

Fire in California



While fires are a natural and necessary part of many healthy ecosystems, they can also be a destructive force when they impact human communities. Due to suppression, human disturbance, invasive pests, and climatic changes, fires in many areas now burn hotter and larger than they would have historically.

Even fire-adapted ecosystems are threatened by the increasing fire intensity, and recent studies show that fire frequency and severity may increase with a warming climate.

Between 2004 and 2013, California experienced:

- 37,432** fires
- 1.6 million** acres burned
- \$4 billion** lost from fires

City of Santa Barbara's Wildland Fire Suppression Assessment District

To mitigate the risks from wildland fire, the City of Santa Barbara Fire Department (fire Department) created a **one-of-its-kind** Wildland Fire Suppression Assessment District (District).

In exchange for a yearly fee of \$75, residents receive additional fire protection services, such as:

- Roadside clearance
- Debris chipping
- Vegetation management
- Defensible space inspections

Homes benefitting from the District fall within the foothill and extreme foothill zones, which are high fire hazard areas.



FACT:

Defensible space is one of the top indicators for whether or not a home will survive a fire, making it an important service for residents to use.

Objectives

1 Determine residents' opinions

2 Assess vegetation management effectiveness

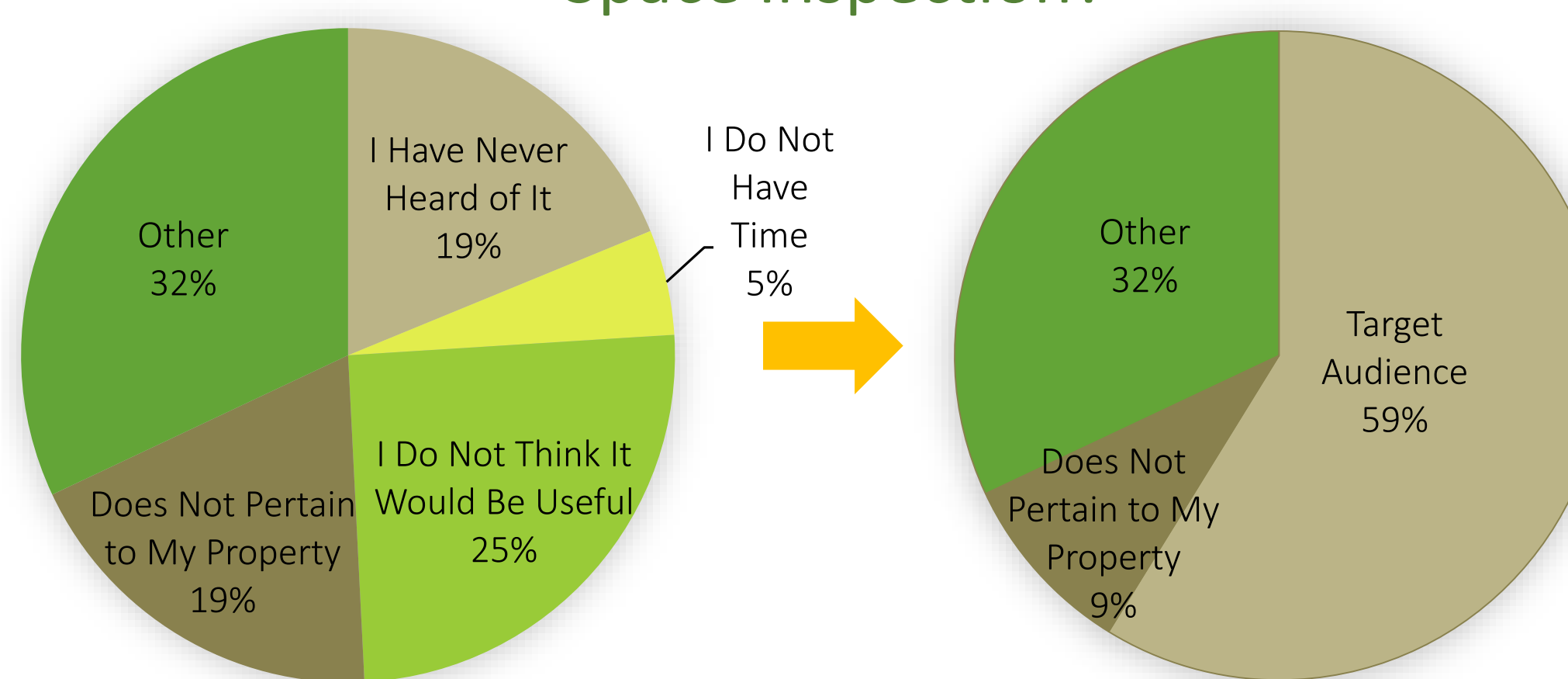
3 Find other suitable cities

Determining Residents' Opinions

1

80% of survey respondents stated that they approve of the Wildland Fire Suppression Assessment District, demonstrating that there is potential for other cities to benefit from a similar fire mitigation program. In fact, **72%** of survey respondents living within the District said that they believe the fire mitigation program creates a safer community.

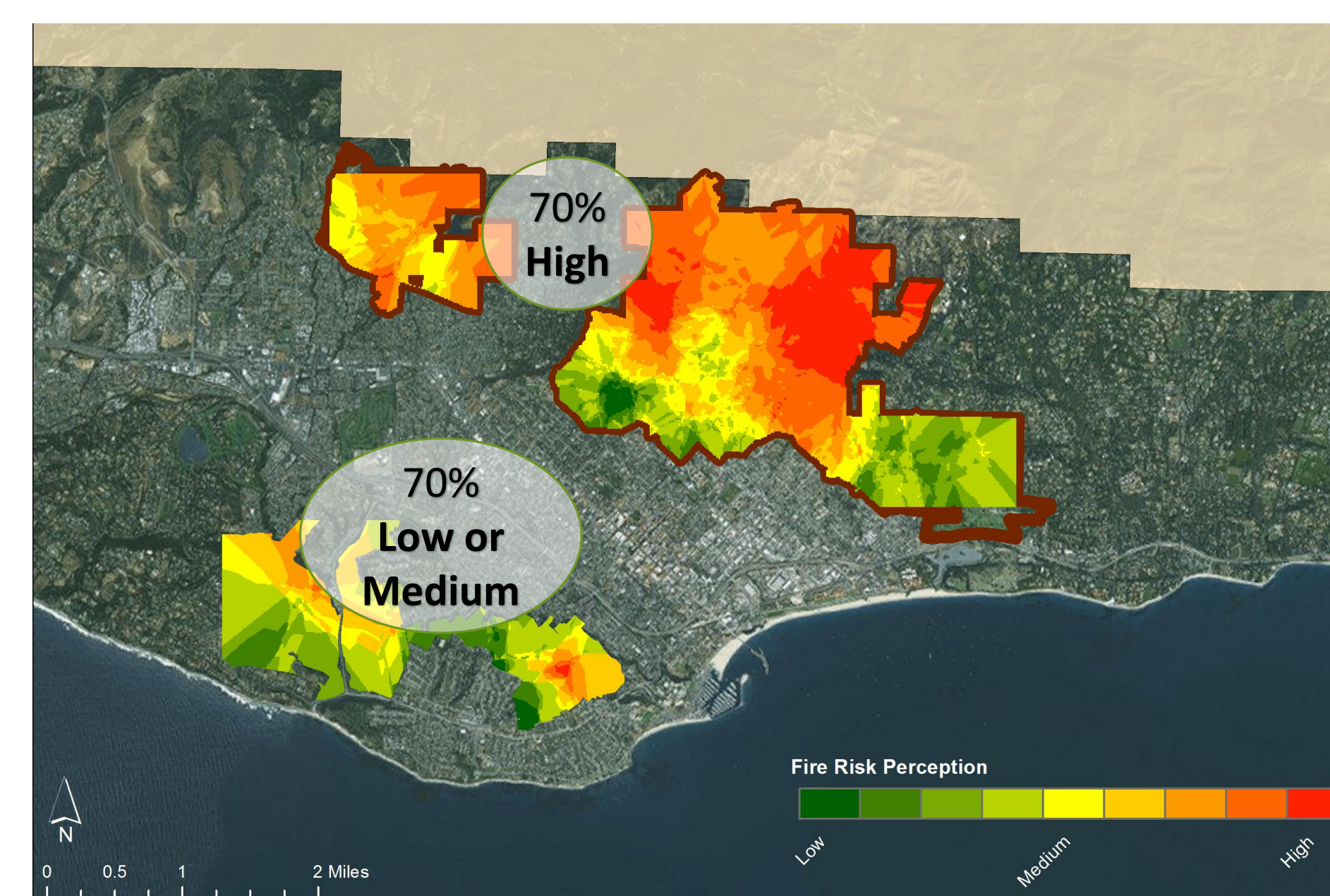
Why Have You Never Used the Defensible Space Inspection?



Survey results showed that only 38% of residents have ever requested a defensible space inspection. Due to the importance of this service, we were concerned that 25% of respondents don't think this service would be useful. By combining selected responses, we came up with a new target audience that could benefit from strategic communication outreach from the Fire Department to increase awareness of the service benefits.



Fire Risk Perception in High Fire Hazard Areas



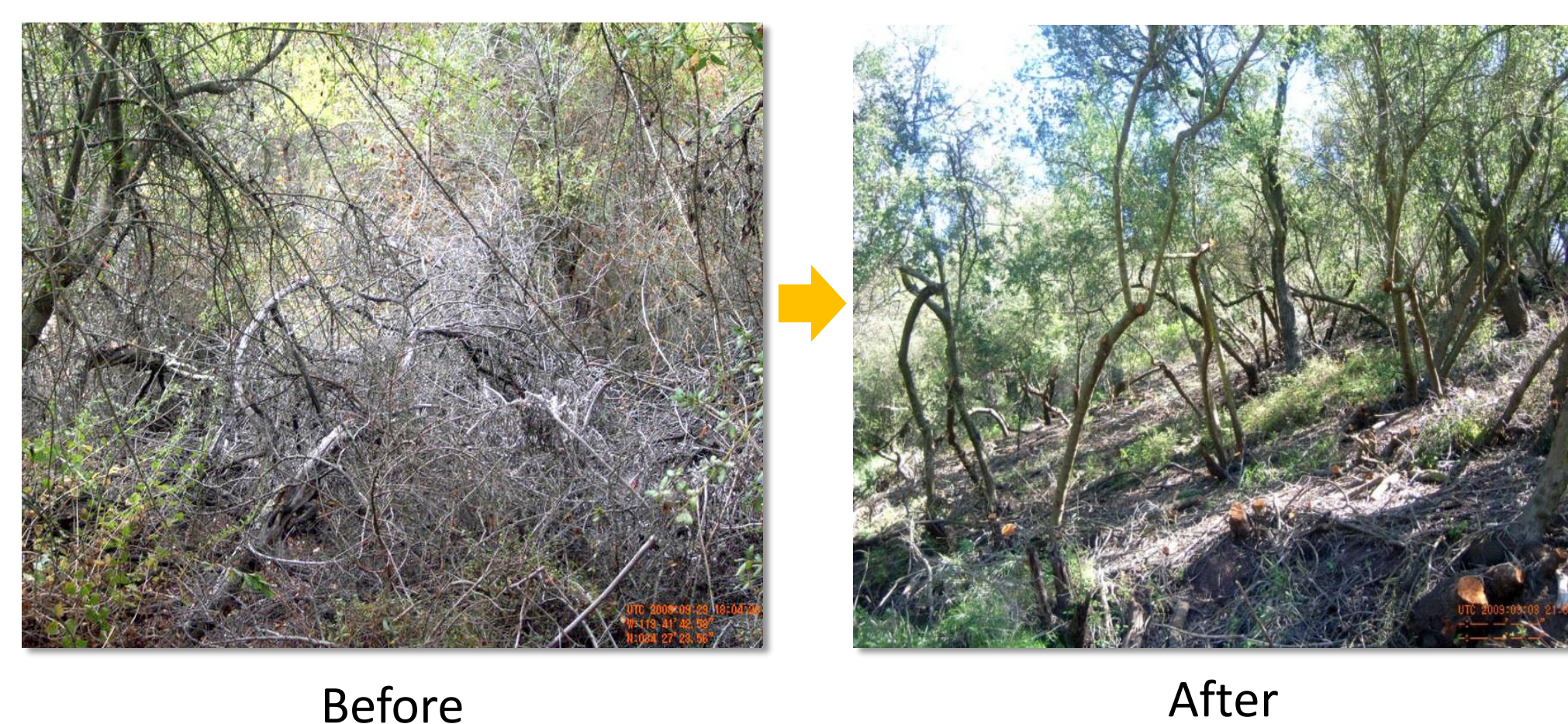
A spatial interpolation analysis of respondents' fire risk perceptions shows that residents living near the Los Padres National Forest (shaded beige) and areas with densely vegetated canyons have a higher fire risk perception than those living near the coast.

Strategic communication efforts such as mailings and social media outreach can help increase awareness of the true fire risks residents face while living in their neighborhoods.

2

Assessing Vegetation Management Effectiveness

Vegetation Management

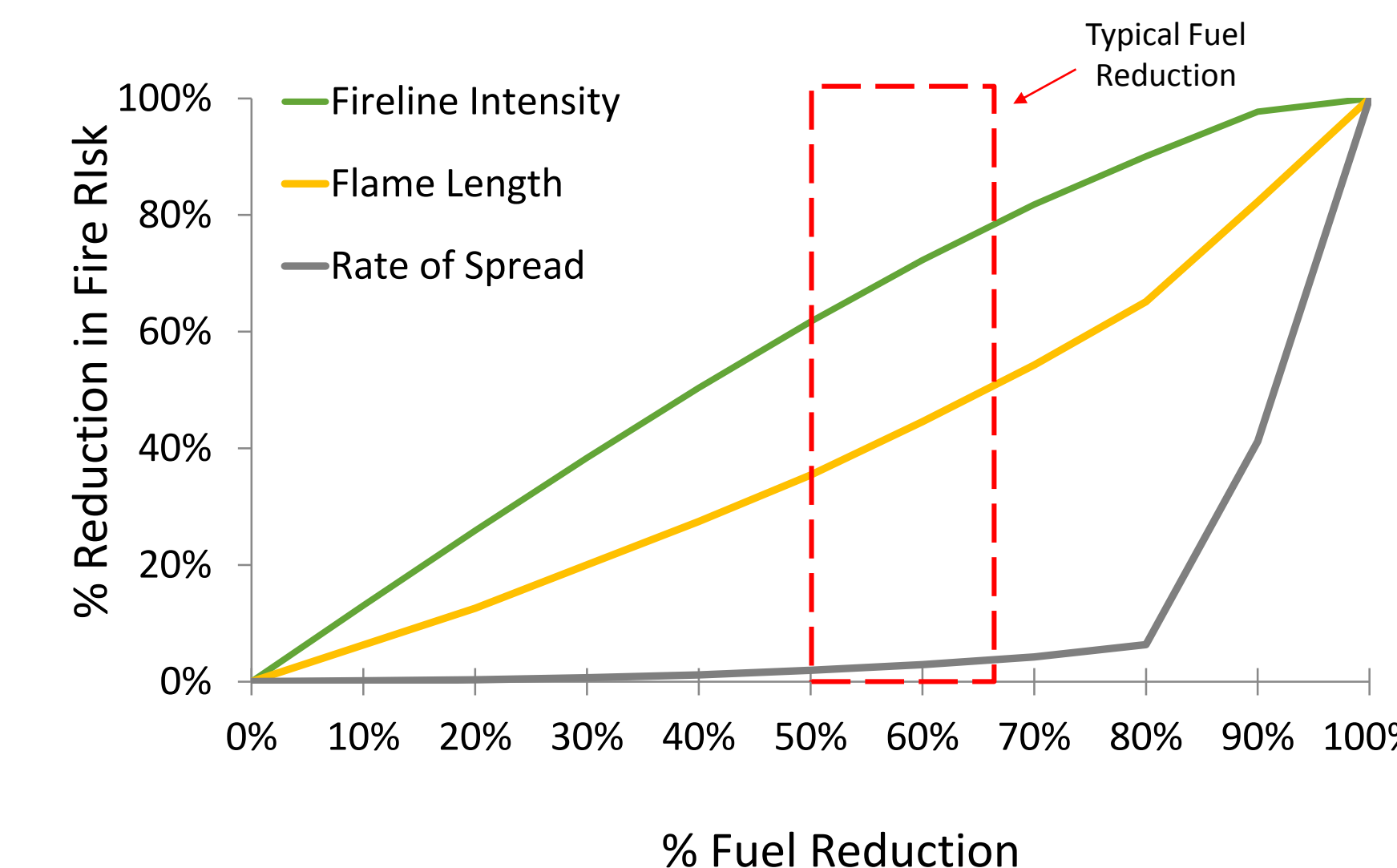


Flame Length (ft) Comparisons

6 mph (Standard winds)		60 mph (Sundowner winds)	
pre	post	pre	post
17.5	8.6	50.2	17.2

Vegetation management reduces flame length even under Sundowner wind conditions. Fuel removal returns flame length under Sundowner conditions to baseline conditions pre-treatment, making firefighting efforts less challenging. This once again emphasizes the importance of defensible space around structures.

Relationship Between Fire Risk and Fuel Removal



The linearity of response to fuel removal indicates that more removal is better. In chaparral ecosystems, rate of spread is not affected until approximately 85% of fuel is removed. This highlights the importance of a quick response time by the Fire Department.

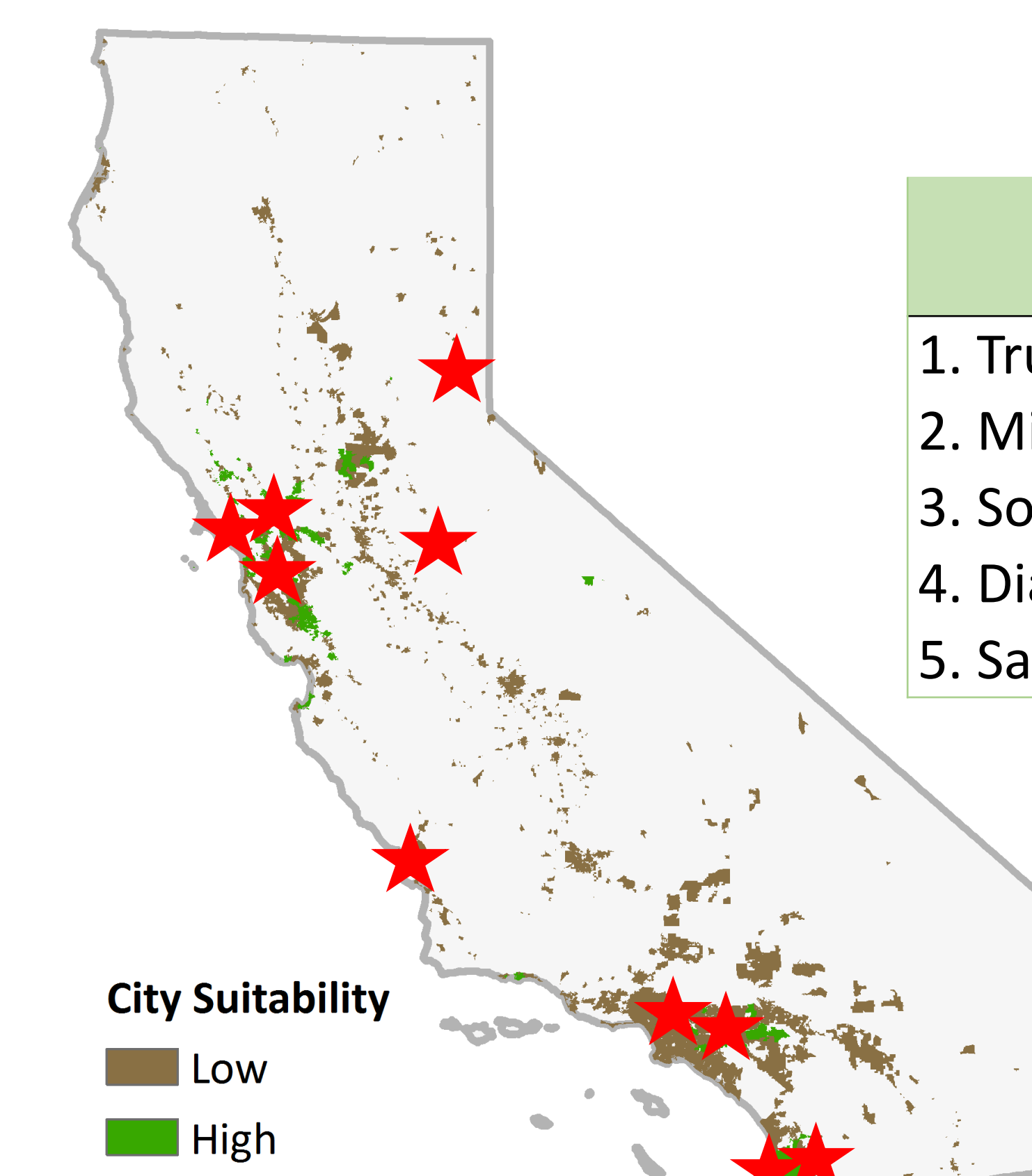
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Finding Other Suitable Cities

Once we found that residents approve of the District and that it is successful in reducing fire risk, we conducted a **multi-criteria decision analysis** in ArcGIS to identify other cities that would benefit from a similar fire mitigation program. To do this, we used expert input to determine indicators that ensure suitability.

Indicators of Suitability:

- WUI – cities that fall within wildland urban interface
- Fire Frequency – cities with more frequent wildfire events
- Vegetation – cities with flammable vegetation
- Topography – cities with steep slopes and deep canyons
- LRAs – cities that are not a part of State Responsibility Areas to avoid double taxation



Top 10 most suitable cities

- | | |
|--------------------|----------------|
| 1. Truckee | 6. Fremont |
| 2. Mill Valley | 7. San Diego |
| 3. Sonora | 8. Chula Vista |
| 4. Diamond Bar | 9. Riverside |
| 5. San Luis Obispo | 10. Oakland |



Given the success of the unique Santa Barbara District, other cities should consider adopting similar special fire management districts. The more communities that are prepared, the better off California will be as a whole.

Conclusions

- Majority approval
- Underutilization of services
- Focused communication efforts

District Approval 1

- Greater fuel removal results in greater reductions of fire risk
- Sundowner effects reduced to baseline levels

Vegetation Management Effectiveness 2

- Up to 80 cities could benefit
- Need for urgent program adoption

City Suitability 3

Acknowledgements

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