Community Wildfire Risk Reduction and Valuation

What has changed?

- Significant Increase in Fuel Loading
- More Development in Fire Dependent Landscapes
- Increasing Vapor Pressure Deficit
- Increasing Exposure to Extreme Fire Weather

Reduction in “Good Fire” Throughout the Watershed

Figure 6. Average Acres Burned per Year in 20-year increments, 1852 - 2020

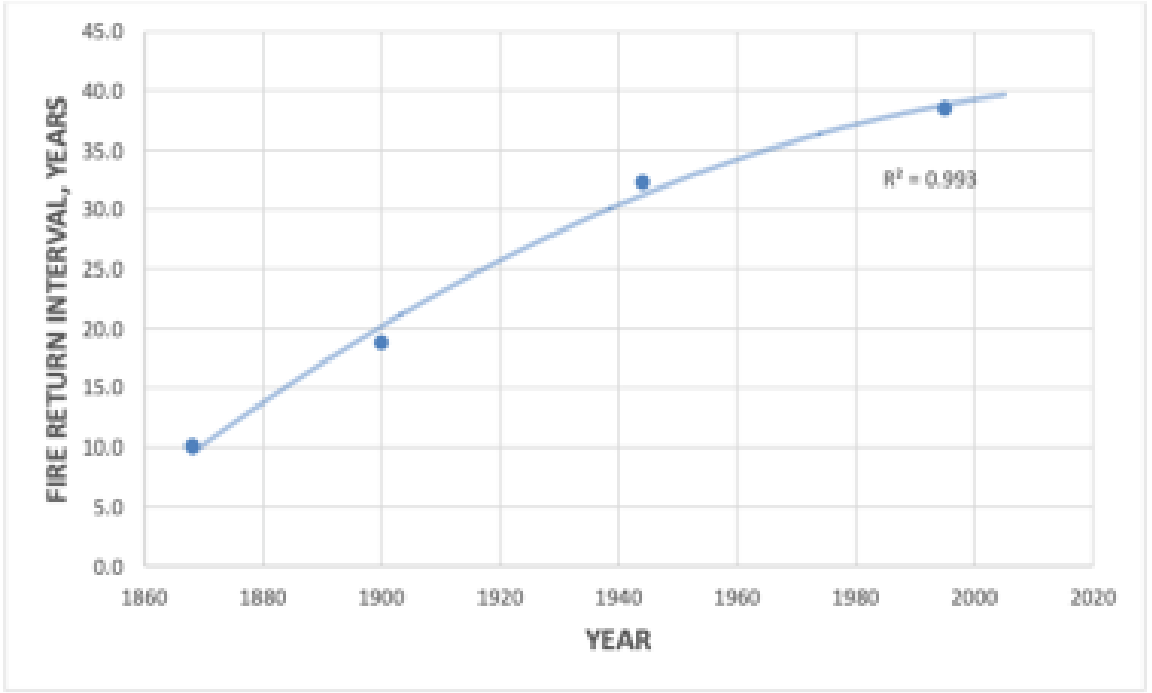


Figure 5. Average Fire Return Intervals using Mid-points of Early & Later Pre-CALFIRE, and Early & Recent CALFIRE Eras: 1868, 1900, 1944, 1995

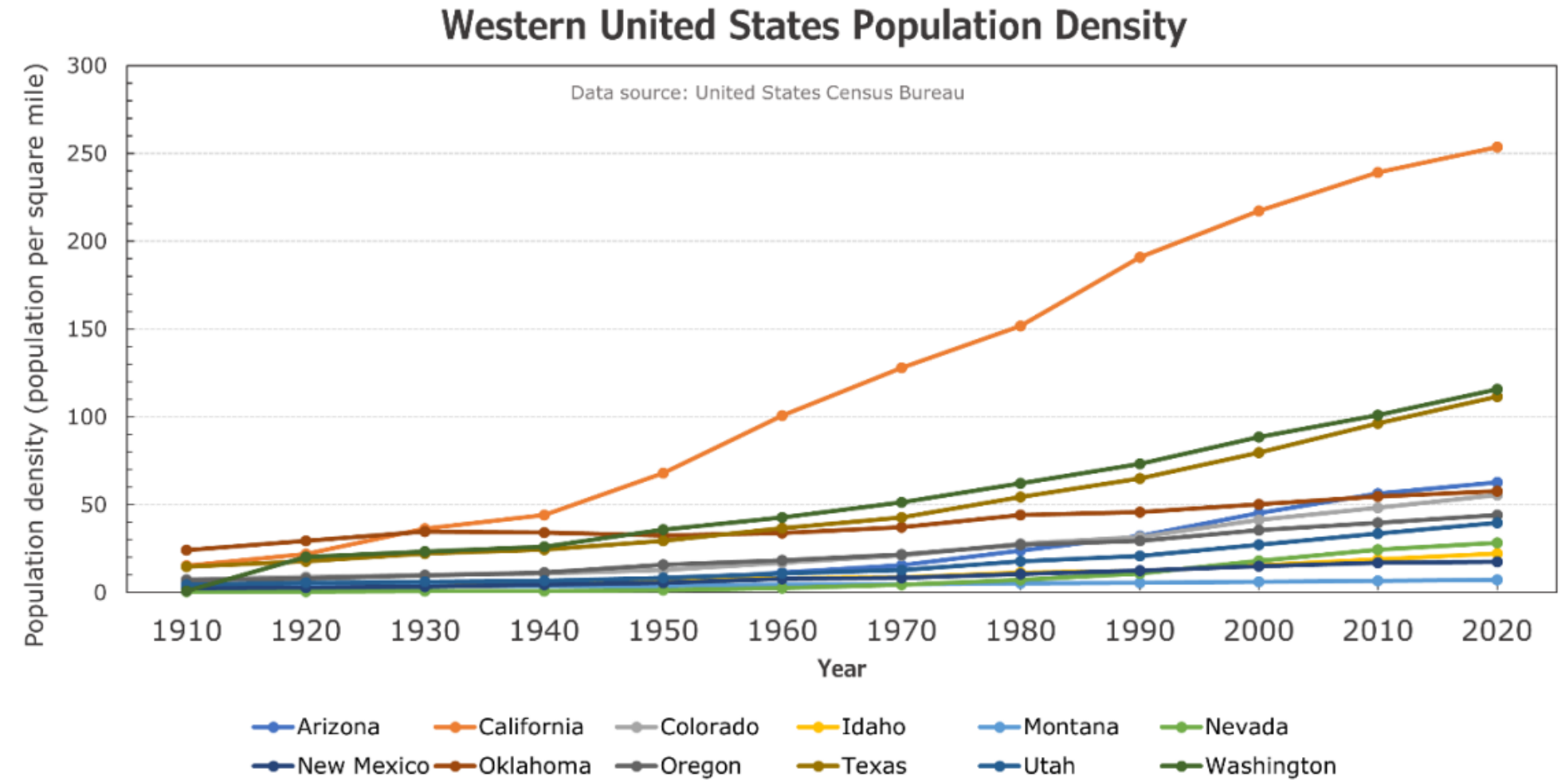
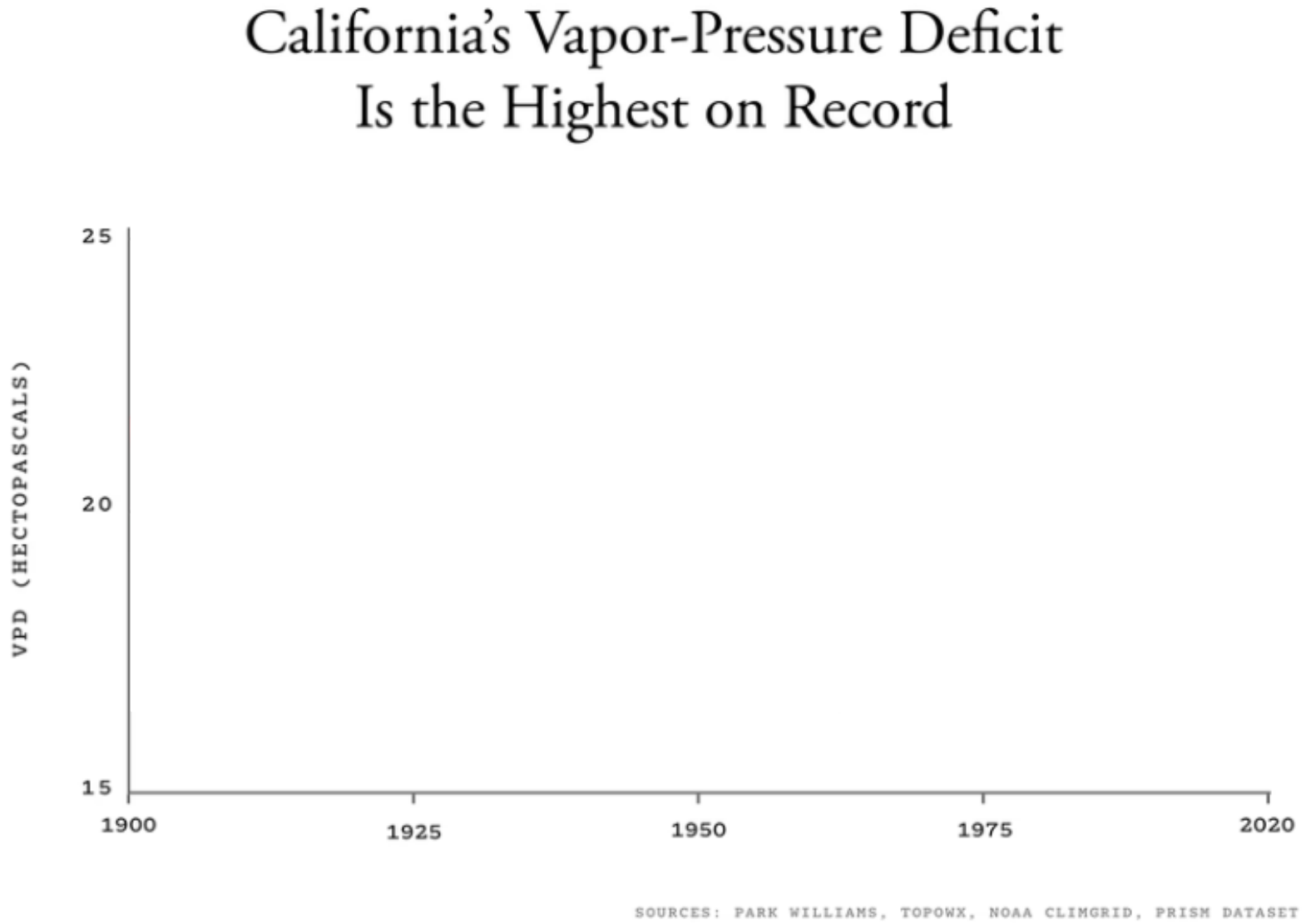


Figure 1: Time history of population density across thirteen western US states. Data source: US Census Bureau

Secondary source: https://ibhs.org/wp-content/uploads/Suburban_Wildfire_Conflagration_WhitePaper.pdf

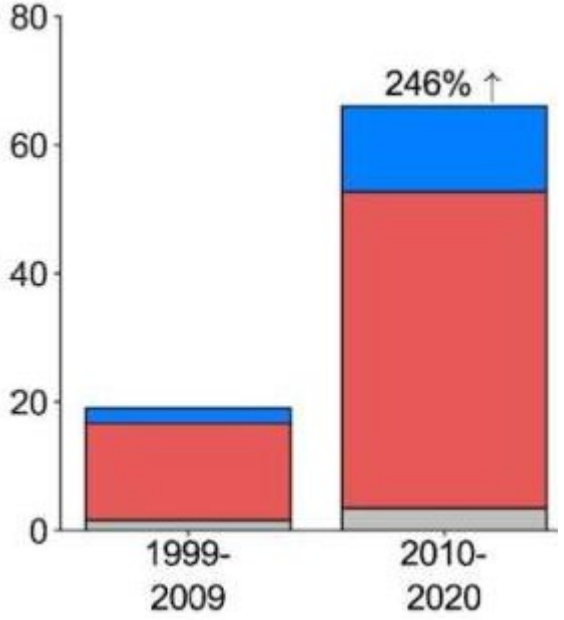


The vapor-pressure deficit in August in California, as calculated by Park Williams

Source: https://www.theatlantic.com/science/archive/2020/09/most-important-number-for-the-wests-wildfires-california/616359/

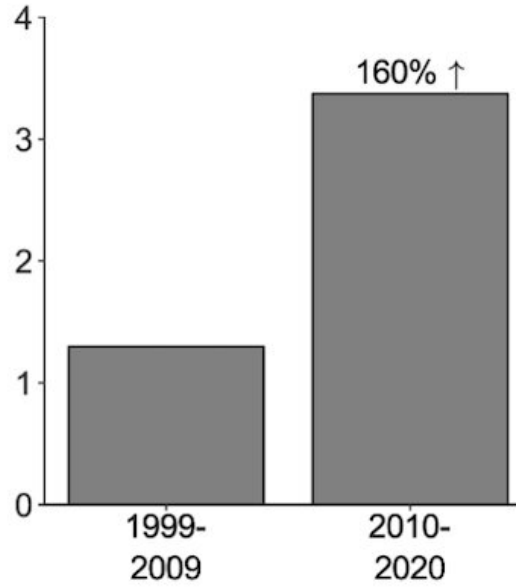
We are Responding to Unprecedented Environmental and Property Losses

Structures Destroyed x 1000



Red = Human Caused
Blue = Lightening Caused
Grey = Undetermined

Structures Destroyed Per 1000 Hectares Burned



Source: https://phys.org/news/2023-02-western-wildfires-destroyed-homes-decade.html

Disconnect in Understanding Wildfire Risk

- Alignment Around Mitigations That Matter
- We Cannot Suppress, Regulate, or Price Our Way Out of the WUI Fire Problem
- Linkage of Conditions on the Ground to Pricing of Risk

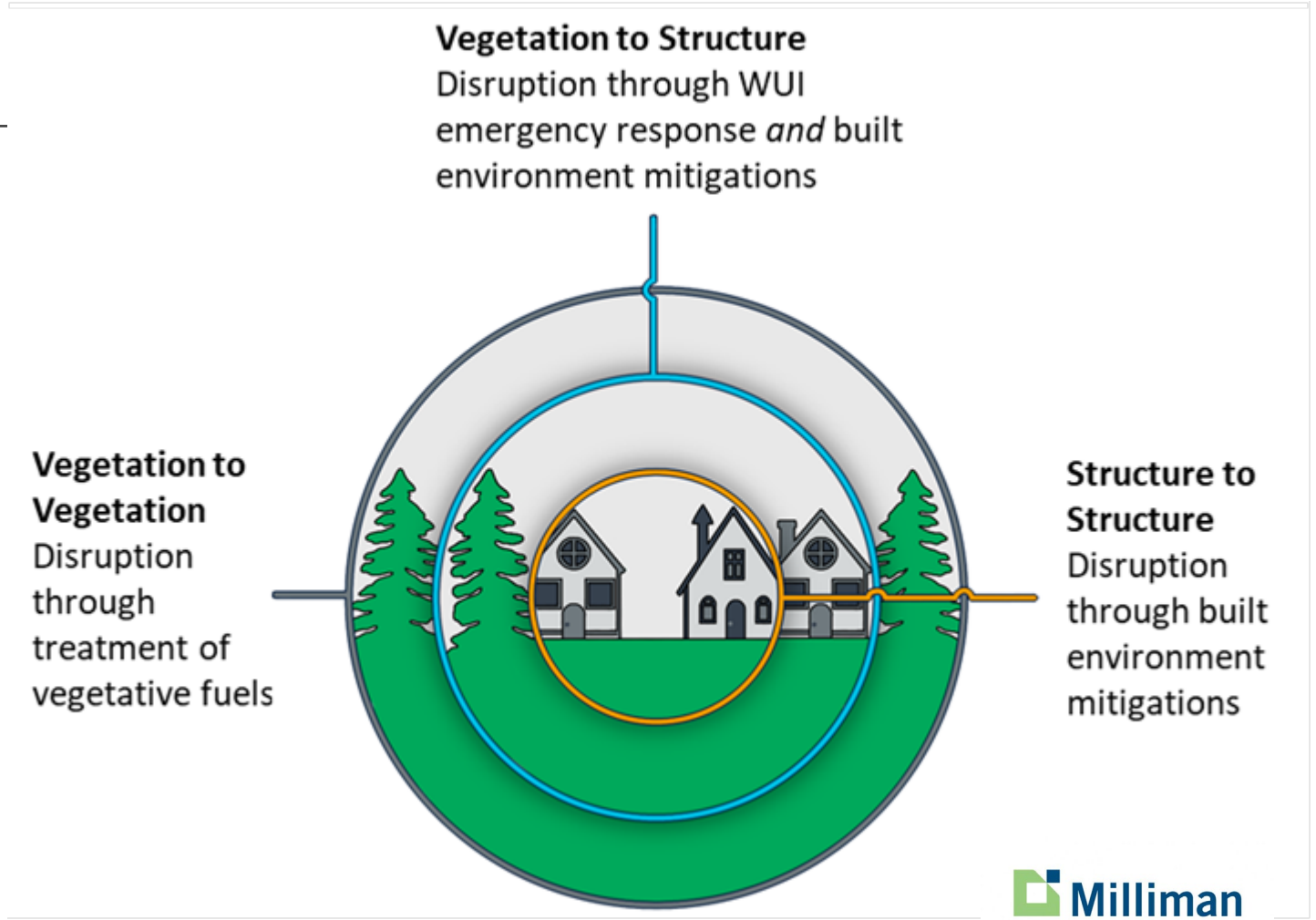
Pathways

Wildfire enters communities via (3) pathways

- Vegetation to vegetation
- Vegetation to structure
- Structure to structure

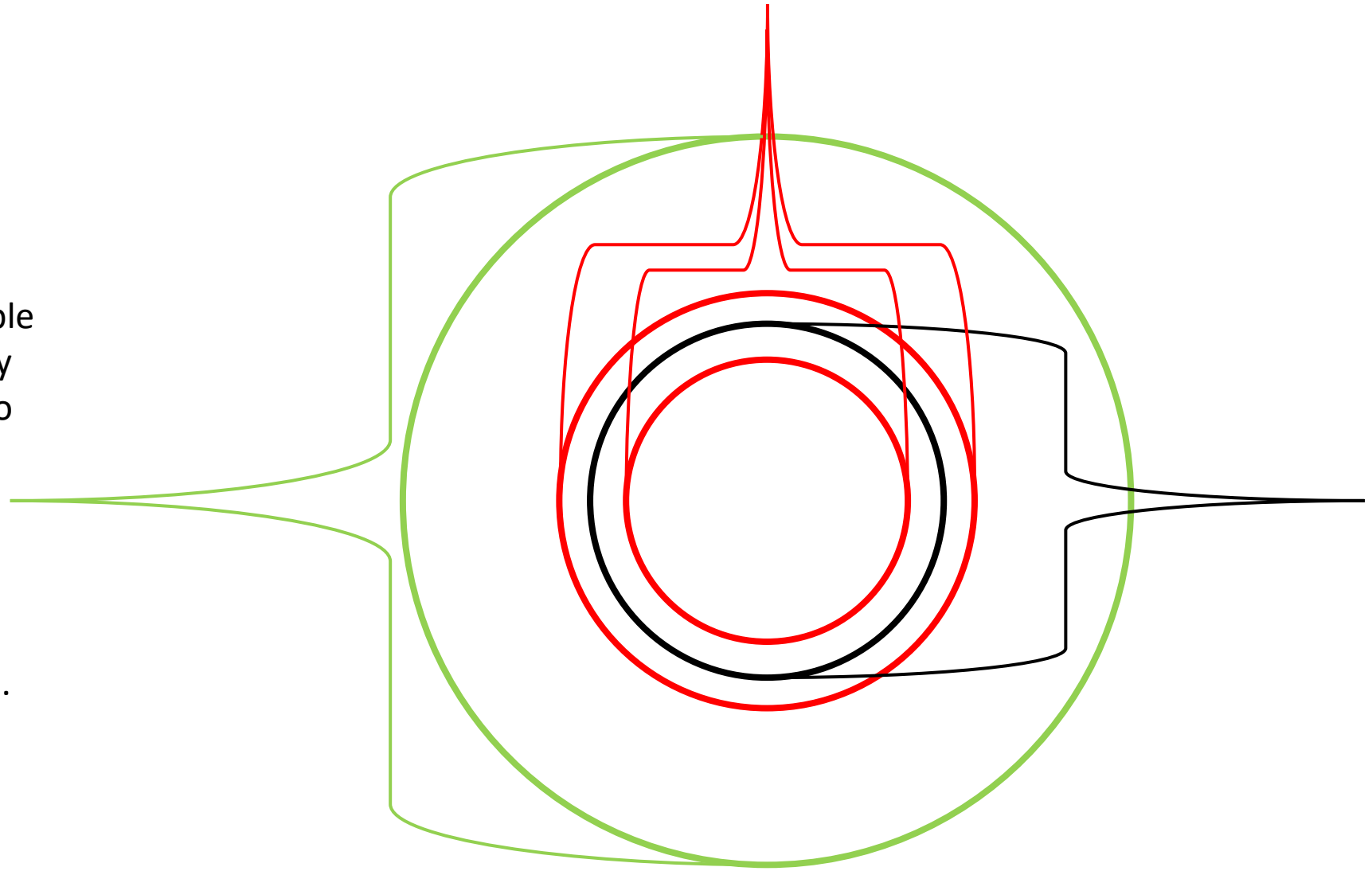
Our goal is to disrupt these pathways in verifiable ways

- Fuel Treatments
- Defensible Space
- Home Hardening
- WUI Suppression Response



“Interface” = band within 100’ of WUI Community boundary to 2nd layer of structures with SSD < 70’

“Most Probable Fire Pathway SOI” = 1/2 to 1/4 mile of interface in vegetation landscapes capable of carrying fire.



“WUI Community” = ≥ 100 structures where 50% or more have SSD < 70’

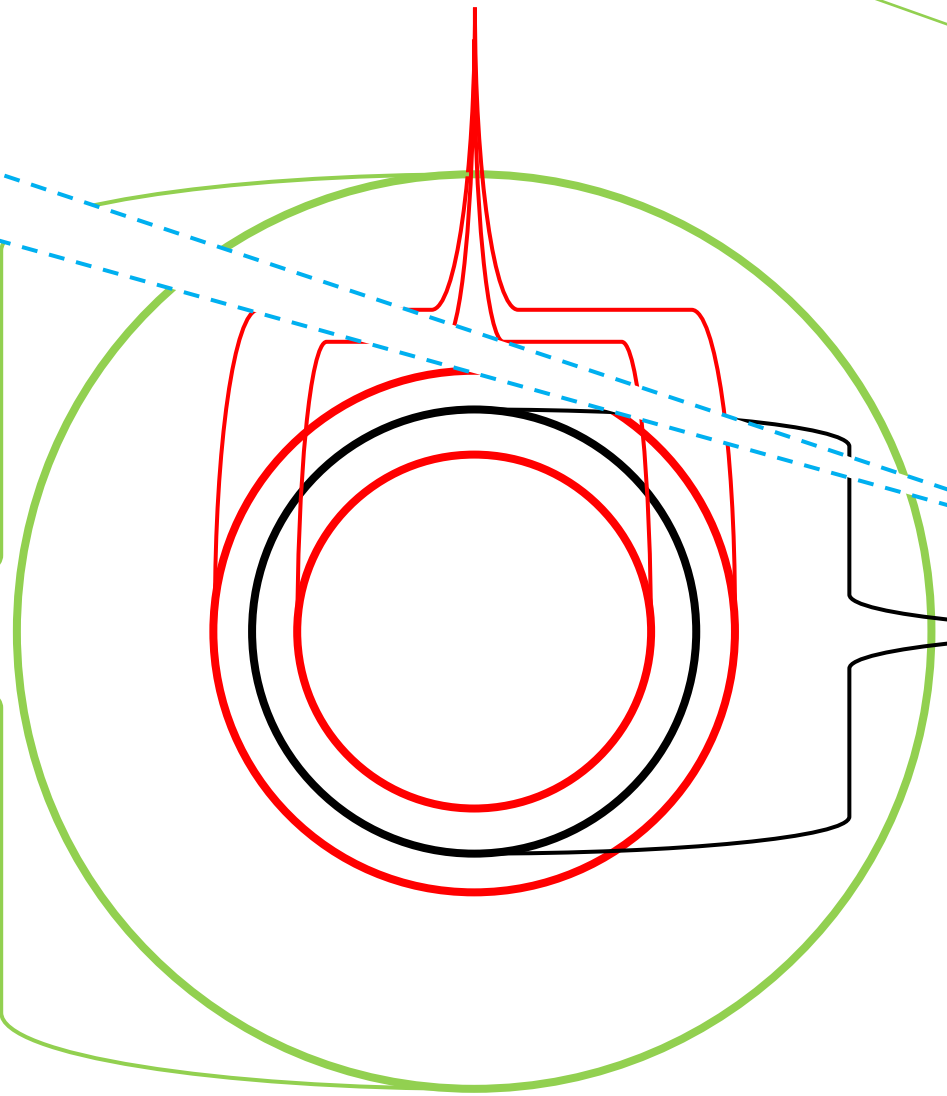
WUI Fire Pathway Taxonomy

CAL POLY
WUI Fire Institute
COLLEGE OF AGRICULTURE, FOOD & ENVIRONMENTAL SCIENCES

Disrupted through "edge" mitigation and WUI Response Capability in all three pathways

Vegetation to Structure

Disrupted Through Mitigations That Matter



Vegetation to Vegetation

Structure to Structure

Modeled through minimum-relative time pathways

WUI Fire Pathway Disruption

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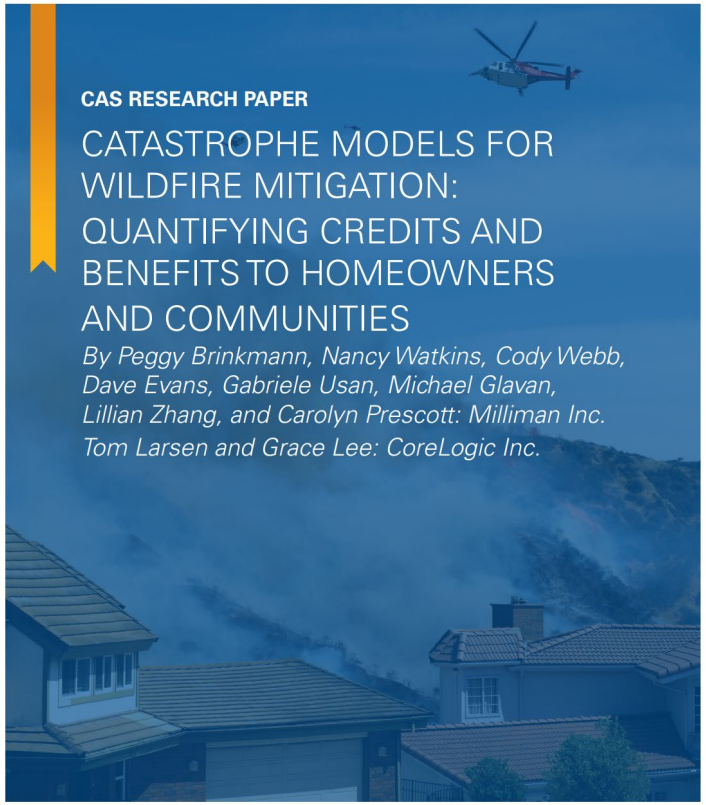
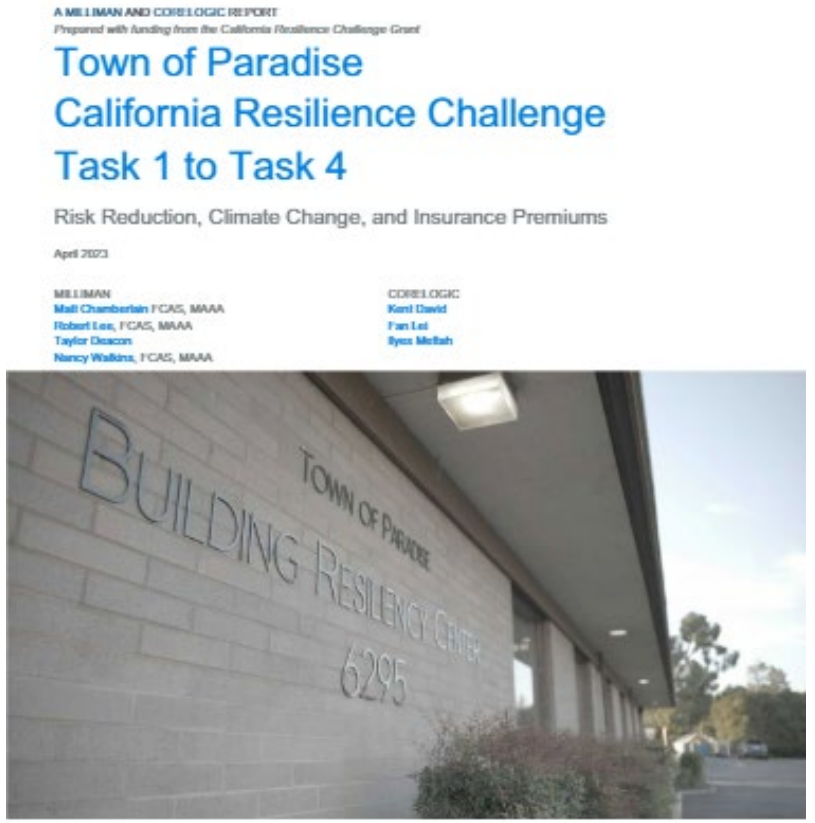


CAS CoreLogic Milliman

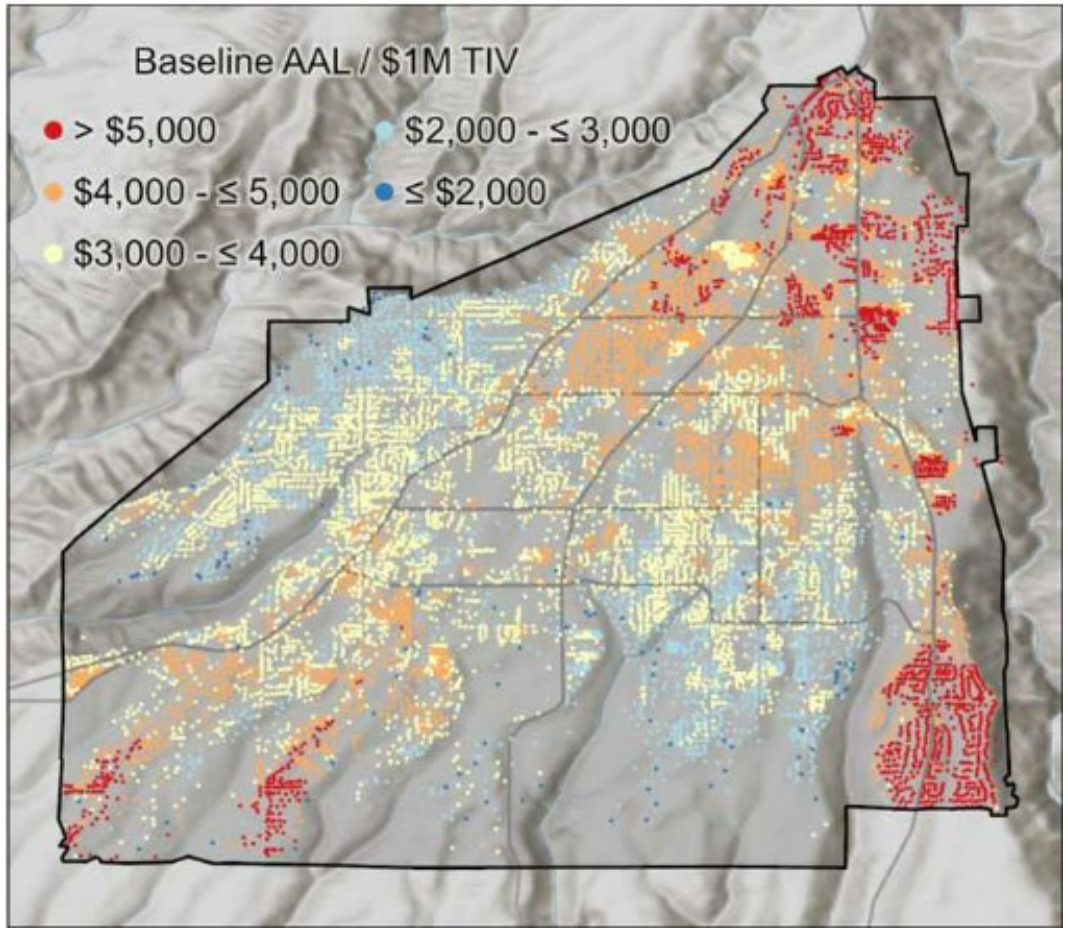
Report Here:

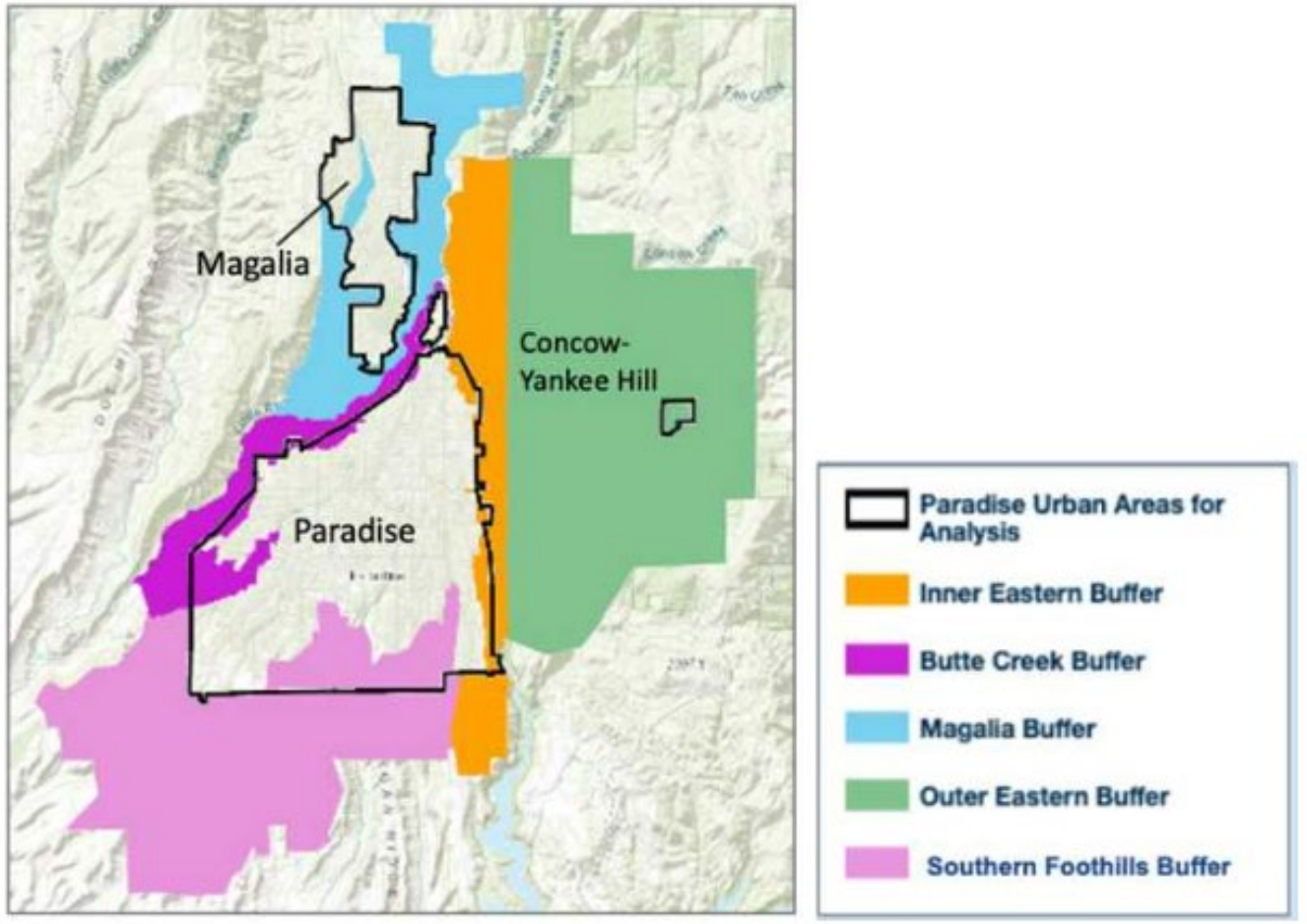


Milliman CoreLogic

Report Here:

Market Forces





Market Forces

FIGURE 9A (LEFT): CHANGE IN AAL DUE TO BASE MITIGATION, IN PERCENTAGE OF BASELINE AAL
FIGURE 9B (RIGHT): CHANGE IN AAL DUE TO BASE MITIGATION, IN DOLLARS

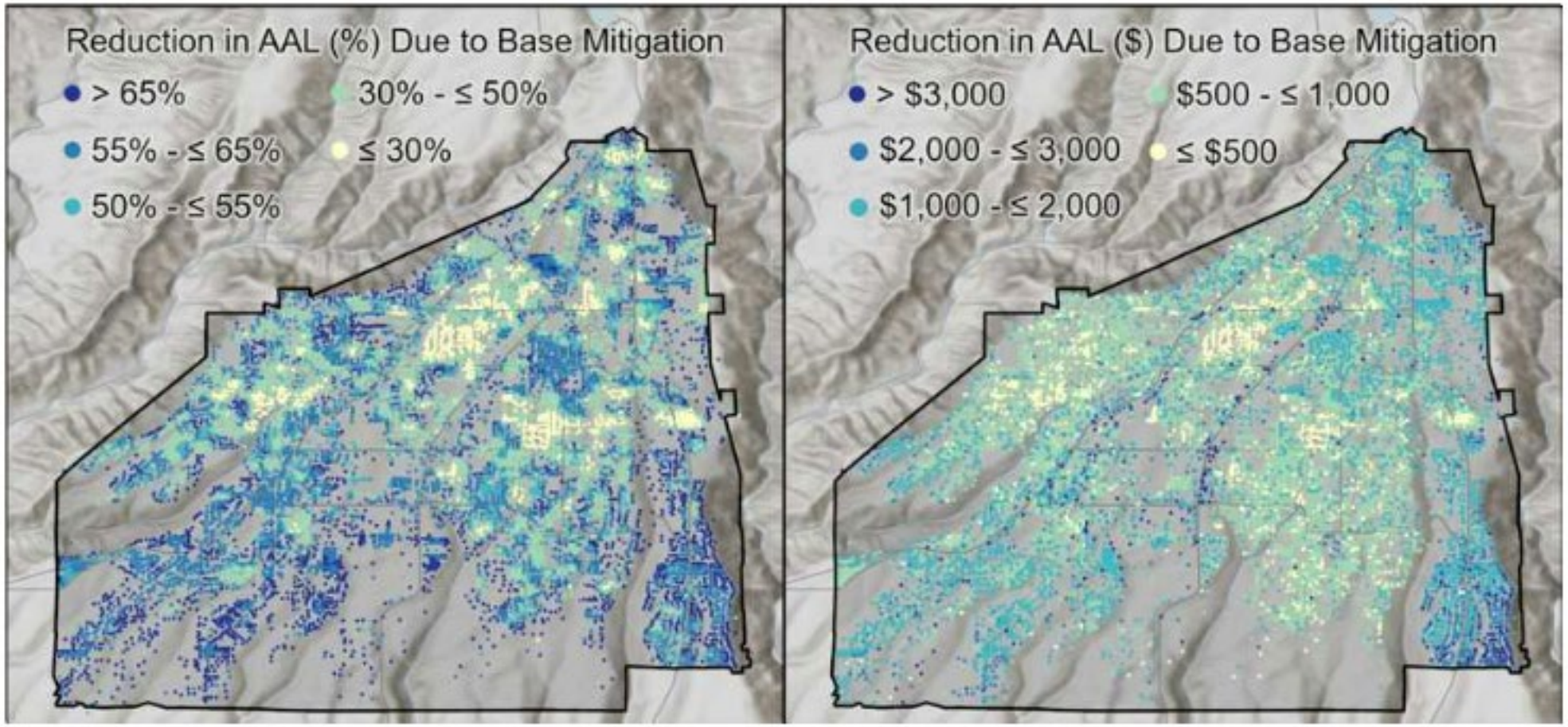
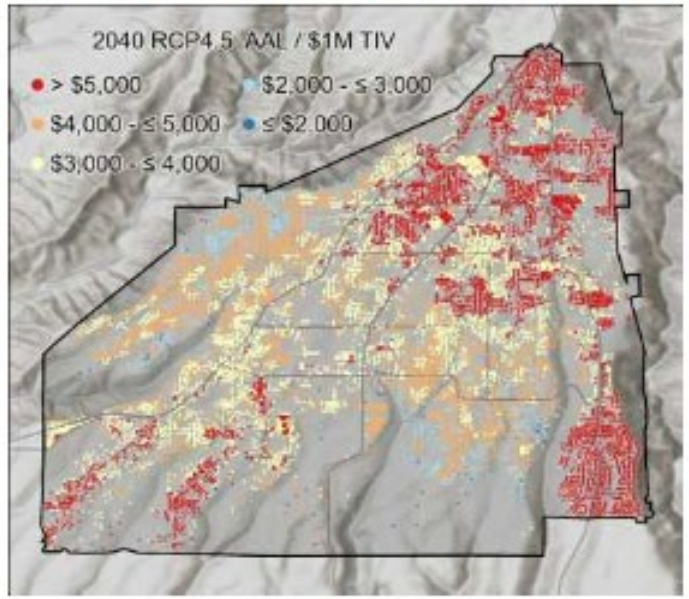
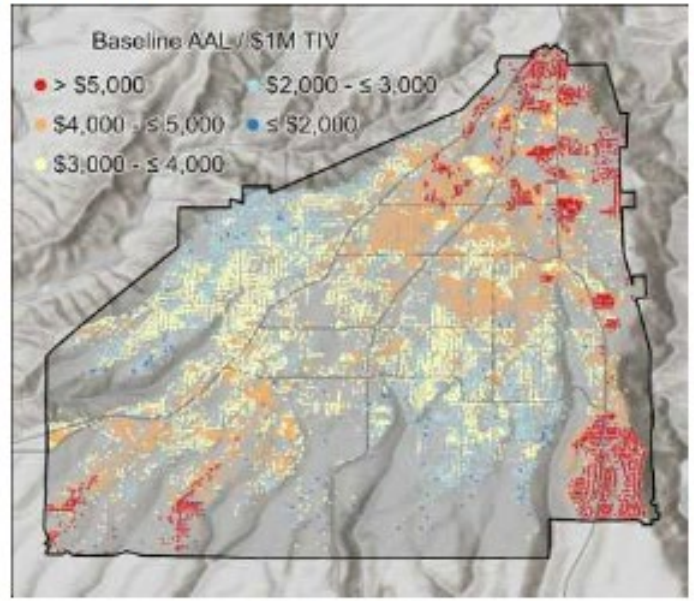


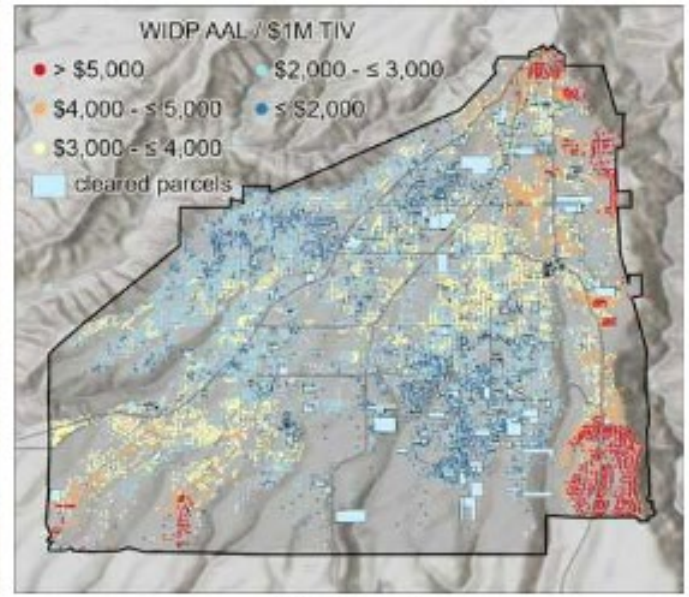
FIGURE 12: CORELOGIC V22.1 AAL / $1M TIV FOR SELECTED SCENARIOS



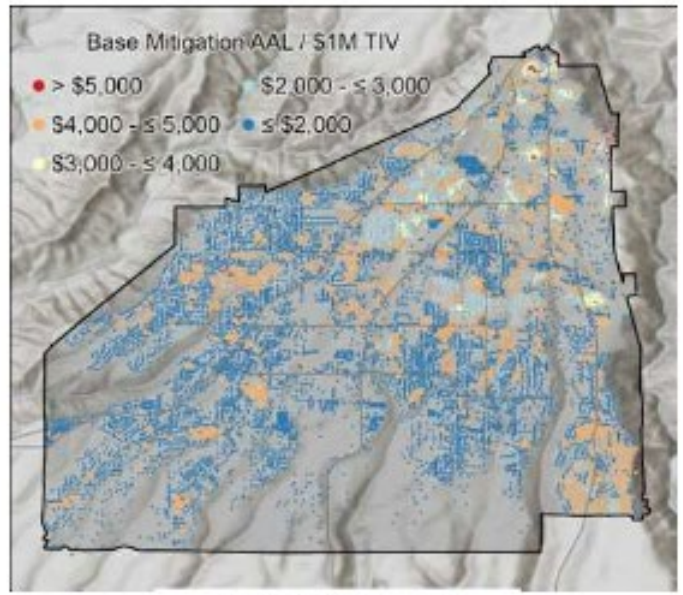
2040 RCP4.5 Scenario



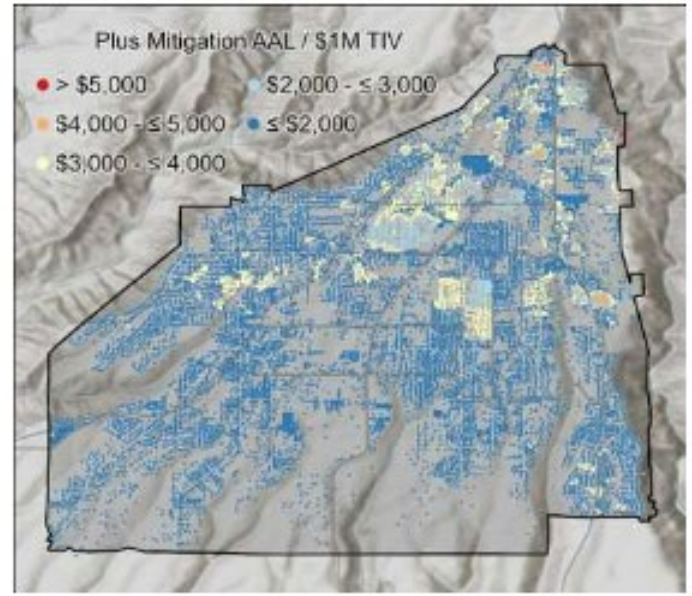
Baseline Scenario



WIDP Scenario



Base Miligation Scenario



Plus Miligation Scenario

Comprehensive View of Risk

1. How fire will come to the community
2. Where it will enter via ground component and ember cast
3. How resilient are those entry points
4. How many firefighters are available
5. What are those firefighters equipped for
6. How long will it take them to get there
7. Under what command relationships will they work

= An understanding of risk, mitigations and residual risk of conflagration level loss

Parcel Level Mitigations

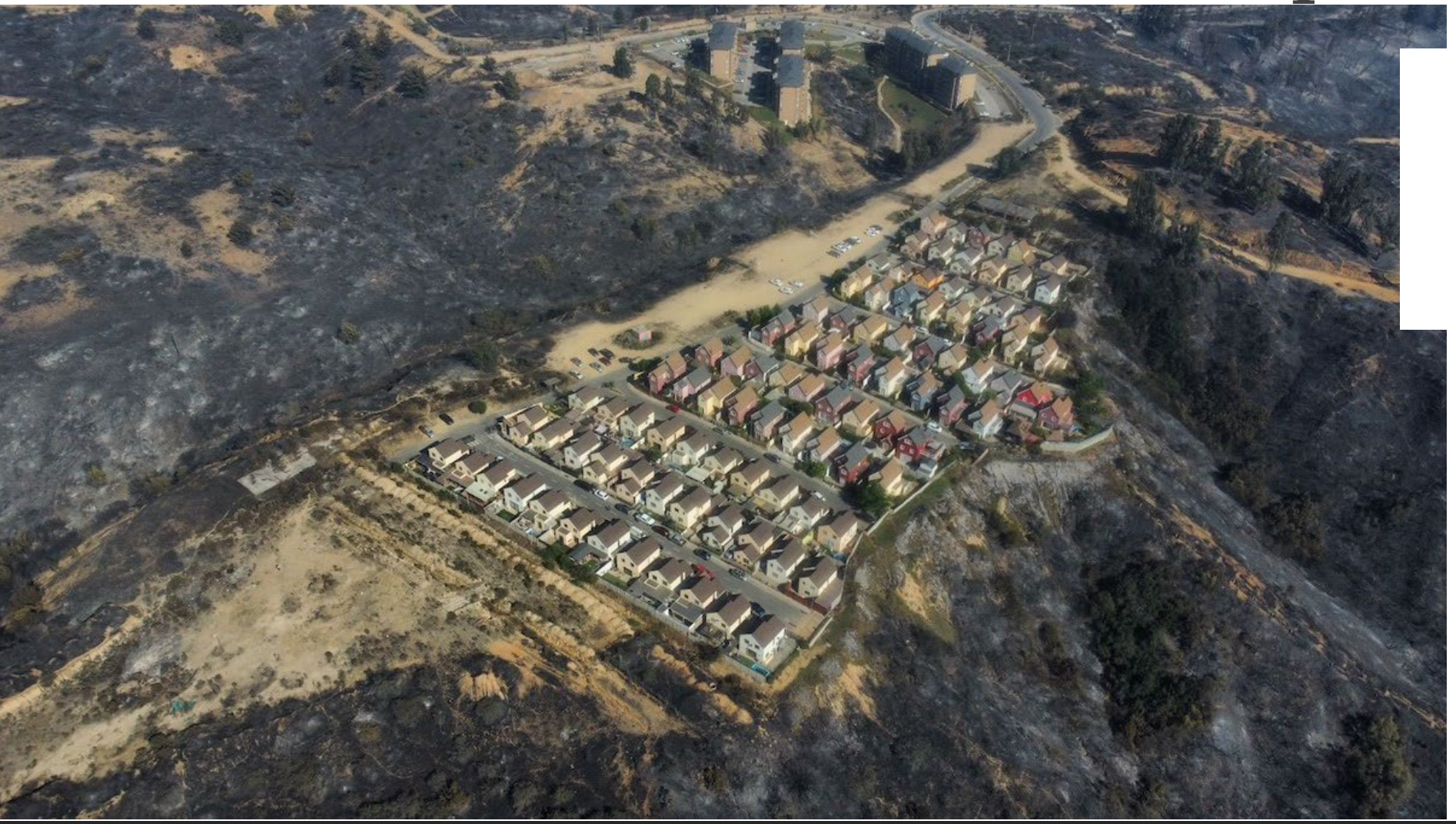
1. *Zone Zero (0-5’ from a structure) free of combustive material to include mulch and fences
2. Home Hardening retrofits (vents)
3. Roofs and gutters maintained free of leaves and needles
4. Annual Grass and Weeds cut to 3” or less by 1 June
5. Juniper removed within 10’ of a road
6. Dead trees removed within 100’ of structures or property lines
7. Ladder fuels removed to create 6’ airgaps to tree canopy

*Exceeds current code requirements


10 minutes of ember exposure.


WILDFIRE
PREPARED
A PROGRAM OF IBHS

"We could no longer be spectators."



- Community Member
Botania, Chile

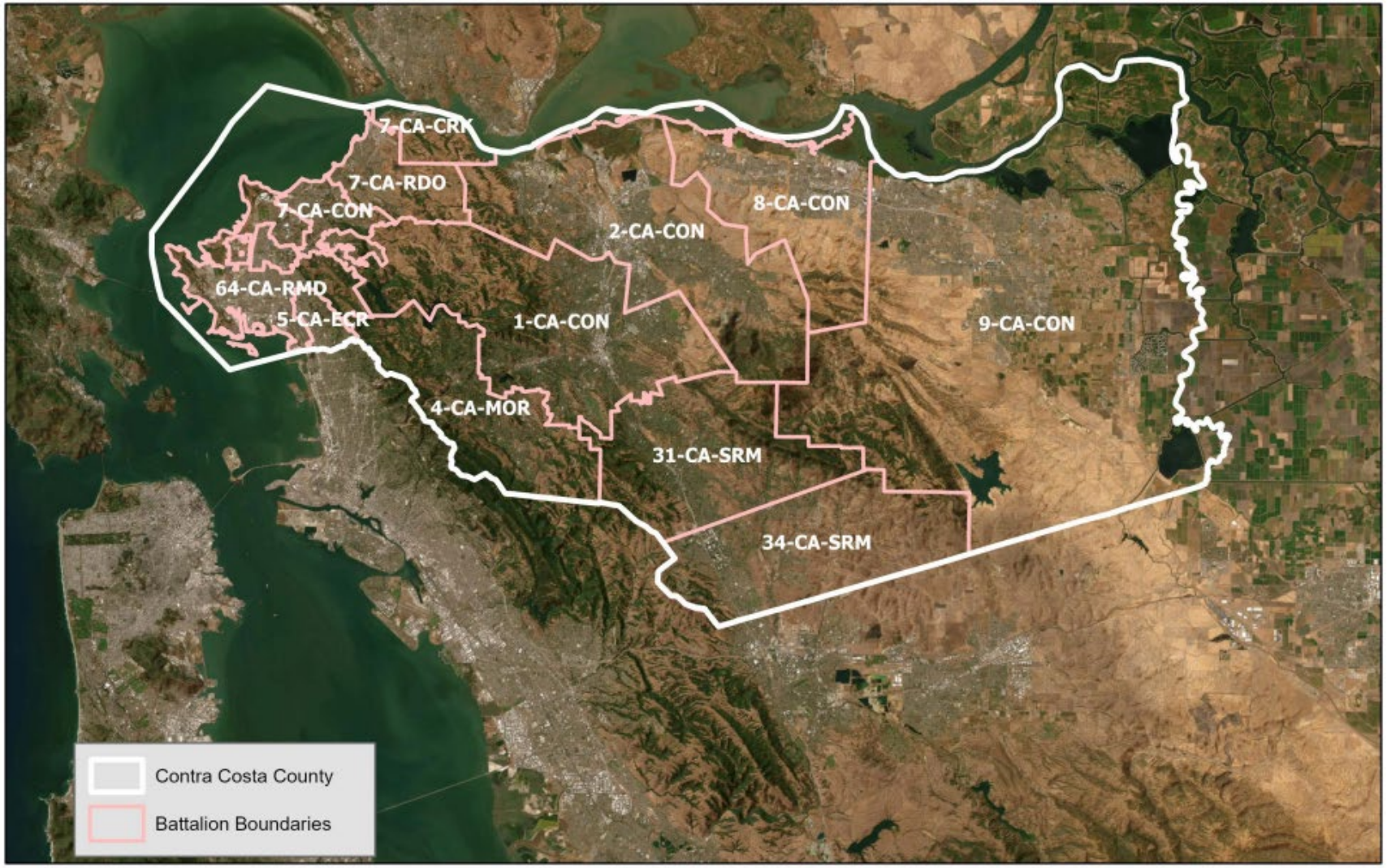
In Closing….

- We’re at the end of the beginning; time to stop admiring the problem and start solving it.
- Environmental and economic calamities have arrived without our permission; move with appropriate urgency.
- We are not hapless victims, communities have agency and can survive if they undertake mitigations that significantly reduce the probability of conflagration level losses.
- Read Fire Weather: A True Story from a Hotter World

WUI Response Rating

Battalion Boundaries
Contra Costa County

Map 1



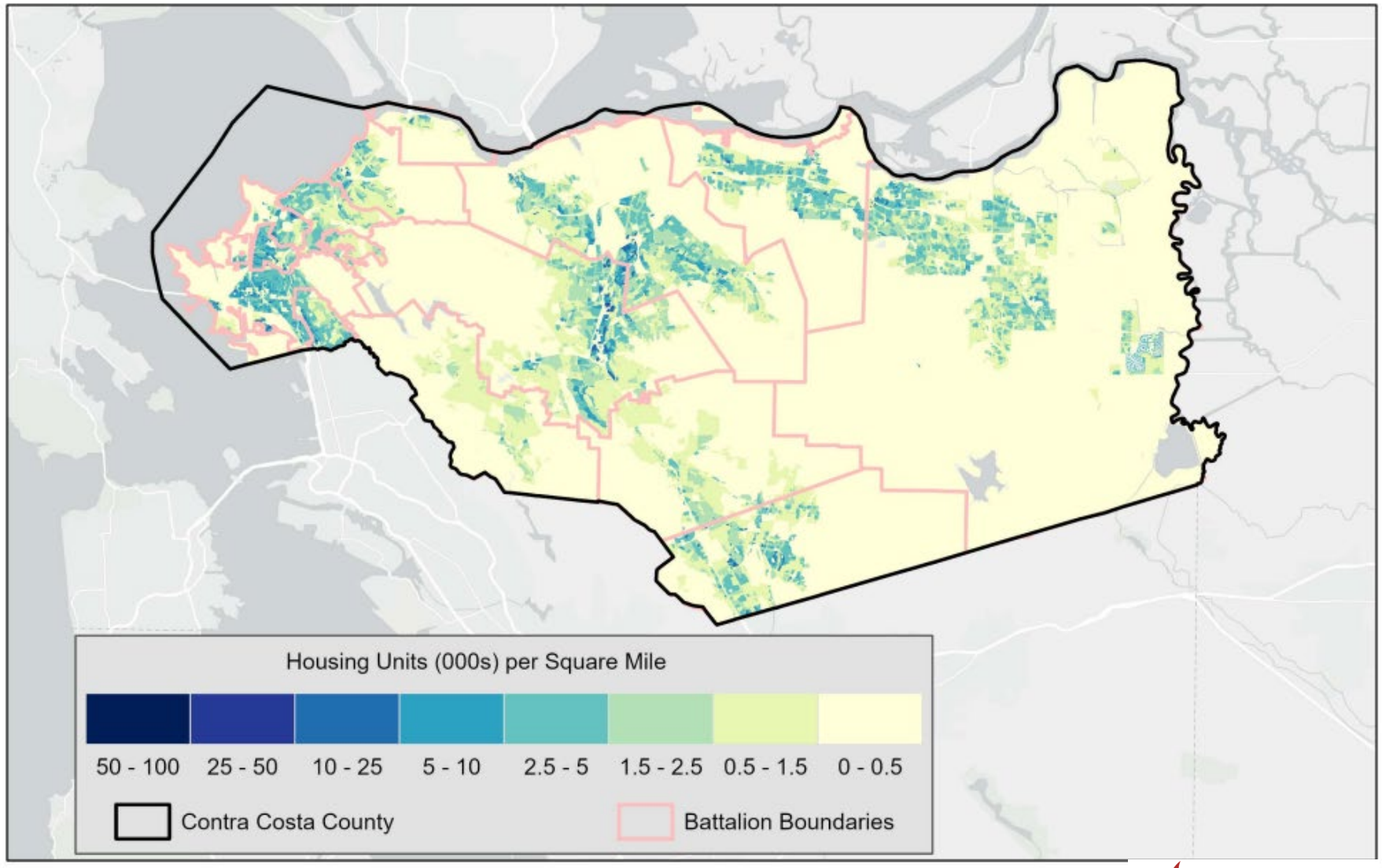
1. Battalion boundaries based on data collected from agency contacts and other publicly available sources.

WESTERN FIRE CHIEFS ASSOCIATION

Population Density

Housing Unit Density by Census Block
Contra Costa County

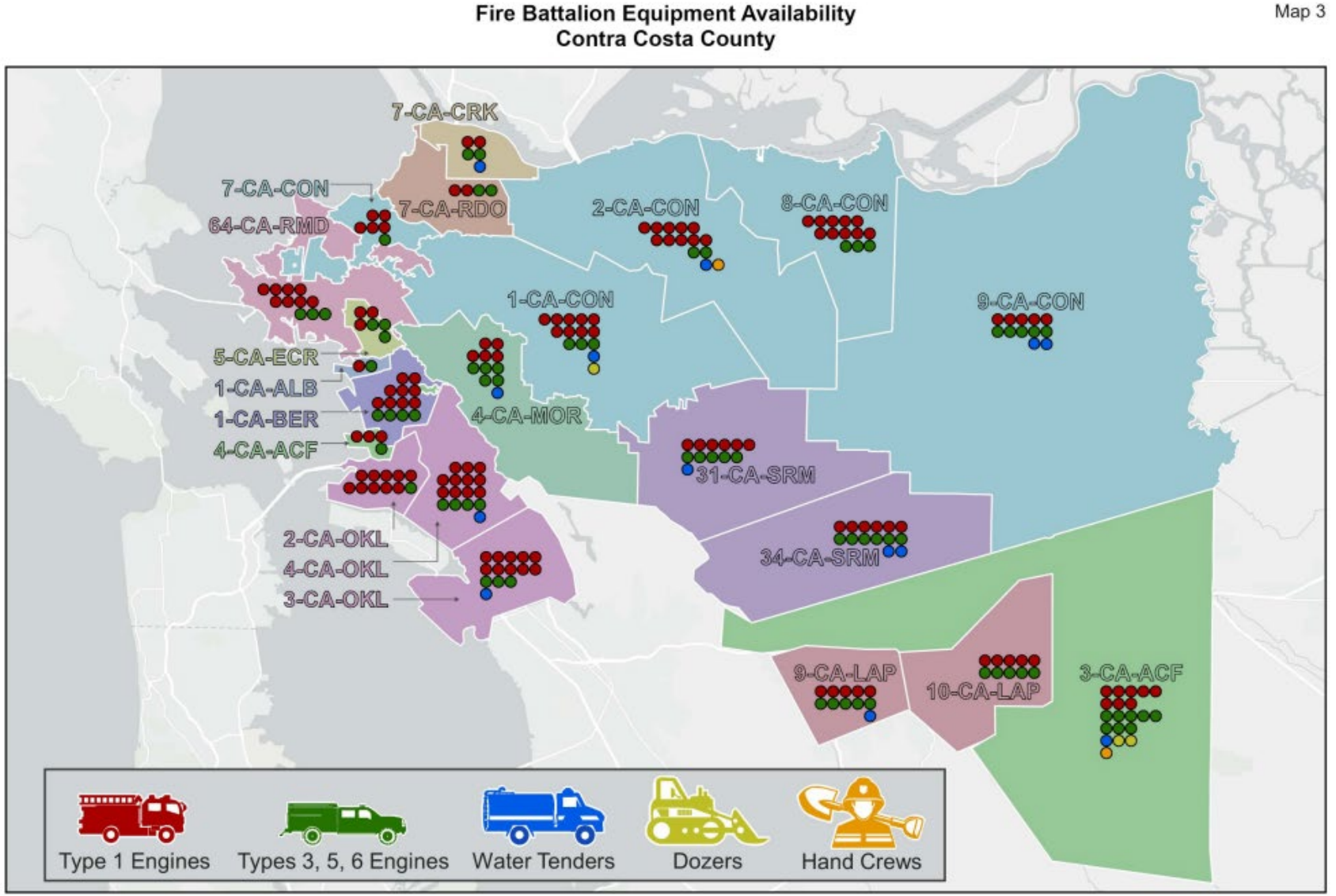
Map 2



1. Housing unit density calculated with housing unit data from 2020 Decennial Census.

WESTERN FIRE CHIEFS ASSOCIATION

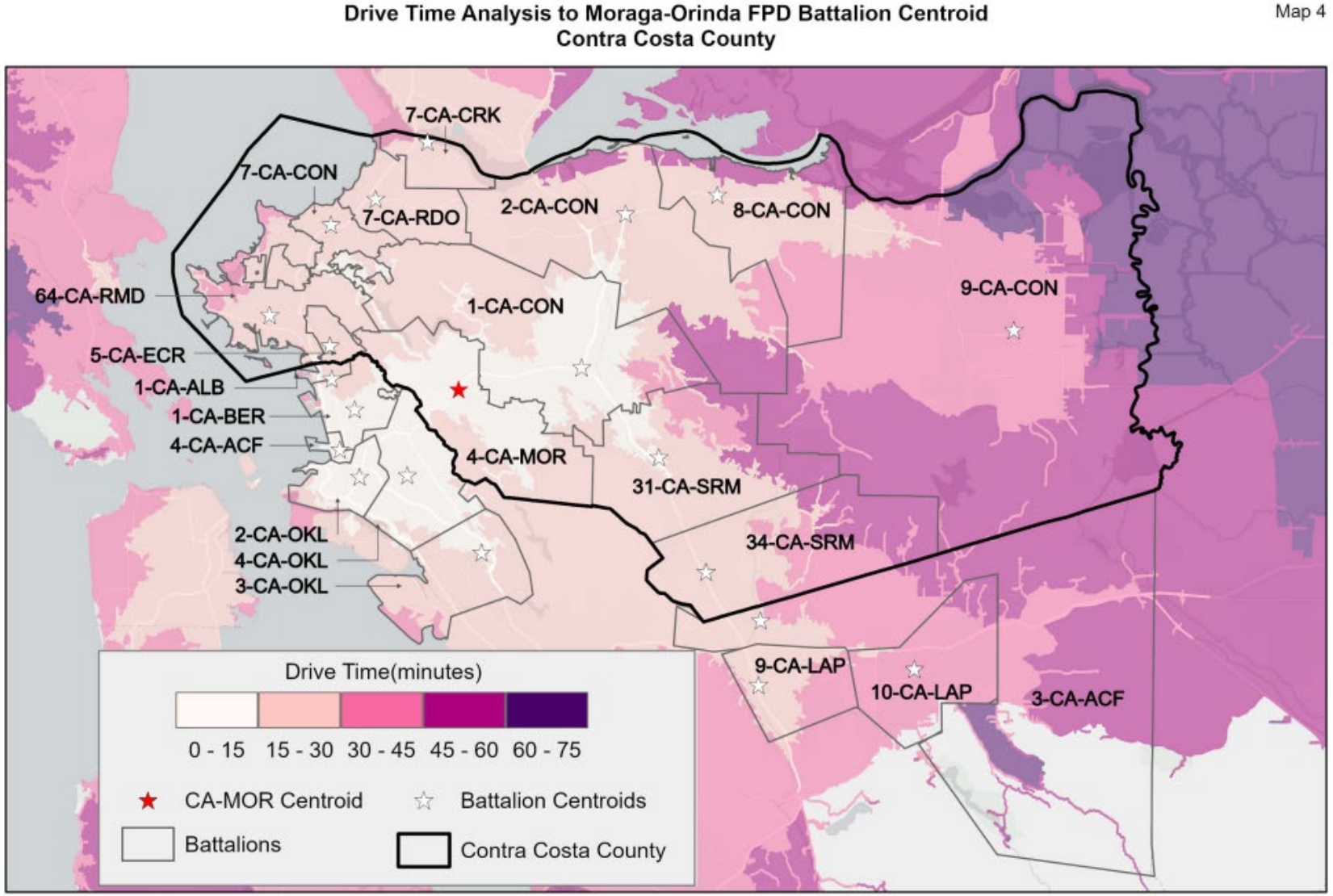
Resource Density



1. Colored circles on the map represent the total number of specific equipment as shown in the legend. Orange circles denote that hand crews are available for a given battalion, but do not show the total crew size. Battalions 3-CA-ACF and 2-CA-CON were both reported to have a total of 12 hand crew members available.
2. Fire engine totals represent staffed engines. Dozer and water tender totals represent total available equipment.

WESTERN FIRE CHIEFS ASSOCIATION

Travel Time



1. Drive time polygons are rendered using ESRI ArcGIS Online Create Drive-Time Areas.
2. The Create Drive-Time Areas considers typical traffic conditions and assumes land areas are reachable by car from the CA-MOR battalion centroid.

WESTERN FIRE CHIEFS ASSOCIATION