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

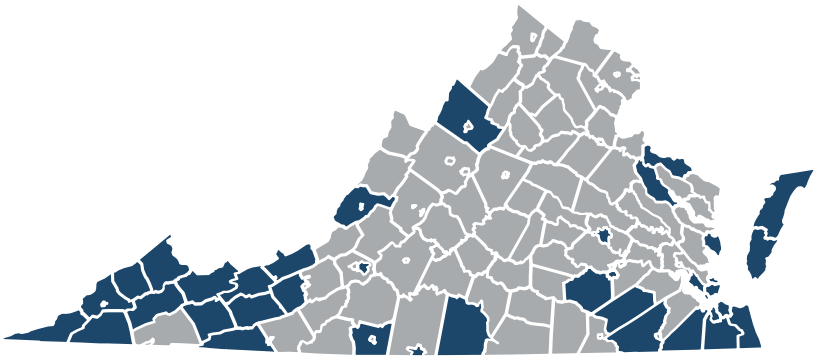
Reflects the number of households in each flood or hurricane zone weighted by risk severity to provide a people-focused risk metric.

## 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 12, 2021 from 10am to 12pm

- Chesapeake
- Norfolk
- Portsmouth
- Virginia Beach

## 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.

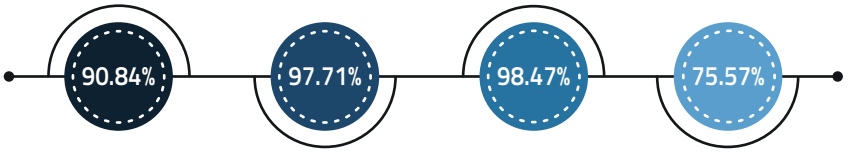
## HAZARD RISK

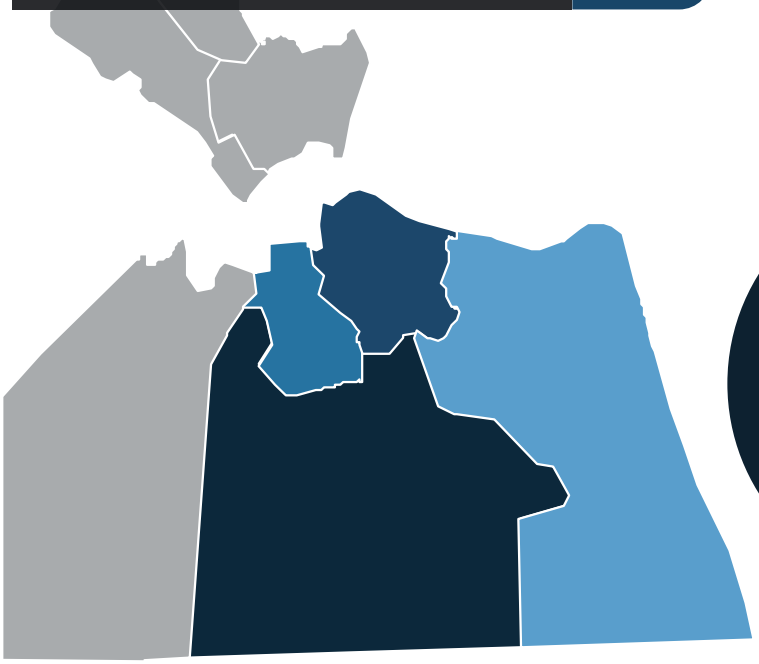
Reflects the number of house-holds in each flood or hurricane zone weighted by risk severity to provide a people-focused risk metric.

## PRIORITIZED CENSUS TRACTS

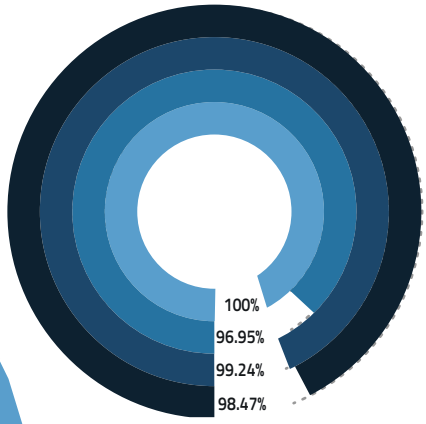
Combining population vulnerability and hazard risk at a sub-locality level can identify potential priority areas to support with future mitigation projects.

## OVERALL PERCENTILE

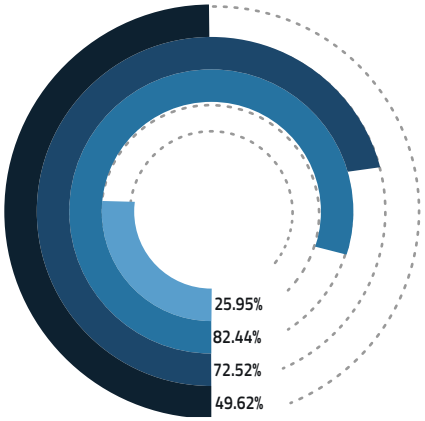


## HAZARD RISK PERCENTILE




## POPULATION VULNERABILITY PECENTILE




FACILITATED BY The Virginia Modeling, Analysis, and Simulation Center

# COVID-19 Unified Command/VEST Health Equity Working Group

MITIGATION PROJECTS ANALYSIS
VIRGINIA BEACH

NOVEMBER 2020

# Topics

The analysis provides **Virginia Beach** 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

**100th**

Your locality has more households in more severe flood/hurricane zones than 100% of other Virginia localities

## Hazard Risk[1] Rank

**1st**

Your locality's Hazard Risk score is ranked 1st 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 |
| 133 | 117 | 20,387 | 16,011 |
| 1st out of 132 Localities | 10th out of 132 Localities | 1st out of 132 Localities | 2nd 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 |
| 11,874 | 50,752 | 91,988 | 47,617 |
| 4th out of 132 Localities | 1st out of 132 Localities | 1st out of 132 Localities | 1st 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

**26th**

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 26% of other Virginia localities

## Population Vulnerability[1] Rank

**98th**

Your locality's Population Vulnerability score is ranked 98th out of 132 Virginia localities

## How VIRGINIA BEACH CITY Compares to Other Localities Across the Eight Vulnerability Attributes

| Low Income | Elevated Health Risk | Age | Communities of Color |
|---|---|---|---|
| **27th** percentile | **27th** percentile | **22nd** percentile | **66th** percentile |

| # of Children in Household | # of People in Household | Unemployment Risk | Lack of Vehicle Access |
|---|---|---|---|
| **73rd** percentile | **66th** percentile | **38th** percentile | **27th** 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

=

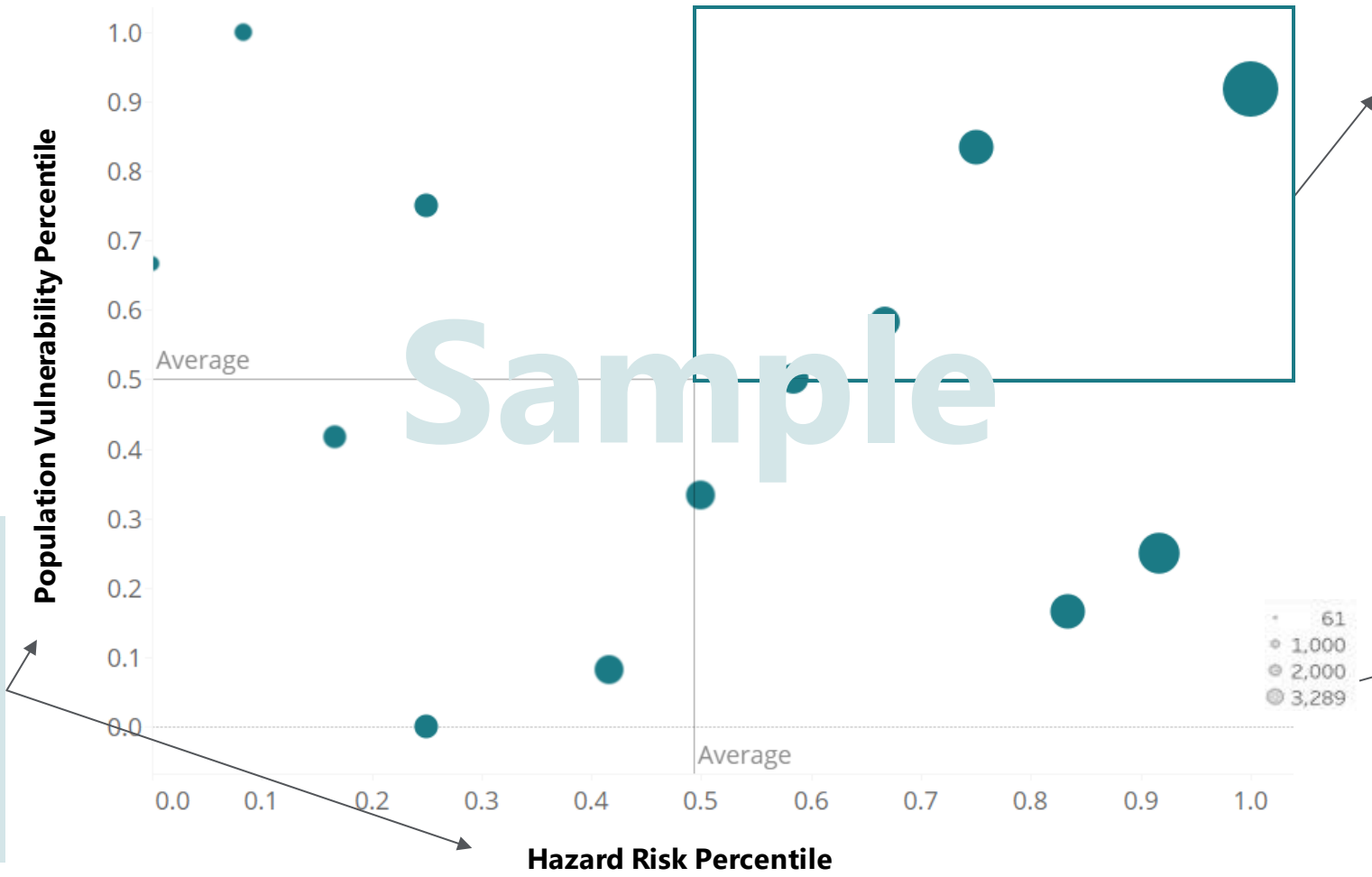
## Prioritized Census Tracts

- 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.



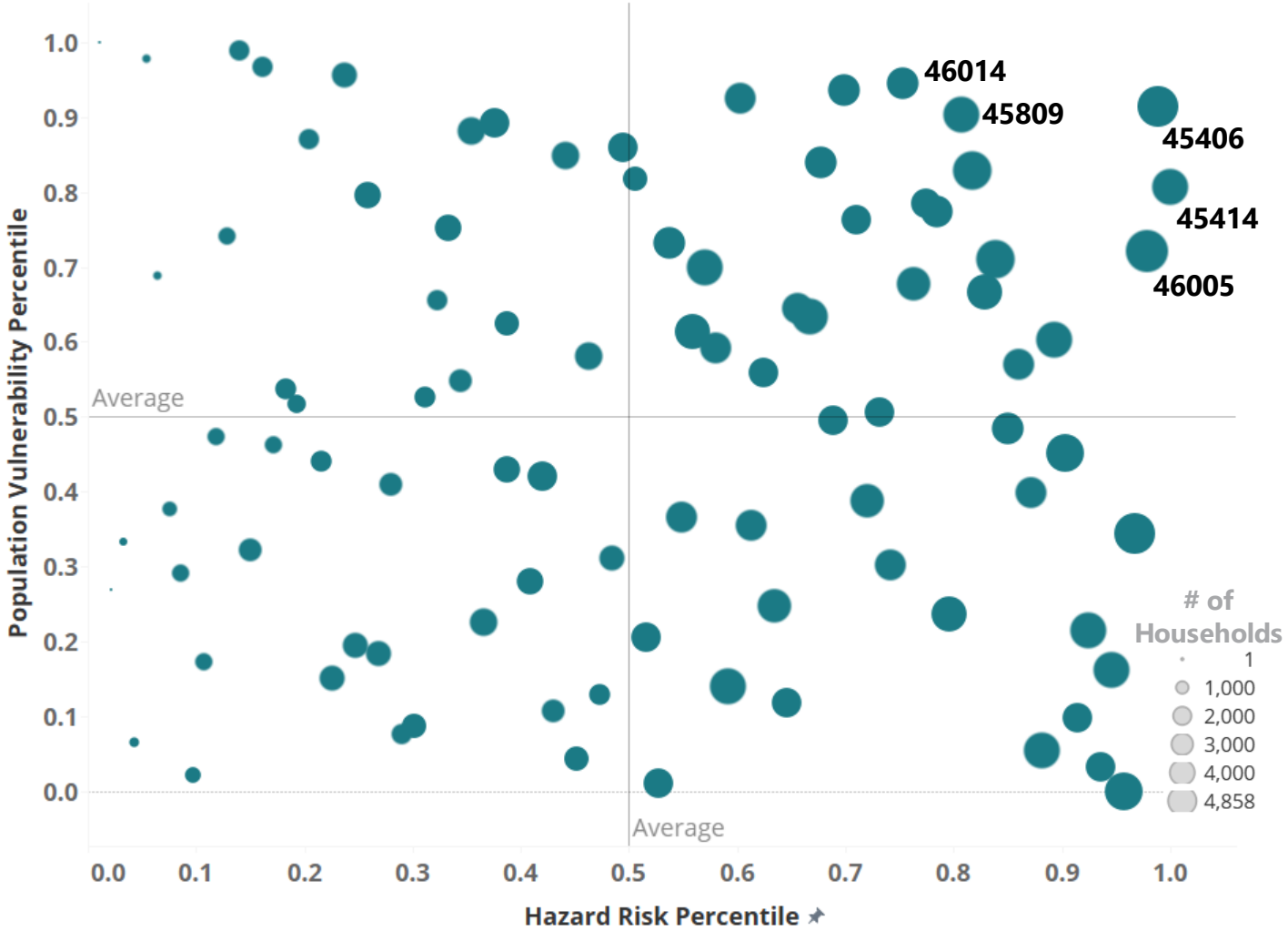

Circles in the upper right quadrant represent areas that you might consider prioritizing due to high population vulnerability and hazard risk

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 Virginia Beach

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

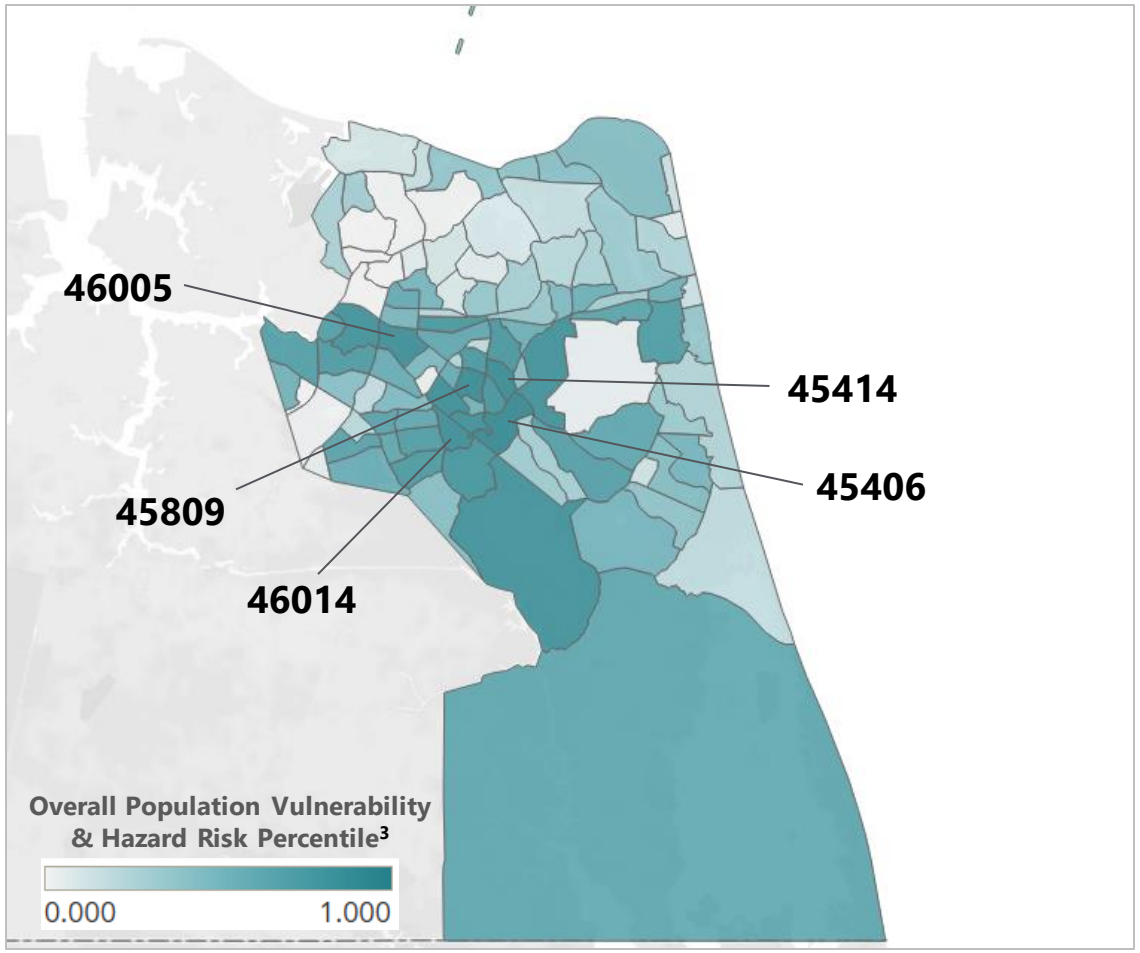
| # | Area | # of Households | Within-Virginia Beach Percentiles: Overall Percentile | Population Vulnerability[1] Percentile | Hazard Risk[2] Percentile |
|---|---|---|---|---|---|
| 1 | 45406 | 4,476 | 100th | 91st | 99th |
| 2 | 45414 | 3,490 | 99th | 81st | 100th |
| 3 | 45809 | 3,579 | 98th | 90th | 81st |
| 4 | 46005 | 4,858 | 96th | 72nd | 98th |
| 5 | 46014 | 2,831 | 96th | 95th | 75th |
| 6 | 46012 | 4,054 | 95th | 83rd | 82nd |
| 7 | 46013 | 2,814 | 94th | 94th | 70th |
| 8 | 46009 | 2,696 | 91st | 77th | 78th |

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 Virginia Beach 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 Virginia Beach




Priority Areas in Flood and Hurricane Zones

| # | Area | # of Households | Within-Virginia Beach Percentiles: Overall Percentile | Within-Virginia Beach Percentiles: Population Vulnerability[1] Percentile | Within-Virginia Beach Percentiles: Hazard Risk[2] Percentile |
|---|---|---|---|---|---|
| **1** | **45406** | **4,476** | **100th** | 91st | 99th |
| **2** | **45414** | **3,490** | **99th** | 81st | 100th |
| **3** | **45809** | **3,579** | **98th** | 90th | 81st |
| **4** | **46005** | **4,858** | **96th** | 72nd | 98th |
| **5** | **46014** | **2,831** | **96th** | 95th | 75th |
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| **8** | **46009** | **2,696** | **91st** | 77th | 78th |

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-Virginia Beach 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 | **45406** | **4476** | **100th** | **91st** | 89th | 48th | 77th | 53rd | 74th | 71st | 13rd | 58th |
| 2 | **45414** | **3490** | **99th** | **81st** | 90th | 14th | 82nd | 40th | 52nd | 66th | 20th | 52nd |
| 3 | **45809** | **3579** | **98th** | **90th** | 94th | 53rd | 69th | 28th | 38th | 58th | 23rd | 37th |

| | | | W/I-Virginia Beach Percentiles | | Virginia Beach 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 | **45406** | **4,476** | **100th** | **99th** | 0 | 0 | 1,081 | 913 | 0 | 2,228 | 2,248 | 0 |
| 2 | **45414** | **3,490** | **99th** | **100th** | 0 | 0 | 2,592 | 578 | 0 | 3,490 | 0 | 0 |
| 3 | **45809** | **3,579** | **98th** | **81st** | 0 | 0 | 0 | 4 | 0 | 0 | 3,579 | 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]**

**$8,415,537**

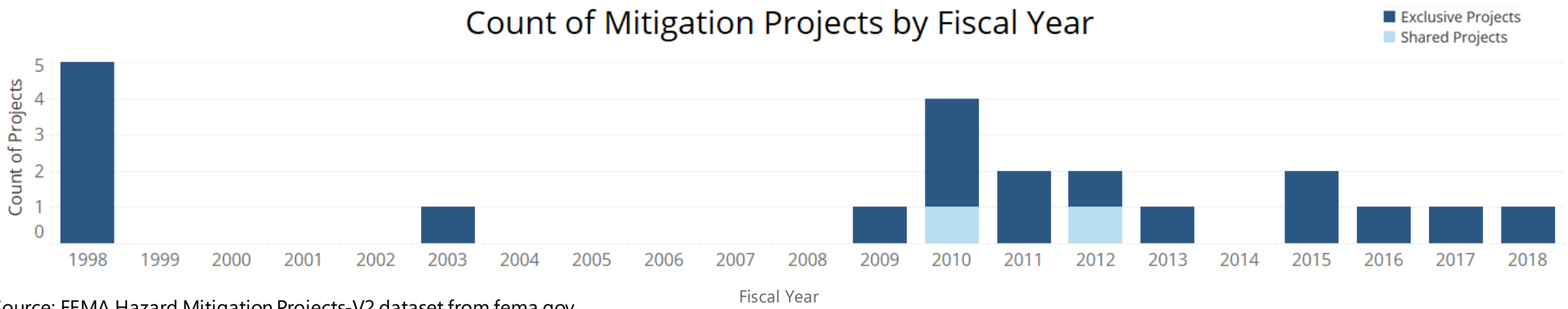
This is the total amount of federal funding alloted to mitigation projects solely owned by your locality from 1990-2019

**Total Shared Project Funding[1]**

**$255,941**

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

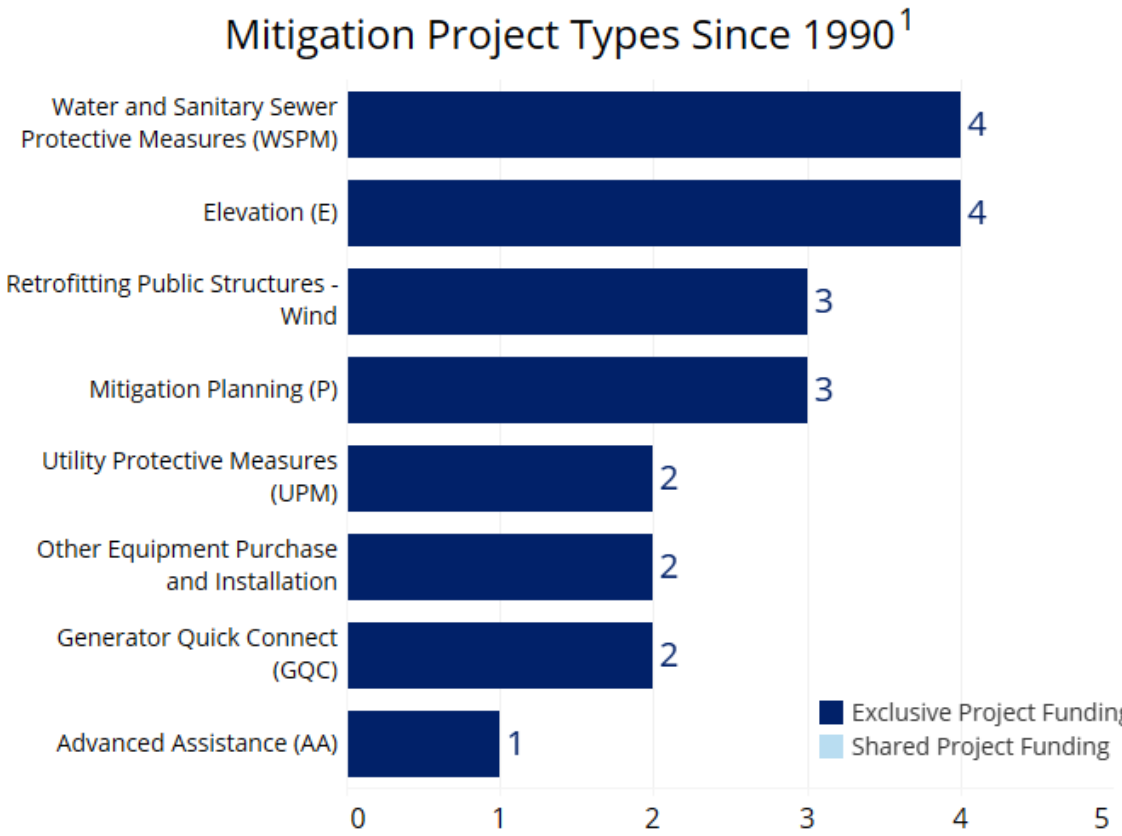
| Exclusive Projects | Average Exclusive Project Size | Shared Projects | Average Counties Per Shared Project |
|---|---|---|---|
| 19 | $443K | 2 | 9.5 |

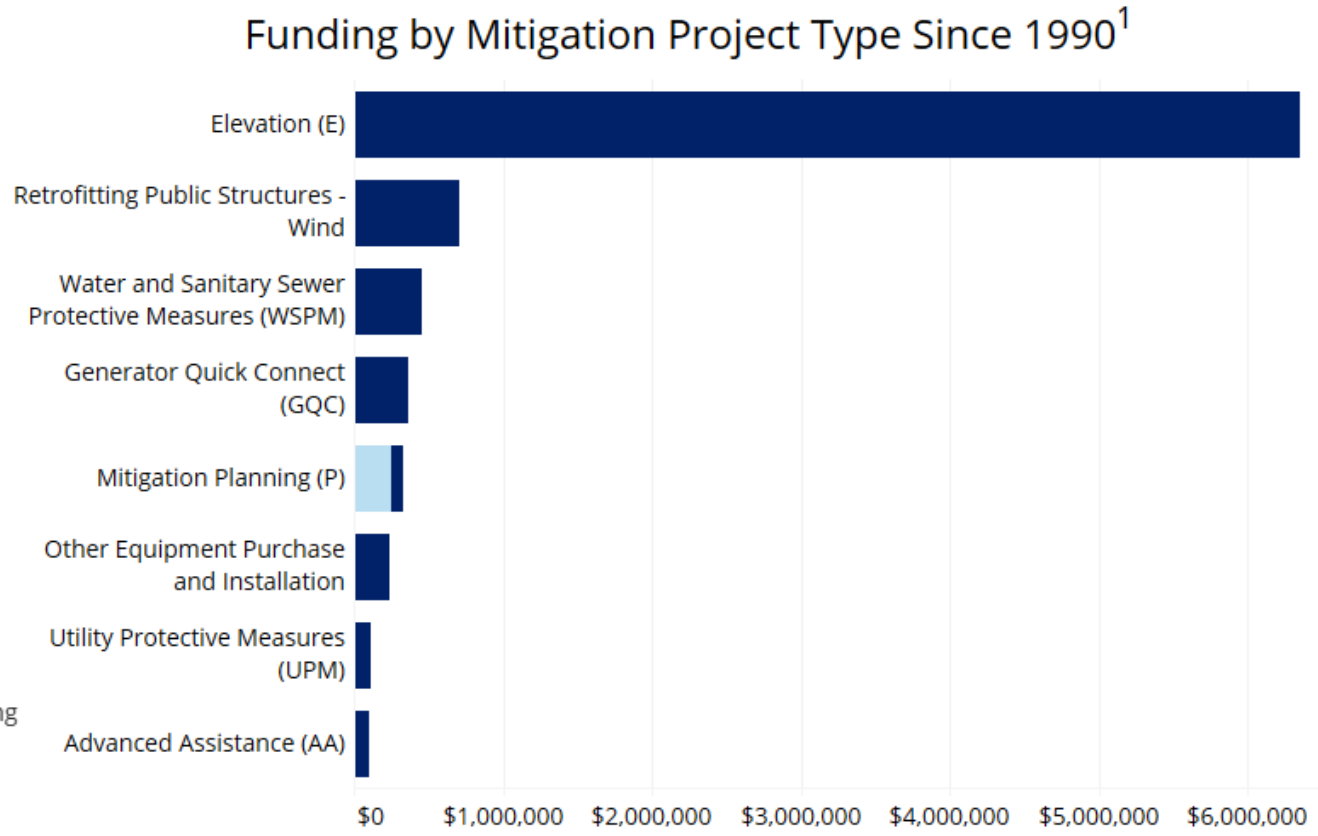



1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

# Past Mitigation Projects – Top Project Types

From 1990-2019, the top projects included WSPM, Elevation, and Retrofitting Public Structures. The project types that received the most funding were Elevation and Retrofitting Public Structures - Wind.




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, Virginia Beach has experienced the following:

## Cases[1]

| Total | Per 100k |
|---|---|
| **8,419**<br>**3rd** out of 133 localities[2] | **1,870**<br>**71st** out of 133 localities |

## Hospitalizations[1]

| Total | Per 100k |
|---|---|
| **454**<br>**8th** out of 133 localities | **101**<br>**79th** out of 133 localities |

## Deaths[1]

| Total | Per 100k |
|---|---|
| **108**<br>**7th** out of 133 localities | **24**<br>**85th** out of 133 localities |

1. COVID-19 case, hospitalization, and death figures are sourced from the Virginia Department of Health as of **11/4/2020**
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.

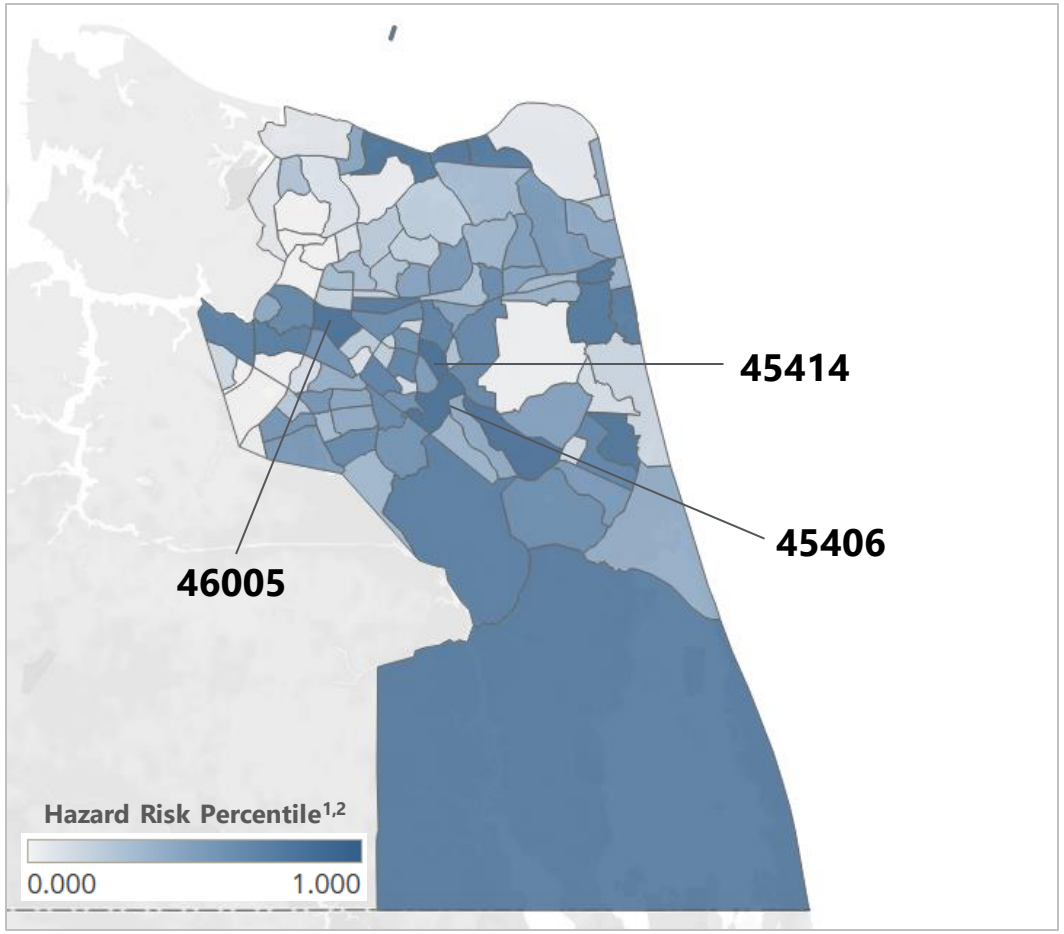
- Consider targeting **priority areas** when designing future mitigation projects
- Consider analysis at the **census tract/block level** to understand population vulnerability and hazard risks at a granular level to support decisions on mitigation projects
- Consider **supplementing these people-focused 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 Virginia Beach




## Top-5 Census Tracts for Hazard Risk[1]

| | | | | Virginia Beach 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** | **45414** | **3,490** | **100th** | 0 | 0 | 2,592 | 578 | 0 | 3,490 | 0 | 0 |
| **2** | **45406** | **4,476** | **99th** | 0 | 0 | 1,081 | 913 | 0 | 2,228 | 2,248 | 0 |
| **3** | **46005** | **4,858** | **98th** | 0 | 0 | 0 | 202 | 0 | 3,785 | 0 | 1,073 |
| **4** | **45417** | **4,554** | **97th** | 0 | 0 | 531 | 817 | 10 | 1,377 | 3,167 | 0 |
| **5** | **41802** | **3,734** | **96th** | 83 | 0 | 1,368 | 370 | 0 | 2,115 | 1,619 | 0 |

**Note:** see the appendix for a data table for the Top 15 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

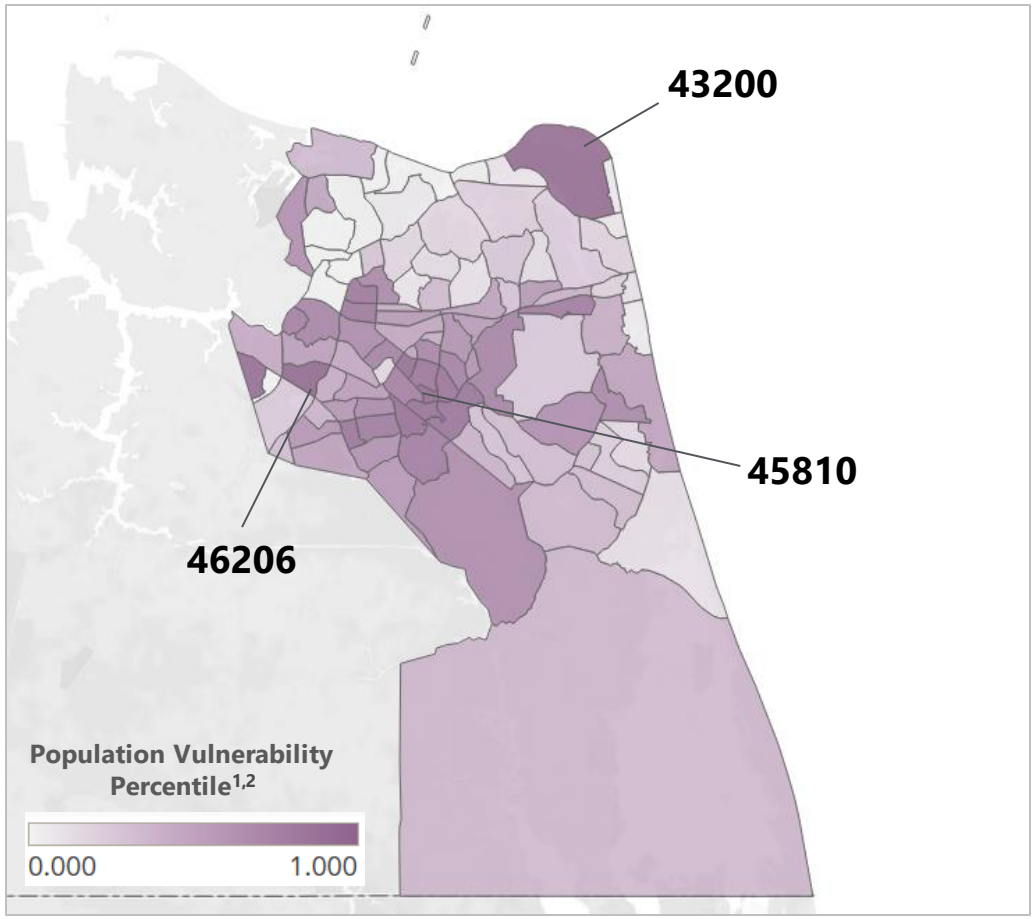
| Attribute[1] | Weighting[2] | Description (in a household) |
|---|---|---|
| Low Income | 18% | Number of adults with income less than $30,000 |
| Elevated Health Risk | 17% | Number of adults with one or more serious health conditions |
| Age (Older Adults) | 15% | Number of adults who are age 65 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 Virginia Beach




## Top-5 Census Tracts for Population Vulnerability[1]

| | | | Within-Virginia Beach 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** | **46206** | **3** | **100th** | 100th | 100th | 0th | 100th | 100th | 0th | 99th | 0th |
| **2** | **45810** | **1,025** | **99th** | 99th | 38th | 95th | 47th | 82nd | 62nd | 10th | 97th |
| **3** | **43200** | **196** | **98th** | 87th | 87th | 100th | 54th | 98th | 60th | 1st | 59th |
| **4** | **46220** | **1,128** | **97th** | 81st | 39th | 94th | 10th | 17th | 98th | 43rd | 99th |
| **5** | **45808** | **1,722** | **96th** | 98th | 67th | 71st | 38th | 42nd | 80th | 25th | 51st |

**Note:** See the appendix for a data table for the Top 15 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 | 45406 | 4,476 | 100th | 91st | 89th | 48th | 77th | 53rd | 74th | 71st | 13rd | 58th | 99th | 0 | 0 | 1081 | 913 | 0 | 2228 | 2248 | 0 |
| 2 | 45414 | 3,490 | 99th | 81st | 90th | 14th | 82nd | 40th | 52nd | 66th | 20th | 52nd | 100th | 0 | 0 | 2592 | 578 | 0 | 3490 | 0 | 0 |
| 3 | 45809 | 3,579 | 98th | 90th | 94th | 53rd | 69th | 28th | 38th | 58th | 23rd | 37th | 81st | 0 | 0 | 0 | 4 | 0 | 0 | 3579 | 0 |
| 4 | 46005 | 4,858 | 96th | 72nd | 84th | 54th | 65th | 22nd | 27th | 85th | 39th | 53rd | 98th | 0 | 0 | 0 | 202 | 0 | 3785 | 0 | 1073 |
| 5 | 46014 | 2,831 | 96th | 95th | 80th | 99th | 54th | 57th | 67th | 92nd | 35th | 44th | 75th | 0 | 0 | 0 | 0 | 0 | 1018 | 1813 | 0 |
| 6 | 46012 | 4,054 | 95th | 83rd | 86th | 49th | 70th | 39th | 43rd | 77th | 30th | 41st | 82nd | 0 | 0 | 0 | 0 | 0 | 0 | 2275 | 1779 |
| 7 | 46013 | 2,814 | 94th | 94th | 92nd | 46th | 84th | 26th | 35th | 78th | 26th | 60th | 70th | 0 | 0 | 0 | 0 | 0 | 206 | 2608 | 0 |
| 8 | 46009 | 2,696 | 91st | 77th | 52nd | 91st | 51st | 58th | 46th | 59th | 74th | 55th | 78th | 0 | 0 | 510 | 297 | 719 | 308 | 1669 | 0 |
| 9 | 45407 | 2,408 | 91st | 78th | 63rd | 60th | 62nd | 62nd | 77th | 42nd | 42nd | 0th | 77th | 0 | 0 | 863 | 232 | 0 | 1688 | 472 | 248 |
| 10 | 45423 | 4,239 | 90th | 71st | 42nd | 96th | 18th | 78th | 66th | 56th | 89th | 61st | 84th | 0 | 4 | 44 | 9 | 75 | 427 | 991 | 2746 |
| 11 | 45405 | 2,571 | 89th | 92nd | 95th | 29th | 80th | 42nd | 61st | 55th | 33rd | 17th | 60th | 0 | 0 | 186 | 180 | 0 | 0 | 2571 | 0 |
| 12 | 46015 | 2,830 | 88th | 84th | 74th | 98th | 45th | 73rd | 85th | 40th | 28th | 29th | 68th | 0 | 0 | 4 | 0 | 0 | 28 | 2802 | 0 |
| 13 | 45604 | 3,688 | 86th | 60th | 73rd | 12nd | 92nd | 5th | 12nd | 96th | 8th | 77th | 89th | 0 | 0 | 516 | 468 | 0 | 0 | 3688 | 0 |
| 14 | 42801 | 3,392 | 86th | 67th | 66th | 28th | 60th | 63rd | 73rd | 68th | 60th | 0th | 83rd | 0 | 0 | 343 | 213 | 0 | 295 | 3097 | 0 |
| 15 | 45806 | 2,360 | 85th | 76th | 82nd | 22nd | 67th | 49th | 57th | 49th | 51st | 81st | 71st | 0 | 0 | 888 | 538 | 0 | 0 | 2360 | 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 |
|---|---|---|---|---|---|---|
| VIRGINIA BEACH CITY | 2018 | Exclusive | City of Virginia Beach | VIRGINIA BEACH CITY | 904.2: Advance Assistance (FMA and PDMC) | $99,999 |
| | 2017 | Exclusive | Virginia Beach | VIRGINIA BEACH (CITY) | 601.2: Generators - Regular | $131,250 |
| | 2016 | Exclusive | City of Virginia Beach | VIRGINIA BEACH CITY | 202.2: Elevation of Private Structures - Coastal | $2,914,976 |
| | 2015 | Exclusive | City of Virginia Beach | VIRGINIA BEACH CITY | 202.2: Elevation of Private Structures - Coastal | $874,061 |
| | | | | | 601.1: Generators | $229,258 |
| | 2013 | Exclusive | City of Virginia Beach | VIRGINIA BEACH CITY | 202.2: Elevation of Private Structures - Coastal | $1,227,144 |
| | 2012 | Exclusive | Virginia Beach | VIRGINIA BEACH (CITY) | 401.1: Water and Sanitary Sewer System Protective Measures | $68,070 |
| | | Shared | HAMPTON ROADS PLANNING DISTRICT C.. | ISLE OF WIGHT; JAMES CITY; WILLIAMSBURG (CITY); VIRGINIA BEACH (CITY); SUFFOLK (CITY); PORTSMOUTH (CITY); POQUOSON (CITY); N.. | 91.1: Local Multihazard Mitigation Plan | $163,140 |
| | 2011 | Exclusive | Virginia Beach | VIRGINIA BEACH (CITY) | 400.1: Utility Protective Measures (Electric, Gas, etc.); 401.1: Water and Sanitary Sewer System Protective Measures | $117,110 |
| | 2010 | Exclusive | Virginia Beach | VIRGINIA BEACH (CITY) | 401.1: Water and Sanitary Sewer System Protective Measures; 602.1: Other Equipment Purchase and Installation | $45,833 |
| | | | | | 602.1: Other Equipment Purchase and Installation | $106,943 |
| | | Shared | Hampton Roads Planning District Com.. | ISLE OF WIGHT; NORFOLK CITY; PORTSMOUTH CITY; SUFFOLK CITY; VIRGINIA BEACH CITY | 91.1: Local Multihazard Mitigation Plan | $92,801 |
| | 2009 | Exclusive | City of Virginia Beach | VIRGINIA BEACH CITY | 202.2: Elevation of Private Structures - Coastal | $1,338,463 |
| | 2003 | Exclusive | Virginia Beach | VIRGINIA BEACH (CITY) | 91.1: Local Multihazard Mitigation Plan | $78,151 |
| | 1998 | Exclusive | VIRGINIA BEACH | VIRGINIA BEACH (CITY) | 205.8: Retrofitting Public Structures - Wind | $710,946 |
| | | | | | 401.1: Water and Sanitary Sewer System Protective Measures | $345,330 |
| | | | | | 602.1: Other Equipment Purchase and Installation | $128,003 |

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

# COVID-19 Unified Command/VEST Health Equity Working Group

MITIGATION PROJECTS ANALYSIS
PORTSMOUTH CITY

NOVEMBER 2020

# Topics

The analysis provides **Portsmouth City** 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

**97th**

Your locality has more households in more severe flood/hurricane zones than 97% of other Virginia localities

## Hazard Risk[1] Rank

**5th**

Your locality's Hazard Risk score is ranked 5th 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 |
| 5 | 0 | 8,377 | 10,656 |
| 7th out of 132 Localities | N/A out of 132 Localities | 5th out of 132 Localities | 4th 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 |
| 11,670 | 18,387 | 12,980 | 8,088 |
| 5th out of 132 Localities | 4th out of 132 Localities | 5th out of 132 Localities | 6th 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

**82nd**

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 82% of other Virginia localities

## Population Vulnerability[1] Rank

**24th**

Your locality's Population Vulnerability score is ranked 24th out of 132 Virginia localities

## How PORTSMOUTH CITY Compares to Other Localities Across the Eight Vulnerability Attributes

| Low Income | Elevated Health Risk | Age | Communities of Color |
|---|---|---|---|
| 65th percentile | 65th percentile | 17th percentile | 86th percentile |

| # of Children in Household | # of People in Household | Unemployment Risk | Lack of Vehicle Access |
|---|---|---|---|
| 67th percentile | 40th percentile | 72nd percentile | 78th 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

=

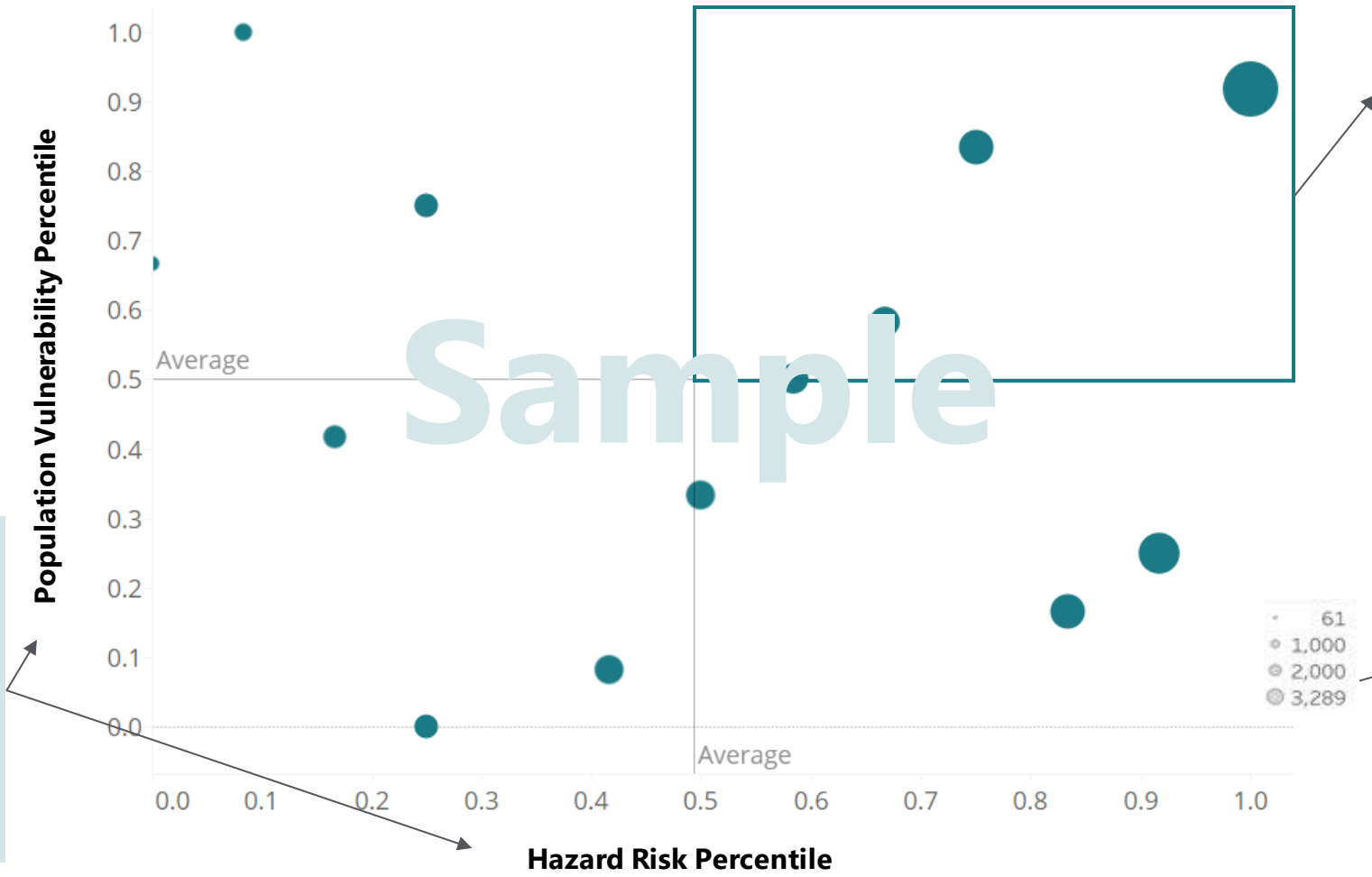
## Prioritized Census Tracts

- 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.



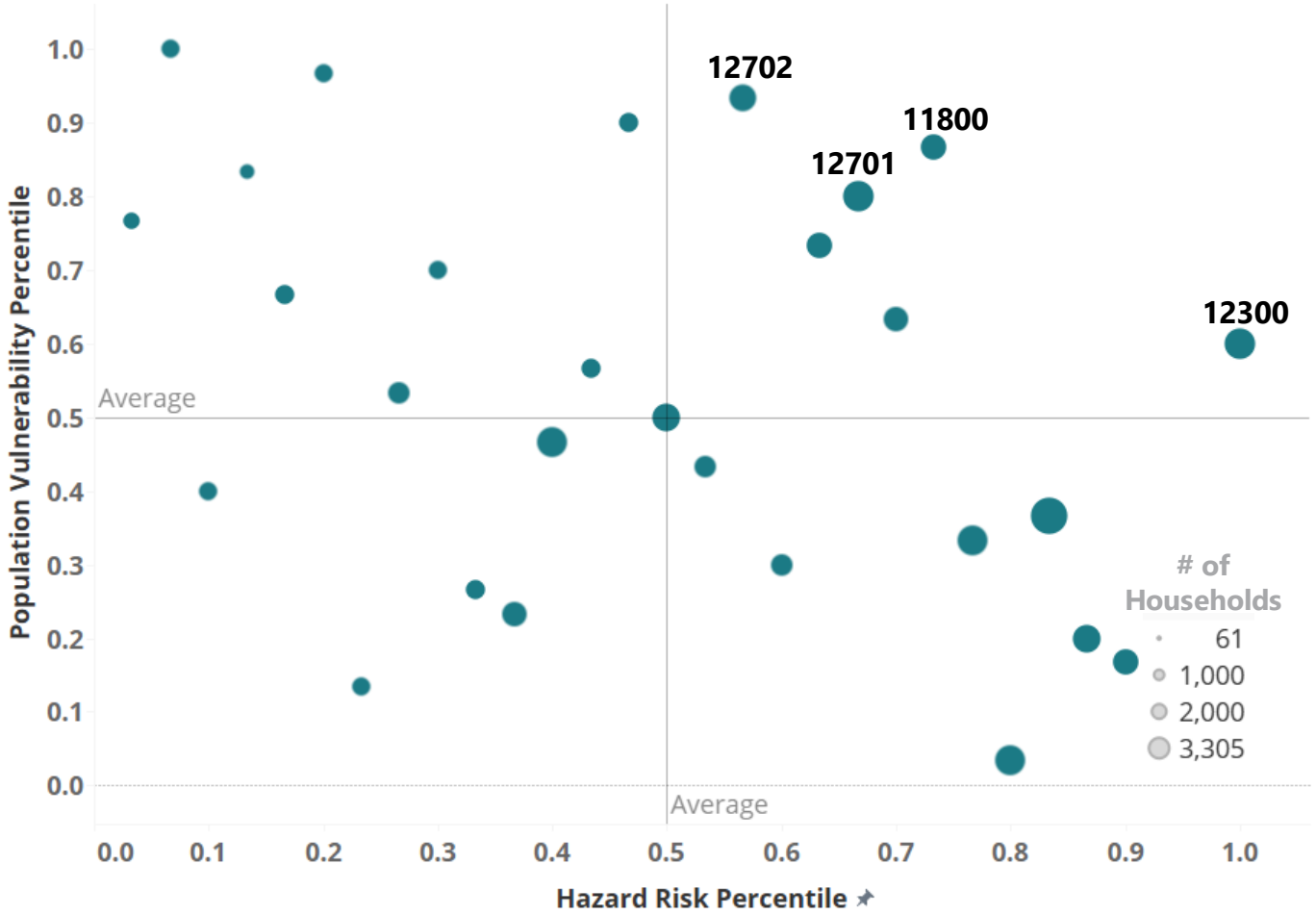

Circles in the upper right quadrant represent areas that you might consider prioritizing due to high population vulnerability and hazard risk

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 Portsmouth City

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

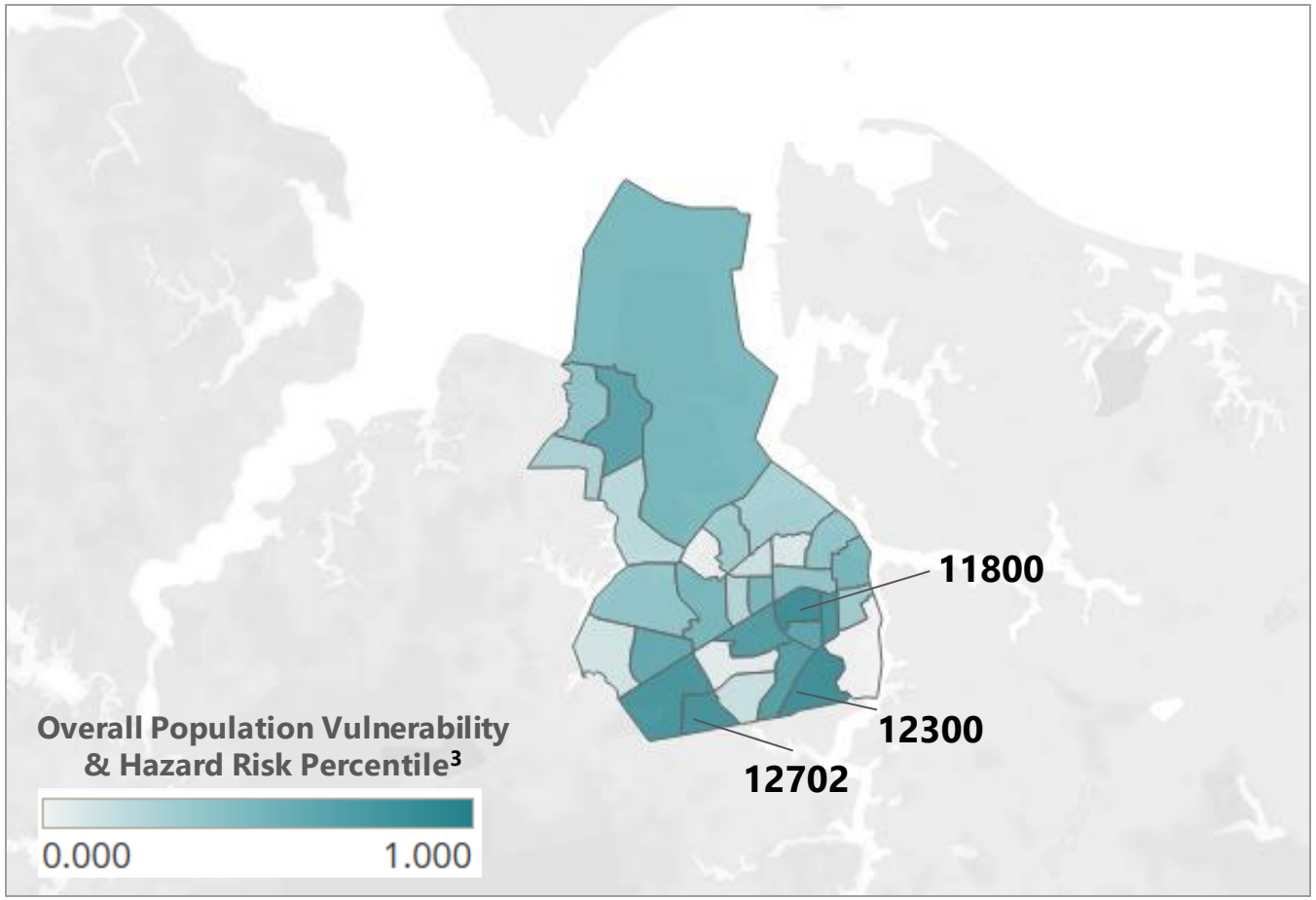
| | | | Within-Portsmouth City Percentiles | | |
|---|---|---|---|---|---|
| # | Area | # of Households | Overall Percentile | Population Vulnerability[1] Percentile | Hazard Risk[2] Percentile |
| 1 | 12300 | 2,623 | 97th | 60th | 100th |
| 2 | 11800 | 1,782 | 97th | 87th | 73rd |
| 3 | 12702 | 1,978 | 93rd | 93rd | 57th |
| 4 | 12701 | 2,575 | 90th | 80th | 67th |
| 5 | 12000 | 1,020 | 87th | 90th | 47th |
| 6 | 11700 | 1,831 | 83rd | 73rd | 63rd |
| 7 | 12400 | 1,610 | 80th | 63rd | 70th |
| 8 | 13103 | 3,658 | 77th | 37th | 83rd |

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 Portsmouth City 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 Portsmouth City




## Priority Areas in Flood and Hurricane Zones

| | | | Within-Portsmouth City Percentiles | | |
|---|---|---|---|---|---|
| # | Area | # of Households | Overall Percentile | Population Vulnerability[1] Percentile | Hazard Risk[2] Percentile |
| 1 | 12300 | 2,623 | 97th | 60th | 100th |
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| 8 | 13103 | 3,658 | 77th | 37th | 83rd |

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-Portsmouth City 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 | **12300** | **2623** | **97th** | **60th** | 47th | 43rd | 67th | 33rd | 63rd | 53rd | 3rd | 53rd |
| 2 | **11800** | **1782** | **97th** | **87th** | 73rd | 80th | 90th | 53rd | 73rd | 93rd | 20th | 100th |
| 3 | **12702** | **1978** | **93rd** | **93rd** | 97th | 30th | 77th | 90th | 50th | 33rd | 90th | 70th |

| | | | W/I-Portsmouth City Percentiles | | Portsmouth City 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 | **12300** | **2,623** | **97th** | **100th** | 0 | 0 | 1276 | 1174 | 2623 | 0 | 0 | 0 |
| 2 | **11800** | **1,782** | **97th** | **73rd** | 0 | 0 | 244 | 791 | 0 | 1342 | 440 | 0 |
| 3 | **12702** | **1,978** | **93rd** | **57th** | 0 | 0 | 0 | 39 | 0 | 399 | 1579 | 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]**

**$162,788**

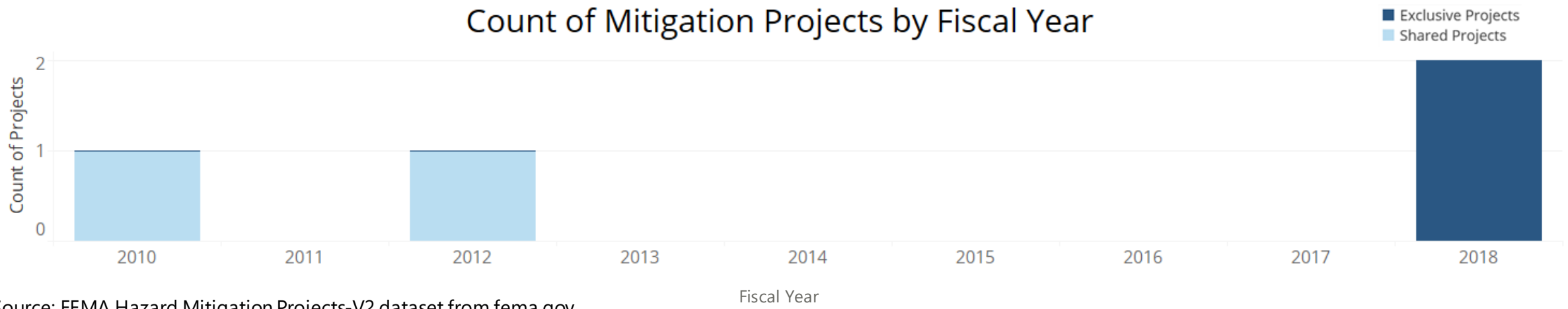
This is the total amount of federal funding alloted to mitigation projects solely owned by your locality from 1990-2019

**Total Shared Project Funding[1]**

**$255,941**

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

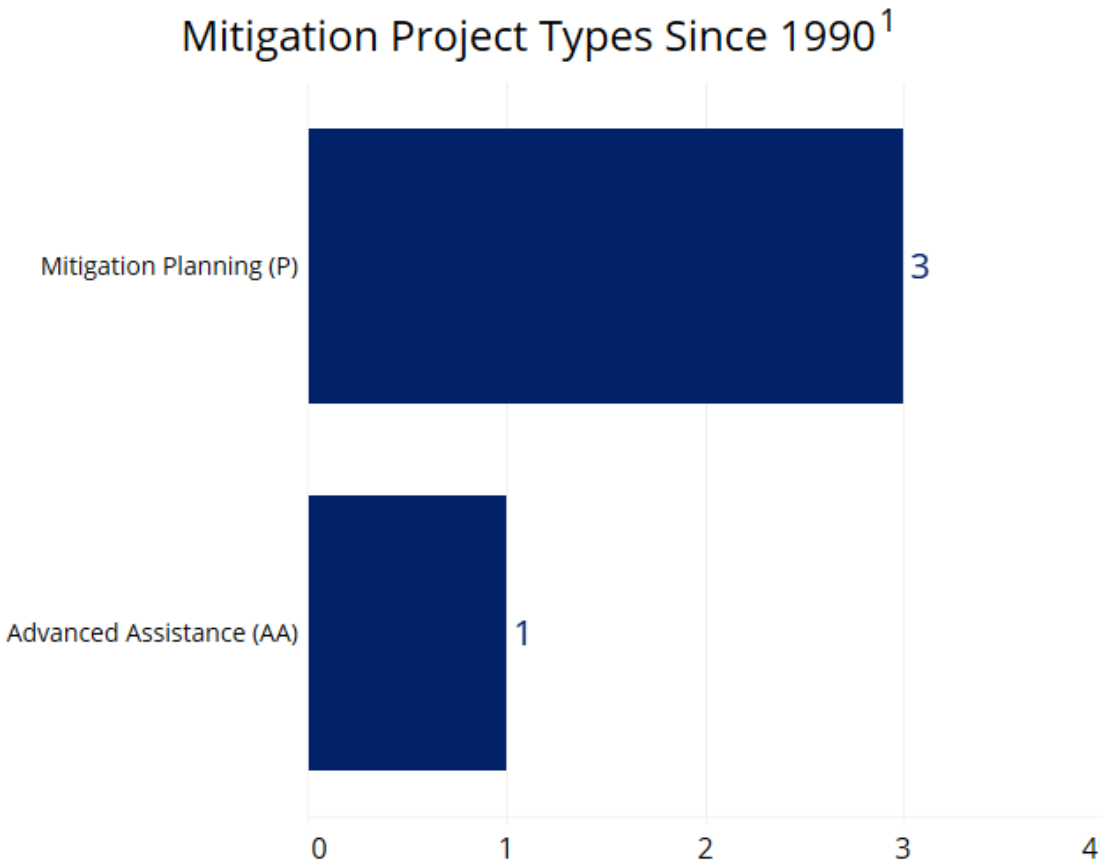
| Exclusive Projects | Average Exclusive Project Size | Shared Projects | Average Counties Per Shared Project |
|---|---|---|---|
| 2 | $81K | 2 | 9.5 |

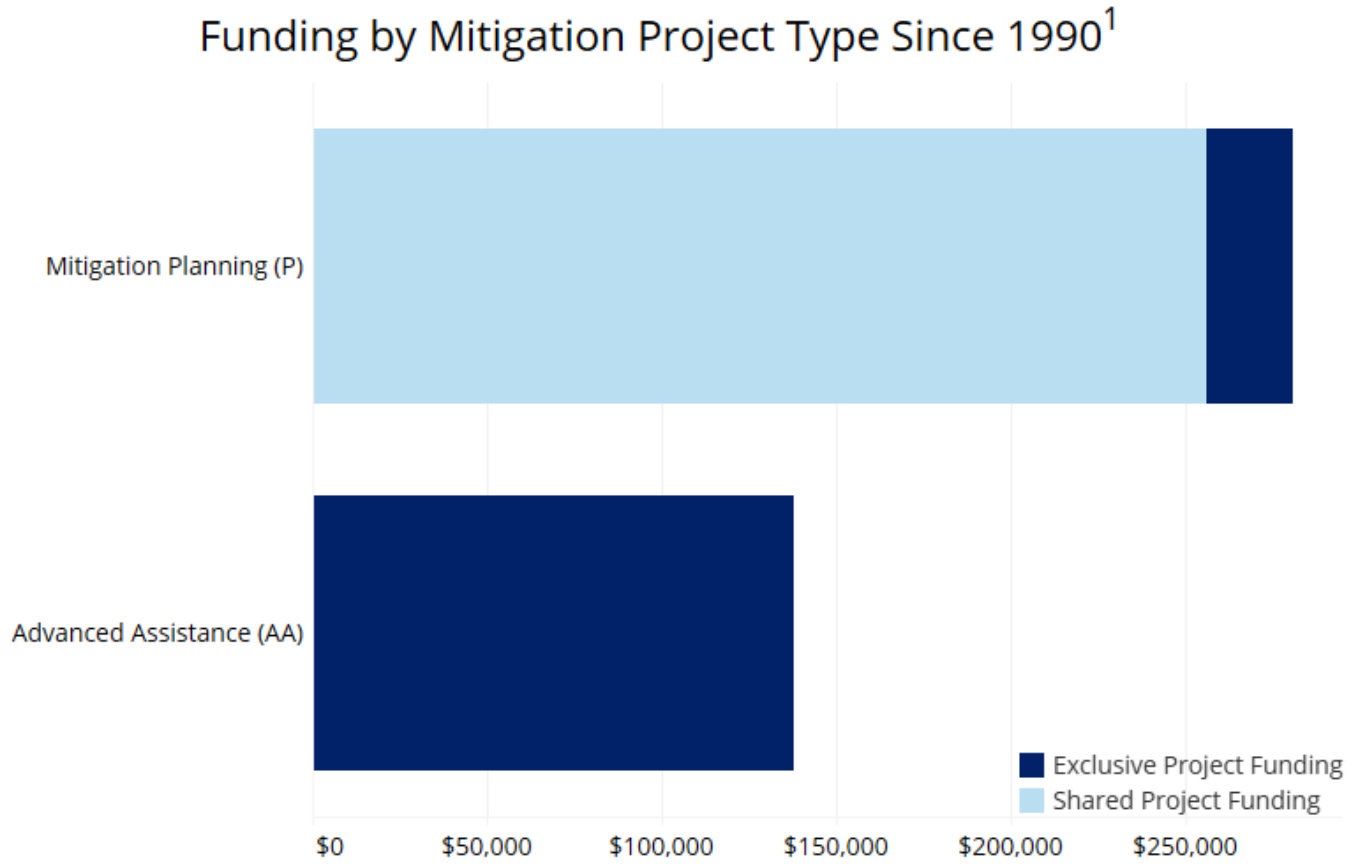



1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

# 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, Portsmouth City has experienced the following:

## Cases[1]

| Total | Per 100k |
|---|---|
| **2,819** | **2,958** |
| **14th** out of 133 localities[2] | **19th** out of 133 localities |

## Hospitalizations[1]

| Total | Per 100k |
|---|---|
| **306** | **321** |
| **12th** out of 133 localities | **8th** out of 133 localities |

## Deaths[1]

| Total | Per 100k |
|---|---|
| **69** | **72** |
| **13th** out of 133 localities | **25th** 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.

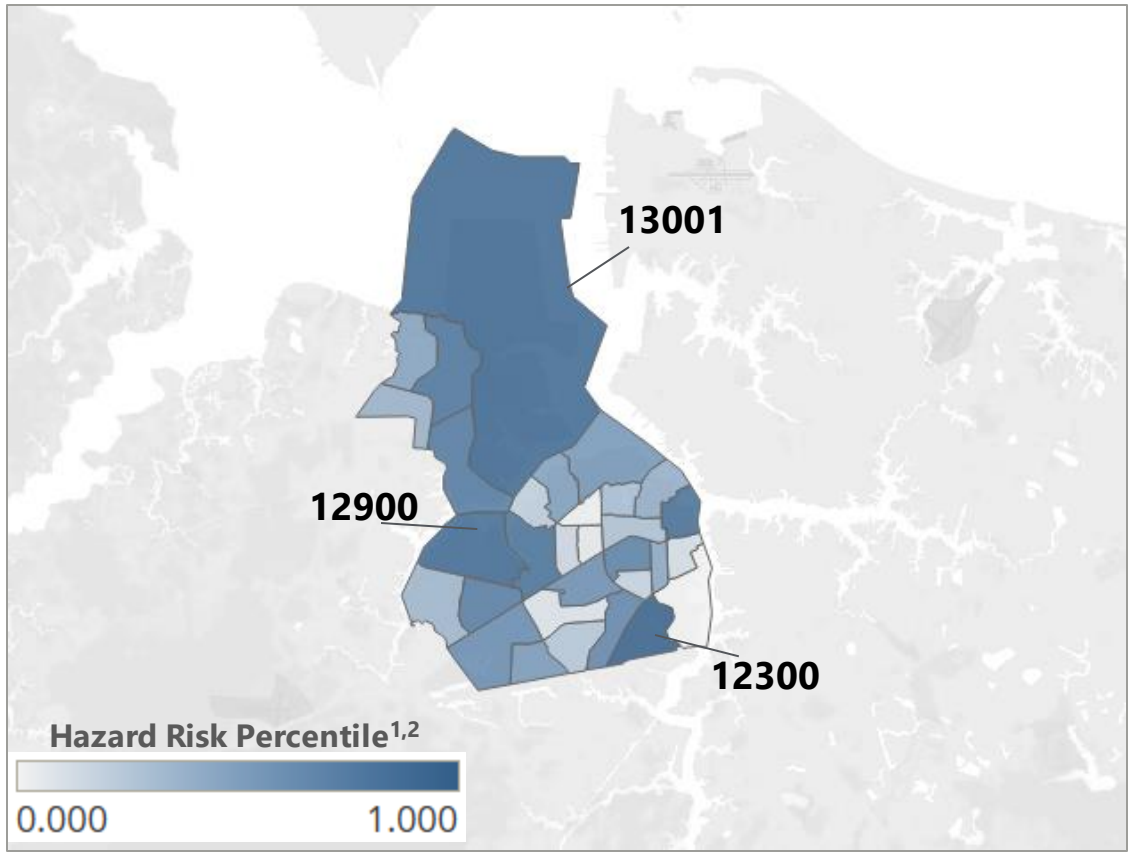
- Consider targeting **priority areas** when designing future mitigation projects
- Consider analysis at the **census tract/block level** to understand population vulnerability and hazard risks at a granular level to support decisions on mitigation projects
- Consider **supplementing these people-focused 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 Portsmouth City




## Top-5 Census Tracts for Hazard Risk[1]

| | | | | Portsmouth City 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 | 12300 | 2,623 | 100th | 0 | 0 | 1276 | 1174 | 2623 | 0 | 0 | 0 |
| 2 | 13001 | 3,390 | 97th | 0 | 0 | 447 | 1076 | 0 | 2327 | 1063 | 0 |
| 3 | 12900 | 3,015 | 93rd | 0 | 0 | 612 | 483 | 612 | 2403 | 0 | 0 |
| 4 | 10900 | 1,708 | 90th | 0 | 0 | 1459 | 249 | 1708 | 0 | 0 | 0 |
| 5 | 11600 | 2,255 | 87th | 0 | 0 | 387 | 711 | 564 | 1348 | 343 | 0 |

**Note:** see the appendix for a data table for the Top 15 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

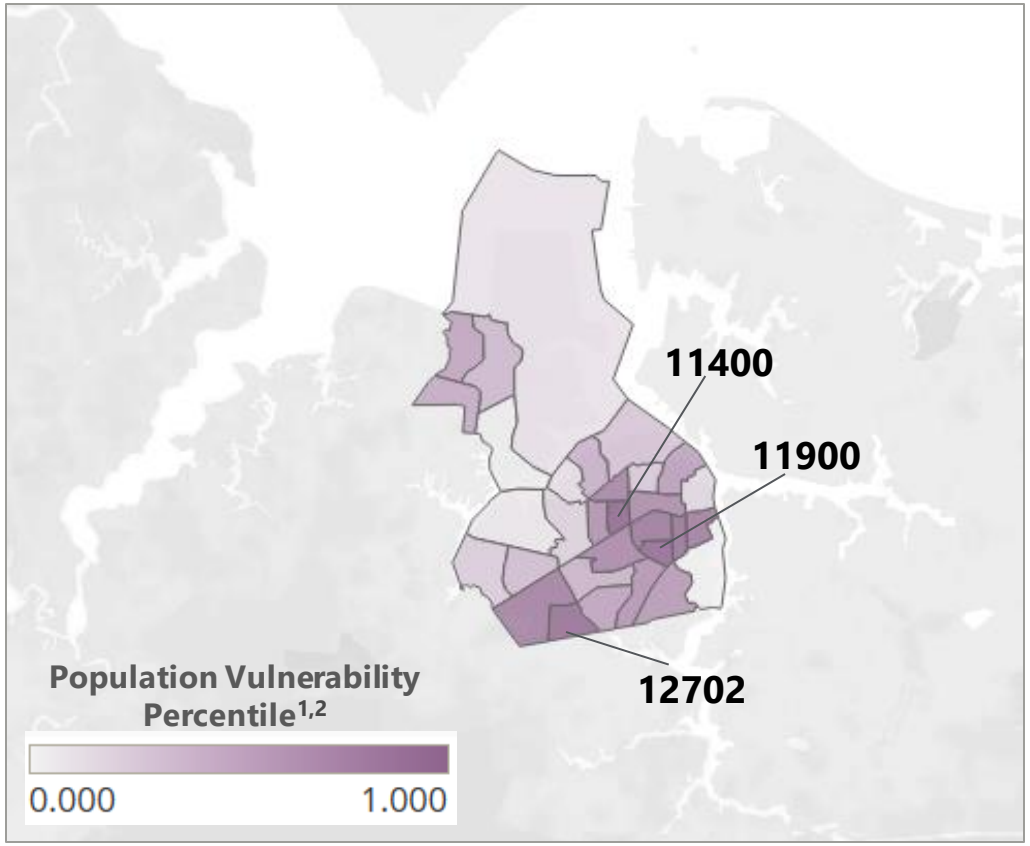
| Attribute[1] | Weighting[2] | Description (in a household) |
|---|---|---|
| Low Income | 18% | Number of adults with income less than $30,000 |
| Elevated Health Risk | 17% | Number of adults with one or more serious health conditions |
| Age (Older Adults) | 15% | Number of adults who are age 65 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 Portsmouth City




## Top-5 Census Tracts for Population Vulnerability[1]

| | | | Within-Portsmouth City 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** | **11400** | **844** | **100th** | 87th | 97th | 97th | 67th | 87th | 77th | 80th | 83rd |
| **2** | **11900** | **867** | **97th** | 90th | 100th | 100th | 70th | 93rd | 87th | 47th | 60th |
| **3** | **12702** | **1,978** | **93rd** | 97th | 30th | 77th | 90th | 50th | 33rd | 90th | 70th |
| **4** | **12000** | **1,020** | **90th** | 80th | 90th | 93rd | 43rd | 43rd | 97th | 43rd | 80th |
| **5** | **11800** | **1,782** | **87th** | 73rd | 80th | 90th | 53rd | 73rd | 93rd | 20th | 100th |

**Note:** See the appendix for a data table for the Top 15 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 | 12300 | 2,623 | 97th | 60th | 47th | 43rd | 67th | 33rd | 63rd | 53rd | 3rd | 53rd | 100th | 0 | 0 | 1276 | 1174 | 2623 | 0 | 0 | 0 |
| 2 | 11800 | 1,782 | 97th | 87th | 73rd | 80th | 90th | 53rd | 73rd | 93rd | 20th | 100th | 73rd | 0 | 0 | 244 | 791 | 0 | 1342 | 440 | 0 |
| 3 | 12702 | 1,978 | 93rd | 93rd | 97th | 30th | 77th | 90th | 50th | 33rd | 90th | 70th | 57th | 0 | 0 | 0 | 39 | 0 | 399 | 1579 | 0 |
| 4 | 12701 | 2,575 | 90th | 80th | 100th | 27th | 43rd | 97th | 53rd | 10th | 100th | 67th | 67th | 0 | 0 | 0 | 0 | 0 | 0 | 955 | 1620 |
| 5 | 12000 | 1,020 | 87th | 90th | 80th | 90th | 93rd | 43rd | 43rd | 97th | 43rd | 80th | 47th | 0 | 0 | 801 | 219 | 1020 | 0 | 0 | 0 |
| 6 | 11700 | 1,831 | 83rd | 73rd | 83rd | 37th | 83rd | 27th | 13rd | 83rd | 53rd | 93rd | 63rd | 0 | 0 | 73 | 382 | 0 | 704 | 1127 | 0 |
| 7 | 12400 | 1,610 | 80th | 63rd | 57th | 50th | 63rd | 40th | 67th | 70th | 13rd | 43rd | 70th | 0 | 0 | 113 | 667 | 0 | 1610 | 0 | 0 |
| 8 | 13103 | 3,658 | 77th | 37th | 60th | 13rd | 20th | 93rd | 90th | 23rd | 60th | 7th | 83rd | 0 | 0 | 0 | 0 | 0 | 13 | 247 | 3398 |
| 9 | 11900 | 867 | 73rd | 97th | 90th | 100th | 100th | 70th | 93rd | 87th | 47th | 60th | 20th | 0 | 0 | 40 | 494 | 0 | 866 | 1 | 0 |
| 10 | 12801 | 2,473 | 70th | 33rd | 40th | 3rd | 57th | 23rd | 30th | 63rd | 40th | 30th | 77th | 0 | 0 | 57 | 374 | 0 | 663 | 1810 | 0 |
| 11 | 13001 | 3,390 | 57th | 10th | 27th | 20th | 0th | 87th | 47th | 7th | 87th | 3rd | 97th | 0 | 0 | 447 | 1076 | 0 | 2327 | 1063 | 0 |
| 12 | 11600 | 2,255 | 57th | 20th | 7th | 47th | 30th | 57th | 57th | 40th | 63rd | 37th | 87th | 0 | 0 | 387 | 711 | 564 | 1348 | 343 | 0 |
| 13 | 10900 | 1,708 | 57th | 17th | 20th | 63rd | 33rd | 3rd | 3rd | 57th | 73rd | 33rd | 90th | 0 | 0 | 1459 | 249 | 1708 | 0 | 0 | 0 |
| 14 | 11400 | 844 | 57th | 100th | 87th | 97th | 97th | 67th | 87th | 77th | 80th | 83rd | 7th | 0 | 0 | 0 | 0 | 0 | 690 | 154 | 0 |
| 15 | 12900 | 3,015 | 43rd | 7th | 3rd | 17th | 17th | 80th | 80th | 20th | 77th | 23rd | 93rd | 0 | 0 | 612 | 483 | 612 | 2403 | 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 |
|---|---|---|---|---|---|---|
| PORTSMOUTH CITY | 2018 | Exclusive | City of Portsmouth | PORTSMOUTH CITY | 91.2: Local Multihazard Mitigation Plan - NEW | $24,975 |
| | | | | | 904.2: Advance Assistance (FMA and PDMC) | $137,813 |
| | 2012 | Shared | HAMPTON ROADS PLANNING DISTRICT COMMISSION | ISLE OF WIGHT; JAMES CITY; WILLIAMSBURG (CITY); VIRGINIA BEACH (CITY); SUFFOLK (CITY); PORTSMOUTH (CITY); POQUOSON (CITY); NORFOLK (CITY); NEWPORT NEWS (CITY); HAMPTON (CITY); FRANKLIN (CITY); SO.. | 91.1: Local Multihazard Mitigation Plan | $163,140 |
| | 2010 | Shared | Hampton Roads Planning District Commission | ISLE OF WIGHT; NORFOLK CITY; PORTSMOUTH CITY; SUFFOLK CITY; VIRGINIA BEACH CITY | 91.1: Local Multihazard Mitigation Plan | $92,801 |

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

# COVID-19 Unified Command/VEST Health Equity Working Group

MITIGATION PROJECTS ANALYSIS
NORFOLK CITY

NOVEMBER 2020

# Topics

The analysis provides **Norfolk City** 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

**99th**

Your locality has more households in more severe flood/hurricane zones than 99% of other Virginia localities

## Hazard Risk[1] Rank

**2nd**

Your locality's Hazard Risk score is ranked 2nd 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 |
| 31 | 0 | 19,167 | 23,907 |
| 3rd out of 132 Localities | N/A out of 132 Localities | 2nd out of 132 Localities | 1st 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 |
| 29,065 | 34,270 | 47,645 | 5 |
| 1st out of 132 Localities | 2nd out of 132 Localities | 2nd out of 132 Localities | 12th 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

**73rd**

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 73% of other Virginia localities

## Population Vulnerability[1] Rank

**37th**

Your locality's Population Vulnerability score is ranked 37th out of 132 Virginia localities

## How NORFOLK CITY Compares to Other Localities Across the Eight Vulnerability Attributes

| Low Income | Elevated Health Risk | Age | Communities of Color |
|---|---|---|---|
| 60th percentile | 80th percentile | 9th percentile | 83rd percentile |

| # of Children in Household | # of People in Household | Unemployment Risk | Lack of Vehicle Access |
|---|---|---|---|
| 43rd percentile | 24th percentile | 56th percentile | 83rd 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

=

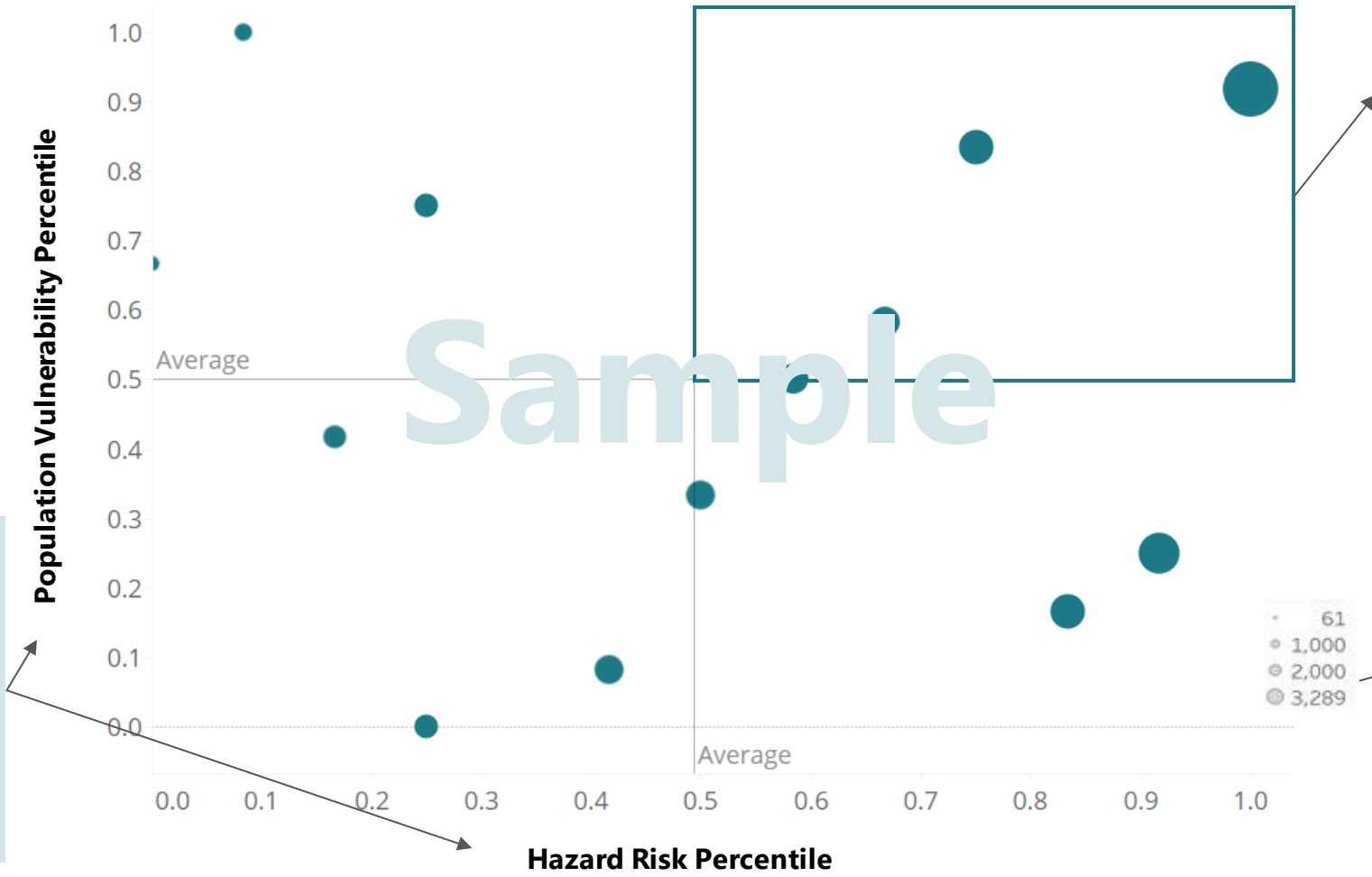
## Prioritized Census Tracts

- 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.



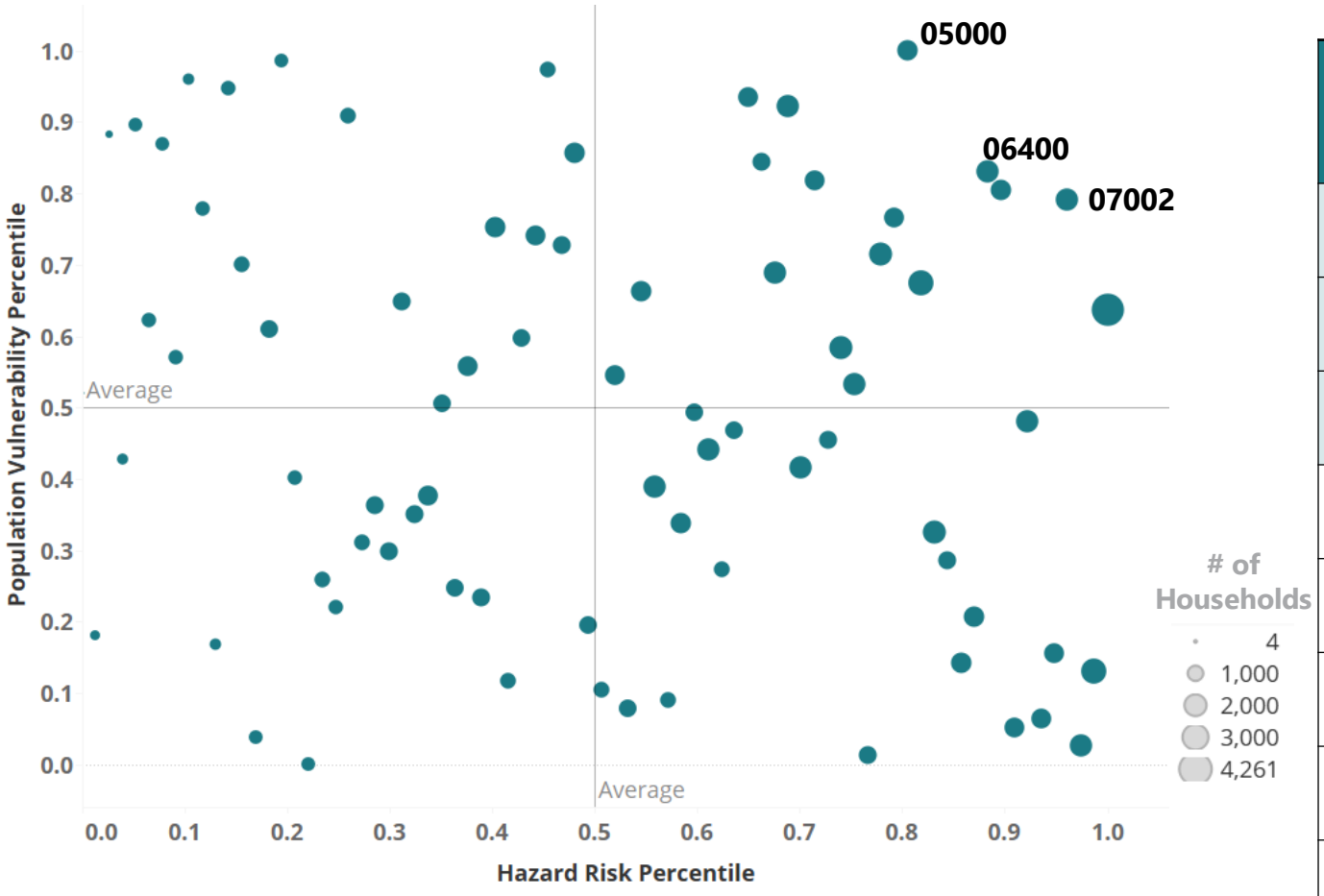

Circles in the upper right quadrant represent areas that you might consider prioritizing due to high population vulnerability and hazard risk

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 Norfolk City

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

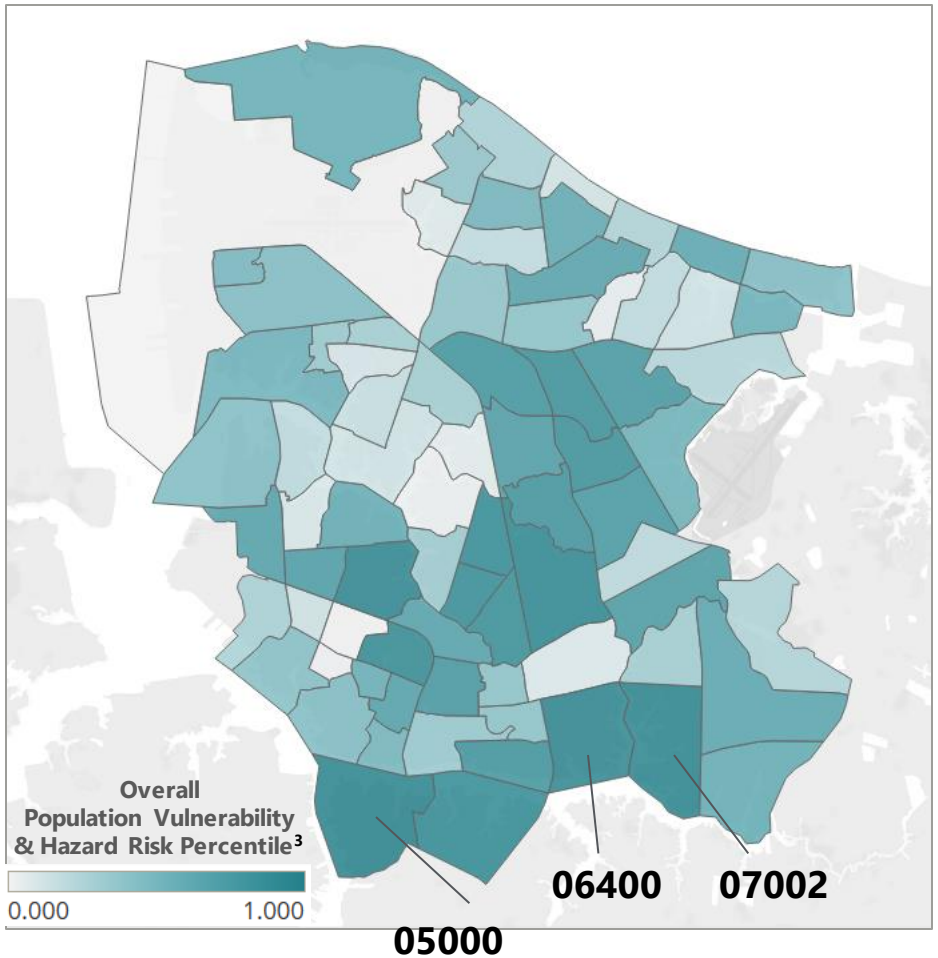
| # | Area | # of Households | Within-Norfolk Percentiles: Overall Percentile | Within-Norfolk Percentiles: Population Vulnerability[1] Percentile | Within-Norfolk Percentiles: Hazard Risk[2] Percentile |
|---|---|---|---|---|---|
| **1** | **05000** | **1,737** | **100th** | 100th | 81st |
| **2** | **07002** | **2,042** | **99th** | 79th | 96th |
| **3** | **06400** | **1,948** | **97th** | 83rd | 88th |
| **4** | **02900** | **1,884** | **96th** | 81st | 90th |
| **5** | **06100** | **4,261** | **95th** | 64th | 100th |
| **6** | **05100** | **1,991** | **94th** | 92nd | 69th |
| **7** | **03501** | **1,580** | **92nd** | 94th | 65th |
| **8** | **03100** | **1,631** | **91st** | 77th | 79th |

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 Norfolk City 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 Norfolk City




Priority Areas in Flood and Hurricane Zones

| | | | Within-Norfolk Percentiles | | |
|---|---|---|---|---|---|
| # | Area | # of Households | Overall Percentile | Population Vulnerability[1] Percentile | Hazard Risk[2] Percentile |
| 1 | 05000 | 1,737 | 100th | 100th | 81st |
| 2 | 07002 | 2,042 | 99th | 79th | 96th |
| 3 | 06400 | 1,948 | 97th | 83rd | 88th |
| 4 | 02900 | 1,884 | 96th | 81st | 90th |
| 5 | 06100 | 4,261 | 95th | 64th | 100th |
| 6 | 05100 | 1,991 | 94th | 92nd | 69th |
| 7 | 03501 | 1,580 | 92nd | 94th | 65th |
| 8 | 03100 | 1,631 | 91st | 77th | 79th |

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-Norfolk City 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 | **05000** | **1,737** | **100th** | **100th** | 97th | 57th | 96th | 83rd | 90th | 100th | 57th | 91st |
| 2 | **07002** | **2,042** | **99th** | **79th** | 74th | 99th | 43rd | 73rd | 34th | 35th | 97th | 45th |
| 3 | **06400** | **1,948** | **97th** | **83rd** | 94th | 94th | 55th | 65th | 52nd | 51st | 79th | 60th |

| | | | W/I-Norfolk City Percentiles | | Norfolk City 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 | **05000** | **1,737** | **100th** | **81st** | 0 | 0 | 297 | 470 | 577 | 966 | 194 | 0 |
| 2 | **07002** | **2,042** | **99th** | **96th** | 0 | 0 | 629 | 938 | 1340 | 0 | 702 | 0 |
| 3 | **06400** | **1,948** | **97th** | **88th** | 0 | 0 | 390 | 816 | 650 | 587 | 711 | 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]

**$14,695,648**

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]

**$255,941**

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

**21**

### Average Exclusive Project Size

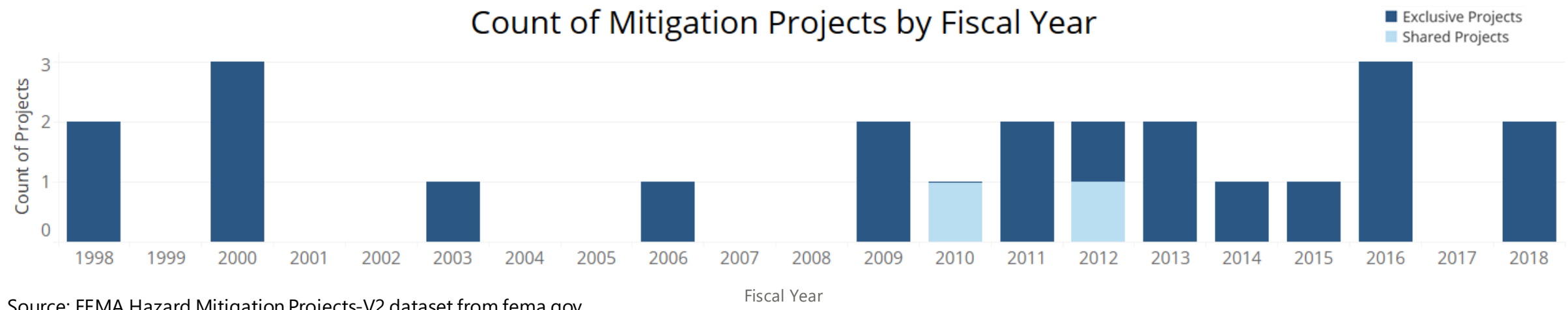
**$700K**

### Shared Projects

**2**

### Average Counties Per Shared Project

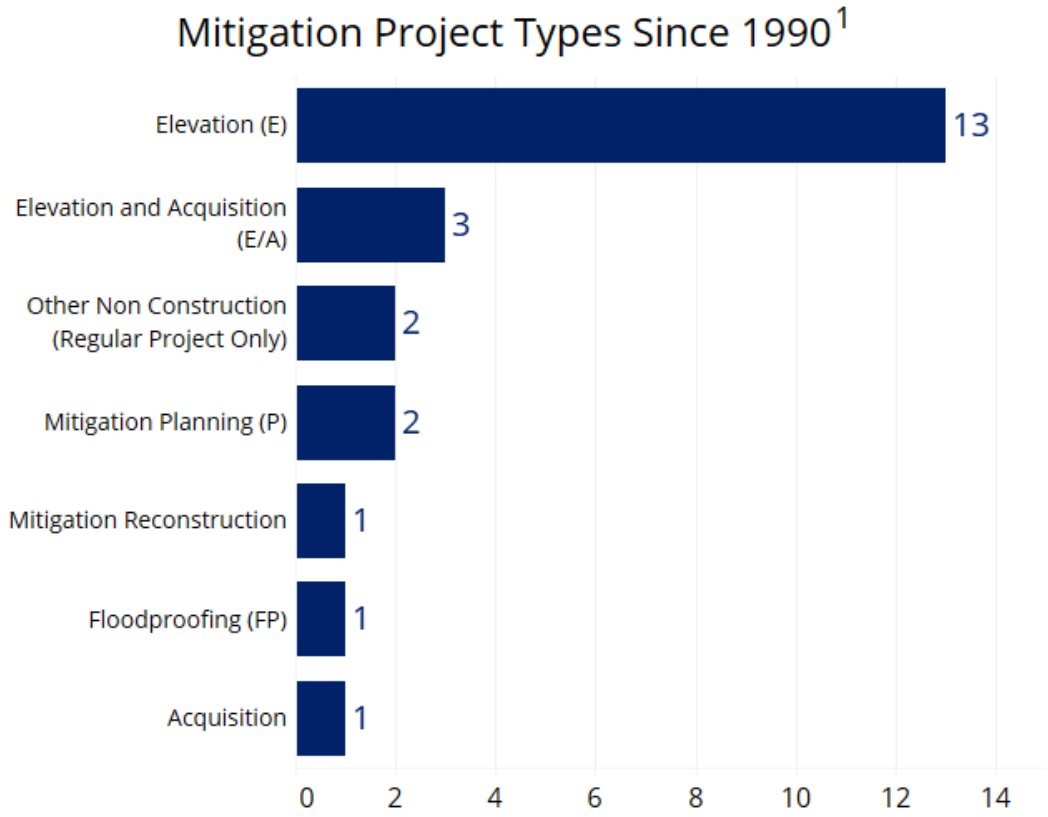
**9.5**

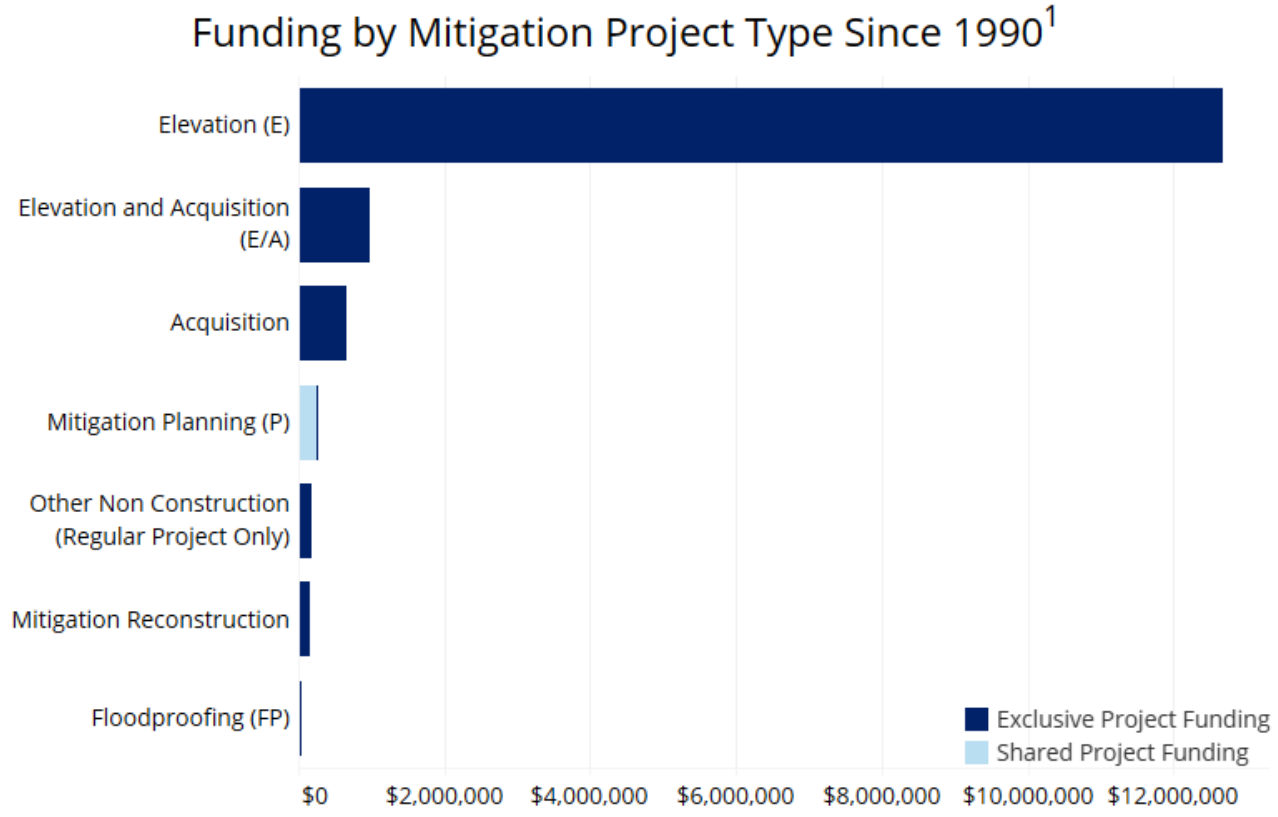



1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

# 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, Norfolk City has experienced the following:

## Cases[1]

| Total | Per 100k |
|---|---|
| **5,219** | **2,125** |
| **7th** out of 133 localities[2] | **40th** out of 133 localities |

## Hospitalizations[1]

| Total | Per 100k |
|---|---|
| **402** | **164** |
| **9th** out of 133 localities | **36th** out of 133 localities |

## Deaths[1]

| Total | Per 100k |
|---|---|
| **84** | **34** |
| **8th** out of 133 localities | **58th** 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.

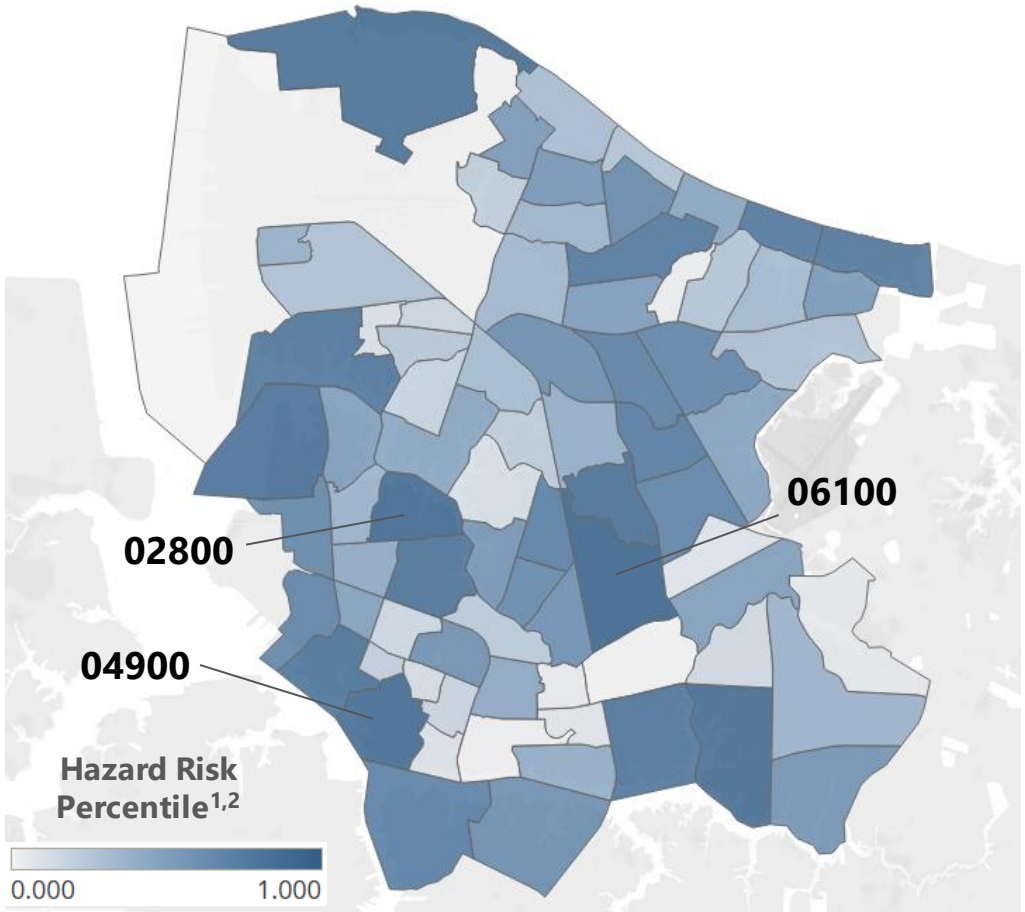
- Consider targeting **priority areas** when designing future mitigation projects
- Consider analysis at the **census tract/block level** to understand population vulnerability and hazard risks at a granular level to support decisions on mitigation projects
- Consider **supplementing these people-focused 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 Norfolk City




## Top-5 Census Tracts for Hazard Risk[1]

| | | | | Norfolk City 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** | **06100** | **4,261** | **100th** | 0 | 0 | 118 | 918 | 1054 | 1524 | 1683 | 0 |
| **2** | **02800** | **2,434** | **99th** | 0 | 0 | 1466 | 846 | 1281 | 1153 | 0 | 0 |
| **3** | **04900** | **2,055** | **97th** | 31 | 0 | 1124 | 625 | 1863 | 192 | 0 | 0 |
| **4** | **07002** | **2,042** | **96th** | 0 | 0 | 629 | 938 | 1340 | 0 | 702 | 0 |
| **5** | **00400** | **1,624** | **95th** | 0 | 0 | 1600 | 24 | 1624 | 0 | 0 | 0 |

**Note:** see the appendix for a data table for the Top 15 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

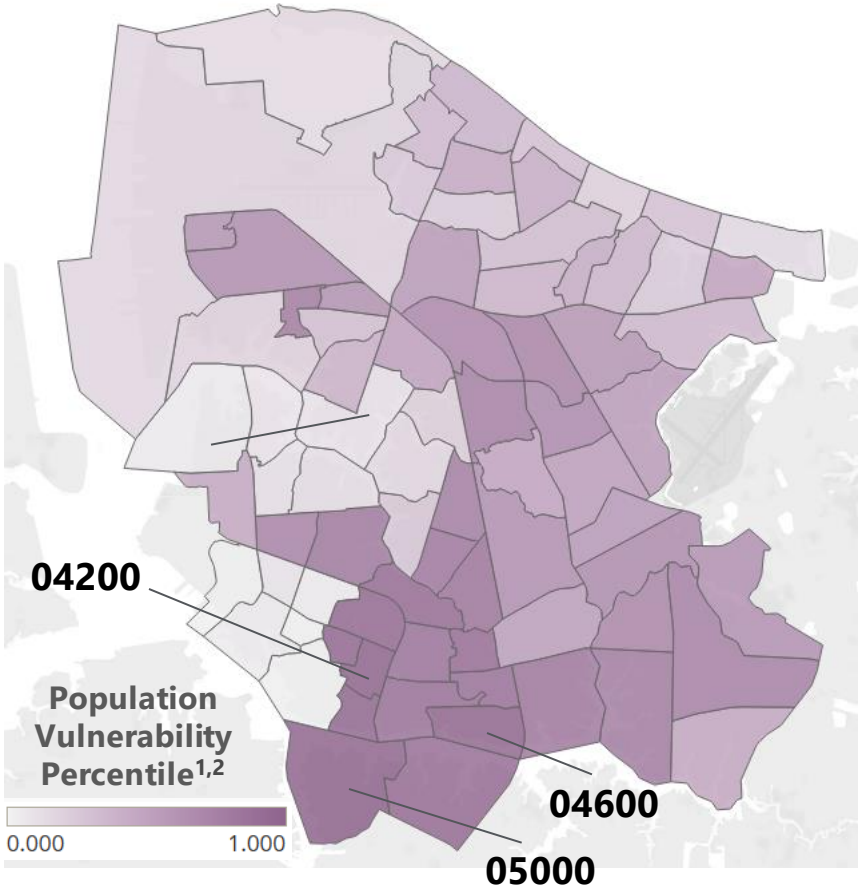
| Attribute[1] | Weighting[2] | Description (in a household) |
|---|---|---|
| Low Income | 18% | Number of adults with income less than $30,000 |
| Elevated Health Risk | 17% | Number of adults with one or more serious health conditions |
| Age (Older Adults) | 15% | Number of adults who are age 65 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 Norfolk City




## Top-5 Census Tracts for Population Vulnerability[1]

| | | | Within-Norfolk City 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** | **05000** | **1,737** | **100th** | 97th | 57th | 96th | 83rd | 90th | 100th | 57th | 91st |
| **2** | **04200** | **711** | **99th** | 78th | 58th | 97th | 60th | 92nd | 86th | 12nd | 100th |
| **3** | **04600** | **1,000** | **97th** | 90th | 79th | 92nd | 64th | 84th | 94th | 38th | 84th |
| **4** | **04800** | **548** | **96th** | 79th | 42nd | 99th | 87th | 100th | 53rd | 4th | 99th |
| **5** | **04100** | **821** | **95th** | 82nd | 31st | 95th | 88th | 99th | 84th | 8th | 97th |

**Note:** See the appendix for a data table for the Top 15 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 | 05000 | 1,737 | 100th | 100th | 97th | 57th | 96th | 83rd | 90th | 100th | 57th | 91st | 81st | 0 | 0 | 297 | 470 | 577 | 966 | 194 | 0 |
| 2 | 07002 | 2,042 | 99th | 79th | 74th | 99th | 43rd | 73rd | 34th | 35th | 97th | 45th | 96th | 0 | 0 | 629 | 938 | 1340 | 0 | 702 | 0 |
| 3 | 06400 | 1,948 | 97th | 83rd | 94th | 94th | 55th | 65th | 52nd | 51st | 79th | 60th | 88th | 0 | 0 | 390 | 816 | 650 | 587 | 711 | 0 |
| 4 | 02900 | 1,884 | 96th | 81st | 77th | 60th | 83rd | 26th | 32nd | 77th | 21st | 94th | 90th | 0 | 0 | 401 | 1344 | 378 | 1447 | 59 | 0 |
| 5 | 06100 | 4,261 | 95th | 64th | 66th | 13rd | 65th | 53rd | 60th | 57th | 43rd | 51st | 100th | 0 | 0 | 118 | 918 | 1054 | 1524 | 1683 | 0 |
| 6 | 05100 | 1,991 | 94th | 92nd | 91st | 45th | 90th | 81st | 95th | 83rd | 22nd | 86th | 69th | 0 | 0 | 29 | 201 | 120 | 0 | 1866 | 5 |
| 7 | 03501 | 1,580 | 92nd | 94th | 88th | 71st | 91st | 49th | 73rd | 90th | 18th | 96th | 65th | 0 | 0 | 0 | 380 | 0 | 1560 | 20 | 0 |
| 8 | 03100 | 1,631 | 91st | 77th | 71st | 78th | 68th | 61st | 83rd | 34th | 32nd | 83rd | 79th | 0 | 0 | 53 | 767 | 463 | 1168 | 0 | 0 |
| 9 | 03200 | 1,577 | 90th | 82nd | 83rd | 77th | 73rd | 55th | 65th | 71st | 36th | 49th | 71st | 0 | 0 | 45 | 665 | 61 | 1516 | 0 | 0 |
| 10 | 03300 | 1,500 | 88th | 84th | 92nd | 90th | 71st | 66th | 66th | 45th | 56th | 42nd | 66th | 0 | 0 | 44 | 503 | 187 | 1313 | 0 | 0 |
| 11 | 05901 | 2,594 | 86th | 68th | 73rd | 0th | 86th | 34th | 64th | 96th | 16th | 66th | 82nd | 0 | 0 | 0 | 0 | 0 | 0 | 2594 | 0 |
| 12 | 05800 | 2,367 | 86th | 71st | 86th | 3rd | 82nd | 57th | 79th | 70th | 45th | 70th | 78th | 0 | 0 | 0 | 0 | 0 | 0 | 2367 | 0 |
| 13 | 04600 | 1,000 | 84th | 97th | 90th | 79th | 92nd | 64th | 84th | 94th | 38th | 84th | 45th | 0 | 0 | 382 | 530 | 1000 | 0 | 0 | 0 |
| 14 | 06000 | 2,130 | 83rd | 48th | 57th | 6th | 56th | 71st | 77th | 48th | 47th | 62nd | 92nd | 0 | 0 | 88 | 392 | 1135 | 945 | 50 | 0 |
| 15 | 05701 | 2,087 | 82nd | 69th | 70th | 38th | 77th | 32nd | 45th | 91st | 34th | 69th | 68th | 0 | 0 | 0 | 39 | 0 | 1 | 2086 | 0 |

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

# Data table | FEMA Funding[1]

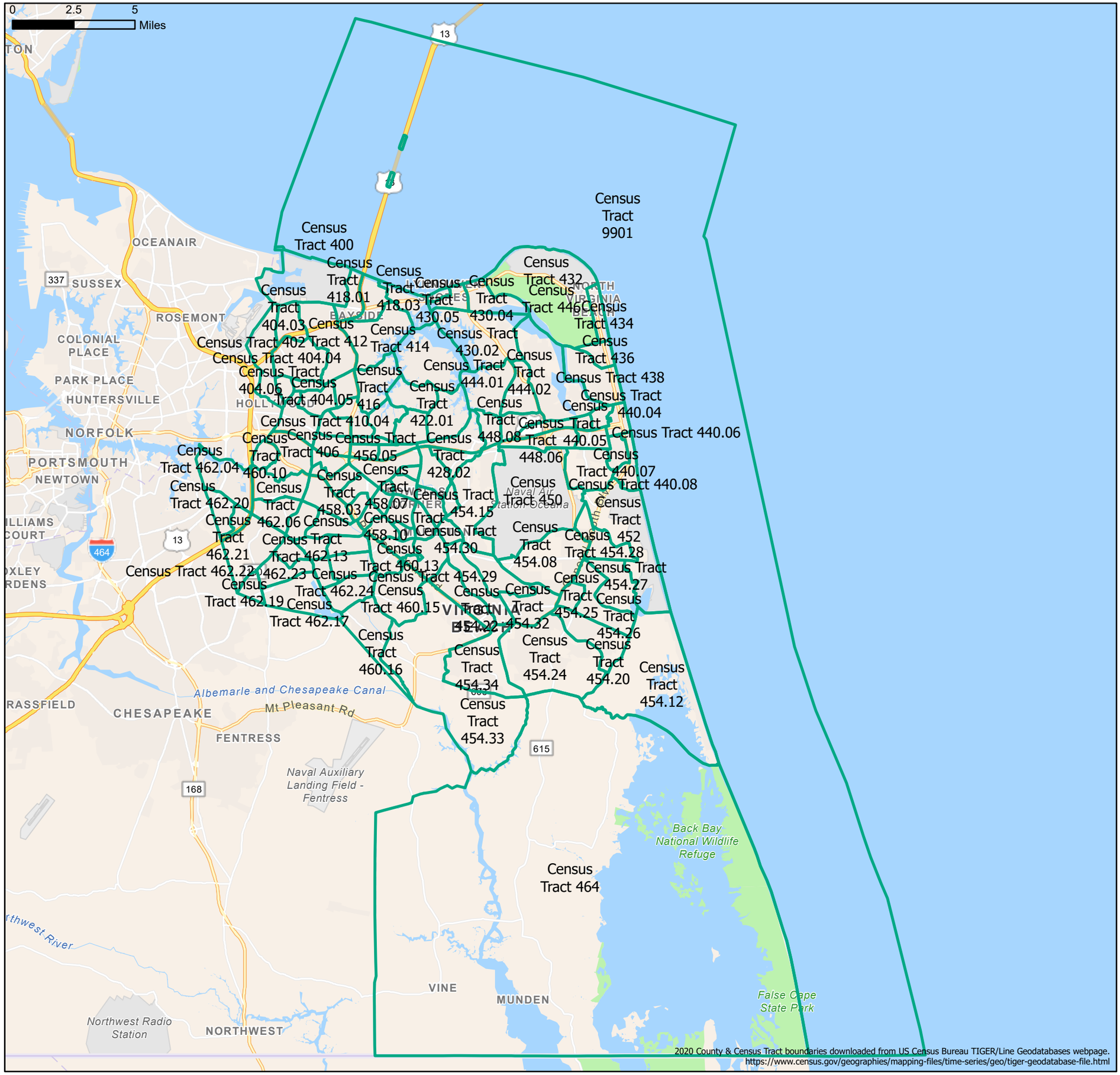
| Grantee | Year of Fiscal Year | Exclusive vs Shared | Subgrantee | Project Counties | Project Type(s) | Federal Funds Obligated |
|---|---|---|---|---|---|---|
| NORFOLK CITY | 2018 | Exclusive | City of Norfolk | NORFOLK CITY | 202.2: Elevation of Private Struc.. | $3,221,164 |
| | | | | | 207.2: Mitigation Reconstruction | $150,000 |
| | 2016 | Exclusive | City of Norfolk | NORFOLK CITY | 202.1: Elevation of Private Struc.. | $1,188,600 |
| | | | Norfolk | NORFOLK (CITY) | 200.2: Acquisition of Private Re.. | $652,523 |
| | | | | | 202.2: Elevation of Private Struc.. | $656,250 |
| | 2015 | Exclusive | City of Norfolk | NORFOLK CITY | 202.1: Elevation of Private Struc.. | $165,000 |
| | 2014 | Exclusive | City of Norfolk | NORFOLK CITY | 202.2: Elevation of Private Struc.. | $899,852 |
| | 2013 | Exclusive | City of Norfolk | NORFOLK CITY | 202.2: Elevation of Private Struc.. | $2,795,287 |
| | 2012 | Exclusive | City of Norfolk | NORFOLK CITY | 202.2: Elevation of Private Struc.. | $567,044 |
| | | Shared | HAMPTON R.. | ISLE OF WIGHT; JAMES CITY; WILLIAM.. | 91.1: Local Multihazard Mitigati.. | $163,140 |
| | 2011 | Exclusive | Norfolk | NORFOLK (CITY) | 202.2: Elevation of Private Struc.. | $480,092 |
| | | | | | 204.2: Dry Floodproofing Privat.. | $34,395 |
| | 2010 | Shared | Hampton Ro.. | ISLE OF WIGHT; NORFOLK CITY; PORT.. | 91.1: Local Multihazard Mitigati.. | $92,801 |
| | 2009 | Exclusive | City of Norfolk | NORFOLK CITY | 202.2: Elevation of Private Struc.. | $1,089,901 |
| | 2006 | Exclusive | Norfolk | NORFOLK (CITY) | 202.2: Elevation of Private Struc.. | $20,517 |
| | 2003 | Exclusive | Norfolk | NORFOLK (CITY) | 202.2: Elevation of Private Struc.. | $1,594,173 |
| | 2000 | Exclusive | Norfolk | NORFOLK (CITY) | 200.1: Acquisition of Private Re.. | $987,499 |
| | 1998 | Exclusive | NORFOLK | NORFOLK (CITY) | 106.1: Other Non Construction (.. | $193,350 |

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

2020 Census Tract

# Virginia Beach city

VDEM GIS | 5/21/2021

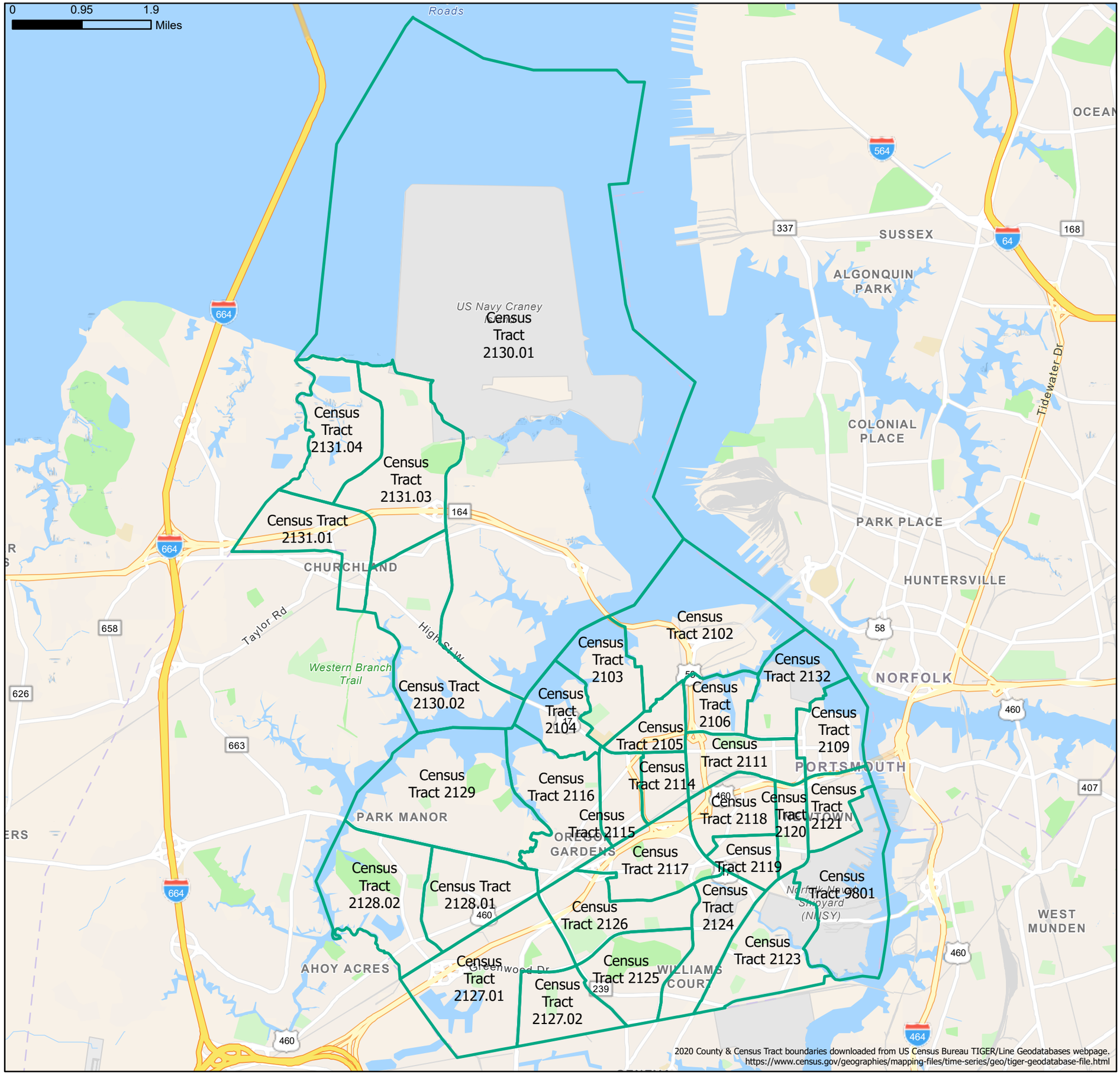



2020 County & Census Tract boundaries downloaded from US Census Bureau TIGER/Line Geodatabases webpage.
https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-geodatabase-file.html

2020 Census Tract

# Portsmouth city

VDEM GIS | 5/21/2021

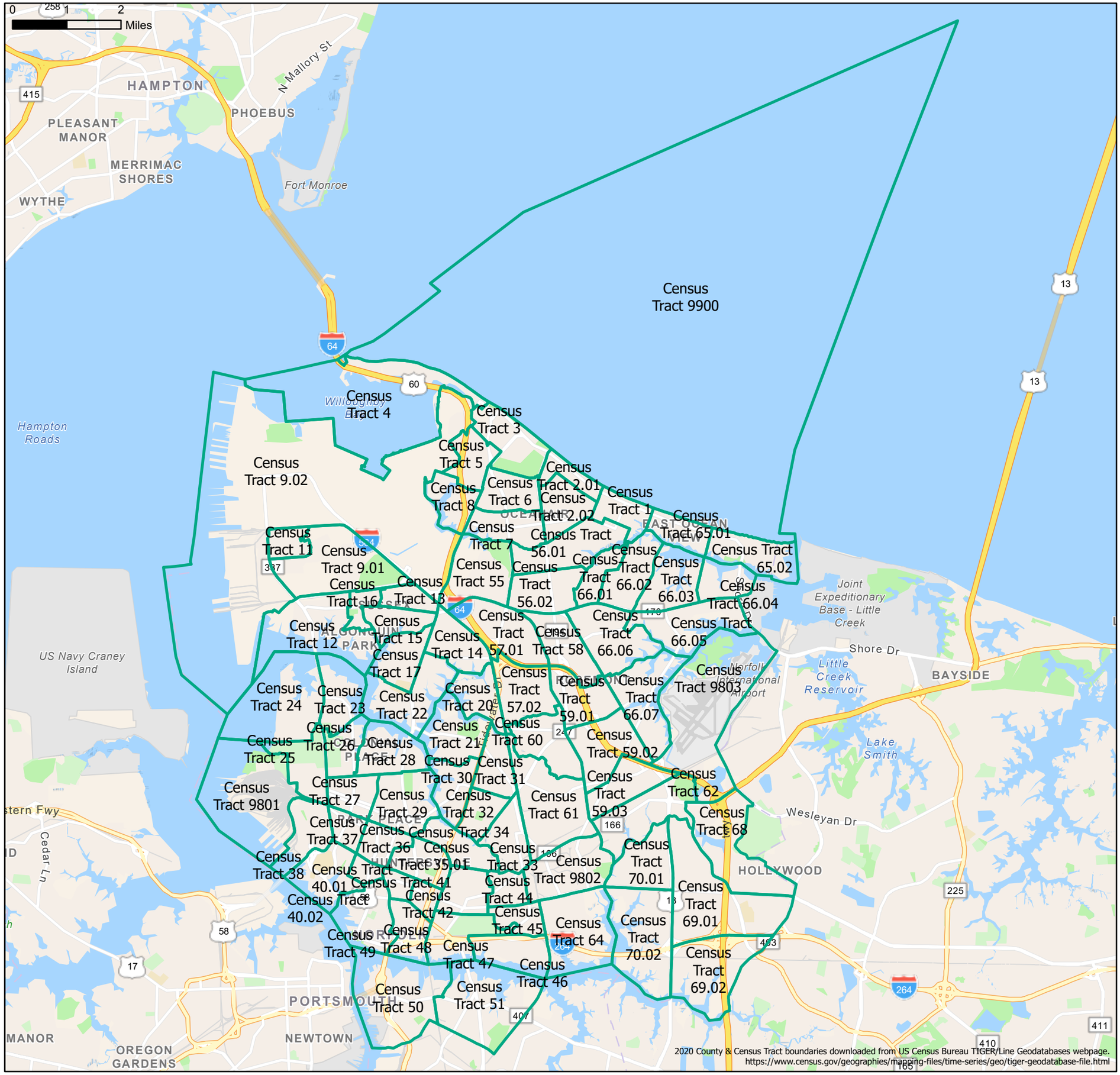



2020 County & Census Tract boundaries downloaded from US Census Bureau TIGER/Line Geodatabases webpage.
https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-geodatabase-file.html

2020 Census Tract

# Norfolk city

VDEM GIS | 5/21/2021

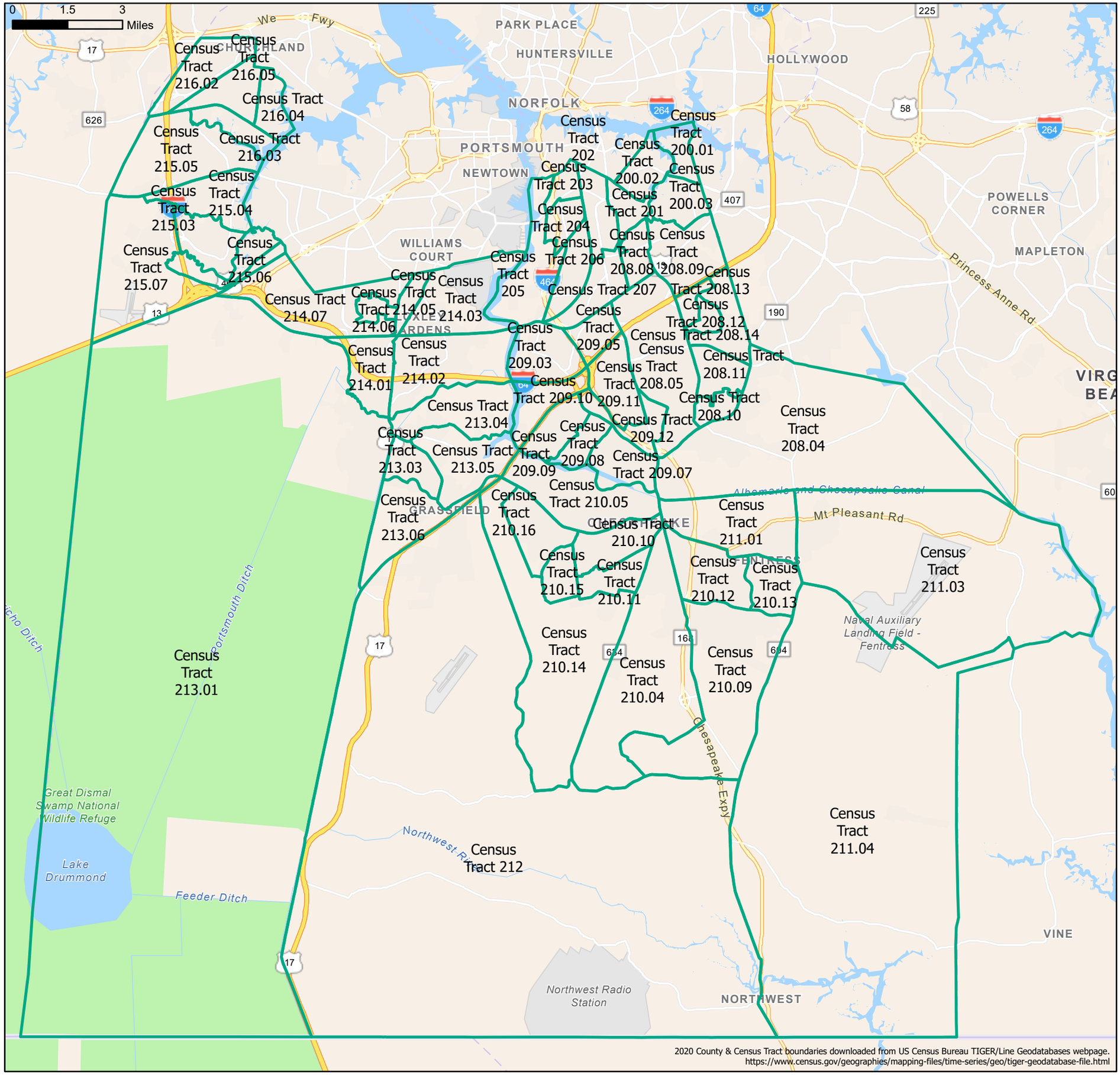



2020 County & Census Tract boundaries downloaded from US Census Bureau TIGER/Line Geodatabases webpage.
https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-geodatabase-file.html

2020 Census Tract

# Chesapeake city

VDEM GIS | 5/21/2021



# COVID-19 Unified Command/VEST Health Equity Working Group

MITIGATION PROJECTS ANALYSIS
CHESAPEAKE CITY

NOVEMBER 2020

# Topics

The analysis provides **Chesapeake City** 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

**98th**

Your locality has more households in more severe flood/hurricane zones than 98% of other Virginia localities

## Hazard Risk[1] Rank

**3rd**

Your locality's Hazard Risk score is ranked 3rd 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 | 0 | 9,876 | 7,229 |
| N/A out of 132 Localities | N/A out of 132 Localities | 4th out of 132 Localities | 5th 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 |
| 17,587 | 25,041 | 31,291 | 26,964 |
| 3rd out of 132 Localities | 3rd out of 132 Localities | 3rd out of 132 Localities | 2nd 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

**50th**

On average, a household in a flood or hurricane zone in your locality is more vulnerable than a household in 50% of other Virginia localities

## Population Vulnerability[1] Rank

**67th**

Your locality's Population Vulnerability score is ranked 67th out of 132 Virginia localities

## How CHESAPEAKE CITY Compares to Other Localities Across the Eight Vulnerability Attributes

| Low Income | Elevated Health Risk | Age | Communities of Color |
|---|---|---|---|
| 34th percentile | 31st percentile | 24th percentile | 81st percentile |

| # of Children in Household | # of People in Household | Unemployment Risk | Lack of Vehicle Access |
|---|---|---|---|
| 98th percentile | 92nd percentile | 43rd percentile | 32nd 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

=

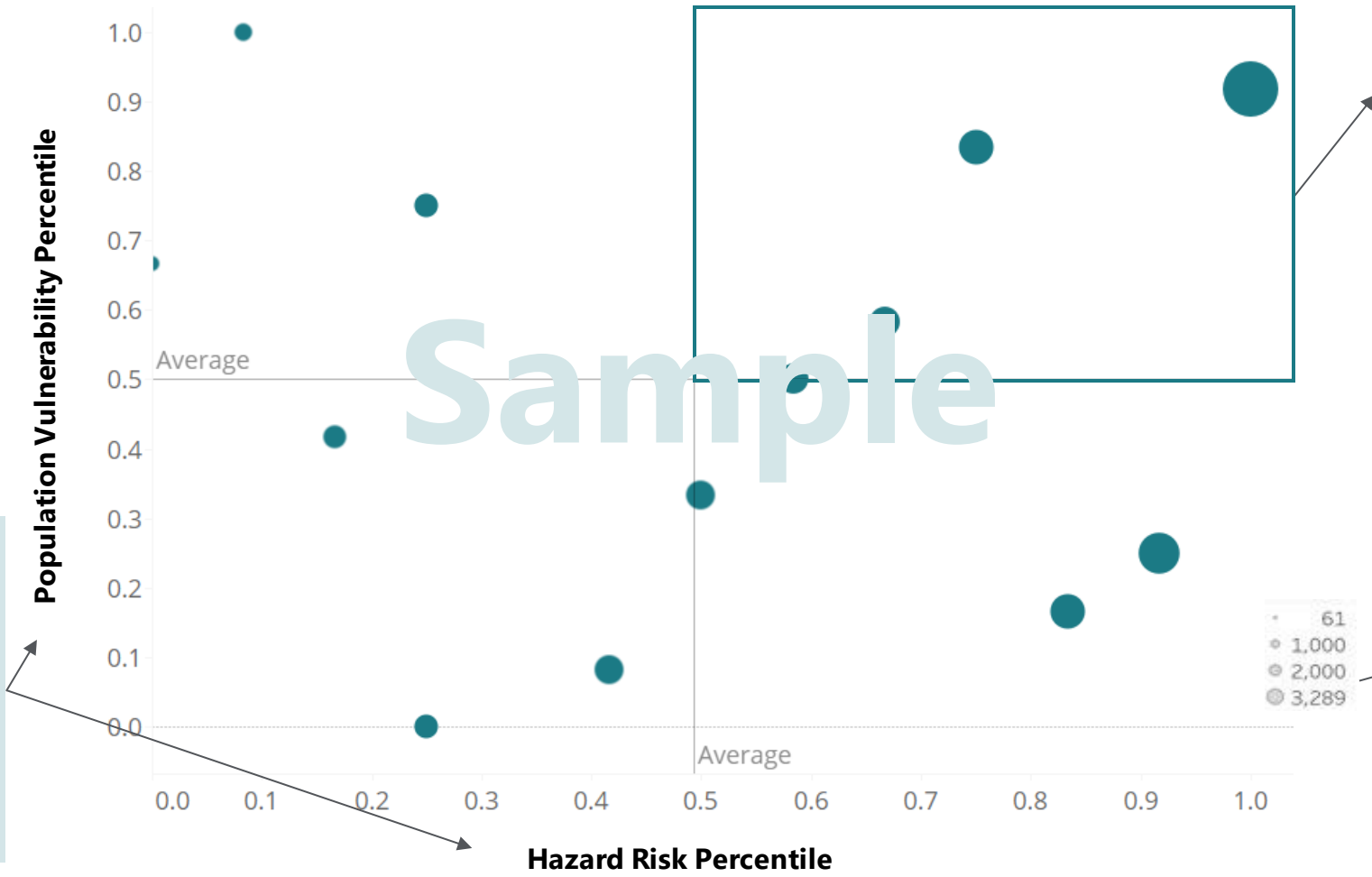
## Prioritized Census Tracts

- 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.



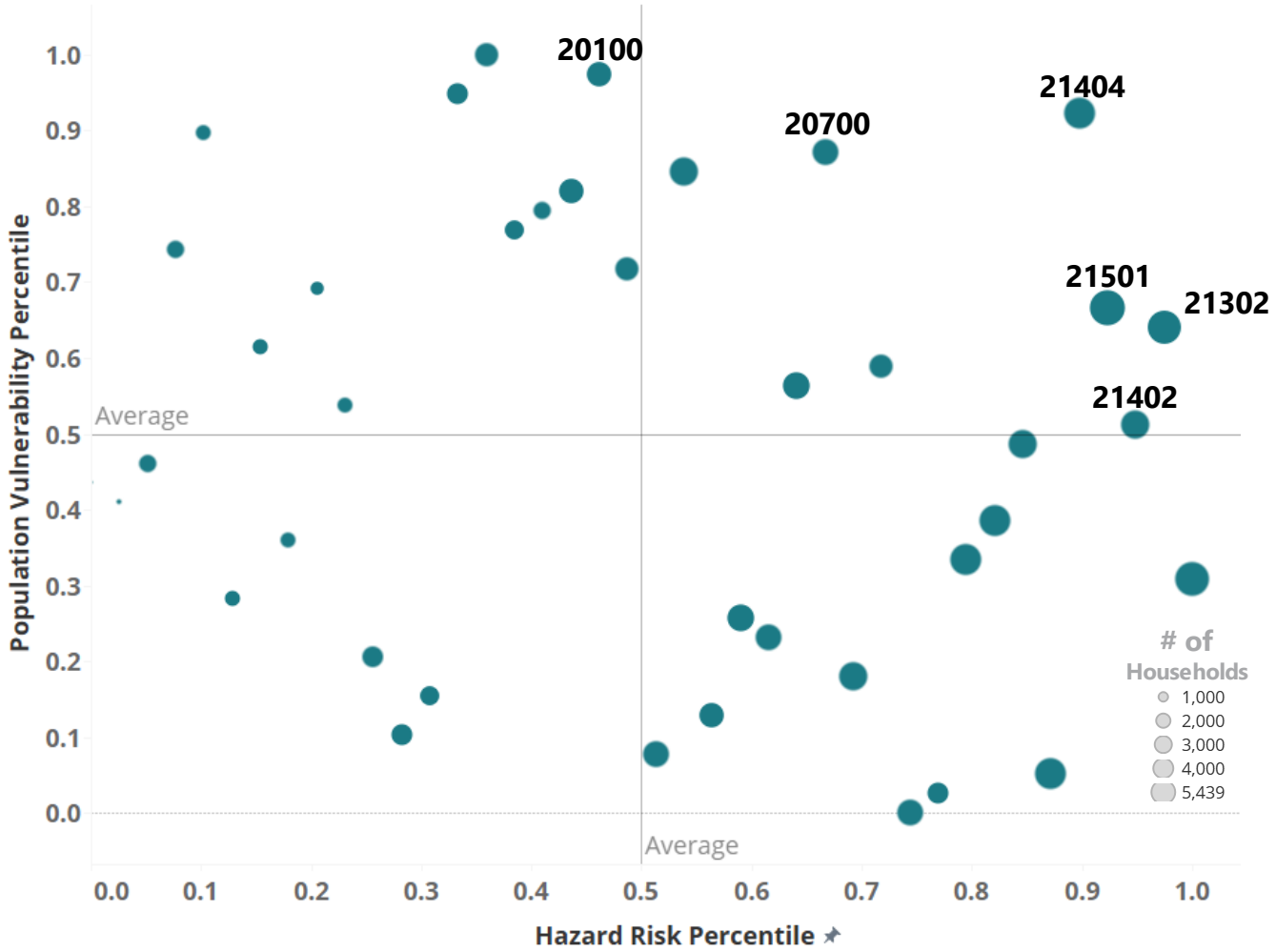

Circles in the upper right quadrant represent areas that you might consider prioritizing due to high population vulnerability and hazard risk

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 Chesapeake City

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

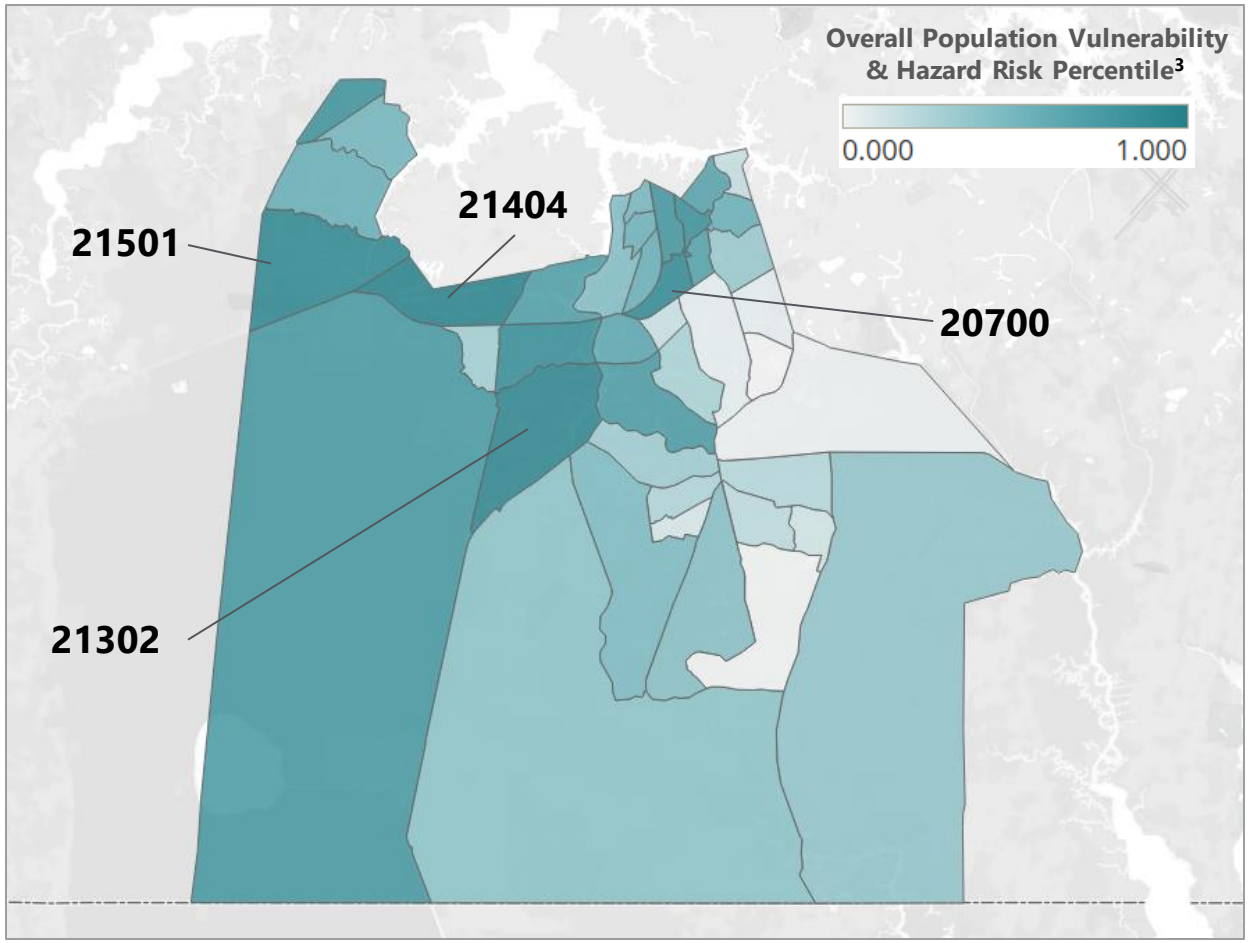
| # | Area | # of Households | Within-Chesapeake City Percentiles: Overall Percentile | Within-Chesapeake City Percentiles: Population Vulnerability[1] Percentile | Within-Chesapeake City Percentiles: Hazard Risk[2] Percentile |
|---|---|---|---|---|---|
| 1 | 21404 | 4,188 | 100th | 92nd | 90th |
| 2 | 21302 | 4,876 | 97th | 64th | 97th |
| 3 | 21501 | 5,439 | 95th | 67th | 92nd |
| 4 | 20700 | 2,857 | 92nd | 87th | 67th |
| 5 | 21402 | 3,593 | 90th | 51st | 95th |
| 6 | 20100 | 2,551 | 87th | 97th | 46th |
| 7 | 21602 | 3,541 | 85th | 85th | 54th |
| 8 | 20200 | 2,373 | 82nd | 100th | 36th |

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 Chesapeake City 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 Chesapeake City




## Priority Areas in Flood and Hurricane Zones

| | | | Within-Chesapeake City Percentiles | | |
|---|---|---|---|---|---|
| # | Area | # of Households | Overall Percentile | Population Vulnerability[1] Percentile | Hazard Risk[2] Percentile |
| 1 | 21404 | 4,188 | 100th | 92nd | 90th |
| 2 | 21302 | 4,876 | 97th | 64th | 97th |
| 3 | 21501 | 5,439 | 95th | 67th | 92nd |
| 4 | 20700 | 2,857 | 92nd | 87th | 67th |
| 5 | 21402 | 3,593 | 90th | 51st | 95th |
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| 7 | 21602 | 3,541 | 85th | 85th | 54th |
| 8 | 20200 | 2,373 | 82nd | 100th | 36th |

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-Chesapeake City 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 | **21404** | **4,188** | **100th** | **92nd** | 92nd | 72nd | 77th | 46th | 54th | 44th | 69th | 10th |
| 2 | **21302** | **4,876** | **97th** | **64th** | 79th | 54th | 21st | 90th | 97th | 8th | 10th | 0th |
| 3 | **21501** | **5,439** | **95th** | **67th** | 69th | 46th | 54th | 69th | 77th | 41st | 62nd | 77th |

| | | | W/I-Chesapeake City Percentiles | | Chesapeake City 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 | **21404** | **4,188** | **100th** | **90th** | 0 | 0 | 192 | 192 | 675 | 2720 | 791 | 2 |
| 2 | **21302** | **4,876** | **97th** | **97th** | 0 | 0 | 1367 | 1140 | 2005 | 2823 | 48 | 0 |
| 3 | **21501** | **5,439** | **95th** | **92nd** | 0 | 0 | 33 | 135 | 1 | 0 | 5279 | 159 |

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]**

**$10,256,909**

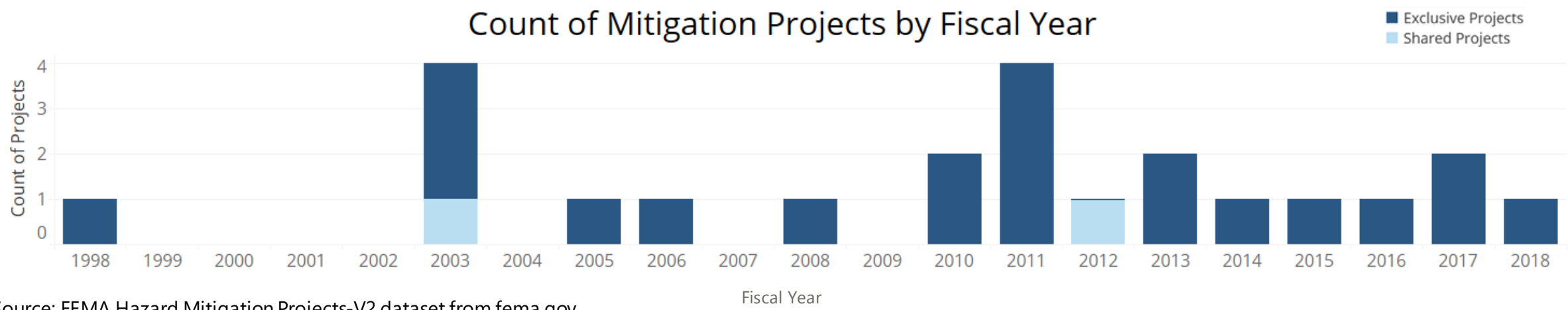
This is the total amount of federal funding alloted to mitigation projects solely owned by your locality from 1990-2019

**Total Shared Project Funding[1]**

**$193,140**

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

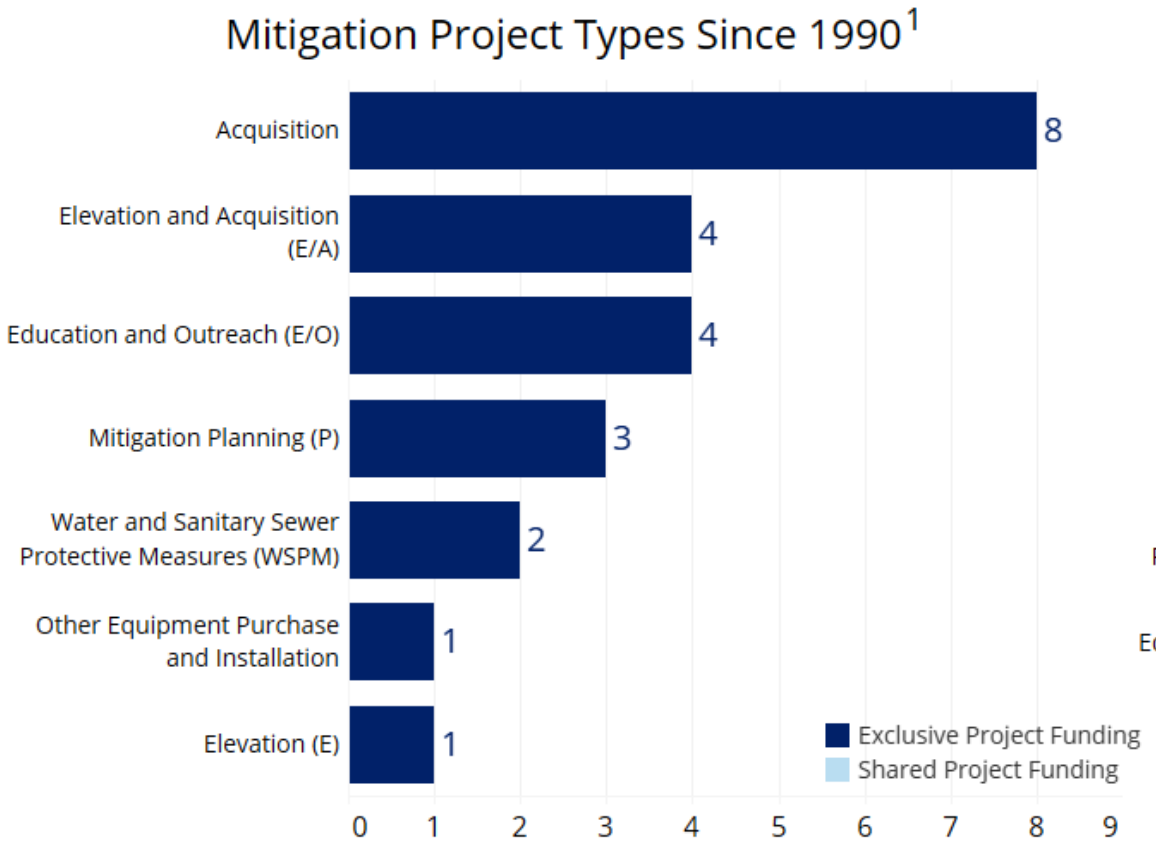
| Exclusive Projects | Average Exclusive Project Size | Shared Projects | Average Counties Per Shared Project |
|---|---|---|---|
| 21 | $488K | 2 | 8.0 |

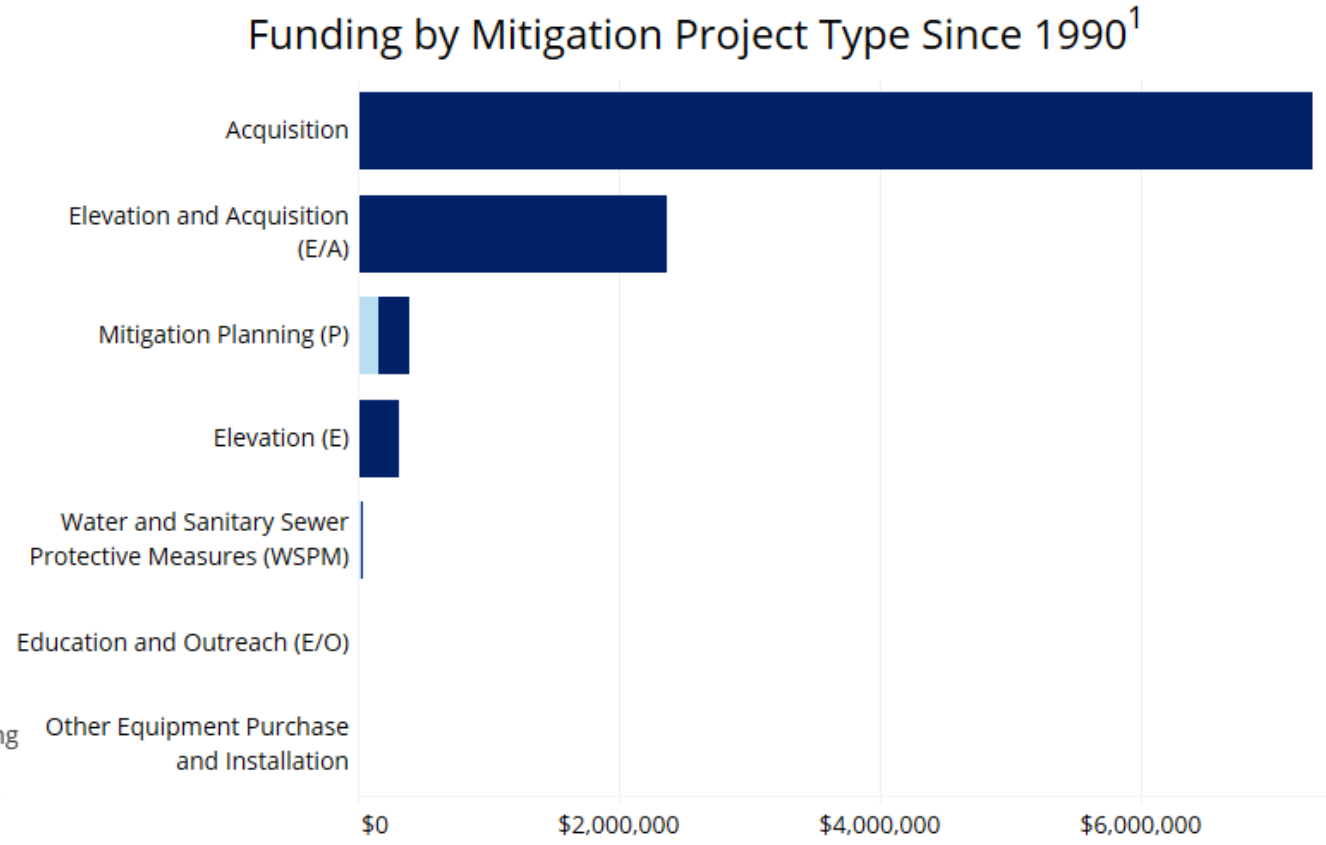



1. Source: FEMA Hazard Mitigation Projects-V2 dataset from fema.gov

# 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, Chesapeake City has experienced the following:

## Cases[1]

| Total | Per 100k |
|---|---|
| **4,748** | **1,996** |
| **9th** out of 133 localities[2] | **44th** out of 133 localities |

## Hospitalizations[1]

| Total | Per 100k |
|---|---|
| **460** | **193** |
| **6th** out of 133 localities | **25th** out of 133 localities |

## Deaths[1]

| Total | Per 100k |
|---|---|
| **79** | **33** |
| **9th** out of 133 localities | **60th** out of 133 localities |

1. COVID-19 case, hospitalization, and death figures are sourced from the Virginia Department of Health as of **10/19/2020**
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.

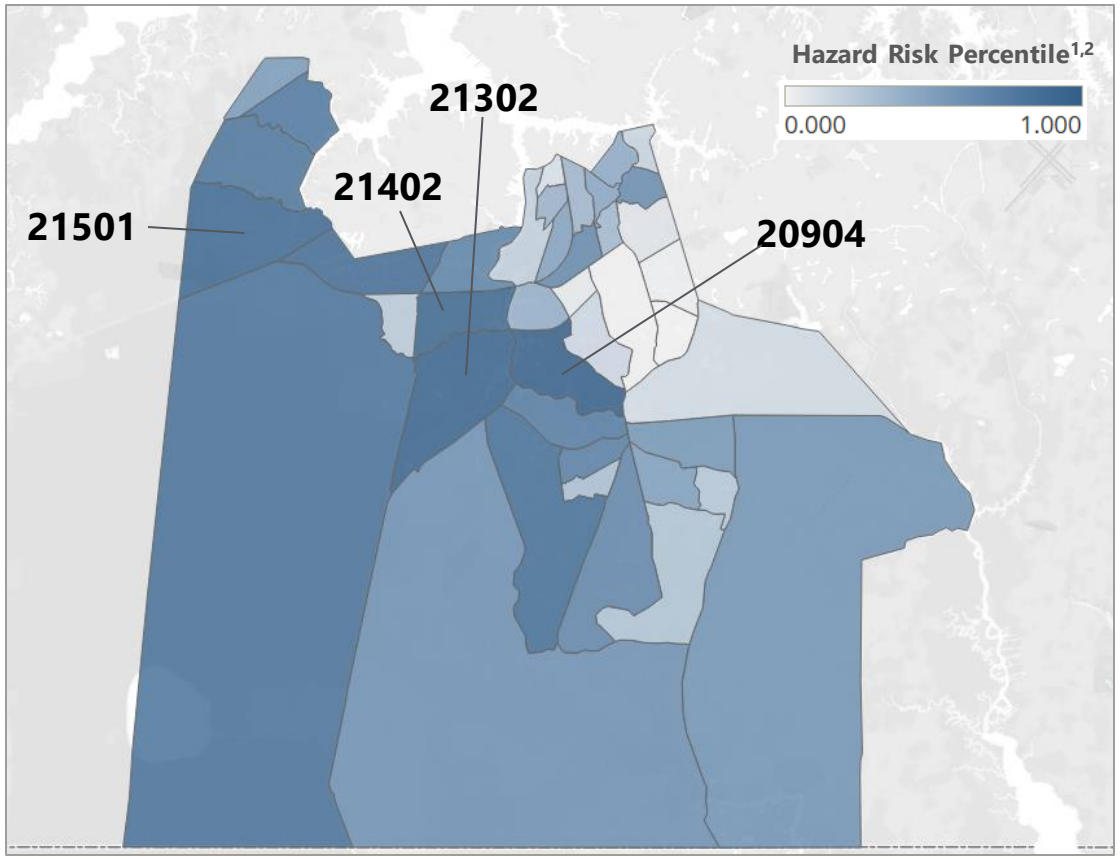
- Consider targeting **priority areas** when designing future mitigation projects
- Consider analysis at the **census tract/block level** to understand population vulnerability and hazard risks at a granular level to support decisions on mitigation projects
- Consider **supplementing these people-focused 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 Chesapeake City




## Top-5 Census Tracts for Hazard Risk[1]

| | | | | Chesapeake City 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** | **20904** | **5,069** | **100th** | 0 | 0 | 3225 | 301 | 3774 | 1295 | 0 | 0 |
| **2** | **21302** | **4,876** | **97th** | 0 | 0 | 1367 | 1140 | 2005 | 2823 | 48 | 0 |
| **3** | **21402** | **3,593** | **95th** | 0 | 0 | 1170 | 728 | 1649 | 1944 | 0 | 0 |
| **4** | **21501** | **5,439** | **92nd** | 0 | 0 | 33 | 135 | 1 | 0 | 5279 | 159 |
| **5** | **21404** | **4,188** | **90th** | 0 | 0 | 192 | 192 | 675 | 2720 | 791 | 2 |

**Note:** see the appendix for a data table for the Top 15 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

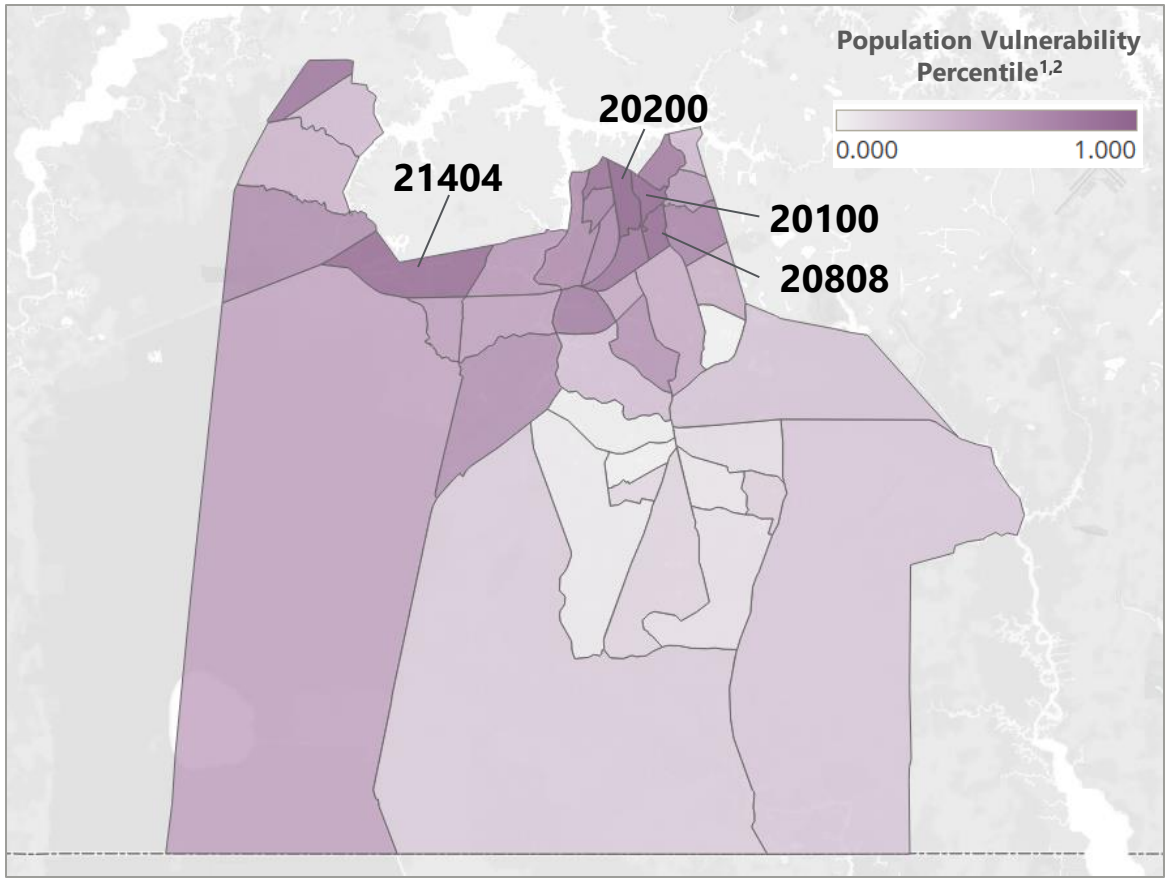
| Attribute[1] | Weighting[2] | Description (in a household) |
|---|---|---|
| Low Income | 18% | Number of adults with income less than $30,000 |
| Elevated Health Risk | 17% | Number of adults with one or more serious health conditions |
| Age (Older Adults) | 15% | Number of adults who are age 65 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 Chesapeake City




## Top-5 Census Tracts for Population Vulnerability[1]

| | | | Within-Chesapeake City 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** | **20200** | **2,373** | **100th** | 95th | 87th | 97th | 31st | 49th | 85th | 26th | 95th |
| **2** | **20100** | **2,551** | **97th** | 90th | 82nd | 100th | 5th | 23rd | 92nd | 13rd | 100th |
| **3** | **20808** | **2,031** | **95th** | 100th | 100th | 72nd | 36th | 18th | 33rd | 95th | 67th |
| **4** | **21404** | **4,188** | **92nd** | 92nd | 72nd | 77th | 46th | 54th | 44th | 69th | 10th |
| **5** | **20300** | **970** | **90th** | 77th | 67th | 92nd | 10th | 38th | 90th | 5th | 97th |

**Note:** See the appendix for a data table for the Top 15 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 | 21404 | 4,188 | 100th | 92nd | 92nd | 72nd | 77th | 46th | 54th | 44th | 69th | 10th | 90th | 0 | 0 | 192 | 192 | 675 | 2720 | 791 | 2 |
| 2 | 21302 | 4,876 | 97th | 64th | 79th | 54th | 21st | 90th | 97th | 8th | 10th | 0th | 97th | 0 | 0 | 1367 | 1140 | 2005 | 2823 | 48 | 0 |
| 3 | 21501 | 5,439 | 95th | 67th | 69th | 46th | 54th | 69th | 77th | 41st | 62nd | 77th | 92nd | 0 | 0 | 33 | 135 | 1 | 0 | 5279 | 159 |
| 4 | 20700 | 2,857 | 92nd | 87th | 74th | 79th | 95th | 3rd | 8th | 79th | 49th | 74th | 67th | 0 | 0 | 214 | 318 | 908 | 461 | 0 | 1488 |
| 5 | 21402 | 3,593 | 90th | 51st | 49th | 64th | 56th | 59th | 69th | 67th | 59th | 13rd | 95th | 0 | 0 | 1170 | 728 | 1649 | 1944 | 0 | 0 |
| 6 | 20100 | 2,551 | 87th | 97th | 90th | 82nd | 100th | 5th | 23rd | 92nd | 13rd | 100th | 46th | 0 | 0 | 0 | 0 | 0 | 0 | 2515 | 36 |
| 7 | 21602 | 3,541 | 85th | 85th | 85th | 51st | 79th | 41st | 44th | 62nd | 33rd | 36th | 54th | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3541 |
| 8 | 20200 | 2,373 | 82nd | 100th | 95th | 87th | 97th | 31st | 49th | 85th | 26th | 95th | 36th | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 2368 |
| 9 | 21301 | 3,644 | 79th | 49th | 72nd | 56th | 44th | 54th | 51st | 59th | 18th | 23rd | 85th | 0 | 0 | 60 | 40 | 180 | 3120 | 339 | 5 |
| 10 | 20904 | 5,069 | 77th | 31st | 51st | 31st | 51st | 15th | 15th | 51st | 31st | 28th | 100th | 0 | 0 | 3225 | 301 | 3774 | 1295 | 0 | 0 |
| 11 | 21403 | 2,389 | 74th | 59th | 44th | 62nd | 82nd | 21st | 26th | 87th | 28th | 92nd | 72nd | 0 | 0 | 520 | 240 | 1217 | 1172 | 0 | 0 |
| 12 | 20808 | 2,031 | 72nd | 95th | 100th | 100th | 72nd | 36th | 18th | 33rd | 95th | 67th | 33rd | 0 | 0 | 0 | 0 | 0 | 0 | 657 | 1374 |
| 13 | 20002 | 2,480 | 69th | 82nd | 64th | 90th | 85th | 18th | 28th | 82nd | 15th | 90th | 44th | 0 | 0 | 11 | 0 | 64 | 0 | 2416 | 0 |
| 14 | 20903 | 1,389 | 67th | 79th | 97th | 36th | 62nd | 56th | 67th | 26th | 41st | 33rd | 41st | 0 | 0 | 826 | 441 | 798 | 591 | 0 | 0 |
| 15 | 21502 | 4,302 | 59th | 38th | 41st | 59th | 36th | 49th | 46th | 54th | 72nd | 38th | 82nd | 0 | 0 | 42 | 294 | 775 | 0 | 1783 | 1744 |

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 |
|---|---|---|---|---|---|---|
| CHESAPEAKE CITY | 2018 | Exclusive | City of Chesa.. | CHESAPEAKE CITY | 200.2: Acquisition of Private Re.. | $1,072,071 |
| | 2017 | Exclusive | Chesapeake | CHESAPEAKE (CITY) | 200.2: Acquisition of Private Re.. | $545,159 |
| | | | City of Chesa.. | CHESAPEAKE CITY | 200.2: Acquisition of Private Re.. | $854,025 |
| | 2016 | Exclusive | City of Chesa.. | CHESAPEAKE CITY | 200.2: Acquisition of Private Re.. | $1,193,236 |
| | 2015 | Exclusive | City of Chesa.. | CHESAPEAKE CITY | 200.2: Acquisition of Private Re.. | $1,213,412 |
| | 2014 | Exclusive | City of Chesa.. | CHESAPEAKE CITY | 200.2: Acquisition of Private Re.. | $846,720 |
| | 2013 | Exclusive | City of Chesa.. | CHESAPEAKE CITY | 200.2: Acquisition of Private Re.. | $1,314,900 |
| | 2012 | Shared | HAMPTON R.. | ISLE OF WIGHT; JAMES CITY; WILLIAM.. | 91.1: Local Multihazard Mitigati.. | $163,140 |
| | 2011 | Exclusive | Chesapeake | CHESAPEAKE (CITY) | 91.1: Local Multihazard Mitigati.. | $29,250 |
| | | | | | 100.1: Public Awareness and Ed.. | $3,618 |
| | | | | | 200.2: Acquisition of Private Re.. | $1,052,543 |
| | 2010 | Exclusive | Chesapeake | CHESAPEAKE (CITY) | 100.1: Public Awareness and Ed.. | $3,235 |
| | | | | | 200.2: Acquisition of Private Re.. | $1,010,582 |
| | 2008 | Exclusive | City of Chesa.. | CHESAPEAKE CITY | 200.2: Acquisition of Private Re.. | $583,650 |
| | 2006 | Exclusive | Chesapeake | CHESAPEAKE (CITY) | 602.1: Other Equipment Purcha.. | $4,125 |
| | 2005 | Exclusive | City of Chesa.. | CHESAPEAKE CITY | 91.1: Local Multihazard Mitigati.. | $205,185 |
| | 2003 | Exclusive | Chesapeake | CHESAPEAKE (CITY) | 100.1: Public Awareness and Ed.. | $2,571 |
| | | | | | 202.2: Elevation of Private Struc.. | $313,623 |
| | | Shared | Chesapeake | DICKENSON | 401.1: Water and Sanitary Sewe.. | $30,000 |
| | 1998 | Exclusive | CHESAPEAKE | CHESAPEAKE (CITY) | 401.1: Water and Sanitary Sewe.. | $9,004 |

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