.1: Acquisition of Private Real Property (Structures and Land) ..	$505,695
	2002	Exclusive	Bluefield	TAZEWELL	200.1: Acquisition of Private Real Property (Structures and Land) ..	$88,199
					200.3: Acquisition of Public Real Property (Structures and Land) ..	$849,140
	2001	Exclusive	Bluefield	TAZEWELL	91.1: Local Multihazard Mitigation Plan	$40,500
					200.1: Acquisition of Private Real Property (Structures and Land) ..	$437,925
					200.3: Acquisition of Public Real Property (Structures and Land) ..	$753,841

1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

COVID-19 Unified Command/VEST Health Equity Working Group

MITIGATION PROJECTS ANALYSIS
RUSSELL COUNTY

NOVEMBER 2020

Topics

The analysis provides **Russell County** with information to support planning and preparation of projects for the Building Resilient Infrastructure and Communities (BRIC) grant application with an equity focus.

- ❑ Introduction to Data-Driven Approach
- ❑ Hazard Risk
- ❑ Population Vulnerability
- ❑ Prioritization
- ❑ FEMA Funding and Past Projects
- ❑ Considerations for Next Steps

This analysis ***expands the scope of population vulnerability*** to provide a ***data-driven equity lens*** for disaster mitigation project design

Data-Driven Approach

The Health360 platform informs population vulnerability and enables a data-driven approach to operationalizing equity in mitigation projects.

Powered By Health360

230M+
U.S. Adults Scored

Data updated every
1 Month

Contains over
1,500+
variables on Social Determinants of Health and other metrics

150+
Advanced predictive algorithms

400+
Variables used in the mortality predictive algorithm

Provides 360° view of a person

Algorithms rebuilt every 2 years

40+
Clients served

What is hazard risk and how is it calculated?

Household Hazard risk reflects the number of households in each flood or hurricane zone, weighted by severity.

Hazard Risk

Number of households in each zone:

Flood zones
- 100 year coastal
- 100 year riverine flood way
- 100 year riverine
- 500 year riverine

Hurricane zones
- Segmented A, B, C, D

- Households that reside in the flood and hurricane zones are considered to be **at-risk for environmental disasters**
- Hazard Risk reflects **the number of households located in Flood and Hurricane Zones**
- Hazard Risk is not a measure of **infrastructure, elevation, or financial risks**, but is a measure of the number of at-risk households in an area, weighted by the severity of the risk, to **provide a people-focused risk metric**

Note: Severity of the risk per household is captured on an ordinal scale from 1 – least severe (Hurricane Zone D, 500 Year Riverine) to 4 – most severe (Hurricane Zone A, 100 Year Coastal)

Hazard Risk = (# of Households in Particular Hurricane or Flood Zones) X (Specified Zone Risk Level (1 through 4 depending on risk severity))

Hazard Risk in Your Locality

The figures below indicate how your locality's hazard risk[1] compares to others in Virginia as well as how many households reside in each flood or hurricane zone.

Hazard Risk[1] Percentile

52nd

Your locality has more households in more severe flood/hurricane zones than 52% of other Virginia localities

Hazard Risk[1] Rank

64th

Your locality's Hazard Risk score is ranked 64th out of 132 Virginia localities

Households in Flood Zones & Locality Rank

← Severity			
100 Year Coastal	100 Year Riverine Floodway	100 Year Riverine	500 Year Riverine
0	18	324	37
N/A out of 132 Localities	39th out of 132 Localities	51st out of 132 Localities	69th out of 132 Localities

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk

Households in Hurricane Zones & Locality Rank

← Severity			
Zone A	Zone B	Zone C	Zone D
0	0	0	0
N/A out of 132 Localities	N/A out of 132 Localities	N/A out of 132 Localities	N/A out of 132 Localities

Evacuation zones designated as A through D are in place across coastal Virginia

1. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
2. Note that the total sum of households may be more than the households in your locality because some are located in both flood and hurricane zones

What is population vulnerability and how is it calculated?

The Population Vulnerability score provides a people-focused metric that can be combined with infrastructure, elevation, and financial metrics to support a holistic approach to mitigation planning.

Population Vulnerability

Prevalence of:

1. Communities of color
2. Elevated health risk
3. Low income
4. # of people in household
5. # of children in household
6. Unemployment risk
7. Age (older adults)
8. Lack of vehicle access

- Population Vulnerability **expands upon the 2018 Virginia Hazard Mitigation plan definition** of population vulnerability (density and percentage of total population)
- Population Vulnerability **only considers localities with households in flood or hurricane zones (132 localities)**
- Population Vulnerability **identifies the locality and census tracts/census blocks** with the most vulnerable individuals/households on average
- Population Vulnerability should be interpreted as a **household's ability to safely respond** to an environmental disaster

Population Vulnerability in Your Locality

The figures below indicate how your locality's population vulnerability[1] score and composite attributes compare to other localities in Virginia.

Population Vulnerability[1] Percentile

79th

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 79% of other Virginia localities

Population Vulnerability[1] Rank

28th

Your locality's Population Vulnerability score is ranked 28th out of 132 Virginia localities

How RUSSELL COUNTY Compares to Other Localities Across the Eight Vulnerability Attributes

Low Income	Elevated Health Risk	Age	Communities of Color
99th percentile	66th percentile	37th percentile	14th percentile

# of Children in Household	# of People in Household	Unemployment Risk	Lack of Vehicle Access
37th percentile	56th percentile	77th percentile	45th percentile

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones

Using Population Vulnerability & Hazard Risk to Prioritize Census Tracts

Combining population vulnerability and hazard risk at a sub-locality level can identify potential priority areas to support with future mitigation projects.

Population Vulnerability

Prevalence of:

1. Communities of color
2. Elevated health risk
3. Low income
4. # of people in household
5. # of children in household
6. Unemployment risk
7. Age (older adults)
8. Lack of vehicle access

+

Hazard Risk

Number of households in each zone:

Flood zones

- 100 year coastal
- 100 year riverine floodway
- 100 year riverine
- 500 year riverine

Hurricane zones

- Segmented A, B, C, D

=

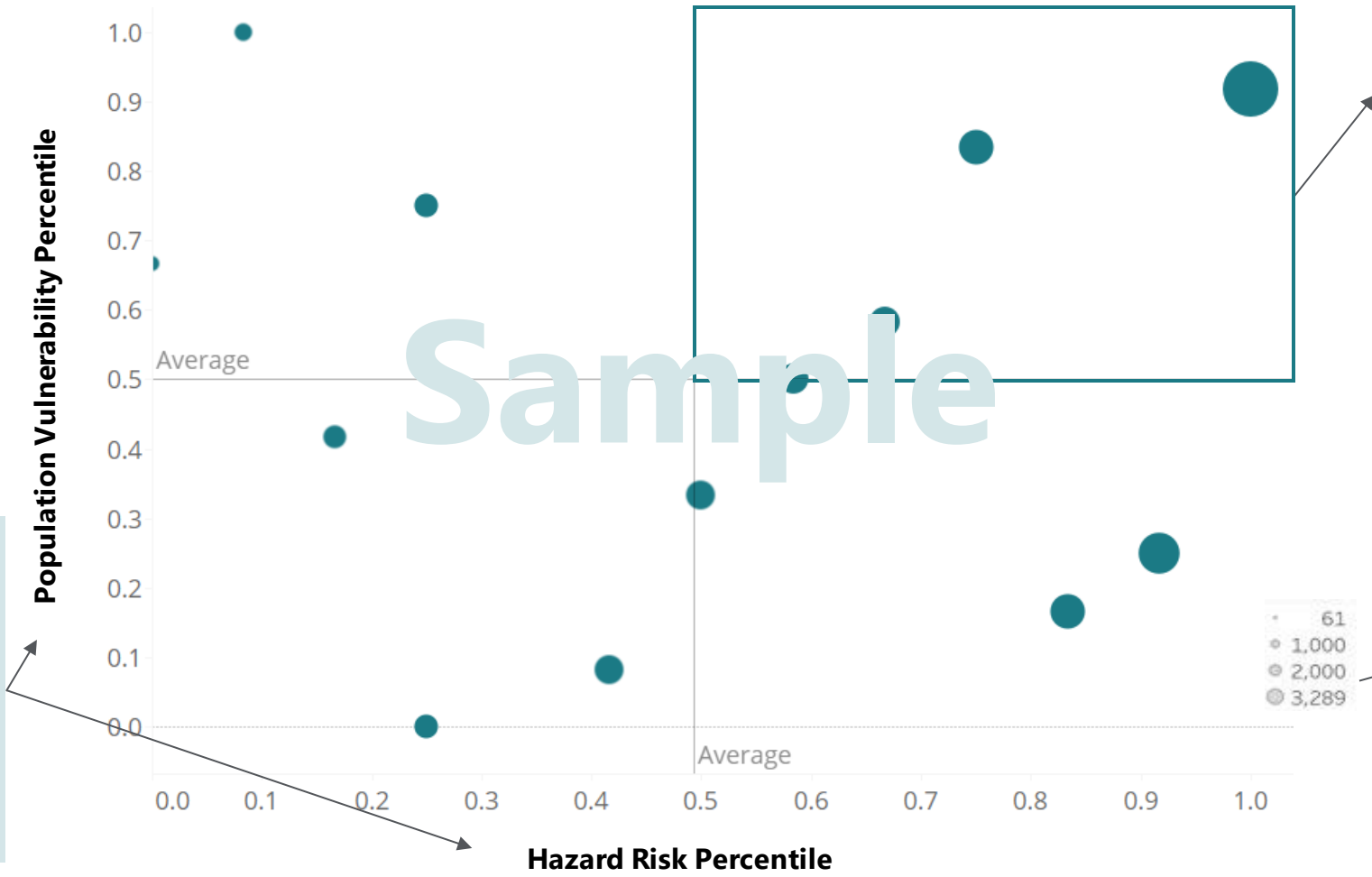
Prioritized Census Tracts

- High Population Vulnerability
- High Hazard Risk

Census tracts with both more households in severe flood/hurricane zones AND households with more vulnerable occupants

How to interpret the Census Tract plots

The chart below represents a *sample* locality and offers guidance on how to interpret the information when planning mitigation efforts.



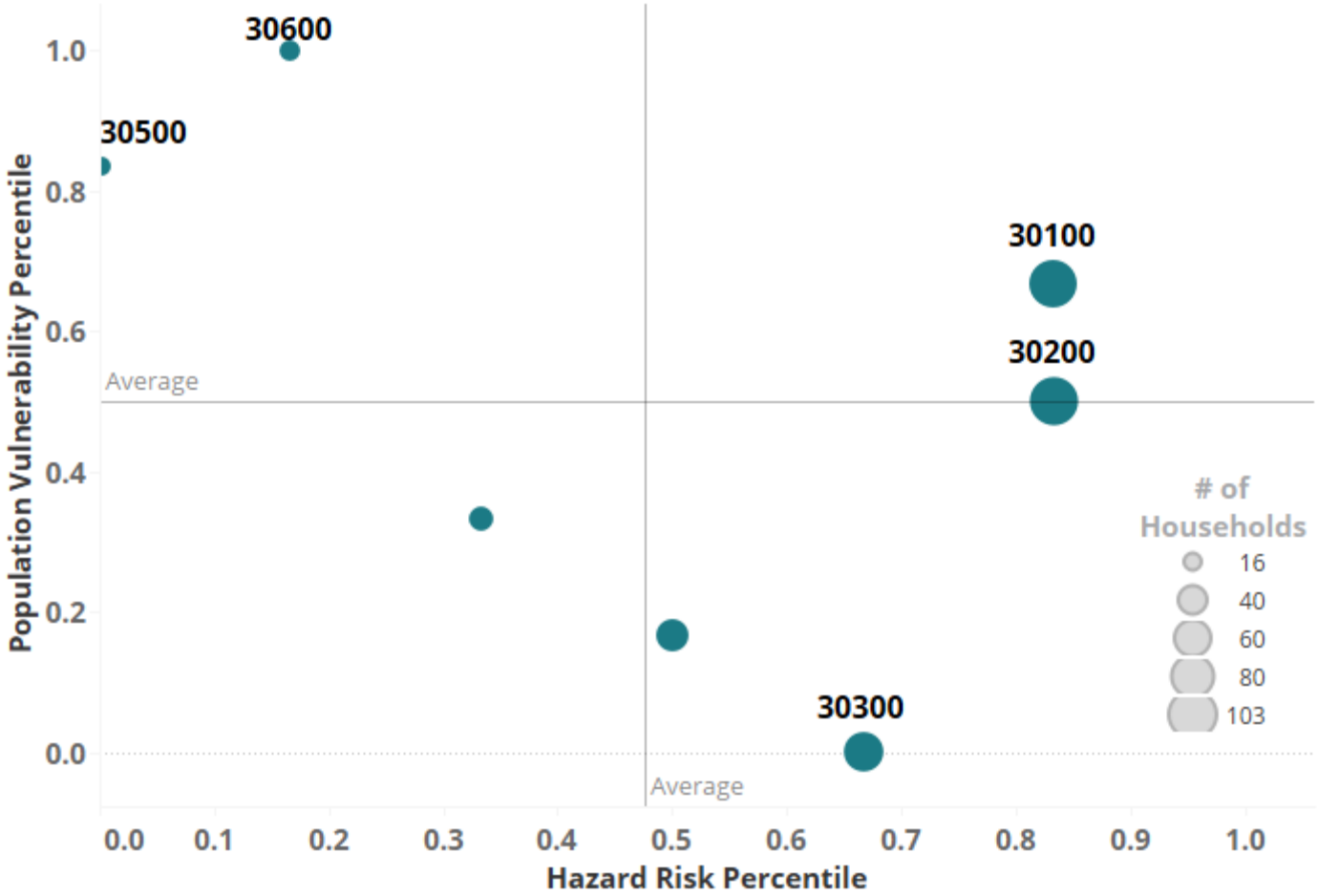
Circles in the upper right quadrant represent areas that you might consider prioritizing due to high population vulnerability and hazard risk

The x- and y-axes measure the percentiles of hazard risk and population vulnerability for each area

Size of the circle indicates the number of households in each area

Prioritizing Census Tracts in Russell County

Areas with the most vulnerable populations and households in severe flood and hurricane zones present prioritization opportunities for mitigation projects.



Priority Areas in Flood and Hurricane Zones

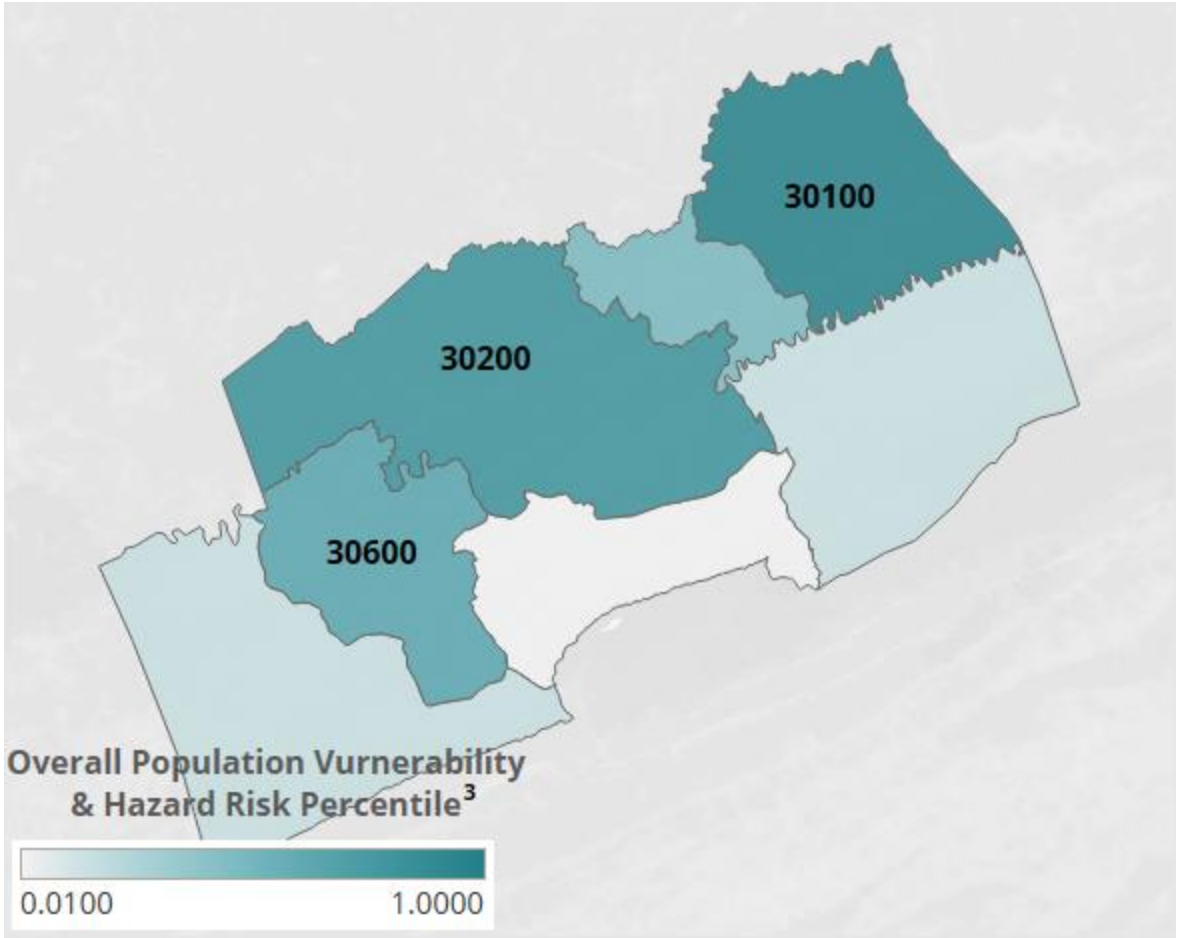
			Within-Russell County Percentiles		
#	Area	# of Households	Overall Percentile	Population Vulnerability[1] Percentile	Hazard Risk[2] Percentile
1	30100	100	100th	67th	83rd
2	30200	103	83rd	50th	83rd
3	30600	19	67th	100th	17th
4	30500	16	50th	83rd	0th
5	30300	69	17th	0th	67th
6	30402	46	17th	17th	50th
7	30401	26	0th	33rd	33rd

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity

Prioritizing Census Tracts in Russell County continued

Areas with the most vulnerable populations and households in severe flood and hurricane zones present prioritization opportunities for mitigation projects.

Potential Priority Areas in Russell County



Priority Areas in Flood and Hurricane Zones

			Within-Russell County Percentiles		
#	Area	# of Households	Overall Percentile	Population Vulnerability[1] Percentile	Hazard Risk[2] Percentile
1	30100	100	100th	67th	83rd
2	30200	103	83rd	50th	83rd
3	30600	19	67th	100th	17th
4	30500	16	50th	83rd	0th
5	30300	69	17th	0th	67th
6	30402	46	17th	17th	50th
7	30401	26	0th	33rd	33rd

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
3. Sub-localities at the 0th percentile (areas in white) do not have households in Flood or Hurricane Zones

Priority Census Tracts Summary

When evaluating future mitigation project opportunities, it may be helpful to consider the underlying attributes of population vulnerability and the number of houses in each flood/hurricane zone.

			Within-Russell County Percentiles										
#	Census Tract	# of Households	Overall	Population Vulnerability[1]	Communities of Color	Elevated Health Risk	Low Income	# of People	# of Children	Unemployment Risk	Age	Lack of Vehicle Access
1	**30100**	**100**	**100th**	**67th**	17th	0th	83rd	17th	17th	67th	83rd	0th
2	**30200**	**103**	**83rd**	**50th**	83rd	83rd	50th	33rd	50th	83rd	0th	100th
3	**30600**	**19**	**67th**	**100th**	50th	100th	100th	100th	67th	100th	100th	67th

			W/I-Russell County Percentiles		Russell County Household Counts[3]							
#	Census Tract	# of Households	Overall	Hazard Risk[2]	100 Year Coastal	100 Year Riverine FW	100 Year Riverine	500 Year Riverine	Hurr. Zone A	Hurr. Zone B	Hurr. Zone C	Hurr Zone D
1	**30100**	**100**	**100th**	**83rd**	-	12	78	10	-	-	-	-
2	**30200**	**103**	**83rd**	**83rd**	-	-	93	10	-	-	-	-
3	**30600**	**19**	**67th**	**17th**	-	-	11	8	-	-	-	-

1. Population Vulnerability should be interpreted as an average household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
3. Note that the total sum of households may be more than the households in your locality because some are located in both flood and hurricane zones

Review of FEMA Funding & Past Mitigation Projects

Review of Mitigation Projects In Your Locality

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.

Total Exclusive Project Funding[1]

$456,908

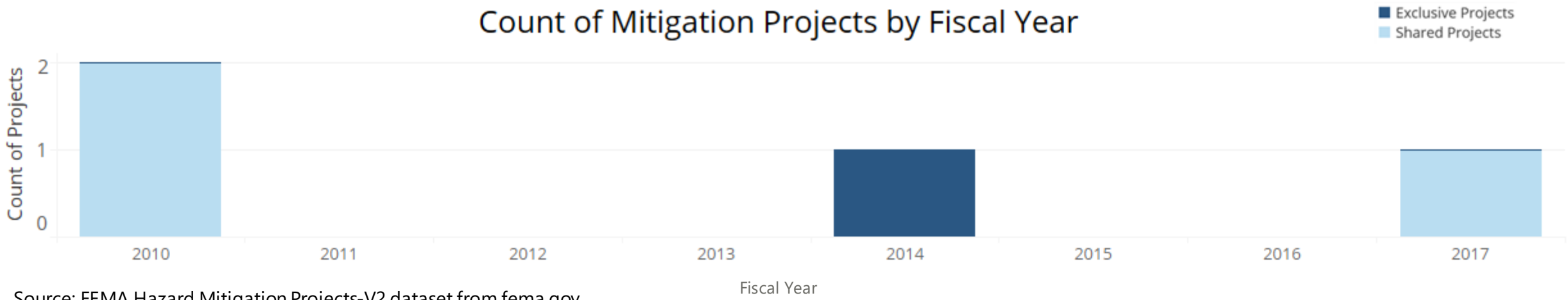
This is the total amount of federal funding alloted to mitigation projects solely owned by your locality from 1990-2019

Total Shared Project Funding[1]

$95,526

This is the total amount of federal funding allotted to mitigation projects owned by your locality and at least 1 other from 1990-2019

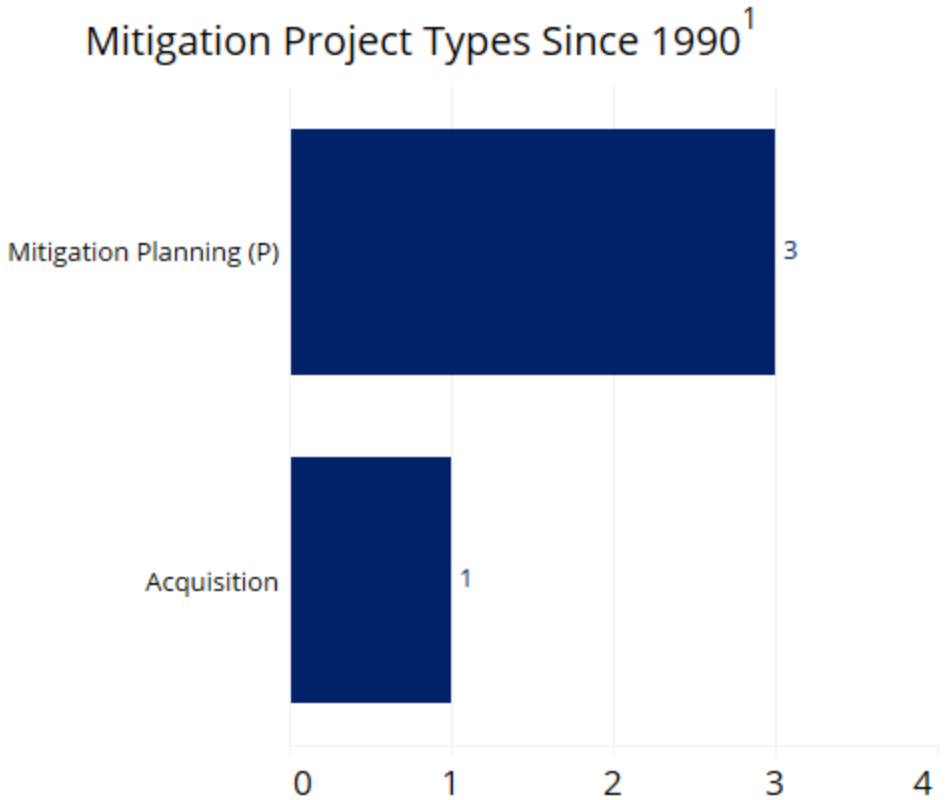
Exclusive Projects	Average Project Size	Shared Projects	Average Counties Per Project
1	$457K	3	3.3

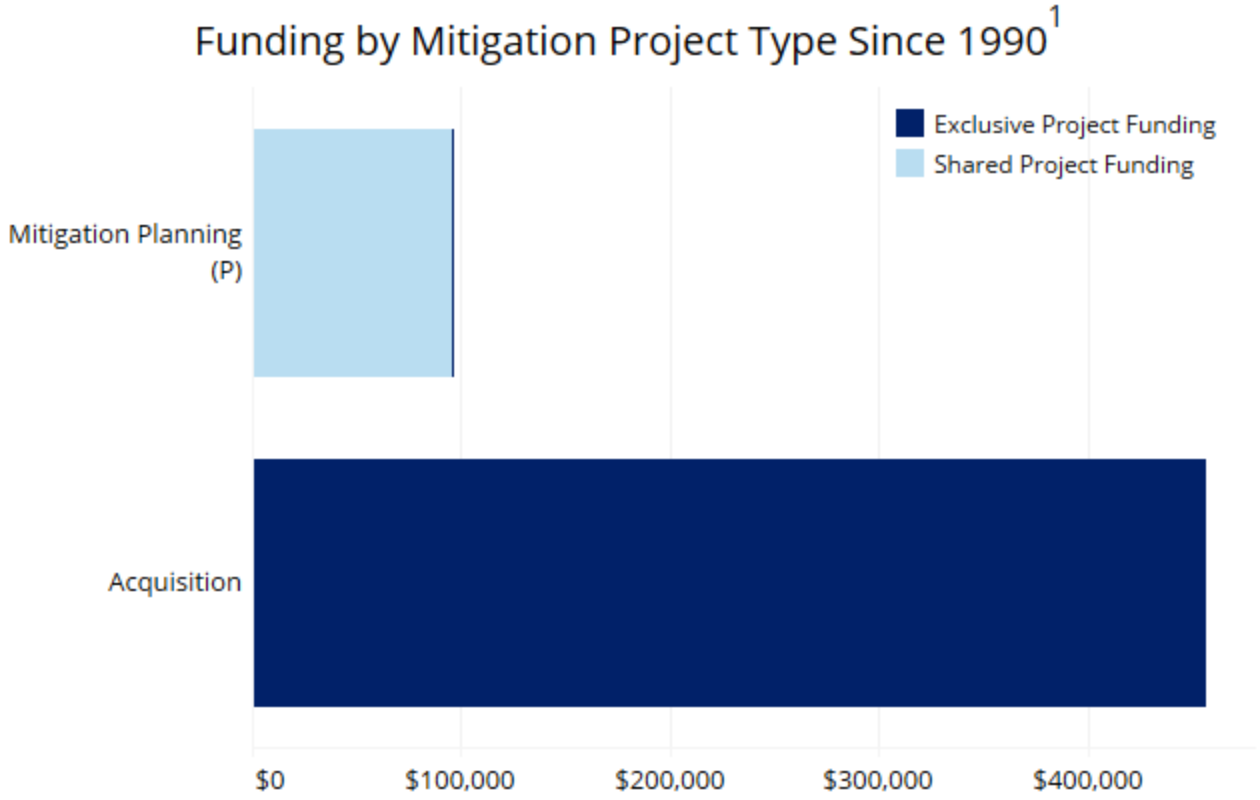


1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

Past Mitigation Projects – Top Project Types

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.





1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

COVID-19 Impacts

COVID-19 In Your Locality

Since the beginning of the COVID-19 Pandemic, Russell County has experienced the following:

Cases[1]

Total	Per 100k
483 **68th** out of 133 localities[2]	**1,762** **70th** out of 133 localities

Hospitalizations[1]

Total	Per 100k
41 **53rd** out of 133 localities	**150** **48th** out of 133 localities

Deaths[1]

Total	Per 100k
8 **68th** out of 133 localities	**29** **72nd** out of 133 localities

1. COVID-19 case, hospitalization, and death figures are sourced from the Virginia Department of Health as of **10/28/2020**
2. COVID-19 Impact rankings are for all 133 Virginia localities, rather than the 132 included in the BRIC analysis for having at least one household in a flood or hurricane zone

Considerations for Next Steps

Considerations for Next Steps

When evaluating future mitigation project opportunities, the population vulnerability and hazard risk metrics can supplement existing measures to design mitigation projects with an equity lens.

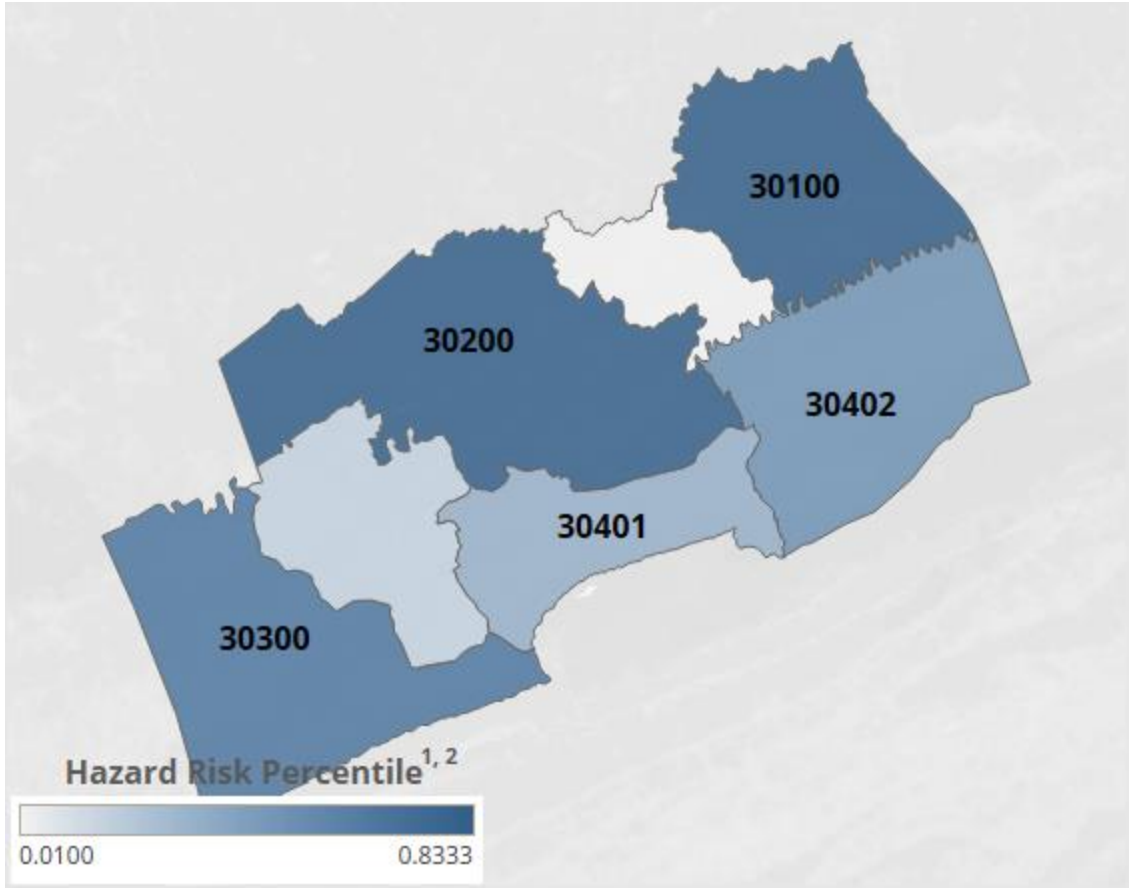
- Consider targeting **priority areas** when designing future mitigation projects
- Consider analysis at the **census tract/block level** to understand population vulnerability and hazard risks at a granular level to support decisions on mitigation projects
- Consider **supplementing these people-focused metrics** with existing infrastructure, elevation, and financial analysis for a holistic mitigation planning approach that includes equity considerations
- Consider **past project types** and **prior funding** in the overall mitigation strategy

Appendix

What areas in your locality have the greatest hazard risk?

When designing mitigation projects, it may be helpful to consider specific census tracts that have the greatest number of households residing in the more severe flood and/or hurricane zones.

Hazard Risk[1] in Russell County



Top-5 Census Tracts for Hazard Risk[1]

				Russell County Household Counts							
#	Census Tract	# of House-holds	Hazard Risk Percentile	100 Year Coastal	100 Year Riverine FW	100 Year Riverine	500 Year Riverine	Hurr. Zone A	Hurr. Zone B	Hurr. Zone C	Hurr. Zone D
1	30100	100	83rd	0	12	78	10	0	0	0	0
2	30200	103	83rd	0	0	93	10	0	0	0	0
3	30300	69	67th	0	0	68	1	0	0	0	0
4	30402	46	50th	0	3	39	4	0	0	0	0
5	30401	26	33rd	0	0	22	4	0	0	0	0

Note: see the appendix for a complete data table for all Census Tracts

1. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
2. Census tracts at the 0th percentile (areas in white) do not have households in Flood or Hurricane Zones

What is population vulnerability and how is it calculated? *continued*

The vulnerability score for each Virginia household reflects an estimate of the household's ability to safely respond in the event of an environmental disaster.

Population Vulnerability

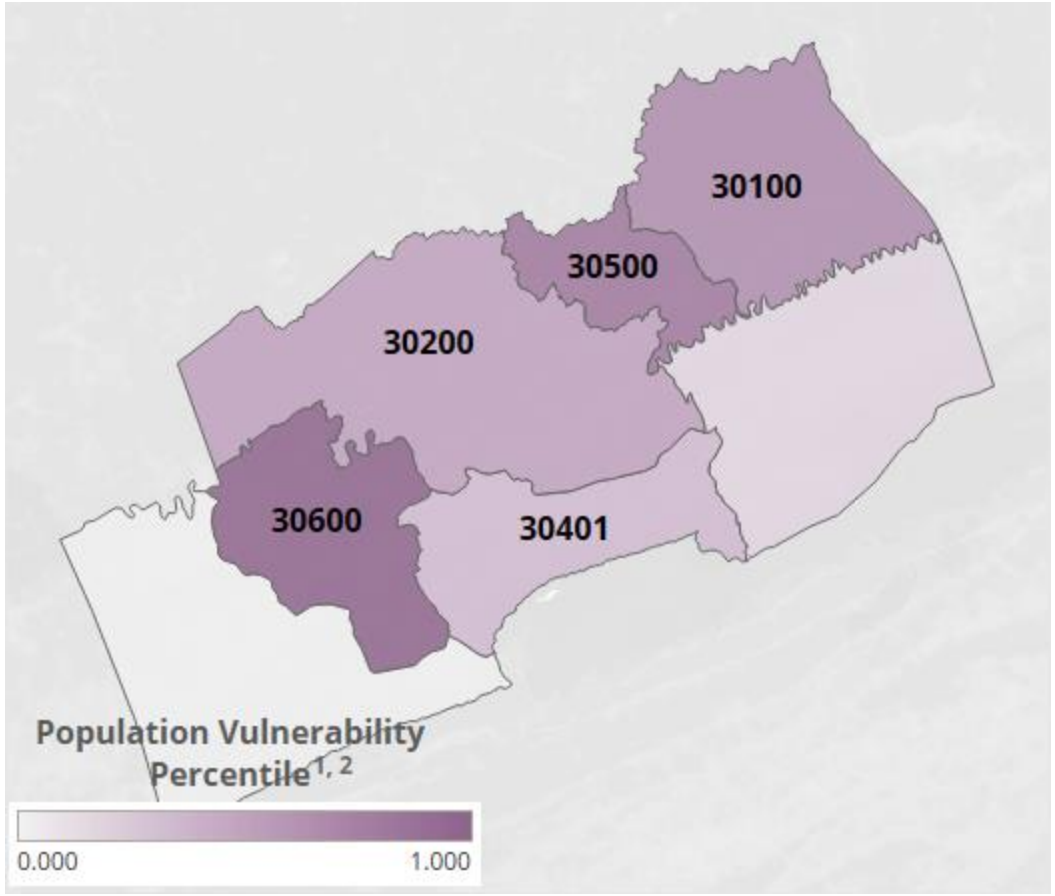
Attribute[1]	Weighting[2]	Description (in a household)
Low Income	18%	Number of adults with income less than $30,000
Elevated Health Risk	17%	Number of adults with one or more serious health conditions
Age (Older Adults)	15%	Number of adults who are age 65 and older
Communities of Color	13%	Number of Black or African American or Hispanic or Latino adults
# of Children in Household	12%	Number of children
# of People in Household	10%	Number of adults and children
Unemployment Risk	8%	Number of adults at high risk of unemployment
Lack of Vehicle Access	6%	Does the a household lack access to a motor vehicle?

1. Two attributes - English as a Primary Language and Prevalence of Mobile Housing - were dropped from consideration based on the 8/20/2020 BRIC Working Group Session
2. Attribute contributions to Population Vulnerability were weighted as a result of the BRIC Working Group Session on 8/20/2020

What areas in your locality have the greatest population vulnerability?

When designing mitigation projects, it may be helpful to consider specific census tracts that are home to the most vulnerable individuals in the event of an environmental disaster.

Population Vulnerability[1] in Russell County



Top-5 Census Tracts for Population Vulnerability[1]

			Within-Russell County Percentiles								
#	Census Tract	# of House-holds	Pop. Vul.	Comm. of Color	Elevated Health Risk	Low Income	# of People	# of Children	Unem. Risk	Age	Vehicle Access
1	**30600**	**19**	**100th**	50th	100th	100th	100th	67th	100th	100th	67th
2	**30500**	**16**	**83rd**	67th	17th	67th	67th	100th	33rd	17th	50th
3	**30100**	**100**	**67th**	17th	0th	83rd	17th	17th	67th	83rd	0th
4	**30200**	**103**	**50th**	83rd	83rd	50th	33rd	50th	83rd	0th	100th
5	**30401**	**26**	**33rd**	33rd	67th	33rd	83rd	83rd	0th	33rd	83rd

Note: See the appendix for a complete data table for all census tracts

1. Population Vulnerability should be interpreted as an average household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Census tracts at the 0th percentile (areas in white) do not have households in Flood or Hurricane Zones

Data table | Population Vulnerability & Hazard Risk

			Percentiles											Within-locality Household Counts							
#	Census Tract	# of Households	Overall	Population Vulnerability	Communities of Color	Elevated Health Risk	Low Income	# of People	# of Children	Unem-ployment Risk	Age	Lack of Vehicle Access	Hazard Risk	100 Year Coastal	100 Year Riverine FW	100 Year Riverine	500 Year Riverine	Hurr. Zone A	Hurr. Zone B	Hurr. Zone C	Hurr Zone D
1	**30100**	**100**	**100th**	67th	17th	0th	83rd	17th	17th	67th	83rd	0th	83rd	0	12	78	10	0	0	0	0
2	**30200**	**103**	**83rd**	50th	83rd	83rd	50th	33rd	50th	83rd	0th	100th	83rd	0	0	93	10	0	0	0	0
3	**30600**	**19**	**67th**	100th	50th	100th	100th	100th	67th	100th	100th	67th	17th	0	0	11	8	0	0	0	0
4	**30500**	**16**	**50th**	83rd	67th	17th	67th	67th	100th	33rd	17th	50th	0th	0	3	13	0	0	0	0	0
5	**30300**	**69**	**17th**	0th	0th	50th	17th	0th	33rd	17th	50th	33rd	67th	0	0	68	1	0	0	0	0
6	**30402**	**46**	**17th**	17th	100th	33rd	0th	50th	0th	50th	67th	17th	50th	0	3	39	4	0	0	0	0
7	**30401**	**26**	**0th**	33rd	33rd	67th	33rd	83rd	83rd	0th	33rd	83rd	33rd	0	0	22	4	0	0	0	0

1. Note: These figures only account for census areas that have households in flood and/or hurricane zones

Data table | FEMA Funding[1]

Grantee	Year of Fiscal Year	Exclusive vs Shared	Subgrantee	Project Counties	Project Type(s)	Federal Funds Obligated
RUSSELL COUNTY	2017	Shared	Cumberland Plateau Planning District Commission	BUCHANAN; DICKENSON; RUSSELL; TAZEWELL	91.5: Local Multijurisdictional Multihazard Mitigation Plan - UPDATE	$30,000
	2014	Exclusive	Town of Cleveland	RUSSELL	200.1: Acquisition of Private Real Property (Structures and Land) - Riverine	$456,908
	2010	Shared	Cumberland Plateau Planning District Commission	BUCHANAN; DICKENSON; RUSSELL; TAZEWELL	91.1: Local Multihazard Mitigation Plan	$30,000
			Statewide	RUSSELL; TAZEWELL	91.1: Local Multihazard Mitigation Plan	$35,526

1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

COVID-19 Unified Command/VEST Health Equity Working Group

MITIGATION PROJECTS ANALYSIS
DICKENSON COUNTY

NOVEMBER 2020

Topics

The analysis provides **Dickenson County** with information to support planning and preparation of projects for the Building Resilient Infrastructure and Communities (BRIC) grant application with an equity focus.

- ❑ Introduction to Data-Driven Approach
- ❑ Hazard Risk
- ❑ Population Vulnerability
- ❑ Summary
- ❑ FEMA Funding and Past Projects
- ❑ Considerations for Next Steps

This analysis ***expands the scope of population vulnerability*** to provide a ***data-driven equity lens*** for disaster mitigation project design

Data-Driven Approach

The Health360 platform informs population vulnerability and enables a data-driven approach to operationalizing equity in mitigation projects.

Powered By Health360

230M+
U.S. Adults Scored

Data updated every
1 Month

Contains over
1,500+
variables on Social Determinants of Health and other metrics

150+
Advanced predictive algorithms

400+
Variables used in the mortality predictive algorithm

Provides 360° view of a person

Algorithms rebuilt every 2 years

40+
Clients served

What is hazard risk and how is it calculated?

Household Hazard risk reflects the number of households in each flood or hurricane zone, weighted by severity.

Hazard Risk

Number of households in each zone:

Flood zones
- 100 year coastal
- 100 year riverine flood way
- 100 year riverine
- 500 year riverine

Hurricane zones
- Segmented A, B, C, D

- Households that reside in the flood and hurricane zones are considered to be **at-risk for environmental disasters**
- Hazard Risk reflects **the number of households located in Flood and Hurricane Zones**
- Hazard Risk is not a measure of **infrastructure, elevation, or financial risks**, but is a measure of the number of at-risk households in an area, weighted by the severity of the risk, to **provide a people-focused risk metric**

Note: Severity of the risk per household is captured on an ordinal scale from 1 – least severe (Hurricane Zone D, 500 Year Riverine) to 4 – most severe (Hurricane Zone A, 100 Year Coastal)

Hazard Risk = (# of Households Analyzed in Particular Hurricane or Flood Zones) X (Specified Zone Risk Level (1 through 4 depending on risk severity))

Hazard Risk in Your Locality

The figures below indicate how your locality's hazard risk[1] compares to others in Virginia as well as how many households reside in each flood or hurricane zone.

Hazard Risk[1] Percentile

44th

Your locality has more households in more severe flood/hurricane zones than 44% of other Virginia localities

Hazard Risk[1] Rank

74th

Your locality's Hazard Risk score is ranked 74th out of 132 Virginia localities

Households in Flood Zones & Locality Rank

← Severity			
100 Year Coastal	100 Year Riverine Floodway	100 Year Riverine	500 Year Riverine
0	9	237	1
N/A out of 132 Localities	47th out of 132 Localities	60th out of 132 Localities	91st out of 132 Localities

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk

Households in Hurricane Zones & Locality Rank

← Severity			
Zone A	Zone B	Zone C	Zone D
0	0	0	0
N/A out of 132 Localities	N/A out of 132 Localities	N/A out of 132 Localities	N/A out of 132 Localities

Evacuation zones designated as A through D are in place across coastal Virginia

1. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
2. Note that the total sum of households may be more than the households in your locality because some are located in both flood and hurricane zones

What is population vulnerability and how is it calculated?

The Population Vulnerability score provides a people-focused metric that can be combined with infrastructure, elevation, and financial metrics to support a holistic approach to mitigation planning.

Population Vulnerability

Prevalence of:

1. Communities of color
2. Elevated health risk
3. Low income
4. # of people in household
5. # of children in household
6. Unemployment risk
7. Age (older adults)
8. Lack of vehicle access

- Population Vulnerability **expands upon the 2018 Virginia Hazard Mitigation plan definition** of population vulnerability (density and percentage of total population)
- Population Vulnerability **only considers localities with households in flood or hurricane zones (132 localities)**
- Population Vulnerability **identifies the locality and census blocks/Census Blocks** with the most vulnerable individuals/households on average
- Population Vulnerability should be interpreted as a **household's ability to safely respond** to an environmental disaster

Population Vulnerability in Your Locality

The figures below indicate how your locality's population vulnerability[1] score and composite attributes compare to other localities in Virginia.

Population Vulnerability[1] Percentile

86th

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 86% of other Virginia localities

Population Vulnerability[1] Rank

19th

Your locality's Population Vulnerability score is ranked 19th out of 132 Virginia localities

How DICKENSON COUNTY Compares to Other Localities Across the Eight Vulnerability Attributes

Low Income	Elevated Health Risk	Age	Communities of Color
100th percentile	47th percentile	43rd percentile	2nd percentile

# of Children in Household	# of People in Household	Unemployment Risk	Lack of Vehicle Access
70th percentile	69th percentile	82nd percentile	93rd percentile

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones

Population Vulnerability & Hazard Risk Summary

Understanding population vulnerability and hazard risk in your locality can help support future mitigation projects.

Population Vulnerability[1] Percentile

86th

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 86% of other Virginia localities

Hazard Risk[2] Percentile

44th

Your locality has more households in more severe flood/hurricane zones than 44% of other Virginia localities

Population Vulnerability[1] Rank

19th

Your locality's Population Vulnerability score is ranked 19th out of 132 Virginia localities

Hazard Risk[2] Rank

74th

Your locality's Hazard Risk score is ranked 74th out of 132 Virginia localities

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity

Review of FEMA Funding & Past Mitigation Projects

Review of Mitigation Projects In Your Locality

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.

Total Exclusive Project Funding[1]

$0

This is the total amount of federal funding alloted to mitigation projects solely owned by your locality from 1990-2019

Total Shared Project Funding[1]

$90,000

This is the total amount of federal funding allotted to mitigation projects owned by your locality and at least 1 other from 1990-2019

Exclusive Projects

0

Average Project Size

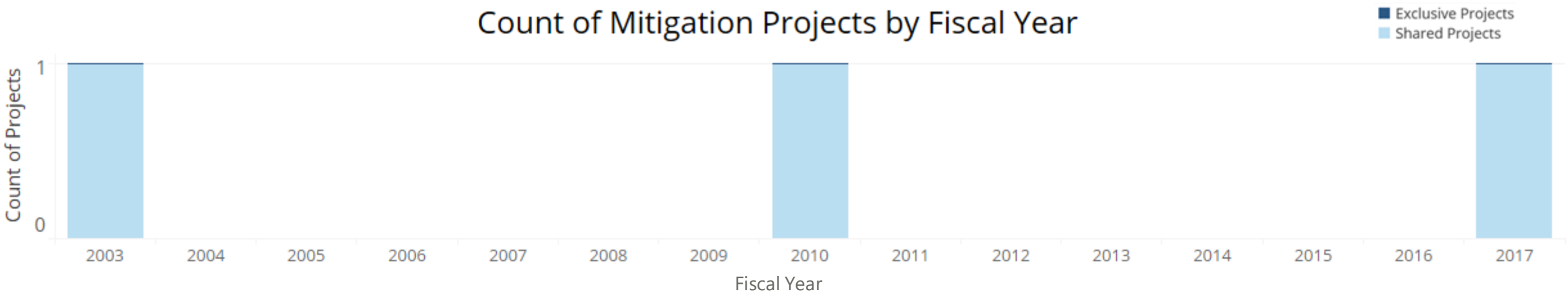
$0

Shared Projects

3

Average Counties Per Project

3.3

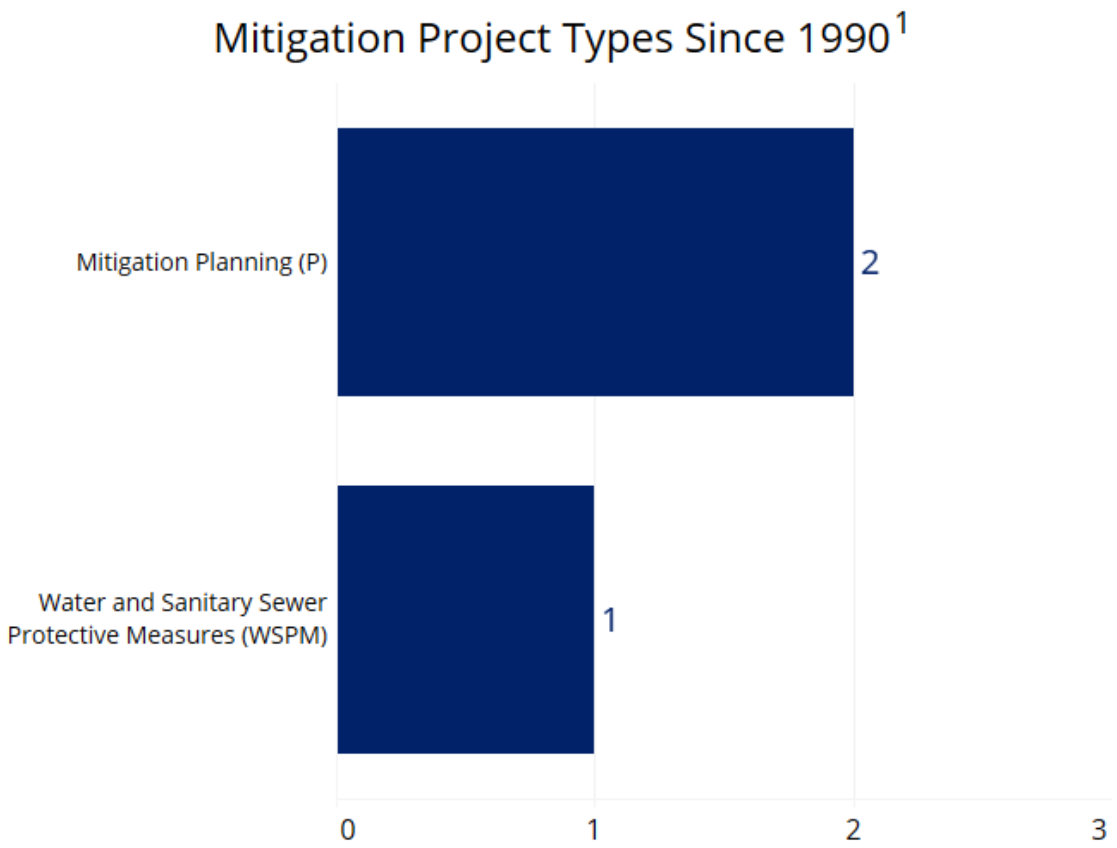


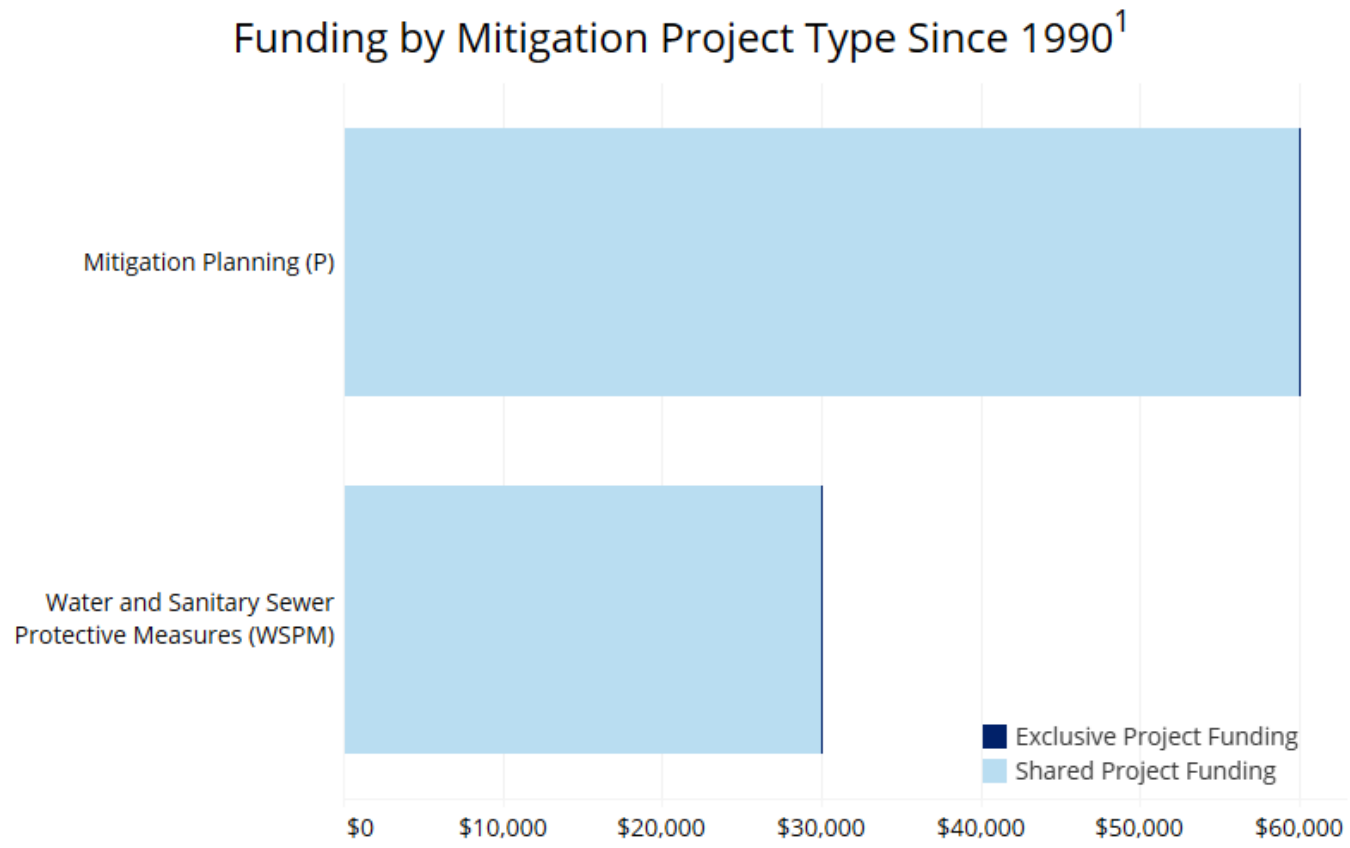
1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

Note: see the appendix for a complete data table of these mitigation projects

Past Mitigation Projects – Top Project Types

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.





1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

Note: see the appendix for a complete data table of these mitigation projects

COVID-19 Impacts

COVID-19 In Your Locality

Since the beginning of the COVID-19 Pandemic, Dickenson County has experienced the following:

Cases[1]

Total	Per 100k
123	**822**
117th out of 133 localities[2]	**122nd** out of 133 localities

Hospitalizations[1]

Total	Per 100k
8	**53**
116th out of 133 localities	**113th** out of 133 localities

Deaths[1]

Total	Per 100k
1	**7**
118th out of 133 localities	**120th** out of 133 localities

1. COVID-19 case, hospitalization, and death figures are sourced from the Virginia Department of Health as of **10/21/2020**
2. COVID-19 Impact rankings are for all 133 Virginia localities, rather than the 132 included in the BRIC analysis for having at least one household in a flood or hurricane zone

Considerations for Next Steps

Considerations for Next Steps

When evaluating future mitigation project opportunities, the population vulnerability and hazard risk metrics can supplement existing measures to design mitigation projects with an equity lens.

- Consider **population vulnerability** and it's various components to support decisions on mitigation projects
- Consider **supplementing these people-focused metrics** with existing infrastructure, elevation, and financial analysis for a holistic mitigation planning approach that includes equity considerations
- Consider **past project types** and **prior funding** in the overall mitigation strategy

Appendix

What is population vulnerability and how is it calculated? *continued*

The vulnerability score for each Virginia household reflects an estimate of the household's ability to safely respond in the event of an environmental disaster.

Population Vulnerability

Attribute[1]	Weighting[2]	Description (in a household)
Low Income	18%	Number of adults with income less than $30,000
Elevated Health Risk	17%	Number of adults with one or more serious health conditions
Age (Older Adults)	15%	Number of adults who are age 65 and older
Communities of Color	13%	Number of Black or African American or Hispanic or Latino adults
# of Children in Household	12%	Number of children
# of People in Household	10%	Number of adults and children
Unemployment Risk	8%	Number of adults at high risk of unemployment
Lack of Vehicle Access	6%	Does the household lack access to a motor vehicle?

1. Two attributes - English as a Primary Language and Prevalence of Mobile Housing - were dropped from consideration based on the 8/20/2020 BRIC Working Group Session
2. Attribute contributions to Population Vulnerability were weighted as a result of the BRIC Working Group Session on 8/20/2020

Data table | FEMA Funding[1]

Grantee	Year of Fiscal Year	Exclusive vs Shared	Subgrantee	Project Counties	Project Type(s)	Federal Funds Obligated
DICKENSON COUNTY	2017	Shared	Cumberland Plateau Planning District Commission	BUCHANAN; DICKENSON; RUSSELL; TAZEWELL	91.5: Local Multijurisdictional Multihazard Mitigation Plan - UPDATE	$30,000
	2010	Shared	Cumberland Plateau Planning District Commission	BUCHANAN; DICKENSON; RUSSELL; TAZEWELL	91.1: Local Multihazard Mitigation Plan	$30,000
	2003	Shared	Chesapeake	DICKENSON	401.1: Water and Sanitary Sewer System Protective Measures	$30,000

1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

COVID-19 Unified Command/VEST Health Equity Working Group

MITIGATION PROJECTS ANALYSIS
BUCHANAN COUNTY

NOVEMBER 2020

Topics

The analysis provides **Buchanan County** with information to support planning and preparation of projects for the Building Resilient Infrastructure and Communities (BRIC) grant application with an equity focus.

- ❑ Introduction to Data-Driven Approach
- ❑ Hazard Risk
- ❑ Population Vulnerability
- ❑ Prioritization
- ❑ FEMA Funding and Past Projects
- ❑ Considerations for Next Steps

This analysis ***expands the scope of population vulnerability*** to provide a ***data-driven equity lens*** for disaster mitigation project design

Data-Driven Approach

The Health360 platform informs population vulnerability and enables a data-driven approach to operationalizing equity in mitigation projects.

Powered By Health360

230M+
U.S. Adults Scored

Data updated every
1 Month

Contains over
1,500+
variables on Social Determinants of Health and other metrics

150+
Advanced predictive algorithms

400+
Variables used in the mortality predictive algorithm

Provides 360° view of a person

Algorithms rebuilt every 2 years

40+
Clients served

What is hazard risk and how is it calculated?

Household Hazard risk reflects the number of households in each flood or hurricane zone, weighted by severity.

Hazard Risk

Number of households in each zone:

Flood zones
- 100 year coastal
- 100 year riverine flood way
- 100 year riverine
- 500 year riverine

Hurricane zones
- Segmented A, B, C, D

- Households that reside in the flood and hurricane zones are considered to be **at-risk for environmental disasters**
- Hazard Risk reflects **the number of households located in Flood and Hurricane Zones**
- Hazard Risk is not a measure of **infrastructure, elevation, or financial risks**, but is a measure of the number of at-risk households in an area, weighted by the severity of the risk, to **provide a people-focused risk metric**

Note: Severity of the risk per household is captured on an ordinal scale from 1 – least severe (Hurricane Zone D, 500 Year Riverine) to 4 – most severe (Hurricane Zone A, 100 Year Coastal)

Hazard Risk = (# of Households in Particular Hurricane or Flood Zones) X (Specified Zone Risk Level (1 through 4 depending on risk severity))

Hazard Risk in Your Locality

The figures below indicate how your locality's hazard risk[1] compares to others in Virginia as well as how many households reside in each flood or hurricane zone.

Hazard Risk[1] Percentile

79th

Your locality has more households in more severe flood/hurricane zones than 79% of other Virginia localities

Hazard Risk[1] Rank

29th

Your locality's Hazard Risk score is ranked 29th out of 132 Virginia localities

Households in Flood Zones & Locality Rank

← Severity			
100 Year Coastal	100 Year Riverine Floodway	100 Year Riverine	500 Year Riverine
0	285	907	167
N/A out of 132 Localities	2nd out of 132 Localities	17th out of 132 Localities	37th out of 132 Localities

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk

Households in Hurricane Zones & Locality Rank

← Severity			
Zone A	Zone B	Zone C	Zone D
0	0	0	0
N/A out of 132 Localities	N/A out of 132 Localities	N/A out of 132 Localities	N/A out of 132 Localities

Evacuation zones designated as A through D are in place across coastal Virginia

1. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
2. Note that the total sum of households may be more than the households in your locality because some are located in both flood and hurricane zones

What is population vulnerability and how is it calculated?

The Population Vulnerability score provides a people-focused metric that can be combined with infrastructure, elevation, and financial metrics to support a holistic approach to mitigation planning.

Population Vulnerability

Prevalence of:

1. Communities of color
2. Elevated health risk
3. Low income
4. # of people in household
5. # of children in household
6. Unemployment risk
7. Age (older adults)
8. Lack of vehicle access

- Population Vulnerability **expands upon the 2018 Virginia Hazard Mitigation plan definition** of population vulnerability (density and percentage of total population)
- Population Vulnerability **only considers localities with households in flood or hurricane zones (132 localities)**
- Population Vulnerability **identifies the locality and census tracts/census blocks** with the most vulnerable individuals/households on average
- Population Vulnerability should be interpreted as a **household's ability to safely respond** to an environmental disaster

Population Vulnerability in Your Locality

The figures below indicate how your locality's population vulnerability[1] score and composite attributes compare to other localities in Virginia.

Population Vulnerability[1] Percentile

79th

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 79% of other Virginia localities

Population Vulnerability[1] Rank

29th

Your locality's Population Vulnerability score is ranked 29th out of 132 Virginia localities

How BUCHANAN COUNTY Compares to Other Localities Across the Eight Vulnerability Attributes

Low Income	Elevated Health Risk	Age	Communities of Color
95th percentile	69th percentile	41st percentile	5th percentile

# of Children in Household	# of People in Household	Unemployment Risk	Lack of Vehicle Access
59th percentile	58th percentile	70th percentile	76th percentile

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones

Using Population Vulnerability & Hazard Risk to Prioritize Census Tracts

Combining population vulnerability and hazard risk at a sub-locality level can identify potential priority areas to support with future mitigation projects.

Population Vulnerability

Prevalence of:

1. Communities of color
2. Elevated health risk
3. Low income
4. # of people in household
5. # of children in household
6. Unemployment risk
7. Age (older adults)
8. Lack of vehicle access

+

Hazard Risk

Number of households in each zone:

Flood zones

- 100 year coastal
- 100 year riverine floodway
- 100 year riverine
- 500 year riverine

Hurricane zones

- Segmented A, B, C, D

=

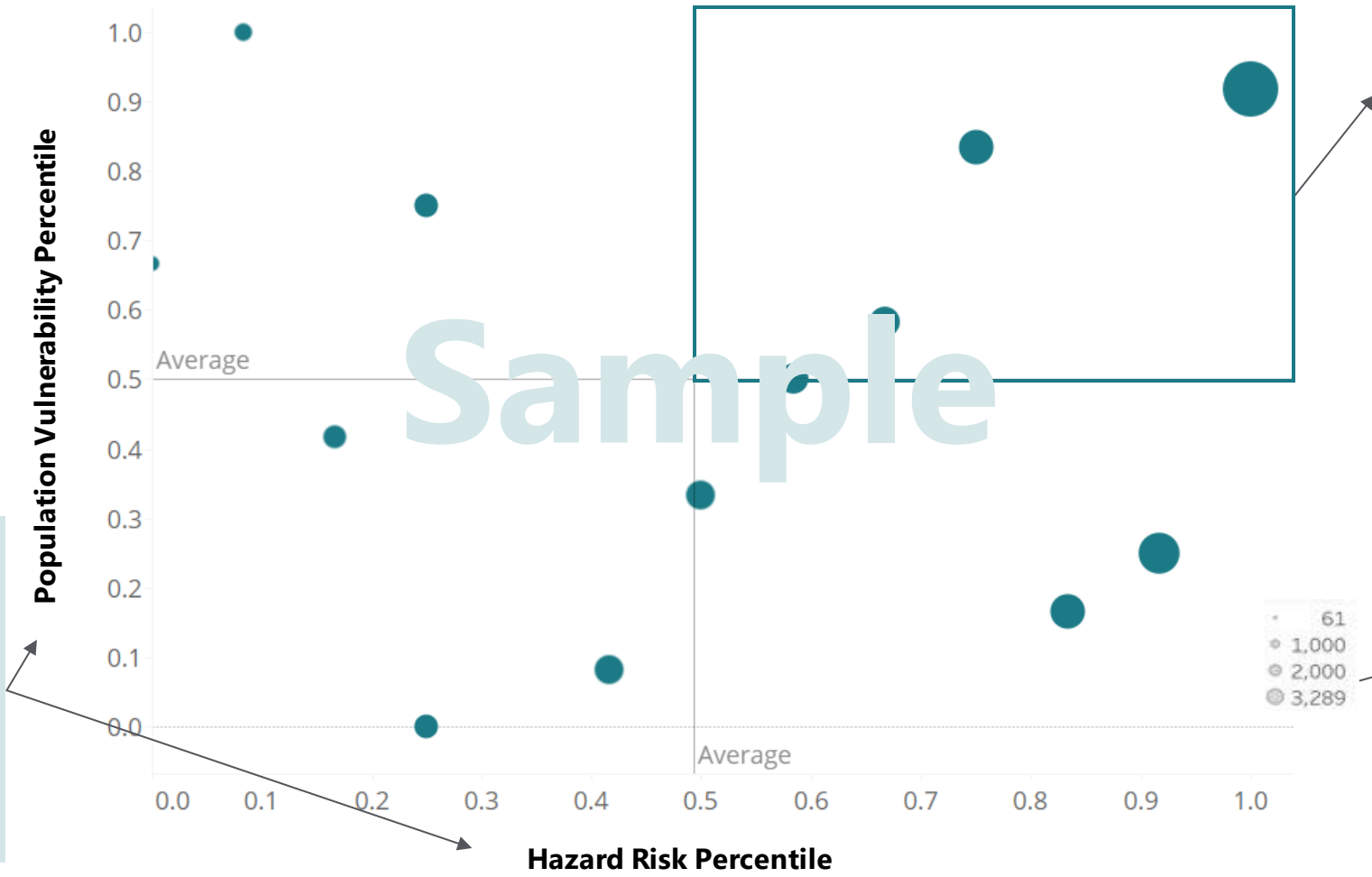
Prioritized Census Tracts

- High Population Vulnerability
- High Hazard Risk

Census tracts with both more households in severe flood/hurricane zones AND households with more vulnerable occupants

How to interpret the Census Tract plots

The chart below represents a *sample* locality and offers guidance on how to interpret the information when planning mitigation efforts.



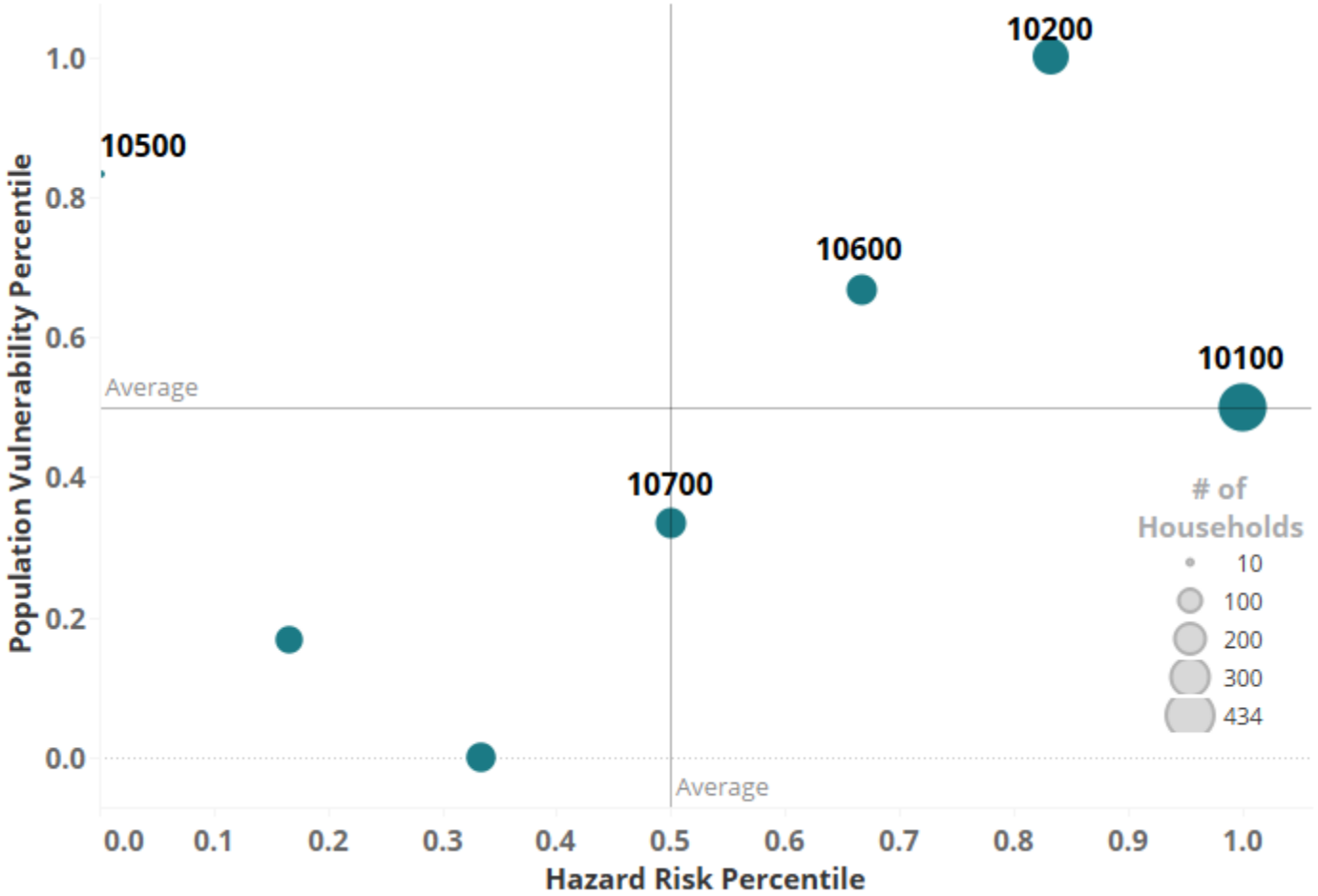
Circles in the upper right quadrant represent areas that you might consider prioritizing due to high population vulnerability and hazard risk

The x- and y-axes measure the percentiles of hazard risk and population vulnerability for each area

Size of the circle indicates the number of households in each area

Prioritizing Census Tracts in Buchanan County

Areas with the most vulnerable populations and households in severe flood and hurricane zones present prioritization opportunities for mitigation projects.



Priority Areas in Flood and Hurricane Zones

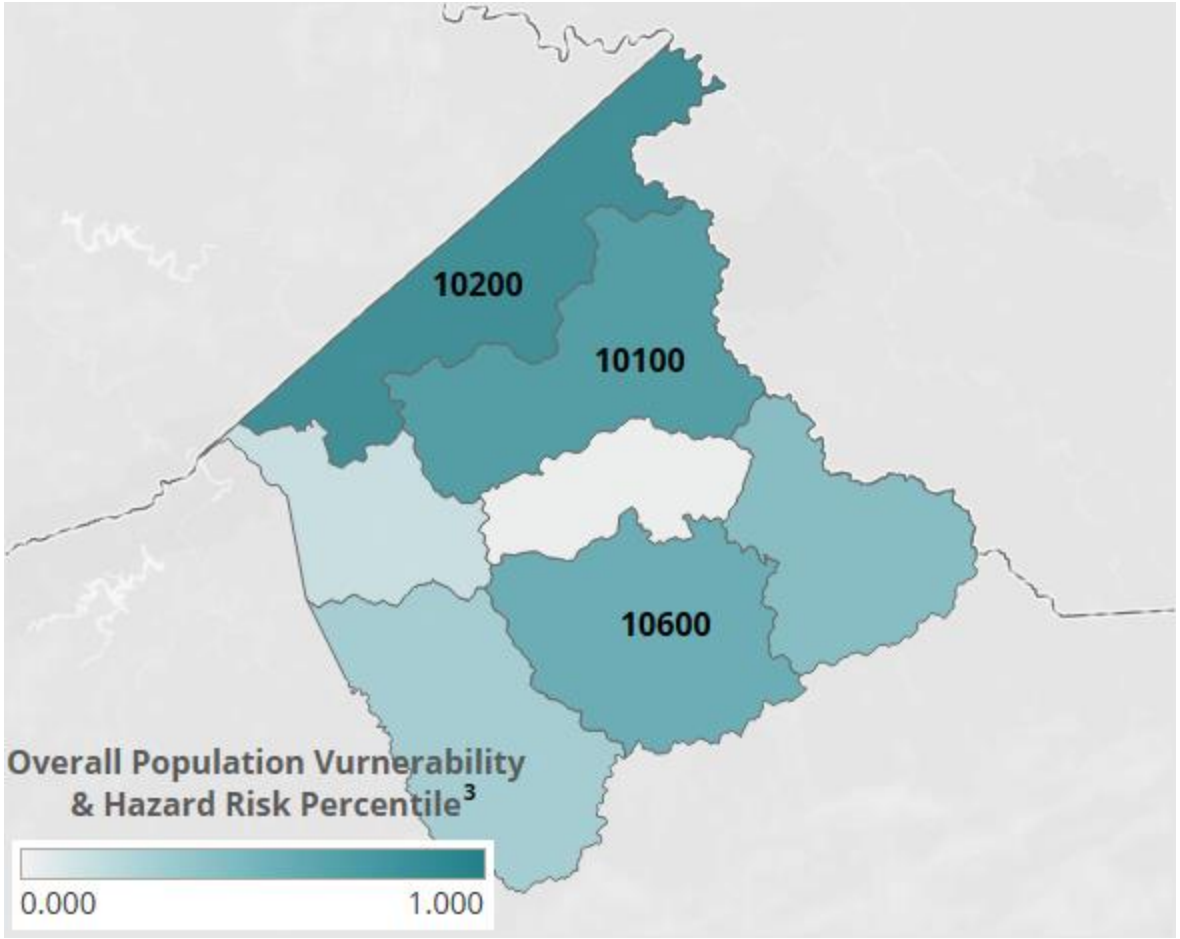
			Within-Buchanan County Percentiles		
#	Area	# of Households	Overall Percentile	Population Vulnerability[1] Percentile	Hazard Risk[2] Percentile
1	10200	245	100th	100th	83rd
2	10100	434	83rd	50th	100th
3	10600	189	67th	67th	67th
4	10500	10	50th	83rd	0th
5	10700	175	33rd	33rd	50th
6	10300	142	17th	17th	17th
7	10400	164	0th	0th	33rd

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity

Prioritizing Census Tracts in Buchanan County continued

Areas with the most vulnerable populations and households in severe flood and hurricane zones present prioritization opportunities for mitigation projects.

Potential Priority Areas in Buchanan County



Priority Areas in Flood and Hurricane Zones

			Within-Buchanan County Percentiles		
#	Area	# of Households	Overall Percentile	Population Vulnerability[1] Percentile	Hazard Risk[2] Percentile
1	10200	245	100th	100th	83rd
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6	10300	142	17th	17th	17th
7	10400	164	0th	0th	33rd

1. Population Vulnerability should be interpreted as a household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
3. Sub-localities at the 0th percentile (areas in white) do not have households in Flood or Hurricane Zones

Priority Census Tracts Summary

When evaluating future mitigation project opportunities, it may be helpful to consider the underlying attributes of population vulnerability and the number of houses in each flood/hurricane zone.

			Within-Buchanan County Percentiles										
#	Census Tract	# of Households	Overall	Population Vulnerability[1]	Communities of Color	Elevated Health Risk	Low Income	# of People	# of Children	Unemployment Risk	Age	Lack of Vehicle Access
1	**10200**	**245**	**100th**	**100th**	33rd	100th	83rd	100th	83rd	17th	67th	100th
2	**10100**	**434**	**83rd**	**50th**	50th	33rd	33rd	67th	50th	50th	17th	83rd
3	**10600**	**189**	**67th**	**67th**	83rd	67th	100th	33rd	33rd	100th	33rd	33rd

			W/I-Buchanan County Percentiles		Buchanan County Household Counts[3]							
#	Census Tract	# of Households	Overall	Hazard Risk[2]	100 Year Coastal	100 Year Riverine FW	100 Year Riverine	500 Year Riverine	Hurr. Zone A	Hurr. Zone B	Hurr. Zone C	Hurr Zone D
1	**10200**	**245**	**100th**	**83rd**	-	34	188	23	-	-	-	-
2	**10100**	**434**	**83rd**	**100th**	-	80	289	65	-	-	-	-
3	**10600**	**189**	**67th**	**67th**	-	17	147	25	-	-	-	-

1. Population Vulnerability should be interpreted as an average household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
3. Note that the total sum of households may be more than the households in your locality because some are located in both flood and hurricane zones

Review of FEMA Funding & Past Mitigation Projects

Review of Mitigation Projects In Your Locality

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.

Total Exclusive Project Funding[1]

$0

This is the total amount of federal funding alloted to mitigation projects solely owned by your locality from 1990-2019

Total Shared Project Funding[1]

$60,000

This is the total amount of federal funding allotted to mitigation projects owned by your locality and at least 1 other from 1990-2019

Exclusive Projects

0

Average Project Size

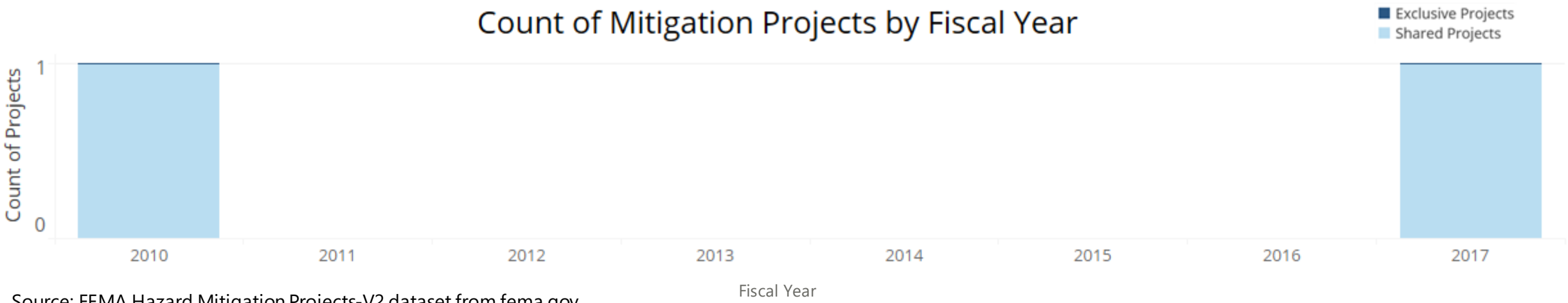
$0

Shared Projects

2

Average Counties Per Project

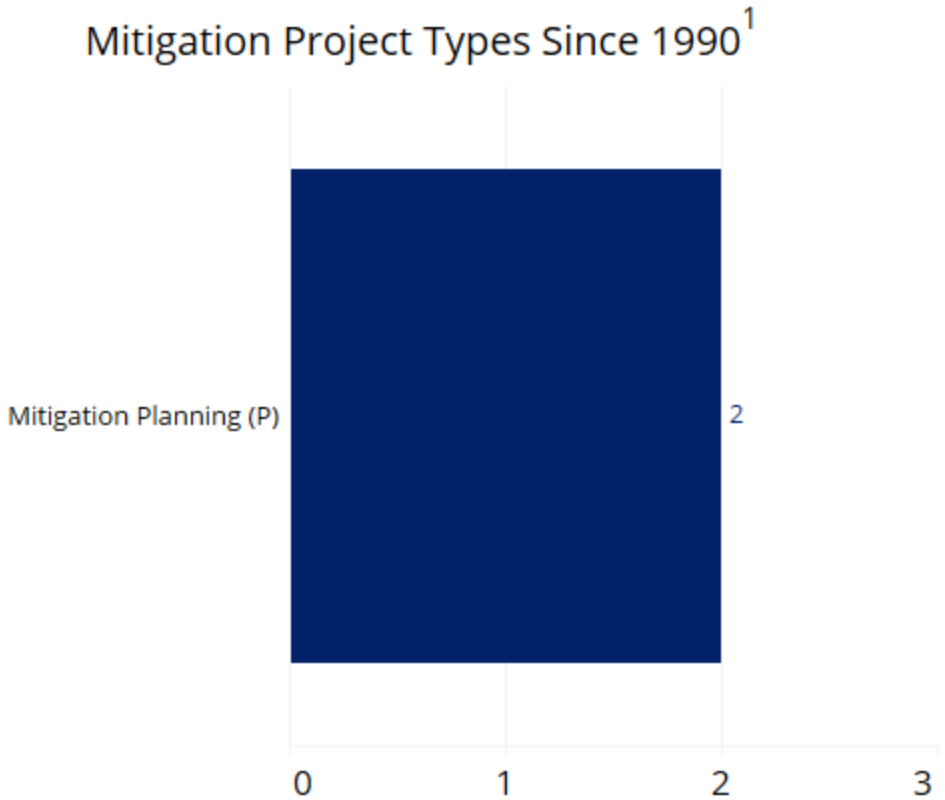
4.0

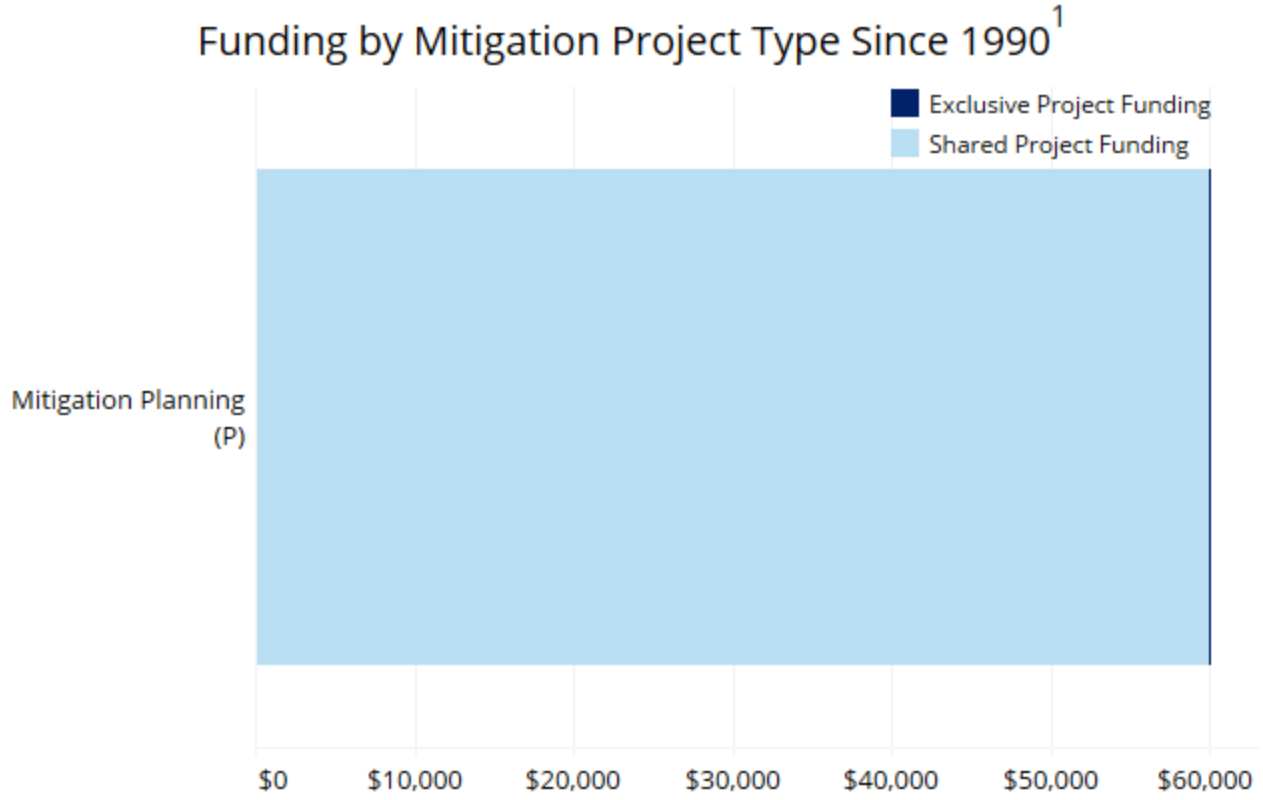


1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

Past Mitigation Projects – Top Project Types

The figures below provide information regarding mitigation projects[1] in your locality from 1990-2019 that may be helpful to consider in planning potential future mitigation projects.





1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

COVID-19 Impacts

COVID-19 In Your Locality

Since the beginning of the COVID-19 Pandemic, Buchanan County has experienced the following:

Cases[1]

Total	Per 100k
266 **99th** out of 133 localities[2]	**1,202** **106th** out of 133 localities

Hospitalizations[1]

Total	Per 100k
15 **97th** out of 133 localities	**68** **104th** out of 133 localities

Deaths[1]

Total	Per 100k
2 **112th** out of 133 localities	**9** **119th** out of 133 localities

1. COVID-19 case, hospitalization, and death figures are sourced from the Virginia Department of Health as of **10/28/2020**
2. COVID-19 Impact rankings are for all 133 Virginia localities, rather than the 132 included in the BRIC analysis for having at least one household in a flood or hurricane zone

Considerations for Next Steps

Considerations for Next Steps

When evaluating future mitigation project opportunities, the population vulnerability and hazard risk metrics can supplement existing measures to design mitigation projects with an equity lens.

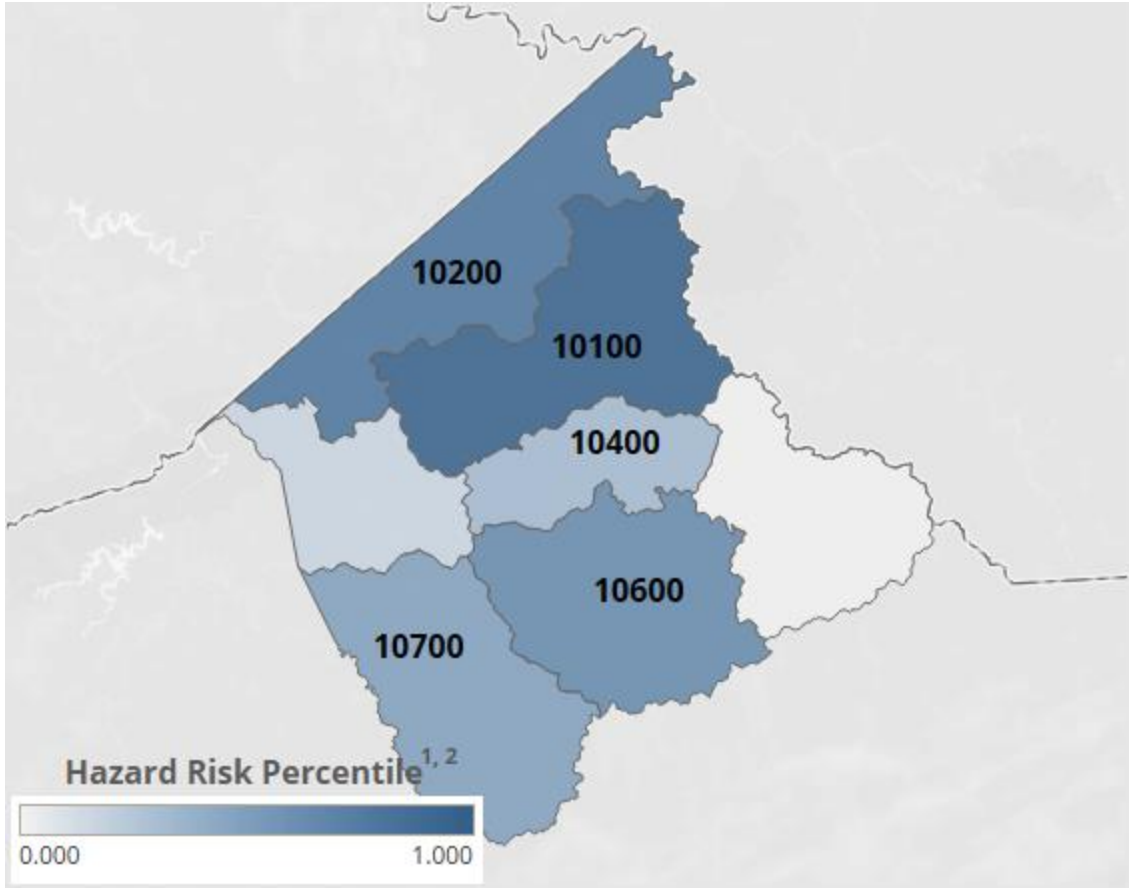
- Consider targeting **priority areas** when designing future mitigation projects
- Consider analysis at the **census tract/block level** to understand population vulnerability and hazard risks at a granular level to support decisions on mitigation projects
- Consider **supplementing these people-focused metrics** with existing infrastructure, elevation, and financial analysis for a holistic mitigation planning approach that includes equity considerations
- Consider **past project types** and **prior funding** in the overall mitigation strategy

Appendix

What areas in your locality have the greatest hazard risk?

When designing mitigation projects, it may be helpful to consider specific census tracts that have the greatest number of households residing in the more severe flood and/or hurricane zones.

Hazard Risk[1] in Buchanan County



Top-5 Census Tracts for Hazard Risk[1]

				Buchanan County Household Counts							
#	Census Tract	# of House-holds	Hazard Risk Percentile	100 Year Coastal	100 Year Riverine FW	100 Year Riverine	500 Year Riverine	Hurr. Zone A	Hurr. Zone B	Hurr. Zone C	Hurr. Zone D
1	**10100**	**434**	**100th**	0	80	289	65	0	0	0	0
2	**10200**	**245**	**83rd**	0	34	188	23	0	0	0	0
3	**10600**	**189**	**67th**	0	17	147	25	0	0	0	0
4	**10700**	**175**	**50th**	0	54	113	8	0	0	0	0
5	**10400**	**164**	**33rd**	0	53	75	36	0	0	0	0

Note: see the appendix for a complete data table for all Census Tracts

1. Hazard risk reflects the number of households located in Flood and Hurricane Zones, weighted by severity
2. Census tracts at the 0th percentile (areas in white) do not have households in Flood or Hurricane Zones

What is population vulnerability and how is it calculated? *continued*

The vulnerability score for each Virginia household reflects an estimate of the household's ability to safely respond in the event of an environmental disaster.

Population Vulnerability

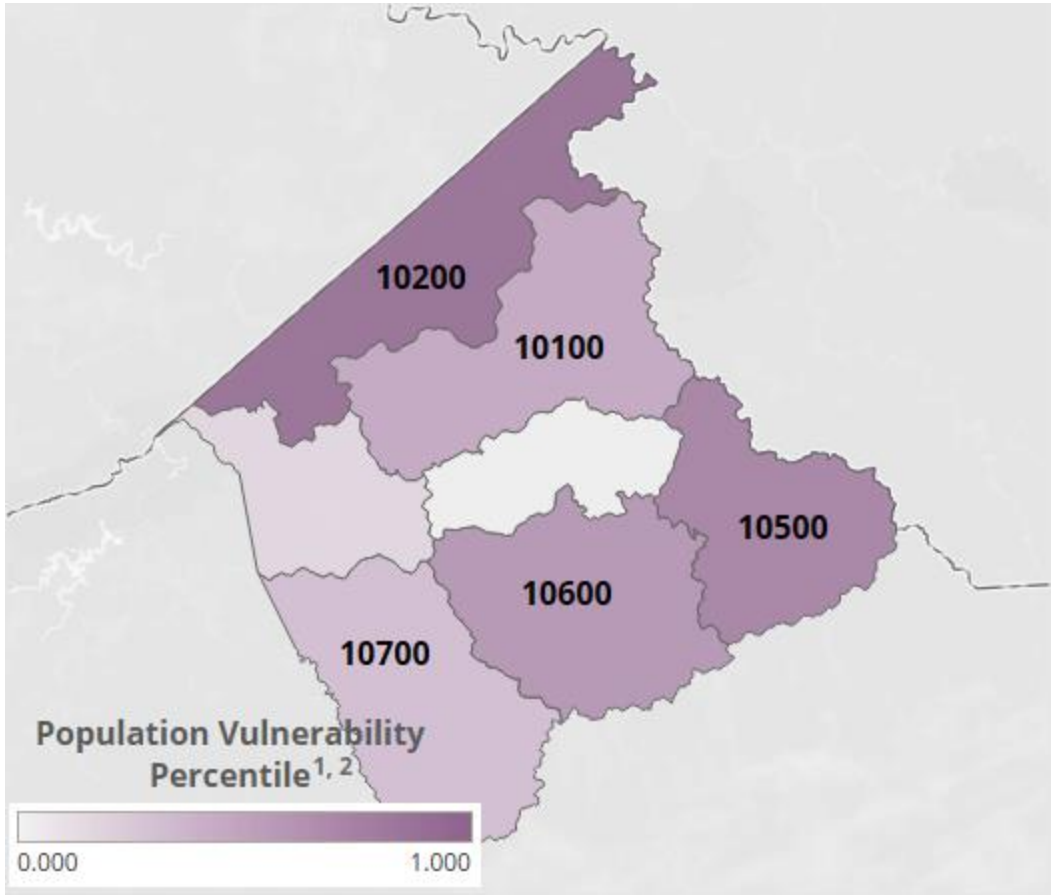
Attribute[1]	Weighting[2]	Description (in a household)
Low Income	18%	Number of adults with income less than $30,000
Elevated Health Risk	17%	Number of adults with one or more serious health conditions
Age (Older Adults)	15%	Number of adults who are age 65 and older
Communities of Color	13%	Number of Black or African American or Hispanic or Latino adults
# of Children in Household	12%	Number of children
# of People in Household	10%	Number of adults and children
Unemployment Risk	8%	Number of adults at high risk of unemployment
Lack of Vehicle Access	6%	Does the household lack access to a motor vehicle?

1. Two attributes - English as a Primary Language and Prevalence of Mobile Housing - were dropped from consideration based on the 8/20/2020 BRIC Working Group Session
2. Attribute contributions to Population Vulnerability were weighted as a result of the BRIC Working Group Session on 8/20/2020

What areas in your locality have the greatest population vulnerability?

When designing mitigation projects, it may be helpful to consider specific census tracts that are home to the most vulnerable individuals in the event of an environmental disaster.

Population Vulnerability[1] in Buchanan County



Top-5 Census Tracts for Population Vulnerability[1]

			Within-Buchanan County Percentiles								
#	Census Tract	# of House-holds	Pop. Vul.	Comm. of Color	Elevated Health Risk	Low Income	# of People	# of Children	Unem. Risk	Age	Vehicle Access
1	**10200**	**245**	**100th**	33rd	100th	83rd	100th	83rd	17th	67th	100th
2	**10500**	**10**	**83rd**	100th	83rd	67th	0th	0th	67th	100th	67th
3	**10600**	**189**	**67th**	83rd	67th	100th	33rd	33rd	100th	33rd	33rd
4	**10100**	**434**	**50th**	50th	33rd	33rd	67th	50th	50th	17th	83rd
5	**10700**	**175**	**33rd**	17th	50th	50th	17th	17th	33rd	50th	0th

Note: See the appendix for a complete data table for all census tracts

1. Population Vulnerability should be interpreted as an average household's ability to safely respond to an environmental disaster and only considers households located in flood or hurricane zones
2. Census tracts at the 0th percentile (areas in white) do not have households in Flood or Hurricane Zones

Data table | Population Vulnerability & Hazard Risk

			Percentiles										Within-locality Household Counts							
#	Census Tract	# of Households	Overall	Population Vulnerability	Communities of Color	Elevated Health Risk	Low Income	# of People	# of Children	Unem-ployment Risk	Age	Lack of Vehicle Access	Hazard Risk	100 Year Coastal	100 Year Riverine FW	100 Year Riverine	500 Year Riverine	Hurr. Zone A	Hurr. Zone B	Hurr. Zone C	Hurr Zone D
1	**10200**	**245**	**100th**	100th	33rd	100th	83rd	100th	83rd	17th	67th	100th	83rd	0	34	188	23	0	0	0	0
2	**10100**	**434**	**83rd**	50th	50th	33rd	33rd	67th	50th	50th	17th	83rd	100th	0	80	289	65	0	0	0	0
3	**10600**	**189**	**67th**	67th	83rd	67th	100th	33rd	33rd	100th	33rd	33rd	67th	0	17	147	25	0	0	0	0
4	**10500**	**10**	**50th**	83rd	100th	83rd	67th	0th	0th	67th	100th	67th	0th	0	2	4	4	0	0	0	0
5	**10700**	**175**	**33rd**	33rd	17th	50th	50th	17th	17th	33rd	50th	0th	50th	0	54	113	8	0	0	0	0
6	**10300**	**142**	**17th**	17th	0th	17th	17th	83rd	67th	0th	83rd	50th	17th	0	45	91	6	0	0	0	0
7	**10400**	**164**	**0th**	0th	67th	0th	0th	50th	100th	83rd	0th	17th	33rd	0	53	75	36	0	0	0	0

1. Note: These figures only account for census areas that have households in flood and/or hurricane zones

Data table | FEMA Funding[1]

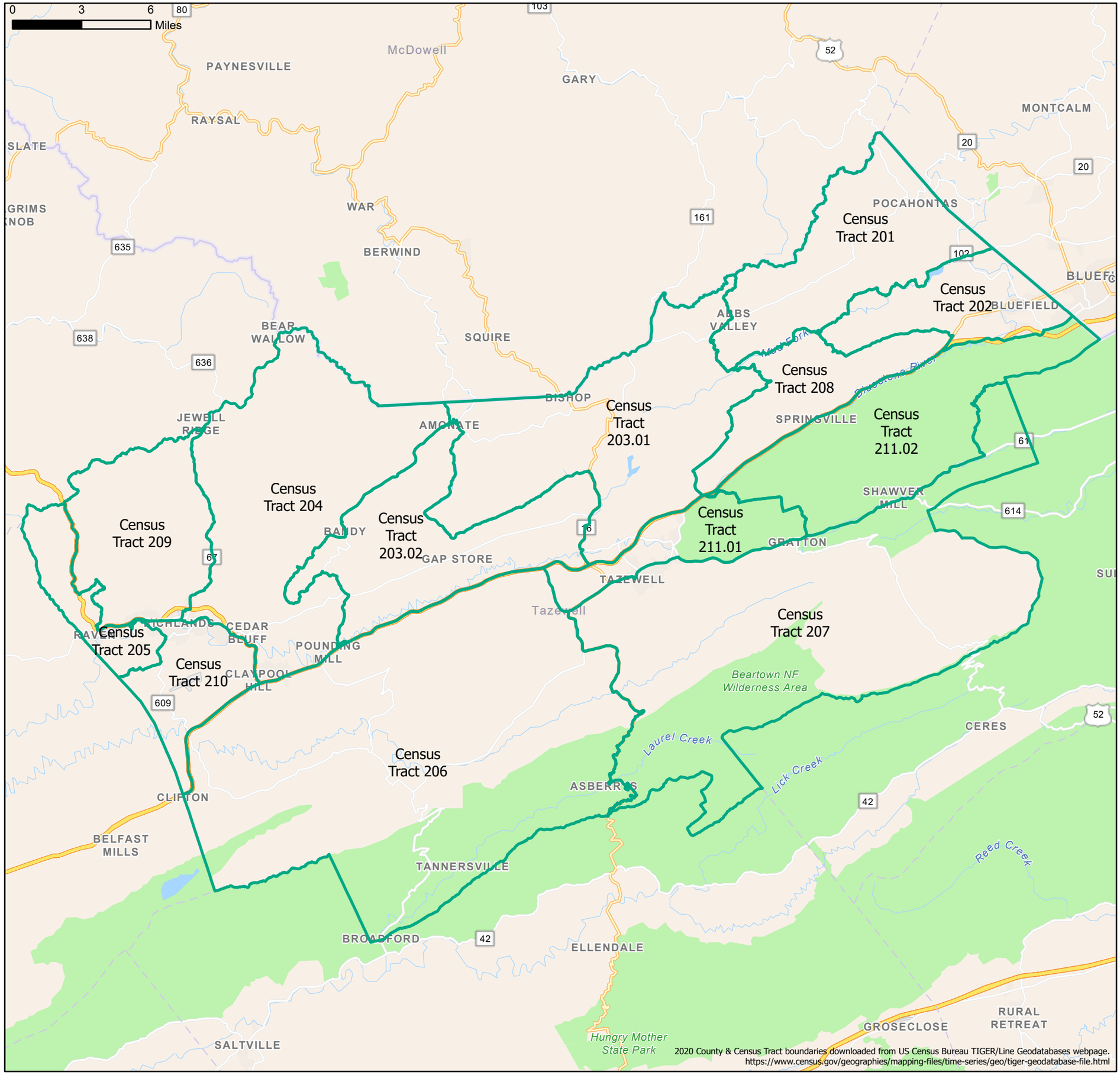
Grantee	Year of Fiscal Year	Exclusive vs Shared	Subgrantee	Project Counties	Project Type(s)	Federal Funds Obligated
BUCHANAN COUNTY	2017	Shared	Cumberland Plateau Planning District Commission	BUCHANAN; DICKENSON; RUSSELL; TAZEWELL	91.5: Local Multijurisdictional Multihazard Mitigation Plan - UPDATE	$30,000
	2010	Shared	Cumberland Plateau Planning District Commission	BUCHANAN; DICKENSON; RUSSELL; TAZEWELL	91.1: Local Multihazard Mitigation Plan	$30,000

1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

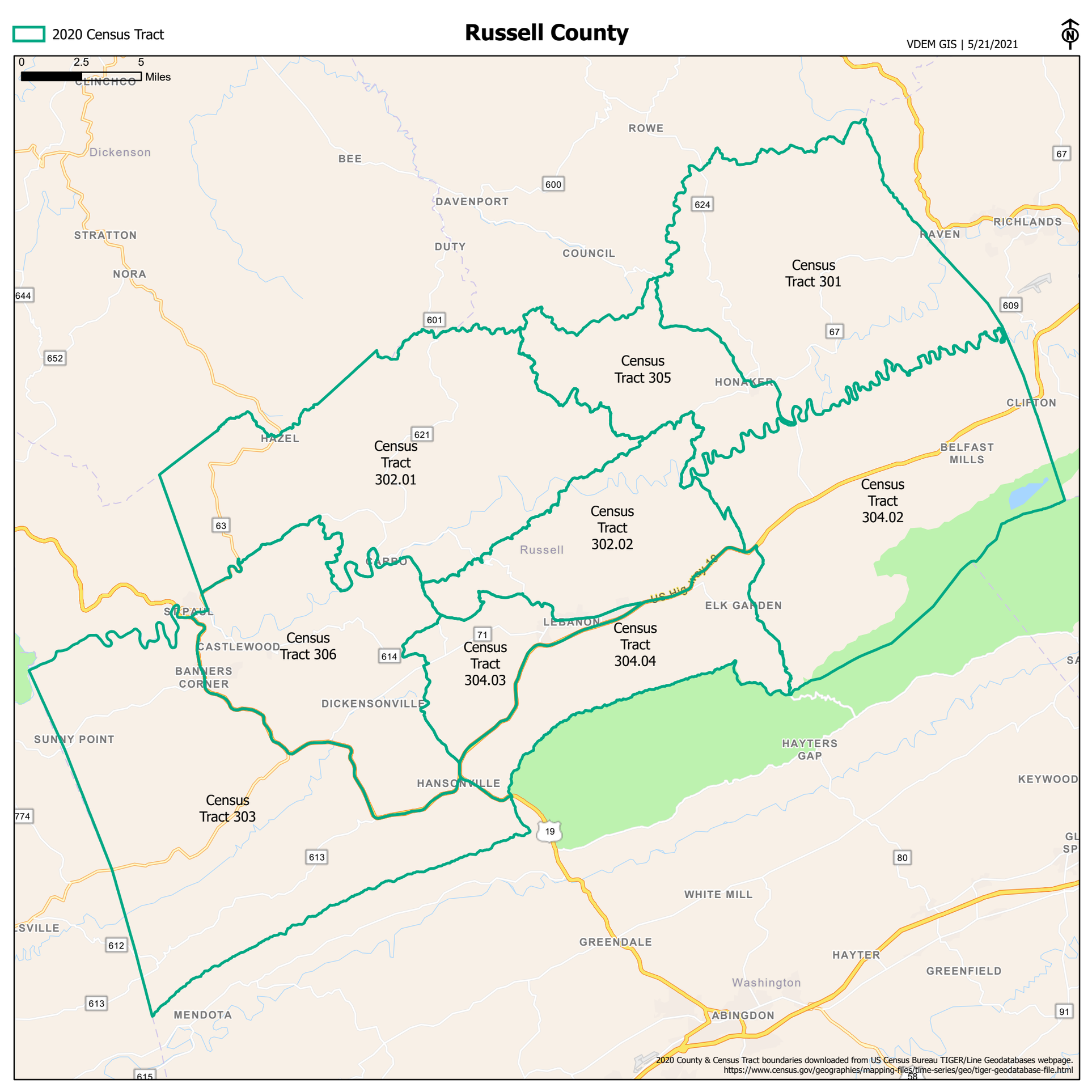
Tazewell County

2020 Census Tract

VDEM GIS | 5/21/2021



2020 County & Census Tract boundaries downloaded from US Census Bureau TIGER/Line Geodatabases webpage.
https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-geodatabase-file.html


2020 Census Tract
Russell County
VDEM GIS | 5/21/2021
0 2.5 5 Miles
Census Tract 301
Census Tract 305
Census Tract 302.01
Census Tract 302.02
Census Tract 304.02
Census Tract 306
Census Tract 304.03
Census Tract 304.04
Census Tract 303
Dickenson
BEE
ROWE
DAVENPORT
STRATTON
DUTY
COUNCIL
NORA
RAVEN
RICHLANDS
HONAKER
CLIFTON
BELFAST MILLS
HAZEL
Russell
CARBO
LEBANON
ELK GARDEN
CASTLEWOOD
BANNERS CORNER
DICKENSONVILLE
SUNNY POINT
HANSONVILLE
HAYTERS GAP
KEYWOOD
WHITE MILL
GREENDALE
HAYTER
GREENFIELD
Washington
ABINGDON
MENDOTA
600
624
67
644
601
609
652
621
63
71
614
19
80
613
612
91
615
2020 County & Census Tract boundaries downloaded from US Census Bureau TIGER/Line Geodatabases webpage.
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2020 Census Tract

Dickenson County

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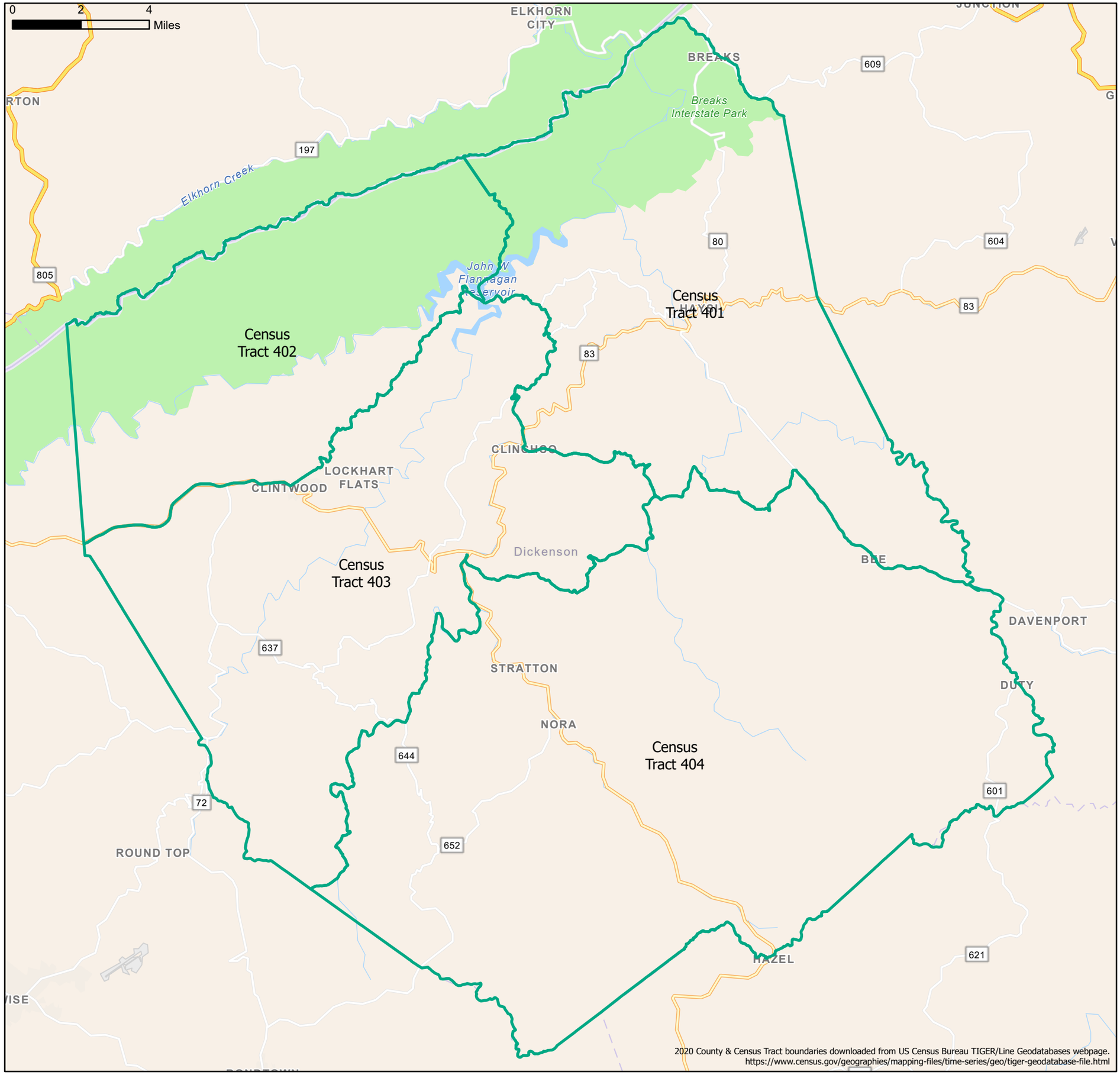

2020 County & Census Tract boundaries downloaded from US Census Bureau TIGER/Line Geodatabases webpage.
https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-geodatabase-file.html

2020 Census Tract

Buchanan County

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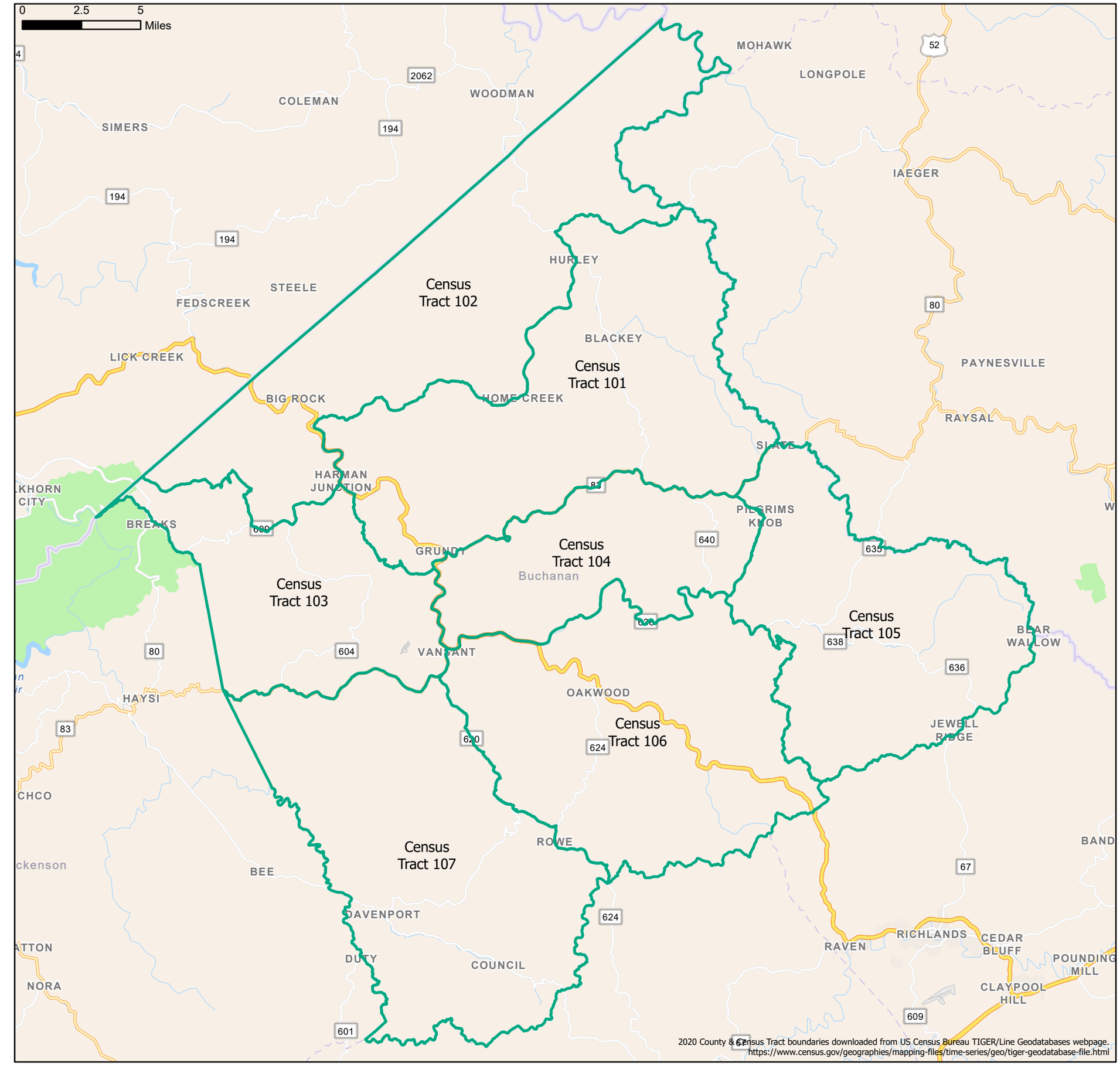

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