



**fire aside**

# Home Hardening & Defensible Space Innovation



University of California, Davis -  
Climate Adaptation Research Center

Wildfire Resilient Structures Conference

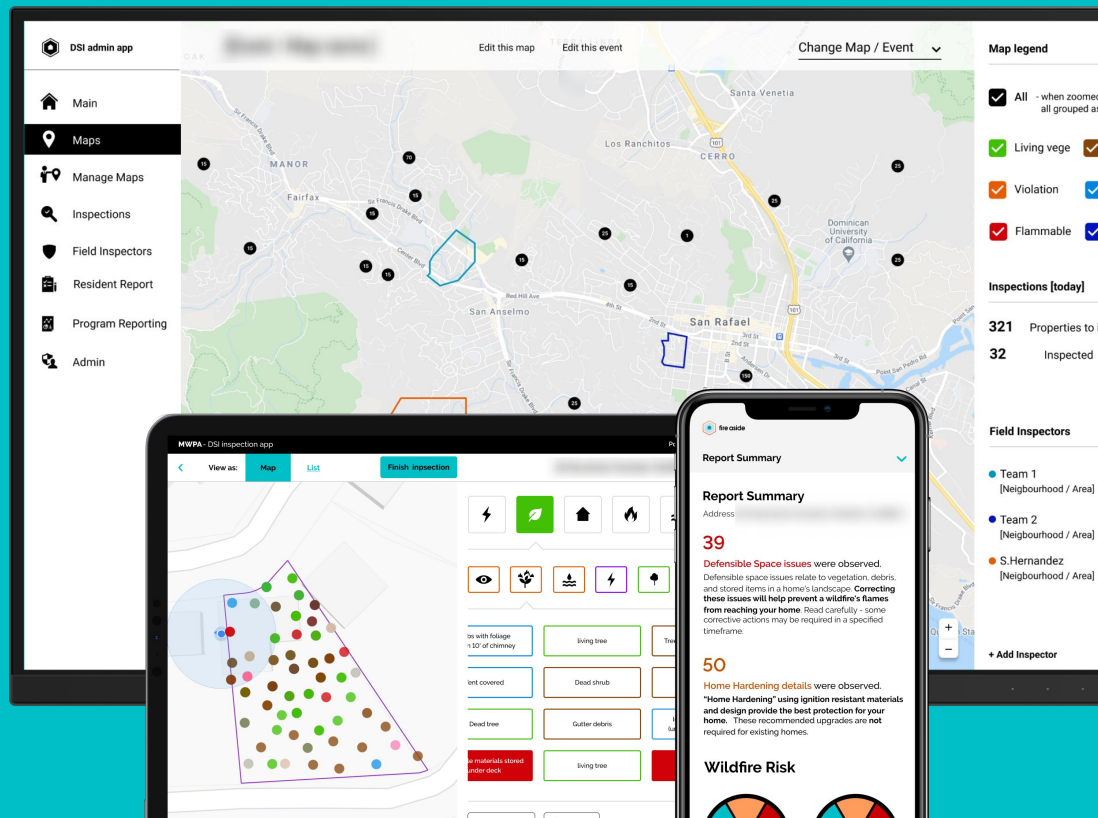
8 February 2023



# Fire Aside

supporting communities as they continue to adapt to wildfire.

Jason Brooks  
CEO & Co-Founder

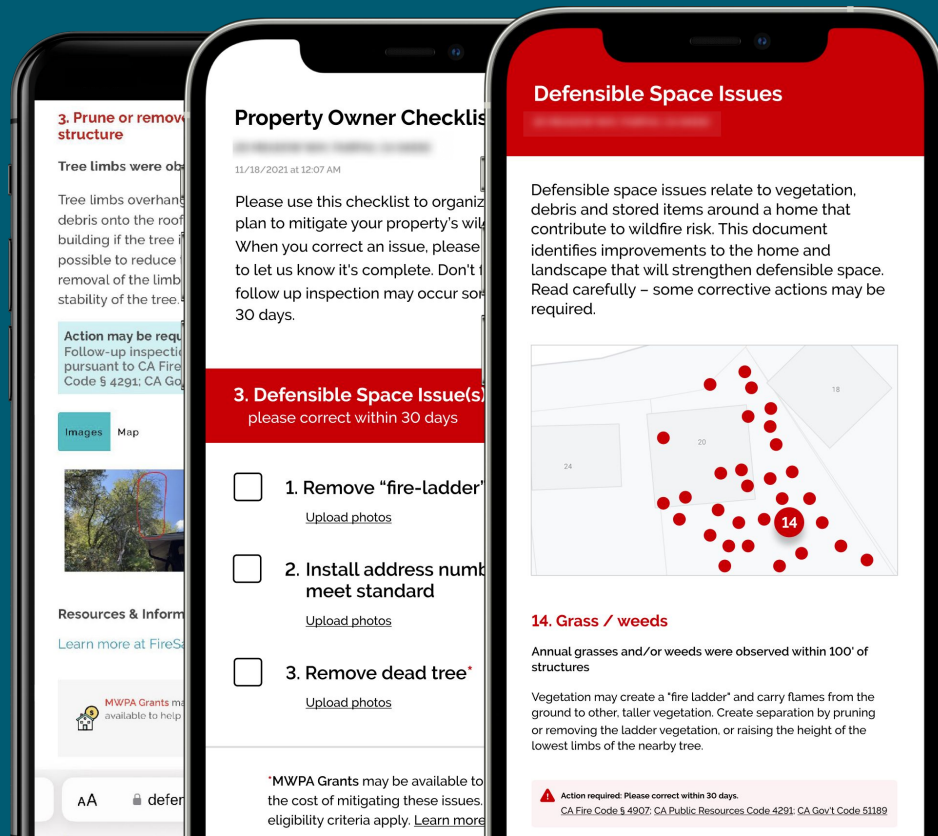


# Defensible Space & Home Hardening Solutions

Helping partners deliver on their mission to reduce wildfire risk for properties in California, Nevada, and Oregon.



fire aside





# Our partners



## Fire Agencies & Municipalities

Marin County	Orinda
Berkeley	Woodside
Truckee	Mill Valley
North Lake Tahoe	Ross Valley Fire
Novato	Kentfield Fire
Olympic Valley	Santa Rosa
Los Altos Hills	Stinson Beach
Southern Marin	Inverness
San Rafael	& 20+ more

## Fire Safe Councils

Butte County  
Marin County  
Mendocino County  
Monterey County  
Nevada County  
Plumas County  
Santa Clara County  
Ventura County

## HOAs

Tahoe Donner  
ArrowCreek



# Participant Introductions

# Central Marin FD & Marin Wildfire Prevention Authority



**Todd Lando**  
Battalion Chief  
Wildfire Hazard  
Mitigation Specialist

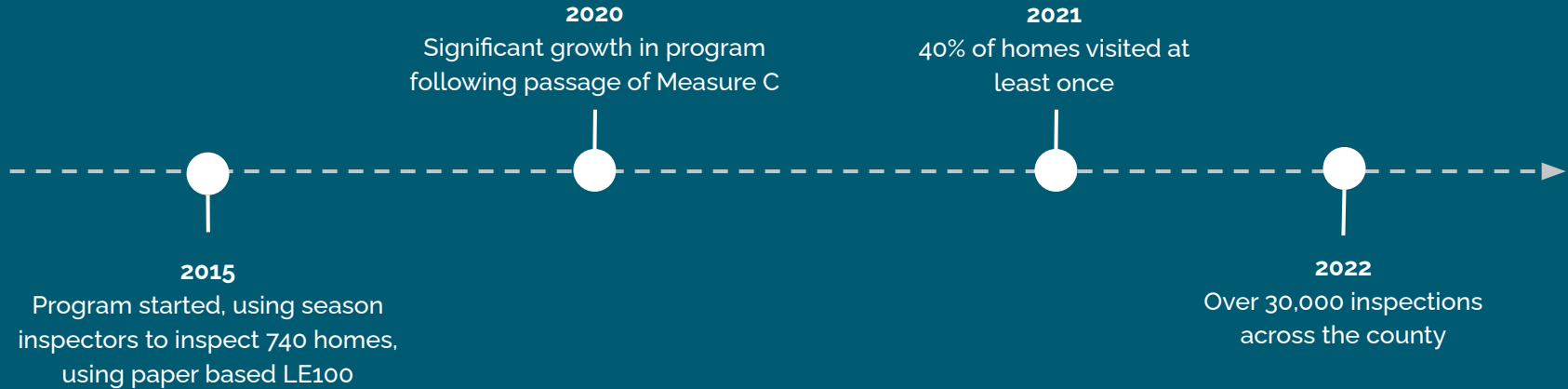


Central Marin is one of 17 agencies participating in the Marin Wildfire Prevention Authority.

Created a common program for consistent resident communications and data tracking across the entire county

Community consists of neighborhoods built on steep slopes & canyons with significant fire history.

Significant number of older homes, and long-time residents in 'house rich, cash poor' situations, with limited ability to invest in HH & DS.



## Mission

Ensuring every property owner has the resources to learn what they can do to make their home safer from the threat of wildfire.

## Funding

Expanded program funded by Marin Wildfire Protection Authority with augmentation from local prevention budgets.

## Staffing

Program consists of 4 full time and ~25+ seasonal inspectors. (regional program)

# Highlights

2022 program saw a pilot of a multiple follow-up and re-inspection program. Some homes were visited 3-4 times in the season. This had a 4-5x impact on resolutions rates (vs. non-inspected homes) and enabled us to expand community grants and partnerships on DS and HH improvements.



Removed enough bamboo to feed 10 pandas for a year along with a lot more Juniper, Italian Cypress, and other hazardous vegetation



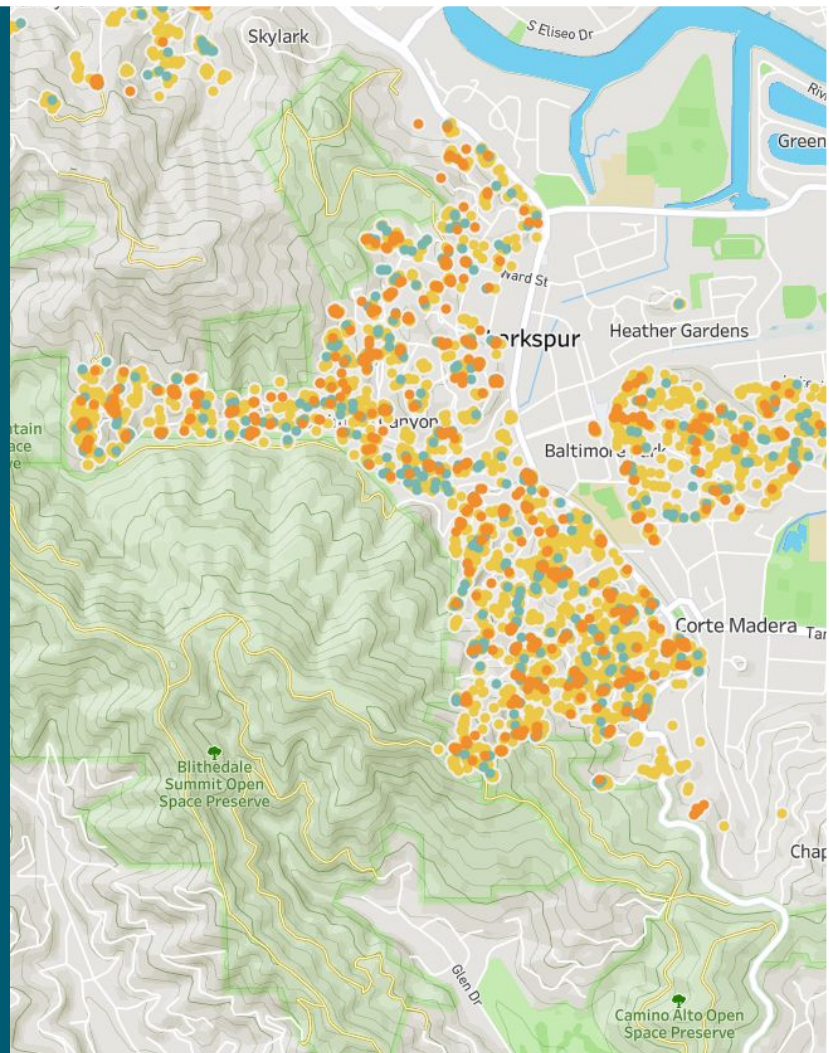
Enough vines & ladder fuel to reach the top of the Golden Gate Bridge



7,700 pickup trucks worth of combustible mulch



Replaced a half mile of vents with openings greater than  $\frac{1}{8}$ "

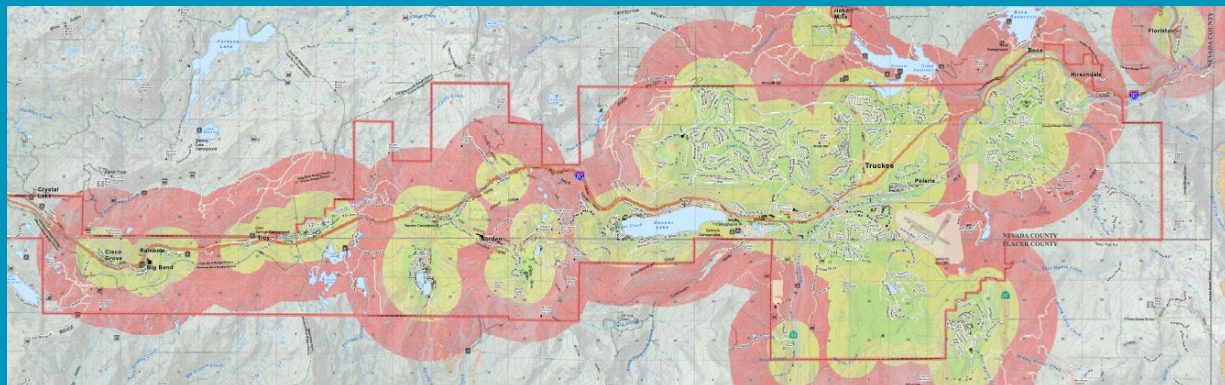


# Truckee Fire Protection District

*Serving Truckee & Donner Summit Communities*



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135 Square Miles (80,000 acres)  
Full Time Population 17,000  
Influxes of Tourists & Recreationists  
Two Counties & One Town

**Dillon Sheedy - RPF #3175**

Asst. Wildfire Prevention  
Manager / Forester

20,000 parcels (15,000 developed)  
Large majority of these are in very  
high fire hazard severity zones as  
determined by CAL FIRE and Town  
of Truckee.

Truckee mountain communities are  
best classified as forested WUI  
Intermix

Community is mostly (75%) vacation  
and 2nd homeowners. This creates  
communication challenges and  
reliance on contractors to perform  
mitigation

25-30% of homes are in HOAs with  
additional DS covenants that HOAs  
enforce



## Funding

Measure T Wildfire Prevention fund (Special Tax, \$179/parcel which generates \$3.6 million annually)

## Plans

Community Wildfire Protection Plan  
Measure T Implementation Plan

## Priority-Based Implementation

CWPP is the wildfire mitigation roadmap to identify and prioritize current & future wildfire protection projects, and foster a community wide collaborative approach to reduce wildfire risk and hazards to life, property, and natural resources.

## Staffing

Program consists of 3 full time personnel, ~5 seasonal defensible space specialists. Truckee Fire prides using local contractors to complete mitigation projects



# Highlights

The **2022** defensible space program provided over **4,500** homeowners with a comprehensive evaluation.

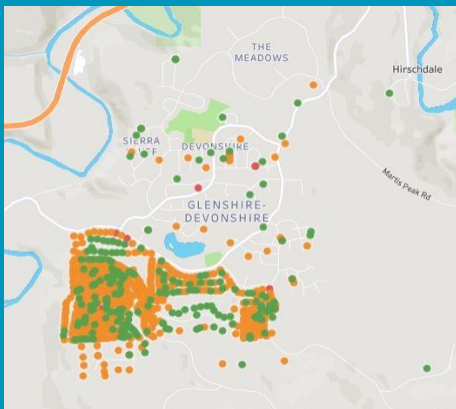
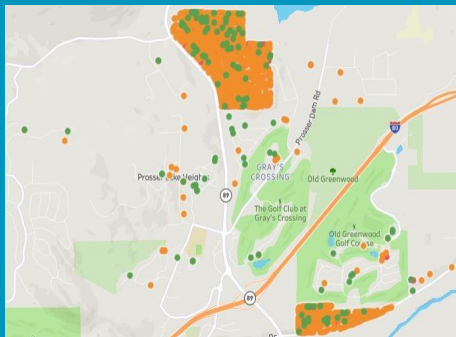
This led to over **46,000** unique discoveries (DS violations and HH issues), and **22,000** photos taken.

On average, **57%** of residents accessed their report online

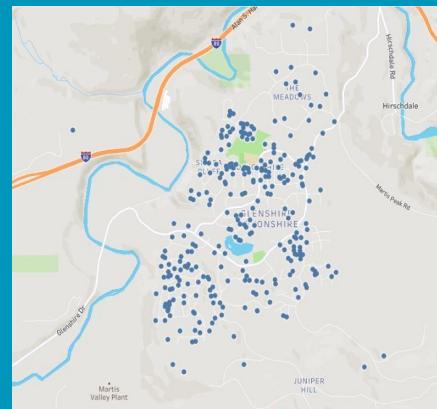
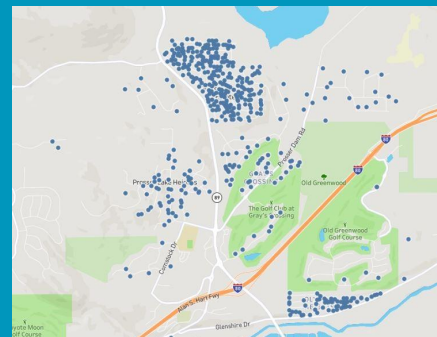
Homeowners were very receptive of the new curbside greenwaste program, in total 2,500 piles were serviced, removing nearly 9,000 cubic yards of flammable vegetation.

Residents reported \$425,905 & 16370 hours spent working on defensible space

Defensible Space Inspections



Pickup/Chipping Completed





# Plumas County Fire Safe Council

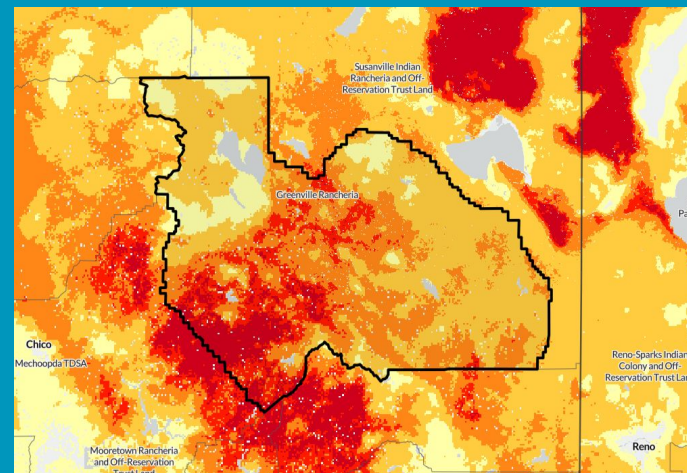
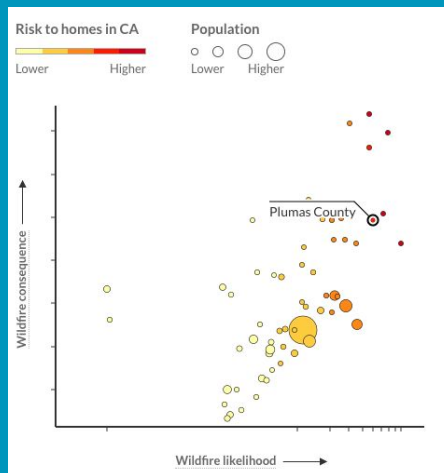


Full Time Population 19,187  
29% Population is 65+  
\$57,287 Median Income  
Source of 25% of California's water

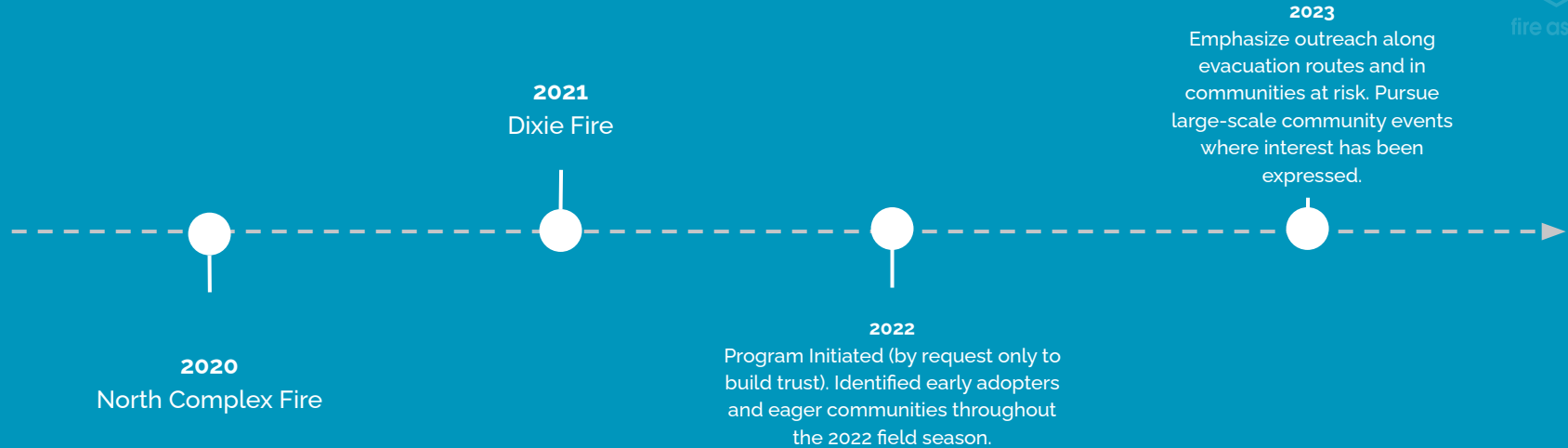
**Liam Galleher**

County Coordinator

Compared to all counties in California, Plumas has a **91%** higher risk to homes and a **95%** greater wildfire likelihood



Source: Wildfire Risk to Communities - USDA Forest Service



## Mission

PCFSC has a mission to reduce losses from wildfire through pre-fire activities and has been providing fuels reduction assistance to residents of Plumas County for nearly 20 years.

## Funding

Program is funded with State Grants: California Fire Safe Council CALFIRE County Coordinator Grant

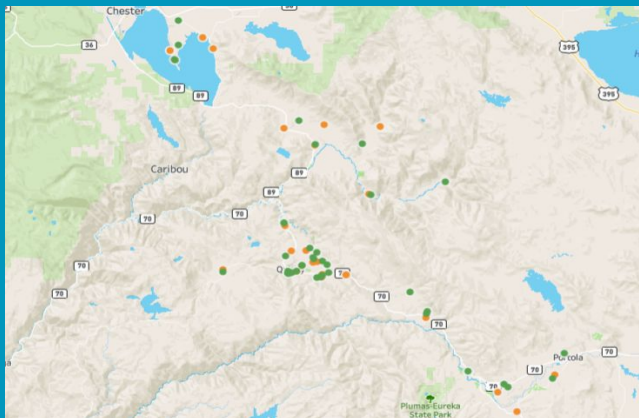
## Staffing

Fire Safe Home Visit program consists of 1 full time program manager. A network of volunteer inspectors are currently being trained.

# Software & innovation as a Nonprofit



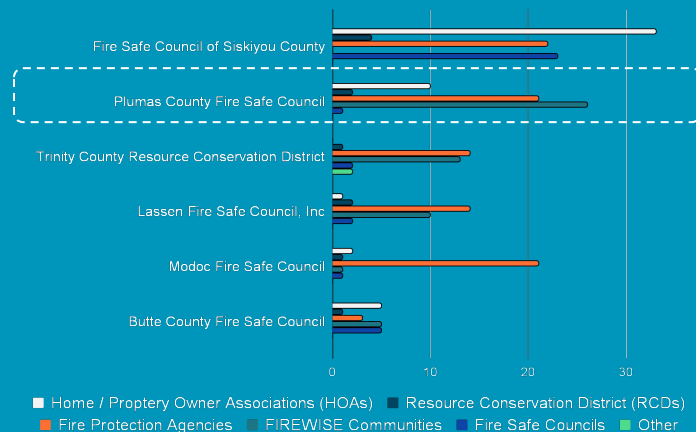
It's our job to develop educational tools that are up to speed with mountain living in the 21st century; the DSI software enables face-to-face learning experiences with personal roadmaps to wildfire mitigation.



## Within 4 months:

- 694 Unique Discoveries
- 117 Residents received personal, face to face education
- 71 Unique Home Visits
- 2 Community-Wide events led with the DSI software

## Mitigation groups



- Fire Safe Council credibility in the public eye has been amplified
- Grant reporting / applications
- The software is malleable
- Provides easy data recording for our 26 Firewise communities

# Berkeley Fire Department

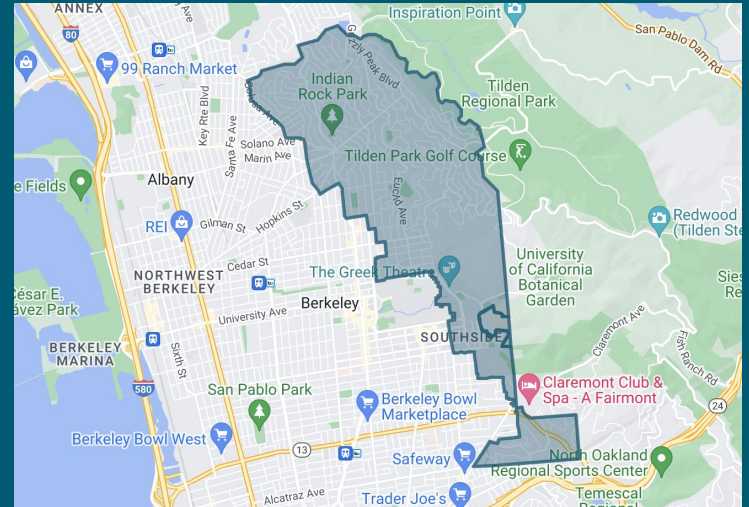


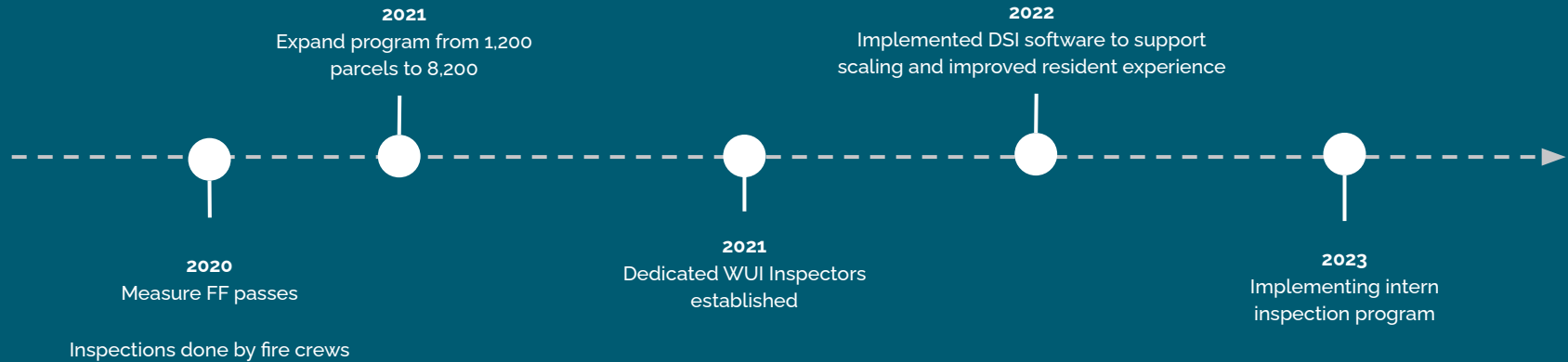
**Duncan Allard**  
Wildland Inspector

Wildland Urban Interface Division

~**8,500** parcels in the  
Berkeley Hills with wildfire  
exposure and fire history

Community is mostly dense  
urban environment with  
homes built in the 1920-1950s





## Program

Year-round defensible space inspections with enforcement and home hardening evaluations. DS violations are re-inspected at 30 days (first notice) and 14 days (2nd + notice)

## Funding

Primarily funded via voter approved Measure FF and grants

## Staffing

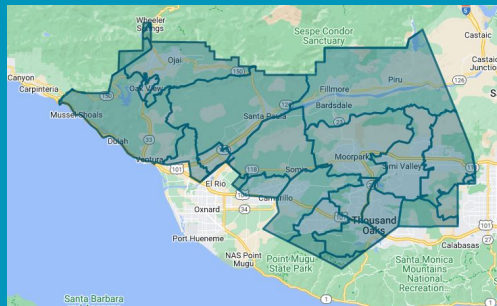
Program consists of 3 sworn inspectors and staff of 10 annuitant inspectors

# Ventura Regional Fire Safe Council

*Serving all of Ventura Counties Communities*



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**10 incorporated cities**

**Population of 850,536**

**10 monitored Fuel Beds**

**Contract County - 4 Fire Agencies**

**Max Young**

Lead Wildfire Safety Liaison

58,700 Structures and 176,000 residents reside in Very High Fire Hazard Severity Zones, with many more in High and Moderate.

Seasonal Santa Ana winds can overlap with early fall critical fuel moistures to create catastrophic fire weather. Major fires in 2017 and 2018 destroyed over 2,500 structures.

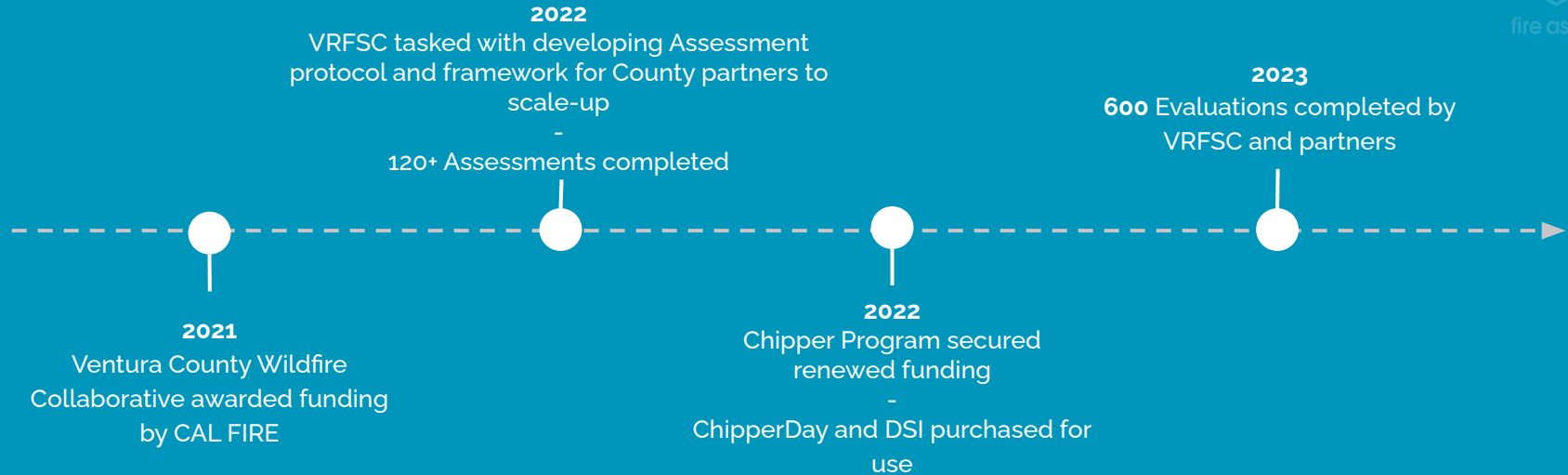
Founding partner of Ventura County Wildfire Collaborative, working together with Ventura County Fire Department.

Ventura is extremely diverse in demographic population, major industry, and WUI classification.

5 Fire Safe Councils in Ventura County; Ventura Regional being countywide



fire aside



## Mission

The mission of the Ventura Regional Fire Safe Council is to reduce the threat of wildfire to farms, ranches, urban neighborhoods, and infrastructure, through an aggressive program of action, education, and collaboration.

## Funding

Home Hardening Program is funded in component parts, by  
*CAL FIRE*  
*CA Fire Safe Council*  
*Conejo Open Space Conservation Agency*

## Staffing

Program managed by **3 full time** Assessors.  
Training to localized FSCs, CERT, and Firewise Leaders funded for 2023 and 2024

# Highlights



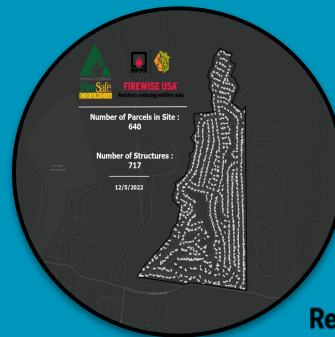
Concerned Resource & Environmental Workers

## Resident Grant Program

Funded and robust Home Hardening Program has opened doors for retrofit subsidization grants for residents

In 2022, VRFSC secured ~\$80k in funding from 2 local organizations to fund Defensible Space and Home Hardening work for homeowners needing assistance

DSI to streamline workflow in 2023



**FIREWISE USA®**  
Residents reducing wildfire risks

## Firewise Communities

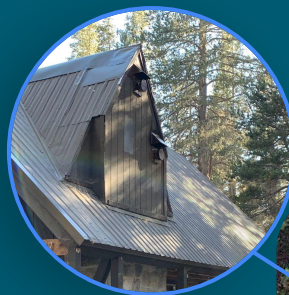
In 2023, Ventura County has **2** Firewise Communities, while California has **600** statewide

**DSI** and **ChipperDay** reporting integration to allow VRFSC to grow the Firewise USA Program in Ventura County

**5 new** community applications since Assessment Program launch



# Creating and Scaling Defensible Space & Home Hardening Programs



Metal roof



Additional spacing  
required

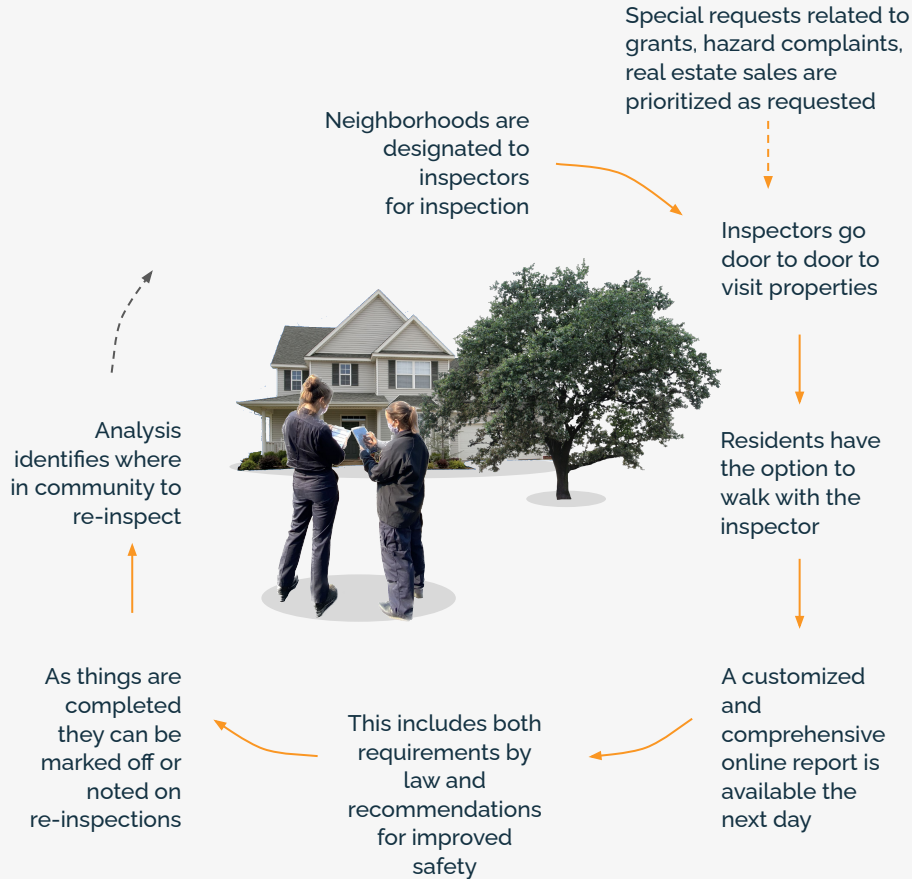


Propane tank  
without 10'  
clearance



Exposed firewood  
stored next to  
structure

## Typical Fire Agency model

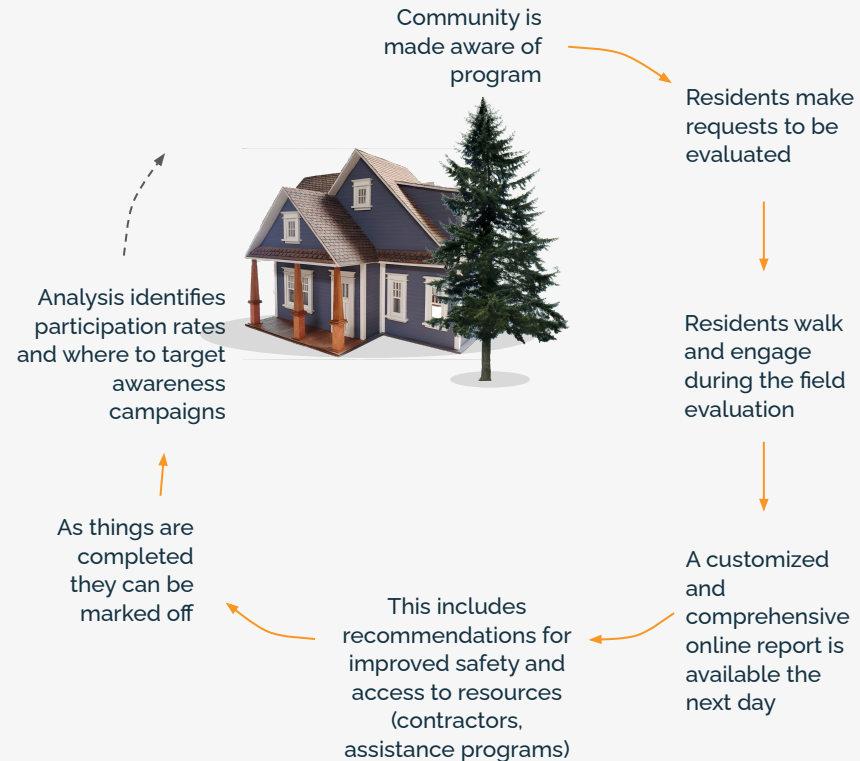


## Differences in an agency inspection program vs. fire safe voluntary program?

## Typical Fire Agency model



## Typical Fire Safe Model





How has your  
program  
evolved over  
time?



How to design &  
operate a  
successful back  
office for the  
program?



Trade offs  
and considerations  
when using  
community volunteers  
to expand field  
programs?





fire aside

# Community Engagement & Buy-in



# Impact of customized education



Property Owners who educated on the specific issues on their property and the impact to their safety are...



more likely to resolve  
achievable Home  
Hardening vulnerabilities



# Impact of customized education



Property Owners who educated on the specific issues on their property and the impact to their safety are...

6x

more likely to resolve  
achievable Home  
Hardening vulnerabilities

5x

more likely to resolve high  
Severity Defensible Space  
Issues

# Impact of customized education



Property Owners who educated on the specific issues on their property and the impact to their safety are...

6x

more likely to resolve  
achievable Home  
Hardening vulnerabilities

5x

more likely to resolve high  
Severity Defensible Space  
Issues

7x

more likely to resolve  
Medium Severity  
Defensible Space Issues

# Impact of customized education



## And prioritize the right zones

6x

more likely to resolve achievable Home Hardening vulnerabilities

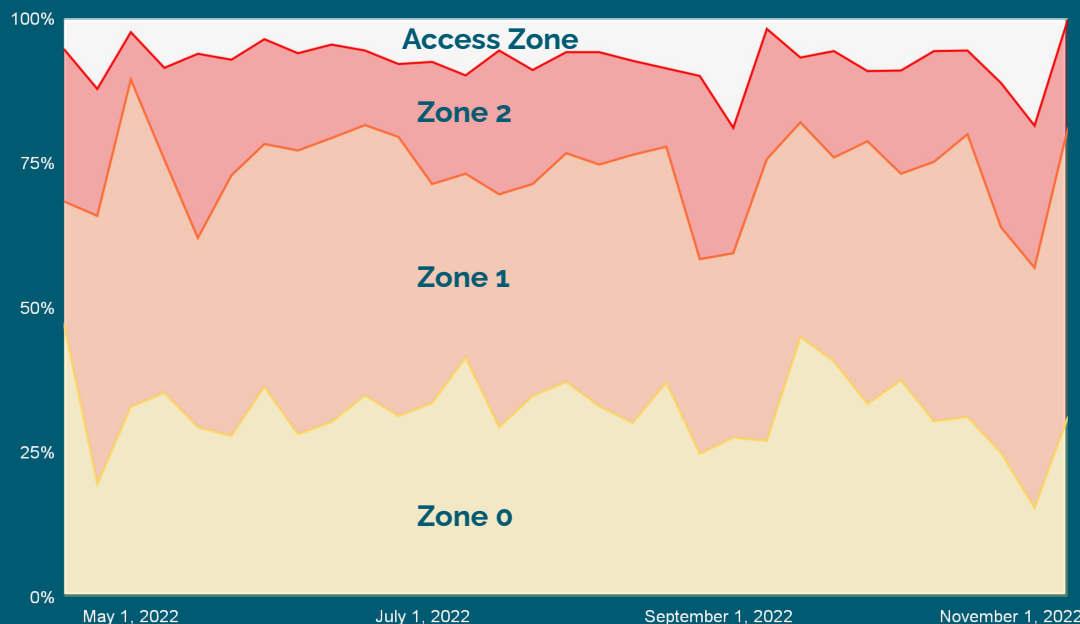
5x

more likely to resolve high Severity Defensible Space Issues

7x

more likely to resolve Medium Severity Defensible Space Issues

Resolved issues by Zone by time



Source: 2022 Marin County Defensible Space Report

And it is working:



*"We weed whack our hill yearly, and we just trimmer our oaks and removed all juniper bushes. We now realize we need to make some major adjustments to our home's exterior. We will keep the list and proceed when possible"*

# Wildfire resilience increases with community engagement



10%

Increase in community resolution rate in the 3 weeks following neighbors' action\*

16%

Of chipping participants were inspired after seeing their neighbor making a pile\*\*

*\*Analysis of 282 micro neighborhoods comparing resolution activity during 2022 season*

*\*\*n=4082 post chipper pickup survey*



# Which can be accelerated by integrating resources to resolve



72%

Increase in cubic yards when offered chipper services after their evaluation

4.5x

more likely to also resolve vulnerable home hardening items after using the chipper service

## Resources & Information:

A **Free chipping service** is available in your area: **August 16**

Learn more 



**MWPA Grants** may be available to help. Check here and **start** the application is in the **Additional resources section**.



I wish to apply for the applicable grant.



How to engage  
the community  
and partner in  
taking action?



Concerns about  
privacy, big brother,  
neighbors and...  
insurance  
companies getting  
this information?



The background is a map of a residential neighborhood, likely in a suburban area. The map is overlaid with a semi-transparent blue layer. Numerous small, colored dots (blue, green, and yellow) are scattered across the map, representing data points. The dots are more densely clustered in certain areas, such as along roads and in some residential blocks. The map shows various streets, including Tamalpais Rd, Scenic Rd, Ridge Rd, Berry Trail, Winton Ave, and School St. There are also labels for 'Fir Trail', 'Manor Rd', 'Azalea Ave', 'Spruce Rd', 'Park Ln', and 'Seventh Day Adventist Church'. The text 'Using the data to reduce risk' is prominently displayed in the center-left of the image.

# Using the data to reduce risk

## DS & HH data has 4 primary components



Community  
ground truth

Inspection /  
Evaluation  
consistency &  
quality  
improvement

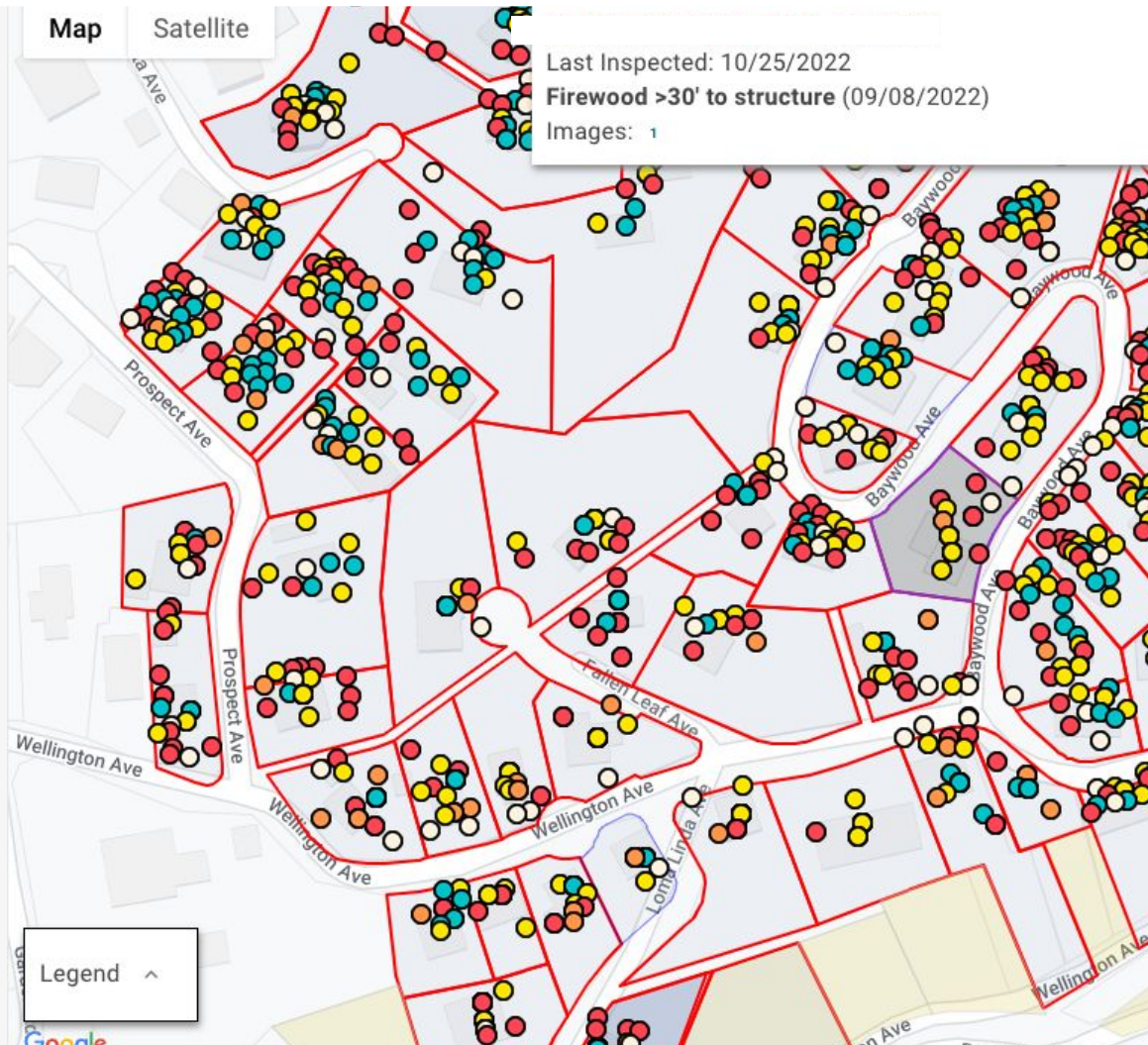
Resident  
engagement and  
actions being  
taken

Improving  
evacuation  
planning &  
suppression  
response



## Large scale analysis of all vulnerable & hardened attributes at the community level

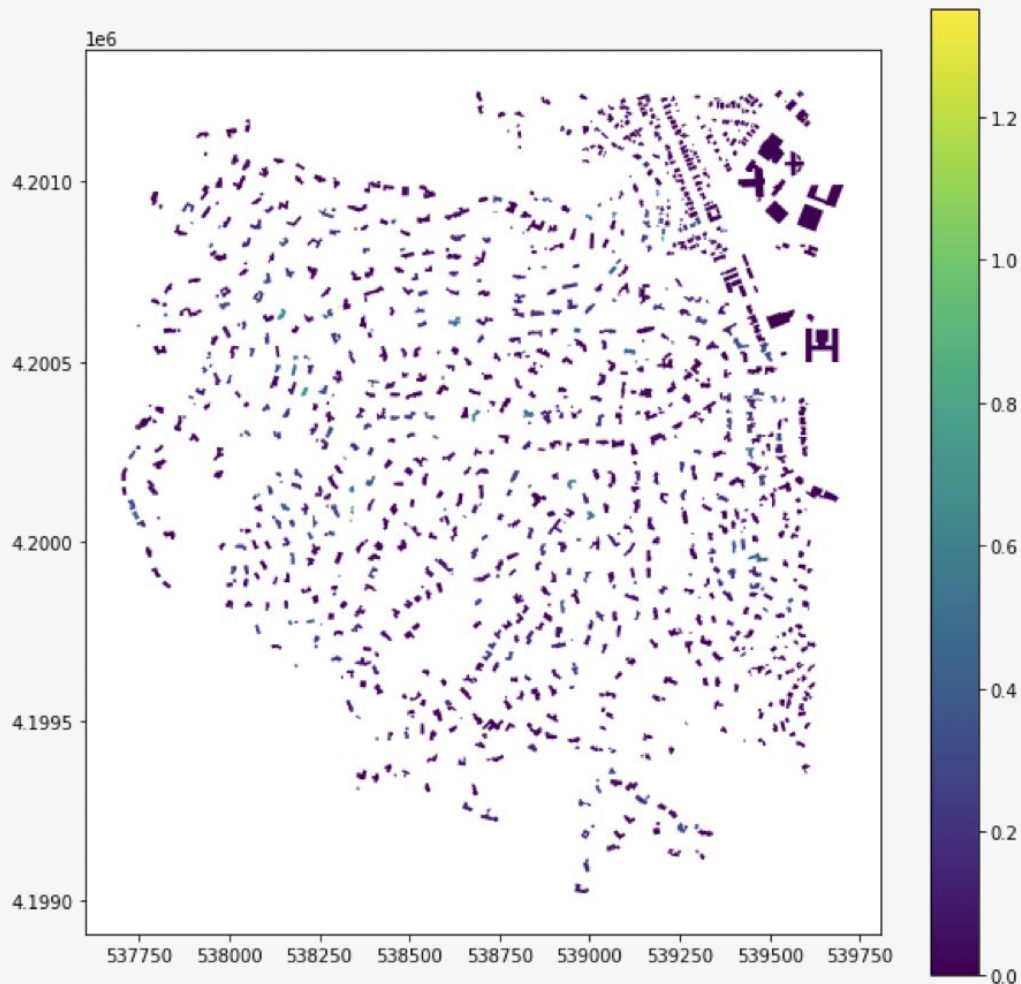
Each discovery is analyzed based on its ignition potential, ember creation, and heat contribution. This considers the proximity to structures on the parcel as well neighboring parcels under different wind conditions





# Analysis of ember potential & transport by structure

An example of the ember analysis  
Analysis by **Willow Labs**

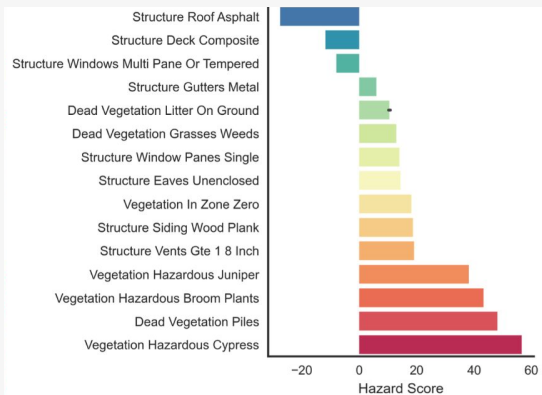






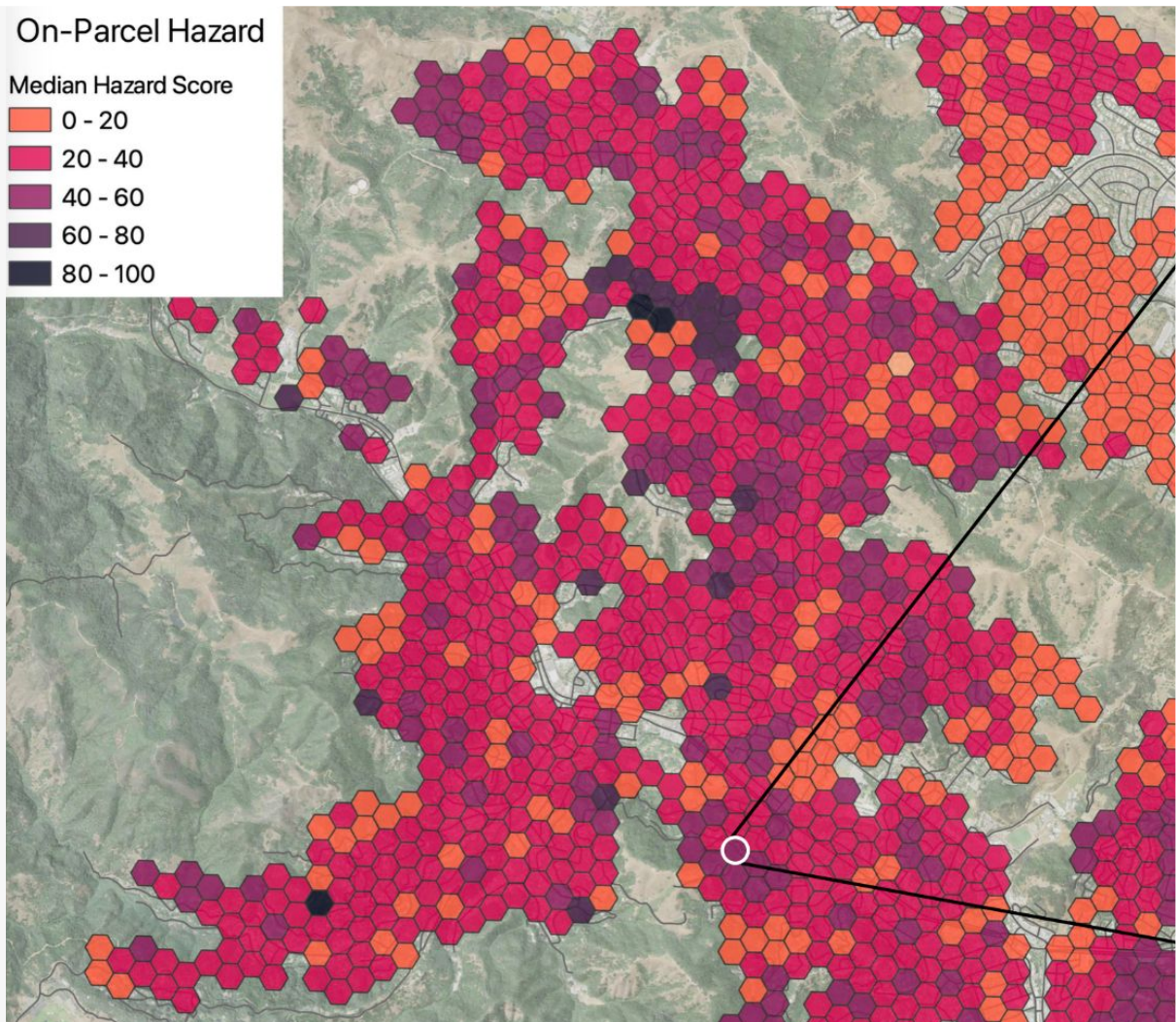
# Prioritizing by discovery to maximize community safety

Analysis by **Willow Labs**




## On-Parcel Hazard

Median Hazard Score





How are you using  
this data to improve  
inspections /  
evaluation quality?



How are you  
integrating updated  
parcel data into  
other projects such  
as your CWPP?



How are you  
improving grant  
reporting and other  
stakeholder  
updates?



# Questions?

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