



A Profile of Wildfire Risk

Selected Geographies:

Three Rivers, OR

United States

Comparison Geographies:

U.S.

Produced by

Headwaters Economics'

Economic Profile System (EPS)

<https://headwaterseconomics.org/eps>

March 13, 2021

Wildfire Risk

Three Rivers, OR

About this report

This report presents data about wildfire risk, socioeconomic vulnerability, and land use to help communities understand their relative wildfire risk profile. It was created through a partnership between Headwaters Economics and the U.S. Forest Service through the Community Planning Assistance for Wildfire program using data from Wildfire Risk to Communities.



cpaw.headwaterseconomics.org

Community Planning Assistance for Wildfire (CPAW) works with communities to reduce wildfire risks through improved land use planning. CPAW provides communities with technical land use planning recommendations, hazard assessments, custom research, and training.



wildfirerisk.org

Wildfire Risk to Communities is a free, easy-to-use website with interactive maps, charts, and data to help communities in the United States understand, explore, and reduce wildfire risk. Wildfire Risk to Communities is a project of the USDA Forest Service, under the direction of Congress.

Project partners



headwaterseconomics.org

Headwaters Economics is an independent, nonprofit research group. Its mission is to improve community development and land management decisions.

Headwaters Economics provides original and effective research to help people and organizations develop solutions to some of the most urgent and important issues that communities face.



www.fs.fed.us

The Forest Service, an agency of the U.S. Department of Agriculture, administers national forests and grasslands encompassing 193 million acres.

The Forest Service's mission is to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations.

See <https://headwaterseconomics.org/eps> for more information about the capabilities of EPS. For technical questions, contact Patty Hernandez at eps@headwaterseconomics.org or telephone 406-599-7425.

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Note to Users:

This is one of 14 reports that can be created and downloaded from EPS. Topics include land use, demographics, specific industry sectors, the role of non-labor income, the wildland-urban interface, the role of amenities in economic development, and payments to county governments from federal lands. The EPS reports are downloadable as Excel or PDF documents. See <https://headwaterseconomics.org/eps>.

Wildfire Risk

Three Rivers, OR

Relative Wildfire Risk

Three Rivers, OR

Statewide Percentile Rank

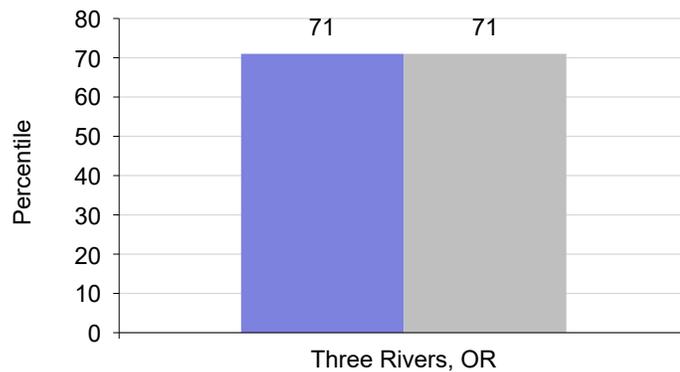
Risk to Homes	71
Wildfire Likelihood	71

Nationwide Percentile Rank

Risk to Homes	83
Wildfire Likelihood	84

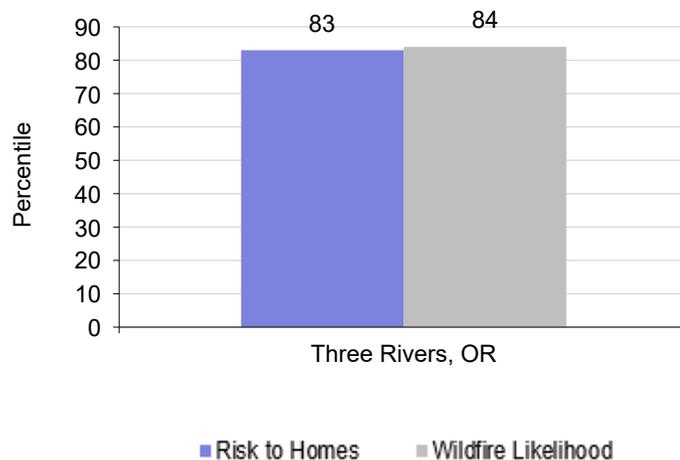
Relative Risk (0-100) Wthin State

- Populated areas in Three Rivers, OR have, on average, greater risk than 71% of communities in the state.
- Populated areas in Three Rivers, OR have, on average, greater wildfire likelihood than 71% of communities in the state.



Relative Risk (0-100) Within Nation

- Populated areas in Three Rivers, OR have, on average, greater risk than 83% of communities in the nation.
- Populated areas in Three Rivers, OR have, on average, greater wildfire likelihood than 84% of communities in the nation.



Wildfire Risk

Three Rivers, OR

Relative Wildfire Risk

What do we measure on this page?

Risk to Homes integrates wildfire likelihood (the probability of wildfire occurring) and wildfire intensity (the energy released by a wildfire) with expected consequences to homes if a fire occurs.

Wildfire Likelihood is the annual probability of a wildfire occurring in a specific location. At the community level, wildfire likelihood is averaged where housing units occur.

Both measures—Risk to Homes and Wildfire Likelihood—are shown as a percentile (or rank). If the place you selected is a community or county, the percentile is relative to all other communities or counties in the state (statewide rank) and the nation (nationwide rank). If the place you selected is a state, the percentile is relative to all other states in the nation.

Why is it important?

The Risk to Homes data pose the hypothetical question: "What would be the relative risk to a house if one existed here?" It asks that question whether a home actually exists at that location or not. This allows us to compare the wildfire risk in places where homes already exist to places where new construction may be proposed.

The Risk to Homes data integrate wildfire likelihood and wildfire intensity from simulation modeling. These two risk components represent wildfire hazard. To translate this into terms specific to the effect of fire on homes, this report uses a generalized concept of susceptibility for all homes as derived from *Wildfire Risk to Communities*.¹ In other words, it is assumed all homes that encounter wildfire will be damaged, and the degree of damage is directly related to wildfire intensity. The report does not account for homes that may have been mitigated.

In reality, an individual home's ability to survive wildfire is driven primarily by local conditions (known as the "home ignition zone"), including the construction materials and the vegetation in the immediate area. The only way to truly assess home susceptibility is through individual home assessments. Communities can reduce their risk to homes by reducing wildfire likelihood, wildfire intensity, exposure, and susceptibility. For example, fuel treatments may reduce wildfire likelihood or intensity, exposure may be reduced through land use planning tools, and susceptibility may be reduced by mitigating the home ignition zone, home hardening, and land use planning tools.

Wildfire Likelihood is based on fire behavior modeling across thousands of simulations of possible fire seasons. In each simulation, factors contributing to the probability of a fire occurring, including weather, topography, and ignitions are varied based on patterns derived from observations in recent decades. Wildfire likelihood is not predictive and does not reflect any currently forecasted weather or fire danger conditions.

Wildfire likelihood is simply a probability that any specific location may experience wildfire in any given year. It does not say anything about the wildfire intensity if it occurs. Wildfire likelihood is difficult to modify but can be reduced through fuel treatment projects and ignition-prevention efforts.

Wildfire Risk

Three Rivers, OR

Wildfire Exposure

Three Rivers, OR

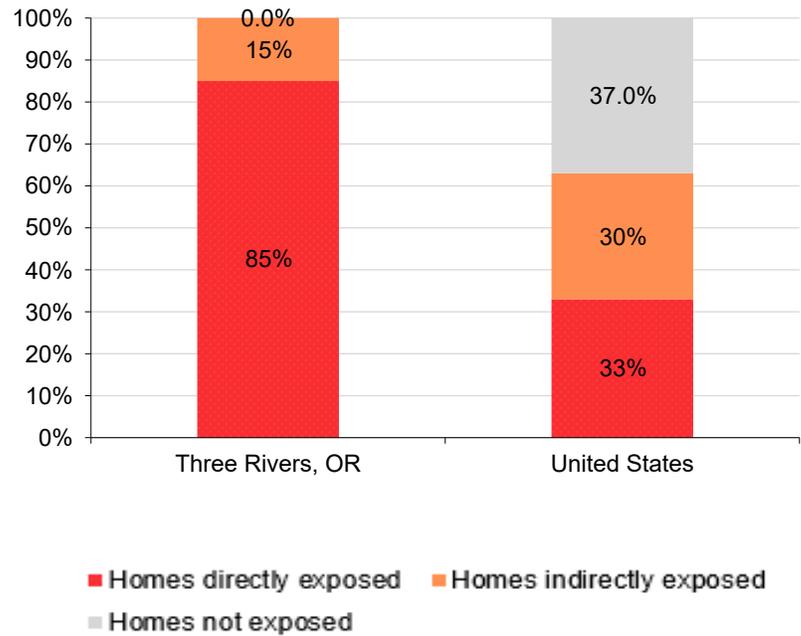
United States

Percent of Total

Homes directly exposed	85.0%	33.0%
Homes indirectly exposed	15.0%	30.0%
Homes not exposed	0.0%	37.0%

Exposure of Homes to Wildfire

- 85% of homes in Three Rivers, OR are exposed to wildfire from direct sources, such as adjacent flammable vegetation.
- 30% of homes in United States are exposed to wildfire from indirect sources, such as embers or home-to-home ignition.



Wildfire Risk

Three Rivers, OR

Wildfire Exposure

What do we measure on this page?

Wildfire Exposure is the spatial coincidence of wildfire likelihood (the probability of wildfire occurring) and wildfire intensity (the energy released by a wildfire) with communities.

Why is it important?

Any part of a community that is located where wildfire likelihood is greater than zero is exposed to wildfire. For example, a home in a flammable forest is exposed to wildfire. Locations within a community can be directly exposed to wildfire from adjacent wildland vegetation, or indirectly exposed to wildfire from embers (firebrands) and home-to-home ignition. Locations within a community that are not exposed are not likely to be subjected to wildfire from either direct or indirect sources.

Communities can reduce their exposure to wildfire with actions such as modifying the home ignition zone and using land use planning tools.

Wildfire Risk

Three Rivers, OR

Population Change

	Three Rivers, OR	United States
Population (2019*)	3,212	324,697,795
Population (2010*)	2,922	303,965,272
Population Change (2010*-2019*)	290	20,732,523
Population Pct. Change (2010*-2019*)	9.9%	6.8%

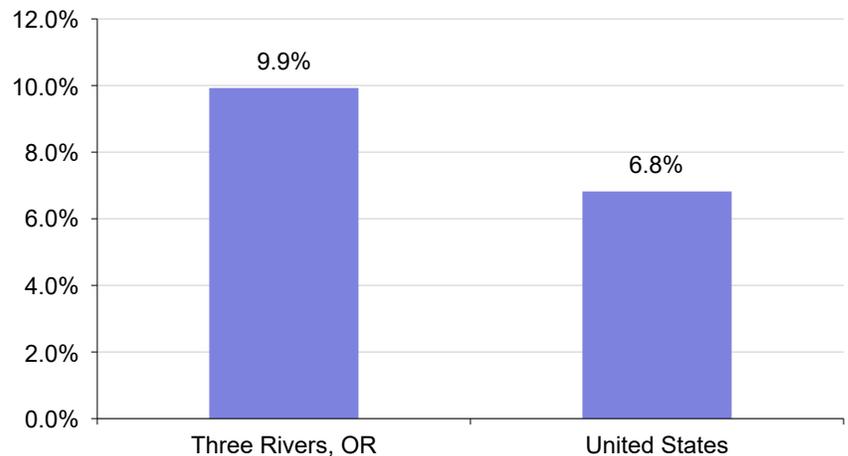
High Reliability: Data with coefficients of variation (CVs) < 12% are in black to indicate that the sampling error is relatively small.

Medium Reliability: Data with CVs between 12 & 40% are in orange to indicate that the values should be interpreted with caution.

Low Reliability: Data with CVs > 40% are displayed in red to indicate that the estimate is considered very unreliable.

Percent Change in Population, 2010*-2019*

- From 2010* to 2019*, Three Rivers, OR had the smallest estimated absolute change in population (290).
- From 2010* to 2019*, Three Rivers, OR had the largest estimated relative change in population (9.9%), and United States had the smallest (6.8%).



* ACS 5-year estimates used. 2019 represents average characteristics from 2015-2019; 2010 represents 2006-2010.

Data Sources: U.S. Department of Commerce. 2020. Census Bureau, American Community Survey Office, Washington, D.C.

Wildfire Risk

Three Rivers, OR

Population Change

What do we measure on this page?

This page describes the total population and change in total population.^{2,3}

Data in this report comes from the U.S. Census Bureau's American Community Survey (ACS).⁴ The ACS is conducted nationwide every year by the U.S. Census Bureau to collect demographic, social, economic, and housing information. For more information about ACS data and accuracy, see the Data Sources & Methods section at the end of this report.

Why is it important?

Population growth is generally an indication of a healthy economy. No growth or long-term decline generally occur when an area is struggling. However, as population grows, more and more people are building homes on fire-prone lands.

Since 2010, 34% of single-family homes are located in the wildland-urban interface (WUI). The WUI is the fastest-growing type of land use in the conterminous United States, increasing by 145% from 1990 to 2015. Today nearly half of the U.S. population lives in the WUI.⁵

Another consequence of population growth is the possibility of more fire ignitions. Almost all wildfires (97%) in the WUI are caused by people. Human-caused wildfires are responsible for 92% of the wildfires that threaten structures, which is 30 times more than lightning-caused wildfires.⁶

CHANGES IN BOUNDARIES: Data describing change over time can be misleading when geographic boundaries have changed. The Census provides documentation about changes in boundaries at this site: www.census.gov/geo/reference/boundary-changes.html

Wildfire Risk

Three Rivers, OR

Potentially Vulnerable Populations

Populations, 2019*	Three Rivers, OR	United States
Families in poverty	79	7,541,196
Households with no car	9	10,395,713
People over 65	754	50,783,796
People with disabilities	501	40,335,099
People with language barriers	0	13,193,113

Percent of Total*

Families in poverty	9.0%	10.0%
Households with no car	0.0%	9.0%
People over 65	23.0%	16.0%
People with disabilities	16.0%	13.0%
People with language barriers	0.0%	4.0%

* Each measure on this page comes from a different subset of the overall population. For example, "poverty status" is not determined for all families. "Households with no car" is determined only for occupied households. "People with disabilities" includes only those people in civilian, noninstitutionalized settings. "Language barriers" is determined only for people five years or older.

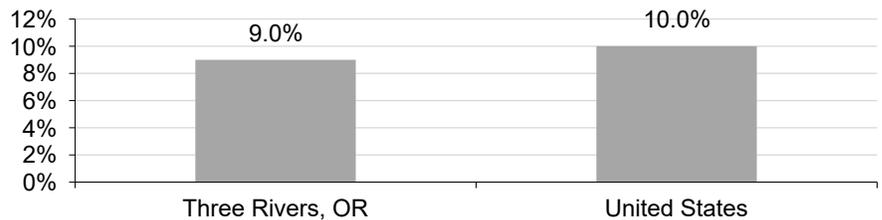
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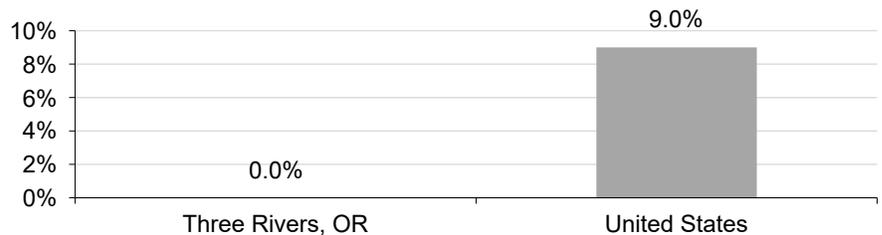
Families in Poverty, 2019*

- From 2010* to 2019*, United States had the largest share of families in poverty (10%).



Households with No Car, 2019*

- From 2010* to 2019*, United States had the largest share of households with no car (9%).



* ACS 5-year estimates used. 2019 represents average characteristics from 2015-2019; 2010 represents 2006-2010.

CITATION: U.S. Department of Commerce. 2020. Census Bureau, American Community Survey Office, Washington, D.C., reported by Headwaters Economics' Populations at Risk, headwaterseconomics.org/par.

Wildfire Risk

Three Rivers, OR

Potentially Vulnerable Populations

What do we measure on this page?

This page describes household types that are associated with increased hardship.⁶

Data in this report come from the U.S. Census Bureau's American Community Survey (ACS).⁷ For more information about ACS, see the Data Sources & Methods section.

Why is it important?

People's susceptibility to wildfire is based on their ability to prepare for, respond to, and recover from a wildfire.⁸ Vulnerable populations are more likely to be disproportionately affected by wildfire disasters because they lack resources, experience cultural and institutional barriers, have limited mobility, and/or have compromised physical health.

Low income is one of the strongest predictors for compromised health and ability to recover from disruptions.⁹ Wildfires disproportionately affect the poor because of factors such as inadequate housing, social exclusion, diminished ability to evacuate or relocate, and more acute emotional stress. People with low incomes are also more likely to be overlooked during emergency response following disasters¹⁰ and are less likely to have adequate property insurance, so they bear a greater burden from property damage following wildfires.¹¹ Due to a lack of financial resources and time, impoverished families may be less likely to take proactive measures to mitigate wildfire hazard in advance of an event.¹⁰

Older populations are more likely to have pre-existing medical conditions or compromised mobility, which can reduce their ability to respond to wildfire. Older adults are more susceptible to air pollution and particulates associated with wildfire smoke.¹²

During emergencies, people who do not have a car are less likely to evacuate or have access to emergency response centers.¹³ Access to a car is also linked with higher wages and more financial stability.¹⁴

Populations with disabilities are subject to health complications that make wildfire more consequential because disasters often result in limited access to medical care.¹² Compromised mobility and medical conditions can reduce the ability to respond to natural disasters.

Language and cultural barriers can make it more difficult to follow directions or interact with agencies before, during, or after a wildfire disaster.¹³

Wildfire Risk

Three Rivers, OR

Housing Characteristics

	Three Rivers, OR	United States
Total Housing Units, 2019*	2,191	137,428,986
Occupied	1,365	120,756,048
Vacant	826	16,672,938
For rent	7	2,793,023
Rented, not occupied	0	604,804
For sale only	107	1,257,737
Sold, not occupied	0	654,889
Seasonal, recreational, occasional	657	5,440,455
For migrant workers	0	37,983
Other vacant	55	5,884,047
Year Built		
Built 2010 or later	89	7,089,880
Built 2000 to 2009	671	19,186,932
Built 1990 to 1999	873	19,072,607
Built 1980 to 1989	297	18,455,307
Built 1970 to 1979	215	20,877,555
Built 1940 to 1969	46	35,417,575
Median year structure built^	1996	1978

Percent of Total

Occupancy		
Occupied	62.3%	87.9%
Vacant	37.7%	12.1%
For rent	0.3%	2.0%
Rented, not occupied	0.0%	0.4%
For sale only	4.9%	0.9%
Sold, not occupied	0.0%	0.5%
Seasonal, recreational, occasional	30.0%	4.0%
For migrant workers	0.0%	0.0%
Other vacant	2.5%	4.3%
Year Built		
Built 2010 or later	4.1%	5.2%
Built 2000 to 2009	30.6%	14.0%
Built 1990 to 1999	39.8%	13.9%
Built 1980 to 1989	13.6%	13.4%
Built 1970 to 1979	9.8%	15.2%
Built 1940 to 1969	2.1%	25.8%

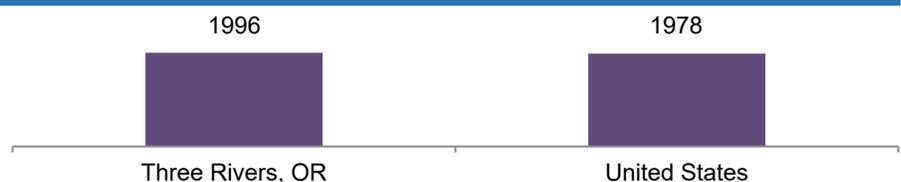
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Median year structure built, 2019*

- The median year of structures is newer (1996) in Three Rivers, OR and older (1978) in United States



* ACS 5-year estimates used. 2019 represents average characteristics from 2015-2019.

Data Sources: U.S. Department of Commerce. 2020. Census Bureau, American Community Survey Office, Washington, D.C.

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Data and Graphics | Page 12

Wildfire Risk

Three Rivers, OR

Housing Characteristics

What do we measure on this page?

This page describes whether housing is occupied or vacant, for rent or seasonally occupied, and the year built.

Rent: The number of homes for rent was defined as occupied housing units that were for rent, vacant housing units that were for rent, and vacant units rented but not occupied at the time of interview.

Seasonal, Recreational, or Occasional Use: Refers to vacant units used or intended for use only in certain seasons or for weekends or other occasional use throughout the year.

For Migrant Workers: Refers to housing units intended for occupancy by migratory workers employed in farm work during the crop season.

Why is it important?

Efforts to reduce wildfire risk to homes center around the home ignition zone, an area 100-200 feet from the foundation. It includes vegetation, the home itself, and other structures or attachments like decks, furniture, fences, and outbuildings.

A majority of homes lost to wildfire are first ignited by embers. By reducing the susceptibility of the area immediately around the home and the home itself—the home ignition zone—the chances of a home surviving an ember storm or small spot-fire are greatly increased.

Housing characteristics are relevant to reducing the risk from wildfires in several ways. The year the home was built may convey information about the housing stock that was built before and after the passage of land use planning regulations to reduce exposure to homes (for example, a building code requiring the use of wildfire-resistant building materials). It may also be possible that newer homes incorporate improved building standards and materials that reduce susceptibility to wildfires.

The prevalence of rental properties, seasonal homes and recreational homes, vacant homes, and homes used for migrant workers may complicate landowner education efforts that are aimed at reducing risk in the home ignition zone. The presence of many non-owner-occupied homes may also make it difficult for community leaders to reach homeowners whose support is needed for the passage of land use planning tools, such as landscape ordinances or building codes, that reduce the risk from wildfires.

Wildfire Risk

Three Rivers, OR

Data Sources & Methods

This report uses statistics from public government sources and from the Wildfire Risk to Communities website. All data used can be verified with the original sources:

Wildfire Risk to Communities. 2020.

Scott JH, Gilbertson-Day JW, Moran C, Dillon GK, Short KC, Vogler KC. 2020. Wildfire Risk to Communities: Spatial datasets of landscape-wide wildfire risk components for the United States. Fort Collins, CO: Forest Service Research Data Archive. Updated 25 November 2020. <https://doi.org/10.2737/RDS-2020-0016> and <https://wildfirerisk.org>

U.S. Geological Survey, Gap Analysis Program. 2012.

Protected Areas Database of the United States (PADUS) version 1.3

<https://www.usgs.gov/core-science-systems/science-analytics-and-synthesis/gap/science/protected-areas>

U.S. Department of Commerce. 2019.

Census Bureau, American Community Survey Office, Washington, D.C.

<https://www.census.gov/programs-surveys/acs>

Endnotes

- 1 - See *Wildfire Risk to Communities* website: <https://wildfirerisk.org/understand-risk/>. Also see Scott JH, Gilbertson-Day JW, Moran C, Dillon GK, Short KC, and Vogler KC. 2020. *Wildfire Risk to Communities: Spatial datasets of landscape-wide wildfire risk components for the United States*. Fort Collins, CO: Forest Service Research Data Archive. <https://doi.org/10.2737/RDS-2020-0016>.
- 2 - A useful resource on rural population change is the U.S. Department of Agriculture's Economic Research Service web page: <https://www.ers.usda.gov/topics/rural-economy-population/population-migration/>.
- 3 - William H. Frey's website provides links to publications, issues, media stories, data tools and resources on migration, population redistribution, and demography of both rural and urban populations in the U.S.: <http://frey-demographer.org/>.
- 4 - For a description of the U.S. Census Bureau's ACS methodology and data accuracy, see <https://www.census.gov/programs-surveys/acs/methodology.html>.
- 5 - Martinuzzi S, Stewart SI, Helmers DP, Mockrin MH, Hammer RB, and Radeloff VC. 2015. *The 2010 wildland-urban interface of the conterminous United States*. Research Map NRS-8. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 124p. <https://www.nrs.fs.fed.us/pubs/48642>. Also Radeloff VC, et al. 2017. Rapid growth of the U.S. wildland-urban interface raises wildfire risk. *PNAS* 115(13): 3314-3319. www.pnas.org/cgi/doi/10.1073/pnas.1718850115. Mietkiewicz N, Balch J, Schoennagel T, Leyk S, Denis L, and Bradley B. 2020. In the line of fire: Consequences of human-ignited wildfires to homes in the U.S. (1992-2015). *Fire*. Available online: <https://www.mdpi.com/2571-6255/3/3/50>.
- 6 - Balch J, Bradley B, Abatzoglou J, Nagy C, Fusco E, and Mahood A. 2017. Human-started wildfires expand the fire niche across the US. *PNAS*. Available online: <http://www.pnas.org/content/114/11/2946>. Also Mietkiewicz N, Balch J, Schoennagel T, Leyk S, Denis L, and Bradley B. 2020. In the line of fire: Consequences of human-ignited wildfires to homes in the U.S. (1992-2015). *Fire*. Available online: <https://www.mdpi.com/2571-6255/3/3/50>
- 7 - <https://www.census.gov/programs-surveys/acs>
- 8 - Collins TW and Bolin B. 2008. Situating hazard vulnerability: People's negotiations with wildfire environments in the U.S. Southwest. *Environmental Management* 44: 441-455.
- 9 - County of Los Angeles Public Health. 2013. Health Atlas for the City of Los Angeles. Los Angeles, CA. <https://wattscommunitystudio.files.wordpress.com/2013/06/healthatlas.pdf>
- 10 - Fothergill A and Peek LA. 2004. Poverty and disasters in the United States: A review of recent sociological findings. *Natural Hazards* 32(1): 89-110.