

**Appendix S:
Climate Change Impacts**

National Risk Index



May 26, 2023

Fairfax City, Virginia

Summary

Risk Index is **Very Low**

Score **25.6**



Expected Annual Loss is **Very Low**

Score **28.8**



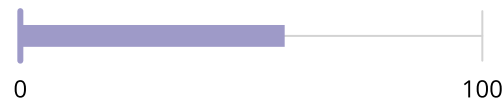
Social Vulnerability is **Relatively Low**

Score **25.1**



Community Resilience is **Relatively Moderate**

Score **57.3**

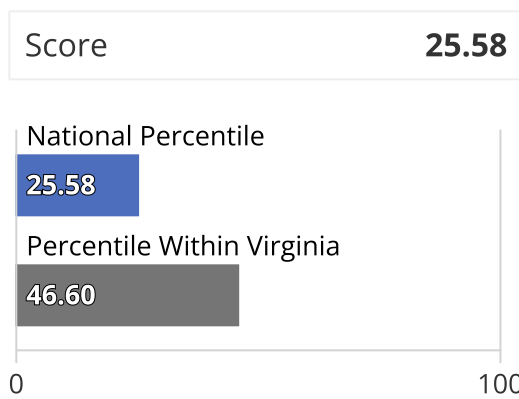
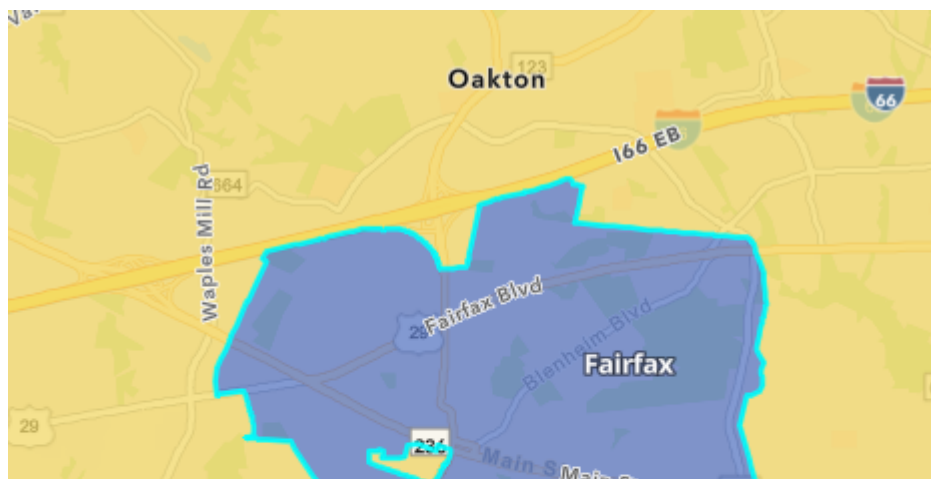


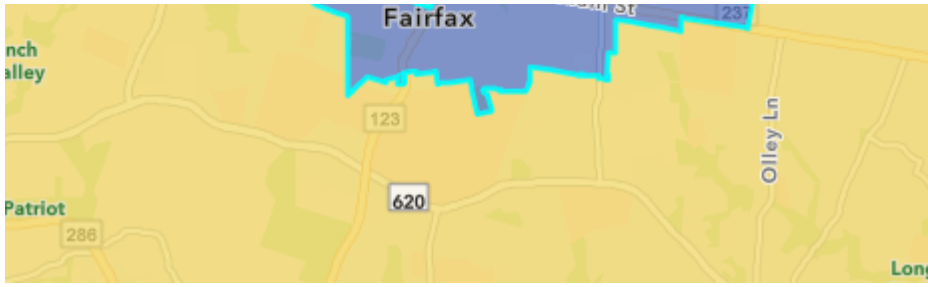
While reviewing this report, keep in mind that low risk is driven by lower loss due to natural hazards, lower social vulnerability, and higher community resilience.

For more information about the National Risk Index, its data, and how to interpret the information it provides, please review the **About the National Risk Index** and **How to Take Action** sections at the end of this report. Or, visit the National Risk Index website at hazards.fema.gov/nri/learn-more to access supporting documentation and links.

Risk Index

The Risk Index rating is **Very Low** for **Fairfax City, VA** when compared to the rest of the U.S.





26% of U.S. counties have a lower Risk Index

47% of counties in Virginia have a lower Risk Index

Risk Index Legend

- Very High
- Relatively High
- Relatively Moderate
- Relatively Low
- Very Low
- No Rating
- Not Applicable
- Insufficient Data

Hazard Type Risk Index

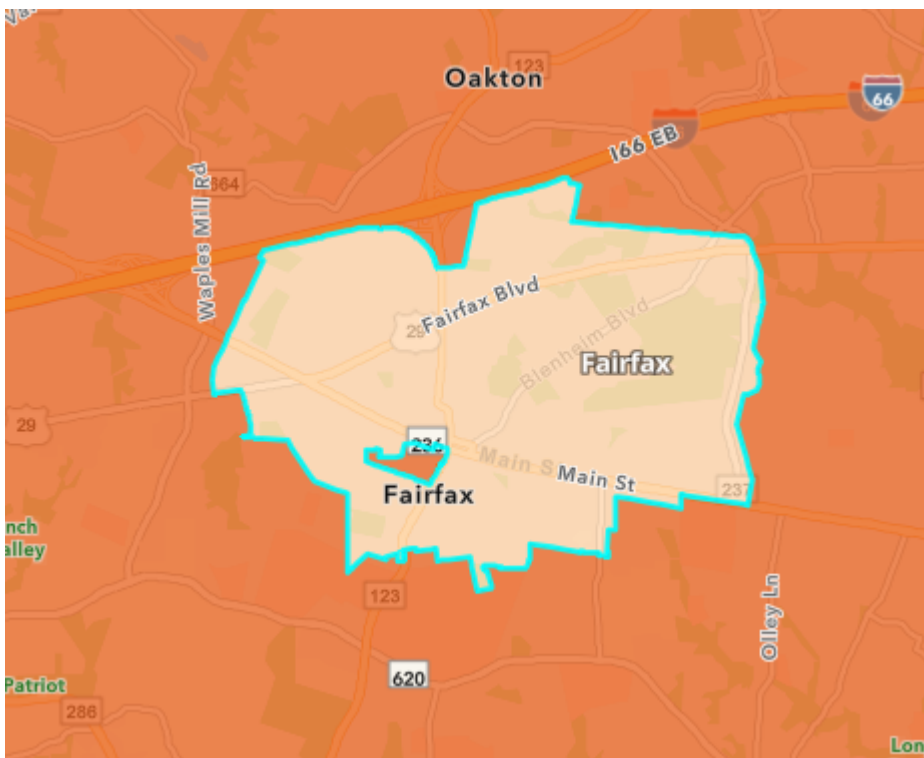
Hazard type Risk Index scores are calculated using data for only a single hazard type, and reflect a community's Expected Annual Loss value, community risk factors, and the adjustment factor used to calculate the risk value.

Hazard Type	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Score
Hurricane	\$1,781,110	Relatively Low	Relatively Moderate	1.06	\$1,897,061	73.7
Strong Wind	\$349,024	Relatively Low	Relatively Moderate	1.06	\$370,872	48.7
Tornado	\$322,017	Relatively Low	Relatively Moderate	1.06	\$342,636	24.9
Hail	\$149,062	Relatively Low	Relatively Moderate	1.06	\$158,780	58.6
Lightning	\$108,412	Relatively Low	Relatively Moderate	1.06	\$115,148	51.9
Heat Wave	\$95,710	Relatively Low	Relatively Moderate	1.06	\$101,658	53
Riverine Flooding	\$76,709	Relatively Low	Relatively Moderate	1.06	\$82,347	20.4
Earthquake	\$35,894	Relatively Low	Relatively Moderate	1.06	\$38,297	30
Landslide	\$21,900	Relatively Low	Relatively Moderate	1.06	\$22,836	30.5
Winter Weather	\$17,379	Relatively Low	Relatively Moderate	1.06	\$18,461	22.7
Cold Wave	\$13,909	Relatively Low	Relatively Moderate	1.06	\$14,773	35.6
Ice Storm	\$6,667	Relatively Low	Relatively Moderate	1.06	\$7,088	14.7
Wildfire	\$1,393	Relatively Low	Relatively Moderate	1.06	\$1,487	2.9
Drought	\$0	Relatively Low	Relatively Moderate	1.06	\$0	0
Avalanche	--	Relatively Low	Relatively Moderate	1.06	--	--
Coastal Flooding	--	Relatively Low	Relatively Moderate	1.06	--	--
Tsunami	--	Relatively Low	Relatively Moderate	1.06	--	--

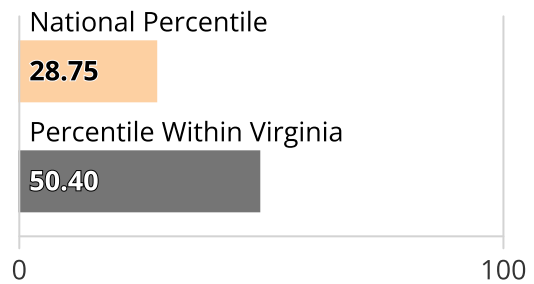
Hazard Type	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Score
Volcanic Activity	--	Relatively Low	Relatively Moderate	1.06	--	--

Expected Annual Loss

In **Fairfax City, VA**, expected loss each year due to natural hazards is **Very Low** when compared to the rest of the U.S.



Score **28.75**



29% of U.S. counties have a lower Expected Annual Loss

50% of counties in Virginia have a lower Expected Annual Loss

Expected Annual Loss Legend

- Very High
- Relatively High
- Relatively Moderate
- Relatively Low
- Very Low
- No Expected Annual Losses
- Not Applicable
- Insufficient Data

Composite Expected Annual Loss	\$2,979,185.78
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Composite Expected Annual Loss Rate National Percentile	30.5
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Building EAL	\$2,188,457.68
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Population EAL	0.07 fatalities
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Building EAL Rate	\$1 per \$2.17K of building value
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Population EAL Rate	1 per 354.22K people
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Agriculture EAL	\$0.00
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Population Equivalence EAL	\$790,728.10
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Agriculture EAL Rate	--
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Expected Annual Loss for Hazard Types

Expected Annual Loss scores for hazard types are calculated using data for only a single hazard type, and reflect a community's relative expected annual loss for only that hazard type. **14 of 18** hazard types contribute to the expected annual loss for **Fairfax City, VA**.

Hazard Type	Expected Annual Loss Rating	EAL Value	Score
Hurricane	Relatively Low	\$1,781,110	71.8
Strong Wind	Relatively Low	\$349,024	53.9
Tornado	Relatively Low	\$322,017	28.1
Hail	Relatively Low	\$149,062	61.7
Lightning	Relatively Low	\$108,412	56.6
Heat Wave	Relatively Low	\$95,710	56.1
Riverine Flooding	Very Low	\$76,709	22.7
Earthquake	Very Low	\$35,894	30.8
Landslide	Relatively Low	\$21,900	35.9
Winter Weather	Relatively Low	\$17,379	27.3
Cold Wave	Relatively Low	\$13,909	37.9
Ice Storm	Very Low	\$6,667	16.4
Wildfire	Very Low	\$1,393	3.6
Drought	No Expected Annual Losses	\$0	0.0
Avalanche	Not Applicable	--	--
Coastal Flooding	Not Applicable	--	--
Tsunami	Not Applicable	--	--
Volcanic Activity	Not Applicable	--	--

Expected Annual Loss Values

Hazard Type	Total	Building Value	Population Equivalence	Population	Agriculture Value
Avalanche	--	--	--	--	--
Coastal Flooding	--	--	--	--	--
Cold Wave	\$13,909	\$24	\$13,885	0.00	\$0
Drought	\$0	n/a	n/a	n/a	\$0
Earthquake	\$35,894	\$27,522	\$8,372	0.00	n/a
Hail	\$149,062	\$148,905	\$157	0.00	\$0
Heat Wave	\$95,710	\$0	\$95,710	0.01	\$0
Hurricane	\$1,781,110	\$1,723,785	\$57,325	0.00	\$0
Ice Storm	\$6,667	\$2,035	\$4,633	0.00	n/a
Landslide	\$21,900	\$4,500	\$17,400	0.00	n/a
Lightning	\$108,412	\$4,610	\$103,802	0.01	n/a
Riverine Flooding	\$76,709	\$25,491	\$51,219	0.00	\$0
Strong Wind	\$349,024	\$50,858	\$298,166	0.03	\$0
Tornado	\$322,017	\$198,784	\$123,234	0.01	\$0
Tsunami	--	--	--	--	--
Volcanic Activity	--	--	--	--	--
Wildfire	\$1,393	\$1,230	\$162	0.00	\$0
Winter Weather	\$17,379	\$716	\$16,663	0.00	\$0

Exposure Values

Hazard Type	Total	Building Value	Population Equivalence	Population	Agriculture Value
Avalanche	--	--	--	--	--
Coastal Flooding	--	--	--	--	--
Cold Wave	\$284,838,179,891	\$4,744,672,152	\$280,093,507,739	24,145.99	\$0
Drought	\$0	n/a	n/a	n/a	\$0
Earthquake	\$284,838,218,000	\$4,744,618,000	\$280,093,600,000	24,146.00	n/a
Hail	\$284,838,272,673	\$4,744,672,673	\$280,093,600,000	24,146.00	\$0
Heat Wave	\$284,838,179,891	\$4,744,672,152	\$280,093,507,739	24,145.99	\$0
Hurricane	\$284,838,179,891	\$4,744,672,152	\$280,093,507,739	24,145.99	\$0
Ice Storm	\$284,646,729,874	\$4,743,371,140	\$279,903,358,733	24,129.60	n/a
Landslide	\$80,614,888,165	\$1,242,192,221	\$79,372,695,944	6,842.47	n/a
Lightning	\$284,838,272,673	\$4,744,672,673	\$280,093,600,000	24,146.00	n/a
Riverine Flooding	\$9,194,302,806	\$150,592,192	\$9,043,710,614	779.63	\$0
Strong Wind	\$284,838,272,673	\$4,744,672,673	\$280,093,600,000	24,146.00	\$0
Tornado	\$284,838,272,673	\$4,744,672,673	\$280,093,600,000	24,146.00	\$0
Tsunami	--	--	--	--	--
Volcanic Activity	--	--	--	--	--
Wildfire	\$27,141,555,804	\$307,617,720	\$26,833,938,084	2,313.27	\$0
Winter Weather	\$284,838,179,891	\$4,744,672,152	\$280,093,507,739	24,145.99	\$0

Annualized Frequency Values

Hazard Type	Annualized Frequency	Events on Record	Period of Record
Avalanche	--	--	--
Coastal Flooding	--	--	--
Cold Wave	0.1 events per year	1	2005-2021 (16 years)
Drought	1.9 events per year	42	2000-2021 (22 years)
Earthquake	0.021% chance per year	n/a	2021 dataset
Hail	4.3 events per year	146	1986-2021 (34 years)
Heat Wave	1 event per year	16	2005-2021 (16 years)
Hurricane	0.1 events per year	6	East 1851-2021 (171 years) / West 1949-2021 (73 years)
Ice Storm	0.6 events per year	39	1946-2014 (67 years)
Landslide	0 events per year	0	2010-2021 (12 years)
Lightning	57.3 events per year	1,261	1991-2012 (22 years)
Riverine Flooding	0.8 events per year	19	1996-2019 (24 years)
Strong Wind	7.9 events per year	270	1986-2021 (34 years)
Tornado	0 events per year	1	1950-2021 (72 years)
Tsunami	--	--	--
Volcanic Activity	--	--	--
Wildfire	Less than 0.001% chance per year	n/a	2021 dataset
Winter Weather	2.8 events per year	45	2005-2021 (16 years)

Historic Loss Ratios

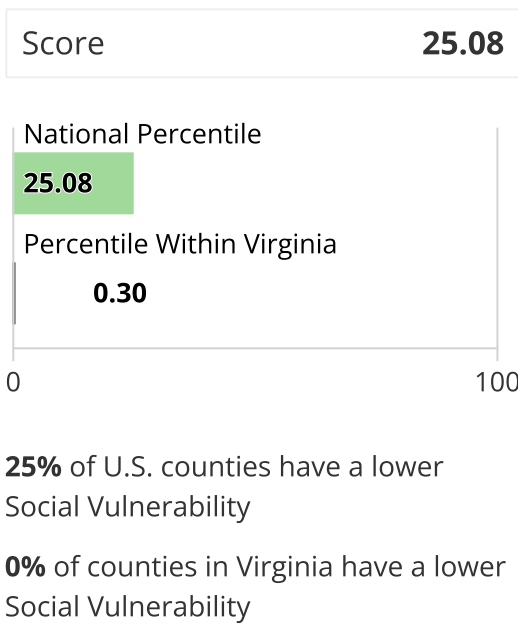
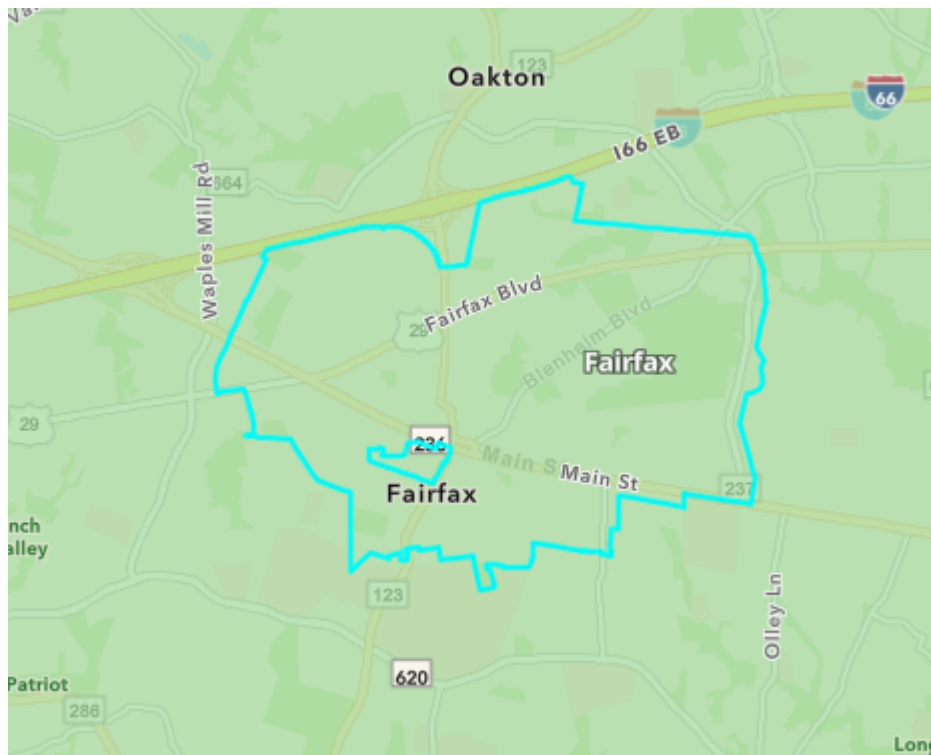
Hazard Type	Overall Rating
Avalanche	--
Coastal Flooding	--
Cold Wave	Very Low
Drought	No Rating
Earthquake	Relatively Low
Hail	Relatively Low
Heat Wave	Very Low
Hurricane	Relatively High
Ice Storm	Very Low
Landslide	Very Low
Lightning	Relatively Moderate
Riverine Flooding	Very Low
Strong Wind	Very Low
Tornado	Very High
Tsunami	--
Volcanic Activity	--
Wildfire	Relatively Low
Winter Weather	Very Low

Expected Annual Loss Rate

Hazard Type	Building EAL Rate (per building value)	Population EAL Rate (per population)	Agriculture EAL Rate (per agriculture value)
Avalanche	--	--	--
Coastal Flooding	--	--	--
Cold Wave	\$1 per \$201.43M	1 per 20.17M	--
Drought	--	--	--
Earthquake	\$1 per \$172.40K	1 per 33.45M	--
Hail	\$1 per \$31.86K	1 per 1.79B	--
Heat Wave	\$1 per \$57.87B	1 per 2.93M	--
Hurricane	\$1 per \$2.75K	1 per 4.89M	--
Ice Storm	\$1 per \$2.33M	1 per 60.46M	--
Landslide	\$1 per \$1.05M	1 per 16.10M	--
Lightning	\$1 per \$1.03M	1 per 2.70M	--
Riverine Flooding	\$1 per \$186.13K	1 per 5.47M	--
Strong Wind	\$1 per \$93.29K	1 per 939.39K	--
Tornado	\$1 per \$23.87K	1 per 2.27M	--
Tsunami	--	--	--
Volcanic Activity	--	--	--
Wildfire	\$1 per \$3.86M	1 per 1.73B	--
Winter Weather	\$1 per \$6.63M	1 per 16.81M	--

Social Vulnerability

Social groups in **Fairfax City, VA** have a **Relatively Low** susceptibility to the adverse impacts of natural hazards when compared to the rest of the U.S.



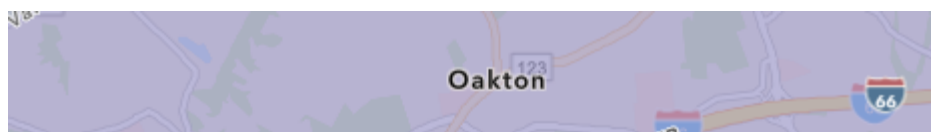
Social Vulnerability Legend

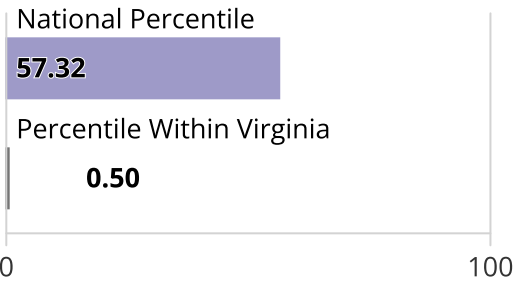
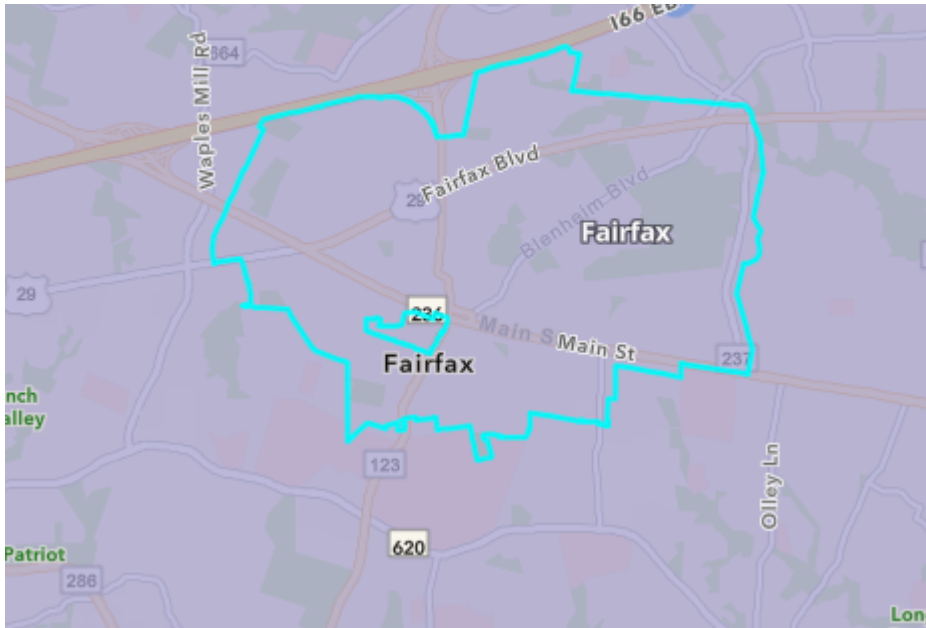
- Very High
- Relatively High
- Relatively Moderate
- Relatively Low
- Very Low

Data Unavailable

Community Resilience

Communities in **Fairfax City, VA** have a **Relatively Moderate** ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions when compared to the rest of the U.S.





43% of U.S. counties have a higher Community Resilience

100% of counties in Virginia have a higher Community Resilience

Community Resilience Legend

- Very High
- Relatively High
- Relatively Moderate
- Relatively Low
- Very Low
- Data Unavailable

About the National Risk Index

The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for 18 natural hazards: Avalanche, Coastal Flooding, Cold Wave, Drought, Earthquake, Hail, Heat Wave, Hurricane, Ice Storm, Landslide, Lightning, Riverine Flooding, Strong Wind, Tornado, Tsunami, Volcanic Activity, Wildfire, and Winter Weather.

The National Risk Index leverages available source data for Expected Annual Loss due to these 18 hazard types, Social Vulnerability, and Community Resilience to develop a baseline relative risk measurement for each United States county and Census tract. These measurements are calculated using average past conditions, but they cannot be used to predict future outcomes for a community. The National Risk Index is intended to fill gaps in available data and analyses to better inform federal, state, local, tribal, and territorial decision makers as they develop risk reduction strategies.

Explore the National Risk Index Map at hazards.fema.gov/nri/map.

Visit the National Risk Index website at hazards.fema.gov/nri/learn-more to access supporting documentation and links.

Calculating the Risk Index

Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability and Community Resilience:

$$\text{Risk Index} = \text{Expected Annual Loss} \times \text{Social Vulnerability} \div \text{Community Resilience}$$

Risk Index scores are presented as a composite score for all 18 hazard types, as well as individual scores for each hazard type.

For more information, visit hazards.fema.gov/nri/determining-risk.

Calculating Expected Annual Loss

Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios for 18 hazard types:

$$\text{Expected Annual Loss} = \text{Exposure} \times \text{Annualized Frequency} \times \text{Historic Loss Ratio}$$

Expected Annual Loss scores are presented as a composite score for all 18 hazard types, as well as individual scores for each hazard type.

For more information, visit hazards.fema.gov/nri/expected-annual-loss.

Calculating Social Vulnerability

Social Vulnerability is measured using the Social Vulnerability Index (SVI) published by the Centers for Disease Control and Prevention (CDC).

For more information, visit hazards.fema.gov/nri/social-vulnerability.

Calculating Community Resilience

Community Resilience is measured using the Baseline Resilience Indicators for Communities (HVRI BRIC) published by the University of South Carolina's Hazards and Vulnerability Research Institute (HVRI).

For more information, visit hazards.fema.gov/nri/community-resilience.

How to Take Action

There are many ways to reduce natural hazard risk through mitigation. Communities with high National Risk Index scores can take action to reduce risk by decreasing Expected Annual Loss due to natural hazards, decreasing Social Vulnerability, and increasing Community Resilience.

For information about how to take action and reduce your risk, visit hazards.fema.gov/nri/take-action.

Disclaimer

The National Risk Index (the Risk Index or the Index) and its associated data are meant for planning purposes only. This tool was created for broad nationwide comparisons and is not a substitute for localized risk assessment analysis. Nationwide datasets used as inputs for the National Risk Index are, in many cases, not as accurate as available local data. Users with access to local data for each National Risk Index risk factor should consider substituting the Risk Index data with local data to recalculate a more accurate risk index. If you decide to download the National Risk Index data and substitute it with local data, you assume responsibility for the accuracy of the data and any resulting data index. Please visit the [Contact Us](#) page if you would like to discuss this process further.

The methodology used by the National Risk Index has been reviewed by subject matter experts in the fields of natural hazard risk research, risk analysis, mitigation planning, and emergency management. The processing methods used to create the National Risk Index have produced results similar to those from other natural hazard risk analyses conducted on a smaller scale. The breadth and combination of geographic information systems (GIS) and data processing techniques leveraged by the National Risk Index enable it to incorporate multiple hazard types and risk factors, manage its nationwide scope, and capture what might have been missed using other methods.

The National Risk Index does not consider the intricate economic and physical interdependencies that exist across geographic regions. Keep in mind that hazard impacts in surrounding counties or Census tracts can cause indirect losses in your community regardless of your community's risk profile.

Nationwide data available for some risk factors are rudimentary at this time. The National Risk Index will be continuously updated as new data become available and improved methodologies are identified.

The National Risk Index Contact Us page is available at hazards.fema.gov/nri/contact-us.