MALIBU FOUNDATION
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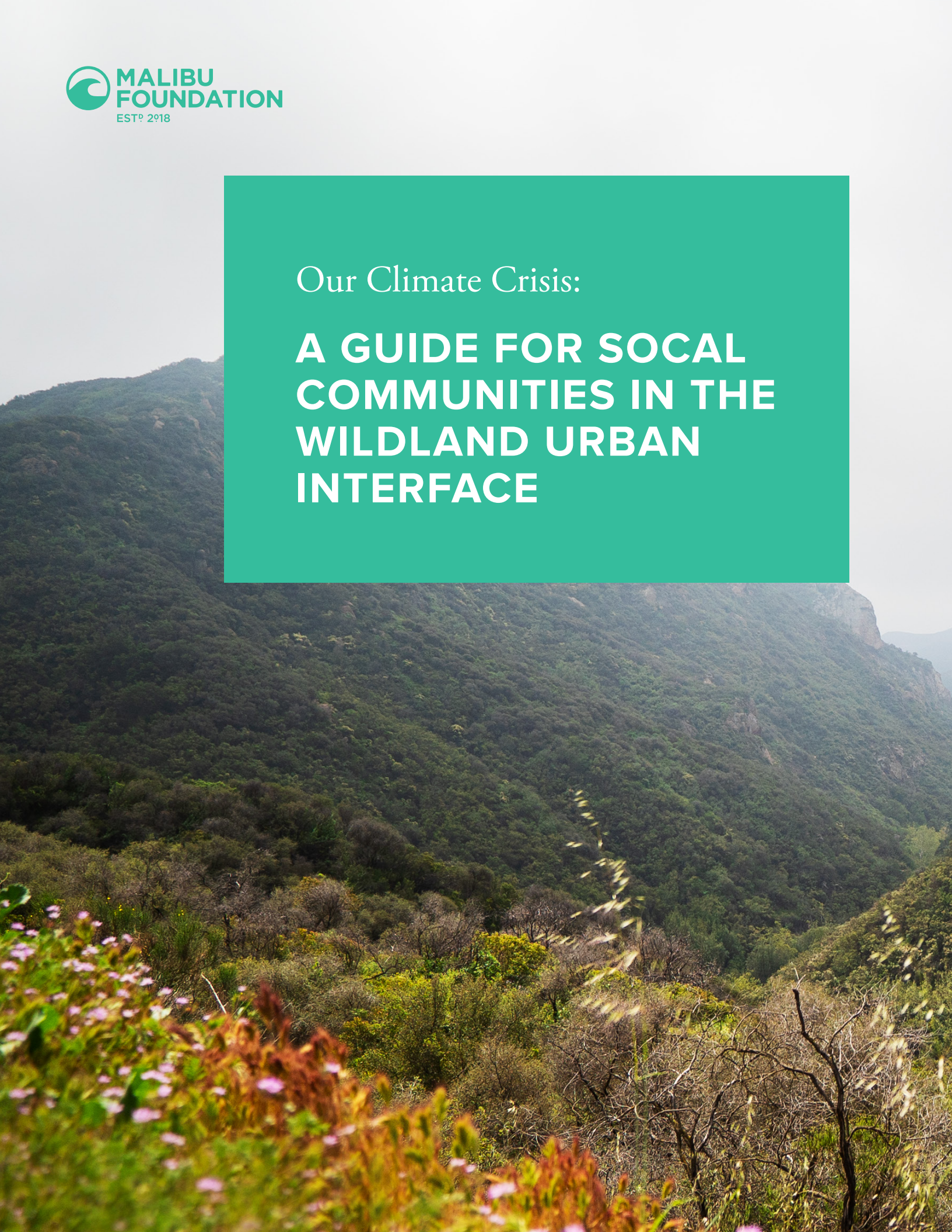
Our Climate Crisis:

A GUIDE FOR SOCAL COMMUNITIES IN THE WILDLAND URBAN INTERFACE



Our Climate Crisis:
A Guide for SoCal Communities in the Wildland Urban Interface

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MALIBU FOUNDATION
ESTD 2018

MESSAGE

FROM THE EXECUTIVE DIRECTOR

The Malibu Foundation was created by local residents immediately following the devastating Woolsey Fire in 2018. The Foundation believes that community resilience and adaptability are key to creating sustainability in an area particularly vulnerable to the effects climate change.

2021 brought more weather extremes and mass casualty events across much of the western United States including heat waves, drought, wildfires, and flooding. This trend of extreme events is likely continue. The Santa Monica Mountains region was not prepared for the Woolsey Fire and the flooding and landslides that followed. We feel that it is only a matter of time until another natural tragedy occurs in the area. As a Foundation, we needed to do something to respond to the urgency and impact of these events – not just talk, but a plan of action.

The Malibu Foundation convened stakeholders from state and county government along with residents and local organizations to figure out how to prepare and adapt to these extreme weather events. This **Climate Action Plan** was the outcome of this group's work. We hope that the clear, actionable items in this Plan, which calls on all stakeholders to work together, will enable the region to be better prepared and more resilient against future natural disasters.

A special thanks to all of the partners who have contributed time, energy and creativity into developing this Plan.

Sincerely,

Evelin G. Weber
Executive Director

MALIBU FOUNDATION
ESTD 2018

ACKNOWLEDGEMENTS

The Santa Monica Mountains are the ancestral lands of the Chumash, the Gabrielino Tongva and the Tataviam tribes. With gratitude, we honor this land and the people who have been its environmental stewards for thousands of years. As such, we are committed to doing our part to become better stewards of this region by conserving its precious resources, including the native flora and fauna, and helping the current inhabitants live more sustainably.

This report is the result of a highly collaborative project that kicked off in January 2021. A dedicated project advisory committee (PAC) guided the process and provided valuable input along the way.

SUBCOMMITTEE

We are deeply grateful to the following Project Advisory Committee (PAC)* and emergency communications subcommittee members:

Alison Frazzini,
LA County Office of Sustainability

Antoine Kunsch,
Resource Conservation District of the Santa Monica Mountains*

Beth Burman, Topanga Coalition for Emergency Preparedness (TCEP)

Brent Woodworth, Los Angeles Emergency Preparedness Foundation*

Dr. Casandra Rauser,
UCLA Sustainable LA Grand Challenge*

Cecilie Stuart,
Move the World

Dr. Chris Doran, Pepperdine University, Sustainability Program*

Clark Stevens, Resource Conservation District of the Santa Monica Mountains*

Greg Kochanowski, landscape architect

Dr. Ingrid Steinberg,
Resilient Palisades*

Jeremy Wolf,
CA Senator Henry Stern's Office

Jonathan Parfrey, Climate Resolve*

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Madelyn Glickfeld, water policy expert

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Susan Duenas, City of Malibu

Tessa Charnofsky, LA County

Supervisor Sheila Kuehl's Office

Thuy Hua, LA County Regional

Tim Pershing, CA Assembly Member Richard Bloom's Office

* *PAC members with an asterisk (*) represent official collaborating partner organizations*

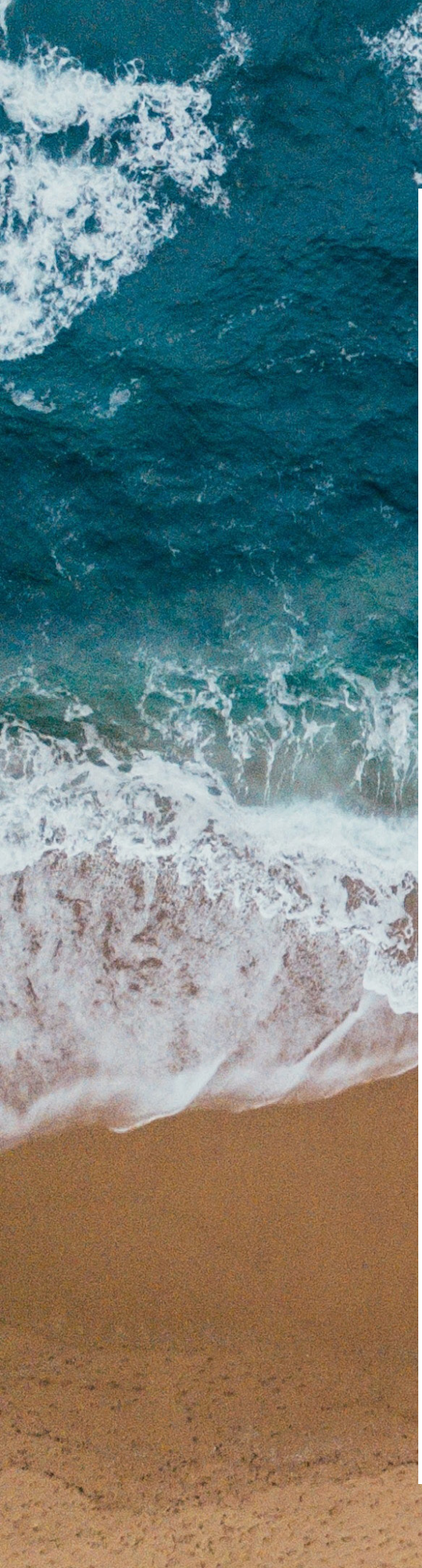
SPECIAL THANKS

Initial research assistance was provided by a hard-working USC capstone project graduate student team (Ana Rosas, Muhan Zhang, Youngwoo Kwon, Ruofan Zhang and their advisor Peter Roberston). Overall guidance and mapping assistance was provided by Sabrina Bornstein and Eden Axelrad of BuroHappold Engineering, which was critical to ensuring this report's accuracy.

We are also tremendously grateful for the steadfast support of the Malibu Labor Exchange Director Oscar Mondragon and Board member Stephanie Cupp, who partnered with The Malibu Foundation on the day laborer listening session and the region's first Spanish language emergency preparedness event. A special shout out also goes to Susan Duenas and Sarah Kaplan from the City of Malibu for graciously co-sponsoring this inaugural event. Tam Taylor of the Cayon Sages was instrumental to our successful older adults listening session, and we sincerely appreciate those who took the time to input into the community survey, participate in the listening sessions, and be interviewed.

Finally, this project would not have been possible without support from The Malibu Foundation's board of directors; and copy editor Amanda Greene.

COLLABORATING PARTNER ORGANIZATIONS



CONTENTS

INTRODUCTION

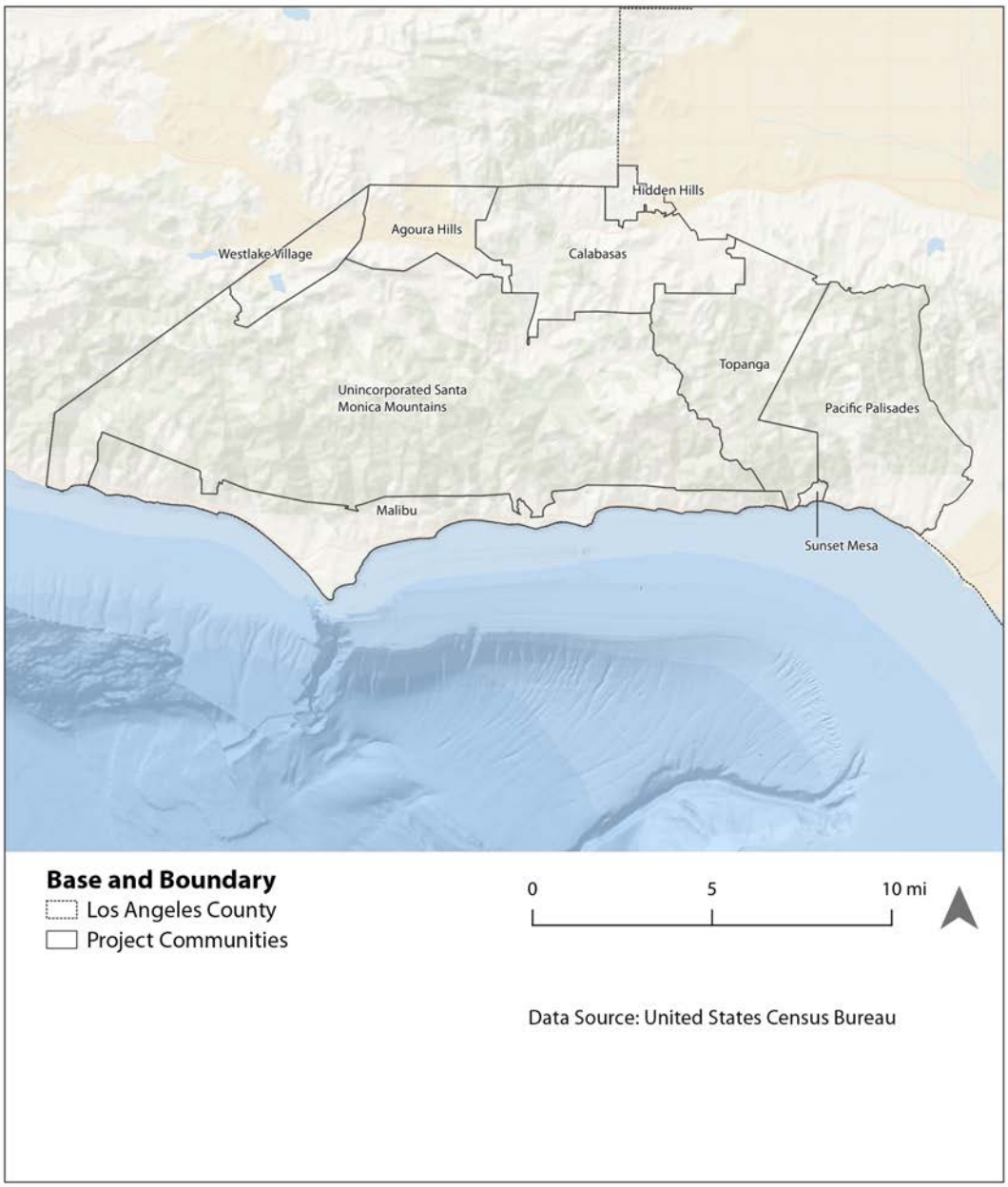
The communities of the Santa Monica Mountains (SMM) are particularly vulnerable to natural hazards such as earthquakes, fires, and landslides and the increasing impacts of climate change, including prolonged droughts, extreme heat and precipitation, storm surges and sea level rise. In November 2018, the devastating Woolsey Fire burned over 97,000 acres and destroyed over 1,600 homes and other structures in the cities of Malibu, Agoura Hills, Calabasas, Westlake Village and the unincorporated SMM area. Three years after the Woolsey Fire, the region is still in the difficult process of recovering.

Unfortunately, this challenging time has been compounded by the COVID-19 pandemic, which has had a profound impact on local economies and the health and well-being of the community – especially for its less affluent residents and older adults. However, "The Great Reset" also presents the region with an opportunity to create more awareness about climate change and proactively build resilience to the resulting shocks and stressors of climate change – including hotter, faster, and more frequent wildfires. It is an opportunity to help minimize the loss of property, lives and livelihoods and be better prepared when the next disaster strikes. It is also an opportunity to strengthen community cohesion, equity, and inclusion by identifying and supporting the most vulnerable populations within the region.

In January 2021, the Malibu Foundation formed a collaboration with a broad range of community stakeholder groups and local experts to conduct a climate vulnerability assessment and resilience plan for the SMM wildland-urban interface (WUI) cities of Malibu, Agoura Hills, Calabasas, Hidden Hills and Westlake Village (which form the Las Virgenes Council of Governments), as well as Topanga, the Pacific Palisades, Sunset Mesa and adjacent unincorporated SMM communities.

Figure 1

SMM WUI REGION PROJECT AREA



KEY DEFINITIONS

Climate vulnerability can be defined as susceptibility to exposure to the hazards associated with climate change, such as more frequent and persistent droughts, more intense storms and wildfires, sea level rise and coastal flooding, and more frequent extreme heat events. *Climate resilience*, on the other hand, is the ability to withstand the impacts of these climate related hazards. *Community resilience* relates to the ability of individuals and neighborhoods to support each other before, during, and after a disaster or crisis, strengthening connections within and between communities, and developing comprehensive support systems.[1]

The *wildland urban interface (WUI)* is the transition zone between wilderness and land developed by human activity, an area where a built environment intermingles with the natural environment. Human settlements in the WUI are at a greater risk of catastrophic wildfire and several other climate hazards. The US Forest Service defines the WUI as a place where "humans and their development meet or intermix with wildland fuel."[2]

This report seeks to:

1. **Increase local knowledge** about the SMM WUI region's climate hazards, the resulting impacts on infrastructure and community resources, and the region's diverse populations;

2. **Provide recommendations** to address and prepare for the disruptive, and potentially devastating impacts of climate change in the region; and

3. **Serve as an actionable plan for regional coordination** by local governments and regional agencies on climate resilience strategies, and as a community resilience guide for individuals, neighborhood groups and other stakeholders in the region.

1 *"Principles of the Resilient Communities Program." New America. Accessed September 5, 2021.* https://www.newamerica.org/resilient-communities/about/principles-resilient-communities-program/

2 https://www.fs.fed.us/openspace/fote/reports/GTR-299.pdf

METHODOLOGY

This study is based on the following:

1. **Community Surveys**: Qualitative results from an on-line community survey based on Los Angeles County's 2020 adaptive capacity survey. Survey respondents were asked 67 questions in seven categories: 1) Demographics, (2) Climate Change & Woolsey Fire, (3) Extreme Heat, (4) Wildfire, (5) Floods, (6) Communications & Mobility, and (7) Mitigation, Sustainability & Preparedness. More than four hundred residents of the SMM WUI region participated in this survey between February and March 2021.

2. **Listening Sessions**: Analysis from two listening sessions focused on older adults and day laborers/domestic workers. A total of thirty-five people participated in these sessions.

3. **Community Asset Inventory**: A catalog of critical community infrastructure was compiled to identify the region's key physical resources and help assess its physical vulnerabilities and climate resilience.

4. **Research and Data Analysis**: Reviews of key studies, including LA County's 2021 Climate Vulnerability Assessment, analysis of census data, and the use of several other databases and statistical sources including CalAdapt, the National Oceanic and Atmospheric Administration (NOAA), and the Coastal Storm Modeling System (CoSMoS) informed this report and its conclusions.

CLIMATE HAZARDS ASSESSMENT

DROUGHT

The SMM WUI region is classified as one of the world's five Mediterranean ecosystem regions, which are characterized by a climate of mild, rainy winters and dry summers moderated by offshore ocean currents.[3]

However, decades of decreasing humidity levels are making the region more vulnerable to extended periods of drought. Across the state, drought conditions are accelerating at unprecedented rates. Since 1980, temperatures across California have risen by 1.8 degrees Fahrenheit, while precipitation has declined by 30%.[4] In the year 2000, the western United States entered what scientists are calling a "megadrought." It has been identified as the second worst in 1,200 years, triggered by a natural dry cycle and exacerbated by human-caused climate change. The National Aeronautics and Space Administration (NASA) predicts that drought conditions in the southwestern United States during the second half of the 21st century will be drier and last longer than any drought experienced in over a millennium.[5] [6] The California Coastal Commission similarly projects that the warming trend attributed to climate change will lead to intense dry periods and more frequent droughts along the coast.[7] According to the US Drought Monitor, the current drought in the western US is impacting flora and fauna, as well as

3 https://www.nps.gov/samo/learn/nature/mediterraneanecosystem.htm

4 Goss, Michael et al (2020) Climate change is increasing the likelihood of extreme autumn wildfire conditions across California. 2020 Environ. Res. Lett. 15 094016. Retrieved from: https://iopscience.iop.org/article/10.1088/1748-9326/ab83a7

5 NASA (2015). Megadroughts in U.S. West Projected to be Worst of the Millennium. Retrieved from: https://svs.gsfc.nasa.gov/cgi-bin/details.cgi?aid=4270

6 https://www.cbsnews.com/news/drought-western-united-states-modern-history/

7 California Coastal Commission (2021). Climate Change Introduction. Retrieved from: http://www.coastal.ca.gov/climate/climatechange.html

lowering the water supply and reducing agricultural yields.[8] Since 2010, an estimated 129 million trees have died in California's national forest due to conditions caused by the unprecedented drought and resulting bark beetle infestation.[9] Moreover, California relies on the gradual melting of Sierra Mountain snowpack to fill its reservoirs, but this year reservoir levels are dropping drastically as record evaporation rates continue unabated.

The U.S. Geological Survey (USGS) found that about 50% of aquifers in the United States are depleting at a much faster rate than once predicted.[10] If aggressive measures to conserve, capture and recycle water are not widely implemented, in 50 years the United States could see its freshwater supply reduced to one third of the current quantity.[11] In May 2021, Governor Gavin Newsom expanded a drought emergency to 50 of the 58 counties across the state. [12]

While ecosystems in Mediterranean climates are adapted to seasonal drought, extended multi-year droughts disrupt these systems.[13] Moreover, prolonged drought conditions along with excessive heat also impact the area's soil quality and native vegetation, including shrubbery and trees, which in turn further increases wildfire risk.[14]

8 *U.S Global Change Research Program (2017).*

9 *https://www.wri.org/insights/new-study-raises-question-what-dont-we-know-about-water-scarcity*

10 *https://www.wri.org/insights/new-study-raises-question-what-dont-we-know-about-water-scarcity*

11 *https://www.nationalgeographic.com/science/article/partner-content-americas-looming-water-crisis*

12 *Whitcomb, D. (2021). California governor declares drought emergency in 41 counties. Reuters. https://www.reuters.com/world/us/california-governor-declares-drought-emergency-41-counties-2021-05-11*

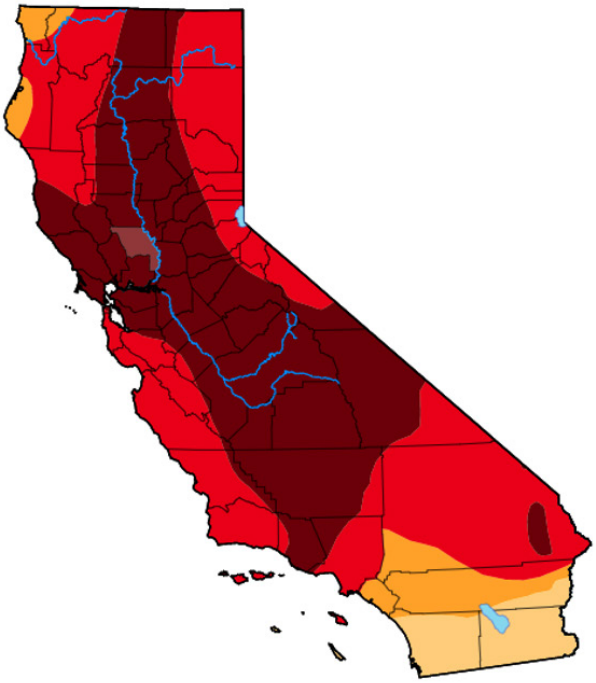
13 *Okin, G. S., Dong, C., Willis, K. S., Gillespie, T. W., & MacDonald, G. M. (2018). The impact of drought on native Southern California vegetation: Remote sensing analysis using MODIS-derived time series. Journal of Geophysical Research: Biogeosciences, 123, 1927–1939. https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2018JG004485*

14 *Dennison, P. E., Moritz, M. A., & Taylor, R. S. (2008). Evaluating predictive models of critical live fuel moisture in the Santa Monica Mountains, California. International Journal of Wildland Fire, 17(1), 18-27. And see: https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?CA*

Figure 2

CALIFORNIA DROUGHT INTENSITY MAP[15]

by The US Drought Monitor shows that most of the state is currently in the extreme or exceptional drought status.



Map released: Thurs. October 14, 2021

Data valid: October 12, 2021 at 8 a.m. EDT

Intensity

- **None**
- **D0** (Abnormally Dry)
- **D1** (Moderate Drought)
- **D2** (Severe Drought)
- **D3** (Extreme Drought)
- **D4** (Exceptional Drought)
- **No Data**

Authors

United States and Puerto Rico Author(s):
Adam Hartman, NOAA/NWS/NCEP/CPC

Pacific Islands and Virgin Islands Author(s):
Denise Gutzmer, National Drought Mitigation Center

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying **text summary** for forecast statements.*

15 https://www.gov.ca.gov/2021/07/08/as-drought-conditions-intensify-governor-newsom-calls-on-californians-to-take-simple-actions-to-conserve-water/

According to Tree People's LA County Tree Canopy interactive map, approximately 35% of the SMM WUI region has tree canopy, nearly twice as much as the average of LA County.[16] Trees provide many environmental benefits and ecosystem services ranging from pollutant removal from soil, air and water, carbon sequestration, water storage, and temperature moderation. The community with the highest amount of tree canopy in the region is Topanga with 55%, while Agoura Hills has the least amount of tree canopy with 31%. Approximately 30% of Malibu (City and unincorporated LA County) is shrubland while the rest of the region has approximately 20% of this type of vegetation. An estimated 21% of the SMM WUI region is bare topsoil, which is unprotected by plants or mulch and therefore more vulnerable to erosion and nutrient depletion. In the absence of cover crops and mulch, tree canopy also helps to protect the soils from these environmental factors.[17]

Unfortunately, drought conditions have resulted in the death of thousands of trees in the Santa Monica Mountains. A report by the Resources Conservation District of the Santa Monica Mountains (RCDSMM) found that between 2015 and 2017, over 9,000 coast live oaks and 114,000 sycamore, alder, and willows died, resulting in ecosystem service losses in excess of $22 million per year. Future losses from further tree mortality are projected to be over a $100 million per year, and this is not accounting for the losses of the environmental and economic benefits listed above such as pollution removal, temperature moderation, aesthetic value and real estate values.[18] As droughts worsen in intensity and duration, trees become more vulnerable, while at the same time the need for the tree canopy and their benefits increases even more to protect from further impacts of the drought.

Another study published in the *Journal of Geophysical Research* assessed the drought vulnerability of chaparral and coastal sage scrub, two common shrubland communities along the SMM. This study also found that native vegetation was negatively impacted by prolonged drought with chaparral showing a greater vulnerability over time than coastal sage. The lack of precipitation has caused stress on the vegetation over the past Another study published in the Journal of Geophysical Research assessed the drought

16 https://www.treepeople.org/los-angeles-county-tree-canopy-map-viewer/

17 http://www.waldeneffect.org/blog/Disadvantages_of_tilling_and_bare_soil/

18 *Dagit, Rosi, et al (2018). "How Can We Save Our Native Trees? Drought and Invasive Beetle Impacts on Wildland Trees and Shrublands in the Santa Monica Mountains," a report for Los Angeles County contract CP-03-44, funded by Third District Supervisor Sheila Kuehl and with the assistance of the NASA DEVELOP Program*

vulnerability of chaparral and coastal sage scrub, two common shrubland communities along the SMM. This study also found that native vegetation was negatively impacted by prolonged drought with chaparral showing a greater vulnerability over time than coastal sage. The lack of precipitation has caused stress on the vegetation over the past several years and resulted in rendering the native shrubland dry and brittle. several years and resulted in rendering the native shrubland dry and brittle.[19]

Prolonged droughts and deteriorating forest health make the Santa Monica Mountains terrain extremely susceptible to wildfires, which now occur year-round in Southern California and are no longer limited to a May to November fire season.[20] Reviews of California's fire history indicate that the deadliest and most destructive wildfires in the state have occurred during the past 10 years and that cycles of drought along with drought-stressed native fuels are among the primary factors that contribute to this increase.[21] The projected increase for intense and prolonged periods of drought and the impact that this will have on other hazards faced by the SMM WUI region, underscores the need to prepare for and mitigate the fast-moving effects of climate change.

19 *Okin, G. S., Dong, C., Willis, K. S., Gillespie, T. W., & MacDonald, G. M. (2018). The impact of drought on native Southern California vegetation: Remote sensing analysis using MODIS-derived time series. Journal of Geophysical Research: Biogeosciences, 123, 1927–1939.* https://doi.org/10.1029/2018JG004485

20 *Dennison, P. E., Moritz, M. A., & Taylor, R. S. (2008). Evaluating predictive models of critical live fuel moisture in the Santa Monica Mountains, California. International Journal of Wildland Fire, 17(1), 18-27.*

21 *County of Los Angeles After Action Review of the Woolsey Fire Incident. (2019)* https://lacounty.gov/wp-content/uploads/Citygate-After-Action-Review-of-the-Woolsey-Fire-Incident-11-17-19.pdf

WATER RECLAMATION AND RECYCLING

Water Reclamation and Recycling play a major role in increasing drought resilience for the region. Water recycling is the process of reclaiming water from a variety of sources by treating it and utilizing the water for purposes such as irrigation, groundwater replenishment, industrial processes, environmental restoration, and potable water.[22] Recycled water can come from various sources including municipal wastewater, industry process and cooling water, stormwater, agricultural runoff and return flows, and water from natural resource extraction activities.[23] The SMM Region relies on its water from the State Water Project and the Colorado River Aqueduct which is treated by the Metropolitan Water District. LA County Waterworks District No. 29 serves the City of Malibu, Topanga, and the Pacific Palisades. LA County Waterworks District 29 is a member agency of the Central Basin Water District which sources its water from the Metropolitan Water District. The Las Virgenes Municipal Water District (LVMWD) provides potable water, wastewater treatment, recycled water and biosolids composting to residents in the cities of Agoura Hills, Calabasas, Hidden Hills, Westlake Village, and unincorporated areas of Los Angeles County. LVMWD is a member agency of the Metropolitan Water District, and leads the region in its water reclamation efforts. Since 1983, the LVMWD has provided non-potable recycled water for irrigation. It also utilizes actively composts and administers a free native seed in a box distribution system for water conservation.[24] The LVMWD is currently developing a state of the art "Pure Water" water reclamation and recycling project, a treatment system that can meet drinking water standards. Although the full-scale project is not yet projected to begin for at least two years, the utility created a demonstration facility to educate its customers on the effectiveness and safety of water recycling and treatment processes.[25]

22 *https://pacinst.org/wp-content/uploads/2014/06/ca-water-reuse.pdf*
23 *https://www.epa.gov/waterreuse/basic-information-about-water-reuse*
24 *https://www.lvmwd.com/*
25 *https://www.lvmwd.com/Home/Components/News/News/5910/22*

RECOMMENDATIONS

for Drought Resilience

Target Audience

Individuals / Residents

- Increase water conservation through the implementation of high efficiency retrofits of toilets, faucets and shower and installation of greywater systems.
- Water Conservation Tips for landscaping:
  - Plant drought tolerant and native plants and trees.
  - Replace nonessential turf with drought tolerant ground covers and mulch.
  - Water only as much as necessary.
  - Install drip irrigation systems and smart meters.
  - Operate irrigation system during the cooler hours to reduce evaporation.
  - Engage in water capture by utilizing rain barrels and larger multi-chamber cisterns.
  - Use greywater to irrigate trees.
- *See Appendix B for links to Utility Rebates.*
- Support tree planting and forest management efforts.

Target Audience

Municipalities / Region

- Evaluate water supply sources and reliability with longer droughts and warmer temperatures. Improve drought management practices for the region.
- Optimize local water supply resources and reduce reliance on imported water.
- Increase the capture and use of stormwater and non-potable use of recycled water.
- Implement sustainable groundwater management. This will help the region prepare for groundwater drawdowns.
- Develop regional water conservation, reclamation and recycling priorities.
- Expand native tree planting programs across the region, and develop urban forest management plans to maintain and protect existing trees.

CLIMATE HAZARDS ASSESSMENT

EXTREME HEAT

An extreme heat event is when the daily maximum temperature exceeds the 95th historical percentile of daily maximum temperatures based on historical data from 1961-1990. [26] Temperatures exceeding 95°F pose a significant risk for heat-related illness with 95°F serving as a threshold for worker safety regulations and when to open cooling centers.[27]

According to the National Oceanic and Atmospheric Administration (NOAA)'s National Centers for Environmental Information, July 2021 was the world's hottest month ever recorded. The world's seven warmest years have all occurred since 2014, with ten of the warmest years occurring since 2005.[28] California is expected to see a steady rise in temperatures and more frequent extreme heat events in the next decade, posing a significant threat to SMM WUI residents. In the last century, annual average temperatures increased by 0.29°F per decade.[29] Under the business as usual, high emissions scenario (which is associated with a greenhouse gas Representative Concentration Pathway (RCP) of 8.5), the warming rate per decade is anticipated to increase to >0.3°C (or 33°F) per decade during the current century.[30] Warming is mostly occurring during the fall and winter months and the county is experiencing more frequent and severe heat waves.

26 *Extreme Heat Days & Warm Nights. (2021). Cal-Adapt https://cal-adapt.org/tools/extreme-heat/*

27 *LA County Community Vulnerability Assessment (2021)*

28 *https://www.noaa.gov/news/2020-was-earth-s-2nd-hottest-year-just-behind-2016*

29 *Hall et al. (2018). Cited in LA County's 2021 Climate Vulnerability Assessment*

30 *Collins, M., Knutti, R., Arblaster, J., Dufresne, J. L., Fichefet, T., Friedlingstein, P., ... & Booth, B. B. (2013). Long-term climate change: projections, commitments and irreversibility. In Climate Change 2013-The Physical Science Basis: Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (pp. 1029-1136). Cambridge University Press.*

Figure 3

EXTREME HEAT PREDICTIONS FOR LA COUNTY[31]

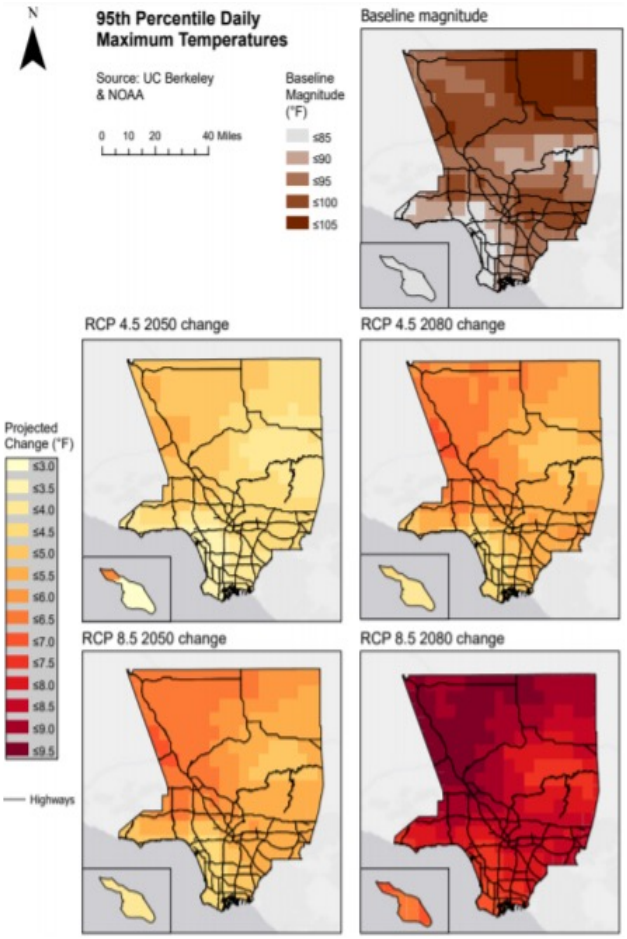


Figure 3: **Extreme Heat Predictions for LA County**, Countywide, Los Angeles is expected to see increases in extreme heat events, with the high temperatures in coastal communities projected to increase by 4°F and 7.5°F in 2050 and 2080, respectively under the business-as-usual RCP 8.5 scenario.[32]

31 *LA County Community Vulnerability Assessment (2021)*

32 *Representative Concentration Pathway (RCPs) represent different long-term global greenhouse gas (GHG) emission concentration scenarios. RCP 4.5 is a scenario of GHGs based on slowly declining emissions, while RCP 8.5 refers to business as usual and rising emissions.*

Figure 4: **Baseline Extreme Heat** and *Figure 5:* **Mid-Century Extreme Heat** depict extreme heat temperature projection estimates for the SMM region into the mid-century based on high emissions (business as usual), where emissions continue to rise strongly through 2050 and plateau around 2100, into the mid-century.Although not all sub-regions within the SMM WUI project area will be impacted equally, by mid-century, maximum temperatures are projected to rise by approximately five degrees in each zone.[33] Rising temperatures in the region will result in increases in the number of extreme heat days with slight variations across each community depending on their set threshold temperature. The northeastern section of the SMM WUI region (Agoura Hills, Calabasas, Hidden Hills) and upper Topanga and the Pacific Palisades will be most affected. Agoura Hills is projected to reach a 95th percentile maximum temperature of 95-100 °F while Calabasas, Hidden Hills, and the northernmost regions of Topanga and Pacific Palisades are projected to reach 100+ °F by the mid-century.[34]

According to the CalAdapt extreme heat days tool, the annual average number of extreme heat days currently ranges from two to four days with the most being in Calabasas and Hidden Hills.[35] High emissions (business as usual) scenarios project that the number of extreme heat days will reach a range of nine to 19 days annually in the SMM region by mid-century. Agoura Hills, Calabasas, and Hidden Hills face the highest temperature increases. The Pacific Palisades and Malibu will face approximately nine to 13 extreme heat days per year, a significant change for the coastal communities who have historically not had to deal with much extreme heat in the past.[33]

33 *The Baseline Extreme Heat map for the project region uses the 30-year average for 95th percentile maximum temperatures from 1976-2005 as the baseline for future temperature projections to be compared to. Mid-century projections are based on an expected 30-year average 95th percentile maximum temperatures from 2035-2064.*

34 *Pierce, D. W., Kalansky, J. F., & Cayan, D. R. (2018). Climate, drought, and sea level rise scenarios for California's fourth climate change assessment. California Energy Commission and California Natural Resources Agency.*

35 *Extreme Heat Days & Warm Nights. (2021). Cal-Adapt https://cal-adapt.org/tools/extreme-heat/*

Figure 4

BASELINE EXTREME HEAT

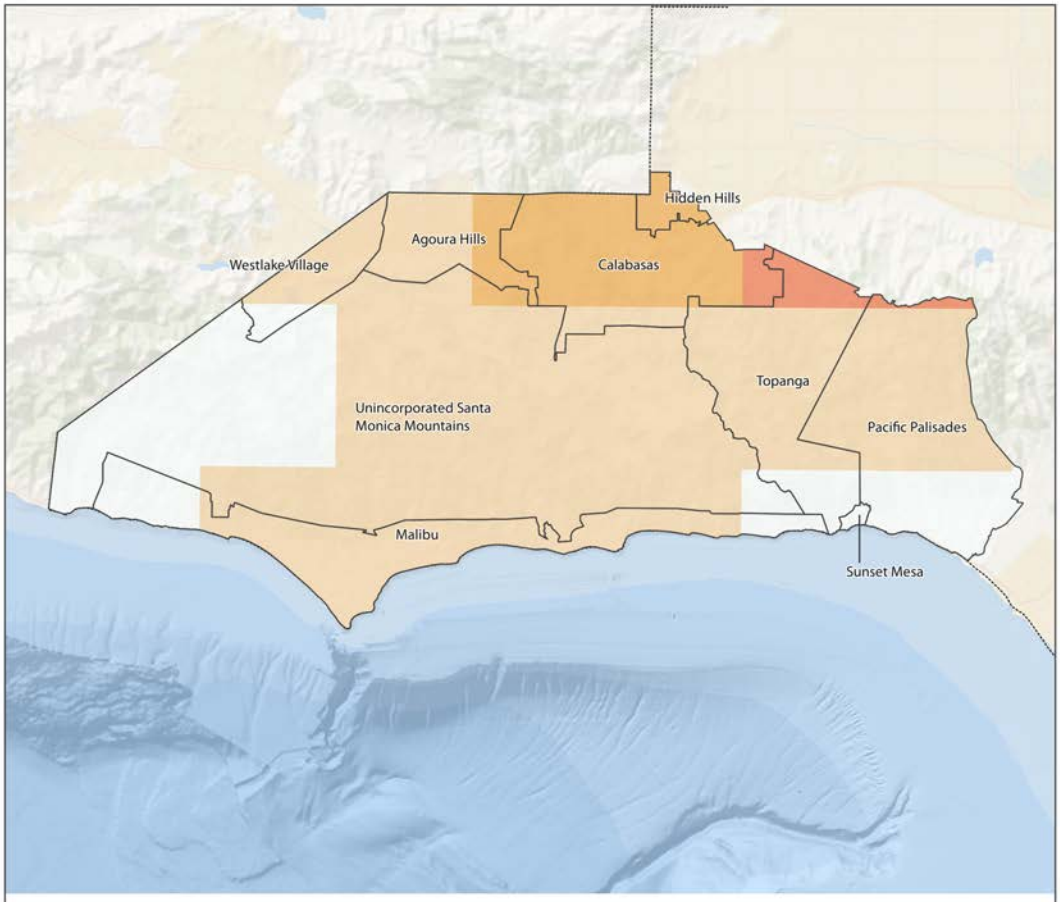
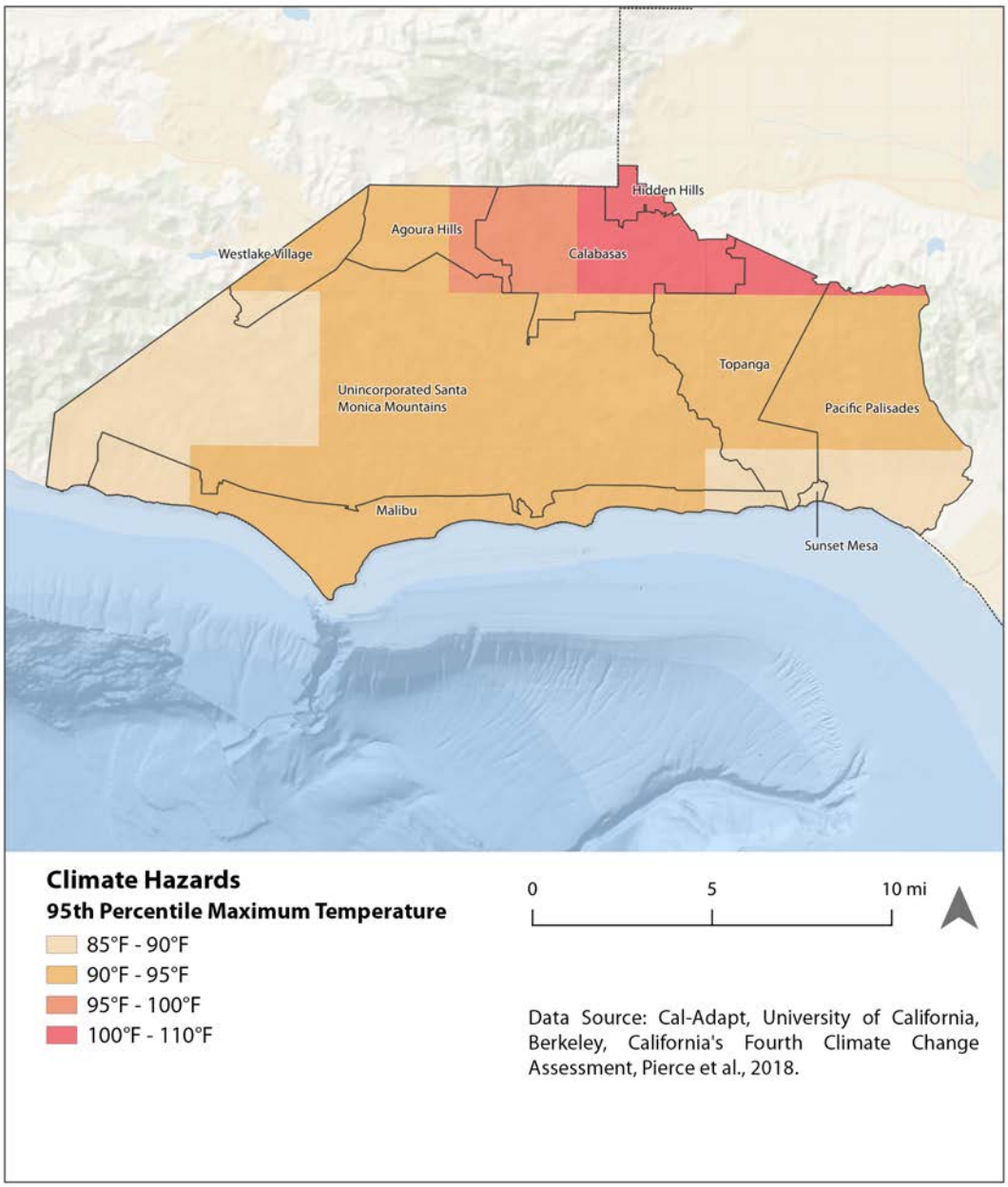


Figure 5

MID-CENTURY EXTREME HEAT

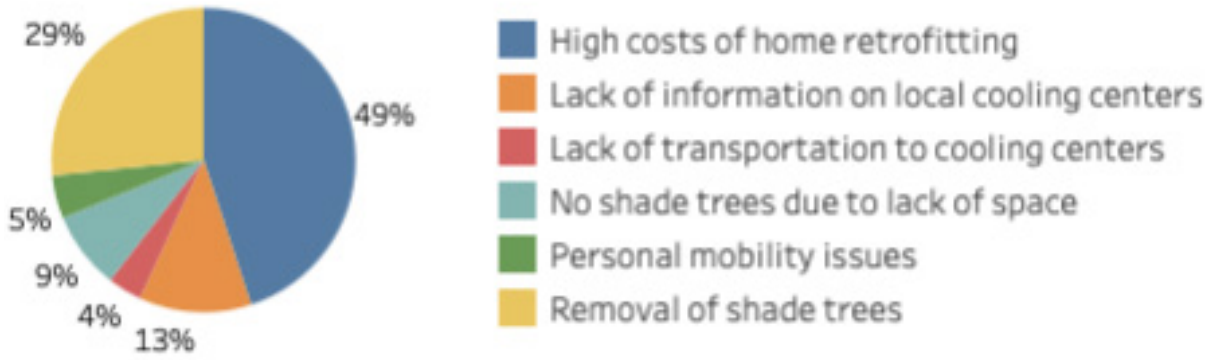


The Malibu Foundation's community survey provides a snapshot into how SMM WUI region residents are impacted by rising temperatures and extreme heat days. According to the survey, 70.5% of all respondents have experienced a heat emergency, defined as a period of high heat over 90°F for three days or more, more than twice a year. Thirty-two percent of respondents indicated that extreme heat is the factor of climate change that is most affecting them. Furthermore, 32% of all respondents have an underlying health condition that is impacted by extreme heat and 16% do not have adequate cooling in response to extreme heat. Most survey respondents (79%) have made changes in their lifestyle as a response to extreme heat.

Figure 6: **Key Challenges in Managing Extreme Heat** details the specific challenges facing residents in the region. Lifestyle changes required to address these challenges include staying indoors and staying hydrated, using an air conditioner, installing drought tolerant landscaping, finding a cooler outdoor space (including the beach), home retrofits, planting trees, and visiting a cooling center.

Figure 6

KEY CHALLENGES IN MANAGING EXTREME HEAT



RECOMMENDATIONS

for Extreme Heat Resilience

Target Audience

Individuals / Residents

- Take necessary precautions to protect yourself, your family, and your neighbors (especially older adults) from extreme heat:
  - Learn how to respond to heat-related illnesses.
  - Insulate home and weather-strip doors and windows.
  - Cover windows with drapes or shades.
  - Use a powered attic ventilator, or attic fan, to regulate heat level of a building's attic by clearing out hot air.
  - If the house is too hot, identify places to get cool such as libraries or shopping malls.
  - Install an energy efficient air conditioner if other heat reduction measures are inadequate.
  - If you are unable to afford your cooling costs, or energy-related home retrofits, contact the Low Income Home Energy Assistance Program (LIHEAP) for help.
  - Increase tree canopy coverage surrounding home.

Target Audience

Municipalities / Region

- Support tree planting and forest management efforts across the region.
- Integrate cool materials and shade into targeted areas to address urban heat island reduction.
- Create an extreme heat mitigation and response regional plan that identifies buildings that can serve as cooling centers, and expands existing programs through innovative initiatives such as pop-up cooling centers and new community partnerships.
- Create a regional buddy system to check on older adults and people with mobility challenges, and provide transportation and other assistance during extreme weather events.

CLIMATE HAZARDS ASSESSMENT

WILDFIRE

In California, 17 of the 20 largest wildfires on record have occurred in the past 17 years.[36]

As of August 2021, over two million acres burned in the state of California, and the state's most destructive wildfire season in history may only continue to worsen as long-term forecasts show little signs of relief.[37] A number of factors, exacerbated by climate change, contribute to the particularly fire-prone nature of the Santa Monica Mountains region, including the flammable native and non-native vegetation. the dry, arid, windy Mediterranean climate, and the mountainous landscape.

During the last century, fire patterns in California have been altered due to a range of factors including climate change, land use change, and legacies of fire management.[38] The ecosystems of Southern CA have not yet adapted to the increase in wildfire frequency, intensity and scale, threatening the ability of native species to recover. In particular, Chapparal, the dominant vegetation type across the region, is composed of native evergreen shrubs with thick, leathery leaves and stiff branches, and is particularly vulnerable to wildfires during the dry periods of the year.[39]

36 https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf

37 "Brutal fire season is still far from over," LA Times Sept. 9, 2021

38 Syphard, Keeley 2020

39 LA County Community Vulnerability Assessment (2021)

Over time, this undermining of native biodiversity can lead to long-term loss of native vegetation, expansion of invasive species (which contributes to soil erosion, clogged streams and increased flooding), and loss of essential habitat for native fauna.[40] Non-native vegetation poses additional problems as it is more flammable than native plants and trees.

The hot, dry climate combined with drought conditions and strong wind events create extremely dangerous wildfire conditions.[41] In addition, irregular weather patterns create ideal growing conditions for flammable local vegetation. Climate change is exacerbating the occurrence of these conditions as temperatures are continuing to increase and the periods of drought become more intense.[42] Future climate projections indicate that such weather patterns will occur more intensely, leading to greater wildfire risk.

Landscape features of the mountainous region also increase the risk for wildfires, particularly for the unincorporated areas of the Santa Monica Mountains, Topanga and Pacific Palisades. The steep, rugged mountain slopes and canyons, vertical walls with high-velocity winds, and chaparral brush contribute to creating ideal wildfire conditions. The SMM WUI region experiences wind dominated fires, as the wind spreads the fire embers quickly and unpredictably throughout the canyon landscape and which can cause fire to reignite.[43]

As indicated by *Figure 7:* **Fire Hazard Severity Zones**, CalFire's State Geoportal categorizes the entire SMM WUI region as a "Very High Fire Hazard Severity Zone." Federal, state, and local government agencies are responsible for fire protection and prevention in this region.[44] LA County's Climate Hazard Assessment also projects an increase in the number and size of wildfires in the region.

40 https://wildlife.ca.gov/Science-Institute/Wildfire-Impacts#:~:text=Atypically%20large%20patches%20of%20high,of%20essential%20habitat%20for%20native

41 *Fire Regime/History. (2018). National Park Service.* https://www.nps.gov/samo/learn/management/firehistory.htm

42 *Dennison, P. E., Moritz, M. A., & Taylor, R. S. (2008). Evaluating predictive models of critical live fuel moisture in the Santa Monica Mountains, California. International Journal of Wildland Fire, 17(1), 18-27.*

43 *JOURNAL OF THE CALIFORNIA NATIVE PLANT SOCIETY, MARCH 2020, VOL 47, NO 2*

44 https://lao.ca.gov/2005/fire_protection/051205_fire_protection.htm

Figure 7

FIRE HAZARD SEVERITY ZONES

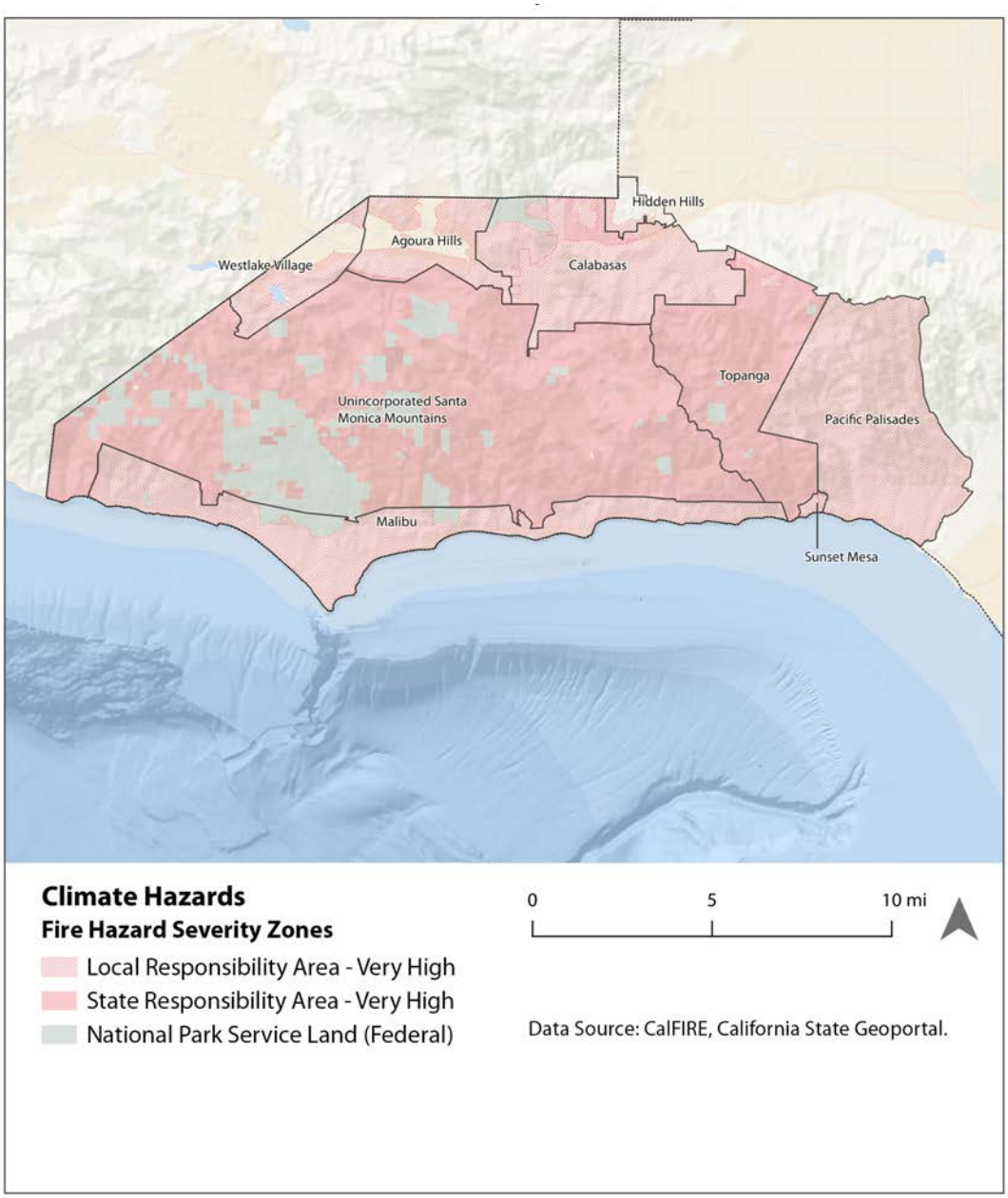
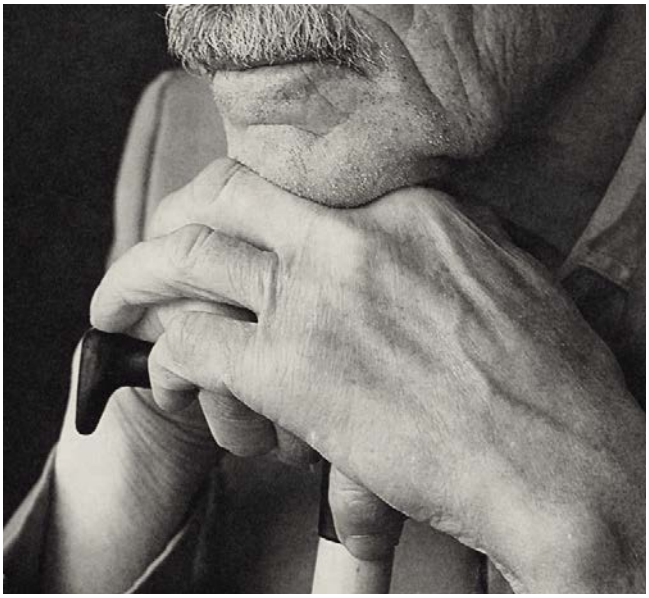


Figure 8: **Wildfire Risk to Potential Structures** demonstrates the wildfire risk to potential structures in the region. While all communities in the region have a measurable level of burn probability, the mountainous areas face a greater risk compared to coastal communities such as parts of Malibu, Sunset Mesa, and Pacific Palisades and flatter regions such as Agoura Hills and Hidden Hills.[45]

The Malibu Foundation's community survey provides a snapshot of how residents in the Santa Monica Mountains region have been impacted by and are responding to wildfire. Seventy percent of survey respondents identified wildfire evacuation as the top physical and/or social climate vulnerability they are most concerned about in the region. Fires pose the additional health threat of air pollution, even after the immediate threat of fire is gone.

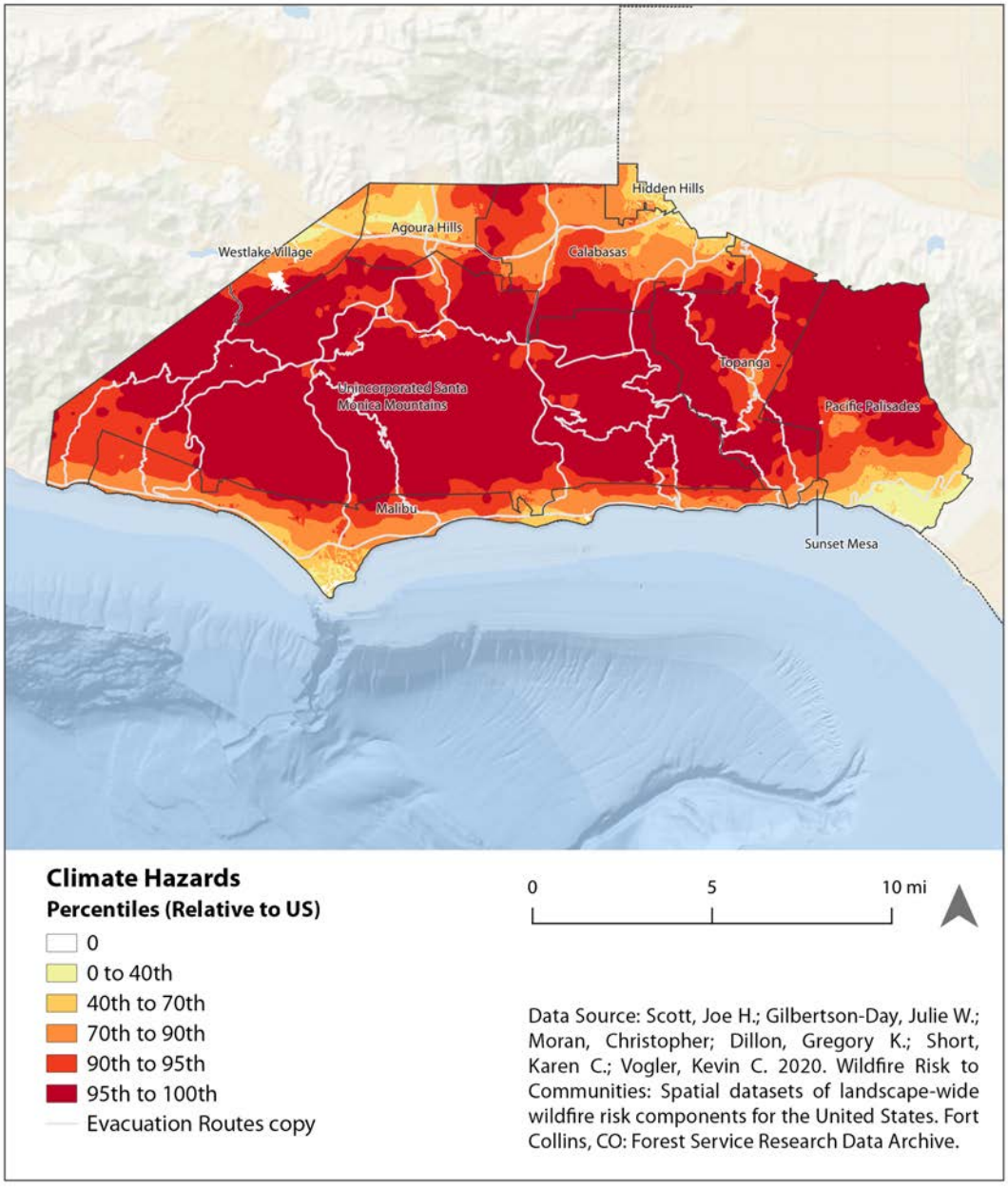


Eight percent of respondents aged 65 or older claimed they have physical disabilities that impede their ability to evacuate. When asked, "What are challenges you encounter with wildfire not covered in the previous questions?," 44% of respondents indicated that the cost of home hardening (upgrading homes with more fire resistant features) was their biggest challenge associated with wildfire preparedness. "Cost or unavailability of insurance" was identified as the second-biggest challenge for survey respondents. Only 15% of respondents rate themselves as "excellent" in their ability to recover economically from a major disaster, including fire.

45 *Scott, Joe H.; Gilbertson-Day, Julie W.; Moran, Christopher; Dillon, Gregory K.; Short, Karen C.; Vogler, Kevin C. 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

Figure 8

WILDFIRE RISK TO POTENTIAL STRUCTURES



THE MOST CONCERNING CLIMATE IMPACT

Among survey respondents 65 or older, 54% deemed **wildfire** as the most concerning climate impact, and more than half (57% and 52%) ranked air quality and access to water for fighting fires as the region's second and third most concerning vulnerabilities related to wildfire.

RECOMMENDATIONS

for Wildfire Resilience

Target Audience

Individuals / Residents

- Prepare your home by creating a defensible space and hardening your home against flying embers. *See Appendix C for fire resistance strategies.*
- Create an evacuation plan with your household and community and evacuate early in the event of a fire.
- Refer to local emergency guides. *See Appendix A: Resources for Climate Resilience.*
- Sign up to emergency alert systems such as Alert LA County and Everbridge Disaster Mass Notification System.
- Assist vulnerable individuals in community with evacuating
- See CalFire's "Ready, Set, Go!" Preparedness Tools & Checklists

Target Audience

Municipalities / Region

- Invest in regular and ongoing education on home hardening, maintaining defensible space, and vegetation management
- Strengthen utilities and infrastructure Work with Southern California Edison to underground the utilities and establish microgrids to ensure energy resilience during fire events.
- To lessen the power and destructiveness of wildfires and improve ecosystem health and resiliency, conduct prescribed (controlled) fires to reduce flammable fuels (such as non-natives and dead brush).
- Create strategic placement of fuel breaks to provide firefighters with safe access while fighting fires.

Recommendations for Wildfire Resilience

Target Audience

Municipalities / Region

- **Reduce potential ignition factors:**
  - Discourage further development in vulnerable mountainous area.
  - Remove flammable and dead vegetation.
  - Provide grant funding and other incentives for those in need of support for creating defensible space and vegetation management
  - Place power lines underground. While costly, in high wind areas, placing power lines underground has proven to reduce power outages and the spread of wildfires.

- **Increase fire resistance of housing and other structures:**
  - Establish comprehensive fire retrofit regulations across region.
  - Conduct annual home hardening inspections to identify potential wildfire risk.
  - Provide financial support for low-income homeowners and renters.
  - Improve the availability and affordability of home insurance for lower-income residents.
  - Enact stringent “fire zoning” laws to limit the development of new houses and re-building in significantly fire prone areas.

- **Strengthen disaster-related information dissemination:**
  - Ensure that notifications about wildfire disasters are reliable and accessible to all populations.
  - Understand the information-seeking preference of the senior population to keep them informed.
  - Establish central information dissemination to avoid information distortion during the transmission process, including a mobile application that can provide the community with authorized information during the wildfire emergencies.

- **Foster cross-sectional cooperation:**
  - Cooperate with public schools and other public sectors to improve the evacuation process. Public schools can serve as aftermath evacuation centers.
  - Coordinate with the private sector to facilitate the restoration process.
  - Cooperate with non-profit organizations and wildfire groups to conduct education programs for the local community.

- **Minimize air pollution impact:**
  - Provide personal protective equipment (PPE) such as face coverings to residents.
  - Establish a “fresh air zone” for those who cannot access air purification.
  - Conduct education programs to educate people about effective measures for coping with the post-wildfire air pollution.

CLIMATE HAZARDS ASSESSMENT

EXTREME PRECIPITATION AND FLOODING

According to the Environmental Protection Agency (EPA), nine of the top ten years for extreme single-day precipitation events ever recorded have occurred since 1996.

Since 1910, the portion of the country experiencing extreme single-day precipitation events has increased at a rate of about half a percentage point per decade.[46]

Rainfall patterns in California are expected to change in the near future with increasingly dry summers and wetter winters. Precipitation events will become more extreme as they will occur during shorter time periods that follow periods of very dry weather.[47] Extreme precipitation presents a danger to the mountainous region because increases the susceptibility to severe flooding and mudslides. The snowpack that builds up during the winter in the Sierra Nevada Mountains is critical as a water resource for southern California. When storms that used to bring snow are now bringing rain, this can lead to unprecedented severe flooding in the winter and exacerbate drought conditions in the spring and summer." [48]

46 https://www.epa.gov/climate-indicators/climate-change-indicators-heavy-precipitation

47 LA County Community Vulnerability Assessment (2021)

48 *Associated Press, "1-in-100 year floods happening so often, the term may change," August 5, 2021.*

Figure 9

BASELINE PRECIPITATION

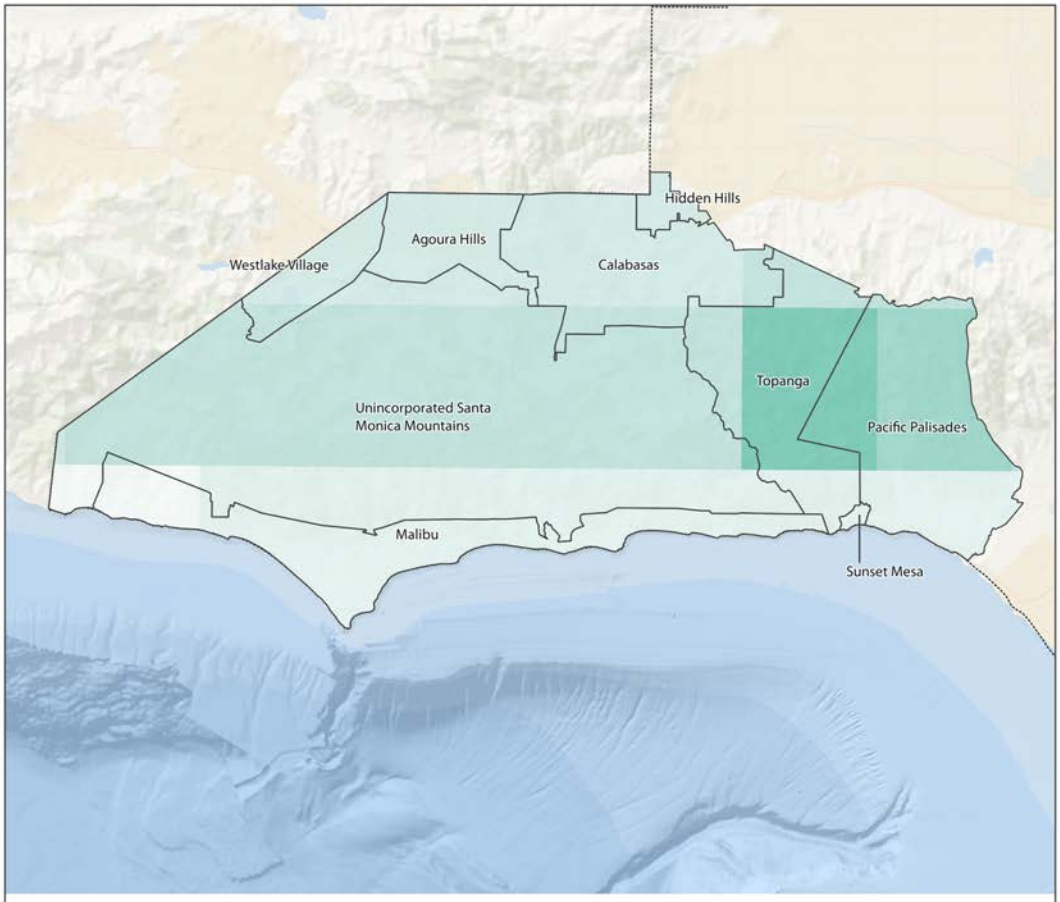


Figure 10

MID-CENTURY PRECIPITATION

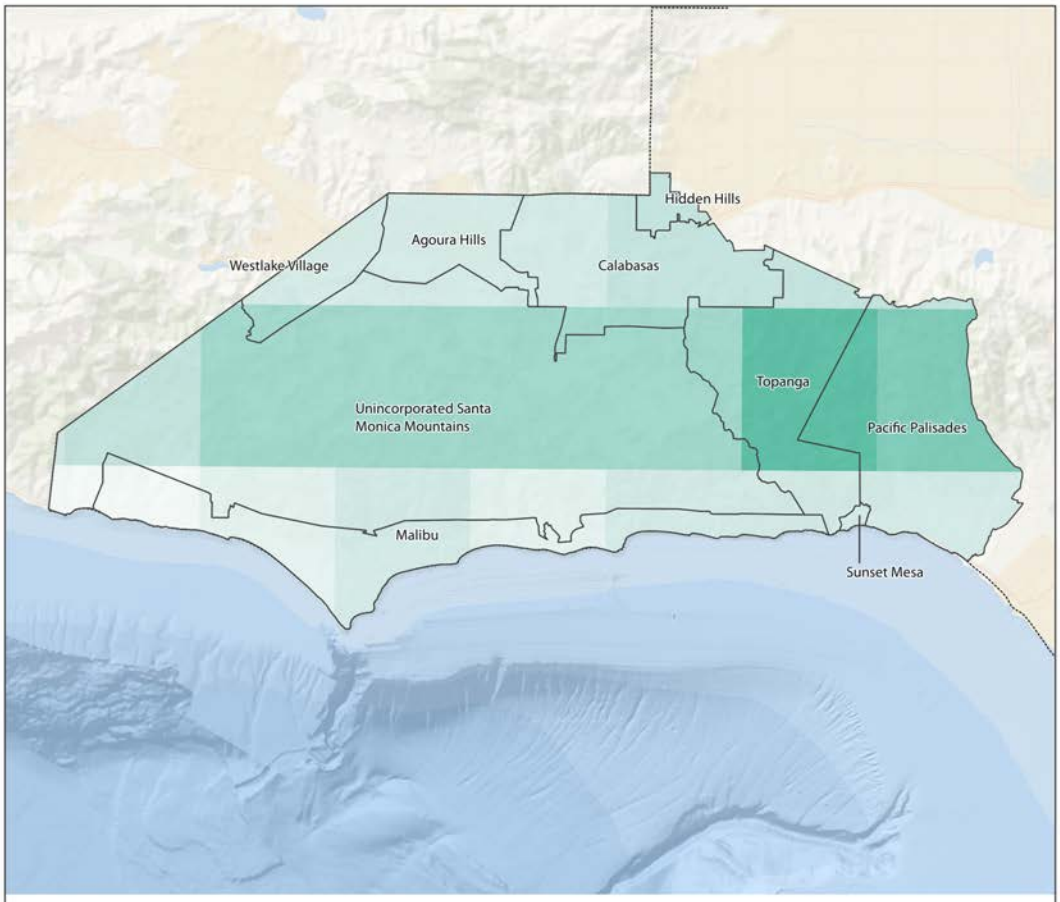


Figure 9: **Baseline Precipitation** and *Figure 10:* **Mid-Century Precipitation** illustrate how the maximum precipitation of the 95th percentile is expected to change in the SMM WUI region by mid-century when compared to the baseline precipitation.[49] The darker green band through the middle of the region reveals that precipitation levels are expected to increase most significantly in the Topanga, Pacific Palisades, and unincorporated areas of the Santa Monica Mountains in the higher elevation areas, while pockets of the of Calabasas and the City of Malibu are also projected to have increases in extreme precipitation events.

Flooding can have severe impacts on the life and property of communities. In addition to submerging dry land, flooding can trigger landslides that cause extensive physical damage and take considerable effort to recover from. Debris transported by floodwaters can directly damage critical infrastructure such as roads, water and sewage pipelines, electricity, and telecommunications facilities. Flooding can also pollute reservoirs and groundwater which poses a threat to the public health of the community.[50]

Flash flooding occurs when there is intense rainfall after a dry period. Areas that are prone to flash flooding include low-lying areas where heavy rainfall collects, areas within river floodplains or next to drainage systems, and areas that have inadequate storm drain infrastructure.[51] Heavy rainfall in areas where there are poor drainage conditions can also cause localized flooding. It is expected that inland flooding will increase in the coming years because of predicted increases in heavy precipitation. The Federal Emergency Management Agency (FEMA) produces and maintains Flood Insurance Rate Maps (FIRMs) that identify flooding hazard zones.[52]

49 *The baseline is based on a 30-year average from 1976-2005, and the mid-century estimate range is the years 2035-2064.*

50 *Andrade, L., O'Dwyer, J., O'Neill, E., & Hynds, P. (2018). Surface water flooding, groundwater contamination, and enteric disease in developed countries: A scoping review of connections and consequences. Environmental pollution, 236, 540-549.*

51 *LA County Community Vulnerability Assessment (2021)*

52 *Flood Maps. (2021). Federal Emergency Management Agency (FEMA). https://www.fema.gov/flood-maps#*

Figure 11

FEMA FLOODPLAIN HAZARD ZONES

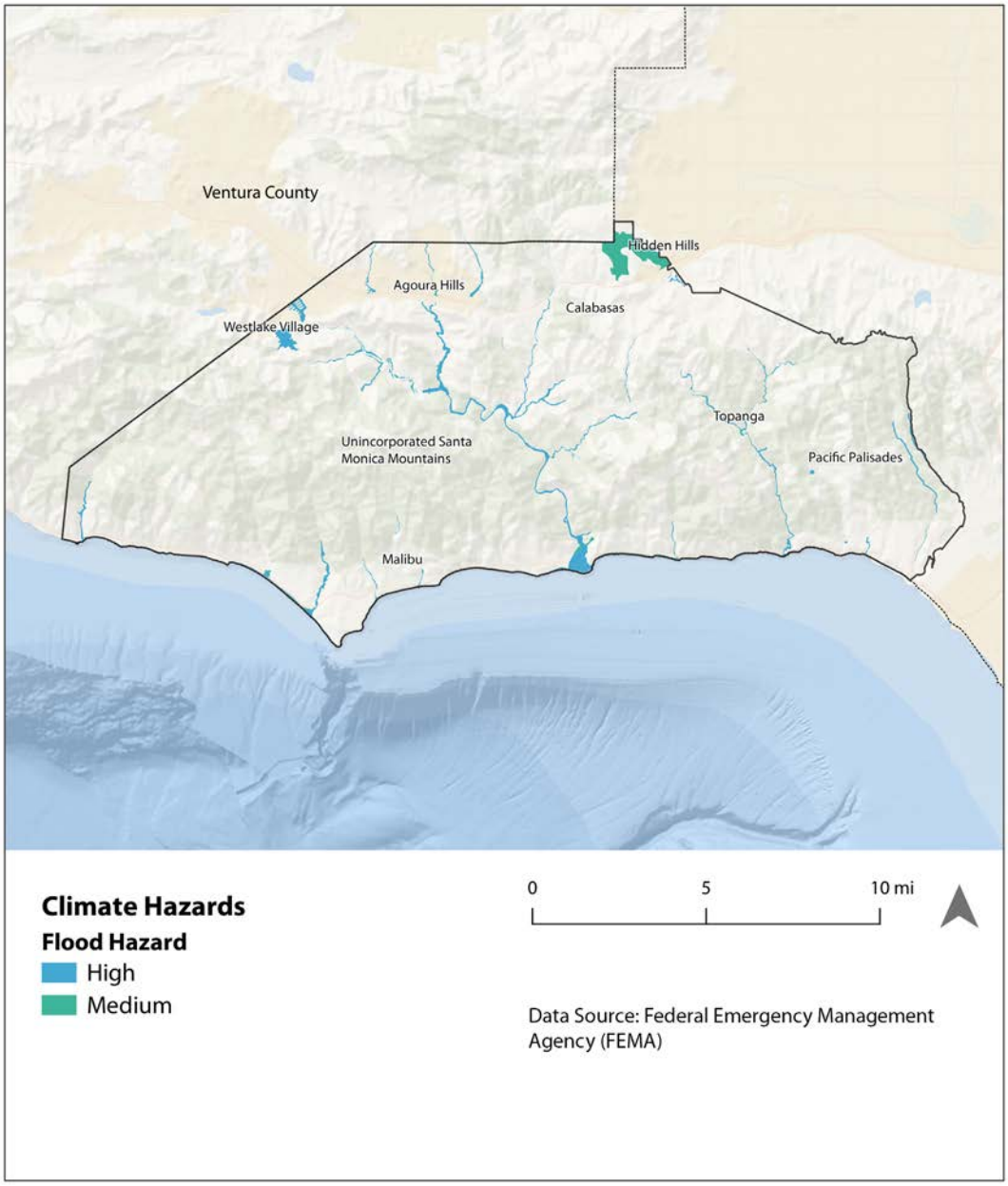
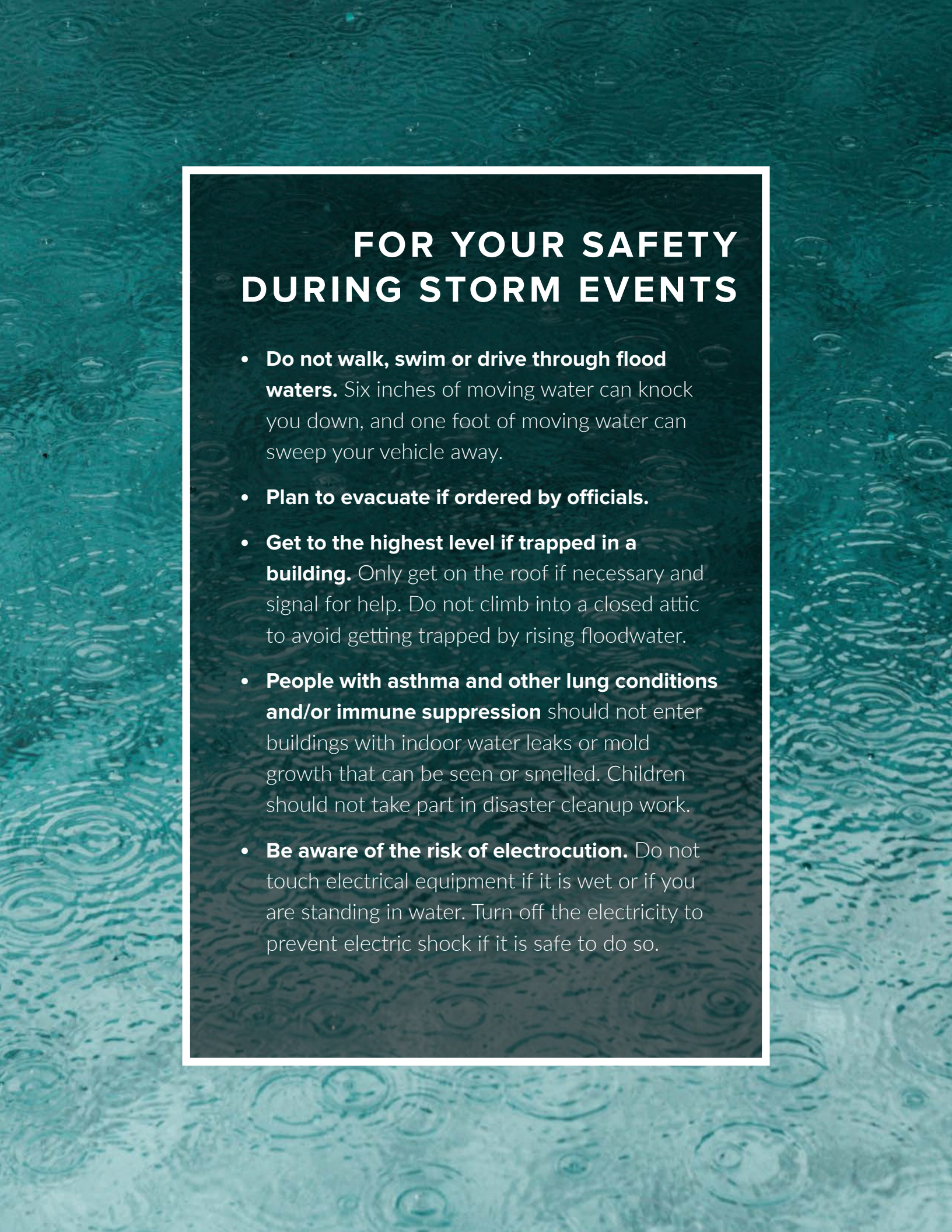


Figure 11: **FEMA Floodplain Hazard Zones** shows areas of the SMM region that have a medium or high risk of flooding. The blue areas are within the 100-year floodplain that have a 1% annual probability of flooding while the green areas are within a 500-year floodplain or have a 0.2% annual chance of flooding. As seen on the map, the high-risk areas in blue include the Creek basins: Malibu Creek and Malibu Lagoon, Topanga Creek, Rustic Creek, Santa Monica Creek, Potrero Valley Creek, Medea Creek; the Lake basins: Malibu Lake, Las Virgenes Reservoir, Westlake Lake; and Low-lying areas: Zuma Canyon, Southeast part of Mulholland Highway, Lindero Canyon Road/ Kanan Road/ Chesebro Road of Agoura Hills.[53] The medium risk areas in green include most low-lying areas of Hidden Hills. The parts of the region that are at a greater risk for flooding should further assess the potential impacts and their adaptive capacities. According to Cal-Adapt projections, the maximum precipitation of the 95th percentile will significantly increase by mid-century.[54] It is important to note that FEMA maps are historical and do not include future climate projections. Therefore, future risk is likely greater than what is shown here.

According to the Malibu Foundation's survey of the SMM region community, seventy-five percent (75%) of survey respondents indicated they had never experienced a flood emergency, while only 11% of respondents have experienced more than one flood emergency. Nonetheless, parts of the SMM region, primarily along the creek and lake basins, and low-lying areas, are at enough risk of flooding to warrant taking mitigation measures. Furthermore, the immense destruction that can occurs from floods make even a moderate risk something to take very seriously.

53 *Federal Emergency Management Agency (FEMA) Flood Maps (2021)*

54 *Pierce, D. W., Kalansky, J. F., & Cayan, D. R. (2018). Climate, drought, and sea level rise scenarios for California's fourth climate change assessment. California Energy Commission and California Natural Resources Agency.*



FOR YOUR SAFETY DURING STORM EVENTS

- **Do not walk, swim or drive through flood waters.** Six inches of moving water can knock you down, and one foot of moving water can sweep your vehicle away.
- **Plan to evacuate if ordered by officials.**
- **Get to the highest level if trapped in a building.** Only get on the roof if necessary and signal for help. Do not climb into a closed attic to avoid getting trapped by rising floodwater.
- **People with asthma and other lung conditions and/or immune suppression** should not enter buildings with indoor water leaks or mold growth that can be seen or smelled. Children should not take part in disaster cleanup work.
- **Be aware of the risk of electrocution.** Do not touch electrical equipment if it is wet or if you are standing in water. Turn off the electricity to prevent electric shock if it is safe to do so.

RECOMMENDATIONS

for Resilience to Extreme Precipitation and Flooding

Target Audience

Municipalities / Region

- **Mitigate risks to key infrastructure from floods and landslides including:**
  - Assess the vulnerability to floods of transportation networks and infrastructure in flood-prone areas.
  - Improve the storm drainage system in flood-prone areas.
  - Integrate climate resilient design into infrastructure and building design in at-risk areas to reduce the impact when flooding occurs.
  - Support efforts to develop local flood models/ projections that incorporate future climate change conditions, and to better understand potential future vulnerability to inland flooding.

- **Apply modern flood management strategies, including:**
  - Integrate floods into overall water management.
  - Take advantage of floodwaters to restore wetlands and river corridors while reducing the intensity of floods.
  - Use floodwaters to recharge aquifers and improve the quality of surface water supplies.

CLIMATE HAZARDS ASSESSMENT

LANDSLIDES

Landslides, also referred to as debris flows, occur when there is a mass movement of rock, debris, or earth down a slope.

Landslides are often caused by flooding on slopes that are already on the verge of movement due to rainfall, snowmelt, changes in water level, stream erosion, changes in groundwater, earthquakes, volcanic activity, disturbance by human activities, or any combination of these factors.[55]

During periods of intense rainfall, surface erosion and land sliding can generate sudden and highly damaging debris flows that not only can damage or destroy homes and critical infrastructure but block roadways and evacuation routes.[56] [57] Since landslides are primarily precipitation induced events, the increasing frequency of heavy rainfall and flooding due to climate change therefore significantly increases the risk for landslides in the SMM region.[58]

See *Figure 12:* **Seismic Hazards – Landslide Zones**

55 *United States Geological Survey (USGS). 2021. "What is a landslide and what causes one?" www.usgs.gov. Retrieved from: https://www.usgs.gov/faqs/what-a-landslide-and-what-causes-one?qt-news_science_products=0#qt-news_science_products*

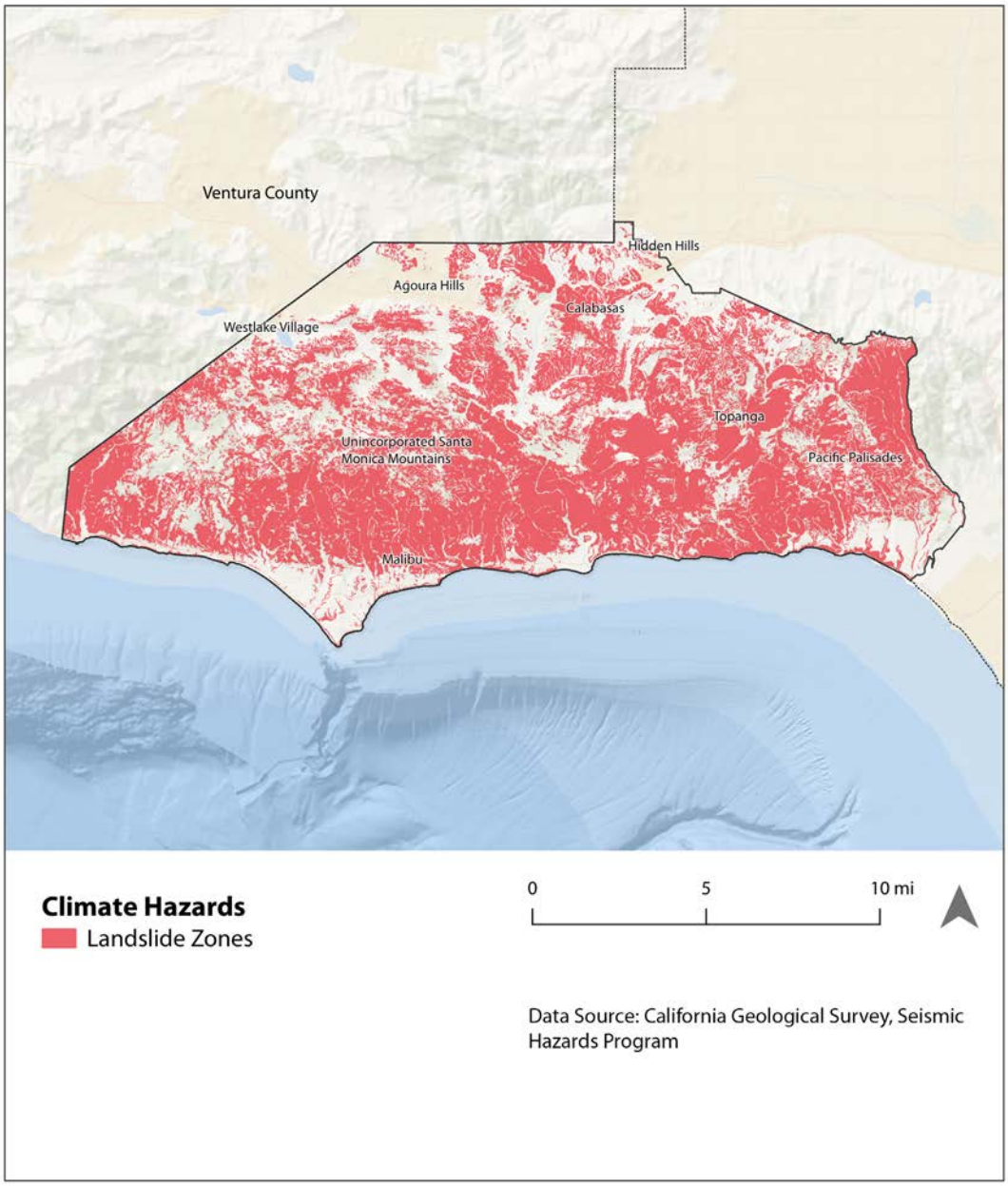
56 *De Graff, J. V., Shelmerdine, B., Gallegos, A., Annis, D., 2015. Uncertainty associated with evaluating rockfall hazard to roads in burned areas. Environ. Eng. Geosci. 21, 21–33. https://doi.org/10.2113/gseegeosci.21.1.21*

57 *Elliott, J.G., Smith, M.E., Friedel, M.J., Stevens, M.R., Bossong, C.R., Litke, D.W., Parker, R.S., Costello, C., Wagner, J., Char, S.J., Bauer, M.A., Wilds, S.R., 2004. Analysis and mapping of post-fire hydrologic hazards for the 2002 Hayman, Coal Seam, and Missionary Ridge Wildfires, Colorado. US Geol. Sci. Investig. Rep. 5300, 1–109.*

58 *Moody, J.A., Shakesby, R.A., Robichaud, P.R., Cannon, S.H., Martin, D.A., 2013. Current research issues related to post-wildfire runoff and erosion processes. Earth-Science Rev. 122, 10–37. https://doi.org/10.1016/j.earscirev.2013.03.004*

Figure 12

SEISMIC HAZARDS – LANDSLIDE ZONES



Landslides that occur due to flooding are more dangerous in areas where landslide zones and floodplains overlap. As the Seismic Hazards map illustrates, most of the SMM WUI region is a landslide zone. The highest-risk landslide zone areas are along the creek basins that flow through the valley terrain of the mountains and in Hidden Hills where most of the city is at a medium flood hazard.[59] The majority of the built environment in the region is at risk of landslides, especially those areas in flood-prone regions, primarily Hidden Hills and Topanga. Overall, the most vulnerable area in the region is Topanga. The communities in the region with the least vulnerability to landslide risks are Agoura Hills and Westlake Village.

Landslides are also more likely in areas with sparse vegetation due to the lack of root networks holding the soil together. This means that vegetation loss due to more frequent wildfires puts the SMM WUI at even greater risk of landslides, also called post-wildfire debris flows. Furthermore, areas where debris flows have occurred in the past are more likely to experience them in the future. For example, the 1996 "Old Topanga Fire" was followed by a storm that brought three inches of rain into the Topanga Canyon watersheds. The resulting debris flow closed PCH for three days and destroyed several structures.[60]

Figure 13: **Post Wildfire Debris Flow – Woolsey Fire** map illustrates the probability of debris flows following extreme rain events in the areas burned in the 2018 Woolsey Fire.

Earthquakes can also trigger landslides (even in the absence of heavy rainfall and flooding).[61] The intensity of the landslide depends on the strength of the earthquake which can cause different kinds of sliding, ranging from rockslides due to weak shaking to highly disrupted soil avalanches.[62] Regardless of whether the landslide is triggered by an earthquake, heavy rain, flooding or some combination, the damage they can cause to property and human life is severe and the risk of their occurrence in the SMM WUI increases as the climate continues to change.

59 *Federal Emergency Management Agency (FEMA) Flood Maps (2021). https://www.fema.gov/flood-maps#*

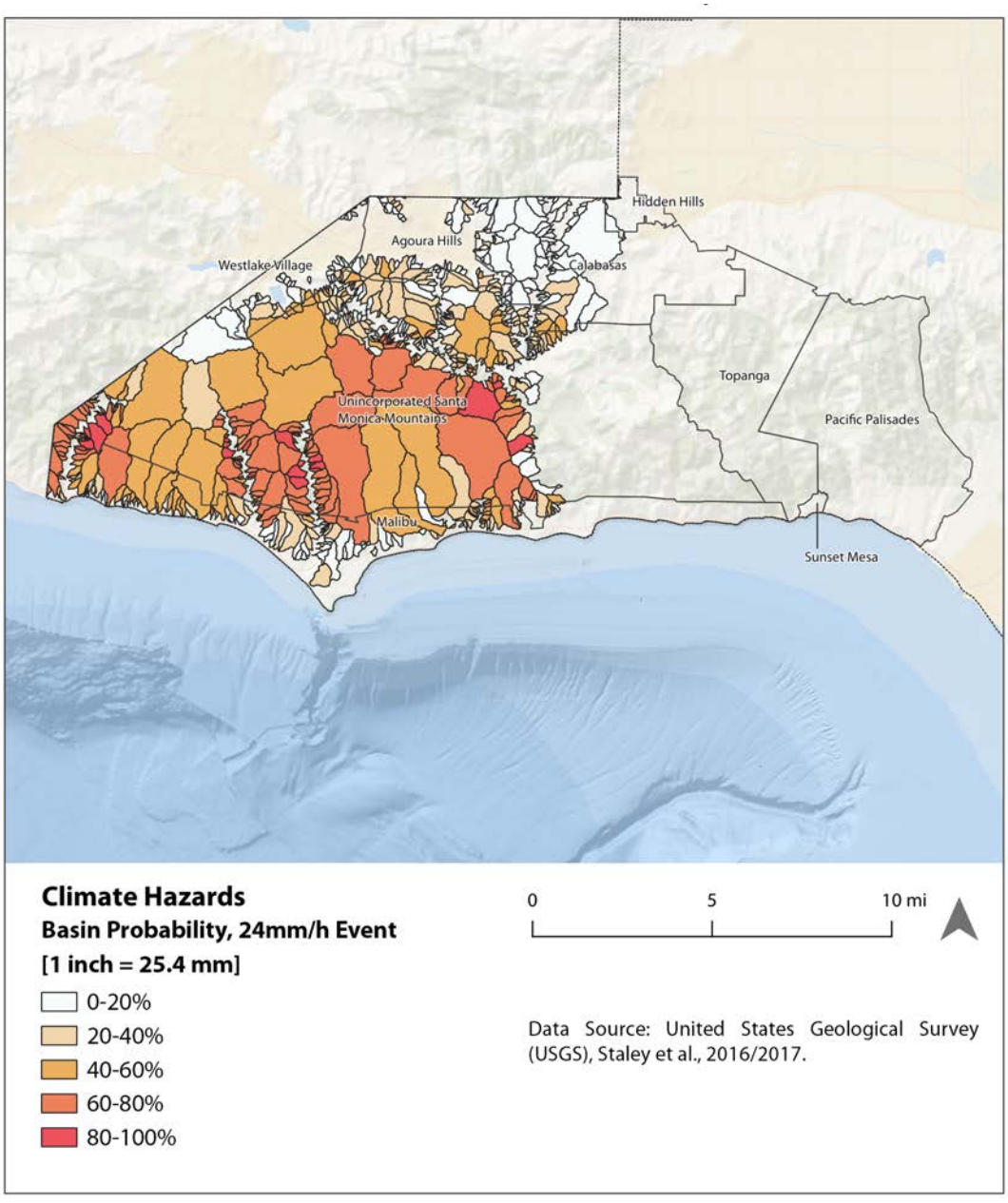
60 *Woolsey and Hill Fires Watershed Emergency Response Team Final Report. (2018). https://www.waterisac.org/system/files/articles/WERT%20Report%20-%20Woolsey%20and%20Hill%20Fires.pdf*

61 *Marui, H. (2017). EARTHQUAKE-INDUCED LANDSLIDES-AN OVERVIEW AND MITIGATION MEASURES OF DISASTERS CAUSED BY THEM.*

62 *Keefer, D. K. (1984). Landslides caused by earthquakes. Geological Society of America Bulletin, 95(4), 406-421.*

Figure 13

POST WILDFIRE DEBRIS FLOW – WOOLSEY FIRE



RECOMMENDATIONS

for Landslide Resilience

Target Audience

Individuals / Residents

- Be conscious of landslide and debris-flow risk when buying a home or property.
- Make a disaster supply kit and have a family emergency plan.
- Become familiar with the land around you; learn whether debris flows have occurred in your area by contacting local officials — slopes where debris flows have occurred in the past are likely to experience them in the future.
- Get a ground assessment of your property.
- Consult a professional for advice on appropriate preventative measures for your home or business, such as flexible pipe fittings, which can better resist breakage.
- Protect your property by planting ground cover on slopes and building retaining walls.
- In mudflow areas, build channels or deflection walls to direct the flow around buildings, but be aware, if you build walls to divert debris flow and the flow lands on a neighbor's property, you may be liable for damages.
- If your residence is at risk from a landslide, talk to your insurance agent — debris flow may be covered by flood insurance policies from the National Flood Insurance Program (NFIP).

Recommendations for Landslide Resilience

Target Audience

Municipalities / Region

- **Establish restrictions on land development**
  - New land uses and alterations of the land purpose within flood-prone areas should include sufficient measures identified by experts to mitigate flooding and landslide risk.
  - New developments should consider designing on-site drainage systems linked to the storm drainage system of the city.
  - Geological investigation and evaluations should be required for all proposed hillside developments.

- **Update disaster evacuation plans and ensure they are distributed to residents**
  - Develop and update hazard-risk maps for each hazard including floods and landslides.
  - In addition to close connections between SMMR regions, evacuation plans linked to nearby areas such as Ventura County should be established and updated periodically.

- **Support Vulnerable populations**
  - Support vulnerable groups to secure mobility measures and communication tools in responding to disasters. Establish a targeted mobile support plan, and assess existing shuttles and public transit that can be rerouted during emergency events to serve as emergency transit as well as mobile cooling centers.

CLIMATE HAZARDS ASSESSMENT

SEA LEVEL RISE

Sea Level Rise (SLR) is one of the most widely known threats of rising global temperatures from climate change. The increase in ocean volume is caused by melting glaciers and the thermal expansion of water that happens as ocean temperatures increase. Besides the obvious concern of low elevation properties on the coast becoming submerged, SLR also aggravates storm surges which can cause rising tides and water inundation of coastal areas. Higher sea levels are also associated with increased flooding and shore erosion, and can result in saltwater intrusion into freshwater supplies and toxic contamination.[63] According to the California Legislative Analyst's Office (LAO), SLR can negatively impact public infrastructure, private property, vulnerable communities, natural resources, and water supply leading to a multitude of economic disruptions.

Figure 14: **California Sea Levels are Projected to Rise Significantly** presents a visual of LAO's statewide prediction. In California, SLR is predicted to reach between 0.6 and 0.9 feet by 2030, and an estimated $8 billion in property could be underwater by 2050, with an additional $10 billion at risk during high tides.[64] The US Geological Survey report predicts between one-third and two-thirds of southern California beaches could be severely eroded by the end of the century.[65]

63 https://ocean.weather.gov/defining_storm_surge.pdf

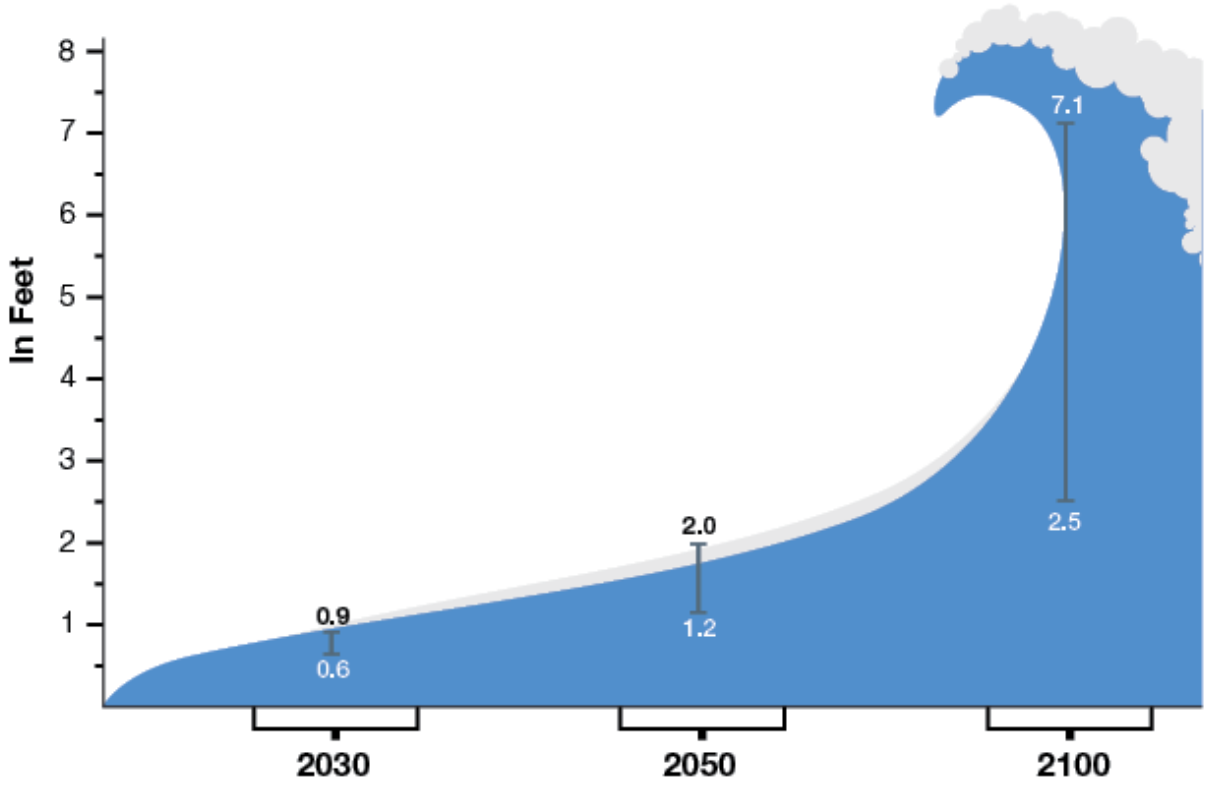
64 https://lao.ca.gov/Publications/Report/4261

65 https://la.curbed.com/2020/4/22/21230250/sea-level-rise-malibu-california

Figure 14

CALIFORNIA SEA LEVELS

are Projected to Rise Significantly



Note: Range of projected sea-level rise scenarios for San Diego from the State of California Sea-Level Rise Guidance Document. Estimates represent the range between "likely" scenarios (66 percent chance of occurring) and scenarios with a 1-in-200 chance of occurring.

LAO

The coastlines of Malibu, Topanga and the Pacific Palisades are highly susceptible to coastal flooding and erosion.[66] SLR is already impacting this coastal area in the form of extreme high tides and storm runoff at higher rates compared to previous years. Local residents are already experiencing the effects of SLR as beach areas have diminished over recent years. The continuing rise in the ocean's volume will increasingly threaten coastal residential and commercial properties, roadways, and public electrical and water infrastructure from increasing high tides and storm surges. Caltrans predicts parts of Pacific Coast Highway within Malibu, Topanga, the Pacific Palisades, may be underwater by the end of the century.[67]

Sea level rise projections are not exact, but rather are presented in ranges based on different scenarios which examine the consequences of various sea level rise amounts, as well as the resulting extreme water levels from storms and El Niño events. The goal of the scenario-based analysis of SLR is to understand where and at what point the sea levels rise and how the combination of SLR and storms pose risks to coastal resources that potentially threaten the health and safety of a developed area.[68]

To understand the implications of SLR the 2021 Los Angeles County Climate Vulnerability Assessment utilized the Coastal Storm Modeling System (CoSMoS) data to create SLR projections to demonstrate how the geography and infrastructure of the region could be affected in the event of a 0.75- and 2.0-meter SLR with a 100-year storm event. A 2.0-meter sea level rise and a 100-year storm event is typically used for late-century impacts. Overlaying this data by parcel/property boundaries with each coastal flooding hazard layer allows us to observe the location, number, and type of properties that are likely to experience flooding during a 0.75 meter and/or 2.0-meter sea level rise and 100-year storm.

66 https://pepperdine-graphic.com/sea-level-rise-and-its-impact-on-coastal-cities-like-malibu/

67 https://www.documentcloud.org/documents/6843469-Caltrans-Report#document/p28

68 https://documents.coastal.ca.gov/assets/slr/guidance/2018/0_Full_2018AdoptedSLRGuidanceUpdate.pdf

Figure 15

COASTAL FLOODING HAZARD

Sea Level Rise & 100-Year Storm

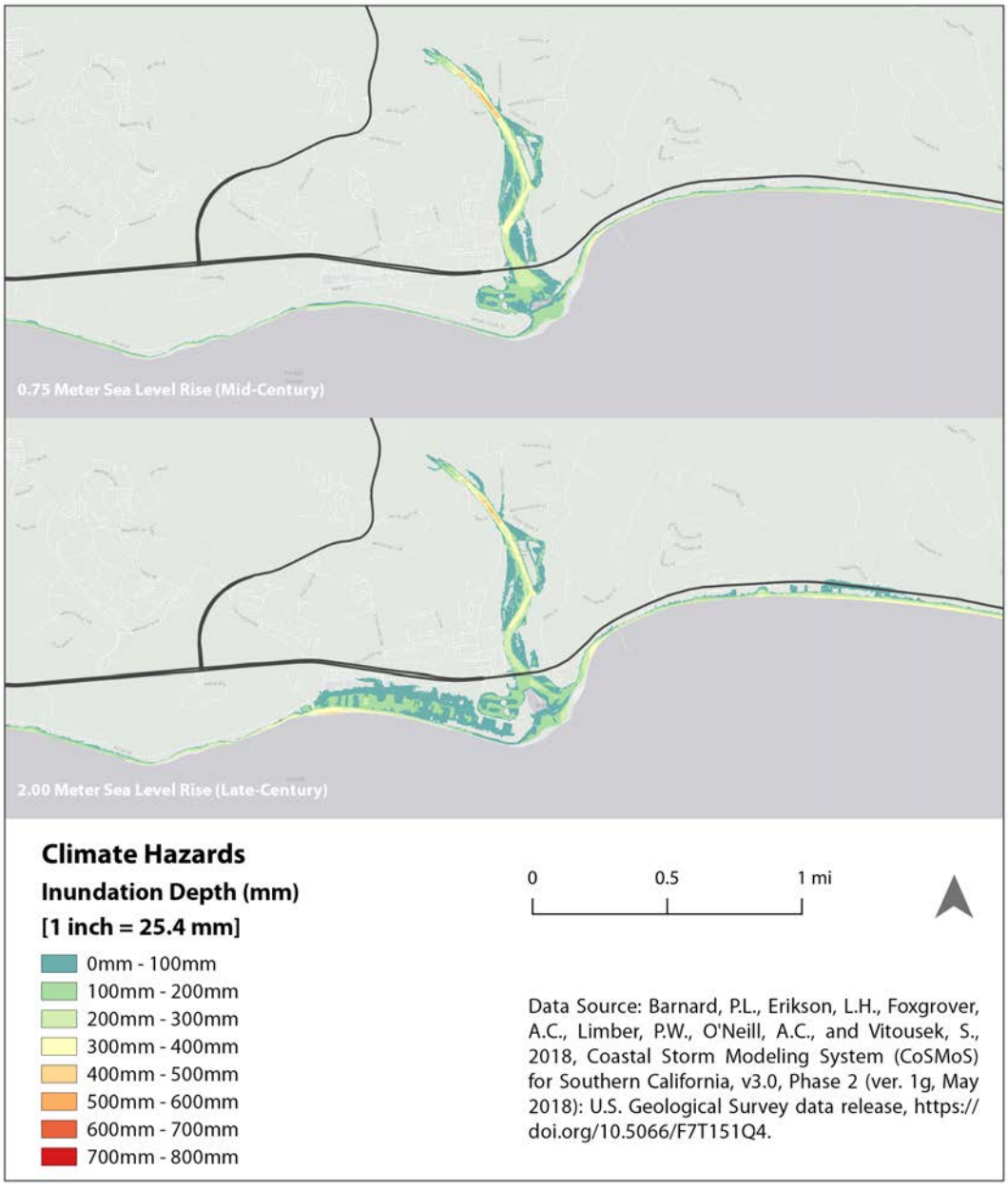


Figure 15: **Coastal Flooding Hazard – Sea Level Rise & 100-Year Storm** represents the potential inundation depth in the event of a 0.75-meter SLR and a 2.0-meter sea level rise. In the 2.0-meter SLR scenario, a large portion of the coast could be inundated with up to 400 mm (15.75 inches) of water. Both scenarios give rise to increased water levels that could result in a loss of a significant amount of infrastructure, especially in the Malibu Civic Center area, around the Pier and the adjacent commercial area, as well as further inland along Malibu Creek.

Figure 16: **Properties likely to be Impacted by Sea Level Rise** utilizes two coastal flooding scenarios to predict the number of properties by sector expected to be inundated from Zuma Beach in Malibu to the Pacific Palisades.

Figure 16

PROPERTIES LIKELY TO BE IMPACTED BY SEA LEVEL RISE

General Use	0.75 SLR and 100-Year Storm	2.00 SLR and 100-Year Storm
Commercial	30	44
Industrial	2	2
Miscellaneous	86	88
Recreational	4	8
Residential	1,520	1,607
Total	**1,642**	**1,749**

With a 0.75-meter sea level rise there could be a total of 1,642 properties damaged, while a 2-meter sea level rise could result in 1,749 damaged properties. In either scenario, over 90% of the properties damaged would be residential. With either scenario, it appears that infrastructure in the Malibu region is at extreme risk.

In addition to the potential loss of property, a significant economic issue directly linked to sea level rise for Malibu, Topanga, and the Pacific Palisades is the region's dependency on beaches and coastal assets for tourism and other economic developments.[69] As the shoreline is rapidly receding, visitor numbers are beginning to drop.[70] Beach nourishment, such as sand replenishment, is costly and only temporarily helps to preserve the beaches for a season. The installation of groins, jetties, and breakwaters have been considered. However, these interventions may result in larger amounts of erosion of the surrounding beach areas. In some areas of Southern California sea walls have been constructed, resulting in an increase in the erosion of neighboring beaches. The construction of seawalls is controversial and has been banned in multiple states including Maine and Oregon.[71]

Broad Beach, Malibu, a popular tourist destination, has already lost two-thirds of its beach property.[72] Additionally, as recently as August 2020, big swells and high tides have washed away portions of Westward Beach Road near Zuma Beach and inundated the beach volleyball area. The LA County Department of Beaches and Harbors placed boulders in the area in hopes of preventing further damage. The road will remain closed indefinitely during remediation efforts, and may no longer be considered safe for visitor access.[73]

Like Malibu, the Pacific Palisades and Topanga are also facing extreme challenges due to SLR, including adaptation and engineering challenges related to their highly vulnerable wastewater management and potable water systems. Erosion caused by flooding from SLR can also impede emergency services and evacuations.[74] The location of the primary roadway for all three communities, PCH, is highly vulnerable to SLR, as there are few options to divert traffic when water inundation renders the highway unusable.

69 https://riskfinder.climatecentral.org/place/malibu.ca.us?comparisonType=place&forecastType=NOAA2017_int_p50&level=3&unit=ft

70 https://la.curbed.com/2020/4/22/21230250/sea-level-rise-malibu-california

71 https://www.latimes.com/archives/la-xpm-2000-may-09-mn-28048-story.html

72 https://pepperdine-graphic.com/sea-level-rise-and-its-impact-on-coastal-cities-like-malibu/

73 https://www.malibutimes.com/news/article_655d3b3a-0570-11ec-b69c-0f1308c8e1ec.html

74 https://patch.com/california/pacificpalisades/pacific-palisades-at-risk-from-rising-sea-level-climate-change

Sea Level Rise Mitigation Efforts

Although the Pacific Palisades faces many threats, the community has also made strides towards resiliency. The Pacific Palisades is home to Will Roger's State Beach which provides a successful example of how technical engineering and the use of unobtrusive structures have managed to stabilize the beach width within the area.[75] Like the actions at Will Roger's State Beach, residents in Malibu, Topanga, and the Pacific Palisades have begun to respond to the effects of SLR. Broad Beach residents have spent approximately $15 million dollars on sand and rock replenishment in recent years. Many residents in Malibu have invested in temporary infrastructure to reduce beach erosion and have researched methods such as the creation of an offshore reef. However, environmental activists fear an artificial offshore reef may harm the wildlife.[76]

The Bay Foundation has conducted the Living Shoreline Project, which aims to preserve three acres of shoreline from Zuma beach to Point Dume through natural dune restoration. The project goals are to increase the resiliency of the Malibu shoreline, implement nature-based protective measures against SLR, and to increase engagement within the community through education.[77] The City of Malibu is also in the process of conducting a coastal vulnerability assessment to gain more information on SLR in the region.

In Topanga, scientists, conservation organizations, and residents have formed the Topanga Lagoon Restoration project to restore the Topanga Lagoon which has been diminished due to construction projects in the region. What was once 30 acres of untouched wetlands is now reduced to one acre. The wetlands host various plants and animals which are considered ecologically vital to the region. The Topanga Lagoon Restoration project aims to create resiliency in the area while preserving Topanga's famous surf beach, and communicate awareness about the significance of the wetlands.[78]

75 https://dornsife.usc.edu/assets/sites/291/docs/pdfs/City_of_LA_SLR_Vulnerability_Study_FINAL_Summary_Report_Online_Hyperlinks.pdf

76 https://riskfinder.climatecentral.org/place/malibu.ca.us?comparisonType=place&forecastType=NOAA2017_int_p50&level=3&unit=ft

77 https://www.malibucity.org/859/Coastal-Vulnerability-Assessment

78 https://www.rcdsmm.org/resources/topanga-lagoon-restoration/

Malibu has also made strides to address issues with the Malibu Lagoon State Beach, a vital wetland located at the mouth of the Malibu Creek Watershed that is significant to Malibu's local ecosystem and home to numerous wildlife species. The Lagoon was listed as an "impaired body of water" by the Environmental Protection Agency.[79] As a result of poor water circulation, bacterial growth, sediment and debris buildup caused the lagoon to become uninhabitable for plants and animals. In response to this situation, the highly collaborative Malibu Lagoon Restoration Project (which includes representatives from local conservation organizations including the RCDSMM, the Bay Foundation and Heal the Bay) worked to improve the waterway channels to recuperate water flow and circulation, remove contaminated soil, improve water quality, and restore wetland plants.[80] The Restoration Project installed new ramps that allow surfers and visitors access to the beach without disturbing the lagoon.[81] However, despite all of this effort, the Lagoon is suffering from an overwhelming influx of algae. On August 12, 2021 the LA County Health Department issued a water quality warning, cautioning citizens to refrain from entering the water due to potentially hazardous conditions, including bacterial overgrowth.[82]

Sea Level Rise Regulations and Legislation

The California Coastal Commission's Enforcement Program works to protect coastal resources by upholding the California Coastal Act and ensuring any new development undergoes a proper permit review process.[83] This is to ensure that future development does not further harm the coastal environment within the various districts of California. Since Malibu, the Pacific Palisades, and Topanga are within California's Coastal Zone, all development within each community is subject to Coastal Commission regulations that pertain to protecting coastal resources and public access to shorelines.[84] Malibu residents who have attempted to undermine the regulations have faced lawsuits with fines of over $4 Million.[85]

79 http://www.150.parks.ca.gov/?page_id=27520
80 https://www.santamonicabay.org/explore/wetlands-rivers-streams/malibu-lagoon/
81 http://www.150.parks.ca.gov/?page_id=27520
82 https://www.malibumag.com/community-1/malibus-endless-lagoon-problems
83 https://www.coastal.ca.gov/meetings/agenda/#/2021/9
84 https://www.malibucity.org/372/Local-Coastal-Program
85 https://www.californialandusedevelopmentlaw.com/2021/04/14/appellate-courts-to-malibu-homeowners-defy-the-coastal-commission-at-your-peril/

New legislation has been proposed in response to the flooding of homes, erosion of major roads, and the destruction of critical infrastructure that is already occurring across the state due to sea level rise. In 2021 alone, more than a dozen bills and resolutions addressing SLR, including adaptation measures and buyout programs, have been introduced in the California Senate and House. Senate Bill 83, introduced by Senator Ben Allen (who represents Topanga and the Pacific Palisades in the SMM Project Area), proposes giving local governments the ability to purchase properties that have been deemed to be at risk of falling into the ocean in the next two decades. These properties can be utilized and rented out at market value to recoup the costs before demolishing them and restoring the land as a public park or natural protection area. Studies show that the public will save $6 in avoided costs for every $1 spent to acquire or demolish flood-prone buildings before disasters hit.[86]

The California Coastal Commission released an updated handbook for local governments to use in developing their own SLR adaptation policies and Local Coastal Plans, and is urging local communities to act now to safeguard key infrastructure including roads, wastewater systems, and stormwater drainage. The report cites a study that echoes the prediction that hundreds of miles of highways and railways statewide are threatened by flood events and warns that rising groundwater and seawater intrusion threatens not just residences and business, but also critical infrastructure such as wastewater treatment plants and stormwater systems.[87]

86 *"Bills take on threat of rising sea level," Rosanna Xia, LA Times, August 26, 2021.*

87 https://documents.coastal.ca.gov/assets/slr/SLR%20Guidance_Critical%20Infrastructure_8.16.21_FINAL_FullPDF.pdf

RECOMMENDATIONS

for Coastline Resilience

Target Audience

Municipalities / Region

- Expand partnerships with other municipalities to share SLR resilience best practices.
- Invest in scientific studies to develop a deeper understanding of SLR.
- Invest in a storm watch weather notification program.
- Monitor SLR annually by measuring beach widths.
- Update infrastructure to withstand sea level rise.
- Expand local public education about climate change and coastal erosion.
- Prevent residents from buying coastal properties and rebuilding damaged ones.
- Support a managed retreat local buyout program to help residents move their assets away from the encroaching ocean.

COMMUNITY ASSET MAPPING AND CRITICAL INFRASTRUCTURE VULNERABILITIES

COMMUNITY ASSETS

Community asset mapping is a systematic process of cataloging key services and resources to identify a community's strengths and weaknesses and help assess its physical vulnerabilities and climate resilience.

Community assets and emergency and evacuation resources for climate resilience include organizations and associations, schools, health and public safety facilities, grocery stores, hotels, parks, emergency operation centers (EOCs), gas stations and electric vehicle (EV) charging stations.

The project team created an inventory of the SMM WUI region's community assets and emergency/evacuation resources to identify what is in place to support the region's climate resilience and what can be used during climate emergencies.[88] It is important for residents to be aware of the location of the physical and organizational assets in their immediate community and region so they can be activated and relied upon during emergency situations. Being knowledgeable about emergency resources, especially those located along evacuation routes, can be potentially lifesaving during climate disasters. This inventory and associated maps also help identify what resources may be lacking in various parts of the region. Note that there is an inherent overlap in the definition of "Community Assets" and "Emergency Resources."

88 *Sources included original research (internet research, including aerial maps, phone calls and on-site research) and supplemental data from the Los Angeles County Office of the Assessor.*

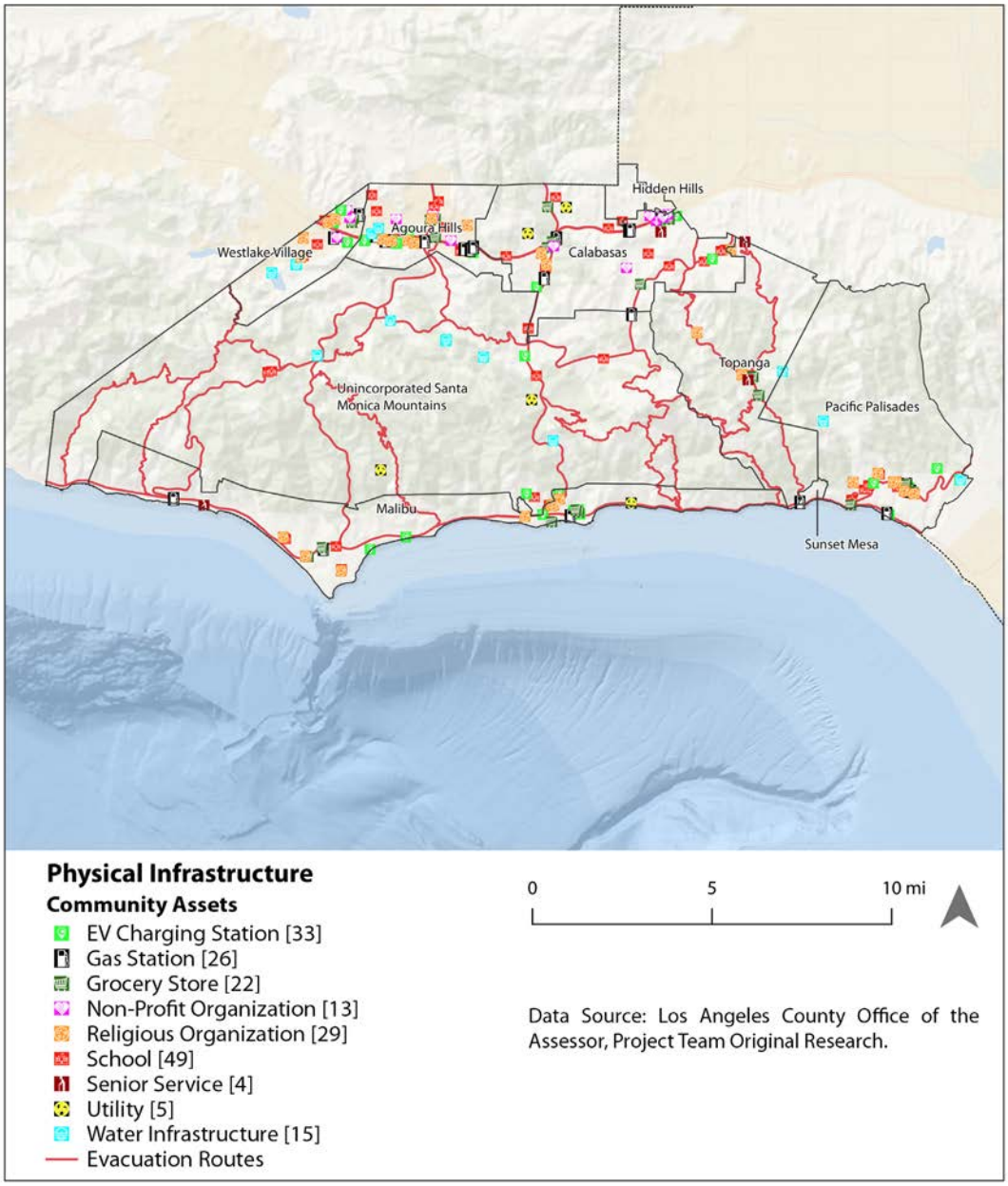
For instance, community assets such as EV charging stations and gas stations can also be essential resources in an emergency. Likewise, public facilities and parks are community assets that play important roles in emergency situations. However, the categories included on the following maps have been divided between primarily "Community Assets" and "Emergency Resources" to make the maps more legible, and readers should also note that some of the resources shown on each map can serve both roles.[89]

Figure 17: **Community Assets** illustrates the location of the following 196 assets throughout the region: EV charging stations (most sites contain multiple chargers, and seven of the locations are for Tesla cars only); gas stations; grocery stores; non-profit organizations; religious organizations; schools, including public and private schools, colleges and universities, and adult education centers; senior services, including senior housing and home care services; utilities, including water district facilities and one landfill located in Agoura Hills; and water infrastructure, including dams and reservoirs. Most of the region's identified community assets are located along the evacuation corridors apart from Hidden Hills and Sunset Mesa, which do not have official evacuation routes within their communities.

89 *The community asset and emergency response resources inventory was collected via internet searches and on-site visits, and supplemented by LA County Office of the Assessor data. It does not include other community resources in the region outside of these categories.*

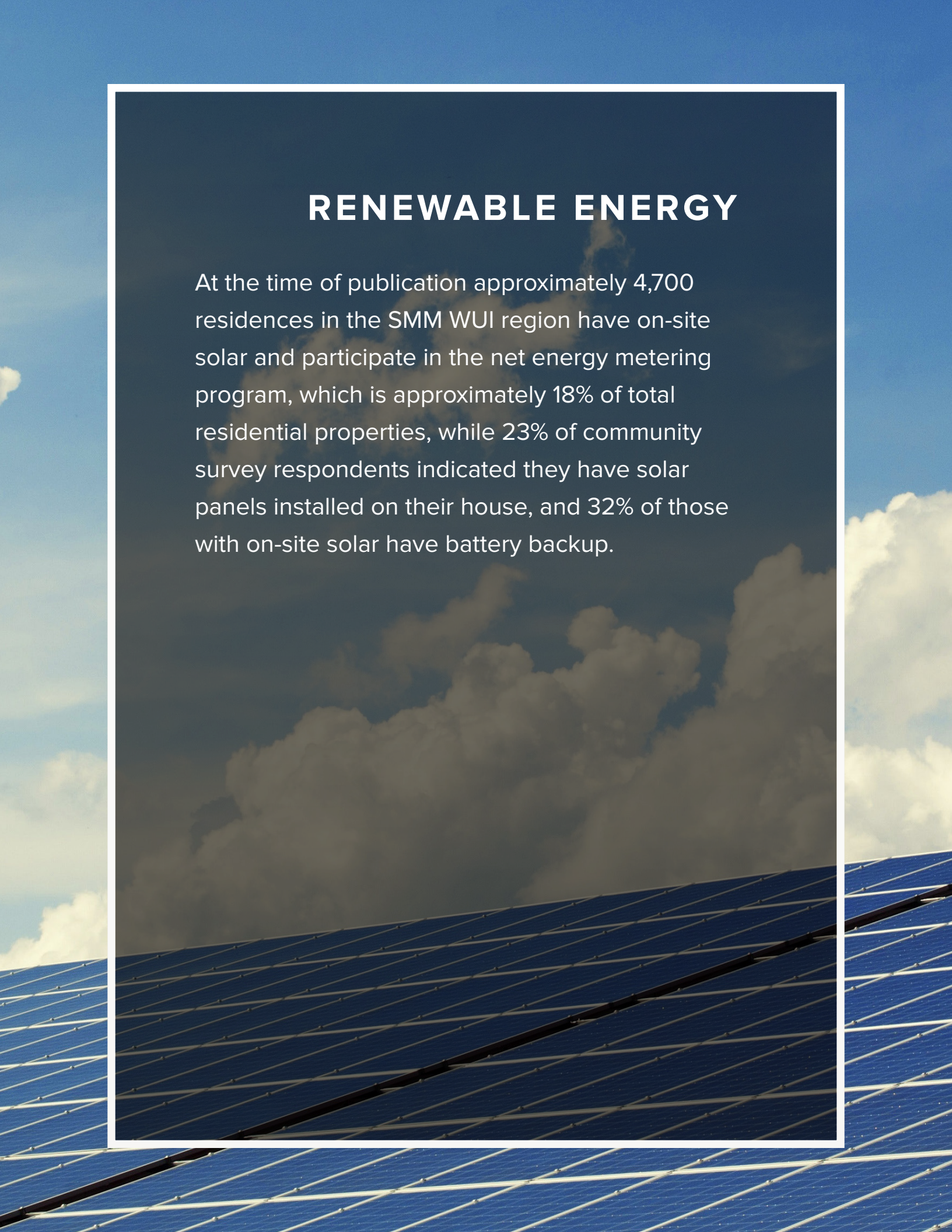
Figure 17

COMMUNITY ASSETS



WATER RESILIENCY

In addition to Las Virgenes Municipal Water District (LVMWD)'s water recycling efforts, Pepperdine University has a water reclamation system for irrigation and the City of Malibu launched the first phase of its water treatment facility in 2018. In spite of these efforts, the region's water demand is almost entirely met using imported water, which will become increasingly unreliable in times of prolonged drought unless water agencies step up stormwater capture efforts and supplement imported water with recycled water. And although Las Virgenes Municipal Water District (LVMWD) has begun a potable water reuse project, the region's primary supplier of imported water, West Basin Municipal Water District, has yet to follow LVMWD's lead to begin this important transition.



RENEWABLE ENERGY

At the time of publication approximately 4,700 residences in the SMM WUI region have on-site solar and participate in the net energy metering program, which is approximately 18% of total residential properties, while 23% of community survey respondents indicated they have solar panels installed on their house, and 32% of those with on-site solar have battery backup.

COMMUNITY ASSET MAPPING AND CRITICAL INFRASTRUCTURE VULNERABILITIES

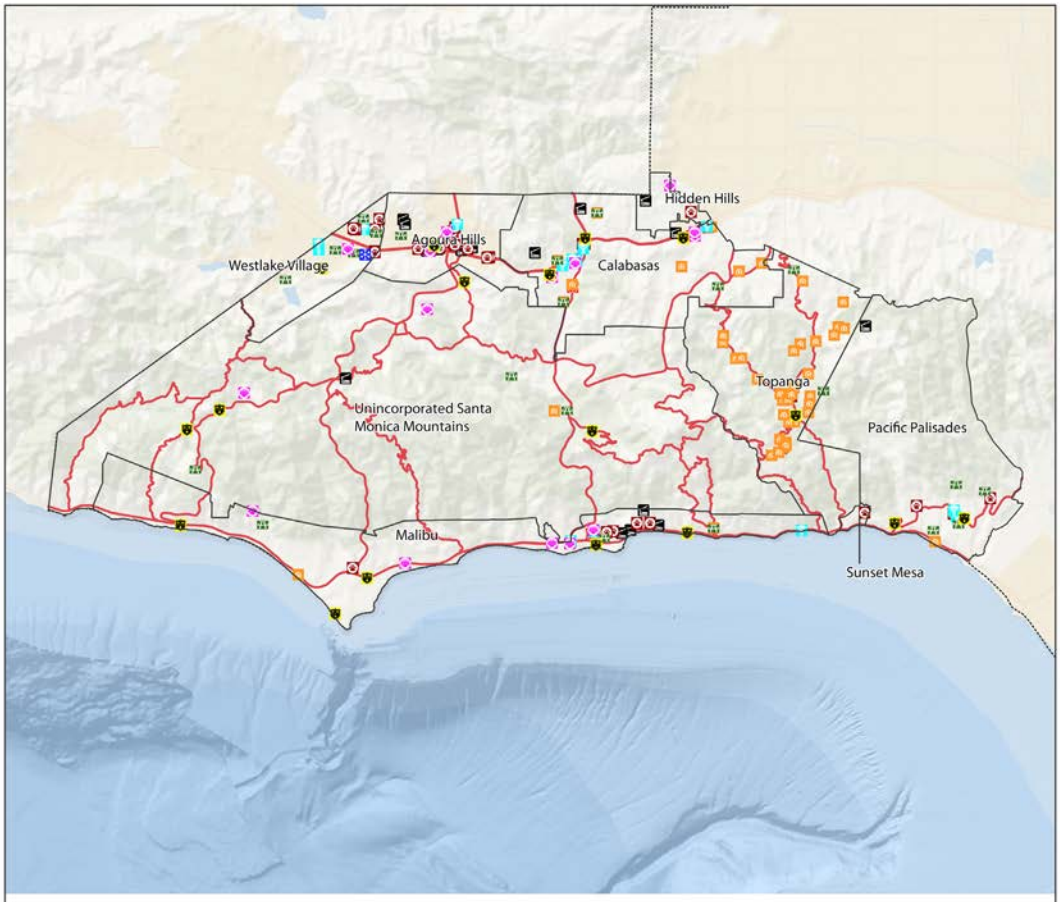
EMERGENCY RESPONSE RESOURCES

Most of the resources in the Community Asset Map can also be categorized as Emergency and Evacuation resources. Community assets such as gas stations and EV charging stations provide essential services during evacuation events. Some schools, religious and non-profit organizations may also be utilized as safe refuge during emergency situations. Grocery stores provide critical food and water resources for those who are not able to evacuate the area during emergency situations. Our original research found eight of the region's gas stations are equipped with backup gas-powered generators and one gas station has on-site solar, while nearly 50% of the region's grocery stores have gas-powered generators and two currently have on-site solar. Backup energy capability is essential for climate resilience, especially in the SMM WUI region, and on-site solar with battery backup and islanding capability is the most resilient and sustainable option. See Appendix E for the full community asset and emergency resources inventory.

Figure 18: **Emergency Response Resources** identifies a total of 178 key resources throughout the region that can be utilized during emergencies and events requiring evacuation. They include: animal services, including boarding services veterinarians and pet stores; one cooling/warming center located in Westlake Village; Emergency Operation Centers (EOCs); evacuation centers, including safe refuge areas and first aid units of which the vast majority are located within Topanga; hotels; medical facilities, including primary and urgent care facilities; public facilities, including city halls and county buildings; public parks and recreation centers; and public safety facilities, including a sheriff station, a lifeguard station and fire stations.

Figure 18

EMERGENCY RESPONSE RESOURCES



As mentioned above, spreading community awareness of these emergency resource locations can save lives by ensuring individuals find assistance during emergency events, including safe areas for evacuation. Understanding the distribution of these sites among communities also provides a guide for establishing new safe refuge sites, cooling/warming centers and evacuation area in locations such as schools, which are spread throughout the region along evacuation routes.

As illustrated by the Emergency Response Resources map, Topanga is the region's leader in emergency evacuation preparedness with over thirty "Public Safe Refuge" evacuation centers for residents to gather during emergencies. Most of the region's other assets and emergency resources are concentrated in the northern municipalities, including Westlake Village, Agoura Hills, Calabasas, and Hidden Hills, with a clustering of assets in the commercial areas along the coast within Malibu and the Pacific Palisades. Some essential emergency services such as grocery stores, gas stations and EV charging stations, and animal services (as a significant number of residents have farm animals including horses and goats, which may need to be evacuated in climate emergencies) are lacking in the unincorporated areas, Sunset Mesa and Topanga. Emergency Operations Centers (EOCs) are established during emergency events as central locations for coordination and dissemination of information.[90] There are six Emergency Operations Centers for the region, which appear to provide adequate coverage depending upon the location of an emergency event.

90 *Incident Management. (2021).* https://www.ready.gov/incident-management

RESILIENCE HUBS

Resilience Hubs are community-serving facilities, such as community centers, recreation facilities and multi-housing buildings as well as surrounding neighborhood infrastructure (e.g. residences, vacant lots, community parks, local businesses) that are augmented to support residents and coordinate communication and resource distribution before, during, and after electrical grid failures and hazard events.[91] Well-designed resilience hubs can equitably enhance community resilience in emergencies while reducing greenhouse gas (GHG) emissions and improving local quality of life during “normal” times.[92]

91 https://www.usdn.org/resilience-hubs.html#:~:text=Resilience%20Hubs%20are%20community%2Dserving,after%20a%20natural%20hazard%20event

92 http://resilience-hub.org/what-are-hubs/

COMMUNITY ASSET MAPPING AND CRITICAL INFRASTRUCTURE VULNERABILITIES

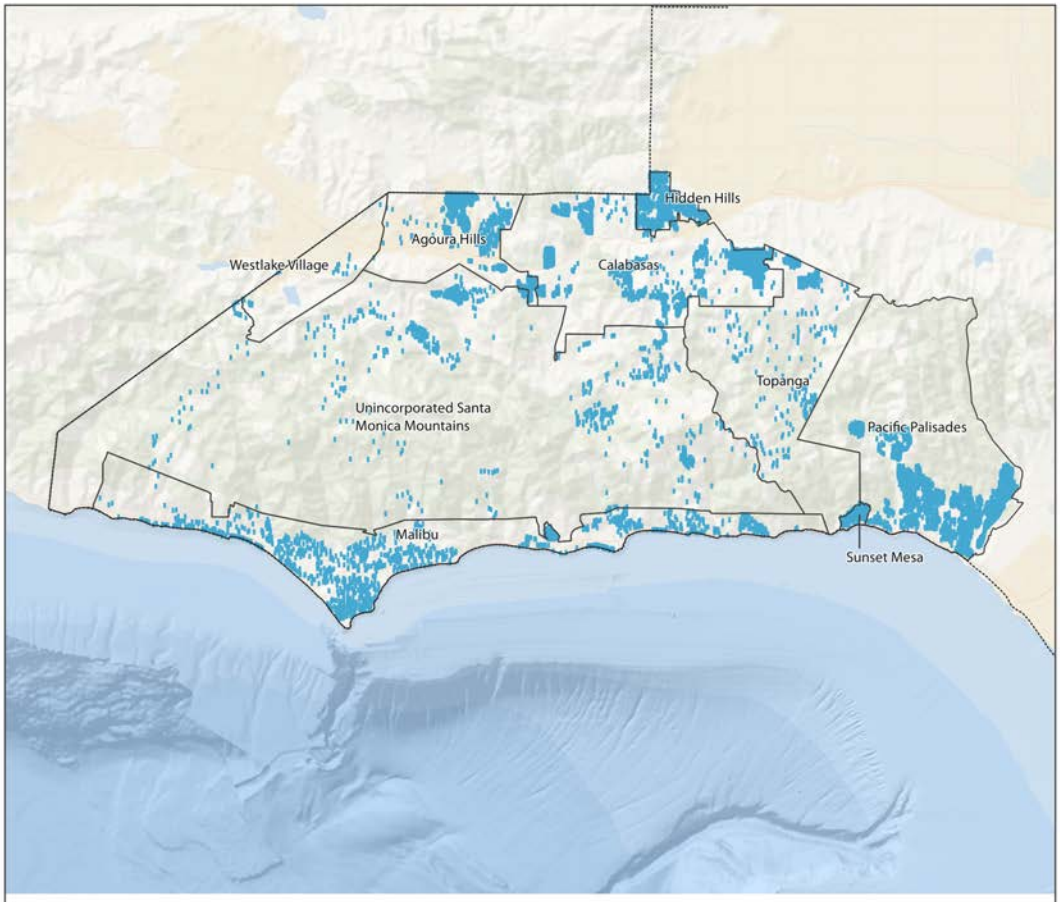
SWIMMING POOLS

Figure 19: **Residential Swimming Pools** One of the strengths of the physical residential infrastructure in the SMM WUI region is the high number of residential swimming pools. This map shows the location and number of residential swimming pools throughout the SMM WUI region. Swimming pools can help residents adapt to extreme heat events, as well as provide an on-site water source for fighting fires. There are a total of 8,092 residential swimming pools in the region. Assuming the average size swimming pool is 12 by 24 feet with a depth of five feet, each pool holds approximately 10,800 gallons of water. This means approximately 87 million gallons of water is available on site to fight fires in the region if firefighters are given access to the pools and can connect to the water source.[93]

93 *Protecting Residences From Wildfires. US Forest Service.* https://www.fs.fed.us/psw/publications/documents/gtr-050/accessories.html

Figure 19

RESIDENTIAL SWIMMING POOLS



Physical Infrastructure

- Residential Swimming Pool

Pacific Palisades: 2,261
Calabasas: 1,854
Malibu: 1,255
Agoura Hills: 934
Unincorporated SMM: 699
Hidden Hills: 480
Topanga: 418
Sunset Mesa: 167
Westlake Village: 24

0 5 10 mi

Data Source: Los Angeles County Office of the Assessor.

COMMUNITY ASSET MAPPING AND CRITICAL INFRASTRUCTURE VULNERABILITIES

HOUSING AND CLIMATE RESILIENCE

Many communities have older housing infrastructure that is not well adapted to face extreme weather events. For example, during events such as the 2018 Camp Fire in northern California, it was found that 51% of homes built after 2008 (the year when stricter building codes for fire-prone regions were implemented) were left undamaged, while only 18% of homes built before 2008 were left standing.[94] Older structures that have not been upgraded to meet new building code standards are more prone to fire damage because older building codes were less stringent.[95] Older homes also tend to warm faster during extreme heat events and perform poorly in regulating indoor temperatures.[96]

Based on LA County Assessors data, 98.6% of units and 98.8% of buildings in the SMM WUI region were built before 2008, the year California established strict codes for new buildings in Fire Hazard Severity Zones. Moreover, approximately 50% of the region's housing stock was built before 1978 when the state's first energy code was established.[97] This presents widespread physical vulnerability for the greater community which will be exacerbated over time due to the projected increase in temperatures, unless building code upgrades, home hardening, and defensible space practices are put into place widely across the region. Until upgrades are made, residents living in older homes will be more vulnerable to extreme heat and will need access to cooling centers.

94 *Which Houses Survived Wildfire? Often, Those Built To Code. (2019). Associated Press. https://www.kpbs.org/news/2019/apr/11/which-houses-survived-wildfire-often-those-built-c/*

95 *Las Virgenes-Malibu Council of Governments. Multi-Jurisdictional Hazard Mitigation Plan Part 1, Multi-Jurisdictional Hazard Mitigation Plan (2018). MLC & Associates. Retrieved from https://www.ci.agoura-hills.ca.us/home/showdocument?id=20367*

96 *Nahlik, M. J., Chester, M. V., Pincetl, S. S., Eisenman, D., Sivaraman, D., & English, P. (2017). Building thermal performance, extreme heat, and climate change. Journal of Infrastructure Systems, 23(3), 04016043.*

97 *LA County Office of the Assessor*

COMMUNITY ASSET MAPPING AND CRITICAL INFRASTRUCTURE VULNERABILITIES

BUILDING HEAT PERFORMANCE INDEX

The Building Heat Performance Index (BHPI) describes how quickly indoor temperatures increase from 25 C to 32 C (77 to 90 degrees Fahrenheit). As is illustrated by *Figure 20:* **Building Heat Performance Index**[98] in the SMM WUI region there is some variation in the region, with parts of the Pacific Palisades, Westlake Village and Agoura Hills (in red) performing worse than the rest of the region. This may be due to the differences in the age and way that the structures in these regions were built. As previously mentioned, older buildings have a lower capacity to regulate the temperature change caused by extreme heat.

Figure 21: **Heat Refuge Accessibility Index (Access to Cooling Resources)** This figure shows the average distance in miles of parcels of land from potential cooling resources, e.g. libraries, shopping malls and retail establishments, grocery stores, museums, restaurants and hotels/motels. Compared to the rest of the LA County, the SMM WUI region has poor access to heat refuge (cooling resources) because homes tend to be more remote and father from resources than other areas. There is only one officially established cooling/warming center in the region (located in a Los Angeles County library in Westlake Village). As the map illustrates, the commercial area within the Pacific Palisades is the exception with greater access to cooling resources than the rest of the region, in part due to its proximity to neighboring Santa Monica where there are more publicly available cooling resources, such as libraries, retail and restaurants.[99]

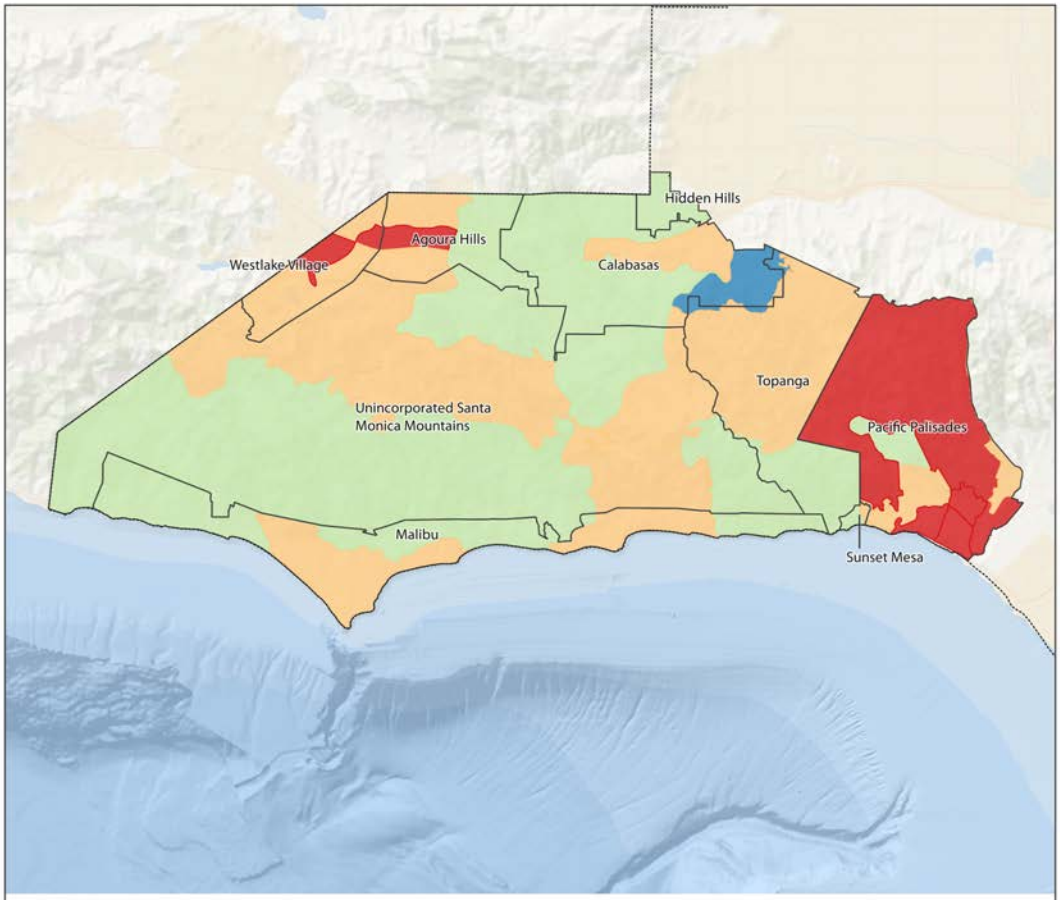
98 *Analysis based on data from Mikahil V. Chester, Arizona State Faculty publications*

99 *Analysis based on data from Mikahil V. Chester, Arizona State Faculty publications*

Figure 20

BUILDING HEAT PERFORMANCE INDEX

(BHPI)

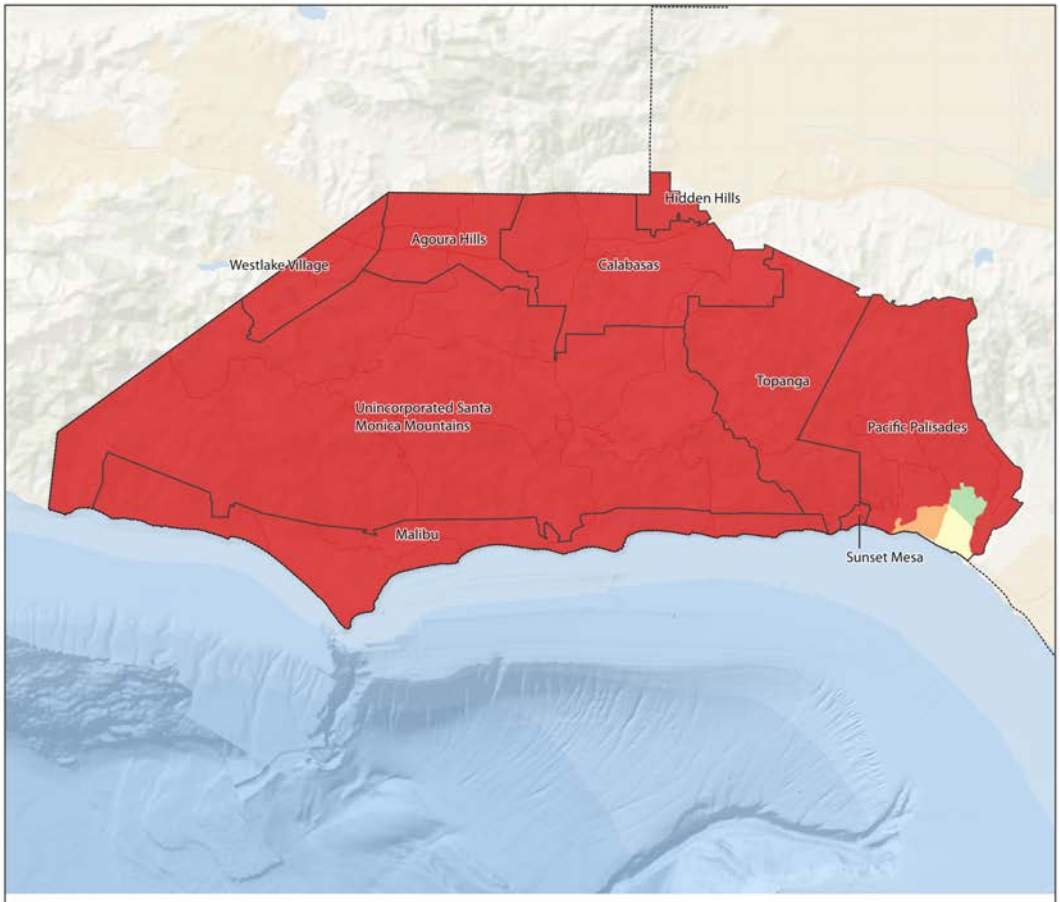


Data Source: Nahlik MJ, Chester M, Pincetl SS, Eisenman D, Sivaraman D, English P. Building thermal performance, extreme heat, and climate change. Journal of Infrastructure Systems. 2017 Sep 1;23(3). 04016043. https://doi.org/10.1061/(ASCE)IS.1943-555X.0000349.

Figure 21

HEAT REFUGE ACCESSIBILITY INDEX

(Access to Cooling Resources)



COMMUNITY ASSET MAPPING AND CRITICAL INFRASTRUCTURE VULNERABILITIES

EVACUATION ROUTES

Figure 22: **Evacuation Routes Pacific Coast Highway (PCH)** is the primary evauation route for Malibu, Sunset Mesa, Topanga and the Pacific Palisades. Susceptible to storm surges and sea level rise, this narrow two-lane highway is a major weakness in the region's transportation infrastructure and climate resilience. Many of the evacuation routes shown on the map can be blocked by mudslides in the event of heavy rains and become unusable for long periods.

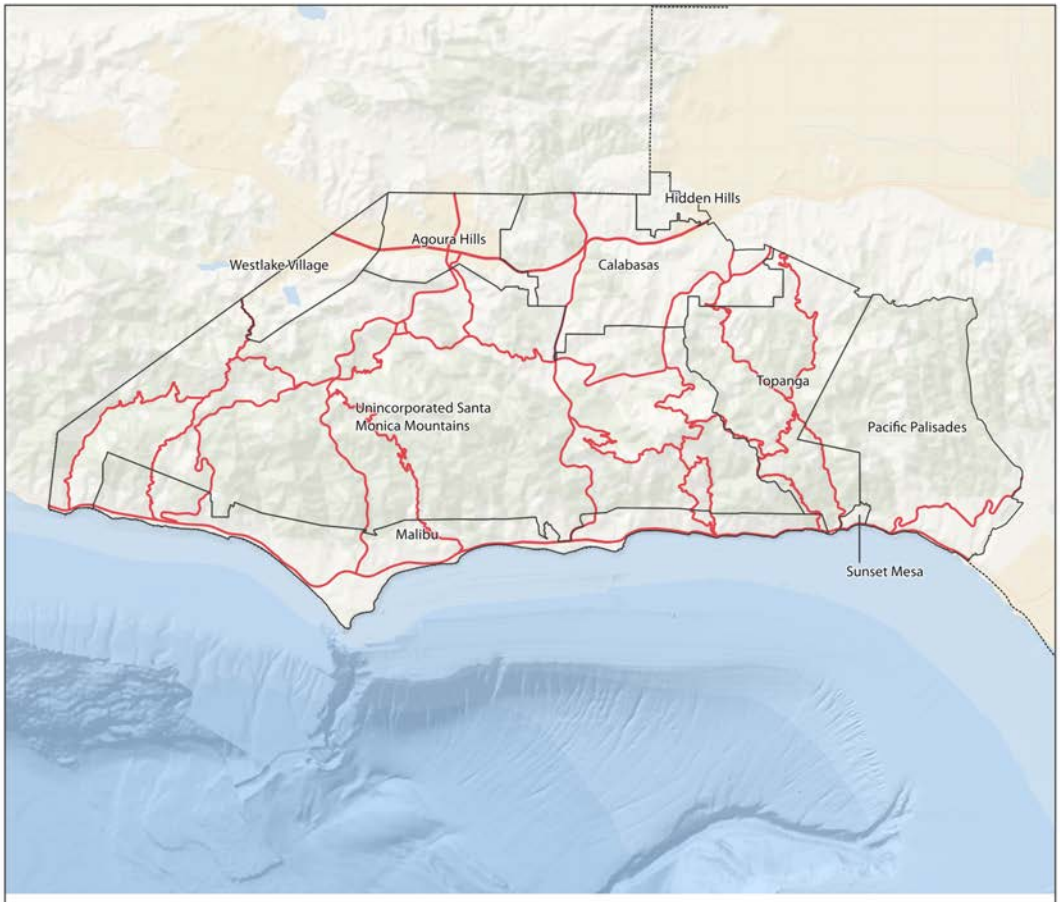
During the 2018 Woolsey Fire, thousands of Malibu residents evacuating the region were stuck in traffic for several hours as the fire grew closer to the highway, placing their lives in jeopardy.[100] In response, the City of Malibu developed a Mass Evacuation Plan which divides the City into four zones that correspond to nearby evacuation areas and includes suggested evacuation routes for each zone. The zones in Malibu are located along the coast numbered 11-14, east to west, correlating with Topanga's evacuation zones which are numbered 1-10. Malibu's Mass Evacuation Plan also identifies five additional evacuation routes that can be used depending on the location of the incident, surrounding conditions, and which zone(s) need to be evacuated.[101]

100 *Sawicki, E. (2019). Evacuation Plan Draft Released for Public Review. The Malibu Times.* https://www.malibutimes.com/news/article_71c882b4-0165-11ea-8482-33dd72e7a14e.html

101 *City of Malibu Mass Evacuation Plan. (2020). City of Malibu.* https://www.malibucity.org/DocumentCenter/View/26832/FINAL-Evacuation-Plan-8192020

Figure 22

EVACUATION ROUTES



COMMUNITY ASSET MAPPING AND CRITICAL INFRASTRUCTURE VULNERABILITIES

ROADWAYS AND DEBRIS FLOWS

As mentioned in the section on landslides, the risk of debris flows greatly increases after wildfires due to vegetation loss and soil exposure. During periods of intense rainfall, surface erosion and land sliding can generate sudden and highly damaging debris flows that not only can damage or destroy homes and critical infrastructure but block roadways and evacuation routes. Post-wildfire debris flows present a grave threat to the physical infrastructure of the SMM region. Roadways and evacuation routes are particularly vulnerable to being disrupted not only during and directly after wildfires but also after heavy rain events which are becoming increasingly common. As mentioned in the section on landslides, the risk of debris flows greatly increases after wildfires due to vegetation loss and soil exposure.

A climate vulnerability assessment conducted by the UCLA Institute of Transportation Studies focused on the projected impacts of post-wildfire debris flows on California roadways. The study, which evaluated soil conditions, vegetative conditions, geologic conditions, precipitation, fire risk, and roadway criticality, found that the occurrences of watershed post-wildfire debris flow and the number of vulnerable roadways are likely to increase with severe storm events across the state. Additionally, climate change is impacting the severity of precipitation and increasing the potential burn area which places more watersheds and roadways in the “extremely high” (more than 80% likelihood) post-wildfire debris flow risk category.[102]

102 *Chester, M. V. and Li, R. (2020). Vulnerability of California Roadways to Post-Wildfire Debris Flows. UCLA Institute of Transportation Studies. Doi: 10.17610/T60W35*

Data from UCLA's statewide study of post-wildfire debris flows for the SMM WUI region indicates that most of the region's roadways are currently categorized as low or medium risk for debris flow, with the exception of significant portions of Topanga and eastern Malibu which fall into the high and extremely high categories (*Figure 23:* **Road Vulnerability – Post-Wildfire Debris Flow**). This analysis utilizes a 10-year storm scenario – a storm of this intensity has a 10% chance of occurring in any given year. In contrast, mid-century road vulnerability projections (*Figure 24:* **Future Road Vulnerability**) based on a 50-year recurrence storm under a high-emissions/business as usual scenario reveals a substantial increase in roadway vulnerability where all the region's roadways move into the high or extremely high vulnerability categories. Although it is not expected that all roads in the region will be impacted to the same degree at the same time, this is a serious concern in an area already challenged by limited and climate-vulnerable evacuation routes.

Figure 23

ROAD VULNERABILITY

Post-Wildfire Debris Flow

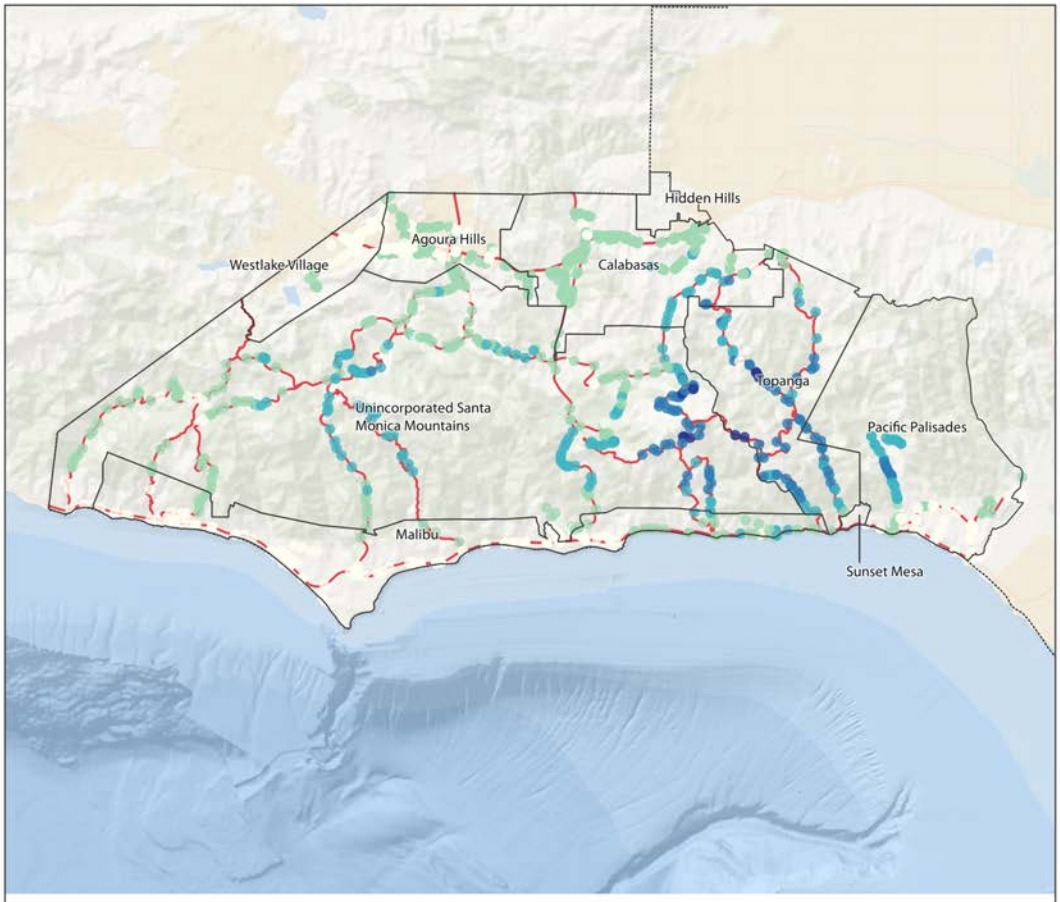
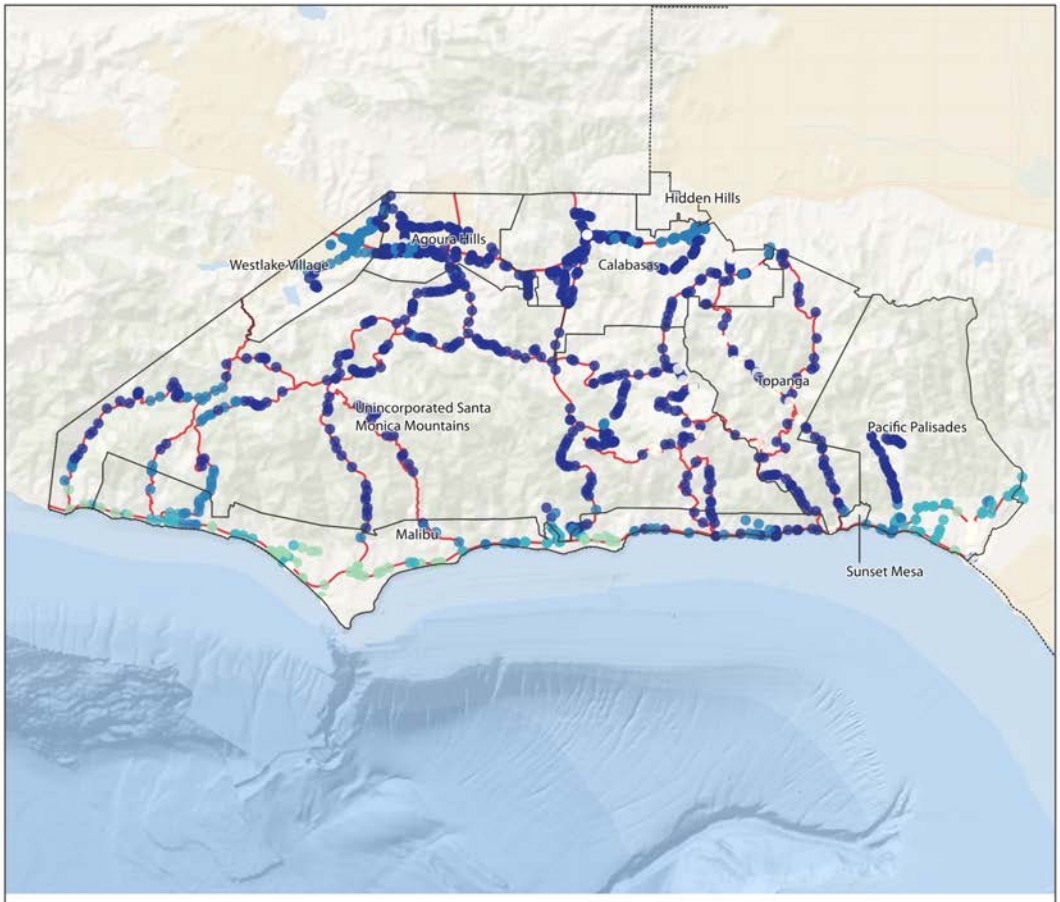


Figure 24

FUTURE ROAD VULNERABILITY



Physical Vulnerability
Debris Flow Risk
(50-Year Storm, Late-Century RCP 8.5)

- Very Low
- Low
- Medium
- High
- Extremely High
- Evacuation Routes

0 5 10 mi

Data Source: Chester M and Li R, 2020, Vulnerability of California Roadways to Post-Wildfire Debris Flow, UCLA Institute of Transportation Studies, Report No. UC-ITS-2020-38, doi: 10.17610/T60W35.

RECOMMENDATIONS

to Improve the Region's Critical Infrastructure Resilience and Adaptive Capacity

Target Audience

Municipalities / Region

- Use the inventory compiled in this report to assess the availability of the region's resources and address the gaps and ability of each community to respond and adapt to climate disasters.
- Integrate resilience into capital planning process – develop resilience criteria to incorporate multi-hazard risks into critical planning projects and to help prioritize investments.
- Coordinate across infrastructure systems to develop projects with multiple benefits.

Recommendations to Improve the Region's Critical Infrastructure Resilience and Adaptive Capacity

Target Audience

Municipalities / Region

- **Water Resilience**
  - Strengthen the region's water resilience and fire resistance by facilitating the installation of dual-use/dual-chamber cisterns for water capture, irrigation and firefighting.
  - Develop regional water resilience by setting a goal to reduce the region's reliance on imported water by increasing stormwater capture and recycled water efforts through the local utilities and treatment centers.
  - All small package plants in the region should be encouraged to upgrade treatment to allow either non-potable or potable water supply.
  - New strategies for capturing stormwater for water supply need to be developed, given the coastline hydrogeology where there is little or no groundwater basins to store stormwater capture.
- **Energy Resilience**
  - Identify the most strategic public sites in region (e.g. city halls, fire departments, schools, clinics, libraries and grocery stores) for the installation of solar and backup power capacity to strengthen each community's resilience to future climate disasters.
  - Incentivize gas station and grocery store owners to transition from gas-powered generators to on-site solar with battery backup and islanding capability.
  - Promote well-funded, targeted programs to assist older and low-income adults with the installation of on-site solar with battery backup storage to increase number of homes with nano grid capacity.
  - Educate the community on the economic benefits (e.g., tax incentives and rebates) and the environmental benefits (e.g., reduce carbon emissions) of installing on-site solar to grow the region's adaptative capacity.
  - Develop a list of community stakeholders willing to support a microgrid project in and begin developing a network of resilience hubs in the region.

Recommendations to Improve the Region's Critical Infrastructure Resilience and Adaptive Capacity

Target Audience

Municipalities / Region

- **Emergency Preparedness**
  - Identify a set of primary and secondary routes for each evacuation area, in case one is not viable during an emergency event.
  - Assess roadways and critical infrastructure threatened by debris flows, SLR, flooding, and excessive heat and develop a plan to mitigate these impacts.
  - Increase awareness of the region's high-risk for post-wildfire debris flow and incorporate this knowledge into local and regional evacuation plans.
  - Identify emergency and evacuation resources in the region that can be shared between communities and create a regional fund and committee to work together on improving SMM WUI's adaptative capacity.
  - Maximize the use of residential swimming pools in the region to fight fires by providing unobstructed direct access to fire engines. We recommend this be done at the regional level, led by public safety directors and key LA County fire liaisons.

- **Public Refuge Centers & Buildings**
  - Identify public buildings and spaces that can serve as safe refuge and cooling centers, and resilience hubs during evacuations and extreme weather events such as schools, libraries, other municipal buildings and parks, as well as community-based organizations and religious organizations.
  - Invest in improvements (such as improved thermal performance or solar plus storage solutions) to public and other critical buildings so they can serve as refuge and evacuation centers.
  - Create a targeted program to assist the region's low income and older residents, as well as small businesses with free to low-cost insulation and cooling capacity to improve public safety during extreme heat events.

- **Fire Resistance**
  - Implement home hardening and defensible space mitigation strategies in older homes located in the highest-risk areas. Offer financial incentives to encourage people with limited incomes to participate in these efforts. We recommend this be a regional collaborative effort between the RCD and city, county and state representative liaisons.

SOCIAL VULNERABILITIES

VULNERABLE POPULATIONS

Social Vulnerabilities of the Santa Monica Mountains WUI Region[103]

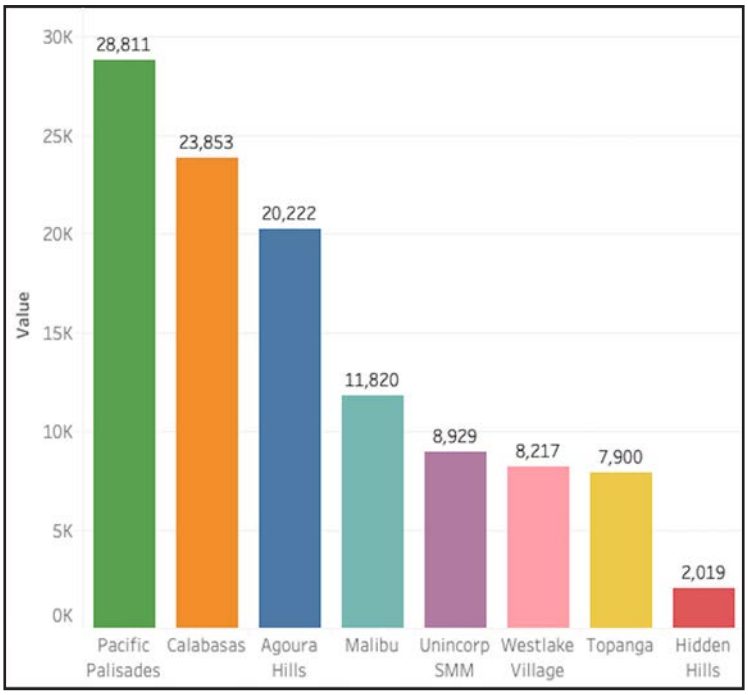
The SMM WUI Project Region communities (Agoura Hills, Calabasas, Hidden Hills, Malibu (city and unincorporated), Pacific Palisades, Sunset Mesa, Topanga, and Westlake Village) are located within Los Angeles County and have a combined population of about 108,000. See *Figure 25:* **Population**. In general, the region's population is more highly educated and affluent, and less diverse, than the overall population of LA County. Over 84% of the population in the region is white, compared to LA County's 52%. The region also has higher education levels than the county's average. While 59% of LA County's adult population have college educations, 85% of adults in the project region are college educated. In addition, approximately 20% of the houses in the project region are occupied by tenants, in comparison to LA County where about 48% of the population are renters.[104]

103 *The Social Vulnerability section is informed by 398 residents in the Santa Monica Mountain (SMM) Wildland Urban Interface (WUI) project region who participated in the Malibu Foundation's online community survey. Largely based on LA County's climate vulnerability survey administered in 2020, the SMM project survey included 67 questions in seven categories: (1) Demographics, (2) Climate Change & Woolsey Fire, (3) Extreme Heat, (4) Wildfire, (5) Floods, (6) Communications & Mobility, and (7) Mitigation, Sustainability & Preparedness. The SMM project survey was administered February through March 2021. In addition, this section includes analysis from two community listening sessions. The first listening session focused on older adults (age 65+) was held virtually on April 29, 2021. Ten (10) residents from the region participated. The second listening session (held in person on May 1, 2021 at the Malibu Labor Exchange) was focused on day laborers and domestic workers and included twenty-five (25) participants. Finally, this section is also supported by related research, census data, and other statistical sources.*

104 *U.S. Census*

Figure 25

POPULATION

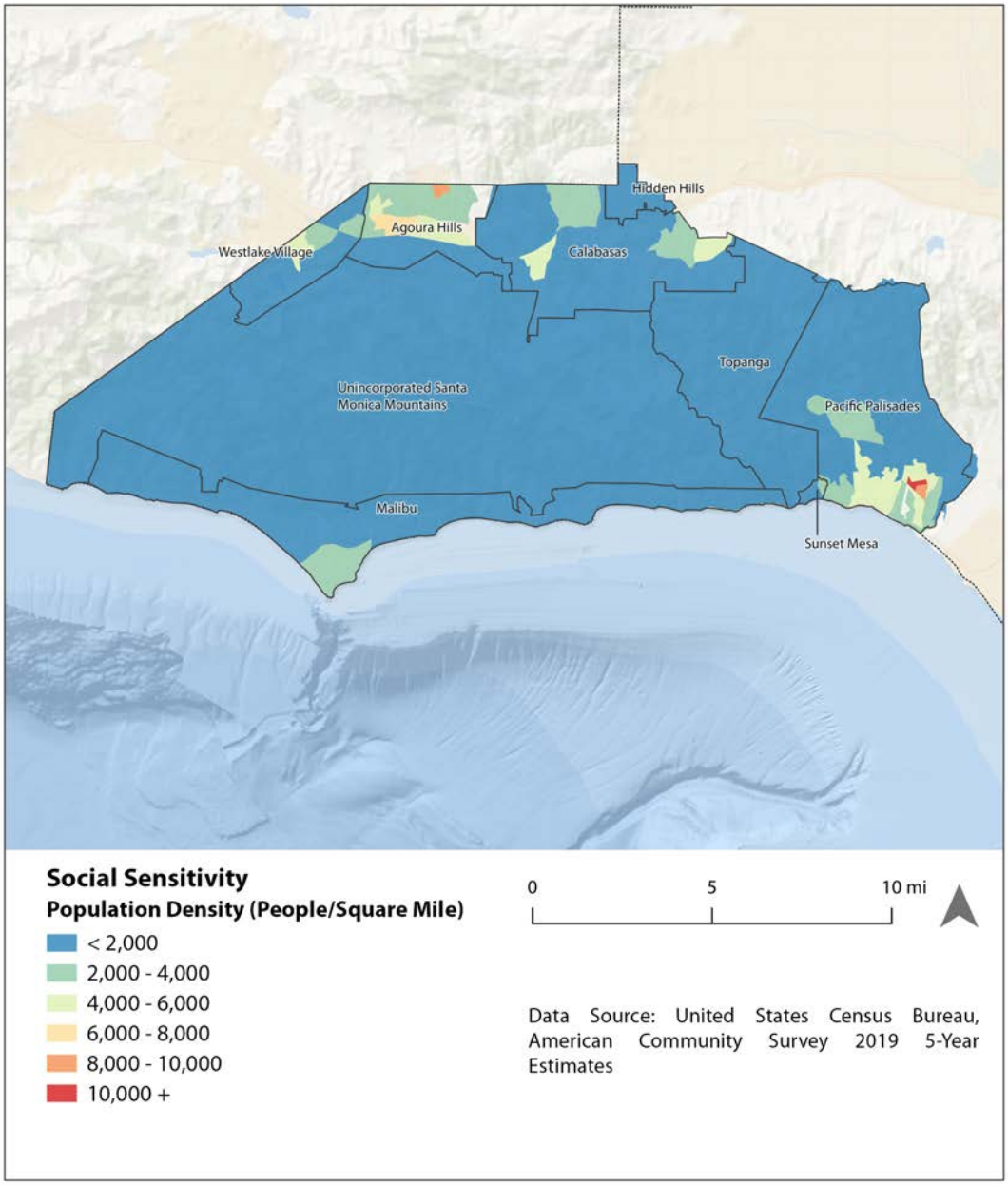


The region's population density is highest in Agoura Hills, Calabasas and the Pacific Palisades with a range between 1,076 – 10,327 people per square mile. The lowest population density in the region is in unincorporated Malibu / Santa Monica Mountains and Southern Topanga with less than 453 people per square mile. See *Figure 26:* **Population Density**. The median age within the region is approximately 8.6 years older than in LA County, indicating a higher portion of older adults. The community with the oldest population in the project region is the City of Malibu with a median age of 52.4, and the youngest population is unincorporated Malibu with a median age of 35.[105]

105 *US Census Bureau American Community Survey 2019 5-Year Estimates*

Figure 26

POPULATION DENSITY



The Region's Vulnerable Populations

Social vulnerability to climate change can be defined as disproportionate exposure and sensitivity of certain communities to the impacts of the shocks and stressors of climate change such as extreme weather and wildfire, and a reduced capacity to adapt. Physical, economic and social factors determine a community's level of vulnerability and the extent of their capacity to prepare for, respond to, and recover from climate hazards.

Despite the region's relative privilege and affluence, there are striking social vulnerabilities. The most vulnerable populations identified in the SMM WUI region include older adults (people 65 and older) and people with physical disabilities, residents of mobile home communities, households headed by women, day laborers and people with limited English, and the unhoused community, all of whom are especially susceptible to and disproportionately impacted by climate change hazards, and a have a reduced adaptive capacity. Key intersectional issues faced by these populations include challenges with mobility, access to transportation, unreliable communications, and limited finances to prepare for, respond to, and mitigate climate emergencies.

Extreme weather events and climate disasters are especially dangerous for people with limited access to medical care, as they tend to have poorer health due to avoiding or delaying diagnosis, treatment, or medication. Although only approximately 3.6% of the region's resident population (and 5% of Malibu residents) do not have health insurance, it is estimated that 83% of the non-resident day laborer population lack health care coverage.[106] Households headed by women (8.7% of households in the region compared to 7.3% in the County) face challenges related to income, education, and food security, making it more challenging for them to respond to health, environmental, or climate risks.

106 U.S. Census

Although the SMM region's median household income is higher than LA County's, *Figure 27:* **Median Household Income** illustrates there are lower-income pockets within each community, except for Hidden Hills, where the median household income ranges from $71,979 to $109,640. In addition, as *Figure 28:* **Households Living in Poverty** indicates, many of these same pockets are also home to a significant subset of the region's population living in poverty. The areas in red on the Median Household Income map are home to residents who are in the lowest income bracket in the region. The Households Living in Poverty map indicates that 5% to 26% of the total population in the region is living beneath Los Angeles County's poverty line within different pockets of the region. Portions of the City of Malibu, the Pacific Palisades and unincorporated SMM have 10% to 25% of households living in poverty. And a small pocket in Agoura Hills, Seminole Springs, which was destroyed in the Woolsey Fire, has over 25% of households living in poverty.

Figure 27

MEDIAN HOUSEHOLD INCOME

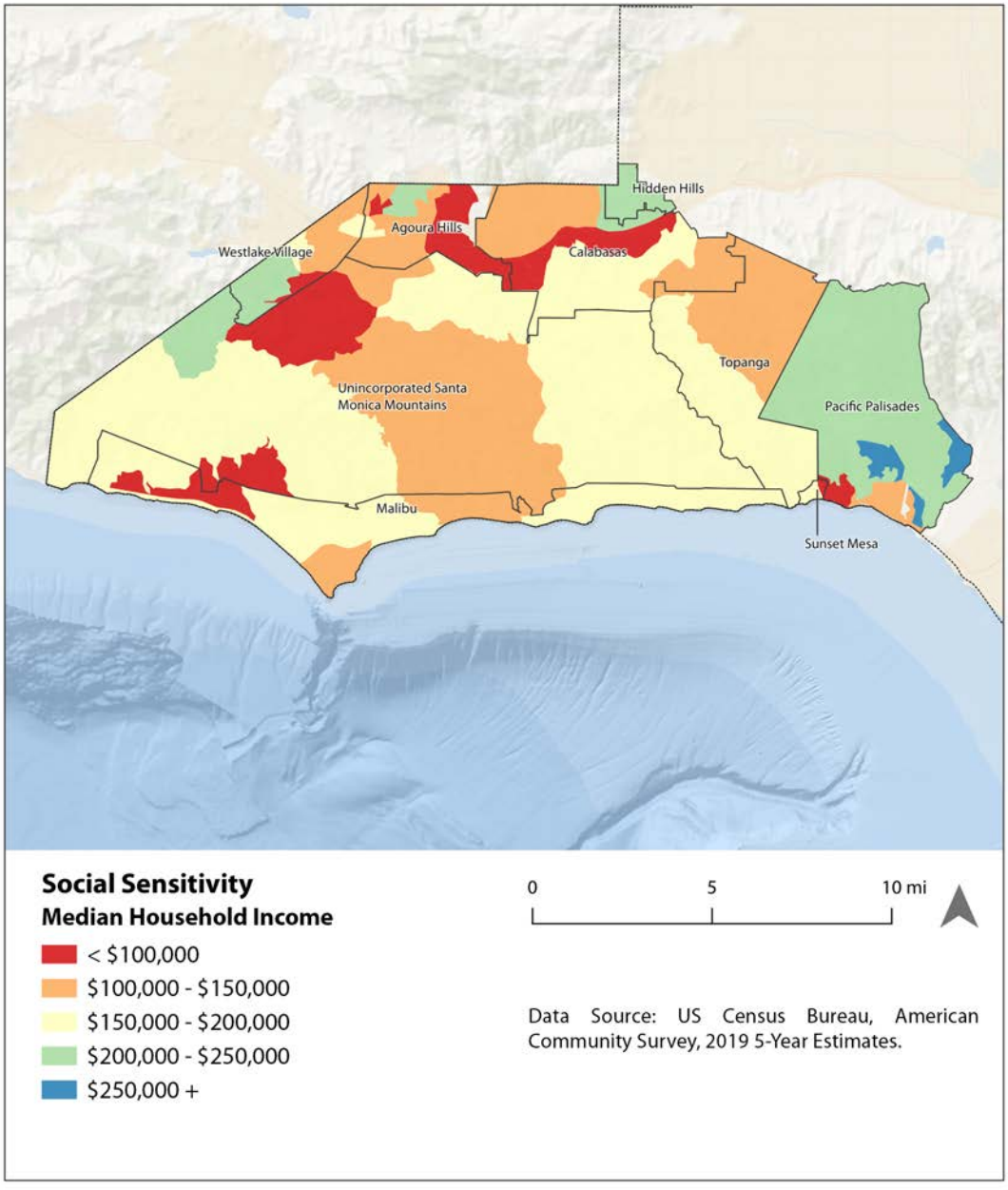
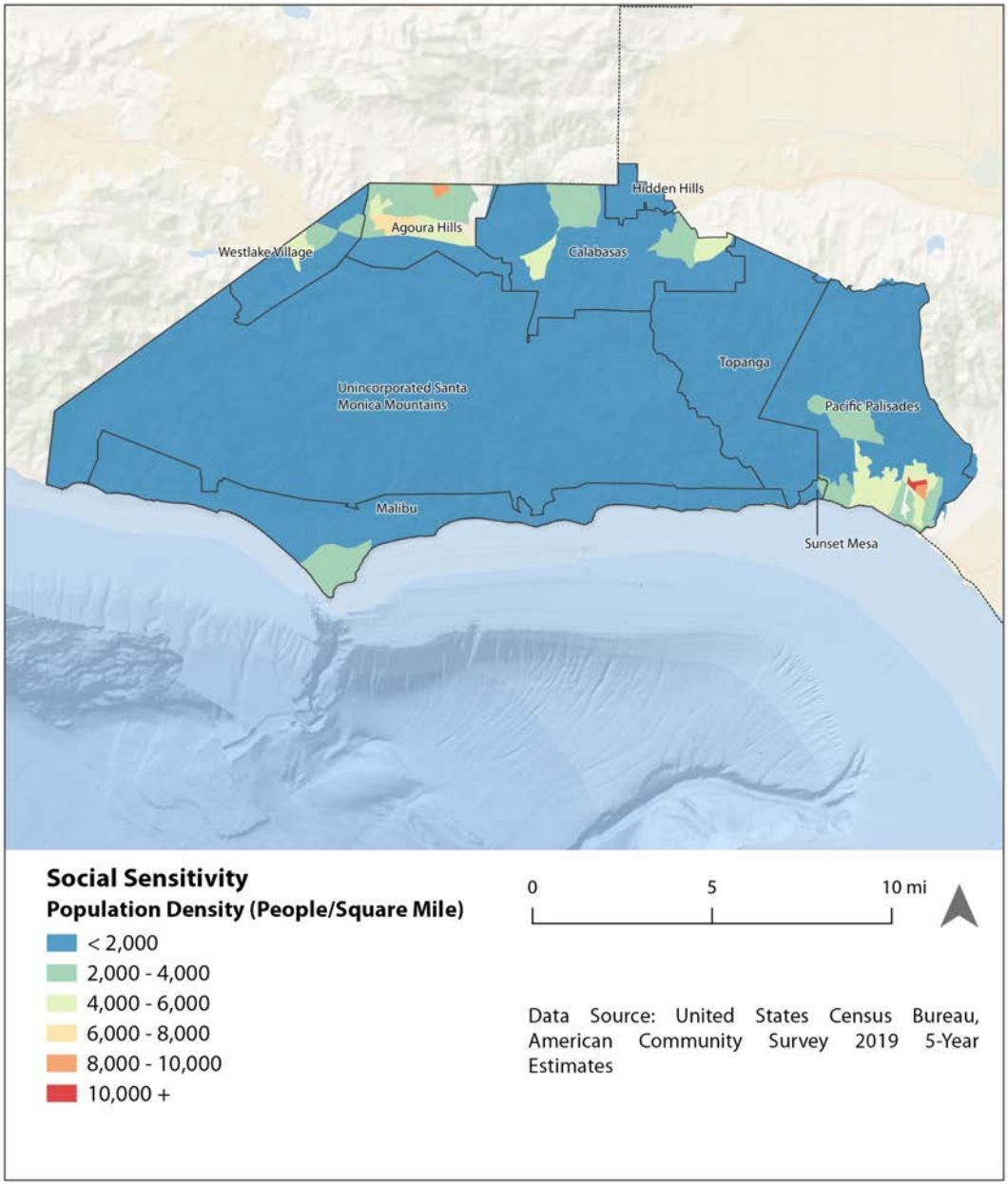


Figure 28

HOUSEHOLDS LIVING IN POVERTY



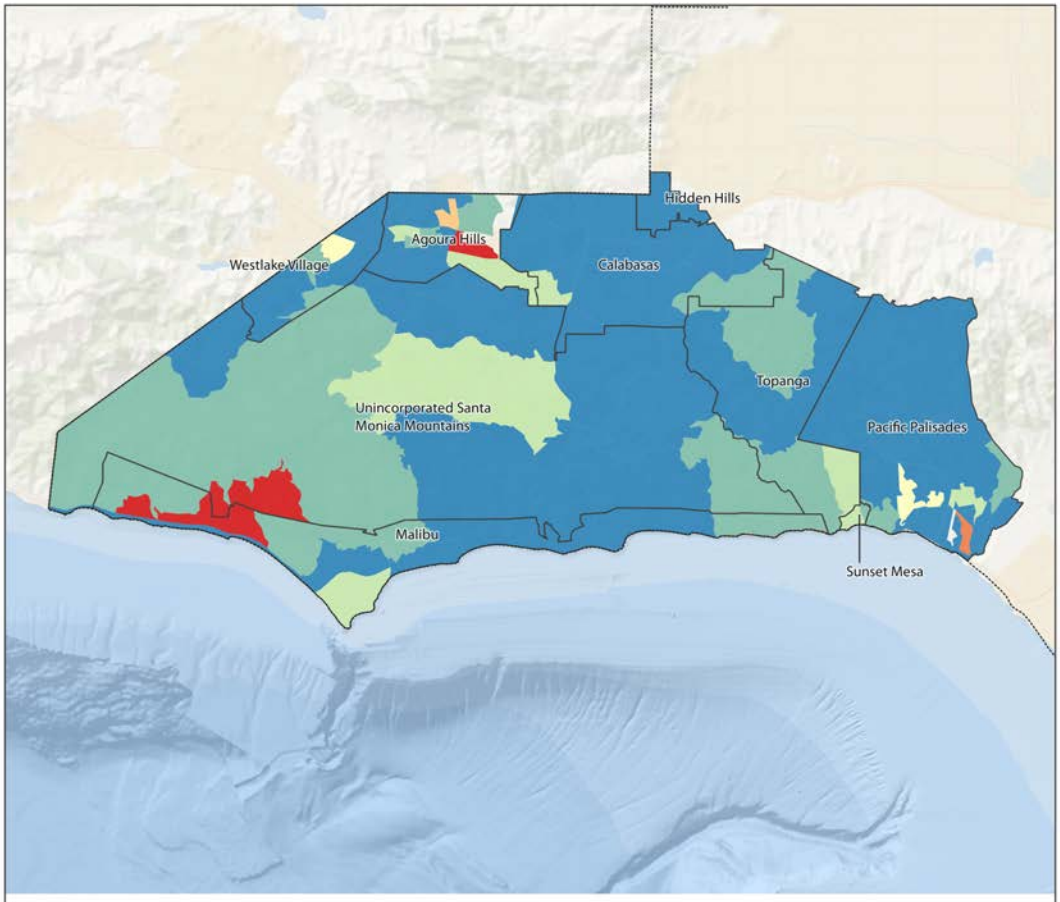
People who do not have a car (approximately 2.4% of the region's residents; 5% of City of Malibu residents;[107] 20% of community survey respondents and an estimated 90% of the non-resident day laborer community) and are therefore less likely to be able to evacuate or access emergency response centers.[108] As illustrated on *Figure 29:* **Households without Vehicle Access**, the region's households without access to a vehicle correspond to the areas with lower income and higher poverty rates, especially in Malibu, as well as in Agoura Hills and the Pacific Palisades where between 9.5% and 13.2% of residents do not have access to vehicles.

107 U.S. Census

108 Headwaters Economics, 2021

Figure 29

HOUSEHOLDS WITHOUT VEHICLE ACCESS



SOCIAL VULNERABILITIES

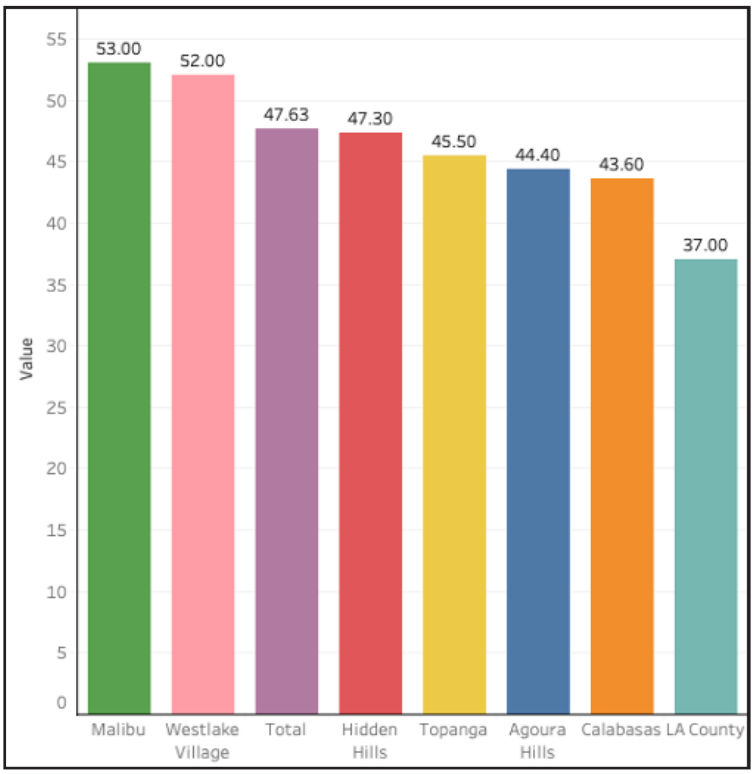
OLDER ADULTS

Older adults are especially vulnerable to the shocks and stressors of climate hazards.

Communities with high percentages of people over the age of 65 are more vulnerable to natural hazards since older adults, compared with younger people, are more likely to have pre-existing medical conditions and compromised mobility. Overall older adults have a diminished capacity to respond quickly and effectively implement emergency measures, and often rely on others for assistance. Moreover, older adults have a significantly higher mortality risk when exposed to extreme heat and other weather events. They are also at greater risk because of increased sensitivity to air pollution, including wildfire smoke, and a reduced ability to mobilize quickly. Socio-economic disadvantages, such as limited income, living alone, lacking a car and having a language barrier, further increases the vulnerability and adaptive capacity of this population.

Figure 30

MEDIAN AGE



As *Figure 30:* **Median Age** illustrates, the SMM WUI region is home to a disproportionately high percentage of older adults. While only 12.4% of LA County's residents are 65 or older, approximately 22% of the project region's population are in this age bracket. While the median age in LA County is 37, the median age in the SMM region is 45.

Figure 31: **Older Adults** shows where the highest concentration of older adults (people over the age 65) are living in the region. In general, the more mountainous and most fire-prone areas of the region are also home to the highest proportions of older adults: Malibu and Westlake Village (26%), the Pacific Palisades (27%) and Topanga (21%). About 18% of the population in Calabasas and Hidden Hills is 65 or over, while in Agoura the older population is approximately 16%.[109] The Pacific Palisades has the highest concentration of residents over the age of 65 with 40% - 50% of residents in more than half of the community area.

Figure 32: **Older Adults Living Alone** shows where there are high concentrations of older adults living alone. The data reveals that between 26% to 46% of older adults are living alone in the majority of unincorporated SMM. Significant portions of the older adult population in the City of Malibu and the Pacific Palisades are also living alone, from 20% to 46%.

109 U.S. Census

Figure 31

OLDER ADULTS

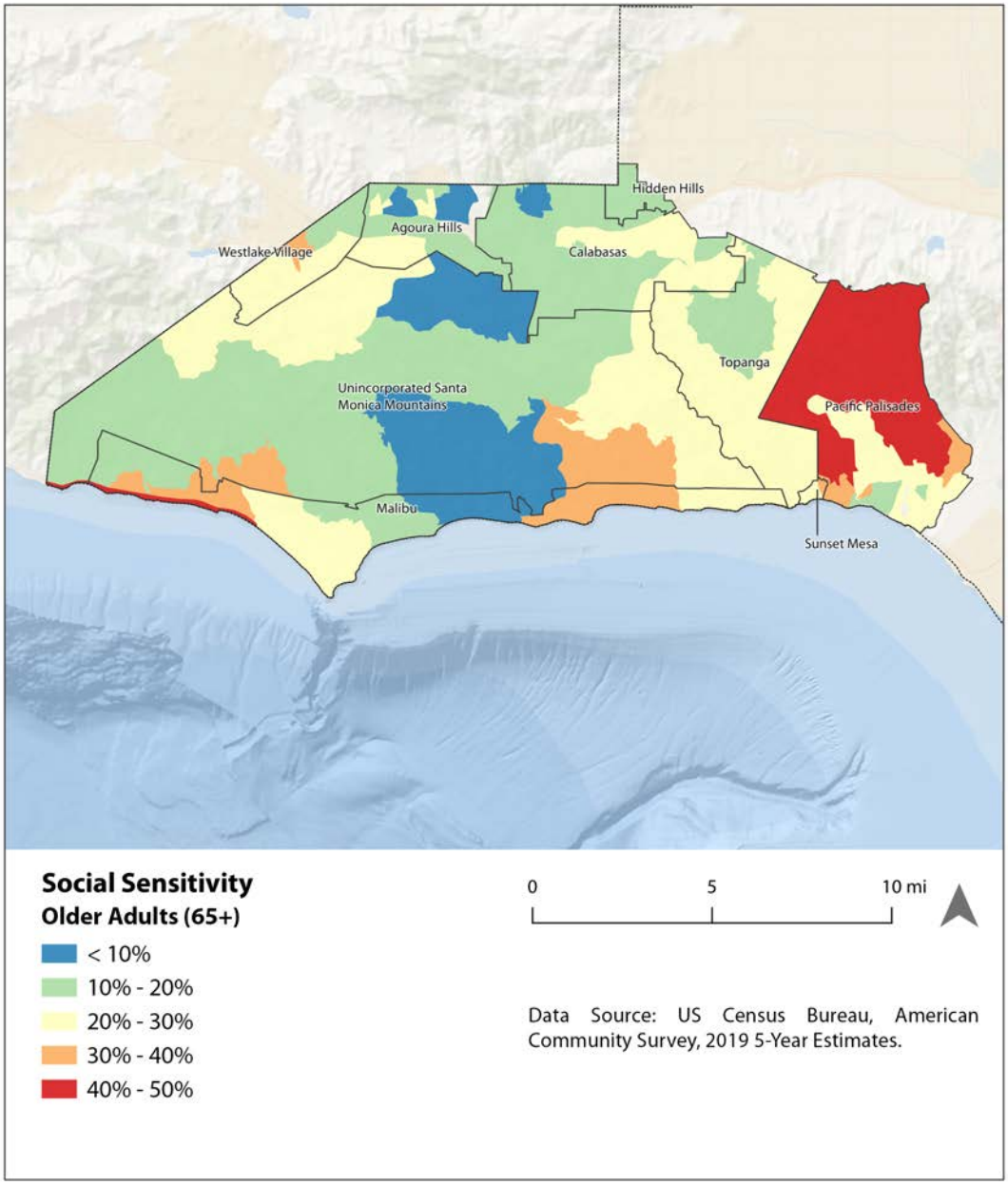
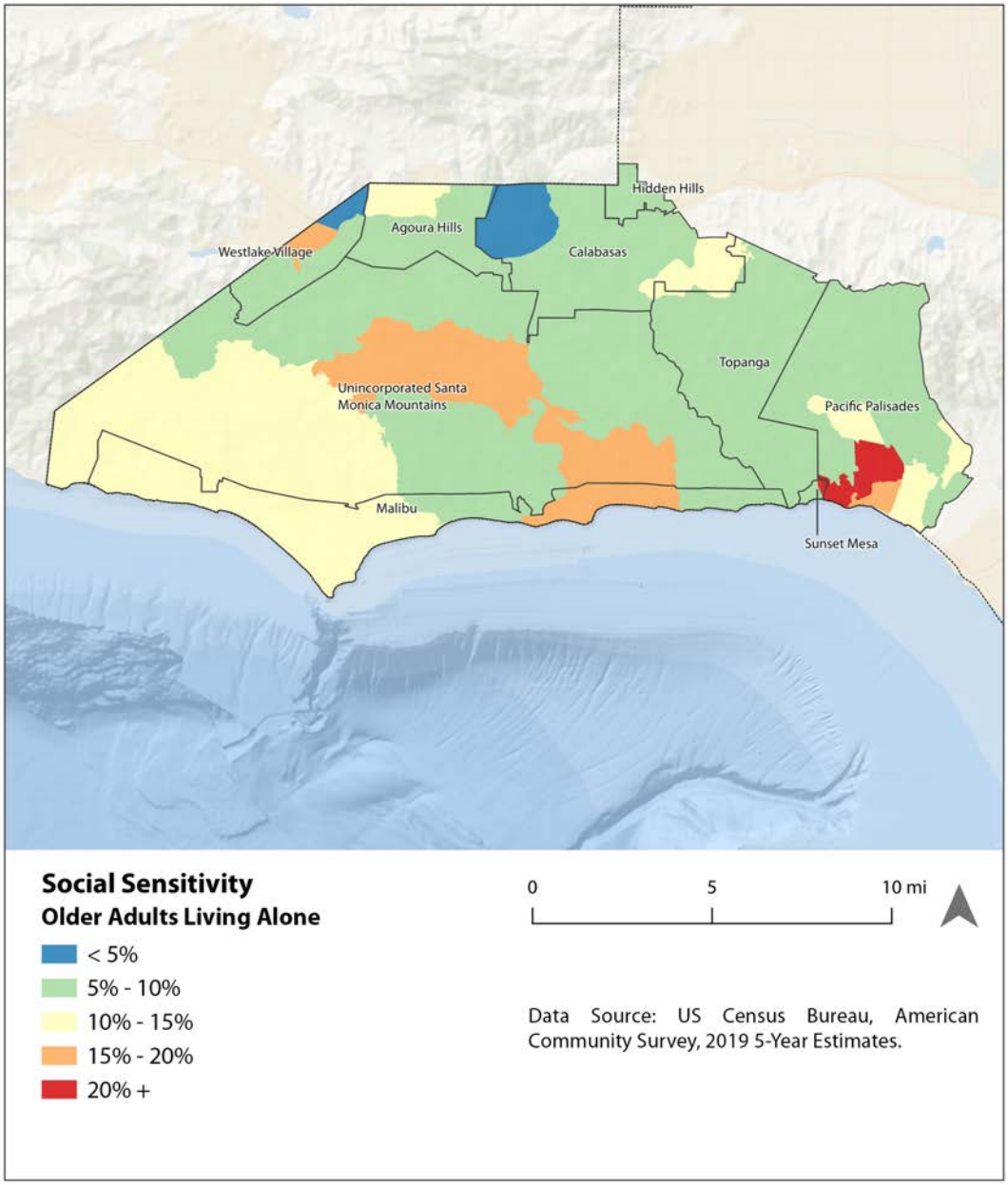


Figure 32

OLDER ADULTS LIVING ALONE



Communication Challenges for Older Adults

Maintaining effective communication channels is vital in a disaster. A principal characteristic of the older adult survey respondents is that they rely more on passive information channels including email alerts and TV news than on active methods such as internet searching to acquire disaster-related information. A significant percentage of older adults have limited technological capabilities which leads to difficulties receiving critical emergency alerts and communicating with people to ask for help. A significant proportion of this population do not have smart phones or do not know how to use many features of their phones, including how to sign up for emergency alerts, which are essential to being kept aware of local emergency events that may require immediate evacuation. Without the necessary education, technological resources and adequate support networks, older adults are disproportionately impacted during extreme weather events and other emergency situations.

Extreme Heat and Older Adults

Studies have found that increased temperatures during heat waves are a contributing factor to a rise in hospital admission rates. Older adults in particular face a higher risk for morbidity and mortality during extreme heat events as they are more susceptible to heat exhaustion, heat stroke, and complications related to preexisting conditions.[110] Being aware of the risks that older adults face related to extreme heat is critically important due to the increased frequency of extreme heat days on the horizon, and the large population of at-risk older adults in the region.

110 *Eady et al., 2020*

Health Impacts of Fire on Older Adults

Wildfire smoke, which often takes several weeks to dissipate, poses a great health risk to older adults who are more sensitive to air pollution and whose immune systems are less effective and responsive than those of younger people. Criteria air pollutants including carbon monoxide, nitrogen dioxide, volatile organic compounds, ozone, and particulate matter are emitted during wildfires and can persist in the environment at high concentrations. Fine particulate matter, which makes up most of the wildfire smoke, is of particular concern as they can get deep into the lungs, causing respiratory damage, and affecting the cardiovascular system through oxidative stress and inflammation.[111] Studies have shown people over the age of 65 have higher rates of hospitalizations for asthma, other respiratory conditions, cardiac arrests, and ischemic heart disease after being exposed to wildfire smoke.[112] The older adult population is also more likely to face challenges with evacuating during a fire, due to mobility limitations and not having access to a personal vehicle or being able to drive. Seniors without access to personal vehicles must rely on caregivers or neighbors to assist them as public transportation is not well incorporated throughout the region, according to input from the listening sessions.

111 *National Academies of Sciences, Engineering, and Medicine, 2019*

112 *Reid, 2016*

Survey Analysis of Older Adult Population

An on-line survey was made available to residents of the Santa Monica Mountains from February 15, 2021 to March 31, 2021 to assess their concerns surrounding topics such as climate change, extreme weather events, and resiliency efforts. Four hundred people participated, including 156 people aged 65 or older (approximately 39% of all respondents). For those above 65, wildfire evacuation (70%), air quality (54%) and access to water for fighting fire (54%) were among their top concerns.

See *Figure 33:* **What are your biggest concerns regarding wildfires and climate change?** for additional responses.

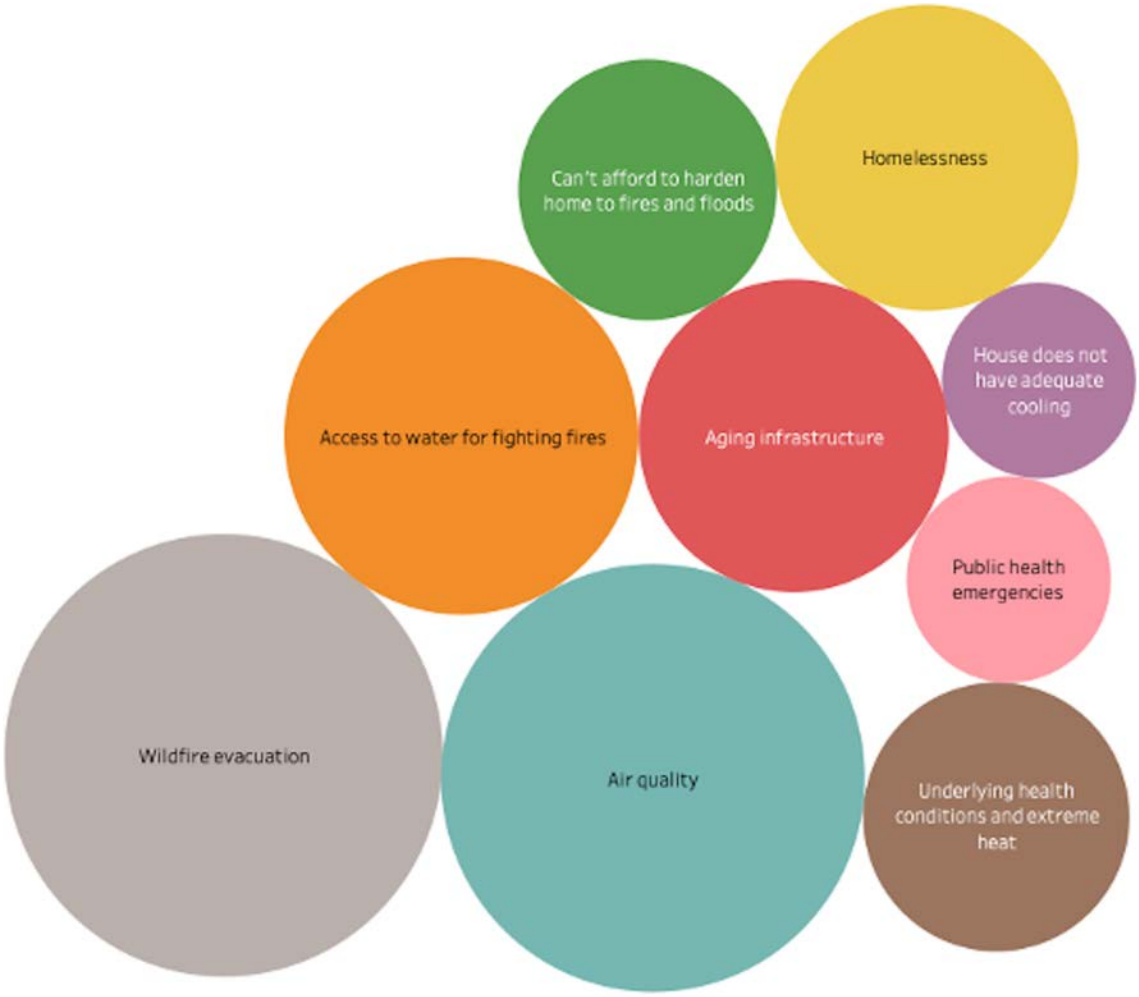
The survey also found that email alerts are the most preferred information channel for the older adult population, chosen by 59% of senior respondents, followed by word of mouth (49%) and TV news (49%). The ability to receive timely and quality disaster alerts plays a critical role in keeping the senior population informed during disasters, especially during urgent hazards like wildfires. A combination of communication methods is often more effective and can reach more people. See the Emergency Communications Section for more in-depth analysis and specific recommendations.

According to the survey, about 80% of older adult respondents indicate they have their own car and don't need to rely on others for transit. Decreased access to transportation and physical or behavioral disabilities can make it harder for the senior population to take proactive actions or evacuate to a safe area. Despite relatively high mobility, more than half of senior respondents plan to evacuate only after a mandatory evacuation order has been issued. Respondents suggested several reasons to explain this contradiction, including unclear egress routes and evacuation plans. Over 20% of senior respondents expressed concern about the lack of detailed evacuation plans in their area and were unsure about the proper egress routes to use in the event of an emergency.

Figure 33

WHAT ARE YOUR BIGGEST CONCERNS

regarding wildfires and climate change?



Older Adults-focused Listening Session

A 90-minute listening session via Zoom was held on April 29, 2021 for older adults in the region and attended by ten residents. Two additional residents provided written input. Key findings revealed the primary concerns of participants were frequent power outages during increasingly frequent emergency situations, technological challenges with communication systems, wide-spread uncertainty about evacuations, limited finances, and health concerns that limit their ability to mobilize quickly.

Listening session participants noted that power outages have been occurring with more frequency in recent years, and that outages tend to occur during high wind events and wildfires, which puts the health and safety of this vulnerable population at risk. It was underscored that many older adults rely on electronic medical devices for their well-being which become non-functional during an outage. One participant pointed out that air conditioners do not function during power outages which can significantly impact the health of older adults who are more are susceptible to heat exhaustion, heat stroke, and complications related to preexisting conditions. Another participant shared that her health condition requires her costly heart medication to be refrigerated, and thus a power outage could be deadly. Another participant noted power outages impact residents' ability to stay aware of emergency situations and alerts, as cell phone or cable-provided home phones do not work in emergencies when the electricity goes out. This participant urged that the safety and security of their city's older residents be prioritized by making the necessary investments to better prepare the community for future emergency events.

Listening session participants also raised concerns about issues with home hardening and creating and maintaining defensible space in preparation for future climate events. Although participants recognize that homes that have not been hardened for fire and lack defensible space put themselves and their neighbors at risk, many of the renovation recommendations are too costly for older adults to implement. Many of the participants have limited, fixed incomes and are in need financial assistance to make the required upgrades to their homes. In addition, several participants voiced that many older adult residents are confused about what is permitted and not permitted with respect to home retrofitting, including installing cisterns and solar systems, and could use assistance with City and/or County regulations to help them move forward on these projects.

Key Listening Session Takeways

Financial limitations and lack of technical knowledge make it difficult for older adults, especially those on fixed incomes, to harden their homes for wildfire, install solar energy systems and cisterns, and create defensible space. The listening session revealed a clear need for both technical and financial support for home retrofitting (including water capture and solar and battery backup), home hardening, defensible space as well as assistance with emergency communication systems.

In addition, many older adults in the region have limited mobility, and some are without personal transportation which limits their ability to quickly respond to climate emergencies and puts them in danger during extreme weather events. Moreover, evacuation orders and road closures often make it difficult for older residents to leave due to highly impacted roads and the inability for caregivers to enter the region and assist them.

RECOMMENDATIONS

to Improve the Climate Resilience of Older Adults

Target Audience

Individuals / Residents

- Obtain a hand-cranked radio.
- Prepare a climate disaster kit that includes at minimum: food and water for three days, essential first aid supplies, flashlight, radio, a hand-cranked radio, list of medications, important documents.
- Have a plan to evacuate safely and work with your neighbors and community. See CalFire's pre-evacuation steps and learn about the Ready, Set Go! Program.
- Sign up to emergency alert systems such as Alert LA County and Everbridge Disaster Mass Notification System. Evacuate early and heed warnings.
- Get involved in trainings: CERT, Firewise Community, Fire Safe Council.
- Install alternative power sources in case of an outage (solar battery or generator).
- Refer to local survival guides for location specific emergency information: Agoura Hills, Calabasas, Hidden Hills, Malibu, Pacific Palisades, Topanga, Westlake Village, Sunset Mesa.

Recommendations to improve the Climate Resilience of Older Adults

Target Audience

Local Community / Neighborhood

- Develop an inventory of all adults 65+ and assign neighbors to check on each one during an emergency event, and ensure they receive accurate emergency communications information.
- Designate local individuals willing to help distribute communications from fire/safety officials among community.
- Establish a funding stream for wide-spread public education and to distribute hand-cranked radios to individuals in need.
- Establish an inventory of older adults with mobility issues and identify funding to assist with transportation coordination during extreme weather events and climate emergencies.

Target Audience

City / County

- Run bi-annual evacuation drills that involve residents, businesses, response teams in coordination with other cities
- Organize ongoing communication assistance and emergency trainings that target the needs of the older adult community and include technical assistance with emergency communications and other hands-on guidance to ensure this community is better prepared.
- Identify a targeted and sustained funding source to improve access to solar with battery backup to blackout proof the homes of older adults. Some communities/utilities are also providing portable back up batteries to medical baseline customers for use during PSPS events: PG&E Launches Portable Battery Program for Income Qualifying Customers | PG&E (pge.com)

Recommendations to improve the Climate Resilience of Older Adults

Target Audience

Municipalities / Region

- Regularly revise evacuation routes to provide residents with feasible, up-to-date recommendations and alternatives.
- Provide residents with maps containing multiple possible egress routes throughout region.
- Identify grant funding opportunities and ultimately develop sustained funding sources for vulnerable residents to obtain resources that will strengthen their adaptive capacities, including communication equipment, solar power systems with battery backup, and resources to assist with home hardening, creation of defensible space.
- Improve affordability of insurance and collaborate with the CA Department of Insurance to compel insurers to recognize and reward residents who implement mitigation measures.

SOCIAL VULNERABILITIES

DAY LABORERS / DOMESTIC WORKERS / CAREGIVERS

Another prominent population in the region disproportionately impacted by the shocks and stressors of climate change are casual day laborers, domestic workers, and caregivers (collectively referred to as "Day Laborers" in this report).

Day laborers constitute a significant portion of the overall daytime population in the SMM WUI region. The vast majority of these workers are ethnically Latinx and of low socio-economic status. Day laborers who work in the SMM region overwhelmingly live in South Los Angeles and commute to the region by bus.[113] South Los Angeles is considered a disadvantaged neighborhood with a median household income of $33,661 and 30% of the population living below the poverty level.[114] Most of the region's day laborers are Spanish-speakers with limited English language skills, and an estimated 75-80% of the workforce are undocumented migrants, which limits their ability to obtain support in times of need.[115]

113 *Based on zip code data from participants of the Day Laborer Listening Session held on May 1st 2021 at the Malibu Labor Exchange.*

114 *Los Angeles Department of City Planning, 2017*

115 *Valenzuela, 2006; Public Policy Institute of CA, 2006*

Like the older adult population, day laborers are disproportionately vulnerable to the negative health effects of wildfire smoke exposure. For day laborers, their health risks are exacerbated by occupational hazards, low socio-economic status, and limited access to health care. Moreover, CalEnviroScreen data demonstrates a greater burden of dangerous air pollution (e.g., particulate matter and lead) on central and south Los Angeles communities compared to other parts of LA County, including the SMM region.[116] The South Los Angeles Health Equity Scorecard found South LA ranks poorly in multiple health outcomes, including asthma, due to chronic exposure to higher levels of industrial and transportation-related air pollution.[117]

Those working outdoors in agriculture, construction, and gardening are exposed to direct sunlight and heat for long hours. Wildfire smoke disproportionately affects outdoor workers as they are exposed to it in concentrated amounts for longer periods of time while simultaneously taking on physically demanding work. In previous wildfire disasters, it has been found these workers are often not provided with the minimal protective equipment such as N95 masks as they continued to work, which can lead to significant respiratory inflammation, infections, and disease.[118] According to a study conducted on the impacts of the Woolsey Fire, casual day laborers and domestic workers were recruited by some residents to help defend their employers' homes or assist with their evacuation process without appropriate training or personal protective equipment.[119] The day laborer community's higher rates of asthma makes wildfire smoke especially harmful to this group's health as it triggers and exacerbates this pre-existing condition.[120]

116 *California Office of Environmental Health Hazard Assessment, 2021*
117 *Community Health Councils, 2008*
118 *Mendez, 2020*
119 *Climate Resolve, 2021*
120 *Environmental Protection Agency, 2020*

Furthermore, many day laborers typically experience a loss of employment after disasters and are not eligible to receive financial support from the state or federal government due to the informal nature of their employment which can be economically devastating for them and their families. Even when eligible, immigrant communities may be concerned about their undocumented status and can be reluctant to seek help.[121] This group has been referred to as the invisible victims of disaster as their high exposures, economic precarity, and immigration status have made them especially vulnerable to the impacts of extreme weather events because they are not able to receive relief and are typically not considered in disaster planning efforts.[122]

In addition to health and financial challenges, day laborers also grapple with mobility and communication challenges, which puts them at greater risk during emergency situations, as noted above. Most day laborers rely on public transportation to travel to and from the region, which is usually not available during emergency events. Technological limitations such as not having a cell phone, reliable phone service, or not being signed up for the region's notifications systems also prevent them from receiving alerts and preparing for scenarios relevant to their work locations. As this group is essential to the residents and local economy of the Santa Monica Mountains, it is vital that this population be assisted to enhance their adaptive capacities, including helping them be better prepared for emergency events such as extreme heat and fire and minimizing their health risks to reduce the incidence of morbidity.

121 *Climate Resolve, 2021*

122 *Mendez, 2020*

Day Laborers / Domestic Workers / Caregivers Listening Session[123]

Participants expressed concerns about a range of issues related to worsening climate change impacts in the SMM WUI region, including frequent power outages, communication challenges and blackouts, health and safety concerns, a widespread lack of disaster preparedness, climate hazards, and their relationships to their employers. Several participants noted that power outages create difficulties for the laborers to complete their tasks and assist their employers with their daily living needs. They shared that during blackouts they often seek the support of neighboring workers who are in homes with auxiliary power systems such as generators and solar battery backup. Many of the participants and their counterparts working in the region either do not have cell phones or smart phones, and those that do still have challenges with sending and receiving calls and texts in general, especially during emergency events. Most of the listening session participants were not registered or even aware of the existence of the emergency alert systems, which are critical public safety resources that help people reduce their risks and assist them with accurate evacuation information during dangerous events.

Several participants stated they have worked outside during poor air quality conditions, including from wildfire, without proper personal protective equipment such as N95 masks. Several of the participants lost their jobs as a result of the Woolsey Fire. Even if their employers' homes were not destroyed, wildfire circumstances caused the loss of their employment opportunities for an extended period which put a severe financial strain on them, their families and greater community. The concerns shared during this discussion gave insight into the unique vulnerabilities that day laborers and domestic workers face related to climate hazards such as wildfires and extreme heat events which will continue to occur with increased regularity, intensity, and duration in this region.

123 *A two hour in-person listening session for day laborers and domestic workers was held at the Malibu Community Labor Exchange on May 1, 2021. It was attended by a group of 25 men and women who have worked in the local region (primarily Malibu) between 6 months and 21 years.*

RECOMMENDATIONS

to Improve the Climate Resilience of Day Laborer / Domestic Worker / Caretaker Community

Target Audience

Individuals / Residents

- Prepare a personal disaster kit including food and water for three days, first aid kit, flashlight, a communication device, radio, list of medications, important documents
- Consider alternative transportation methods in case of a shutdown of public transportation. Alternatives may include planning to seek support from employers or other laborers with personal vehicles.
- Sign up for regional alert system notifications - Alert LA County, Everbridge Disaster Mass Notification System, and see LA County Emergency Survival Guides in Spanish and other languages
- **Employers:** Ensure your workers have a reliable cell phone. Help them register for emergency alerts, provide cool water and shaded areas during extreme heat days to reduce health risks for outdoor laborers, and provide PPE for workers during poor air quality and hazardous conditions. Include workers in any disaster emergency planning (same as for family).

Recommendations to Improve the Climate Resilience of Day Laborer / Domestic Worker / Caretaker Community

Target Audience

Local Community / Neighborhood

- Provide workers with essential resources such as water, shaded resting areas, and transportation out of area in an emergency.

Target Audience

City / County

- Those with limited English proficiency are at risk of missing critical messaging, especially if they rely on word-of-mouth communication. Access to up-to-date hazard information is crucial in preparing for climate emergencies. Provide multi-language (starting with Spanish, the second most prevalent language in the region) disaster materials and trainings for people with limited English.
- Distribute Spanish-language preparedness guides and tools to this population on a regular basis.

Target Audience

Municipalities / Region

- Develop a financial assistance fund to support casual day laborers, domestic workers and caregivers during the period of disaster and recovery.
- Develop & promote more accessible regional alert resources and systems in Spanish.

SOCIAL VULNERABILITIES

MOBILE HOME COMMUNITIES

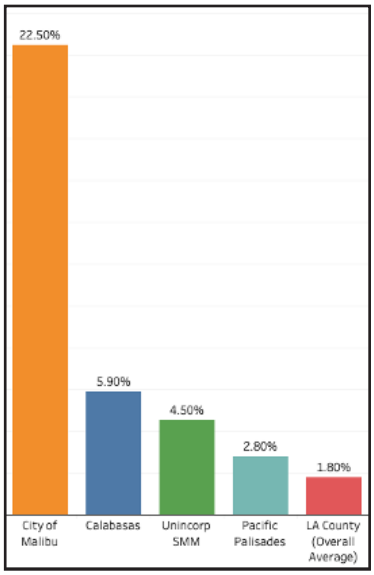
A significant number of the SMM region's residents live in mobile home parks in comparison to LA County. A mobile home is a prefabricated structure, built in a factory on a permanently attached chassis before being transported to a location. Used as permanent homes or temporary accommodations, they are often left permanently in one place.

The community in the region with the largest percentage of people living in mobile homes is the City of Malibu, with an estimated 22.5% of residents living in mobile homes. See *Figure 34:* **Mobile Homes**. The other communities in the region with residents living in mobile homes are Calabasas with 5.9%, unincorporated Santa Monica Mountains with 4.5%, and the Pacific Palisades with 2.8%. In comparison, only approximately 1.8% of LA County's total population resides in mobile homes.[124]

124 *U.S. Census Bureau (2018)*

Figure 34

MOBILE HOMES



There are 1,760 mobile home sites in the region. Along the coast, the mobile home parks include Paradise Cove (256 sites), Point Dume Club (297), Malibu Village (29), Pacific Palisades Bowl (178), and Tahitian Terrace (158). Inland, the mobile home parks include Blu Dude Mobile Home Park (13), Seminole Springs Mobile Home Park (215), Oak Forest Mobile Estates (197), Calabasas Village Mobile Estates (210), and Woodland Park Estates (207).

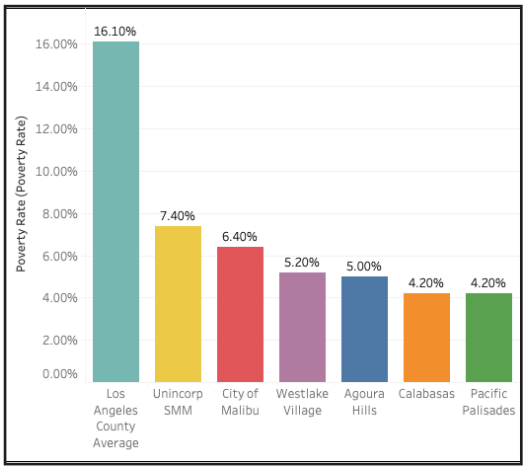
Residents of mobile homes are typically of lower-income status and utilize mobile homes as an affordable housing opportunity. In 2017, the median household income for mobile home residents was approximately $30,000, which was about half the national median household income of $60,336 at that time.[125] While residents of the SMM region have a high-income level on average when compared to LA County, a significant portion of people are living beneath the state of California's poverty threshold of $49,460 for an individual, $67,640 for a couple and $103,000 for a family of four.

See *Figure 35:* **Poverty Rate.**

125 *Dhesi, S. (2018) Protecting Mobile Homes as Affordable Housing. UCLA Law Review.* https://www.uclalawreview.org/protecting-mobile-homes-as-affordable-housing/#_ftn19

Figure 35

POVERTY RATE



People living in mobile homes are considered highly vulnerable to the impacts of climate change including extreme weather events, such as extreme heat and cold, as mobile homes are less energy efficient with lower levels of insulation than site-built homes for the same era, and many are not equipped with air conditioning which is costly to operate.[126] Lower income mobile home residents may also be more susceptible to the associated health consequences of extreme heat exposure such as dehydration and heat stroke, as their limited income reduces their capacity to adapt and recover and receive quality healthcare. People living in mobile homes often lack sufficient resources to install air conditioning units and pay for the increased associated monthly utility bills.[127] Mobile home communities are also more prone to utility shutoffs which further contributes to the ability to adapt to and recover from extreme weather events. The mobile home communities in the more rural, mountainous part of the region, such as Blu Dude and Seminole Springs, are especially susceptible to climate hazards such as wildfires, extreme precipitation, and landslides.[128]

126 *Vulnerability, Housing. (2021). Convergence of Climate-Health-Vulnerabilities. Retrieved from https://convergence.unc.edu/vulnerabilities/housing;*

127 *Gabbe, C. J., & Pierce, G. (2020). Extreme Heat Vulnerability of Subsidized Housing Residents in California. Housing Policy Debate, 30(5), 843-860; George, L. (2016). Manufactured Housing. National Low Income Housing Coalition. http://nlihc.org/sites/default/files/Sec6.03_Manufactured-Housing_2015.pdf*

128 *Pierce, G., & Jimenez, S. (2015). Unreliable water access in U.S. mobile homes: Evidence from the American Housing Survey. Housing Policy Debate, 25(4), 739–753.*

RECOMMENDATIONS

to Improve the Climate Resilience of Mobile Home Communities

Target Audience

Individuals / Residents

- Plan to evacuate early in emergency situations.
- Sign up to emergency alert systems: Alert LA County, Everbridge Disaster Mass Notification System.
- Prepare a personal disaster kit including food and water for three days, first aid kit, flashlight, a communication device, radio, list of medications, important documents.
- Shade windows.
- Install energy efficient air conditioners.
- The Low-Income Home Energy Assistance Program (LIHEAP) assists eligible low-income households with their heating and cooling energy costs, bill payment assistance, energy crisis assistance, weatherization and energy-related home repairs.

Target Audience

Local Community / Neighborhood

- Discuss evacuation plans and hold drills with community.
- Designate individuals to check-on vulnerable neighbors.
- Collaborate on projects to increase tree canopy.

Recommendations to Improve the Climate Resilience of Mobile Home Communities

Target Audience

City / County

- Subsidize reflective roofs and paving/green roofs.
- Increase tree canopy coverage among these neighborhoods.

Target Audience

Municipalities / Region

- Provide funding assistance for mobile home residents to install or upgrade insulation and energy efficient air conditioning.
- Provide opportunity for mobile home communities to obtain solar power and backup energy sources for utility shutoff events.

SOCIAL VULNERABILITIES

THE BUSINESS COMMUNITY

The Santa Monica Mountains WUI region is home to approximately 12,944 businesses, most of which are small, and many are home-based. The top sectors by revenue are retail, food services and healthcare. The most populated city of the region, Calabasas, has the largest business community with just under 5,000 businesses. Agoura Hills, with the second largest population in the region, has just under 4,000 businesses.[129] Malibu also has a significant number of businesses with approximately 2,500.[130] Topanga has just over 1,500 businesses, and according to the Pacific Palisades Chamber of Commerce, there are 84 businesses registered in the Pacific Palisades,[131] and about 40 businesses are located in Hidden Hills.[132]

To better assess the business community's vulnerabilities to extreme weather and climate disasters, attempts were made to interview key staff at several of the region's chamber of commerce associations. In the end only one interview was conducted, with Barbara Bruderlin, the CEO of the Malibu Chamber of Commerce, which has approximately 550 members.[133]

129 https://www.census.gov/quickfacts/losangelescountycalifornia

130 https://www.census.gov/quickfacts/fact/table/malibucitycalifornia/PST045219

131 https://www.palisadeschamber.com/

132 https://www.chamberofcommerce.com/united-states/california/hidden-hills/

133 *Several attempts were made to contact other local chambers, however only one interview was conducted, with Malibu Chambert CEO Ms. Bruderlin (on July 20, 2021).*

Ms. Bruderlin identified the region's unreliable communication and electrical systems as the key challenges for the business community, especially during emergencies. She also noted that in the City of Malibu, businesses are not required to have a business license to operate, which makes it difficult for the Chamber and the City to maintain a comprehensive directory of the business community. According to Ms. Bruderlin, the lack of a business license contact database makes the business community especially vulnerable during extreme weather and related emergency events, as contact information for business community members is spotty and unreliable. Ms. Bruderlin further noted that social media was one of the most widely used and effective platforms used during the 2018 Woolsey Fire to reach out to people in need, however the lack of clear methods of communication within the community made it a challenge for the Chamber and the business community to spread the word and provide necessary resources such as information about assistance with evacuating the region. In the absence of reliable cell phone service, Ms. Bruderlin suggested every business have access to a satellite radio as a more reliable means of communication. During the Woolsey Fire tourist companies offered to help businesses and residents evacuate and bring food and other supplies into the area via ferry service, but according to Ms. Bruderlin, it was too difficult to connect this information to the proper authorities to operationalize the system.

Although most business structures physically survived the Woolsey Fire, they faced economic challenges long after the fire stopped burning. In Malibu, two restaurants burned down in the fire and four others closed soon after because their customer base shrank significantly and it was deemed too costly to keep the businesses open.[134] A report analyzing the Woolsey Fire impact on the local businesses found that five percent of businesses across all sectors permanently closed following the fire. Arts and entertainment businesses, bars, and restaurants were the most impacted business sectors.[135] In response to the impact of the Woolsey Fire on businesses, the Malibu Chamber provided free memberships, and assisted their access to grants and other business assistance programs made available by the county and the state. According to Ms. Burderlin, many businesses were affected by the wildfire smoke and many people in the business community suffered from Post Traumatic Stress Disorder (PTSD) after

134 https://www.kcrw.com/news/shows/greater-la/a-pending-rule-change-for-airbnb-and-other-short-term-rentals-in-la/which-malibu-restaurants-didnt-survive-the-woolsey-fire

135 The impact of wildfires on local businesses. (2021). https://www.womply.com/impact-of-severe-weather/wildfires/

the fire. To address this issue, the Chamber created on-line wellness support sessions for the community. The Chamber also launched a “Shop Malibu” campaign to attract customers back into the community to revive the businesses and bring revenue back into the community. The eight-month campaign was widely supported by the business community.

Business activity tends to slow down during extreme heat, which often discourages people from going out and patronizing businesses. Other climate change impacts negatively affecting coastal Malibu are storm surge events, sea level rise, and the erosion and degradation of beaches. According to Ms. Bruderlin, discussions are beginning to take place among the coastal business community about strategies to address these concerns, including ways to stem beach erosion and provide storm protection for coastal structures.

Finally, Ms. Bruderlin expressed concern that the local business community is getting priced out of the Malibu market as rents in the large shopping centers have become cost prohibitive for small business owners. She suggests that to improve affordability, shopping centers should subdivide the larger vacant spaces to accommodate smaller businesses. Strengthening the economic barriers faced by small businesses will improve their resiliency during times of challenge such as climate disasters.

RECOMMENDATIONS

for Business Community Climate Resilience

Target Audience

Municipalities / Region

- Require business licenses in the City of Malibu and unincorporated SMM. This will create a reliable and up-to-date contact to facilitate communications and generate revenues to better support the community, especially during emergencies.
- Ensure all businesses are equipped with satellite radios to provide communications during periods of cell service outage.
- Consider using drone technology to improve the dissemination of information in the area.
- Follow examples of strategies implemented by people of the community to protect their properties. For example, the Calamigos Ranch used an advanced sprinkler system and other smart technology to save the property from the Woolsey Fire.
- Increase awareness of and access to programs for reduced cost solar PV with battery backup for islanding capabilities during electricity blackouts.
- Create an alternative evacuation route to alleviate the gridlock that happens on PCH by utilizing ferries and other boats and creating an evacuation-by-sea plan for the community.

SOCIAL VULNERABILITIES

THE UNHOUSED COMMUNITY[136]

An estimated 150-170 people experiencing homelessness (PEH) live in the SMM WUI region.[137]

See *Figure 36:* **Point-in-Time Homeless Count**. Most of the region's unhoused population seek shelter along the Malibu coastline, including those in parked vehicles along the beach. Of the total population, approximately twenty PEH live in the Las Virgenes area, including Agoura Hills and Calabasas. Often overlooked, PEH in the SMM region are especially affected by climate change impacts, as they are more directly exposed to the extreme weather conditions. PEH have limited resources available to them to assist with their disaster preparedness and a limited ability to be proactive in emergency situations.

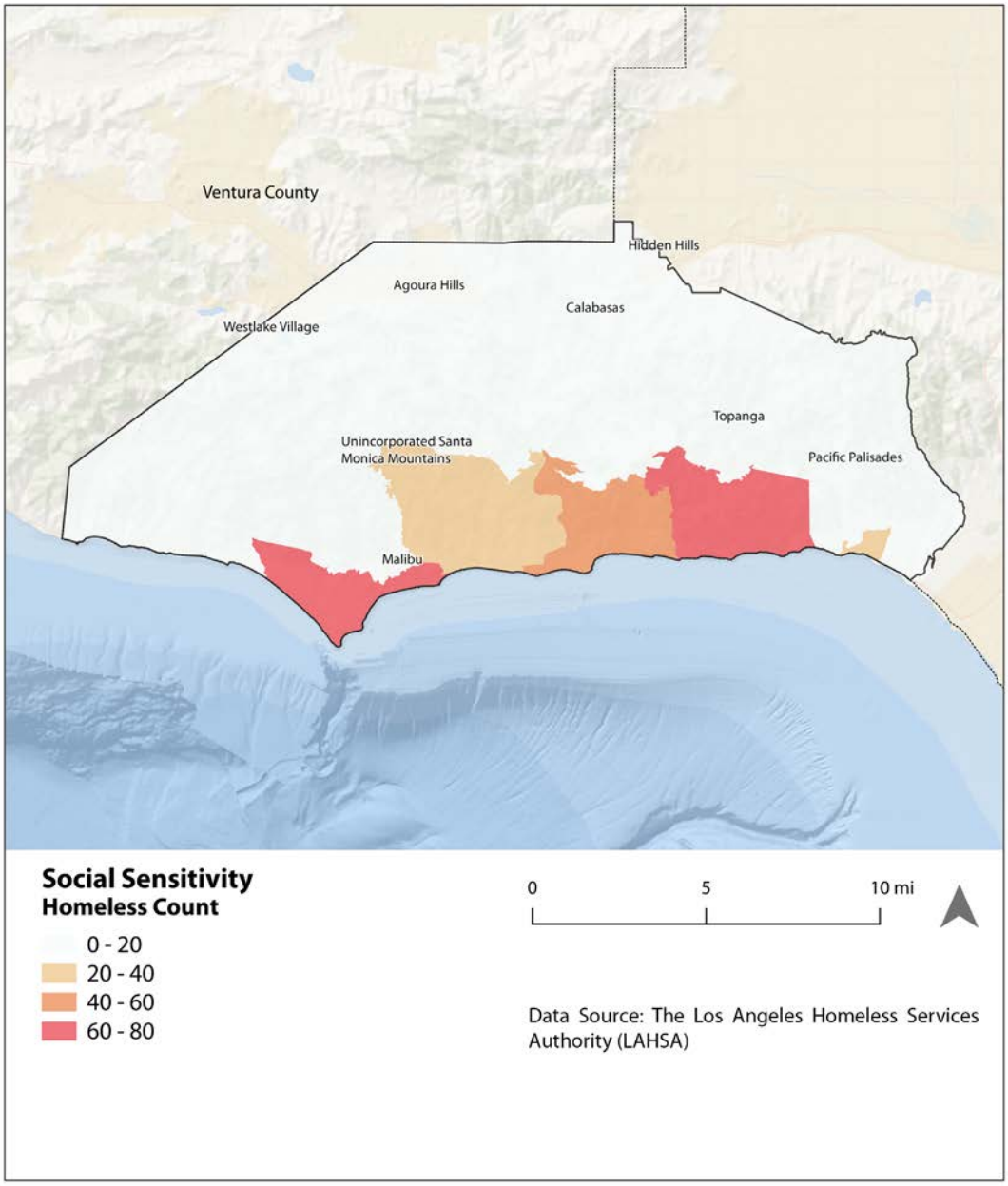
One of the primary challenges faced by unhoused community is the ability to evacuate during emergency events. Many PEH have been living in the region for several years and have established their belongings at their encampment sites. During an evacuation order, these groups do not have vehicles to transport their belongings out of the area which causes many to stay back and not leave the area if they are not in immediate danger. Remaining in the region during an evacuation order puts this population in danger and increases their health risks. For example, in the event of a wildfire, PEH

136 *To assess the climate vulnerability of the region's unhoused community, several interviews were conducted with key individuals working directly with this community through "The People Concern" and the Community Assistance Resource Team (CART). Interviews were held with Gabriel Graham on June 8, 2021 who focuses on the Las Virgines area and Victoriya Karpilovich Arenas on June 15, 2021 from The People Concern. On May 27, 2021 an interview was conducted with Kay Gabbard, a dedicated volunteer and advocate, and member of the CART board who leads a daily meal service for the homeless community in Malibu.*

137 *An annual count of the region's unhoused population is conducted as part of LA County's Homeless Population Count.*

Figure 36

POINT-IN-TIME HOMELESS COUNT



would be exposed to smoke and particulate matter than can damage their respiratory health. Assisting this community during evacuations has been made difficult for outreach workers because they are often not allowed into the region during emergencies.

People experiencing homelessness also face communication challenges with evacuation orders as some people in the community do not have cell phones and are not able to receive emergency alert notifications. Even if they do have cell phones, many lack a reliable location to recharge their phone and cell service in the region is often unreliable.

Another concern is the risk of fires in homeless encampments themselves. There are many encampments located in the brush made up of tents and makeshift shelters which are fire hazards if precautions are not taken. Although campfires are not allowed in the region, multiple small fires have been started by people experiencing homelessness, with one of the most recent high-profile cases being the Palisades Fire in May 2021.[138] Many PEH consider themselves to be part of the overall community and want to do their part to avoid fires and preserve the environment -- several small fires have been called in to the LAFD by people within the unhoused community, which has helped to ensure containment, avoid property damage, and provided protection for the greater community.

The People Concern, a Los Angeles County social services agency, and the Malibu Community Assistance Resource Team (CART) are the two primary organizations in the region focused on supporting the unhoused population. The City of Malibu funds two homeless outreach workers from The People Concern who assess the needs of the unhoused community and work to connect PEH with health care, transitional or permanent housing, and other resources. These outreach workers are also responsible for helping PEH evacuate from known encampment sites during emergencies. The People Concern was involved during the COVID pandemic by providing the unhoused community with PPE, COVID testing, and vaccination services. CART's mission is to "help stabilize the homeless, where possible, and help connect these individuals with available services, with the belief that this will benefit the broader community while

138 *Pinho and Winton, 2021*

lessening the suffering of all involved."[139] CART provides meals, transports people to shelters during extreme weather events, partners with other organizations to bring health services into the region, and hosts bi-annual "CONNECT" events at the Malibu Civic Center where PEHs can obtain medical services, dentists, DMV services, food stamp applications, haircuts, and clothing.

Kay Gabbard, a longtime Malibu resident, has volunteered her time to help meet the needs of the unhoused population since 2014. Kay leads a volunteer group people focused on feeding this vulnerable community through the Malibu United Methodist Church and provides PEH a daily meal five days a week. Kay's group has established relationships with local grocery stores and Pepperdine University and collects food on a regular basis for the unhoused community.

Ms. Gabbard also works with the City of Malibu's "Homeless Community Task Force" which has recommended establishing a PEH resource center and transitional housing in Malibu. The resource center would provide the following for the local unhoused community: lockers, showers, drinking water, food, charging stations for cell phones, and limited short-term housing and services to connect people with permanent housing. Although the proposal to establish and manage a permanent facility for the unhoused community has received a "Not In My Backyard" backlash, and funding remains elusive, City Council members and others in the greater community agree that more resources are needed to help improve the living conditions of these individuals and support their transition into transitional or permanent housing.

To improve the adaptive capacity of the region's unhoused population, and to create a safer environment for the entire region, the vulnerabilities of this population must be adequately addressed.

139 *About Us. (2019). Malibu C.A.R.T.* https://malibucart.org/about/

RECOMMENDATIONS

to Increase the Climate Resilience of the Unhoused Community

Target Audience

Individuals

- Make use of services provided by outreach groups.
- Remain vigilant and report any hazardous situations.
- Review the Malibu Survival Guide

Target Audience

Local Community / Neighborhood

- Use community networks to remain informed during extreme weather events.
- Work together to evacuate safely and early.
- Identify areas near encampment sites that are safe to evacuate to/ seek shelter during extreme weather events such as storms.

Recommendations to Increase the Climate Resilience of the Unhoused Community

Target Audience

City / County

- Allow people experiencing homelessness (PEH) to seek shelter in public areas such as libraries during emergencies.
- Identify funding and establish a permanent facility to provide services such as a temporary shelter, bathrooms, showers, and charging stations for PEH
- Ease restrictions for permitting individuals to use these facilities.
- Facilitate and decrease duration of process for obtaining transitional housing.
- Establish transportation methods such as dedicated vans that can move people out of the area during an evacuation order when public transportation is shut down.

Target Audience

Municipalities / Region

- Provide funding assistance for mobile home residents to install or upgrade insulation and energy efficient air conditioning.
- Provide opportunity for mobile home communities to obtain solar power and backup energy sources for utility shutoff events.

SOCIAL VULNERABILITIES

SACRED NATIVE AMERICAN SITES

Native Americans have lived in the Santa Monica Mountains and the surrounding area for approximately 14,000 years. Their lifestyle was built on the abundant food and materials provided by the local environment. Today the descendants of these people are known as the Chumash who primarily populated the coast and the Gabrielino Tongva, as well as the Tataviam, in the inland areas of the region.[140] The Chumash tribe was the most populous tribe, with an estimated 7,000 square miles of territory between Malibu and San Luis Obispo. Approximately 200 years ago there were an estimated 20,000 Chumash, today there are about 4,000-5,000 people of Chumash descent living in California, most of whom reside in Ventura, Santa Barbara and San Bernardino.[141] In comparison, the Gabrielino Tongva had an estimated population of about 5,000 when Europeans first arrived in California in the 1600s, and approximately 2,500 of their descendants remain in the Southern California area.[142]

The name "Malibu" is derived from the Chumash word "Himaliwu" which means "Where the surf sounds loudly". The Himaliwu village occupied a hill across from Malibu Lagoon State Beach. Sycamore Canyon, which cuts through Rancho Sierra Vista and Point Mugu State Park, was part of an important Chumash trade route. Satwiwa, which means "the bluffs," was the name of a nearby Chumash village.

140 https://www.nps.gov/samo/learn/historyculture/nativeamericanindians.htm

141 https://www.latimes.com/archives/la-xpm-1990-06-12-mn-154-story.html

142 https://www.latimes.com/projects/la-me-col1-tongva-language-native-american-tribe/
https://www.rancholoscerritos.org/tongva/

The Chumash were skilled artisans and made a variety of tools out of wood, whalebone, and other materials, fashioned vessels of soapstone, and produced some of the most complex basketry in native North America. They were also purveyors of clamshell-bead currency. Although the native peoples are no longer living in the Santa Monica Mountain region, sacred burial sites and other artifacts have been left behind by their ancestors and are of critical historical and cultural importance.[143] These sacred sites are under threat by vandals, development, and accelerated erosion from climate hazards – including more frequent wildfires, extreme precipitation, and landslides. Climate change affects the integrity and stability of the land by altering ecosystem processes and biodiversity. Native ecosystems provide a rich array of benefits and services including habitat for fish and wildlife, drinking water storage and filtration, fertile soils for growing crops, buffering against a range of stressors, and aesthetic and cultural values.

Indigenous "traditional knowledges" have emerged in climate assessments, policies, and adaptation strategies, and have been defined as "a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment." Speaking for the Chumash Community, Julie Tumamait stated, "a primary concern of the Chumash population is that our sacred sites are being damaged and eroded by climate hazards in the Santa Monica Mountain region." After the Woolsey Fire, Ms. Tumamait assisted FEMA and Cal OES with assessing the impacts of the fire on the Chumash sites. She and her team discovered village sites, burial sites, rock art and painted caves. An inventory and mapping of a subset of sacred tribal properties impacted by the fires was created but is being kept confidential to prevent looting.

143 *Virtual Interview with Julie Tumamait on July 19, 2021.*

Over the years numerous burial sites and artifacts have also been lost and damaged by private development. Many residences and businesses have been built on top of these archeological sites which has rendered them inaccessible to preservation efforts. Although efforts have been made to contact homeowners and catalog these sites, little progress has been made. The Satwiwa Native American Indian Culture Center within the SMM National Recreation Area in Calabasas and the Wishtoyo Chumash Village on Nicholas Canyon Beach in Malibu (which was severely damaged by the Woolsey Fire) serve as two cultural education sites. Although the Satwiwa Native American Indian Culture Center was spared by the Woolsey Fire, adjacent National Park Service (NPS) trails were damaged and closed for an extended period.

Santa Monica Mountains — Before and After 2019
Photo by Michael Racanelli (Instagram @mikeracanelli)

RECOMMENDATIONS

to Improve the Climate Resilience of Native American Sacred Sites[144]

Target Audience

Municipalities / Region

- Improve preservation efforts of the remaining sacred sites, including a well-funded expansion of archeological records research.
- Eradicate non-native trees and plants, including invasive mustard which provides fuel for fire, and have grown around many of the sacred sites and crowded watersheds.
- Disallow landscaping with non-native plants and support the reintroduction of native trees and plants (including Coast live oak, Lemonade berry, Chaparral yucca and Toyon) to improve water and soil retention and provide bioretention which filters stormwater to restore the land, support habitat for butterflies and other native fauna, as well as increase overall fire resiliency.
- Mandate and fund sustained public education about native plants, native American history, and the importance of sacred site preservation.

144 *Virtual Interview with Julie Tumamait on July 19, 2021.*

EMERGENCY COMMUNICATIONS AND CLIMATE RESILIENCE

The unreliability of the region's emergency communication system during extreme weather events and emergencies, and confusion around protocols was identified as a primary topic of concern by SMM residents who participated in the online community survey.

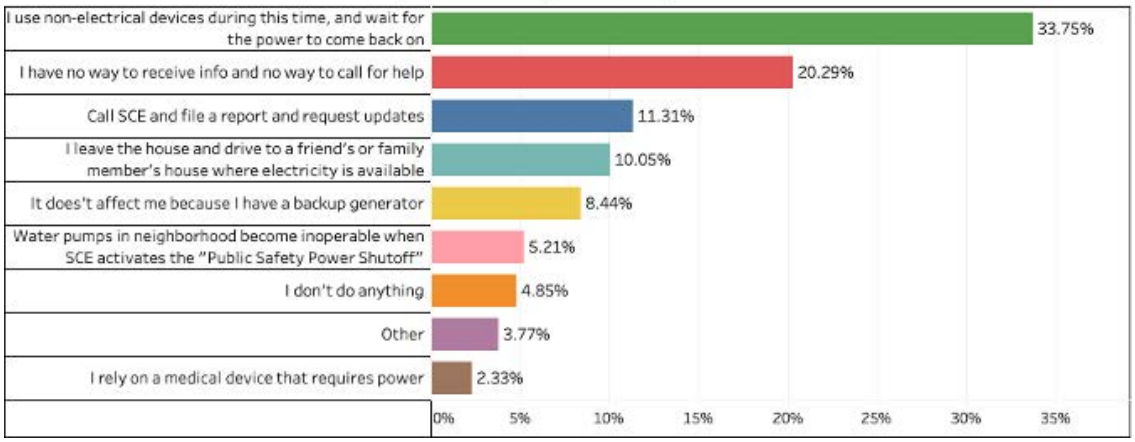
Through the listening sessions, it became clear that reliable communications, and specifically emergency communications, are critical to the climate resilience of those who live and work in the SMM WUI, and that special attention is needed to scale up the technical skills of older adults and the day laborer community.

The reliability of emergency communication systems is an essential and critical aspect of maintaining public safety. Emergency communications include alerts, warnings, directives about evacuation, information about response status, and hands-on assistance to impact response and recovery. Emergency communication can be delivered via cell phones, lined-based phones, SMS/text messaging, social media, emergency-oriented computer screen pop-ups., TV, hand-cranked and battery-operated radios, satellite phones, citizen band radio and Family Radio Service (FRS) handheld two-way radios. Impairment of communications capability caused by a lack of power or service is especially dangerous during emergencies such as wildfires which require swift and orderly evacuation out of the area and to safety.

Figure 37

POWER SHUTOFF

What do you do in Response to a Power Shutoff?



Community Survey Communications-focused Results

Twenty-two percent of survey respondents expressed they do not have reliable modes of communication for extreme weather and emergency situations, including reliable cell phone and internet coverage. About 18% of total survey participants reported they do not have a way of receiving news or critical information, 12% of survey respondents are not able to call for help when there is a power outage, and 64% of respondents reported they do not have reliable cell phone coverage. Although battery operated and hand-cranked radios are reliable tools to use during disasters because they don't require an additional power source, only 30% of total survey respondents reported having a hand-cranked radio.

Figure 37: **What do you do in Response to a Power Shutoff?** illustrates how survey respondents respond during power outages.

The survey results further indicate there is a significant older adult population who are less able to cope with climate emergencies, due to unreliable modes of communication and electricity, poor mobility, insufficient evacuation plans, lack of preparation and lack of community connectivity. The survey revealed older adults typically choose to receive disaster-related information through more passive (non-internet) formats, including email alerts, TV news and word of mouth.

The survey found distinct information sourcing preferences between age groups. For instance, social media is ranked as the third most prevalent information source by younger people (ages 18-64), while only 26% of seniors choose it to obtain notifications. Understanding the disaster-related information-seeking behavior for older adults is particularly important to inform and improve public safety and disaster coping strategies. Timely, accurate, and accessible disaster alerts are critical to keeping the older adult population informed during disasters, especially fast-moving hazards such as wildfires.

These survey findings demonstrate the need for wide-spread education and financial support for residents who lack the means to be adequately prepared for climate disasters, especially for the communities with the highest ratio of older adults, in order to increase the capacity of these community members to evacuate safely during emergency situations, recover, and thrive. Furthermore, providing multiple modes of accessible and reliable communication is necessary to ensure public safety during climate hazards. Providing this redundancy ensures that back-up communication channels are available even if one or more are not functioning during an emergency. Additionally, there is a strong need for a more reliable power grid and cell phone service in the region to help provide this redundancy of communication channels.

A subcommittee of the Project Advisory Committee (PAC) was created to provide feasible recommendations to improve the emergency communications system in the region. Their observations and recommendations are as follows:

Understanding the common approaches for seeking information and the accessibility of different resources is important for strengthening the strategies that can be used in future events. Maintaining effective and accurate communication channels is vital during any kind of emergency, and timely and reliable updates during extreme weather events is an essential part of ensuring the safety of and improving the resiliency of the SMM population toward future climate events. Since there is significant power grid instability in the region, it is necessary to establish neighborhood-based communication systems that do not rely on cell phone service or electricity to ensure the safety of the population in case of power outages. To create a more reliable emergency communication system for the region, the PAC subcommittee of local communication experts provided the following observations and recommendations: *(See next page.)*

Key Observations from the Emergency Communications Sub-Committee:

1. Emergency alert notifications are not able to reach residents when there is a power outage. Landlines do not work during power outages, which are frequent in the region.

2. Cellular service is faulty and unreliable in various parts of the Santa Monica Mountains during extreme weather events, which hinders the ability of some residents to connect with their neighbors, families, and local authorities during critical events.

3. When the power grid and/or cell phone service is lost so is the ability for individuals to stay informed. Radio broadcasts, which are one of the more technologically accessible formats for emergency communications, can become unavailable in pockets throughout the region due to the canyon terrain.

4. Misinformation can be spread during times of crisis when there are multiple sources of information with a lack of coordination. Participants noted that some communities have received false evacuation orders in past wildfire events and false information about resources available for helping people after a fire.

5. Other barriers exist for populations that do not have access to communications technology such as cell phones or smartphones that can receive notifications from alert systems; these individuals rely on person-to-person spread of information or TV news which creates the potential for misinformation and slows down the reception of important updates in emergency situations.

RECOMMENDATIONS

to Improve the SMM WUI Region Emergency Communications System

Target Audience

Individuals / Residents

- Residents must assume responsibility for themselves and to account for and assist their most vulnerable neighbors in times of emergency, especially those with mobility challenges.
- All residents should have hand-cranked radios, the most reliable form of emergency communications.
- According to California Office of Emergency Services (CalOES) there are three official emergency information radio stations for Los Angeles County: KFI (AM) 640 KHz; KNX (AM) 1070 KHz; KBIG (FM) 104.3 MHz. All other radio stations are requested to monitor one of these three in addition to NOAA and the National Weather Service.
- Trusted emergency information can also be found through LA County Fire, LA County Sheriff's Department, and official City websites.
- Although social media can provide quick updates during emergency situations and allows communities to connect and ask for help or share resources, social media also has a great potential for spreading misinformation, thus it should not be used as a primary source of information.
- It is important for all residents to get to know at least a few neighbors to assess each other's specific needs, helpful skills, abilities and equipment, to keep everyone safe, especially for those not technologically proficient.

Recommendations to Improve the SMM WUI Region Emergency Communications System

Target Audience

Local Community / Neighborhood

- Battery-powered Family Radio Service (FRS) radios allow residents to directly receive information relevant to their community's experiences and facilitate the dissemination of information across neighborhoods. FRS have frequencies that are specified to specific zones and have a limited range. Coordinating frequencies between neighboring groups is essential to eliminate confusion between frequencies.

Target Audience

City / County

- Emergency communications tech support should be provided to older adults to ensure they are able to access reliable information.

Target Audience

Municipalities / Region

- Improve coordination between frontline personnel such as fire, sheriff, city liaisons and media sources to ensure accurate and clear information is being disseminated across the region.
- Improve WiFi access throughout the region by installing more small cell service nodes and create an app-enabled static regional evacuation map with overlays to be used on mobile devices even when cell services is down.
- Hand-cranked radios are the most reliable information source during emergencies. improve community resiliency and overall public safety in the region, every household in the region should be provided with a hand-cranked radio. This will require a collaborative and well-funded effort.
- Establish a regional evacuation plan and system so all SMM WUI residents have access to the same critical information, and host regional bi-annual emergency evacuation drills to engage residents and practice how information will be distributed and how evacuations will take place during emergency situations. This should include the creation of a comprehensive wildfire monitor and emergency communication system to ensure timely and accurate alert and evacuation orders for entire region, and regular updates of evacuation routes. This effort will necessitate cooperation between LA County Fire, the region's municipalities, wildfire safety groups, and other stakeholder groups.

TOPANGA'S NEIGHBORHOOD-BASED COMMUNICATIONS SYSTEM

A Community-based Model

Topanga's Coalition for Emergency Preparedness (T-CEP) is an example of a strong emergency communications strategy that exists within the Santa Monica Mountains. The T-CEP organization is comprised of citizen volunteers that disseminate information during disasters that occur in the Topanga area (T-CEP 2021). The T-CEP strives to provide accurate and up-to-date information on an hourly basis using FRS (Family Radio Service) handheld two-way radios. TCEP Neighborhood networks are groups that organize to share contact information, skills, and resources to help their community in disastrous situations. The size of the networks can vary from 12 to 40 households with new groups still forming. Coordinators of the neighborhood networks are the first to receive information from TCEP about emergency events that may threaten the area and oversee relaying this information to their networks through methods such as phone calls, texts, or the use of an FRS radio. During Topanga's evacuation drills, TCEP sets up their command post to run a communications drill and reach out to designated individuals in every zone.

Lessons learned from T-CEP: (1) Every household should have a FRS radio; (2) Citizen volunteers can be utilized to disseminate information within their local areas; (3) Accurate updates can be provided through FRS radios as information is tailored to specific zones; (4) Development of neighborhood networks is an effective way to increase public safety; (5) Regular evacuation drills are effective and support improvements in communication strategies.

PERSONAL RESPONSIBILITY + SUSTAINED REGIONAL COLLABORATION

= CLIMATE RESILIENCE

It is of critical importance for residents living in the SMM WUI region to assume personal responsibility to be aware of and prepared for climate emergencies.

It is also imperative that community members reach out to their neighbors to help ensure they are safe, especially older adults with mobility issues. Everyone in the SMM WUI region should be aware of the Fire Safe Council wildfire safety information and pursue Firewise Community Certification. In addition, each neighborhood should have a Community Emergency Response Team (CERT)-trained liaison. Per the community survey, 18% of survey respondents are CERT trained, while only 14% of respondents live in a Firewise Community and only 8% are members of a Firesafe Council. To increase the community resilience of the region, more residents need to become aware of and participate in a community-based wildfire safety group.

Figure 38

Are you a member of a Fire Safe Council?

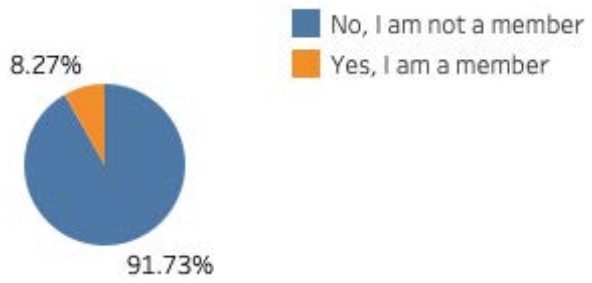


Figure 39

Is your neighborhood a certified Fire Wise Community?

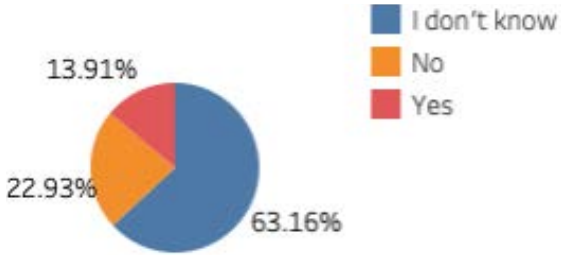
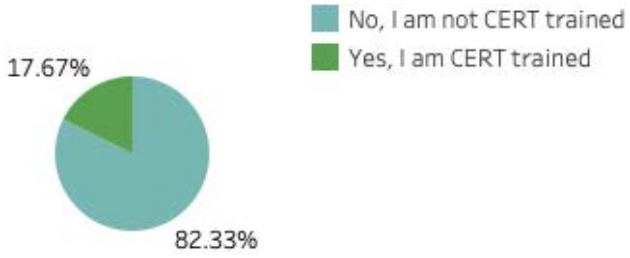


Figure 40

Are you CERT trained?



Fortunately, the SMM CVA community survey revealed that SMM WUI residents are willing to increase their engagement in the community and take action toward climate resilience. This can be seen in the final data visuals on recommendations for creating a more resilient community and how residents would like to help strengthen resiliency.

In addition to a critical mass of engaged residents, effective and sustained regional collaboration is required for the development of a comprehensive support system to mitigate climate impacts and build the adaptive capacity to withstand and recover from future shocks and stressors of climate hazards.

Figure 41

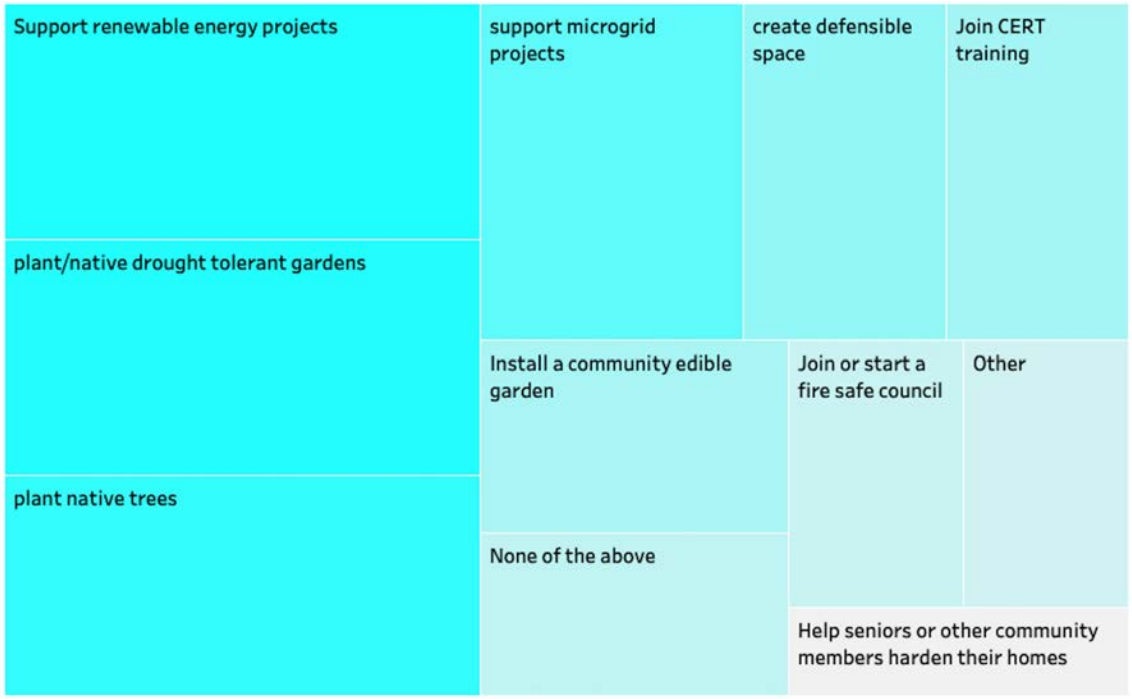
A MORE RESILIENT COMMUNITY

What recommendations do you have to create a more resilient community?

Figure 42

STRENGTHEN RESILIENCY

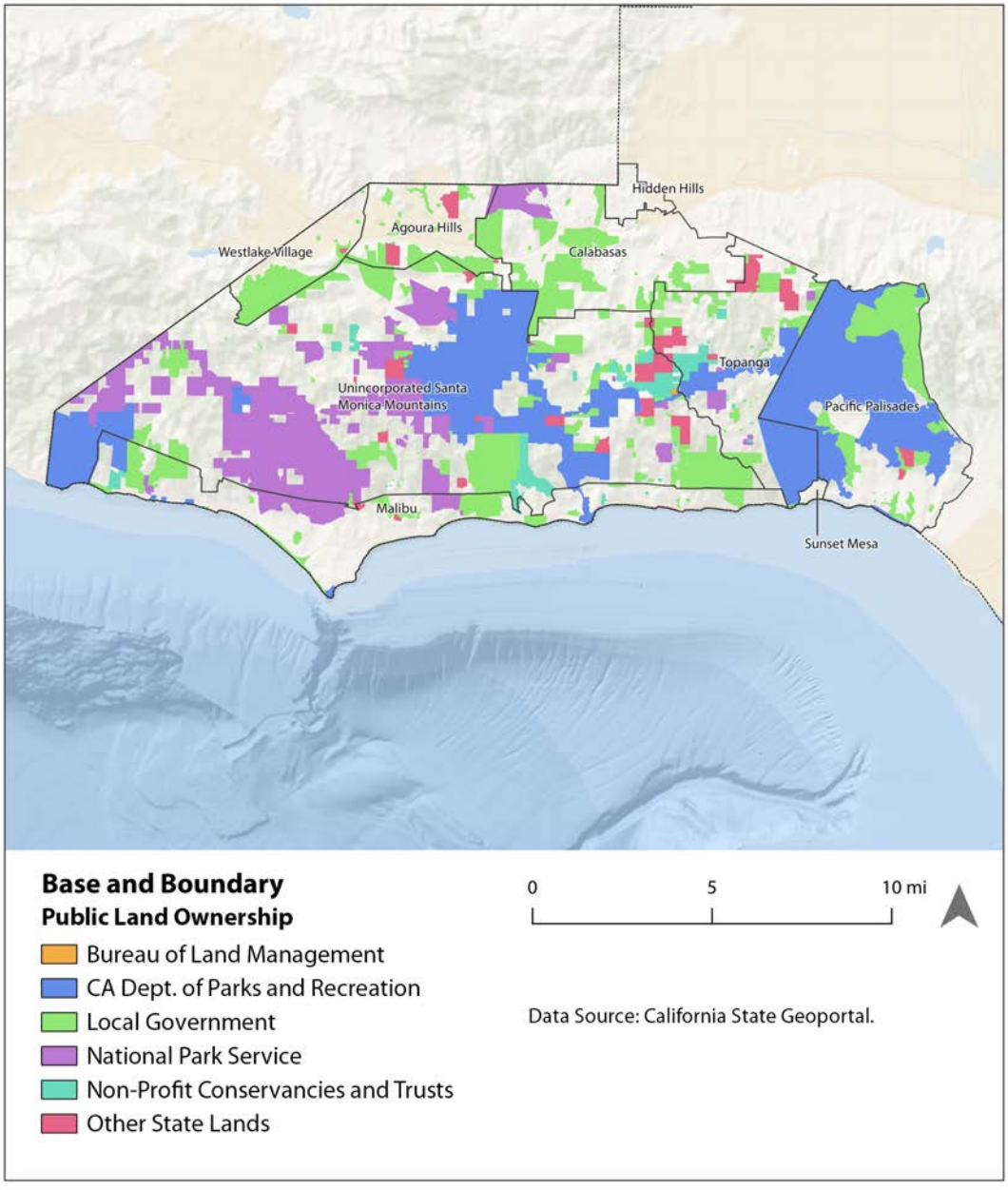
How would you like to contribute
to help strengthen resiliency in our community?



The **Public Land Ownership Map** *(Figure 43)* illustrates the multijurisdictional web that makes up the SMM WUI region. In addition to the nine communities and local and county governments, a large portion of the land is owned by state and federal agencies, including the Department of Parks and Recreation, the Bureau of Land Management, the National Park Service and non-profit conservancies and trusts such as the Mountains Recreation and Conservation Authority (MRCA) and the Santa Monica Mountains Conservancy. The multitude of regional stakeholders points to the need for a wide-spread collaborative approach on climate resilience solutions. A regional approach with multi-jurisdictional collaboration is also a way to avoid duplication of efforts, pool resources, and reduce costs.

Figure 43

PUBLIC LAND OWNERSHIP MAP



In the words of National Park Service Fire Ecologist Marti Witter, for regional collaboration to be effective it must:

1. Be permanent
2. Be supported administratively
3. Provide necessary professional and scientific expertise
4. Have its findings and recommendations incorporated into agency plans and actions and in regional and local planning and regulatory actions
5. Provide or advise on project funding
6. Ensure policy and practice are data driven and supported by science

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Bibliography B: *Project Data Sources*

Maps/Figures			
Name	**Description**	**Source**	**Notes**
Study Area	Map of study area for context		
Wildfire Risk	Risk to homes, exposure type, wildfire likelihood for study area	Wildfire Risk to Communities Tool (https://wildfirerisk.org)	
Extreme Heat	Current and projected extreme heat risk (maximum temperature)	Cal-Adapt (https://cal-adapt.org/)	
Extreme Precipitation	Current and projected extreme precipitation risk	Cal-Adapt (https://cal-adapt.org/)	
FEMA Floodplain Maps	National Flood Insurance Program (NFIP) flood risk zones	FEMA (https://www.fema.gov/flood-maps)	
Seismic Hazards - Landslide Zones	Areas where liquefaction and landslides may occur during a strong earthquake	CGS (https://gis.data.ca.gov/datasets/cadoc::cgs-seismic-hazards-program-landslide-zones-1)	Seismic induced landslides
Post Wildfire Debris Flow, Woolsey	Post wildfire debris flow preliminary hazard assessment for the Woolsey Fire	USGS (https://landslides.usgs.gov/hazards/postfire_debrisflow/detail.php?objectid=251)	Precipitation induced
Wetland Cover	Percent areal cover per block group designated as wetland	National Wetlands Inventory	From NOAA Geodatabase
Predicted Species Richness	Prediction of the number of species found in each pixel; Modelled using MaxEnt software; 980 species	Global Biodiversity Information Facility / Coastal Change Analysis Program (C-CAP)	From NOAA Geodatabase
Significant Ecological Areas	Areas of irreplaceable biological resources	LA County Department of Regional Planning	From NOAA Geodatabase
Disaster Routes	Mileage of disaster routes (freeway, highway, or arterial) in a block group normalized to the land area of the block group	Disaster Route Layer from LA County Geoportal	From NOAA Geodatabase
Critical Infrastructure	Location count per block group of facilities considered critical to the functioning of a city: power plants, wastewater treatment, dams, reservoirs, police and fire, emergency services, educational, hospitals, cooling/warming centers	Points of Interest layer from LA County Geoportal	From NOAA Geodatabase, LA County Geohub (https://geohub.lacity.org/datasets/87e1ebfdab244002b0b70b35d69c990c_55/data)

Additional Resources			
Name	**Description**	**Source**	**Notes**
Healthy Places Index	A PHASC tool that allows users to explore local factors that predict life expectancy and comparing community conditions across the state	https://healthyplacesindex.org/	Social vulnerability
CalEnviroScreen 3.0	CalEnviroScreen identifies California communities by census tract that are disproportionately burdened by, and vulnerable to, multiple sources of pollution.	https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30	Social vulnerability, environmental conditions
Neighborhood Data for Social Change	A platform that allows civic actors to explore the unique challenges and opportunities of an area (neighborhood and census tract level)	https://ladata.myneighborhooddata.org/#!/dashboard?places=&restrictedPlaces=&categories=23:36%3D1&start_date=2018-01-01&end_date=2018-12-31&lat=34.0522&lng=-118.243699999999998&zoom=9&shapeIds=&shapeGroupId=nm6n-sgfb&mapType=ChoroplethMap&listViewTab=overview&overlayLayers=Neighborhoods&search_field=&search_value=&autoUpdate=false&heatFilters=&statusFilter=&choroplethField=thematic_attribute_0_u7m9_48qx&choroplethCategory=Demography&searchType=&include_restricted_places=false	Social vulnerability
CDC's Social Vulnerability Index	CDC Social Vulnerability Index (CDC SVI) uses 15 U.S. census variables to help local officials identify communities that may need support before, during, or after disasters.	https://www.atsdr.cdc.gov/placeandhealth/svi/index.html	Social vulnerability
California Heat Assessment Tool (CHAT)	This tool allows users to explore and understand how extreme heat will impact specific communities across the state.	https://www.cal-heat.org/	
Landslide Inventory (Beta)	The statewide landslide map database shows many of the landslides mapped by CGS and others over the past 50 years.	https://maps.conservation.ca.gov/cgs/lsi/app/	
Cal-Adapt	Tools, data, resources for climate change impacts	https://cal-adapt.org/	

Bibliography B: *Project Data Sources*

Table C-1: Sources for data used in vulnerability metrics

Category	Variable	Resolution	Year	Source	Notes
Social Vulnerability	All	Polygon (Census	2012-2016	US Census Bureau, American Community Survey	
Structural Vulnerability	Parcel Age	Polygon (parcel)	2016	L.A. County Geoportal	Percentage of parcels within the block group with an effective build date before 1978
	Disaster Routes	Line	2015	Disaster Route Layer from LA County Geoportal	Mileage of disaster routes (freeway, highway, or arterial) in a block group normalized to the land area of the block group
	Improvement Value	Polygon (structur	2014	LARIAC4 data from LA County Geoportal	Sum of improvement values for each building in the block group (from the County Tax Assessor's Office)
	Critical Infrastructure	Point	2015	Points of Interest layer from LA County Geoportal	Location count per block group of facilities considered critical to the functioning of a city: power plants, wastewater treatment, dams, reservoirs, police and fire, emergency services, educational, hospitals
	Historic Places	Point	updated 2017	National Register of Historic Places	Location count per block group of places registered with the National Register of Historic Places
Natural Resource Vulnerability	Greenness	30m Raster	2018	NDVI by US Geological Survey from ESRI Online (retrieved 4/5/18)	Percentage of pixels per block group with an NDVI value greater than 0.2 (non-desert vegetative growth)
	Tree canopy cover	30m Raster	2011	National Land Cover Database by US Forest Service	Percentage of each pixel covered with tree canopy
	Habitat fragmentation	Polygon	2011	National Land Cover Database	Aggregation level of land cover types that can serve as habitat for mobile species in the region, utilizing the clumpiness index (Wang et al 2014), calculated per block group using FRAGSTATS (McGarigal et al 2012)
	Wetland cover	Polygon	2017	National Wetlands Inventory	Percent areal cover per block group designated as wetland
	Predicted Species richness	30m Raster	2017	Global Biodiversity Information Facility / Coastal Change Analysis Program (C-CAP)	Prediction of the number of species found in each pixel; Modelled using MaxEnt software; 980 species
	Significant ecological areas	Polygon	2015	LA County Department of Regional Planning	Areas of irreplaceable biological resources

Table C-2: Sources for data used in risk metrics

Category	Variable	Resolution	Year	Source	Notes
Coastal Flooding	Inundation	2m Raster	2017	Costal Storm Modeling System (CoSMoS)	Short term-low risk with an annual storm event; mid term-medium risk with a 20 year storm event; long term-high risk with a 100 year storm event
Stormwater Flooding	Flow Accumulation	10m Raster	2016	US Geological Survey Digital Elevation Model (DEM)	Derived from elevation data from the US Geological Survey's 10-meter National Elevation Dataset (NED) Resampled to 30m for analysis
	Rainfall Intensity	400m Raster	2006	LA Department of Public Works	50-yr frequency rainfall for 24-hour duration; Resampled to 30m for analysis
	Hydrologic Soil Groups	Polygon	2002-2017	US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO)	Individual soil surveys merged and clipped to LA County; Reclassified according to hydrogroup; Converted to 30m raster for analysis
	Land Cover	30m Raster	2010	C-CAP 2010	Reclassified according to land cover type propensity to inundation
	Slope	10m Raster	2016	USGS DEM	Derived from elevation data from the US Geological Survey's 10-meter National Elevation Dataset (NED) Resampled to 30m for analysis
	Elevation	10m Raster	2016	USGS DEM	Derived from elevation data from the US Geological Survey's 10-meter National Elevation Dataset (NED) Resampled to 30m for analysis
	Density of Drainage Network	Polyline	2018	National Hydrography Dataset (NHD) Flowline	Line density calculated for Southern CA region and then clipped to LA County; 30m raster product used in analysis
Erosion	Soil Wind Erodibility	Polygon	2002-2017	USDA NRCS SSURGO	Individual soil surveys merged and clipped to LA County
	Water Erosion Hazard	Polygon	2002-2017	USDA NRCS SSURGO	Individual soil surveys merged and clipped to LA County
Drought	Drought severity and coverage index	Polygon	2017	US Drought Monitor	Weekly polygons converted to 30m raster and combined in calculation of Accumulated Drought Severity and Coverage Index (ADSCI)
Heat	Temperature Normals	Point	1981-2010	National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI)	Rasterized from point data to all of LA County
Wildfire	Wildfire Threat	30m Raster	2004	California Department of Forestry and Fire Protection	Raster dataset

APPENDICES

- **Appendix A** - Resources for Climate Resilience
- **Appendix B** - Funding Opportunities for Climate Resilience
- **Appendix C** - Fire Resistance Strategies
- **Appendix D** - Nature-Based Solutions Energy Resilience (The Malibu Foundation Initiatives)
- **Appendix E** - Critical Infrastructure Inventory
- **Appendix F** - CalAdapt Extreme Heat Projection Tables
- **Appendix G** - Community CVA Survey Questions

Appendix A: *Resources for Climate Resilience*

Key SMM WUI Region Stakeholder Agencies and Organizations

- California Highway Patrol
- California State Parks
- California Land Conservation Assistance Network
- Las Virgenes Malibu Council of Governments (COG)
- City of Agoura Hills
- City of Calabasas
- City of Hidden Hills
- City of Malibu
- City of Westlake Village
- Las Virgenes Municipal Water District (LVMWD)
- LA County Waterworks District 29
- Southern California Edison (SCE)
- Clean Power Alliance (CPA)
- LA County Fire
- LA County Sheriff Department
- LA Office of Emergency Management
- LA County Supervisor Sheila Kuehl's Office
- Community Emergency Response Team (CERT)
- Santa Monica Mountains Conservancy (SMMC)
- Mountains Recreation & Conservation Authority (MRCA)
- Resource Conservation District of the Santa Monica Mountains (RCD)
- Topanga Coalition for Emergency Preparedness (T-CEP)
- North Topanga Canyon Fire Safe Council (NTCFSC)
- Irvine Ranch Conservancy (IRC)

Appendix A: *Resources for Climate Resilience*

Stakeholder Engagement and Regional Collaboration Templates

- Cool City Challenge
- Neighborhood Council Sustainability Alliance of Los Angeles and ToolKit
- Cool Neighborhoods NYC
- UCLA Sustainability Grand Challenge (SLAGC)

Fire-Mitigation Focused Regional Programs

- Santa Monica Mountains Firesafe Alliance (via Sheila Kuehl's office)
- Natural Communities Coalition (NRC)
- Regional Forest and Fire Capacity Program (RFFCP)
- Santa Barbara Regional Wildfire Mitigation Program (RWMP)

Local Climate Action, Resilience and Hazard Mitigation Plans

- Agoura Hills Climate Action and Adaptation Plan (CAAP) Draft (2021)
- LA County Regional Planning Community Climate Action Plan
- LA County Regional Planning Climate Action Safety Element - Wildfire
- LA County Climate Action Plan (2020 update review draft)
- LA County Community Climate Action Plan (2020)
- LA County "Our County" Sustainability Plan (2020)
- LA County Climate Vulnerability Assessment (2021)
- LVMCOG's Hazard Mitigation Plan (2019)
- How State Governments Can Help Communities Invest in Climate Resilience, US Climate Resilience Tool Kit (2020)

Post-Woolsey Fire Assessments

- LA Emergency Preparedness Foundation's Woolsey Fire Assessment & Roadmap
- Lessons from the Woolsey Fire (Climate Resolve, 2021)
- Woolsey Fire After Action Review

Appendix A: *Resources for Climate Resilience*

Local Emergency Preparedness Guides

- Agoura Hills Emergency Preparedness Handbook
- Calabasas Evacuation Route Maps (2008)
- Hidden Hills Emergency Operations Plan (2016)
- City of Malibu Mass Evacuation Plan (2020)
- Pacific Palisades Disaster Preparedness Resources
- Westlake Village
- Topanga Disaster Survival Guide (2017)
- Sunset Mesa
- LA County Emergency Disaster Plans
- LA County Emergency Survival Guides in Spanish and other languages

Appendix B: *Funding Opportunities for Climate Resilience*

Climate Action Planning Resources

Agency	Program Name	Program Description	Application	Important Dates	Notes
Department of Housing and Community Development	Community Development Block Grant-Mitigation Resilience Planning and Public Service	Assist local jurisdictions with mitigation related planning and public services needs to support risk reduction from three primary hazards: wildfire, flooding, and earthquake→ funding to create (plan) projects that address risks to communities	Non-profit Public agency	Annual	
FEMA	Building Resilient Infrastructure and Communities	Will support communities as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. BRIC is a new FEMA pre-disaster hazard mitigation program.	States, territories, and tribal governments. Homeowners, businesses and non-profits can be included in sub application	Annual	For capability and Capacity building, mitigation projects, management costs
FEMA	Flood Mitigation Assistance	Creation of a flood mitigation plan	Same as above	Annual	
California Resilience Challenge	2021 grant program	Grants in support of climate resilience planning projects with a preference for resilient infrastructure initiatives	Public entities, CA Native American Tribes, NGOs Community based organizations,	Summer	

Appendix B: *Funding Opportunities for Climate Resilience*

Key Resources for Public Incentives for Nature-based solutions

- **Federal:**
    * Sustainable Agriculture (USDA Farm Service Agency)
    * Food security (USDA National Institute of Food and Agriculture)
    * Conservation practices (USDA Natural Resources Conservation Service)
- **State:** California Department of Food and Agriculture (CDFA) Healthy Soils Program
- **Local:** LA County Urban Agriculture Incentive Zone (UAIZ) Program

Utility Rebates and Financial Incentives for Water Conservation

Agency	Program/Rebate	Application Link/Contact
Las Virgenes Municipal Water District	Customers of water systems served by MWD are also eligible for incentives including rebates for drip irrigation and removing turf, and rebates for water efficient appliances.	Application
LA County Waterworks District 29	Residents can apply for rebates on water savings appliances including high efficiency clothes washers, weather-based irrigation controllers, and rotary sprinkler nozzles	Application
District 29	Commercial, Industrial, and Institution Rebate Programs	Application
Los Angeles County Water District Water Conservation Program	Cash for Grass Rebate Program	Application
City of Malibu	Smart Enhanced Water Saving Device Incentive programs	water@malibusmart.org

Appendix C: *Fire Resistance Strategies*

Home Hardening

As climate change continues to contribute to larger and more frequent wildfires in California, there are a number of adaptation strategies that individuals and communities can take to protect their homes and properties. "Home hardening" involves making modifications to homes that make them more resistant to extreme or radiant heat, direct flame contact, and embers from wind dominated wildfires.[1] Embers that are blown onto homes during wind dominated wildfires are one of the most common causes of home fires. **The Los Angeles County Fire Department estimates that embers cause the ignition of at least 50 percent of homes that burn in wildfires.**[2] Although they won't make a home completely fireproof, the following measures will reduce the risk of ignition:

1. Reduce vegetative debris including dead leaves and pine needles that fall onto roofs, gutters, and surrounding areas such as sidewalks and driveways.
2. Regularly clean-up / replace vegetation producing large amount of vegetative debris within the immediate surroundings of a home or structures.[3]
3. Install leaf-guards to gutters and utilize non-combustible materials. Install drip edges to metal gutters to protect the roof's edge and minimize the entry of embers.[4]
4. Install fine (1/8") mesh screens on house vents including attics, soffits, and crawlspaces to reduce ember intrusion into the house.
5. Install double pane windows, replace window frames with fire resistant materials, and utilize fire resistant glazing for skylights.[5]
6. Update home siding with fire resistant material and create a 6-inch noncombustible area at the base of the siding.
7. The existence of untreated wooden roofs and shingle roof coverings are one of the greatest threats to homes during wildfire events. Reroof with materials such as composition, metal, or tiles.

1 https://humboldtgov.org/DocumentCenter/View/79449/CFSC-Hardened-Homes-brochure#:~:text=Home%20hardening%20addresses%20the%20most,embers%20that%20accompany%20most%20wildfires

2 https://messengermountainnews.com/will-your-home-survive-when-the-embers-arrive/

3 *JOURNAL OF THE CALIFORNIA NATIVE PLANT SOCIETY, MARCH 2020, VOL 47, NO 2*

4 https://defensiblespace.org/house/house-upgrade/

5 *"Glazing refers to the glass, plastic, or fiberglass-reinforced translucent material in windows, sliding glass doors, door vision panels, and skylights. The recommended glazing products for homes in wildfire zones are laminated glass, tempered glass, glass with a low-emissivity, fiberglass-reinforced translucent glazing, and insulated glazing units (IGUs)." FEMA – FS no 10 – Windows and Skylights, 2008*

Appendix C: *Fire Resistance Strategies*

8. Replace wooden garage doors with fire resistant materials, replace single-pane sliding glass doors or protect them with shutters, and add weatherstripping to doors.[6]
9. Install rooftop sprinklers. To prepare for power outages and water shutoffs, the sprinklers should be accompanied with a stand-alone water tank (including water collected from rain barrels and cisterns), ideally with a solar power source.

The aforementioned measures can be prioritized according to which have the largest benefit at the lowest costs. For example, protecting vents would be considered a high priority as it provides high protection at a relatively low cost. Sprinkler systems on the other hand are expensive to install, and more research is needed to determine how effective they are particularly for wind-driven fires. The Cost/Priority Diagram gives a high-level overview of the home hardening measures in relative importance and cost.[7]

6 https://defensiblespace.org/house/house-upgrade/

7 www.defensiblespace.org

Appendix C: *Fire Resistance Strategies*

Defensible Space

A component of home hardening is the maintenance of defensible space, which is a natural and/or landscaped area around a structure that designed to reduce the risk of ignition or damage from wildfire by managing vegetation. *Fire safety is important to consider at multiple scales and for multiple variables, which will ultimately require the cooperation of multiple stakeholders.* The state of California requires that homeowners *keep 30 meters (100 feet) of defensible space between woody vegetation around their homes*. However, studies have shown that as little as 5 to 20 meters (16 – 66 feet) of defensible space may provide some amount of protection for houses, depending on the type of vegetation immediately surrounding the home, while too much defensible space may lead to the growth of invasive grasses that could ultimately increase a home's vulnerability to wildfires.

To create defensible spaces homeowners should:

1. Leave at least fifteen and up to 100 feet of defensible space between their homes and woody vegetation.
2. Surround the house with a walkway and maintain a native garden up to five feet from the house.[1]

Managed gardening, and planting of native and drought and heat tolerant plants allows for more resiliency against wind dominated wildfires.

For proper vegetation management homeowners should:

1. Remove invasive weeds, which can be highly flammable in the fall months. Invasive plants fuel wildfires, contribute to soil erosion, clog streams and rivers, and increase flooding. Poor maintenance of cleared areas can promote their spread.[2]
2. Maintain well-watered trees. When the ground area is damp, fire is less likely to spread. Tree foliage can provide protection from embers reaching homes if the trees are healthy and properly maintained and watered.
3. To increase soil moisture, reduce the susceptibility to embers, residents can grow herbaceous, rhizomatous, and native plants under the shade of their trees.[3]

1 *JOURNAL OF THE CALIFORNIA NATIVE PLANT SOCIETY, MARCH 2020, VOL 47, NO 2*

2 http://www.defensiblespace.org/plants

3 *JOURNAL OF THE CALIFORNIA NATIVE PLANT SOCIETY, MARCH 2020, VOL 47, NO 2*

Appendix D: *Nature-Based Solutions, Energy Resilience & Malibu Foundation Initiatives*

Nature-Based Solutions

Plant and animal biodiversity provides a vast array of environmental, economic and social benefits to humans. Increases in drought and fire have resulted in further loss of the very things that help to mitigate the threats, such as trees that help sequester carbon and regulate temperatures, and natural biodiversity that promotes soil health and healthy water cycles. Nature-based solutions can strengthen the resilience of the natural ecosystems (e.g., animals, plants, soil, and water) in which we live.

Trees

Trees provide a multitude of environmental as well as economic, social and health benefits. Some of the direct benefits to communities from trees and tree canopy include:[1]

- Removal of pollutants from the air, soil and water,
- Cooling effects on surrounding areas (through the release of water vapor into the atmosphere and by providing shade) which reduces the need for air conditioners and other mechanical cooling systems and the associated energy consumption, pollutants and greenhouse gases that they emit.
- The inherent aesthetic value and emotionally uplifting effects of trees increase community well-being and property values.

Trees are also key to building resilience by providing:[2]

- Carbon sequestration
- Absorption of water from rainfall that would otherwise become stormwater runoff
- Protection of bare soil (soil unprotected by plants or mulch) from erosion during rainfall and nutrient depletion from summer heat

1 https://healthyplacesindex.org/policy-actions/tree-canopy/

2 https://healthyplacesindex.org/policy-actions/tree-canopy/

Appendix D: *Nature-Based Solutions, Energy Resilience & Malibu Foundation Initiatives*

Native trees are important to the region's resilience by supporting thousands of species of insects, amphibians, reptiles, birds and mammals, which are unable to survive without the habitat provided by the trees.[3] Minimizing net tree loss is critical to the region's climate resilience and biodiversity. See the Resource Conservation District of the Santa Monica Mountain's Native Tree Planting Plan which is currently in the process of being implemented by Los Angeles County.

Regenerative Agriculture

Regenerative Agriculture is a broad term used to describe systems approaches to growing food in ways that also rehabilitate the land and enhance natural resources. Regenerative agriculture aims to replenish soil health through practices that support biodiversity above and below the ground. These methods can also improve water cycles and air quality, and reduce waste and sequester carbon through composting. As discussed in other sections, enhanced biodiversity and improved soil health and water cycles are key to mitigating the climate threats.[4] Regenerative farming practices include a wide range of techniques including:

- **Low-or no-tillage farming and mulching**: Low/No tillage farming helps minimize or eliminate damage to soil nutrients when digging up and turning over soil, allowing better soil structure for crops to grow.
- **Diverse Crop rotation, including Perennials**: Planting several different crops in same location across growing seasons creates a more nutrient rich soil. Perennials - plants that provide harvests for multiple growing seasons - further reduce soil disturbances, and the crop biodiversity increases the resilience of the overall ecosystem.
- **Diverse Cover crops**: The use of cover crops (crops that do not get harvested) increases soil nutrient content while protecting soil from weather erosion and increasing biodiversity.
- **Using Natural Fertilizers such as compost**. Minimizing artificial fertilizers ensures the maintenance of the microbial balance in the soil and avoids chemical seepage into water sources and the atmosphere. Using composted materials (e.g. crop residues, food and animal waste) as fertilizer has the added benefit of reducing waste.

3 *Los Angeles County Native Tree Priority Planting Plan Final Report for Los Angeles County Contract #SPF03-03*

4 https://regenerationinternational.org/why-regenerative-agriculture/
https://www.greenamerica.org/farming-reverse-climate-change-regenerative-agriculture
https://www.masterclass.com/articles/regenerative-farming-practices#4-basic-regenerative-farming-practices

Appendix D: *Nature-Based Solutions, Energy Resilience & Malibu Foundation Initiatives*

- **Managed grazing**: Regenerative livestock management mimics the natural grazing patterns of animals by limiting the time animals graze in one particular area, giving the land time to regenerate in between grazing cycles, resulting in increased soil carbon deposits, water retention and biodiversity.
- **Animal Integration**: Allowing animals to graze amidst crops helps to naturally and gently turn over soil and enhance nutrient cycling.
- **Agroforestry**: Planting crops between trees allows for a wider variety of crops to be planted each season.[5]

In addition to the environmental benefits, regenerative urban farms and community gardens provide vast socioeconomic benefits to the communities in which they reside, including:

- Improve food security and increase resilience in the food system, by moving away from a centralized supply chain to a more diverse one.
- Increase community awareness of the connection between health and environment and provide hands-on educational opportunities
- Create jobs and strengthen community by bringing people together
- Increase access to healthy food increases community health[6]

5 https://heliae.com/10-regenerative-agriculture-practices/
https://rodaleinstitute.org/why-organic/organic-farming-practices/organic-no-till/
https://www.greensgrow.org/urban-farm/what-is-urban-farming/

6 https://grocycle.com/regenerative-agriculture-ultimate-guide/
https://agfundernews.com/regenerative-agriculture-is-getting-more-mainstream-but-how-scalable-is-it.html
https://noharm-uscanada.org/regenerativeagriculture

Appendix D: *Nature-Based Solutions, Energy Resilience & Malibu Foundation Initiatives*

The Malibu Foundation Regenerative Agriculture Projects in Progress

The Malibu Foundation is working to initiate several regenerative agriculture initiatives in the Santa Monica Mountains region including:

- Creation of a small scale commercial urban regenerative farm to grow food that can be sold at farmers markets, food stands, and through CSA subscriptions, with the proceeds helping to subsidize food donations to the elderly and homeless communities. The project will provide employment and educational opportunities to the community.
- A community composting program is planned in parallel to the urban farm project with a compost bin and education center on the same site as the farm. Community members and small businesses and restaurants will be able to drop off their compostable materials and food scraps which will in turn be used to fertilize the farm.
- Establishment of a network of regenerative community gardens and residential farms or “pods” where residents of the City of Malibu can implement regenerative farming practices on their own properties and which could also serve as community gardens for education on a case-by-case basis.

Appendix D: *Nature-Based Solutions, Energy Resilience & Malibu Foundation Initiatives*

Energy Resilience

Reducing the reliance on fossil fuels and an unreliable electric grid by installing nano and micro grids across the region is a key strategy for transitioning to clean renewable energy, creating energy independence and building climate resilience. A nano-grid is a power distribution system for a single house or small groups of buildings on the same property, with the ability to connect or disconnect from the power grid via a gateway. A nano-grid typically consists of photovoltaic solar energy generation coupled with battery storage which provides all of the electricity needs of a given property and allows it to continue to operate in the event of an electrical grid failure. A micro-grid is a similar but larger system with interconnected energy generation and storage systems across multiple properties that act as a single controllable entity with respect to the grid. A microgrid can connect and disconnect from the grid to enable it to operate in both grid-connected or in island mode. A microgrid can be as small as a few houses utilizing solar panels and batteries, or it can encompass an entire neighborhood or community. Microgrids and nano-grids allow communities to meet their energy needs locally and increase local energy resilience and are resilient to extreme weather and climate events such as high winds and wildfires, as they can continue to provide electricity to the community when the local utility grid is down.[7]

Microgrids and nano-grids also allow homeowners to lower their carbon footprint by meeting their energy needs through locally-produced clean, renewable energy.[8] However current regulations in California make it difficult to install microgrids to transfer electricity between properties owned by different people, and energy utilities have been reluctant to approve the installation and operation of such systems. Until these regulations are revised installation of nano-grids on individual properties are the most viable energy resilience option for this region in the near term.

7 *Lewis , Craig. "A Revolutionary Way to Easily Value Resilience for Any Facility." Clean Coalition. Clean Coalition , May 20, 2021. https://clean-coalition.org/news/a-revolutionary-way-to-easily-value-resilience-for-any-facility/.*

8 *"Features and Benefits." Features and Benefits - Microgrids. Accessed September 5, 2021. https://www.districtenergy.org/microgrids/about-microgrids97/features.*

Appendix D: *Nature-Based Solutions, Energy Resilience & Malibu Foundation Initiatives*

Local Community Solar Microgrid Project Underway

The community-based Resilient Palisades organization has created a Clean Energy Resilience Team to pursue the creation of a microgrid to reduce greenhouse gas emissions and increase energy resilience in the Pacific Palisades community. As a first step to creating the microgrid, Pacific Palisades community members are installing on-site solar and solar back up storage on their homes, creating a network of nano-grids. To reduce costs, they are purchasing solar panels in bulk and benefit from group discounts. In the coming year, the Resilient Palisades Clean Energy Resilience Team will work with the local utility, the Los Angeles Department of Water and Power (LADWP), and solar technicians to connect the individual solar sites and establish the solar storage capacity. This project is on track for becoming the first community-level microgrid within the LADWP service area.[9]

On-site solar in the SMM WUI Region

The installation of on-site solar is the first step to creating a microgrid or nano-grid, and the benefits to residents include offsetting costs by locking in lower electricity bills and receiving reimbursements for returning energy to the grid. The Clean Power Alliance (CPA) is a non-profit community choice energy aggregation system established in 2017 to meet the need in Los Angeles County for local clean power, reduce GHGs, stimulate renewable energy development, and implement distributed energy resources among other goals. CPA provides renewable energy to residents in the cities of Malibu, Calabasas, Agoura Hills and Westlake Village as well as the unincorporated regions of the SMM area. The CPA also offers four types of on-site solar energy programs in the region: Net energy metering (NEM), NEM Paired Storage, NEM Aggregation (NEMA) and a Multi Family Solar Housing Program (MASH):

- **NEM Program** allows customers with rooftop solar to receive credit when their energy systems produce more energy than they utilize within a one-year period. The meter calculates the difference between the energy created through a resident's solar system and the energy Clean Power Alliance is supplying the household.[10] At the time of publication, approximately 4,700 residences in the SMM WUI region have on-site solar and participate in the NEM program, which is approximately 18% of total residential properties.[11]

9 *Ryan Craig, Introducing the Pali Microgrid, Resilient Palisades, 2021*

10 *"Understand Net Energy Metering and Your Bill." Net Energy Metering (NEM) and your bill. Accessed September 5, 2021. https://www.pge.com/en_US/residential/solar-and-vehicles/green-energy-incentives/solar-and-renewable-metering-and-billing/net-energy-meter*

11 *Does not include residents w on-site solar via SoCalEdison (SCE). SCE was unresponsive to our data request.*

Appendix D: *Nature-Based Solutions, Energy Resilience & Malibu Foundation Initiatives*

- **NEM Paired Storage program** provides customers with behind-the-meter solar and storage systems to release battery storage back into the grid to receive net energy metering credits.[12] There are a total of 293 CPA NEM Paired Storage participants in the SMM WUI region.
- **The CPA's NEM Aggregation program** benefits individual customers who utilize multiple meters on the same or adjacent properties. NEM aggregation allows one renewable generation system to serve multiple meters.[13] A total of 21 residents currently utilize CPA's NEMA program.[14]
- **MASH program** provides incentives to families to offset the cost of installing solar energy systems on multi-family housing units.[15] A total of 163 family units within Hidden Hills currently utilize this program.[16]

12 *"Energy Storage Net Metering: An Illustration of Why It's so Valuable." Solar Power World, April 21, 2020. https://www.solarpowerworldonline.com/2020/04/energy-storage-net-metering-an-illustration-of-why-its-so-valuable/*

13 *"Discover Net Energy Metering Aggregation." PG&E's Net Energy Metering Aggregation program. Accessed September 5, 2021. https://www.pge.com/en_US/residential/solar-and-vehicles/options/option-overview/how-to-get-started/nema/net-energy-metering-aggreg*

14 *CPA Interview, NEM_DATARequest 8.2.21, September 22, 2021*

15 *"Discover the Multifamily Affordable Solar Housing Program." Multifamily Affordable Solar Housing (MASH). Accessed September 5, 2021. https://www.pge.com/en_US/small-medium-business/energy-alternatives/private-solar/understand-the-solar-process/multifamily-affordable-solar-housing-program.page.*

16 *CPA Interview, NEM DATARequest 8.2.21, September 22, 2021*

Appendix D: *Nature-Based Solutions, Energy Resilience & Malibu Foundation Initiatives*

Next Steps for Nano and Micro grids in the SMM WUI Region

- Determine the total number of on-site solar systems in the region, including residences and key facilities such as schools, municipal buildings, grocery stores, gas stations, clinics and other buildings that can serve as emergency shelters.
- Establish a well-funded, targeted program to assist older and low-income adults with the installation of on-site solar with battery backup storage to increase number of homes with nano grid capacity.
- Determine the total number of on-site solar energy systems with battery storage to enable continued operation in the event of an electrical grid failure.
- Develop a list of community stakeholders willing to support a microgrid project.
- Educate the community on the economic benefits (e.g., tax incentives and rebates) and the environmental benefits (e.g., reduce carbon emissions) of installing on-site solar to grow the region's adaptative capacity.
- Partner with a consulting company that specializes in community solar microgrids to develop a feasibility study and determine the process.
- Work with SCE to establish rights to operationalize the project.

Appendix D: *Nature-Based Solutions, Energy Resilience & Malibu Foundation Initiatives*

Resilient Hubs and the Malibu Foundation

The Malibu Foundation funded a resilience hub pilot project in the region's "County Line Community" area in summer 2021. Resilience Hubs are community-serving facilities, such as community centers, recreation facilities and multi-housing buildings as well as surrounding neighborhood infrastructure (e.g. residences, vacant lots, community parks, local businesses) that are augmented to support residents and coordinate communication and resource distribution before, during and after electrical grid failures and hazard events.[17] Well-designed resilience hubs can enhance community resilience in emergencies while reducing greenhouse gas emissions and improving local quality of life during "normal" times.[18]

The County Line Pilot project, led by sustainability architect David Hertz, began by creating a neighborhood resilience map utilizing the ArcGIS online mapping tool to provide a detailed, workable geographic inventory of resilience assets in the local community to better inform community members of their resources, risks, and options to improve the safety of people, pets, investments, and the environment. The mapped data includes structures, pools, tanks, evacuation routes, temporary refuge areas, lookout points, turnarounds, large animal facilities, and subclassifications within these categorical layers. The neighborhood inventory maps will be utilized by community members to allow them to share resources in the event of emergency situations and identify resource gaps. A resilience hub template, including information on self-sufficient electrical nano and micro-grid development, will be created from this pilot to serve as guide for other neighborhoods in the region.

17 https://www.usdn.org/resilience-hubs.html#:~:text=Resilience%20Hubs%20are%20community%2Dserving,after%20a%20natural%20hazard%20event

18 http://resilience-hub.org/what-are-hubs/

Appendix E: *Critical Infrastructure Inventory*

Name	Category	Sub-Category	Address	City	State	Zip
Calamigos Guest Ranch and Beach Club	Accommodation	Hotel	327 Latigo Canyon Rd	Malibu	CA	90265
Cambria Hotel Calabasas- Malibu	Accommodation	Hotel	26300 Rondell St	Calabasas	CA	90302
Courtyard by Marriott Thousand Oaks Agoura Hills	Accommodation	Hotel	29505 Agoura Rd	Agoura Hills	CA	90301
Four Seasons Hotel Westlake Village	Accommodation	Hotel	2 Dole Dr	Westlake Village	CA	91361
Good Nite Inn Calabasas Malibu	Accommodation	Hotel	26557 Agoura Rd	Calabasas	CA	90302
Hampton Inn & Suites Agoura Hills	Accommodation	Hotel	30255 Agoura Rd	Agoura Hills	CA	90301
Hilton Garden Inn Calabasas	Accommodation	Hotel	24150 Park Sorrento	Calabasas	CA	90302
Homewood Suites by Hilto	Accommodation	Hotel	28901 Canwood Street	Agoura Hills	CA	91301
Homewood Suites by Hilton Agoura Hills	Accommodation	Hotel	28901 Canwood St	Agoura Hills	CA	90301
Hyatt Regency Westlake	Accommodation	Hotel	880 S Westlake Blvd	Westlake Village	CA	91361
Malibu Beach Inn	Accommodation	Hotel	22878 Pacific Coast Hwy	Malibu	CA	90265
Malibu Country Inn	Accommodation	Hotel	6506 Westward Beach Rd	Malibu	CA	90265
Nobu Ryokan Malibu	Accommodation	Hotel	22752 Pacific Coast Hwy	Malibu	CA	90265
Residence Inn by Marriott Los Angeles Westlake Village	Accommodation	Hotel	30950 Russell Ranch Rd, Westlake Village	Westlake Village	CA	91361
Sheraton Agoura Hills Hotel	Accommodation	Hotel	30100 Agoura Rd	Agoura Hills	CA	90301
The Anza A Calabasas Hotel	Accommodation	Hotel	23627 Calabasas Rd	Calabasas	CA	90302
The M Malibu	Accommodation	Hotel	22541 CA-1	Malibu	CA	90265
The Surfrider Hotel, Malibu	Accommodation	Hotel	23033 Pacific Coast Hwy	Malibu	CA	90265
Topanga Canyon Inn Bed and Breakfast	Accommodation	Hotel	20310 Callon Dr	Topanga	CA	90290
TownePlace Suites by Marriott Thousand Oaks Agoura Hills	Accommodation	Hotel	29505 Agoura Rd	Agoura Hills	CA	90301
Westlake Village Inn	Accommodation	Hotel	31943 Agoura Rd	Westlake Village	CA	91361
Agoura Animal Clinic	Animal Services	Veterinarian	28282 Dorothy Dr	Agoura Hills	CA	91301
Agoura Hills Animal Hospital	Animal Services	Veterinarian	5605 Kanan Rd	Agoura Hills	CA	91301
All Animals Veterinary Hospital	Animal Services	Veterinarian	23815 Ventura Blvd	Calabasas	CA	91302
Animal Clinic of Topanga	Animal Services	Veterinarian	115 S Topanga Canyon Blvd # B	Topanga	CA	90290
Banfield Pet Hospital	Animal Services	Veterinarian	30849 Thousand Oaks Blvd	Westlake Village	CA	91362
Calabasas Animal Clinic	Animal Services	Veterinarian	4937 Las Virgenes Rd Suite 101	Calabasas	CA	91302
Dog and Cat Hospital Calabasas	Animal Services	Veterinarian	22291 Mulholland Hwy	Calabasas	CA	91302
Dr. Wright Jim DVM	Animal Services	Veterinarian	23431 Pacific Coast Hwy	Malibu	CA	90265
Jonokuchi Kathy DVM	Animal Services	Veterinarian	4937 US-101	Calabasas	CA	91302
Just Food For Dogs	Animal Services	Pet supply store	22633 Pacific Coast Hwy	Malibu	CA	90265
K9 Gym & Rehabilitation Center	Animal Services	Rehabilitation center	4937 Las Virgenes Rd	Calabasas	CA	91302
Love's Pets	Animal Services	Pet store	5651 Kanan Rd	Agoura Hills	CA	91301
Malibu Coast Animal Hospital	Animal Services	Veterinarian	23431 CA-1	Malibu	CA	90265
Malibu Holistic Healthcare	Animal Services	Veterinarian	22775 Pacific Coast Hwy	Malibu	CA	90265
Malibu Vet Clinic	Animal Services	Veterinarian	28990 CA-1 UNIT 103	Malibu	CA	90265
NVA	Animal Services	Veterinarian	29229 Canwood St Suite 100	Agoura Hills	CA	91301
Oaks Veterinary Urgent Care	Animal Services	Veterinarian	29105 Canwood St ste b	Agoura Hills	CA	91301
ODIE Pet Insurance	Animal Services	Insurance agency	29899 Agoura Rd #110	Agoura Hills	CA	91301
Oliver Debbie DVM	Animal Services	Veterinarian	15239 La Cruz Dr	Pacific Palisades	CA	90272
Pacific Palisades Veterinary Center	Animal Services	Veterinarian	853 Vía De La Paz	Pacific Palisades	CA	90272
Palisades Animal Clinic	Animal Services	Veterinarian	16636 Marquez Ave	Pacific Palisades	CA	90272
Pet Boarding	Animal Services	Pet boarding service	28282 Dorothy Dr	Agoura Hills	CA	91301
PetSmart	Animal Services	Pet supply store	5766 Lindero Canyon Rd	Westlake Village	CA	91362
RxPETFOOD.com	Animal Services	Pet supply store	30941 Agoura Rd #126b	Westlake Village	CA	91361
The Barkley Pet Hotel & Day Spa	Animal Services	Pet boarding service	31166 Via Colinas	Westlake Village	CA	91362
The Malibu Feed Bin	Animal Services	Pet supply store	3931 S Topanga Canyon Blvd	Malibu	CA	90265
Townsgate Pet Hospital Westlake Village	Animal Services	Veterinarian	2806 Townsgate Rd suite c	Westlake Village	CA	91361
VCA Westlake Village Animal Hospital	Animal Services	Veterinarian	31166 Via Colinas	Westlake Village	CA	91362
Veterinary Angels Medical Center	Animal Services	Veterinarian	29348 Roadside Dr	Agoura Hills	CA	91301
VetSpace Inc	Animal Services	Veterinarian	30941 Agoura Rd	Westlake Village	CA	91361
Village Veterinary Hospital	Animal Services	Veterinarian	822 Hampshire Rd G	Westlake Village	CA	91361
Vital Equine Holistic Veterinary Medicine	Animal Services	Veterinarian	4774 Park Granada Box 9281	Calabasas	CA	91372
Braewood Calabasas	Home Owners Association	Home Owners Association	22208 Camay Ct	Calabasas	CA	91302
Casa Gateway Hoa	Home Owners Association	Home Owners Association	501 Palisades Dr	Pacific Palisades	CA	90272
Edgewater Towers Condominiums Homeowners Association	Home Owners Association	Home Owners Association	17352 Sunset Blvd	Pacific Palisades	CA	90272
Las Brisas Homeowners Association	Home Owners Association	Home Owners Association	16601 Marquez Ave	Pacific Palisades	CA	90272
Malibu Road Home Owners Association	Home Owners Association	Home Owners Association	25366 Malibu Rd	Malibu	CA	90265
Mountain Glen HOA	Home Owners Association	Home Owners Association	30343 Canwood St	Agoura Hills	CA	91301
Oak Park Calabasas HOA	Home Owners Association	Home Owners Association	4700 Park Granada	Calabasas	CA	91302
Palisades Hoa	Home Owners Association	Home Owners Association	1738 Palisades Dr	Pacific Palisades	CA	90272
Paradise Cove Homeowners Association	Home Owners Association	Home Owners Association	28128 Pacific Coast Hwy # 23	Malibu	CA	90265
The First Neighborhood Community Center	Home Owners Association	Home Owners Association	31830 Village Center Rd	Westlake Village	CA	91361
Village Homes Property Owners	Home Owners Association	Home Owners Association	1040 Evenstar Ave	Westlake Village	CA	91361
Vista Pointe Calabasas	Home Owners Association	Home Owners Association	4518-4536 Park Entrada	Calabasas	CA	91302
Westhills Homeowners Association	Home Owners Association	Home Owners Association	27050 Agoura Rd	Calabasas	CA	91301
Whitesails HOA	Home Owners Association	Home Owners Association	31255 Cedar Valley Dr	Westlake Village	CA	91361
Agoura High School	School	Public High Schools	28545 West Driver Avenue	Agoura	CA	91301
Alexandria Academy, The	School	Private and Charter Schools	5776-D Lindero Canyon Road, Number 353	Westlake Village	CA	91302
Alice C. Stelle Middle School	School	Public Middle Schools	22450 Mulholland Highway	Calabasas	CA	91302
Arthur E. Wright Middle School	School	Public Middle Schools	4029 North Las Virgenes Road	Calabasas	CA	91302
Bay Laurel Elementary School	School	Public Elementary Schools	24740 Paseo Primario	Calabasas	CA	91302
Born Learners School	School	Private and Charter Schools	28348 Agoura Road	Agoura Hills	CA	91301
Buttercup Pre-School	School	Public Elementary Schools	6098 Reyes Adobe Road	Agoura Hills	CA	91301
Calabasas High School	School	Public High Schools	22855 West Mulholland Highway	Calabasas	CA	91302
Calabash Charter Academy	School	Private and Charter Schools	23055 Eugene Street	Woodland Hills	CA	91364
Calvary Christian	School	Private and Charter Schools	701 Palisades Drive	Pacific Palisades	CA	90272
Chaparral Elementary School	School	Public Elementary Schools	22601 Liberty Bell Road	Woodland Hills	CA	91302

Appendix E: *Critical Infrastructure Inventory*

Child's World School	School	Private and Charter Schools	5414 Capistrano Avenue	Woodland Hills	CA	91367
CHIME Institute's Schwarzenegger Community	School	Private and Charter Schools	19722 Collier Street	Woodland Hills	CA	91364
Corpus Christi Elementary School	School	Private and Charter Schools	890 Toyopa Drive	Pacific Palisades	CA	90272
County Of Los Angeles Public Library - Topanga Library	School	Guidance and Tutoring Programs	122 N Topanga Canyon Blvd	Topanga	CA	90290
Elements Montessori	School	Private and Charter Schools	21338 Dumetz Road	Woodland Hills	CA	91364
Gonzales, David Camp	School	Public High Schools	1301 North Las Virgenes Road	Calabasas	CA	91302
Henry David Thoreau Continuation	School	Public High Schools	5429 Quakertown Avenue	Woodland Hills	CA	91364
Ilan Ramon Day School	School	Private and Charter Schools	27400 Canwood Street	Agoura	CA	91301
Indian Hills Continuation High School	School	Public High Schools	28545 West Driver Avenue	Agoura	CA	91301
Ivy Academia	School	Private and Charter Schools	5461 Winnetka Avenue	Winnetka	CA	91364
Jai Seed Homeschool	School	Private and Charter Schools	25154 Mulholland Highway	Calabasas	CA	91302
Juan Cabrillo Elementary School	School	Public Elementary Schools	30237 Morning View Drive	Malibu	CA	90265
Kilpatrick, Vernon Camp	School	Public High Schools	427 South Encinal Canyon Road	Malibu	CA	90265
Las Virgenes Adult School	School	Adult Education	4111 North Las Virgenes Road	Calabasas	CA	91302
Las Virgenes Unified School District	School	School Districts	4111 N. Las Virgenes Rd.	Calabasas	CA	91302
Le Lycee Francais de Los Angeles	School	Private and Charter Schools	16720 Marquez Avenue	Pacific Palisades	CA	90272
Lindero Canyon Middle School	School	Public Middle Schools	5844 North Larboard Lane	Agoura	CA	91301
Louisville High School	School	Private and Charter Schools	22300 Mulholland Drive	Woodland Hills	CA	91364
Lupin Hill Elementary School	School	Public Elementary Schools	26210 Adamor Road	Calabasas	CA	91302
Malibu High School	School	Public High Schools	30215 Morning View Drive	Malibu	CA	90265
Mariposa School of Global Education	School	Public Elementary Schools	6050 North Calmfield Avenue	Agoura	CA	91301
Marquez Charter	School	Private and Charter Schools	16821 Marquez Avenue	Pacific Palisades	CA	90272
McKinna Learning Center	School	Private and Charter Schools	28990 Pacific Coast Highway, Suite 220	Malibu	CA	90265
Mesivta of Greater Los Angeles	School	Private and Charter Schools	25115 Mureau Road	Calabasas	CA	91302
Miller, Fred C. Camp	School	Public High Schools	433 South Encinal Canyon Road	Malibu	CA	90265
Oaks Christian School	School	Private and Charter Schools	31749 La Tienda Drive	Westlake Village	CA	91362
Our Lady of Malibu	School	Private and Charter Schools	3625 South Winter Canyon Road	Malibu	CA	90265
Pacific Lodge Residential Education Center	School	Public High Schools	4900 Serrania Avenue	Woodland Hills	CA	91364
Palisades Charter Elementary School	School	Private and Charter Schools	800 Via de La Paz	Pacific Palisades	CA	90272
Palisades Charter High School	School	Private and Charter Schools	15777 Bowdoin Street	Pacific Palisades	CA	90272
Palisades Montessori Center	School	Private and Charter Schools	16706 Marquez Avenue	Pacific Palisades	CA	90272
Pepperdine University	School	Colleges and Universities	24255 Pacific Coast Hwy	Malibu	CA	90263
Point Dume Elementary School	School	Public Elementary Schools	6955 Fernhill Drive	Malibu	CA	90265
Rockland Academy	School	Private and Charter Schools	5340 Topanga Canyon Boulevard	Woodland Hills	CA	91364
Round Meadow Elementary School	School	Public Elementary Schools	5151 Round Meadow Road	Calabasas	CA	91302
Saint Jude the Apostle	School	Private and Charter Schools	32036 West Lindero Canyon Road	Westlake Village	CA	91361
Serrania Avenue Charter For Enriched Studies	School	Private and Charter Schools	5014 Serrania Avenue	Woodland Hills	CA	91364
Seven Arrows Elementary School	School	Private and Charter Schools	15240 La Cruz Drive	Pacific Palisades	CA	90272
St. Matthew's Parish School	School	Private and Charter Schools	1031 Bienveneda Avenue	Pacific Palisades	CA	90272
St. Mel Elementary School	School	Private and Charter Schools	20874 Ventura Boulevard	Woodland Hills	CA	91364
Sumac Elementary School	School	Public Elementary Schools	6050 North Calmfield Avenue	Agoura	CA	91301
Taft Charter High School	School	Private and Charter Schools	5461 Winnetka Avenue	Woodland Hills	CA	91364
Topanga Elementary School Charter	School	Private and Charter Schools	22075 Topanga School Road	Topanga	CA	90290
Viewpoint School	School	Private and Charter Schools	23620 Mulholland Highway	Calabasas	CA	91302
Village School, Inc.	School	Private and Charter Schools	780 Swarthmore Avenue	Pacific Palisades	CA	90272
Webster Elementary School	School	Public Elementary Schools	3602 Winter Canyon	Malibu	CA	90265
Westside Waldorf School	School	Private and Charter Schools	17310 West Sunset Boulevard	Pacific Palisades	CA	90272
White Oak Elementary School	School	Public Elementary Schools	31761 West Village School Road	Westlake Village	CA	91361
Willow Elementary School	School	Public Elementary Schools	29026 Laro Drive	Agoura	CA	91301
Woodland Hills Elementary School Charter For Enriched Studies	School	Private and Charter Schools	22201 San Miguel Street	Woodland Hills	CA	91364
Yerba Buena Elementary School	School	Public Elementary Schools	6098 Reyes Adobe Road	Agoura Hills	CA	91301
A.C. Stelle Middle School	Emergency Operation Centers	Emergency Operation Centers (EOC	22450 Mulholland Hwy	Calabasas	CA	91302
A.E. Wright Middle School	Emergency Operation Centers	Emergency Operation Centers (EOC	4029 Las Virgenes Rd	Calabasas	CA	91302
Calabasas High School	Emergency Operation Centers	Emergency Operation Centers (EOC	22855 Mulholland Hwy	Calabasas	CA	91302
City of Malibu City Hall Multi-Purpose Room	Emergency Operation Centers	Primary EOC	23825 Stuart Ranch Rd	Malibu	CA	90265
Malibu Bluffs Park	Emergency Operation Centers	Alternate EOC	24250 Pacific Coast Hwy	Malibu	CA	90265
Topanga Emergency Operations Center	Emergency Operation Centers	Emergency Operation Centers (EOC	139 Old Church Rd	Topanga	CA	90290
County Of Los Angeles Public Library - Westlake Village Library	Emergency Response	Cooling and Warming Centers	31220 Oak Crest Dr	Westlake Village	CA	91361
Will Rogers State Park	EV Chargers		1421 Will Rogers State Historic Park	Pacific Palisades	CA	
Semaconnect Charging Station	EV Chargers		1250 Capri Dr	Pacific Palisades	CA	90272
GreenLots	EV Chargers		888 North Swarthmore Avenue	Pacific Palisades	CA	90272
ChargePoint Charging Station	EV Chargers		15225 Palisades Village Ln	Pacific Palisades	CA	90272
GreenLots	EV Chargers		16602 Marquez Avenue	Pacific Palisades	CA	90272
The Getty Villa	EV Chargers		17985 Pacific Coast Highway	Pacific Palisades	CA	90272
Tesla Supercharger	EV Chargers		3862 Cross Creek Rd	Malibu	CA	90265
EV Charging Station	EV Chargers		3835 Cross Creek Rd	Malibu	CA	90265
ChargePoint Charging Station	EV Chargers		Civic Ctr / Malibu Library	Malibu	CA	90265
Tesla Supercharger	EV Chargers		23475 Civic Center Way	Malibu	CA	90265
ChargePoint Charging Station	EV Chargers		23401 Civic Center Way	Malibu	CA	90265
EV Connect Charging Station	EV Chargers		3011 Malibu Canyon Rd Lot 6	Malibu	CA	90265
EV Connect Charging Stations	EV Chargers		24255 Pacific Coast Hwy	Malibu	CA	90263
ChargePoint Charging Station	EV Chargers		Towers Rd	Malibu	CA	90265
Tesla Destination Charger	EV Chargers		27400 CA-1	Malibu	CA	90265
Tesla Destination Charger	EV Chargers		28128 Pacific Coast Hwy	Malibu	CA	90265
EV Charging Station	EV Chargers		3440 Thousand Oaks Blvd	Westlake Village	CA	91362
EV Connect Charging Stations	EV Chargers		310 N Westlake Blvd	Westlake Village	CA	91362
ChargePoint Charging Station	EV Chargers		3059 Townsgate Rd	Westlake Village	CA	91361
ChargePoint Charging Station	EV Chargers		3925 Auto Mall Drive	Westlake Village	CA	91362
ChargePoint Charging Station	EV Chargers		2659 Townsgate Road	Westlake Village	CA	91361
Tesla Charger	EV Chargers		880 South Westlake Boulevard	Westlake Village	CA	91361
Westlake Plaza	EV Chargers		2725 Agoura Road	Westlake Village	CA	91361
ChargePoint Charging Station	EV Chargers		3075 Townsgate Road	Westlake Village	CA	91361

Appendix E: *Critical Infrastructure Inventory*

Tesla Destination Charger	EV Chargers		2 Dole Dr	Westlake Village	CA	91362
ChargePoint Charging Station	EV Chargers		31107 Thousand Oaks Blvd	Westlake Village	CA	91362
ChargePoint Charging Station	EV Chargers		31105 Thousand Oaks Blvd	Westlake Village	CA	91362
ChargePoint Charging Station	EV Chargers		31220 Oak Crest Dr	Westlake Village	CA	91361
ChargePoint Charging Station	EV Chargers		30801 Agoura Rd	Agoura Hills	CA	91301
EVConnect Charging Station	EV Chargers		30601 Agoura Hills Road	Agoura Hills	CA	91301
ChargePoint Charging Station	EV Chargers		29900 Ladyface Ct	Agoura Hills	CA	91301
ChargePoint Charging Station	EV Chargers		29505 Agoura Rd	Agoura Hills	CA	91301
EVConnect Charging Station	EV Chargers		29219 Canwood Street	Agoura Hills	CA	91301
EVgo Charging Station	EV Chargers		3701 Lost Hills Rd	Agoura Hills	CA	91301
Tesla Charger	EV Chargers		27050 Agoura Road	Agoura Hills	CA	91301
Malibu Creek State Park	EV Chargers		1925 Las Virgenes	Calabasas	CA	91302
EVgo Charging Station	EV Chargers		100 Civic Center Way	Calabasas	CA	91302
ChargePoint Charging Station	EV Chargers		23577 Calabasas Rd	Calabasas	CA	91302
EVgo Charging Station	EV Chargers		23400 Park Sorrento	Calabasas	CA	91302
EVgo Charging Station	EV Chargers		22277 Mulholland Hwy	Calabasas	CA	91302
ChargePoint Charging Station	EV Chargers		6165 Spring Valley Rd	Hidden Hills	CA	91302
1410 Will Geer Rd	Evacuation Centers	Public Temporary Safe Refuge	1410 Will Geer Rd	Topanga	CA	90290
1711 Tuna Canyon Rd	Evacuation Centers	Public Temporary Safe Refuge	1711 Tuna Canyon Rd	Topanga	CA	90290
1950 Tuna Canyon Rd	Evacuation Centers	Public Temporary Safe Refuge	1950 Tuna Canyon Rd	Topanga	CA	90290
19543 Webb Trail	Evacuation Centers	Public Temporary Safe Refuge	19543 Webb Trail	Topanga	CA	90290
20301 Croydon Ln	Evacuation Centers	Public Temporary Safe Refuge	20301 Croydon Ln	Topanga	CA	90290
20403 Paradise Ln	Evacuation Centers	Public Temporary Safe Refuge	20403 Paradise Ln	Topanga	CA	90290
20620 Medley Ln	Evacuation Centers	Public Temporary Safe Refuge	20620 Medley Ln	Topanga	CA	90290
21071 Entrada Rd	Evacuation Centers	Public Temporary Safe Refuge	21071 Entrada Rd	Topanga	CA	90290
21342 Colina Dr	Evacuation Centers	Public Temporary Safe Refuge	21342 Colina Dr	Topanga	CA	90290
21460 Colina Dr	Evacuation Centers	Public Temporary Safe Refuge	21460 Colina Dr	Topanga	CA	90290
22155 Eden Rd	Evacuation Centers	Public Temporary Safe Refuge	22155 Eden Rd	Topanga	CA	90290
269 Old Topanga Canyon Rd	Evacuation Centers	Public Temporary Safe Refuge	269 Old Topanga Canyon Rd	Topanga	CA	90290
A. C. Stelle Middle School	Evacuation Centers	First Aids Units	22450 Mulholland Hwy	Calabasas	CA	91302
A. E. Wright Middle School	Evacuation Centers	First Aids Units	4029 Las Virgenes Rd	Calabasas	CA	91302
Agoura Hills/Calabasas Community Center	Evacuation Centers		27040 Malibu Hills Road	Agoura	CA	91301
Bay Laurel Elementary	Evacuation Centers	First Aids Units	24740 Paseo Primario	Calabasas	CA	91302
Big Rock Ranch	Evacuation Centers	Public Safe Refuge	1717 Old Topanga Canyon Rd	Topanga	CA	90290
Blue Moon	Evacuation Centers	Public Temporary Safe Refuge	711 Old Topanga Cyn	Topanga	CA	90290
Bonnell Park	Evacuation Centers	Public Temporary Safe Refuge	Bonnell & Willow Dr	Topanga	CA	90290
Calabasas High School	Evacuation Centers	First Aids Units	22855 Mulholland Hwy	Calabasas	CA	91302
Community House	Evacuation Centers	Public Safe Refuge	1440 North Topanga Canyon Blvd	Topanga	CA	90290
De Anza Park	Evacuation Centers	First Aids Units	3701 Lost Hills Rd	Agoura	CA	91301
Dead Horse Parking Lot	Evacuation Centers	Public Temporary Safe Refuge	Entrada @ Poquito	Topanga	CA	90290
Fair Hills Farm	Evacuation Centers	Public Temporary Safe Refuge	2735 Santa Maria Rd	Topanga	CA	90290
Fernwood Pacific @ Basin Dr	Evacuation Centers	Public Temporary Safe Refuge	Fernwood Pacific @ Basin Dr	Topanga	CA	90290
Gates Canyon Park	Evacuation Centers	First Aids Units	25801 Thousand Oaks Blvd	Calabasas	CA	91302
Grape Arbor Park	Evacuation Centers	First Aids Units	5100 Parkville Rd	Calabasas	CA	91301
JR's Ranch	Evacuation Centers	Public Temporary Safe Refuge	20501 Callon Dr	Topanga	CA	90290
Las Flores Park	Evacuation Centers	Safe Refuge Areas	3773-3805 Las Flores Canyon Rd	Malibu	CA	90265
Legacy Park	Evacuation Centers	Safe Refuge Areas	23500 Civic Center Way	Malibu	CA	90265
Malibu Bluffs Park	Evacuation Centers	Family Assitance Center	24250 CA-1	Malibu	CA	90265
Mill Creek Ranch	Evacuation Centers	Public Safe Refuge	1881 Old Topanga Canyon Rd	Topanga	CA	90290
Old Canyon Ranch	Evacuation Centers	Public Temporary Safe Refuge	1180 Old Topanga Cyn	Topanga	CA	90290
Old Elysium Field	Evacuation Centers	Public Safe Refuge	814 Robinson Rd	Topanga	CA	90290
Paradise Ranch	Evacuation Centers	Public Temporary Safe Refuge	20233 Paradise Ln	Topanga	CA	90290
Pierce College	Evacuation Centers	Large Animal Evacation Centers	6201 Winnetka Avenue	Woodland Hills	CA	91371
Pine Tree Circle	Evacuation Centers	Public Safe Refuge	120 South Topanga Canyon Blvd	Topanga	CA	90290
Salvation Army Camps at Tapia Park	Evacuation Centers	Safe Refuge Areas	26801 Dorothy Dr	Calabasas	CA	91302
Summit Drive @ Peak Trail	Evacuation Centers	Public Temporary Safe Refuge	Summit Drive @ Peak Trail	Topanga	CA	90290
Tennis and Swim Center	Evacuation Centers	First Aids Units	23400 Park Sorrento	Calabasas	CA	91302
Topanga General Creek Center	Evacuation Centers	Public Safe Refuge	101, 137, 139 South Topanga Canyon Blvd	Topanga	CA	90290
Topanga State Beach Parking Lot	Evacuation Centers	Safe Refuge Areas	18700 Pacific Coast Hwy	Malibu	CA	90265
Trust Ranch	Evacuation Centers	Public Temporary Safe Refuge	1291 Will Geer Rd	Topanga	CA	90290
Tuna Canyon and Saddle Peak	Evacuation Centers	Public Temporary Safe Refuge	Tuna Canyon and Saddle Peak	Topanga	CA	90290
Viewridge Rd	Evacuation Centers	Public Safe Refuge	Viewridge Rd	Topanga	CA	90290
Water Tank at 2300 Tuna Canyon Rd	Evacuation Centers	Public Safe Refuge	2300 Tuna Canyon Rd	Topanga	CA	90290
Will Rogers State Beach Parking Lot	Evacuation Centers	Safe Refuge Areas	17000 Pacific Coast Hwy	Pacific Palisades	CA	90272
Zuma Beach Parking Lot	Evacuation Centers	Safe Refuge Areas	30000 Pacific Coast Highway	Malibu	CA	90265
76	Gas Stations	Gas Stations	15400 Sunset Blvd	Pacific Palisades	CA	90272
USA Gasoline	Gas Stations	Gas Stations	1715 Thousand Oaks Blvd	Thousand Oaks	CA	91362
76	Gas Stations	Gas Stations	17299 CA-1	Pacific Palisades	CA	90272
ARCO	Gas Stations	Gas Stations	18541 Pacific Coast Hwy	Malibu	CA	90265
United Oil	Gas Stations	Gas Stations	19706 Ventura Blvd	Woodland Hills	CA	91364
76	Gas Stations	Gas Stations	20021 Ventura Blvd	Woodland Hills	CA	91364
Chevron	Gas Stations	Gas Stations	20905 Ventura Blvd	Woodland Hills	CA	91364
Phillips 66	Gas Stations	Gas Stations	21216 Pacific Coast Hwy	Malibu	CA	90265
Ralph's Fuel Center	Gas Stations	Gas Stations	21909 Ventura Blvd	Woodland Hills	CA	91364
Shell	Gas Stations	Gas Stations	22295 Mulholland Hwy	Calabasas	CA	91302
Shell	Gas Stations	Gas Stations	22330 Ventura Blvd	Woodland Hills	CA	91364
Chevron	Gas Stations	Gas Stations	22351 Ventura Blvd	Woodland Hills	CA	91364
USA Gasoline	Gas Stations	Gas Stations	22406 Ventura Blvd	Woodland Hills	CA	91364
ARCO	Gas Stations	Gas Stations	22455 Ventura Blvd	Woodland Hills	CA	91364
Chevron	Gas Stations	Gas Stations	225 Hampshire Rd	Thousand Oaks	CA	91361
Shell	Gas Stations	Gas Stations	23201 Ventura Blvd	Woodland Hills	CA	91364
Shell	Gas Stations	Gas Stations	23387 Pacific Coast Hwy	Malibu	CA	90265

Appendix E: *Critical Infrastructure Inventory*

Chevron	Gas Stations	Gas Stations	23670 Pacific Coast Hwy	Malibu	CA	90265
Sinclair	Gas Stations	Gas Stations	24025 Calabasas Rd	Calabasas	CA	91302
Chevron	Gas Stations	Gas Stations	24101 Ventura Blvd	Calabasas	CA	91302
Shell	Gas Stations	Gas Stations	24115 Calabasas Rd	Calabasas	CA	91302
ARCO	Gas Stations	Gas Stations	2473 Thousand Oaks Blvd	Thousand Oaks	CA	91362
76	Gas Stations	Gas Stations	26101 Pacific Coast Hwy	Malibu	CA	90265
76	Gas Stations	Gas Stations	28203 Dorothy Dr	Agoura Hills	CA	91301
ARCO	Gas Stations	Gas Stations	29145 Heathercliff Rd	Malibu	CA	90265
76	Gas Stations	Gas Stations	30245 Canwood St	Agoura Hills	CA	91301
TR Oil	Gas Stations	Gas Stations	3050 Thousand Oaks Blvd	Thousand Oaks	CA	91362
Chevron	Gas Stations	Gas Stations	30811 Pacific Coast Hwy	Malibu	CA	90265
76	Gas Stations	Gas Stations	3102 Thousand Oaks Blvd	Thousand Oaks	CA	91362
Chevron	Gas Stations	Gas Stations	31505 Agoura Rd	Westlake Village	CA	91361
Shell	Gas Stations	Gas Stations	395 Hampshire Rd	Thousand Oaks	CA	91361
Shell	Gas Stations	Gas Stations	3995 Thousand Oaks Blvd	Westlake Village	CA	91362
Chevron	Gas Stations	Gas Stations	4807 Las Virgenes Rd	Calabasas	CA	91302
Mobil	Gas Stations	Gas Stations	4830 Las Virgenes Rd	Calabasas	CA	91302
Shell	Gas Stations	Gas Stations	4831 Las Virgenes Rd	Calabasas	CA	91302
Mobil	Gas Stations	Gas Stations	4950 Reyes Adobe Rd	Old Agoura	CA	91301
Chevron	Gas Stations	Gas Stations	5051 Kanan Rd	Agoura Hills	CA	91301
Chevron	Gas Stations	Gas Stations	5116 Chesebro Rd	Agoura Hills	CA	91301
Chevron	Gas Stations	Gas Stations	5221 Palo Comado Canyon Rd	Old Agoura	CA	91301
Agoura Hills Alliance	Gas Stations	Gas Stations	5226 Palo Comado Canyon Rd	Agoura Hills	CA	91301
Chevron	Gas Stations	Gas Stations	5356 Canoga Ave	Woodland Hills	CA	91364
Palisades Gas & wash	Gas Stations	Gas Stations	890 Alma Real Dr	Pacific Palisades	CA	90272
Mobil	Gas Stations	Gas Stations	942 S Westlake Blvd	Westlake Village	CA	91361
Smart & Final	Grocery Store	Grocery Store	5770 Lindero Canyon Road	Westlake Village	CA	91362
Albertsons	Grocery Store	Grocery Store	26521 Agoura Road	Calabassas	CA	91302
Alma Food Ventura	Grocery Store	Grocery Store	180 Promenade Way	Westlake Village	CA	91362
Calabasas Liquor & Market	Grocery Store	Grocery Store	5657 Las Virgenes Road	Calabassas	CA	91302
Canyon Gourmet	Grocery Store	Grocery Store	120 S. Topanga Canyon Blvd	Topanga	CA	90290
Costco	Grocery Store	Grocery Store	5700 Lindero Cyn Rd.	Westlake Village	CA	91362
Everest Grocers & Vending Inc	Grocery Store	Grocery Store	26500 Agoura Road	Calabasas	CA	91302
Fernwood Market	Grocery Store	Grocery Store	446 S. Topanga Canyon Blvd	Topanga	CA	90290
Gelson's Market	Grocery Store	Grocery Store	2734 Townsgate Road	Westlake Village	CA	91361
Gelson's Markets	Grocery Store	Grocery Store	22277 Mulholland Hwy	Calabasas	CA	91302
Gelson's The Super Market	Grocery Store	Grocery Store	15424 Sunset Blvd.	Pacific Palisades	CA	90272
Malibu Country Mart	Grocery Store	Grocery Store	3835 Cross Creek Road	Malibu	CA	90265
Malibu Ranch Market	Grocery Store	Grocery Store	29575 Pacific Coast Hwy	Malibu	CA	90265
Pavilions	Grocery Store	Grocery Store	29211 Heathercliff Road	Malibu	CA	90265
Ralphs	Grocery Store	Grocery Store	23841 Malibu Road	Malibu	CA	90265
Ralphs	Grocery Store	Grocery Store	3963 E Thousand Oaks Blvd	Westlake Village	CA	91362
Ralphs	Grocery Store	Grocery Store	5727 Kanan Road	Agoura Hills	CA	91301
Ralphs	Grocery Store	Grocery Store	4754 Commons Way	Calabassas	CA	91302
Ralphs	Grocery Store	Grocery Store	15120 W Sunset Blvd	Pacific Palisades	CA	90272
Sprouts Farmers Market	Grocery Store	Grocery Store	1012 S Westlake Blvd	Westlake Village	CA	91361
Topanga Creek General Store	Grocery Store	Grocery Store	141 S. Topanga Canyon Blvd	Topanga	CA	90290
Trader Joe's	Grocery Store	Grocery Store	3835 E Thousand Oaks Blvd	Westlake Village	CA	91362
Trader Joe's	Grocery Store	Grocery Store	28941 Canwood St	Agoura Hills	CA	91301
Vintage Grocers	Grocery Store	Grocery Store	30745 Pacific Coast Hwy	Malibu	CA	90265
Vons	Grocery Store	Grocery Store	2725 Agoura Road	Westlake Village	CA	91361
Vons	Grocery Store	Grocery Store	17380 W Sunset Blvd	Pacific Palisades	CA	90272
Vons	Grocery Store	Grocery Store	5671 Kanan Road	Agoura Hills	CA	91301
Whole Foods Market Malibu	Grocery Store	Grocery Store	23401 Civic Center Way	Malibu	CA	90265
Exer Urgent Care	Medical Facility	Urgent Care	111 S Westlake Blvd #110	Westlake Village	CA	91362
Westlake Medical Plaza	Medical Facility	Medical Center	1220 La Venta Rd	Westlake Village	CA	91361
UCLA Health Westlake Village Primary & Specialty Care	Medical Facility	Primary Care	1250 La Venta Dr	Westlake Village	CA	91361
Community Medical Building	Medical Facility	Medical Center	1250 La Venta Rd	Westlake Village	CA	91361
UCLA Health Westlake Village Triunfo Primary & Specialty Care	Medical Facility	Primary Care	141 Triunfo Canyon Rd	Westlake Village	CA	91361
Los Robles Rehabilitation Hospital	Medical Facility	Hospital	150 Via Merida	Westlake Village	CA	91362
Primary Caring of Malibu	Medical Facility	Primary Care	22601 Pacific Coast Hwy	Malibu	CA	90265
Calabasas Urgent Care	Medical Facility	Urgent Care	23341 Mulholland Dr	Calabasas	CA	91364
Community Psychiatry - Calabasas	Medical Facility	Mental Health	23622 Calabasas Rd #320	Calabasas	CA	91302
Malibu Urgent Care	Medical Facility	Urgent Care	23656 Pacific Coast Hwy	Malibu	CA	90265
Malibu Medical Group	Medical Facility	Medical Center	23661 CA-1	Malibu	CA	90265
UCLA Health Malibu Primary Care & Immediate Care	Medical Facility	Primary Care	23815 Stuart Ranch Rd	Malibu	CA	90265
Pepperdine University Student Health Center	Medical Facility	Medical Center	24255 Pacific Coast Hwy	Malibu	CA	90263
DWC Pros	Medical Facility	Medical Center	2625 Townsgate Rd Suite 330	Westlake Village	CA	91361
Pacific Shores Hospital	Medical Facility	Hospital	26560 Agoura Rd	Calabasas	CA	91302
UCLA Health Calabasas Primary & Specialty Care	Medical Facility	Primary Care	26585 W Agoura Rd	Calabasas	CA	91302
Exer Urgent Care	Medical Facility	Urgent Care	26777 Agoura Rd	Agoura Hills	CA	91302
Westlake Village Urgent Care Center	Medical Facility	Urgent Care	2900 Townsgate Rd	Westlake Village	CA	91361
Primary Care Sports Medicine - Agoura Hills	Medical Facility	Primary Care	29525 Canwood St	Agoura Hills	CA	91301
Urgent Care in Agoura Hills - AME Medical Group	Medical Facility	Urgent Care	29525 Canwood St	Agoura Hills	CA	91301
Pacific Palisades Medical Dental Center	Medical Facility	Medical Center	2FWF+V7 Pacific Palisades	Pacific Palisades	CA	
Westminter Free Clinic	Medical Facility	Medical Center	32111 Watergate Rd	Westlake Village	CA	91361
Westlake Medical Center	Medical Facility	Medical Center	32144 Agoura Rd	Westlake Village	CA	91361
Westlake Physical Medicine and Rehabiliation	Medical Facility	Rehabilitation	32144 Agoura Rd UNIT 206	Westlake Village	CA	91361
Thousand Oaks Surgical Hospital	Medical Facility	Hosptial	401 Rolling Oaks Dr	Thousand Oaks	CA	91361
Canyon Medical Center & Urgent Care	Medical Facility	Urgent Care	4937 Las Virgenes Rd	Calabasas	CA	91302
Westlake Village Psychotherapy	Medical Facility	Mental Health	5655 Lindero Canyon Rd #225	Westlake Village	CA	91362
AFC Urgent Care Agoura Hills	Medical Facility	Urgent Care	5825 Kanan Rd	Agoura Hills	CA	91301

Appendix E: *Critical Infrastructure Inventory*

Warner Medical Center	Medical Facility	Medical Center	6325 CA-27	Woodland Hills	CA	91367
Specialty Surgical Center of Westlake Village	Medical Facility	Primary Care	696 Hampshire Rd Suite 100	Westlake Village	CA	91361
Primary Care Pacific Palisades - Saint John's Physician Partners	Medical Facility	Primary Care	881 Alma Real Dr	Pacific Palisades	CA	90272
UCLA Health Pacific Palisades Family Medicine	Medical Facility	Family Medicine	881 Alma Real Dr	Pacific Palisades	CA	90272
Sunset Urgent Care Medical Center: Isidore Kwaw, MD	Medical Facility	Urgent Care	910 Vía De La Paz	Pacific Palisades	CA	90272
BLUE DUDE MOBILE ESTATES (19-1379-MP)	Mobile Home Park	Mobile Home Park	1667 LAS VIRGENES CANYON RD	Calabasas	CA	91302
CALABASAS VILLAGE (19-1448-MP)	Mobile Home Park	Mobile Home Park	23777 MULHOLLAND HWY	Calabasas	CA	91302
CROCKERS TRAILER CT (19-0870-MP)	Mobile Home Park	Mobile Home Park	1548 N TOPANGA BLVD	Topanga	CA	90290
LITTLE FOX TRAILER COURT (19-0097-MP)	Mobile Home Park	Mobile Home Park	272 N TOPANGA CANYON BLVD	Topanga	CA	90290
MALIBU BEACH RV PARK (19-1480-MP)	Mobile Home Park	Mobile Home Park	25801 PACIFIC COAST HWY	Malibu	CA	90265
MALIBU VILLAGE MOBILEHOME OWNERS ASSOCIATION INC (1	Mobile Home Park	Mobile Home Park	17015 PACIFIC COAST HWY	Pacific Palisades	CA	90272
OAK FOREST ESTATES ASSOC. (19-1493-MP)	Mobile Home Park	Mobile Home Park	32100 TRIUNFO CANYON RD	Westlake Village	CA	91361
PACIFIC PALISADES BOWL MOBILE ESTATES (19-1103-MP)	Mobile Home Park	Mobile Home Park	16321 PACIFIC COAST HWY	Pacific Palisades	CA	90272
PARADISE COVE MHP (19-0515-MP)	Mobile Home Park	Mobile Home Park	28128 PACIFIC COAST HWY	Malibu	CA	90265
SEMINOLE SPRINGS MHP	Mobile Home Park	Mobile Home Park	30473 MULHOLLAND HWY	Agoura	CA	91301
SLB TOP O TOPANGA HOA (19-1200-MP)	Mobile Home Park	Mobile Home Park	3360 N TOPANGA CANYON BLVD	Topanga	CA	90290
TAHITIAN TERRACE (19-1105-MP)	Mobile Home Park	Mobile Home Park	16001 PACIFIC COAST HWY	Pacific Palisades	CA	90272
Behavioral Healthcare Community Endowment Fund	Non-Profit Organization	Non-Profit Organization	23945 Calabasas Rd Suite 106	Calabasas	CA	91302
BEST FOOT FORWARD	Non-Profit Organization	Non-Profit Organization	3690 Avenida Callada	Calabasas	CA	91302
Conejo Las Virgenes Future	Non-Profit Organization	Non-Profit Organization	4232 Las Virgenes Rd	Calabasas	CA	91302
Embrace USA	Non-Profit Organization	Non-Profit Organization	26500 Agoura Rd Suite 201	Calabasas	CA	91302
Grossman Burn Foundation	Non-Profit Organization	Non-Profit Organization	23679 Calabasas Rd #270	Calabasas	CA	91302
LIDE Foundation	Non-Profit Organization	Non-Profit Organization	5737 Kanan Rd	Agoura Hills	CA	91301
Life Without Limbs	Non-Profit Organization	Non-Profit Organization	5701 Lindero Canyon Rd # 1-202	Westlake Village	CA	91362
LV Fire Relief Resource Center	Non-Profit Organization	Non-Profit Organization	28631 Canwood St UNIT A	Agoura Hills	CA	91301
My Stuff Bags Foundation	Non-Profit Organization	Non-Profit Organization	5347 Sterling Center Dr	Westlake Village	CA	91362
Options For Life Foundation	Non-Profit Organization	Non-Profit Organization	23801 Calabasas Rd # 1017	Calabasas	CA	91302
Save Our Souls	Non-Profit Organization	Non-Profit Organization	5010 N, Parkway Calabasas #101	Calabasas	CA	91302
SOS Mentor	Non-Profit Organization	Non-Profit Organization	22935 Ventura Blvd Ste 224	Woodland Hills	CA	91364
Surya-Chandra Foundation	Non-Profit Organization	Non-Profit Organization	29932 Quail Run Dr	Agoura Hills	CA	91301
The Malibu/Lost Hills Sheriff's Foundation	Non-Profit Organization	Non-Profit Organization	5743 Corsa Ave #205	Westlake Village	CA	91362
1501 Will Rogers State Park Rd	Park and Recreation	Public Park	1501 Will Rogers State Park Rd	Pacific Palisades	CA	90272
Asilomar View Park	Park and Recreation	Public Park	15900 Asilomar Blvd	Pacific Palisades	CA	90272
Berniece Bennett Park	Park and Recreation	Public Park	31800 Village Center Rd	Westlake Village	CA	91361
Calabasas Creek Park	Park and Recreation	Public Park	1925 Las Virgenes Rd	Calabasas	CA	91302
Charmlee Wilderness Park	Park and Recreation	Public Park	2577 Encinal Canyon Rd	Malibu	CA	90265
Creekside Park	Park and Recreation	Public Park	3655 Old Topanga Canyon Rd	Calabasas	CA	91302
Foxfield Park	Park and Recreation	Public Park	31965 Foxfield Dr	Westlake Village	CA	91361
Gates Canyon Park	Park and Recreation	Public Park	25801 Thousand Oaks Blvd	Calabasas	CA	91302
Grape Arbor Park	Park and Recreation	Public Park	5100 Parkville Rd	Calabasas	CA	91302
Juan Bautista de Anza Park	Park and Recreation	Public Park	3701 Lost Hills Rd	Agoura	CA	91301
Las Flores Creek Park	Park and Recreation	Public Park	3773-3805 Las Flores Canyon Rd	Malibu	CA	90265
Legacy Park	Park and Recreation	Public Park	23500 Civic Center Way	Malibu	CA	90265
Malibu Bluffs Park	Park and Recreation	Public Park	24250 CA-1	Malibu	CA	90265
Palisades Recreation Center	Park and Recreation	Recreation Center	851 Alma Real Dr	Pacific Palisades	CA	90272
Reyes Adobe Park	Park and Recreation	Public Park	31400 Rainbow Crest Dr	Agoura	CA	91301
Russell Ranch Park	Park and Recreation	Public Park	30798 Russell Ranch Rd	Westlake Village	CA	91361
Serrania Park	Park and Recreation	Public Park	20726 Wells Dr	Woodland Hills	CA	91367
Tapia Park Public Use Area	Park and Recreation	Public Park	Agoura Hills	Agoura	CA	91301
Temescal Canyon Park	Park and Recreation	Public Park	15900 Pacific Coast Hwy	Pacific Palisades	CA	90272
Three Springs Park	Park and Recreation	Public Park	3000 Three Springs Dr	Westlake Village	CA	91361
Top of Topanga Overlook	Park and Recreation	Public Park	3400 N Topanga Canyon Blvd	Topanga	CA	90290
Topanga State Park	Park and Recreation	Public Park	20828 Entrada Rd	Topanga	CA	90290
Topanga State Park	Park and Recreation	Public Park	20828 Entrada Rd	Topanga	CA	90290
Trancas Canyon Park	Park and Recreation	Public Park	6050 Trancas Canyon Rd	Malibu	CA	90265
Warner Center Park	Park and Recreation	Public Park	5800 Topanga Canyon Blvd	Woodland Hills	CA	91367
Westlake Village Community Park	Park and Recreation	Public Park	31107 Thousand Oaks Blvd	Westlake Village	CA	91361
Westlake Village Dog Park	Park and Recreation	Public Park	31400 Oak Crest Dr	Westlake Village	CA	91361
Woodland Hills Recreation Center	Park and Recreation	Recreation Center	5858 Shoup Ave	Woodland Hills	CA	91367
Century 001-071 Dam	Water Infrastructure	Dams			CA	
Contury Reservoir	Water Infrastructure	Reservoirs				
Girard Reservoir	Water Infrastructure	Reservoirs				
J W Wisda 1-067 Dam	Water Infrastructure	Dams			CA	
Lake Enchanto	Water Infrastructure	Reservoirs				
Lake Lindero	Water Infrastructure	Reservoirs				
Lindero 785 Dam	Water Infrastructure	Dams		Agoura Hills	CA	
Malibou Lake Club 771 Dam	Water Infrastructure	Dams			CA	
Malibu Lake	Water Infrastructure	Reservoirs				
Malibu Reservoir	Water Infrastructure	Reservoirs				
Potrero 786 Dam	Water Infrastructure	Dams		Westlake Village	CA	
Riviera Reservoir 1043 Dam	Water Infrastructure	Dams		Los Angeles	CA	
Rocky Oaks Dam	Water Infrastructure	Dams			CA	
Santa Ynez Canyon 6-047 Dam	Water Infrastructure	Dams		Los Angeles	CA	
Westlake Lake	Water Infrastructure	Reservoirs				
Westlake Reservoir 1073 Dam	Water Infrastructure	Dams		Westlake Village	CA	
Agoura Hills City Hall	Public Facility	City Hall	30001 Ladyface Ct	Agoura	CA	91301
Agoura Hills/Calabasas Community Center	Public Facility	Community Center	27040 Malibu Hills	Calabasas	CA	91302
Calabasas City Hall	Public Facility	City Hall	100 Civic Center Way	Calabasas	CA	91302
Calabasas Senior Center	Public Facility	Senior Center	300 Civic Center Way	Calabasas	CA	91302
Hidden Hills City Hall	Public Facility	City Hall	6165 Spring Valley Rd	Hidden Hills	CA	91302
Los Angeles County Animal Care & Control – Agoura Shelter	Public Facility	Animal Care & Control	29525 Agoura Rd	Agoura Hills	CA	91301
Los Angeles County Board-Sprvsrs	Public Facility	LA County Facilities	26600 Agoura Rd # 100	Calabasas	CA	91302

Appendix E: *Critical Infrastructure Inventory*

Los Angeles County Public Works	Public Facility	LA County Facilities	29773 Mulholland Hwy	Agoura Hills
Malibu City Hall	Public Facility	City Hall	23825 Stuart Ranch Rd	Malibu
Malibu Conservation Camp #13	Public Facility	Conservation Camp	1250 S. Encinal Canyon Rd.	Malibu
Malibu Senior Center	Public Facility	Senior Center	23825 Stuart Ranch Rd	Malibu
Michael Landon Community Center	Public Facility	Community Center	24250 Pacific Coast Hwy	Malibu
Senior Community Outreach Professionals for the Elderly in Vent	Public Facility	Senior Center	31157 Anacapa View Dr	Malibu
Supervisor Sheila Kuehl District Office	Public Facility	LA County Facilities	26600 Agoura Rd # 100	Calabasas
Westlake City Hall	Public Facility	City Hall	31200 Oak Crest Drive	Westlake Village
Wishtoyo Chumash Village	Public Facility	Museum	33904 Pacific Coast Hwy	Malibu
County Fire Station #125, Calabasas	Public Safety	Fire Stations	5215 N. Las Virgenes Rd.	Calabasas
County Fire Station #144, Westlake Village	Public Safety	Fire Stations	31981 Foxfield Dr.	Westlake Village
County Fire Station #65, Agoura	Public Safety	Fire Stations	4206 Cornell Rd.	Agoura
County Fire Station #67, Calabasas	Public Safety	Fire Stations	25801 Piuma Rd.	Calabasas
County Fire Station #68, Calabasas	Public Safety	Fire Stations	24130 Calabasas Rd.	Calabasas
County Fire Station #69, Topanga	Public Safety	Fire Stations	401 S. Topanga Cyn Blvd.	Topanga
County Fire Station #70 - Hdqtrs, Malibu	Public Safety	Fire Stations	3970 Carbon Cyn Rd.	Malibu
County Fire Station #71, Malibu	Public Safety	Fire Stations	28722 W. Pacific Coast Hwy.	Malibu
County Fire Station #72, Malibu	Public Safety	Fire Stations	1832 S. Decker Rd.	Malibu
County Fire Station #88, Malibu	Public Safety	Fire Stations	23720 W. Malibu Rd.	Malibu
County Fire Station #89, Agoura Hills	Public Safety	Fire Stations	29575 Canwood St.	Agoura Hills
County Fire Station #99, Malibu	Public Safety	Fire Stations	32550 Pacific Coast Hwy.	Malibu
Los Angeles County Fire Department - Battalion 5 - Headquarters	Public Safety	Fire Stations	3970 Carbon Canyon Rd.	Malibu
Los Angeles County Fire Department - Battalion 5 - Station 72	Public Safety	Fire Stations	1260 Encinal Canyon Rd	Malibu
Los Angeles County Lifeguards	Public Safety	Lifeguards	7150 Westward Beach Rd	Malibu
Los Angeles Fire Department - Station 23 - Palisades Highlands	Public Safety	Fire Stations	17281 Sunset Blvd.	Pacific Palisades
Los Angeles Fire Department - Station 69 - Pacific Palisades	Public Safety	Fire Stations	15045 Sunset Blvd.	Pacific Palisades
Malibu/Lost Hills Sheriff Station	Public Safety	Sheriff and Police Stations	27050 Agoura Rd.	Calabasas
Station No. 84 - Canoga Ave.	Public Safety	Fire Stations	5340 Canoga Ave.	Woodland Hills
Agoura Bible Fellowship	Religious Organization	Churches	5564 Foothill Dr	Agoura Hills
Atmosphere Church	Religious Organization	Churches	299 S Moorpark Rd	Thousand Oaks
Bethel Christian Fellowship	Religious Organization	Churches	30255 Agoura Rd	Agoura Hills
California Community Church	Religious Organization	Churches	30125 Agoura Rd	Agoura Hills
Calvary Chapel Calabasas	Religious Organization	Churches	26670 Agoura Rd	Calabasas
Calvary Chapel Malibu	Religious Organization	Churches	30237 Morning View Dr	Malibu
Calvary Church of Pacific Palisades	Religious Organization	Churches	701 N Palisades Dr	Pacific Palisades
Calvary Community Church	Religious Organization	Churches	5495 Via Rocas	Westlake Village
Chabad of Topanga	Religious organization	Religious organization	1459 Old Topanga Canyon Rd	Topanga
Christian City Church	Religious Organization	Churches	22450 Mulholland Hwy	Calabasas
Christian Science Church - Malibu	Religious Organization	Churches	28635 CA-1	Malibu
Church In the Canyon	Religious Organization	Churches	4235 Las Virgenes Rd	Calabasas
Community United Methodist Church of Pacific Palisades	Religious Organization	Churches	801 Vía De La Paz	Pacific Palisades
Corpus Christi Catholic Church	Religious Organization	Churches	880 Toyopa Dr	Pacific Palisades
Food Distribution Center - Calvary Community Church	Religious Organization	Churches	5495 Via Rocas	Westlake Village
Gateway Foursquare Church	Religious Organization	Churches	29646 Agoura Rd	Agoura Hills
Living Well Church	Religious Organization	Churches	880 S Westlake Blvd	Westlake Village
Malibu Gathering	Religious Organization	Churches	6425 Busch Dr	Malibu
Malibu Pacific Church	Religious Organization	Churches	3324 Malibu Canyon Rd	Malibu
New Hope Lutheran Church	Religious Organization	Churches	29295 Agoura Rd	Agoura Hills
Our Lady of Malibu Catholic Church	Religious Organization	Churches	3625 Winter Canyon Rd	Malibu
Pacific Palisades Presbyterian Church	Religious Organization	Churches	15821 Sunset Blvd	Pacific Palisades
Palisades Lutheran Church	Religious Organization	Churches	15905 Sunset Blvd	Pacific Palisades
St Jude's Catholic Church	Religious Organization	Churches	32032 Lindero Canyon Rd	Westlake Village
St Matthew's Episcopal Church	Religious Organization	Churches	1031 Bienveneda Ave	Pacific Palisades
St Maximilian Kolbe Catholic	Religious Organization	Churches	5801 Kanan Rd	Westlake Village
St Paul Lutheran Church	Religious Organization	Churches	30600 Thousand Oaks Blvd	Agoura Hills
The Parish of St Matthew	Religious Organization	Churches	1031 Bienveneda Ave	Pacific Palisades
Topanga Christian Fellowship	Religious Organization	Churches	269 Old Topanga Canyon Rd	Topanga
United Methodist Church	Religious Organization	Churches	1049 S Westlake Blvd	Westlake Village
Vintage Church Malibu	Religious Organization	Churches	Webster Elementary	Malibu
Waveside Church	Religious Organization	Churches	6955 Fernhill Dr	Malibu
Westminster Presbyterian Church	Religious Organization	Churches	32111 Watergate Rd	Westlake Village
24Hour Caregivers & Senior Services	Senior Service	Homecare Service	2659 Townsgate Rd #132	Westlake Village
Calabasas Senior Home Caregivers	Senior Service	Homecare Service	4500 Park Granada Blvd	Calabasas
Canyon Trails Assisted Living and Memory Care	Senior Service	Homecare Service	7945 Topanga Canyon Blvd	Topanga
Geriatric Care Consultants LLC	Senior Service	Homecare Service	31805 Broad Beach Rd #2620	Malibu
Home Instead	Senior Service	Homecare Service	171 Thousand Oaks Blvd #203	Thousand Oaks
Rose Senior Home Caregivers	Senior Service	Homecare Service	585 S Fairfax Ave	Topanga
Villa Mulholland II Assisted Living Facility for Elderly	Senior Service	Senior Housing	4501 San Feliciano Dr	Woodland Hills
Calabasas Landfill	Utility	Waste Landfill	5300 Lost Hills Rd	Agoura Hills
California Water Service Co	Utility	Water District	2524 Townsgate Rd # A	Westlake Village
County of Los Angeles Department of Public Works Winding Way	Utility	Water District	28001 Overview	Malibu
Las Virgenes Municipal Water District	Utility	Water District	4232 Las Virgenes Rd #1994	Calabasas
Las Virgenes Water District	Utility	Water District	731 Malibu Canyon Rd	Calabasas
Los Angeles County Waterworks Districts	Utility	Water District	23533 Civic Center Way	Malibu
Southern California Edison	Utility	Electricity	3599 Foothill Dr	Thousand Oaks

Appendix F: *CalAdapt[1] Extreme Heat Projection Tables by Community*

Agoura Hills (Number of days in a year above 99.6F)

PERIOD	LABEL	CHANGE	AVERAGE	RANGE	UNITS
Baseline (1961-1990)	Modeled Historical	-	3	2,5	days
Mid-Century (2035-2064)	Medium Emissions (RCP 4.5)	11	14	8,36	days
End-Century (2070-2099)	Medium Emissions (RCP 4.5)	17	20	11,55	days
Mid-Century (2035-2064)	High Emissions (RCP 8.5)	15	18	11,39	days
End-Century (2070-2099)	High Emissions (RCP 8.5)	36	39	25,85	days
Baseline (1961-1990)	Observed	-	4	NaN,NaN	days

Calabasas (Number of days in a year above 99.6F)

PERIOD	LABEL	CHANGE	AVERAGE	RANGE	UNITS
Baseline (1961-1990)	Modeled Historical	-	4	2,5	days
Mid-Century (2035-2064)	Medium Emissions (RCP 4.5)	11	15	8,37	days
End-Century (2070-2099)	Medium Emissions (RCP 4.5)	16	20	12,55	days
Mid-Century (2035-2064)	High Emissions (RCP 8.5)	15	19	12,40	days
End-Century (2070-2099)	High Emissions (RCP 8.5)	35	39	25,82	days
Baseline (1961-1990)	Observed	-	4	NaN,NaN	days

Hidden Hills (Number of days in a year above 99.6F)

PERIOD	LABEL	CHANGE	AVERAGE	RANGE	UNITS
Baseline (1961-1990)	Modeled Historical	-	4	2,5	days
Mid-Century (2035-2064)	Medium Emissions (RCP 4.5)	11	15	8,37	days
End-Century (2070-2099)	Medium Emissions (RCP 4.5)	16	20	12,55	days
Mid-Century (2035-2064)	High Emissions (RCP 8.5)	15	19	12,40	days
End-Century (2070-2099)	High Emissions (RCP 8.5)	35	39	25,82	days
Baseline (1961-1990)	Observed	-	4	NaN,NaN	days

1 https://cal-adapt.org/

Appendix F: *CalAdapt Extreme Heat Projection Tables by Community*

Malibu (Number of days in a year above 99.6F)

PERIOD	LABEL	CHANGE	AVERAGE	RANGE	UNITS
Baseline (1961-1990)	Modeled Historical	-	3	1,4	days
Mid-Century (2035-2064)	Medium Emissions (RCP 4.5)	7	10	6,22	days
End-Century (2070-2099)	Medium Emissions (RCP 4.5)	11	14	9,39	days
Mid-Century (2035-2064)	High Emissions (RCP 8.5)	10	13	8,26	days
End-Century (2070-2099)	High Emissions (RCP 8.5)	27	30	17,70	days
Baseline (1961-1990)	Observed	-	4	NaN,NaN	days

Pacific Palisades (Number of days in a year above 99.6F)

PERIOD	LABEL	CHANGE	AVERAGE	RANGE	UNITS
Baseline (1961-1990)	Modeled Historical	-	2	1,3	days
Mid-Century (2035-2064)	Medium Emissions (RCP 4.5)	5	7	4,14	days
End-Century (2070-2099)	Medium Emissions (RCP 4.5)	7	9	6,25	DAYS
Mid-Century (2035-2064)	High Emissions (RCP 8.5)	7	9	6,18	days
End-Century (2070-2099)	High Emissions (RCP 8.5)	20	22	11,60	days
Baseline (1961-1990)	Observed	-	4	NaN,NaN	days

Topanga (Number of days in a year above 99.6F)

PERIOD	LABEL	CHANGE	AVERAGE	RANGE	UNITS
Baseline (1961-1990)	Modeled Historical	-	3	2,4	days
Mid-Century (2035-2064)	Medium Emissions (RCP 4.5)	9	12	6,29	days
End-Century (2070-2099)	Medium Emissions (RCP 4.5)	13	16	10,48	days
Mid-Century (2035-2064)	High Emissions (RCP 8.5)	12	15	9,33	days
End-Century (2070-2099)	High Emissions (RCP 8.5)	30	33	20,76	days
Baseline (1961-1990)	Observed	-	4	NaN,NaN	days

Appendix F: *CalAdapt Extreme Heat Projection Tables by Community*

Westlake Village (Number of days in a year above 99.6F)

PERIOD	LABEL	CHANGE	AVERAGE	RANGE	UNITS
Baseline (1961-1990)	Modeled Historical	-	3	2,4	days
Mid-Century (2035-2064)	Medium Emissions (RCP 4.5)	9	12	6,30	days
End-Century (2070-2099)	Medium Emissions (RCP 4.5)	13	16	9,47	days
Mid-Century (2035-2064)	High Emissions (RCP 8.5)	12	15	9,33	days
End-Century (2070-2099)	High Emissions (RCP 8.5)	31	34	20,79	days
Baseline (1961-1990)	Observed	-	4	NaN,NaN	days

Appendix G: *Community CVA Survey Questions*

DEMOGRAPHICS (10 Questions)

Live in the region?

- (●) Live and work in the region.
- ( ) Live in the region.
- ( ) Work in the region
- ( ) None of the above.

Zip Code *

Please select...

Ethnicity *

- ( ) White
- ( ) Black or African American
- ( ) American Indian or Alaska Native
- ( ) Asian
- ( ) Native Hawaiian or Other Pacific Islander
- ( ) Hispanic or Latinx
- ( ) Mixed Race
- ( ) Other
- ( ) Prefer Not to Answer

Gender Identity *

- ( ) Female
- ( ) Male
- ( ) Gender Variant/Non-conforming
- ( ) Other
- ( ) Prefer Not to Answer

Appendix G: *Community CVA Survey Questions*

Occupation Status *

- ○ Full Time
- ○ Part Time
- ○ Unemployed
- ○ Retired

Home Type *

- ○ Owner
- ○ Renter
- ○ Not applicable

How many years have you lived or worked in the Santa Monica Mountains/Greater Malibu community? *

Languages (Please select all that you are fluent in) *

- ☐ English
- ☐ Spanish
- ☐ Chinese
- ☐ Armenian
- ☐ Other

Household Annual Income Range *

Please select...

What is your age?

Please select...

Next Page

Appendix G: *Community CVA Survey Questions*

CLIMATE CHANGE & WOOLSEY FIRE (Up to 10 Questions)

Is climate change impacting you? *

- (●) Yes
- ( ) No

How is climate change impacting you? *

What word comes to mind when you hear "climate vulnerability"? *

Select the climate impacts that most concern you (in order of priority):

	#1	#2	#3	#4	#5	#6	#7
Coastal Storm Surges *	○	○	○	○	○	○	○
Drought *	○	○	○	○	○	○	○
Extreme Heat *	○	○	○	○	○	○	○
Floods *	○	○	○	○	○	○	○
Landslides *	○	○	○	○	○	○	○
Sea Level Rise *	○	○	○	○	○	○	○
Wildfire *	○	○	○	○	○	○	○

Appendix G: *Community CVA Survey Questions*

What vulnerabilities (physical + social) are of most concern to you? Select all that apply. *

- ☐ Aging infrastructure
- ☐ House does not have adequate cooling
- ☐ Can't afford to harden home to fires and floods
- ☐ Access to water for fighting fires
- ☐ Underlying health conditions and extreme heat
- ☐ Wildfire evacuation
- ☐ Air quality
- ☐ Homelessness
- ☐ Public health emergencies
- ☐ Other

Have any members of your family left after the Woolsey Fire due to the City's vulnerabilities to local hazards? *

- ◉ Yes
- ○ No
- ○ Not applicable

Did these family members move out of the region? *

- ○ Yes
- ○ No

What do you rely on for *economic recovery after a major disaster? Select all that apply. *

- ☐ Savings
- ☐ Insurance
- ☐ Social networks
- ☐ Credit cards
- ☐ Loans
- ☐ Emergency relief
- ☐ Other

*Economic recovery meaning returning financially to pre-disaster status

Appendix G: *Community CVA Survey Questions*

How would you rate your economic recovery potential in the event of a major disaster? *

- ○ Poor
- ○ Moderate
- ○ Excellent
- ○ Unsure

Did you lose your home in the Woolsey Fire? *

- ○ Yes
- ○ No
- ○ Not applicable

Are you rebuilding? *

- ○ Yes
- ○ No
- ○ Not applicable

Do you know someone in your neighborhood who is struggling financially to rebuild? *

- ○ Yes
- ○ No
- ○ Not applicable

Next Page

Appendix G: *Community CVA Survey Questions*

EXTREME HEAT (8 Questions)

An extreme heat emergency is a period of high heat with temperatures above 90˚F for three days or more. Have you ever experienced an extreme heat emergency? If so, about how many times each year? *

- ○ Never
- ○ Once
- ○ Twice
- ○ More than twice
- ○ I don't know

What have you changed in your lifestyle to adapt to extreme heat? Select all that apply. *

- ☐ Adjusted personal behavior (stay indoors, drink water)
- ☐ Used an air conditioner
- ☐ Visited a cooling center, mall, library, or other place with air conditioning
- ☐ Found an outdoor space with overhead shade; visited the beach or a pool
- ☐ Retrofitted the home (insulation, dual pane windows)
- ☐ Planted trees to provide shade
- ☐ Installed native, drought tolerant landscaping
- ☐ None

Which of the following adaptation strategies for extreme heat would you consider in the next 1-3 years? Select all that apply. *

- ☐ Air conditioning
- ☐ Insulate buildings
- ☐ Cool roofs
- ☐ Rebates / discounts for retrofits to insulate home
- ☐ Energy efficient appliances
- ☐ Consultant provides free advice on how to retrofit home to reduce electrical bill
- ☐ Install native, drought tolerant landscaping
- ☐ Other
- ☐ None

Other. Please specify:

What may be reasons some of these strategies may not work for you?

During a heat emergency, if you do not plan to leave your home, what are your reasons for staying?

Rank the following long-term adaptation strategies to help our community stay cool from MOST to LEAST effective, with 1 being most effective and 4 being least effective.

	1	2	3	4
Increase tree canopy cover in our community (residents provide water) *	○	○	○	○
Establish Cooling centers *	○	○	○	○
Install shade structures that protect pedestrians from the sun on streets and in public spaces *	○	○	○	○
Design buildings with passive natural cooling features *	○	○	○	○

Can you recommend additional adaptation strategies for extreme heat that would work for our community?

Appendix G: *Community CVA Survey Questions*

What are challenges you encounter with extreme heat not covered in the previous questions? Select all that apply. *

- [ ] None
- [ ] Don't know where cooling centers are located
- [ ] Lack transportation to cooling centers
- [ ] Home retrofit costs are too high
- [ ] No shade trees because there is no space
- [ ] Existing shade trees were removed because they became a hazard
- [ ] Personal mobility challenges

Other

Next Page

Appendix G: *Community CVA Survey Questions*

WILDFIRE (Up to 9 Questions)

Have you ever experienced a wildfire emergency? If so, how many times? *

- (●) Once
- ( ) Twice
- ( ) More than twice
- ( ) Never

What have you changed in your lifestyle to adapt to/prepare for wildfire? Select all that apply. *

- [ ] Joined a wildfire safety group (Arson Watch, Fire Safe Community, Firewise Community)
- [ ] Modified vegetation around home (to create defensible space)
- [ ] Retrofitted home to lower risk of burning (home hardening)
- [ ] Evacuation plan
- [ ] Considered moving to a less wildfire-prone area
- [ ] Purchased fire-fighting equipment and trained to protect property
- [ ] Made emergency plans with neighbors
- [ ] Other
- [ ] None

Other. Please specify:

Appendix G: *Community CVA Survey Questions*

Which of the following adaptation strategies for wildfire would you consider adopting in the next 1-3 years? Select all that apply. *

- ☐ Early evacuation
- ☐ Shelter in place
- ☐ Retofitting home with less flammable materials
- ☐ Modifying vegetation around home (to create defensible space)
- ☐ Finding a secondary egress route
- ☐ Find a new place to live where the fire risk is lower
- ☐ None

What are reasons the other strategies may not work for you?

In a wildfire event, when do you plan to evacuate? *

- ○ As soon as possible
- ○ Without the need for an ordered evacuation
- ○ When a voluntary evacuation order is issued
- ○ When a mandatory evacuation order is issued
- ○ When there is insufficient water to fight the fire
- ◉ I do not leave

If you are not planning to leave, what are your reasons for staying?

Rank the following long-term wildfire adaptation strategies from MOST to LEAST effective, with 1 being most effective and 4 being least effective:

	#1	#2	#3	#4
Discourage further development in or close to undeveloped wildlands *	○	○	○	○

Appendix G: *Community CVA Survey Questions*

	#1	#2	#3	#4
Develop buyout programs for areas at greatest risk for wildfire so residents can relocate *	○	○	○	○
Decrease reliance on the electrical grid (establish microgrids) *	○	○	○	○
Require retrofits of existing homes built before 2008 to meet stronger fire safety standards *	○	○	○	○

Can you recommend additional adaptation strategies for wildfire that would work for our community?

What are challenges you encounter with wildfire not covered in the previous questions? Select all that apply. *

- ☐ Lack funds for vegetation modification for wildfire protection
- ☐ Don't know how to prioritize/identify the most effective action to reduce ignition risk
- ☐ Don't know how to retrofit home against wildfire
- ☐ Home retrofit costs are too high
- ☐ Don't have permission to retrofit the home (renting)
- ☐ Don't know where emergency shelters are located
- ☐ Cost or unavailability of of insurance
- ☐ None

Next Page

Appendix G: *Community CVA Survey Questions*

FLOODS (Up to 8 Questions)

Have you ever experienced a flood emergency? If so, how many times? *

- (●) Once
- ( ) Twice
- ( ) More than twice
- ( ) Never

What have you changed in your lifestyle to adapt to flooding? Select all that apply. *

- [ ] Joined a Community Emergency Response Team
- [ ] Bought flood insurance
- [ ] Elevated the house
- [ ] Evacuation plan
- [ ] Considered moving to a less flood-prone area
- [ ] Stabilized our sloped landscape with native vegetation and drainage improvements
- [ ] None

Which of the following adaptation strategies for flooding would you consider adopting in the next 1-3 years? *

- [ ] Evacuation Plan
- [ ] Reduce stormwater runoff
- [ ] Elevate house
- [ ] Restore floodplains
- [ ] Participate in a buyout program / relocate
- [ ] Stabilized our sloped landscape with native vegetation and drainage improvements
- [ ] Other
- [ ] None

Other

Appendix G: *Community CVA Survey Questions*

What are reasons why the other strategies may not work for you?

In a flood emergency, when do you plan to evacuate? *

- ○ As soon as possible, without the need for an ordered evacuation
- ○ When a voluntary evacuation order is issued
- ○ When a mandatory evacuation order is issued
- ◉ I do not leave

If you are not planning to leave, what are your reasons for staying? *

Rank the following long-term adaptation strategies from MOST to LEAST effective to lower risks from flooding, with 1 being most effective and 4 being least effective.

	#1	#2	#3	#4
Discourage further development in flood hazard areas *	○	○	○	○
Require retrofits of existing homes above base flood elevation *	○	○	○	○
Restore floodplains *	○	○	○	○
Install permeable paving in streets and public spaces *	○	○	○	○

Can you recommend additional adaptation strategies for flooding that would work for our community?

Appendix G: *Community CVA Survey Questions*

What are challenges you encounter with flooding not covered in previous questions? Select all that apply. *

- [ ] Don't know where shelters are located
- [ ] Don't know how to retrofit home against flooding
- [ ] Home retrofit costs too high
- [ ] Don't have permission to retrofit the home
- [ ] None

Next Page

Appendix G: *Community CVA Survey Questions*

COMMUNICATIONS & MOBILITY (5 Questions)

What are some ways to reach out to other community members who may not be aware of extreme heat/wildfire/flood risks? Select all that apply. *

- ☐ Phone call
- ☐ Walk/drive to house
- ☐ Text
- ☐ Email
- ☐ Social media
- ☐ Two-way radio
- ☐ Walkie-talkie

How do you obtain notifications and information during a heat/wildfire/flood risk emergency? Select all that apply. *

- ☐ Word of mouth
- ☐ Internet news
- ☐ TV news
- ☐ Radio
- ☐ Email alerts
- ☐ Text alerts
- ☐ Social media
- ☐ Two-way radio
- ☐ Walkie-talkie

For public safety, utility companies may turn off electricity when high winds and dry conditions are forecasted; or extreme weather can cause power outages/blackouts. What do you do in response to a power shutoff? Select all that apply. *

- ☐ I use non-electrical devices during this time, and wait for the power to come back on
- ☐ It doesn't affect me because I have a backup generator, or I have my own power source
- ☐ I leave the house and drive to a friend's or family member's house where electricity is available
- ☐ I rely on a medical device that requires power
- ☐ I have no way to receive news or information
- ☐ I have no way to call for help
- ☐ I live in a remote area where help is far away
- ☐ Call SCE and file a report and request updates.
- ☐ Water pumps in neighborhood become inoperable when SCE activates the "Public Safety Power Shutoff"
- ☐ I don't do anything

Do you have a disability that may affect your ability to get to an air-conditioned place during an extreme heat emergency, or your ability to move quickly in the event of a fire or flood? *

- ○ Yes
- ○ No
- ○ Prefer Not to Say

Do you have your own car or do you rely on others and/or public transportation? Select all that apply. *

- ☐ I own my own car
- ☐ I rely on others
- ☐ I rely on public transportation
- ☐ Other

Other. Please specify:

Next Page

Appendix G: *Community CVA Survey Questions*

MITIGATION, SUSTAINABILITY, & PREPAREDNESS (Up to 17)

Do you have solar panels? *

- (●) Yes
- ( ) No

Other renewables, please describe:

Do you have battery back up for your solar panels? *

- ( ) Yes
- ( ) No

Are you taking measures to mitigate drought? Select all that apply.

- [ ] Use a rain barrel or cistern to capture water stormwater
- [ ] Have a native/drought-tolerant garden
- [ ] Use drip irrigation
- [ ] Installed High Efficiency faucets and showerheads
- [ ] Installed high efficiency toilets
- [ ] Installed a grey water system

Is your home energy efficient? Select all that apply. *

- [ ] Insulation
- [ ] EE lighting (LEDs)
- [ ] Battery
- [ ] Tankless hot water heater
- [ ] Native/drought-tolerant garden
- [ ] Dual-paned windows
- [ ] Solar panels
- [ ] Energy star appliances
- [ ] Electric hot water heater

Is your house/building foundation bolted for earthquake protection? *

- ( ) Yes
- ( ) No

Appendix G: *Community CVA Survey Questions*

Do you have residential disaster insurance coverage (Fire, Earthquake, Floods) in your home owner or renter policy? *

- ○ Yes
- ○ No

Are you covered under the CA Fair Access to Insurance Requirements (FAIR) Plan? *

- ○ Yes
- ○ No

Do you have any of the following? Select all that apply. *

- ☐ At least one location identified outside your home where you plan to reunite with family or friends
- ☐ At least one out-of-state friend or relative who you and your family can call if you are separated during an emergency
- ☐ An evacuation plan to exit your home and neighborhood
- ☐ Copies of important documents such as birth certificates, immigration papers and identification
- ☐ A list of what medications you take, and at what dosages
- ☐ None of the above

Does your household have enough supplies on hand in the event of an emergency or natural disaster for at least seven days? eg. water, flashlights, batteries, canned food, satellite phone *

- ○ Yes
- ○ No

Do you have reliable cell phone coverage? Do you have a hand-cranked radio? Hand Cranked Phone charger? Select all that apply. *

- ☐ I have reliable cell phone coverage
- ☐ I have a hand-cranked radio
- ☐ I have a hand-cranked phone charger
- ☐ None of the above

Appendix G: *Community CVA Survey Questions*

What local community programs do you or your family participate in? (eg. senior center, parks and recreation, non-profit programming, library, church, temple etc.)
Please specify:

How often do you participate in any local or regional government meetings, committees, or events? *

- (●) Every month or more
- ( ) A few times a year
- ( ) Once a year
- ( ) Never

What type of local or regional government gatherings do you attend? Please select all that apply. Select all that apply. *

- [ ] City Council Meetings
- [ ] City Council Committee
- [ ] County Committee
- [ ] Regional Committee
- [ ] None of the above

Other

Is your neighborhood a certified Fire Wise Community? *

- ( ) Yes
- ( ) No

Are you a member of a Fire Safe Council? *

- ( ) Yes
- ( ) No

Are you CERT trained? *

- ( ) Yes
- ( ) No

Appendix G: *Community CVA Survey Questions*

How would you like to contribute to help strengthen resiliency and/or sustainability in our community? Select all that apply. *

- [ ] Join CERT training
- [ ] Join or start a Fire Safe Council or Fire Wise Community
- [ ] Help seniors or other community members harden their homes
- [ ] Create defensible space
- [ ] Plant native/drought tolerant gardens
- [ ] Plant native trees
- [ ] Install a community edible garden
- [ ] Support renewable energy projects
- [ ] Support micro-grid projects
- [ ] Other
- [ ] None of the above

Other. Please specify:

Additional comments or questions:

Submit

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