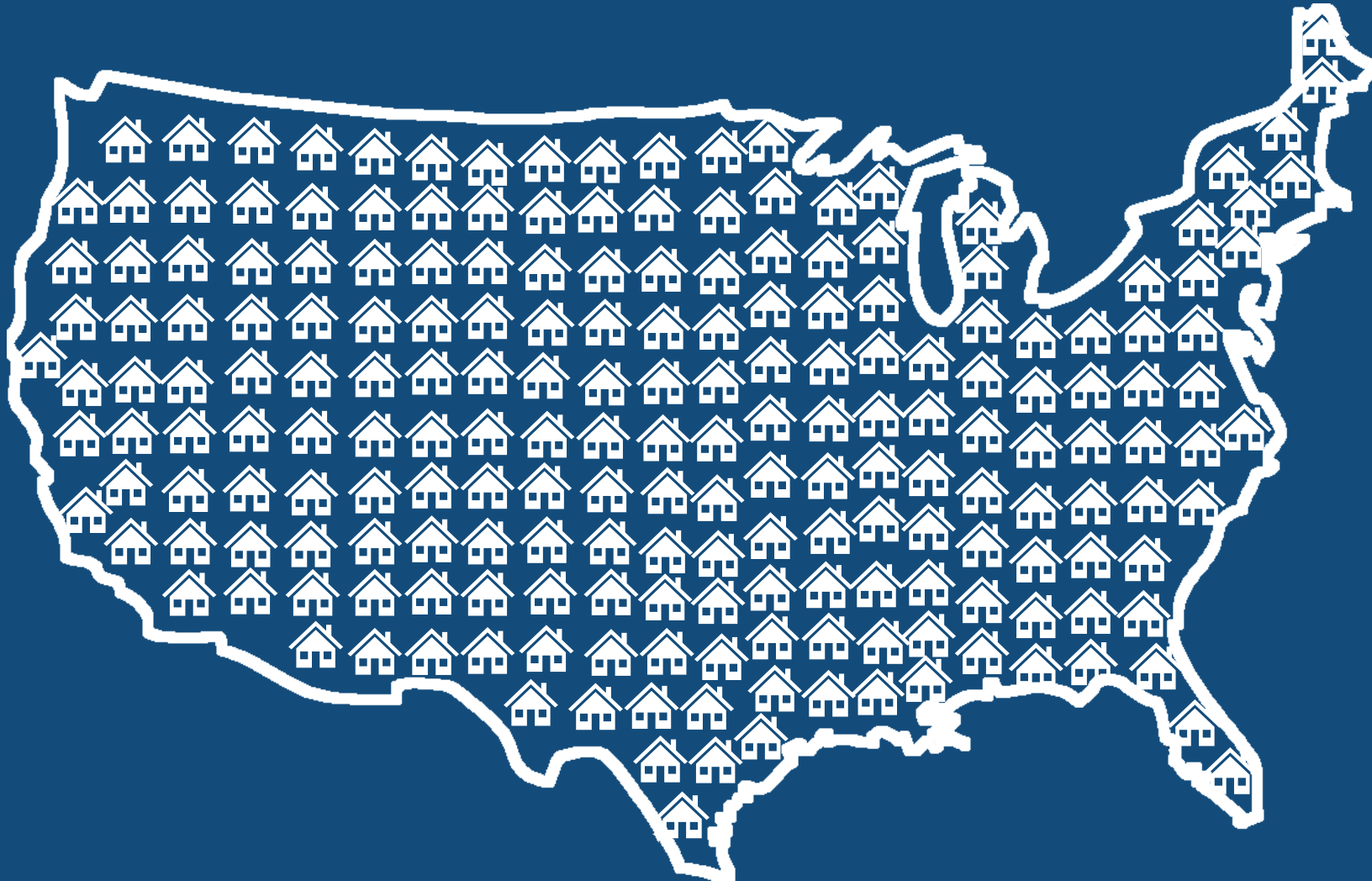
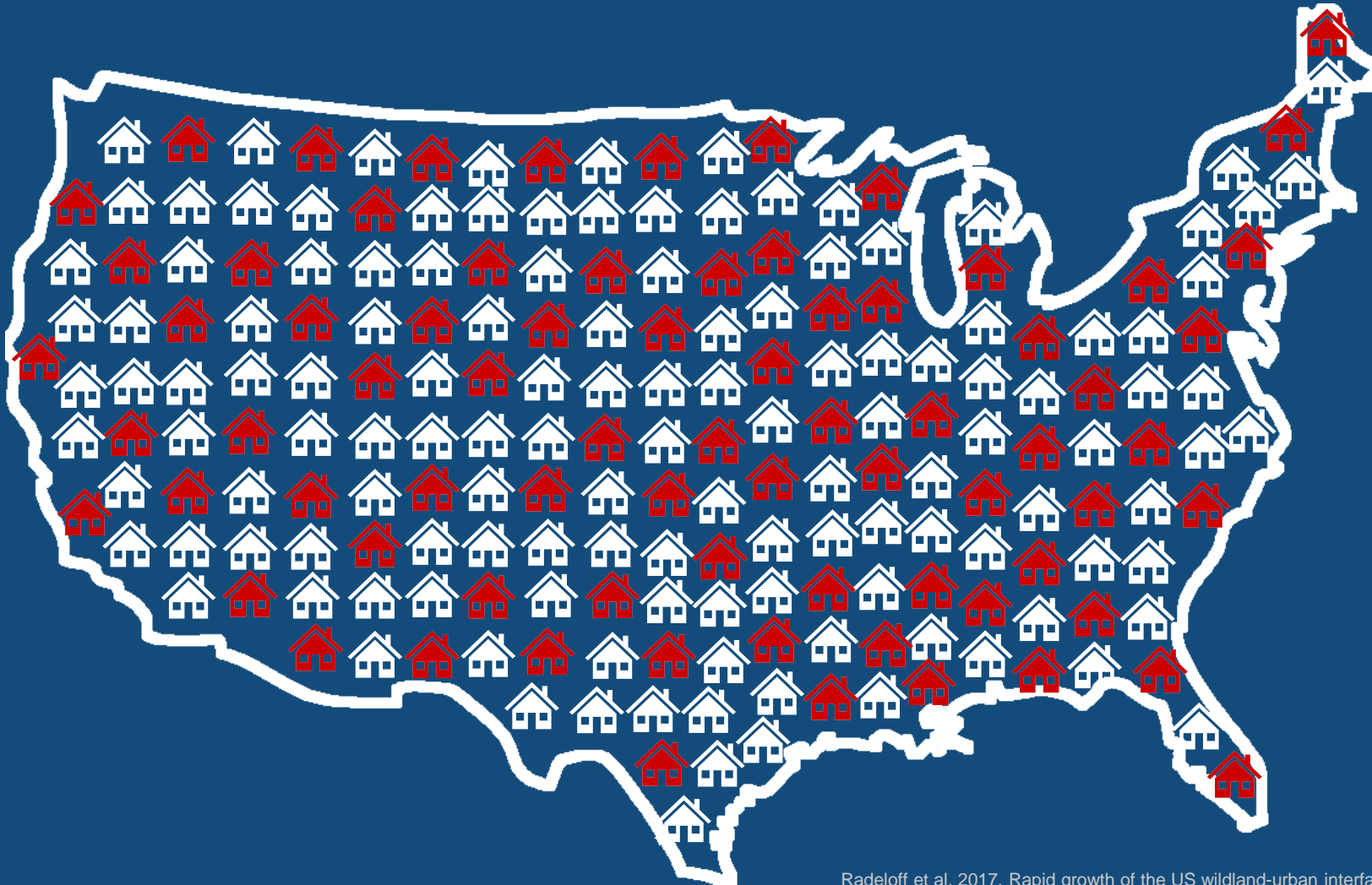


What % of U.S. homes are located in the wildland-urban interface?




What % of U.S. homes are located in the wildland-urban interface?



One in
three.






An aerial night photograph of the Austin, Texas skyline. The city lights are visible, with the Capitol building prominently on the left. A semi-transparent dark rectangle is overlaid in the center, containing white text.

60%
of Austin's structures are in the WUI

Photo: Createve Commons Tendinci

Austin Fire Department Wildfire Division. Update on Council Resolution Presented to Public Safety Commission, April 1, 2019.



The WUI is the fastest growing land use type in the country.

<https://headwaterseconomics.org>

Radeloff et al. 2017. Rapid growth of the US wildland-urban interface raises wildfire risk. PNAS. <https://www.pnas.org/content/115/13/3314.short>



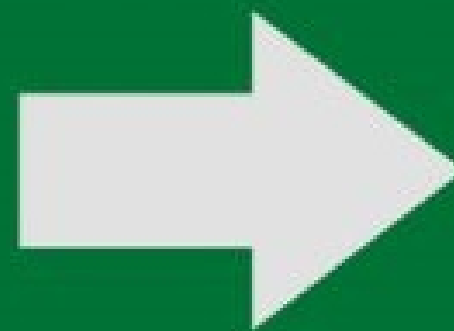
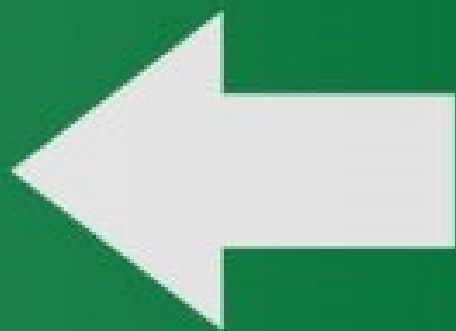
**Wildfires are bigger, burn longer,
cause more damage, and kill more
people than before.**



The problem is likely to get worse in the future.

DOOM

GLOOM



DOOM GLOOM



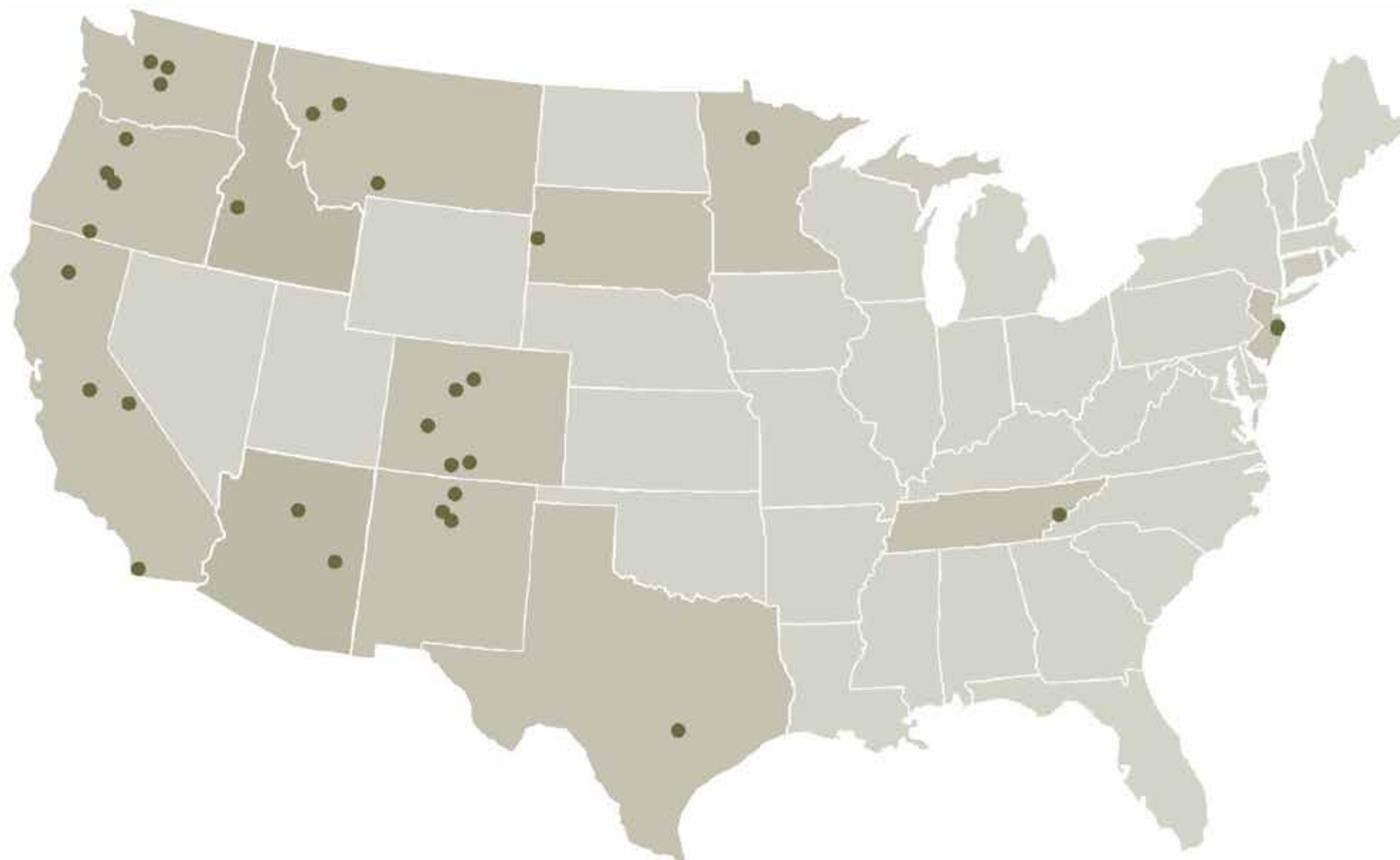
Socioeconomic Tools for Wildfire Resilience in Austin





Independent Nonpartisan Research





Helping communities better plan the wildland-urban interface.

planningforwildfire.org

Austin & Community Planning Assistance for Wildfire



- Featured case study (2015)
- Land Use Planning recommendations (2016)
- Vulnerable Populations Tool (2018)

Three Strategies:

1. Understand the true costs
2. Identify vulnerable neighborhoods
3. Prioritize actions that work

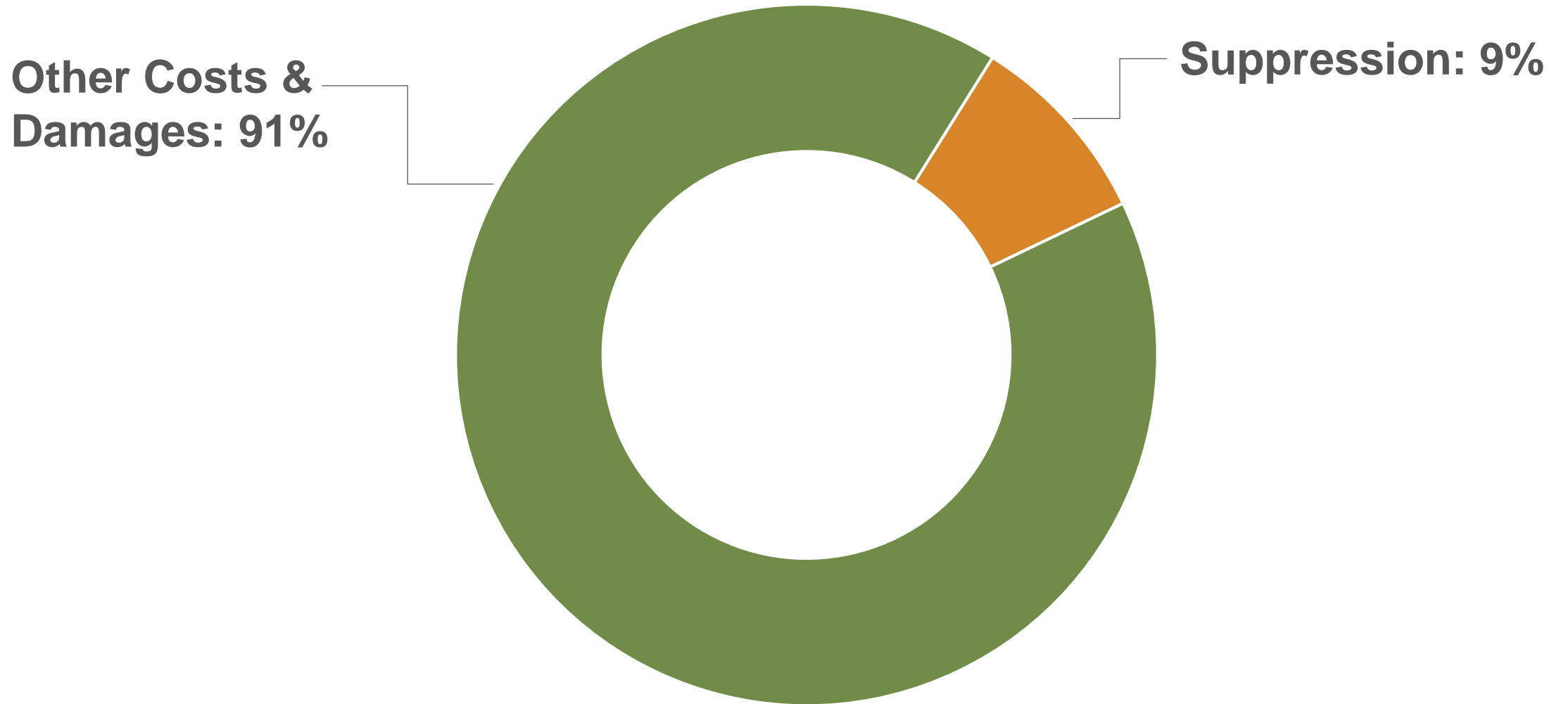
Three Strategies:

1. Understand the true costs
2. Identify vulnerable neighborhoods
3. Prioritize actions that work

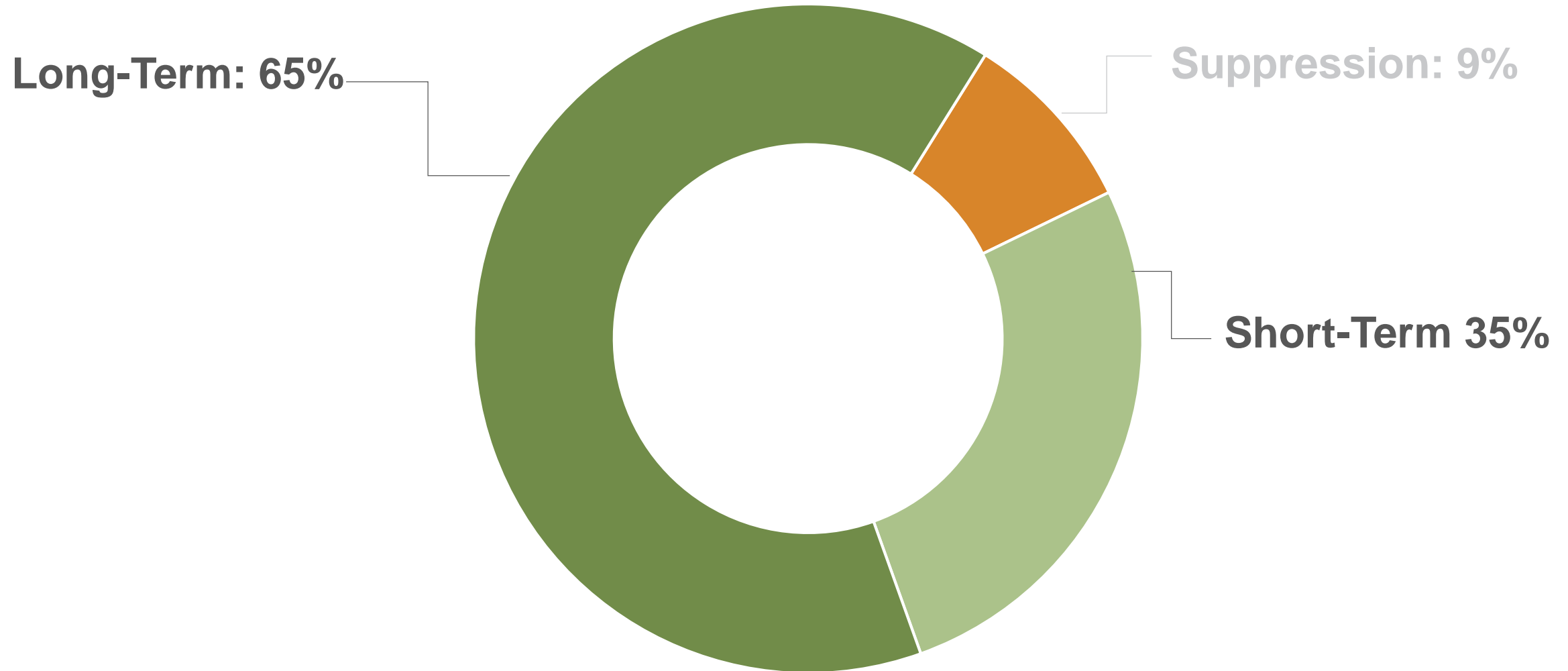
An aerial photograph showing a vast residential area that has been almost completely destroyed by a wildfire. The landscape is covered in a layer of brown, charred debris and ash. Only a few skeletal remains of trees and some isolated, undamaged buildings are visible. A network of roads winds through the devastation. A semi-transparent dark grey rectangular box is centered over the image, containing white text.

\$3 Billion
per year average federal fire suppression costs

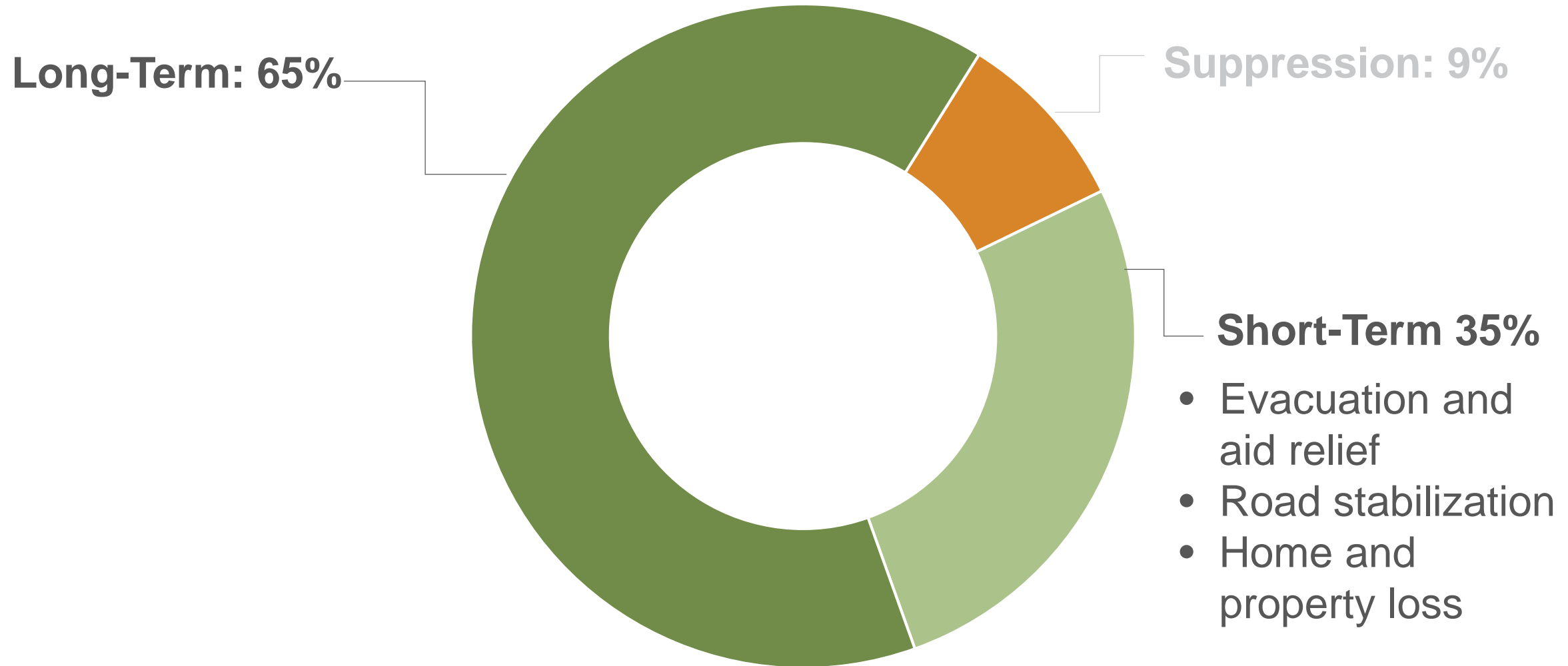
Suppression is only 9% of total fire costs



Most costs are long-term



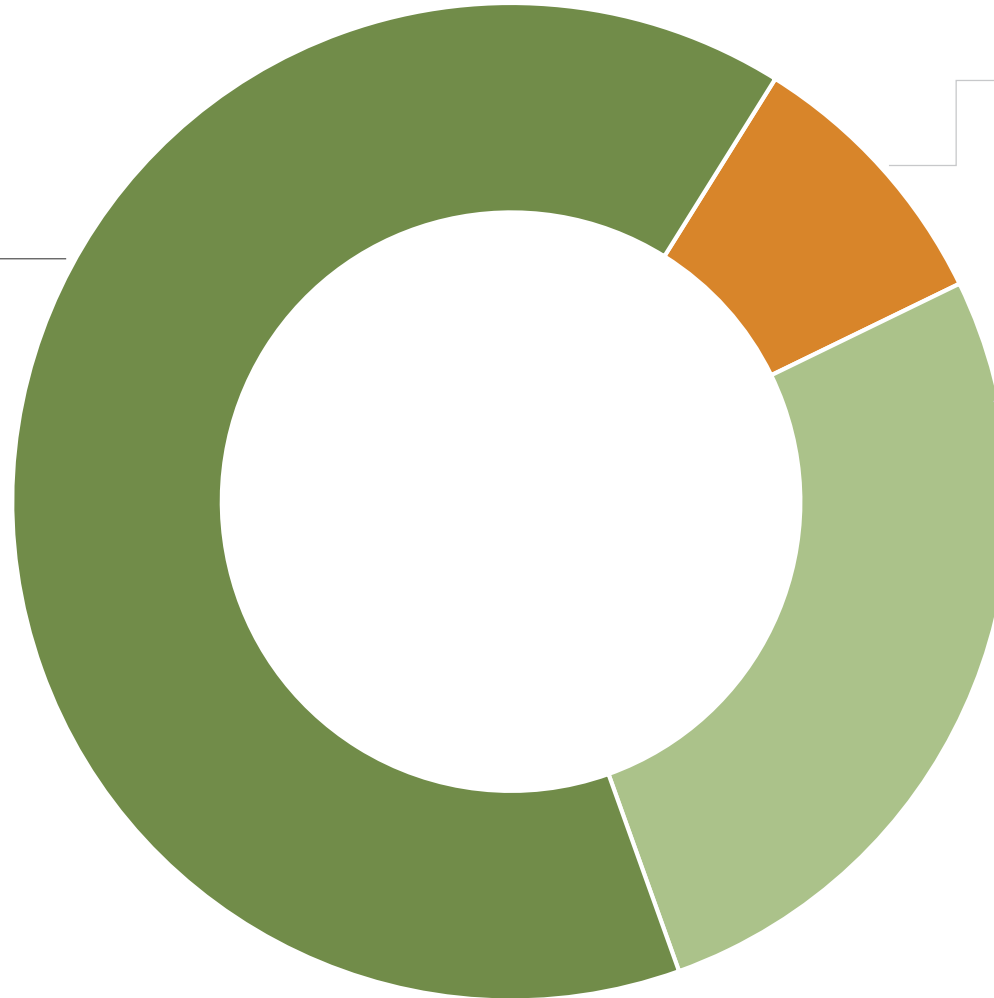
Most costs are long-term



Most costs are long-term

Long-Term: 65%

- Loss of property value, tax, business revenue
- Rehabilitation
- Infrastructure
- Loss of ecosystem services
- Human casualties

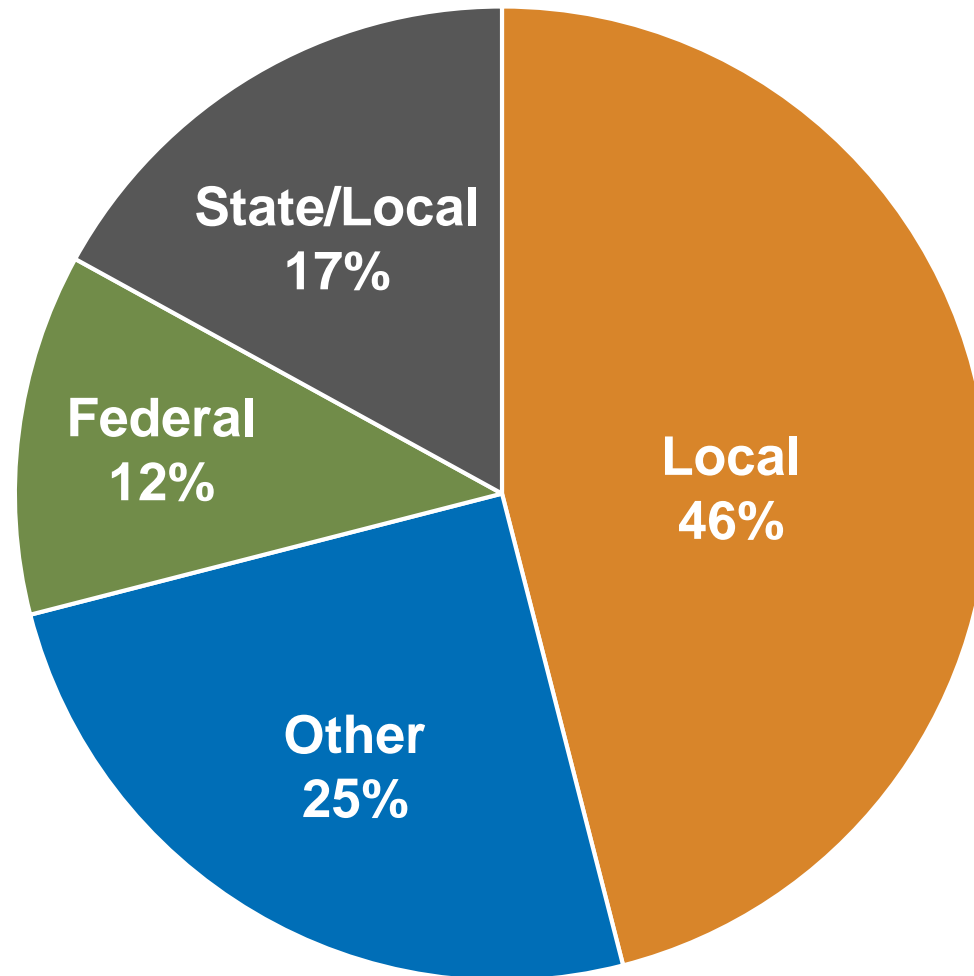


Suppression: 9%

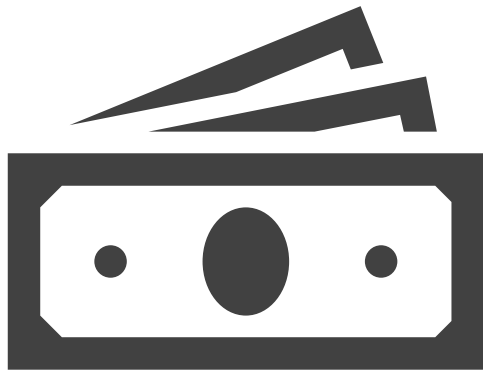
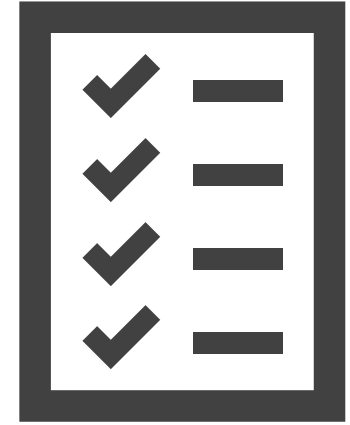
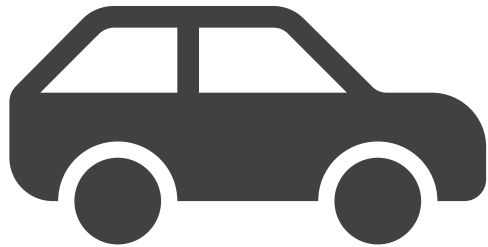
Short-Term 35%

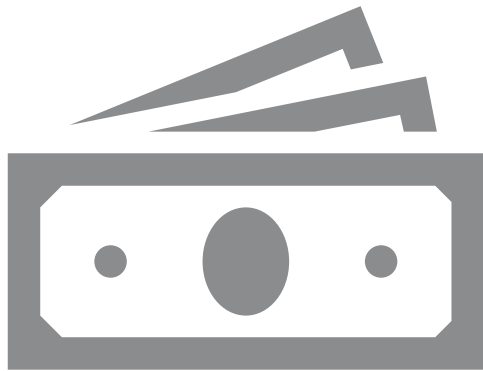
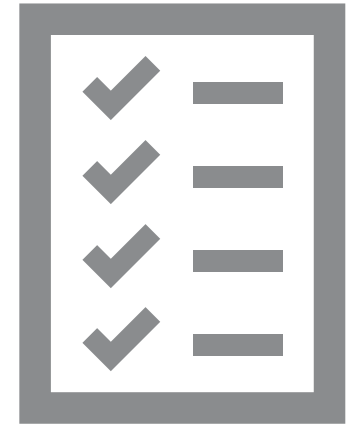
- Evacuation and aid relief
- Road stabilization
- Home and property loss

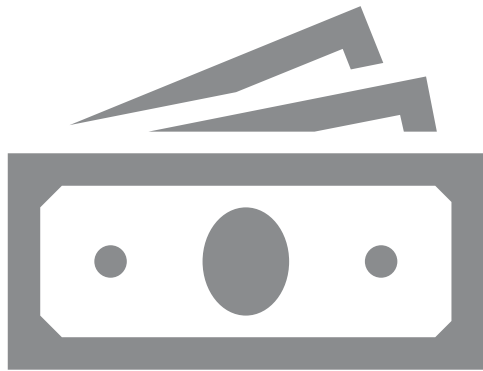
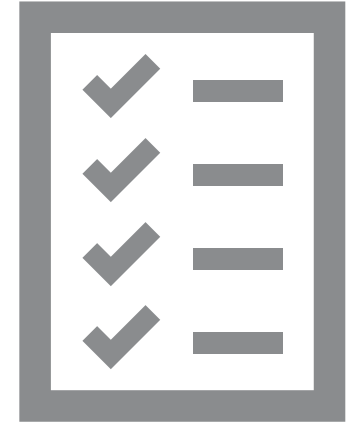
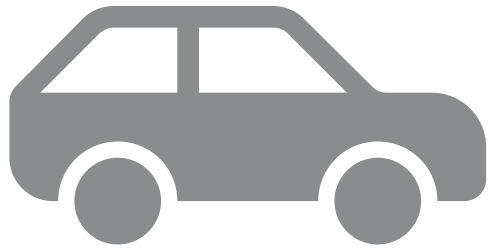
Nearly Half of All Wildfire Costs are Local

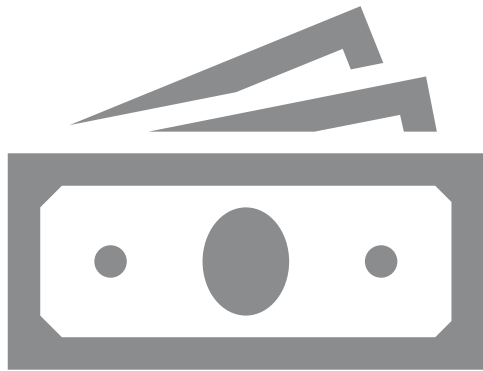
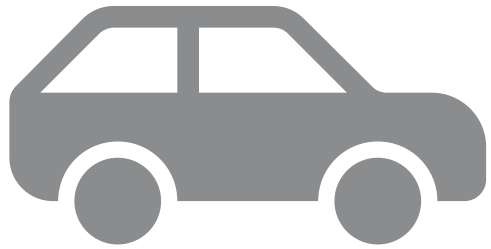


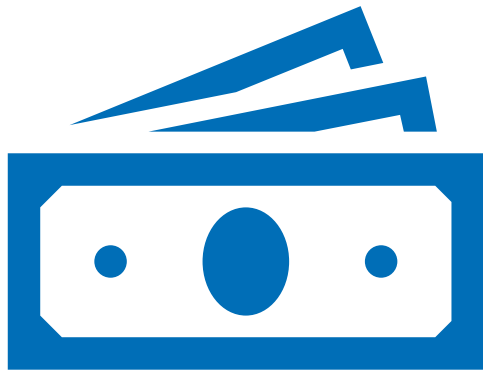
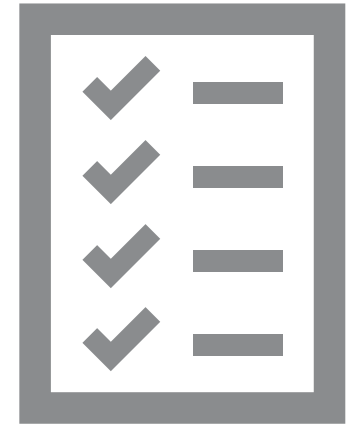
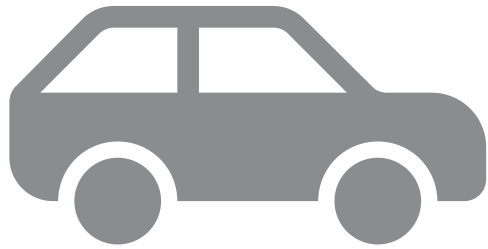


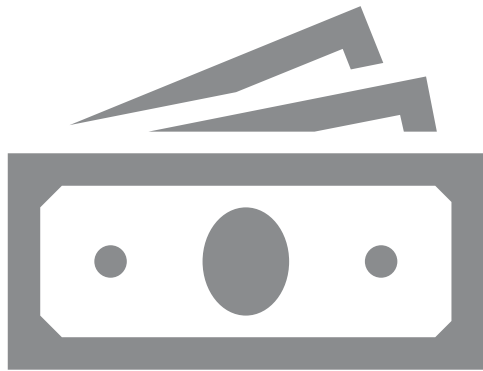
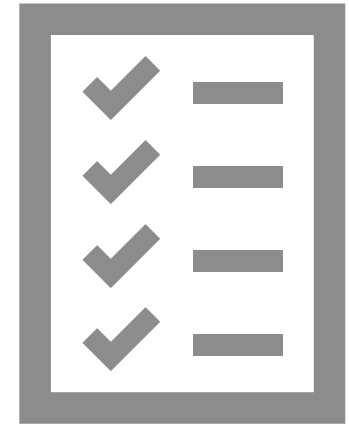
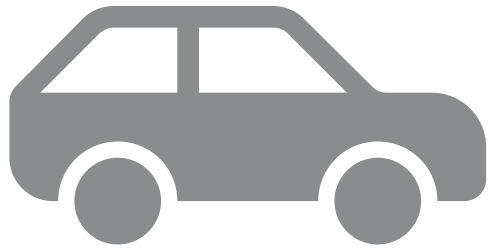


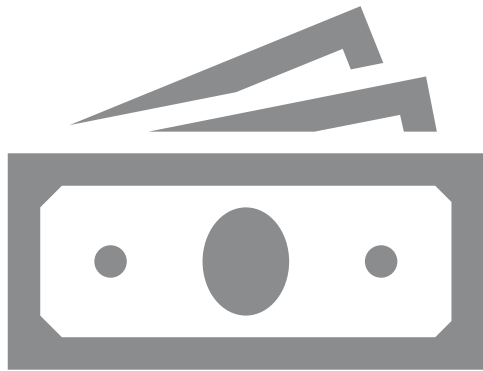
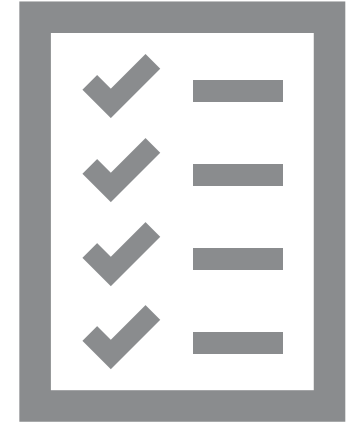
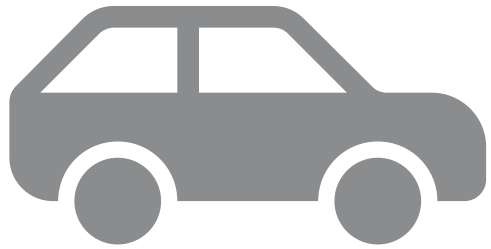












Three Strategies:

1. Understand the true costs
- 2. Identify vulnerable neighborhoods**
3. Prioritize actions that work

What neighborhoods are disproportionately at risk?

What neighborhoods are disproportionately at risk?



Wildfire Hazard

- Wildfire Potential
- Flame Length
- Rate of Spread

What neighborhoods are disproportionately at risk?



Wildfire Hazard

- Wildfire Potential
- Flame Length
- Rate of Spread



Socioeconomic Variables

- Families in poverty
- People with disability
- People with difficulty speaking English
- People over 65
- People under 5
- Households without a car
- Nonwhite population
- Population and rate of change
- Housing units
- Adults with COPD
- Adults with asthma

Set criteria:

WILDFIRE POTENTIAL

Wildfire Potential
>= Normal

AT-RISK POPULATIONS

Accuracy Choice
RESTRICTIVE: Areas definitely meeting criteria

Families in Poverty
>= 0% Median = 6.9%

People with a Disability
>= 0% Median = 8.9%

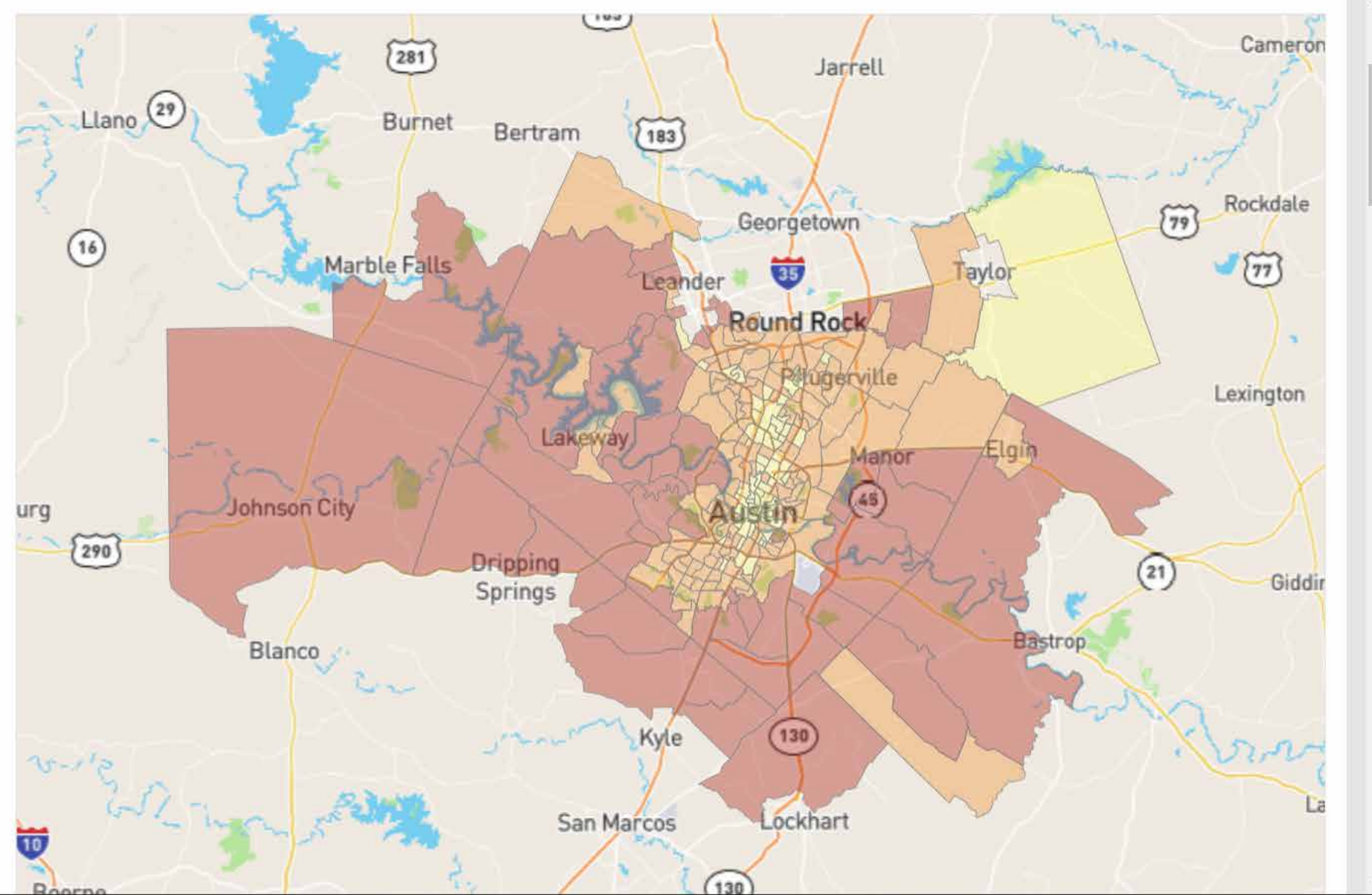
People with Difficulty Speaking English
>= 0% Median = 3.1%

People Over 65
>= 0% Median = 8.4%

People Under 5
>= 0% Median = 6.6%

Households Without a Car
>= 0% Median = 3.8%

Nonwhite Population
>= 0%



RESTRICTIVE: Areas definitely meeting criteria

Median = 6.9%

Median = 8.9%

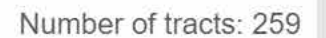
Median = 3.1%

Median = 8.4%

Median = 6.6%

☐ Median = 3.8%

Median = 18.6%



RESTRICTIVE: Areas definitely meeting criteria

 $\geq 0\%$

$\geq 0\%$

$\geq 0\%$

$\geq 0\%$

$\geq 0\%$

$\geq 0\%$

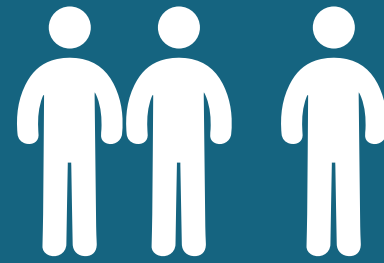
$\geq 0\%$

$\geq -100\%$

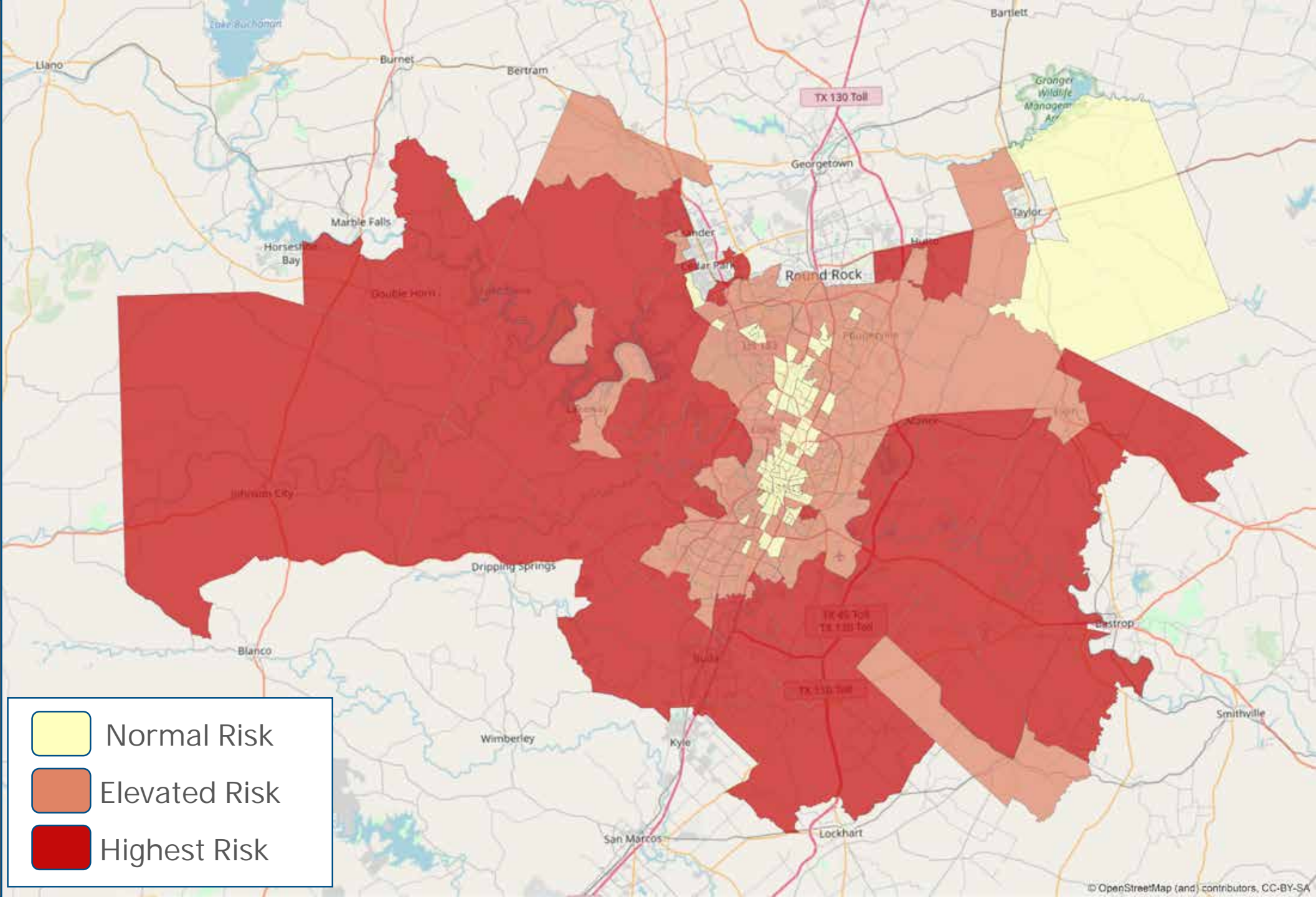
■ Highest ■ Elevated ■ Normal

2:08 PM
4/28/2019

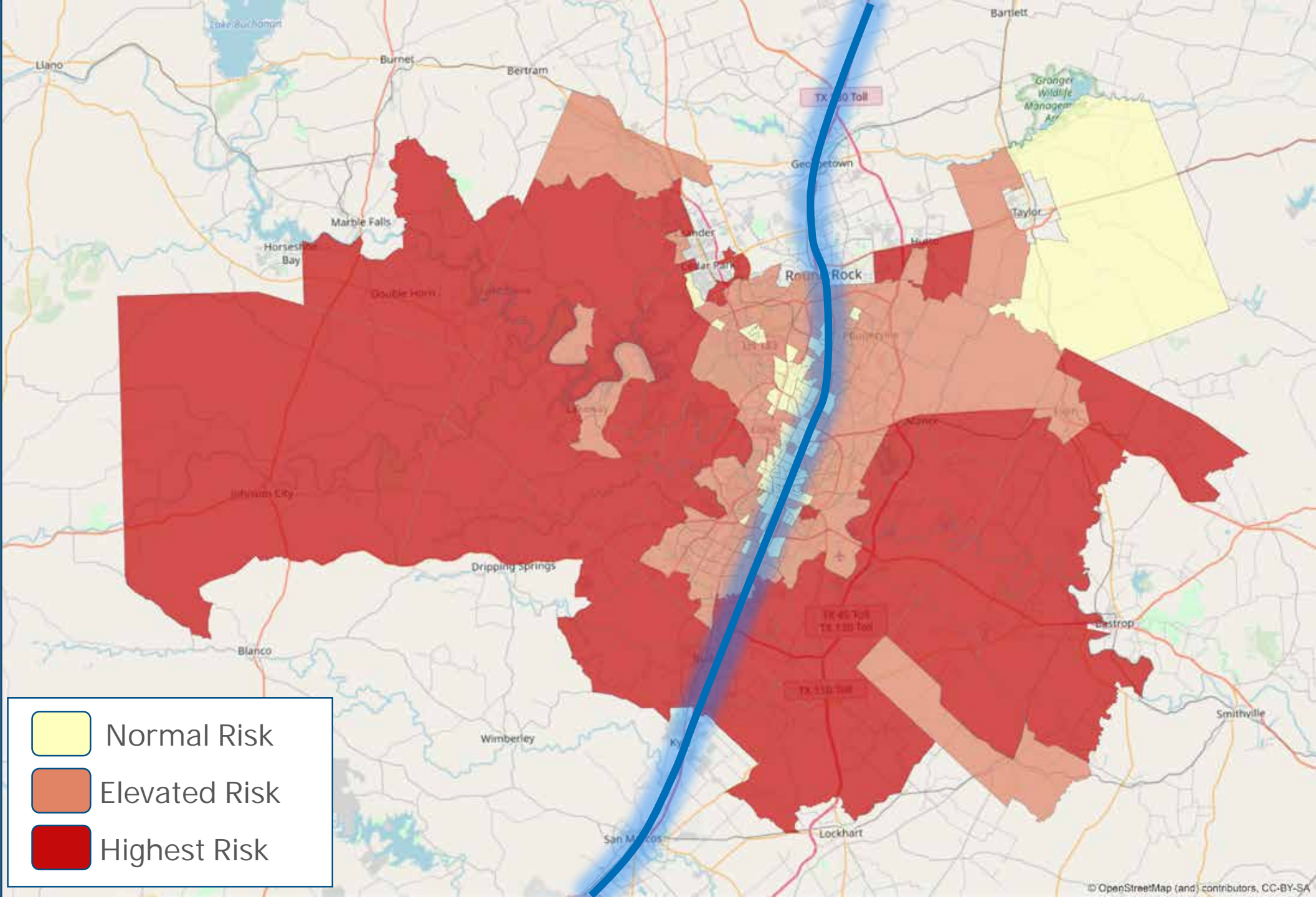
Populations at Risk Report



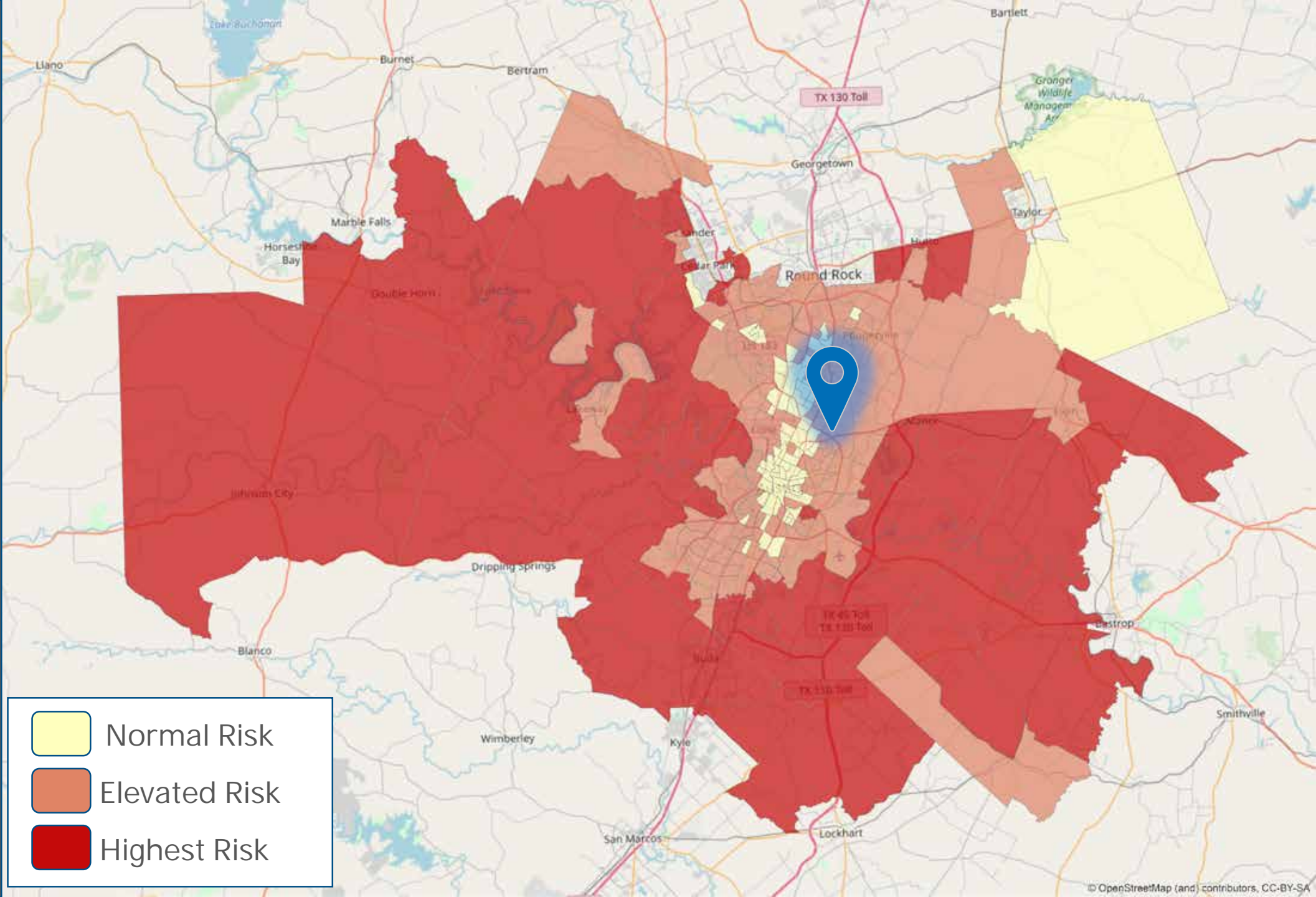
Wildfire Potential



Wildfire Potential

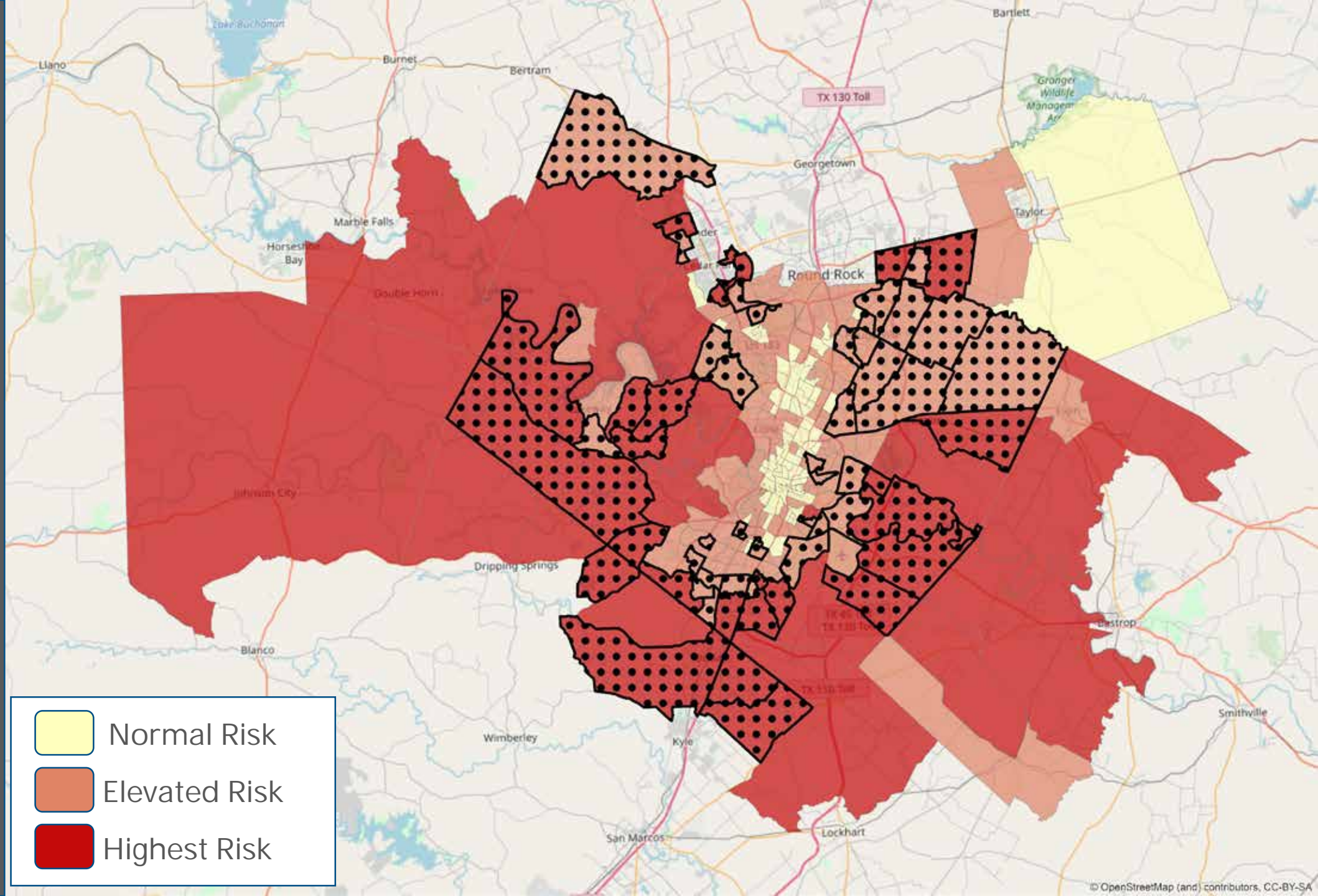


Wildfire Potential



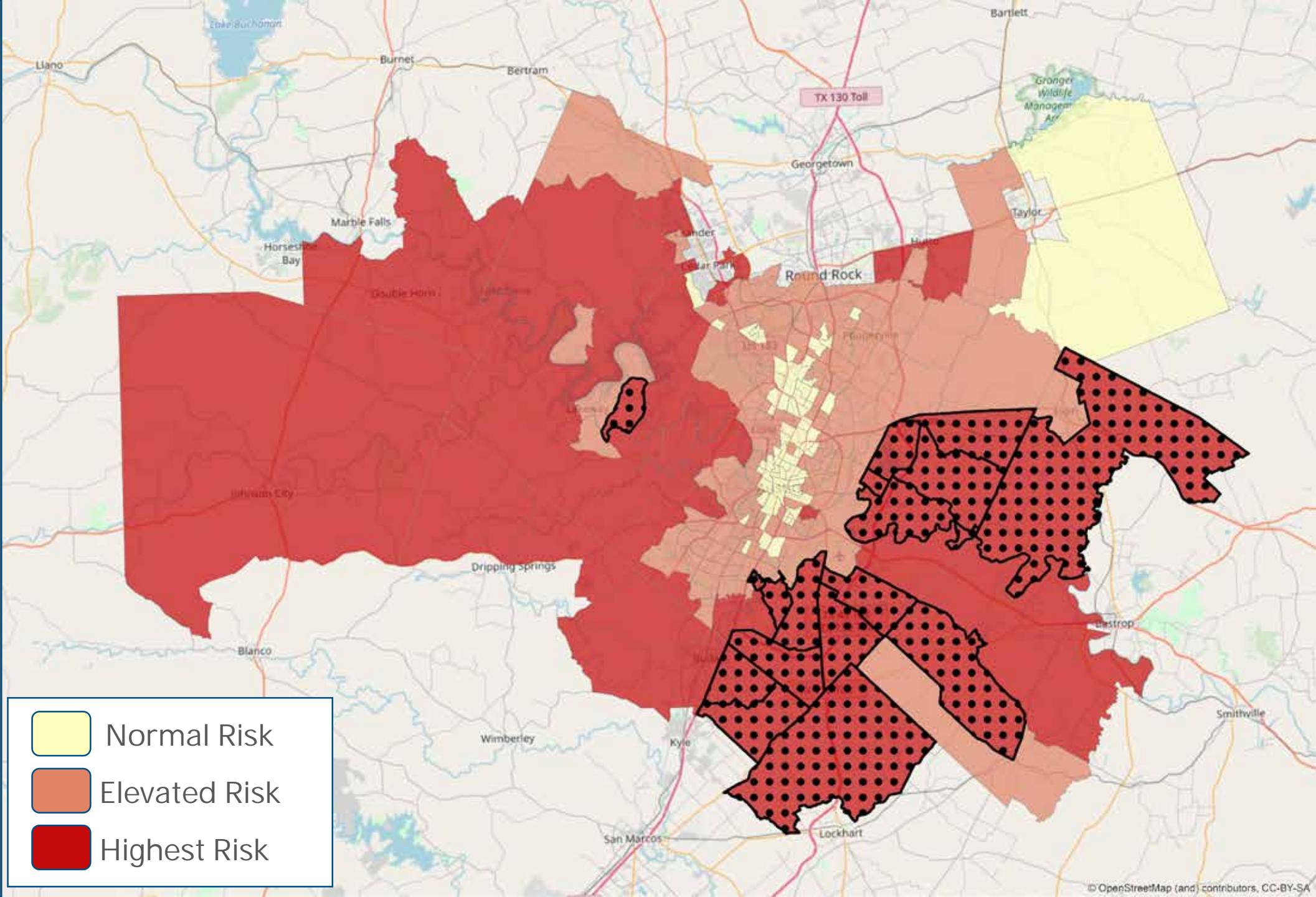
Above Median

Population Growth



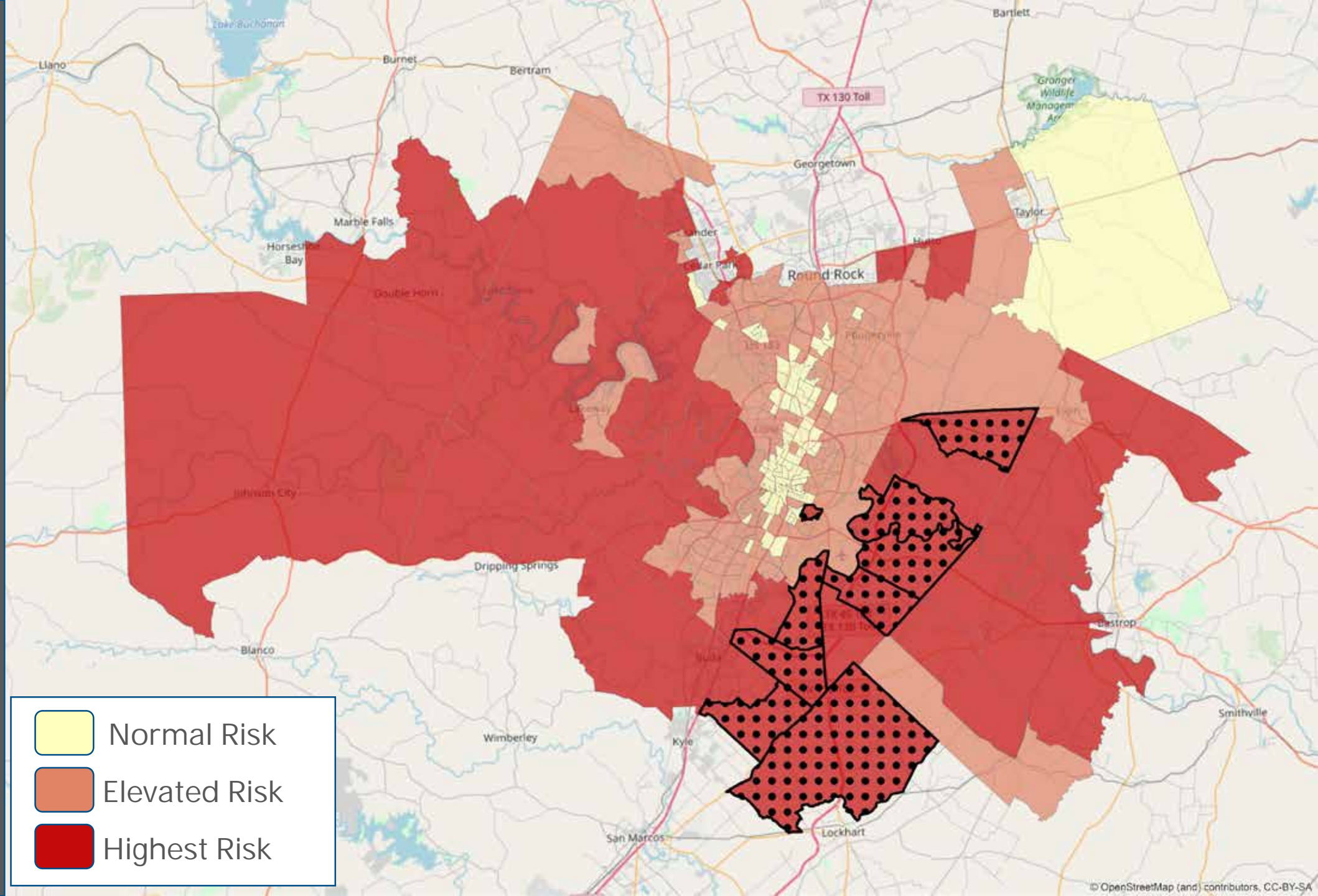
Above Median

Difficulty Speaking English



Above Median

Families in Poverty



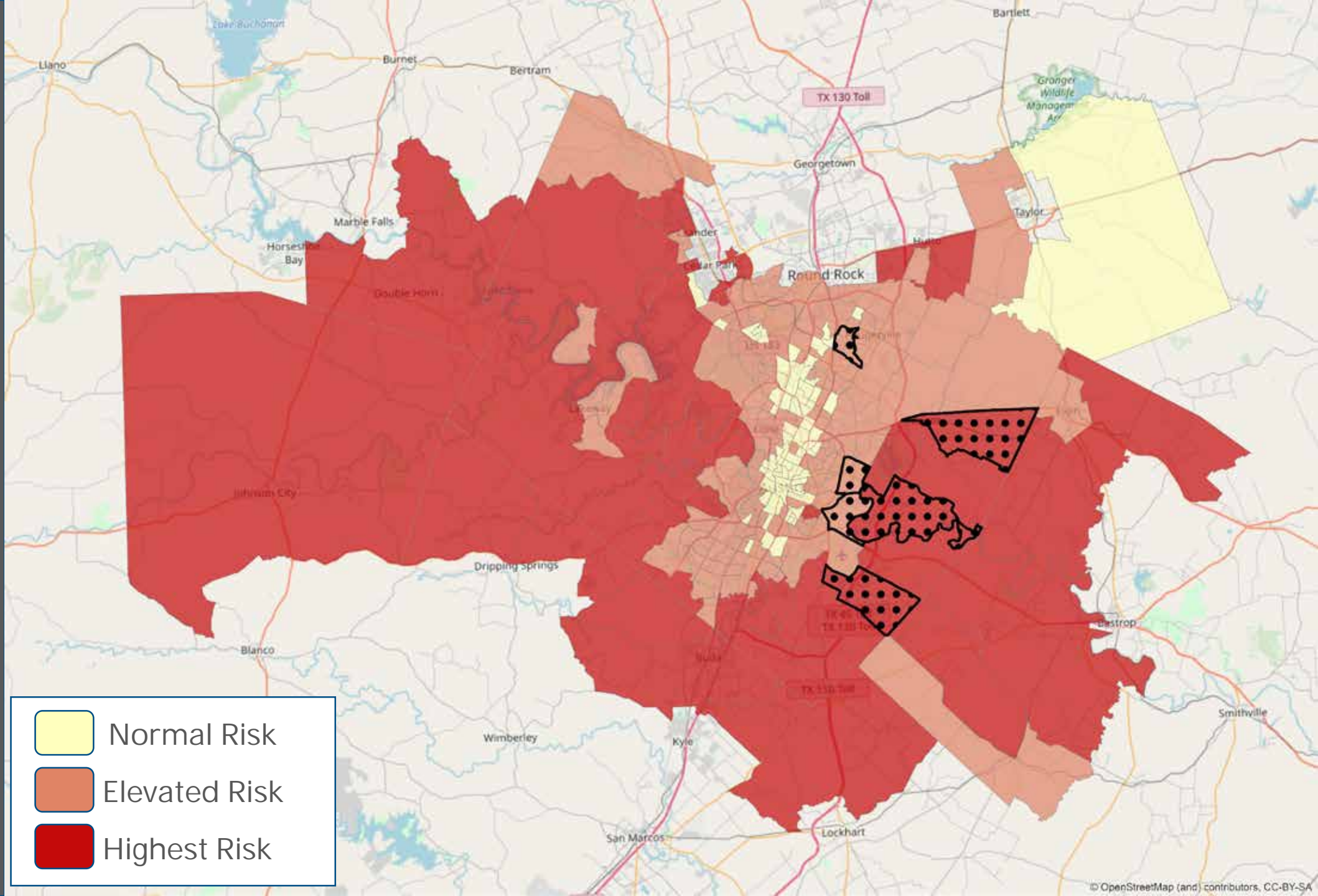
Above Median

Population
Growth

+ Poverty

+ Difficulty
English

+Nonwhite





Austin Wildfire and Vulnerable Populations Tool

Set criteria:

WILDFIRE POTENTIAL

Wildfire Potential

>= Normal

AT-RISK POPULATIONS

Accuracy Choice

RESTRICTIVE: Areas definitely meeting criteria

Families in Poverty

>= 9%

Median = 6.9%

People with a Disability

>= 0%

Median = 8.9%

People with Difficulty Speaking English

>= 0%

Median = 3.1%

People Over 65

>= 0%

Median = 8.4%

People Under 5

>= 0%

Median = 6.6%

Households Without a Car

>= 0%

Median = 3.8%

Nonwhite Population

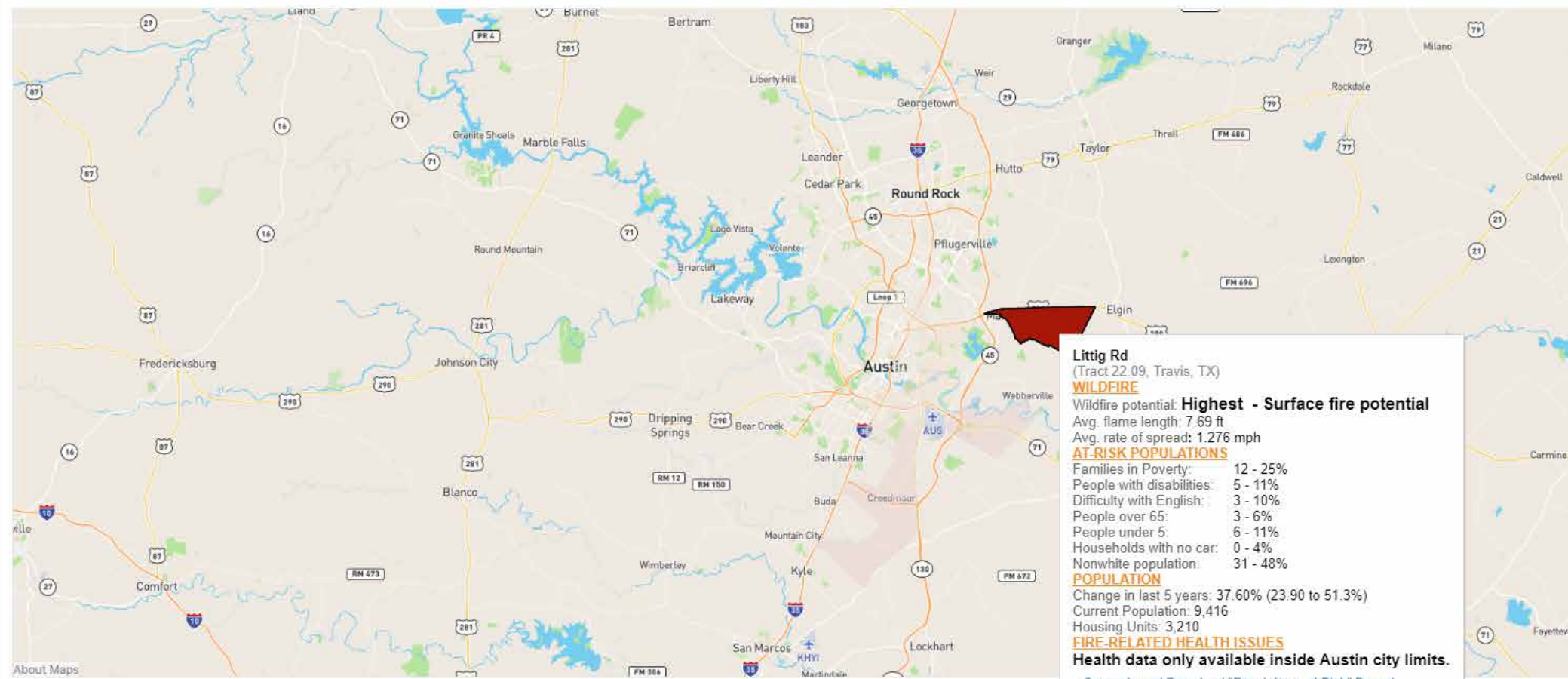
>= 0%

Median = 18.6%

Population Change, Last Five Years

>= -100 %

Median = 12.0%



Littig Rd
(Tract 22.09, Travis, TX)

WILDFIRE

Wildfire potential: **Highest - Surface fire potential**

Avg. flame length: 7.69 ft

Avg. rate of spread: 1.276 mph

AT-RISK POPULATIONS

Families in Poverty: 12 - 25%

People with disabilities: 5 - 11%

Difficulty with English: 3 - 10%

People over 65: 3 - 6%

People under 5: 6 - 11%

Households with no car: 0 - 4%

Nonwhite population: 31 - 48%

POPULATION

Change in last 5 years: 37.60% (23.90 to 51.3%)

Current Population: 9,416

Housing Units: 3,210

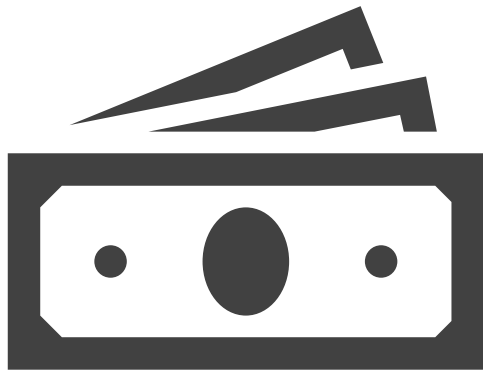
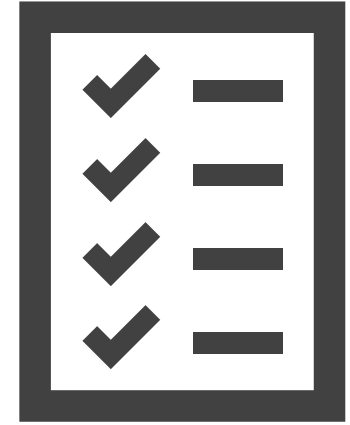
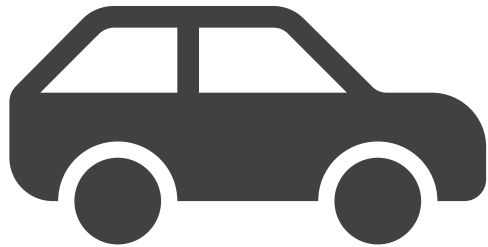
FIRE-RELATED HEALTH ISSUES

Health data only available inside Austin city limits.

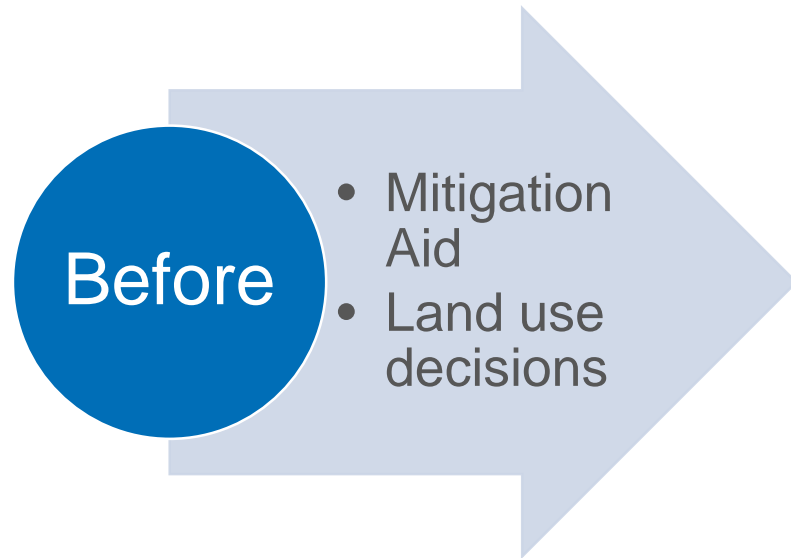
[Generate and Download "Populations at Risk" Report](#)

Three Strategies :

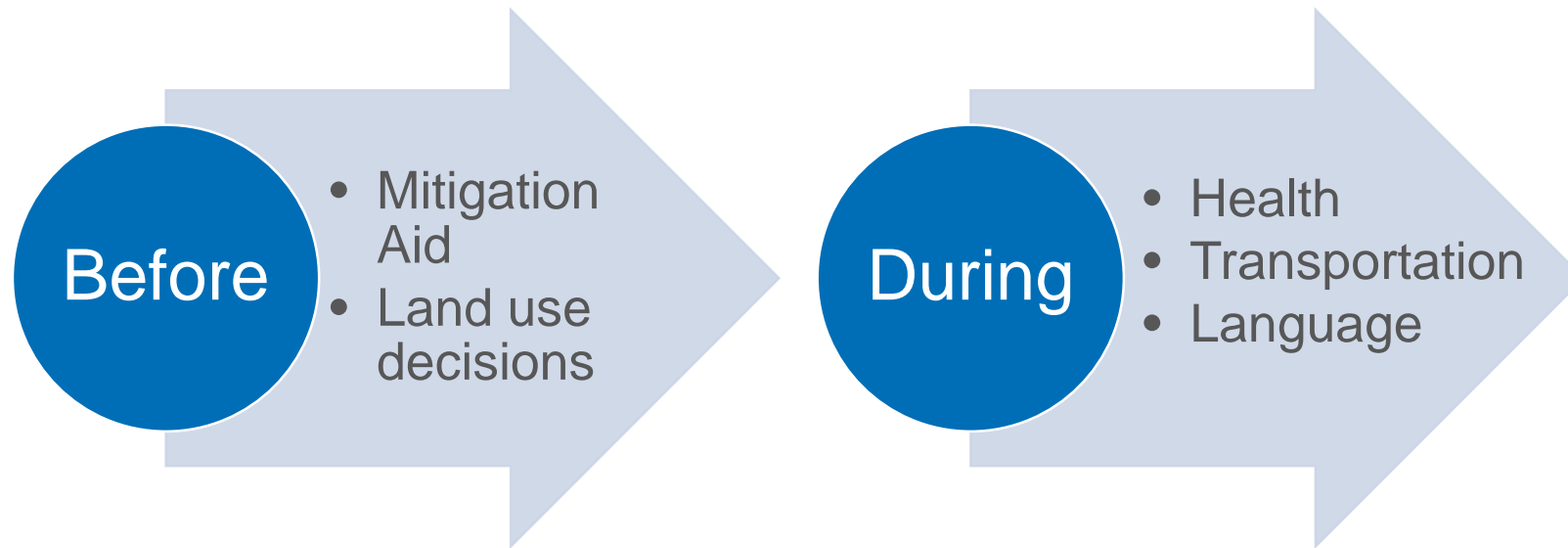
1. Understand the true costs
2. Identify vulnerable neighborhoods
3. **Prioritize actions that work**



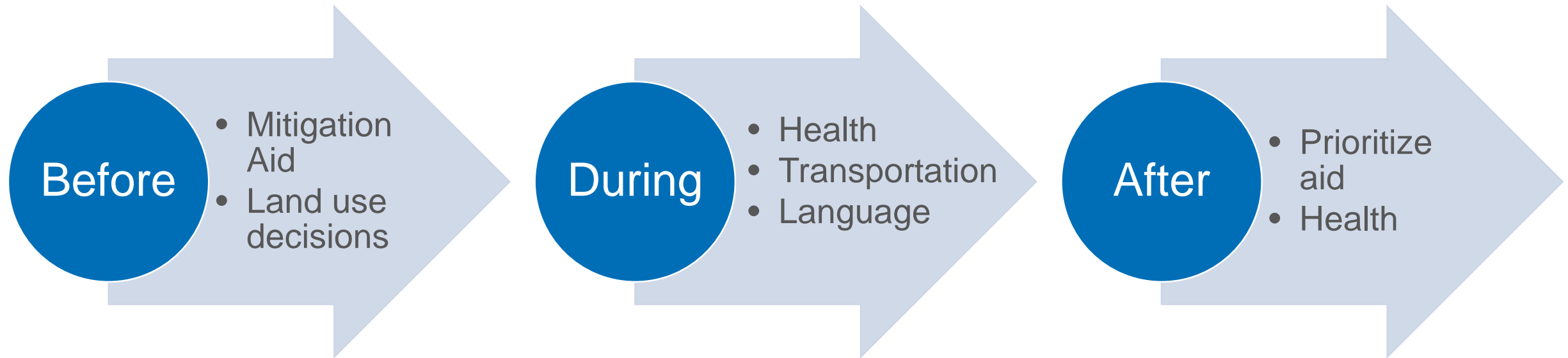
Equity & Resilience



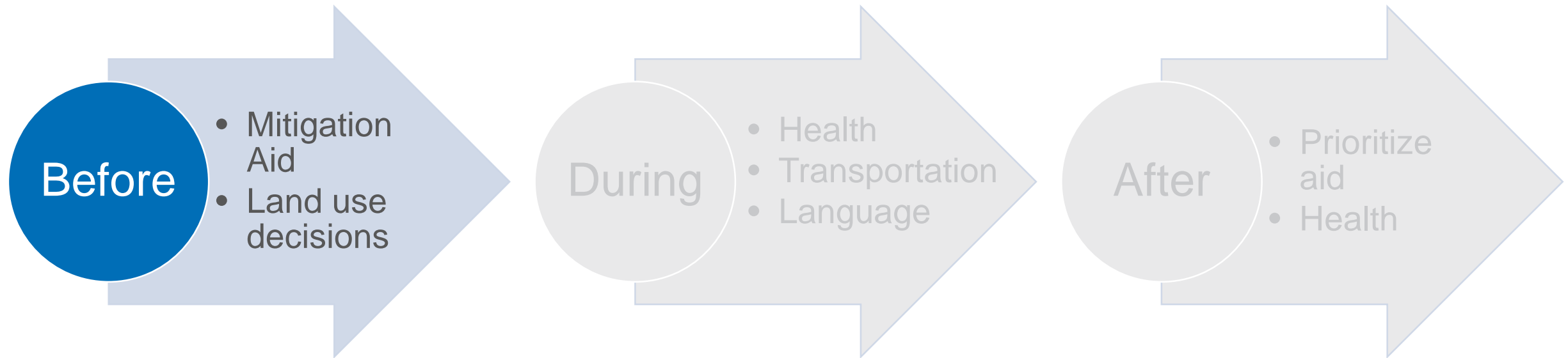
Equity & Resilience



Equity & Resilience



Equity & Resiliency



The Home Ignition Zone



The Home Ignition Zone



Most WUI Disasters Happen Because of Embers



Photo: Wenatchee Valley Firefighters– Sleepy Hollow Fire 2015

<https://headwaterseconomics.org>

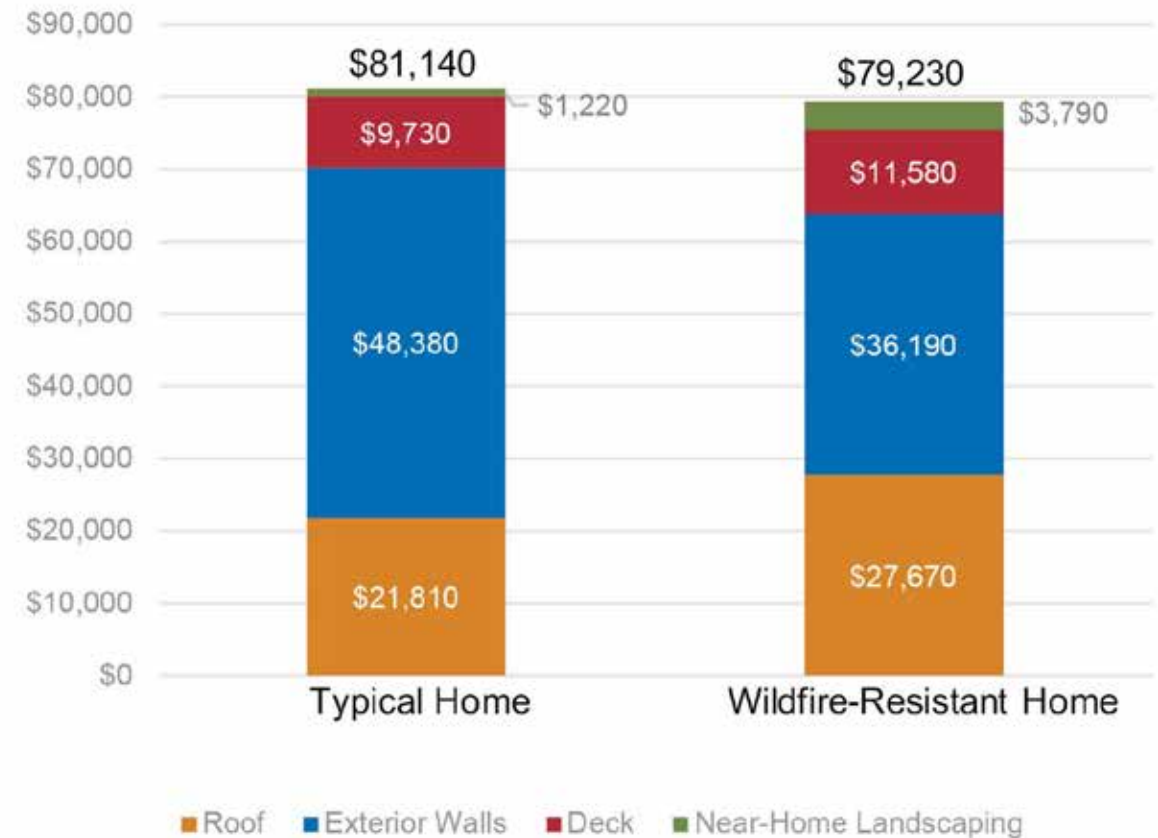
Finney, M.A., and J. D. Cohen. 2003. Expectation and Evaluation of Fuel Management Objectives. USDA Forest Service Proceedings RMRS-P-29.



Insurance Institute for Business & Home Safety: Wildfire Demo

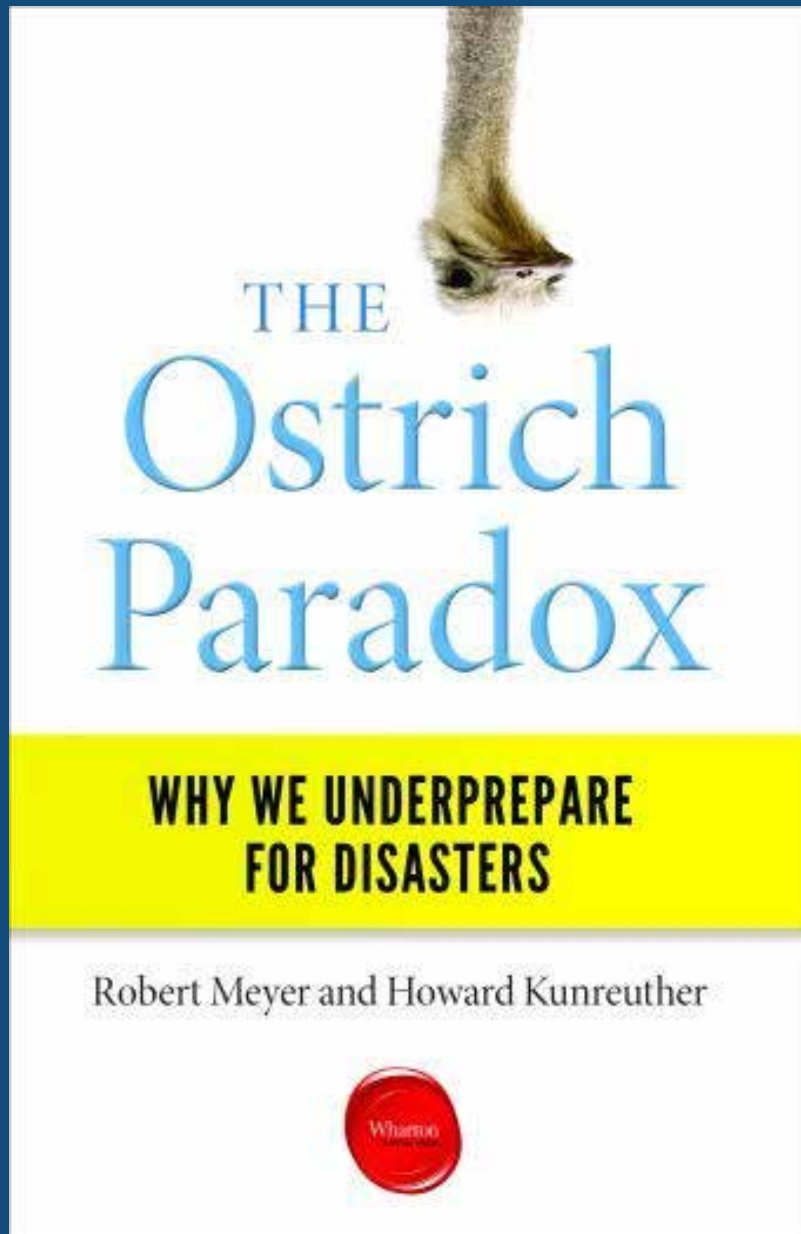


A wildfire-resistant home is comparable in cost



Why aren't we building safer communities?





“ People are naturally prone to a range of biases that inhibit long-term thinking.”





➡ Amnesia



➡ Amnesia

➡ Optimism




➡ Amnesia

➡ Optimism

➡ Herding



An aerial photograph of a coastal town, likely in New England, showing a dense residential area with many houses and a large body of water in the background. A semi-transparent dark grey rectangle is overlaid in the center of the image, containing the text 'ü Implement land use planning tools' in white. The text is centered horizontally and vertically within the rectangle.

ü Implement land use planning tools

An aerial photograph of a coastal town, likely in New England, showing a dense residential area with many houses and a large body of water in the background. A semi-transparent dark grey rectangle is overlaid on the center of the image, containing two lines of white text.

ü Implement land use planning tools

ü Create a culture of safety

An aerial photograph of a coastal city, likely San Francisco, showing a dense urban area with a mix of residential and commercial buildings. The city extends to the water's edge, with a large body of water visible in the background. The image is used as a background for a presentation slide.

- ü Implement land use planning tools

- ü Create a culture of safety

- ü Prioritize resources to the people who need it most

Example Land Use Planning Tools





WUI Code

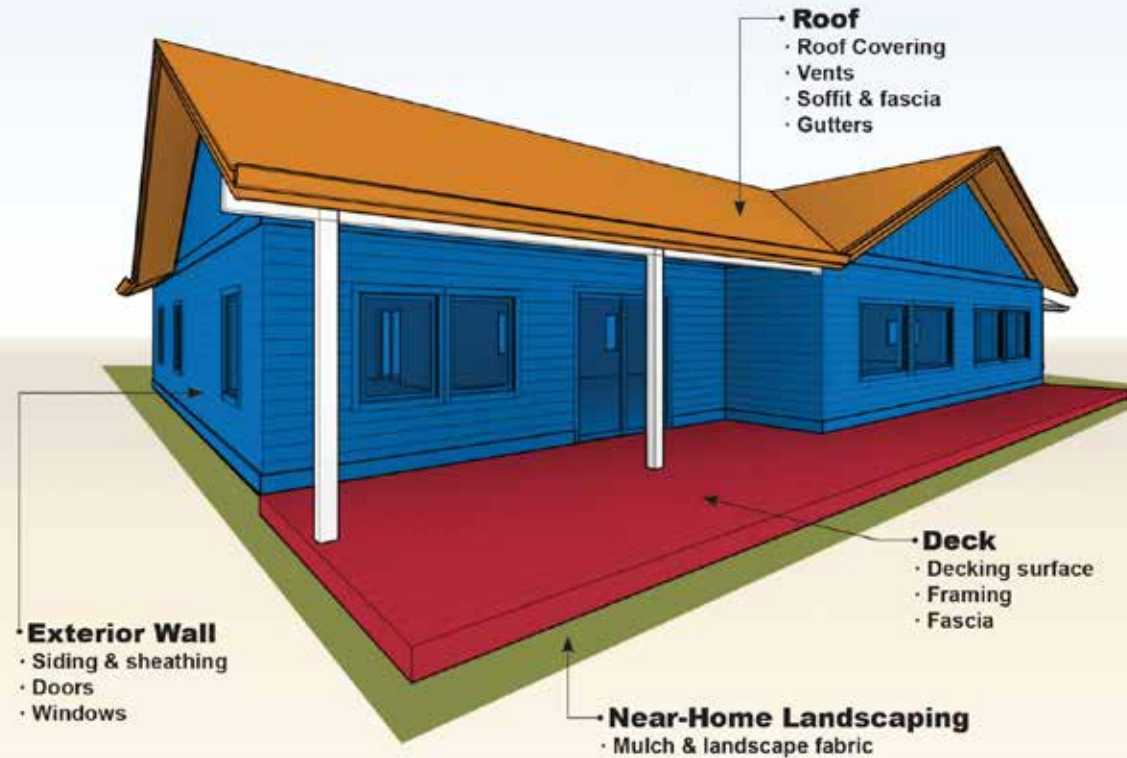
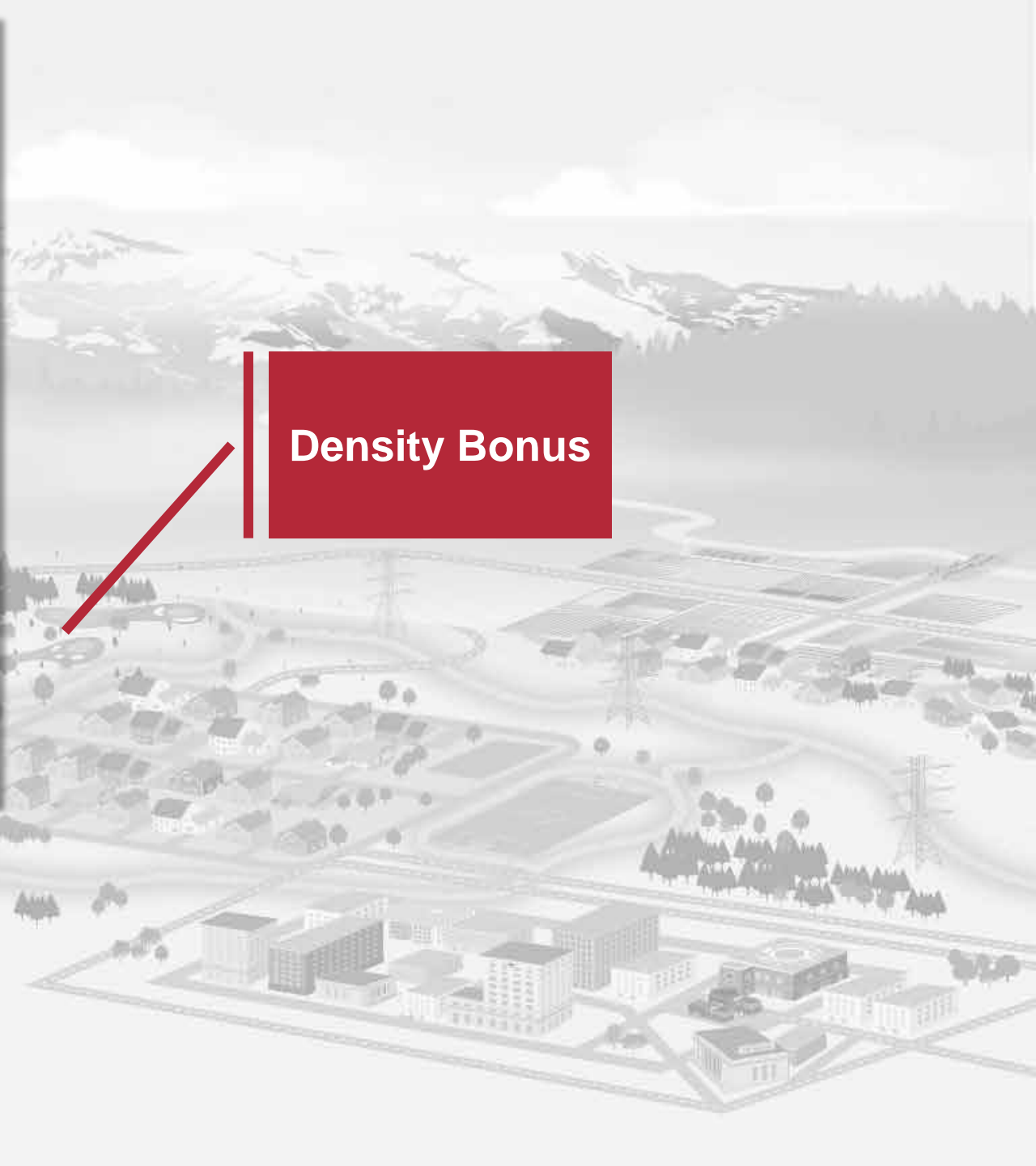
- 
- **Roof**
 - Roof Covering
 - Vents
 - Soffit & fascia
 - Gutters
 - **Deck**
 - Decking surface
 - Framing
 - Fascia
 - **Near-Home Landscaping**
 - Mulch & landscape fabric
 - **Exterior Wall**
 - Siding & sheathing
 - Doors
 - Windows



Photo: La Citta Vita Flickr



Density Bonus

FIRE-RESISTANT LANDSCAPING

A "how to" guide for
protecting your home



LANDSCAPING
DEFENSIBLE SPACE

NON-COMBUSTIBLE
LANDSCAPE ZONE

TYPES OF
GROUND COVER

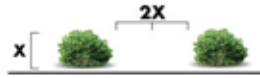
STRUCTURAL
ELEMENTS

LANDSCAPE
MAINTENANCE

PROPERTY
SELF-ASSESSMENT



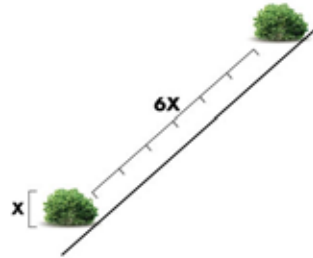
SHRUBS



FLAT TO MILD SLOPE (LESS THAN 20%)



MILD TO MODERATE SLOPE (20%–40%)



MODERATE TO STEEP SLOPE (GREATER THAN 40%)

TREES



Landscape
Regulations





**Subdivision
Standards**



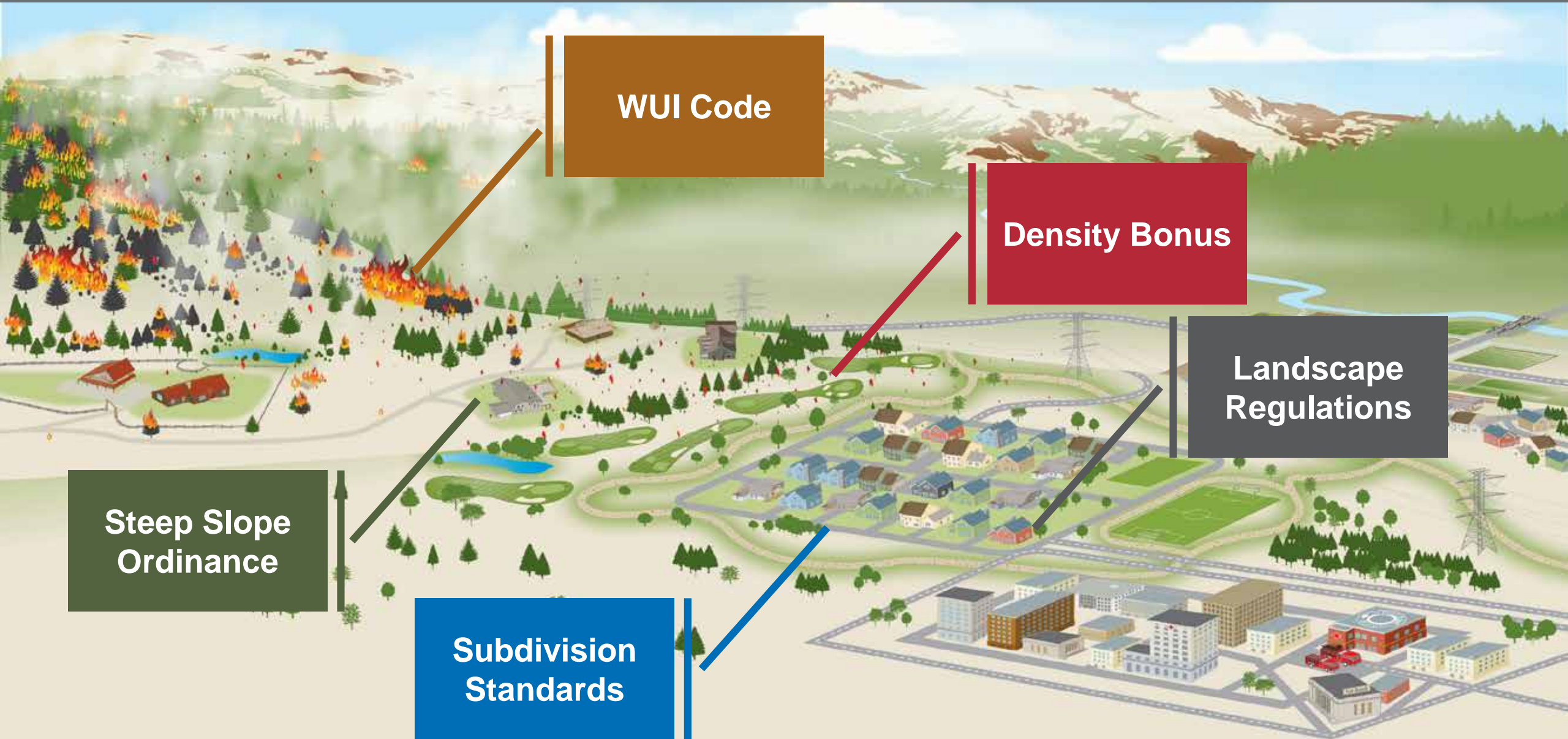
Steep Slope Ordinance



Photo: Wenatchee World



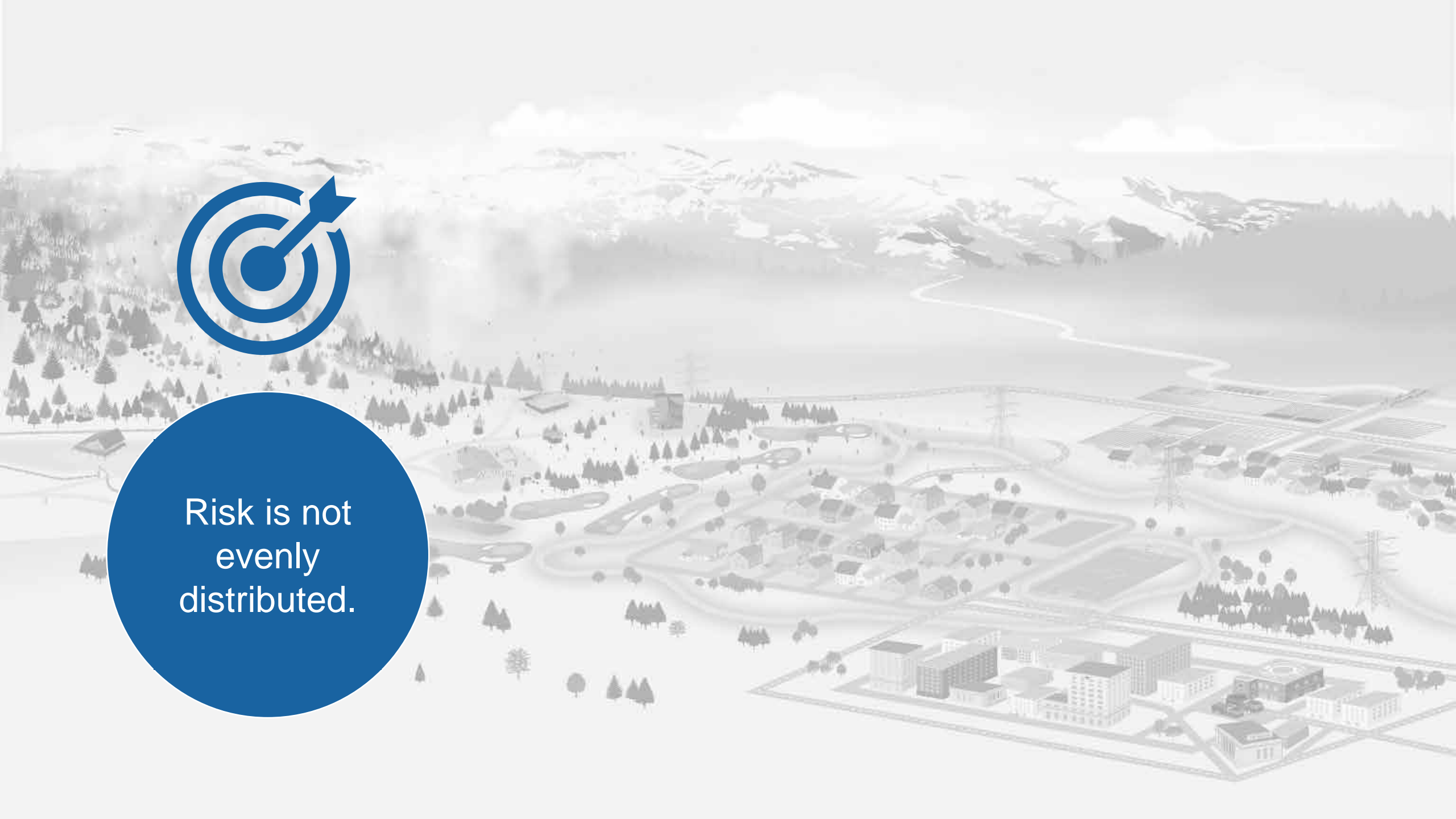
Powerful Tools for Resilience







Risk is not
evenly
distributed.





Risk is not
evenly
distributed.

We know how
to build safer
communities.



Risk is not
evenly
distributed.

We know how
to build safer
communities.

We can't
afford not to.



Thank you!



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kelly@headwaterseconomics.org

<https://headwaterseconomics.org>

[@headecon](#)

