

Preparing for Wildfire: The Home Ignition Zone



- Credit Wildfire Adapted Partners and FACO for some of the slide material.

Fire Adapted Communities

- they understand the role of fire and are prepared for its occurrence

“A human community of informed and prepared citizens collaboratively planning and taking action to safely coexist with wildland fire.”

- Built Environment & Defensible Space
- Connect with Neighbors
- Build Fuel Breaks and establish evacuation routes
- Work with neighboring Land Managers to reduce wildfire risk



Start with most important part of communities, homes.

Home construction and proper management of vegetation near home

Working with neighbors to manage their homes

Build fuel breaks along boundaries of communities and ensure access for evacuations and first responders

Move into surrounding environments to reduce risk of fire nearby

Why are we here!

- Mitigation and Home Hardening Works!
- Wildfire Response Budgets and WUI losses are increasing
- Mitigation Work Benefits Outweigh Costs



- Because this is a complicated topic we're going to cover the basics of thinking about fire and the simplest things you can do today.

Outline

- **Fire Behavior**
 - Flaming Front
 - Ember Wash
- **Definitions**
- **HIZ Concepts**
 - 5ft zone
 - Structure Construction
 - Past 30ft

- Because this is short presentation we're going to focus on concepts that prepare you to think about how fire impacts your home, instead of details. I encourage you to go out side after this presentation and try out some of these concepts.



- Learning about fire behavior allows to envision the threats facing our home, then we can decide how to protect against those threats.
- The flaming front- direct flame contact to your home.
- Surface Fire - Spreads with a flaming front and burns leaf litter, fallen branches, brush, and other fuels located at ground level
- Crown Fire -Burns through the foliage on the trees, known as the canopy or crown. Crown fires are the most intense type of fire and often most difficult to contain and usually need strong winds, steep slopes, and a heavy fuel load to continue burning
- **Radiant Heat is what will catch your home on fire**
- Radiant heat is stronger from more intense flames/ fire behavior
- Influence of slope and wind can drastically change fire behavior

Receptive Fuels

- Smaller fuels ignite larger fuels
- Fine Fuels = less than ¼ inch in diameter



- Campfire analogy,
- Need fine fuels to sustain the fire and fine fuel to catch larger fuels. Removing fine fuels removes the chances for fire to spread.
- These are the fuels you need to look for around your home, we'll refer to them through out the presentation.

Fire Behavior

Ember Wash

“Snowstorm of Embers”

- Most (~60%) homes catch fire in Ember Wash
- Ignite home directly or fuel on home
- Enter home and ignite from inside
- Catch on complex shapes



<https://youtu.be/VNF0PVYQO6I>

Imagine the “Snowstorm” of embers and picture where they’ll land

You can’t really prevent ember wash from happening, but you can make your house ember proof.

Defensible Space / Survivable Space

- *Defensible space* implies that there will be firefighters available to defend your home.
 - Depends on Firefighter Safety & Availability
 - “Putting out the welcome mat for Firefighters, not the fire”
- *Survivable space* means you've completed preparations so your home can survive a fire with no assistance.
 - (You must be prepared to evacuate)



- Firefighters more likely to invest more work
- Firefighters more likely to stay there
- Need to also prep your house for the chance that fire fighters won't be there to defend the structure

Breaking the Fire Triangle



- How do we go about creating the space we need for our home to survive.
- Remove the fuel
- Insulate against heat

What is the Home Ignition Zone?

Two factors create the concept called the Home Ignition Zone (HIZ).

1. The quality of the defensible space
2. The structure's ignitability potential

A home can survive a wildfire by removing ignition sources within the HIZ.

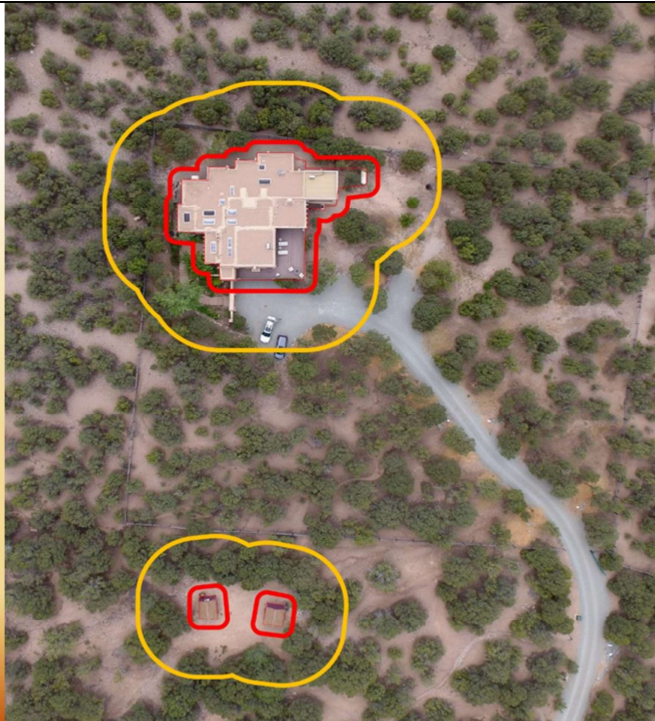


You can create survivable space without creating a parking lot!

- Mitigate these with other desires, like having a nice comfortable home with nice landscaping.
- The HIZ is full of trade offs, but by knowing the risks you can make decisions!

Most Important Areas

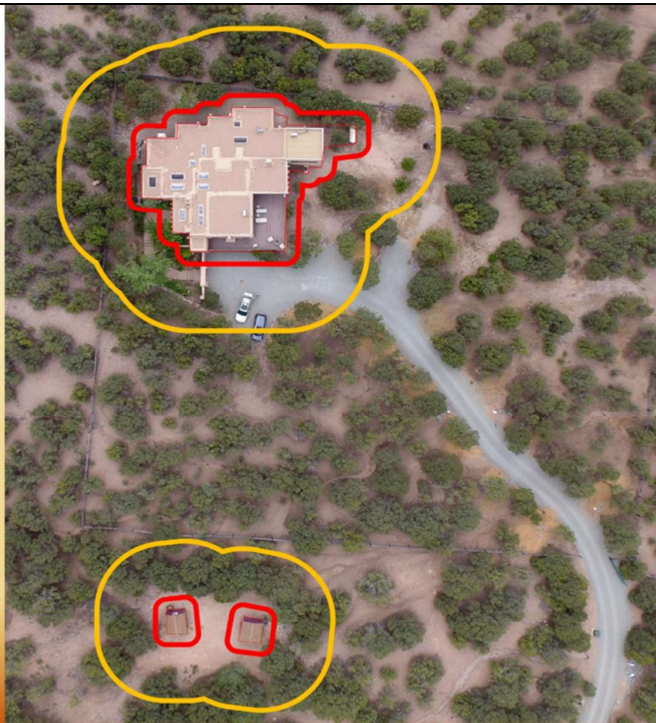
- Home Materials
- First 5 ft
- First 30ft



- Include outbuildings and other structures into the Home Ignition zone!

Within 5 ft

- Prevent flame contact with structure
- Don't provide fuels for embers to ignite



Clean up!



- This is the most important part! Just remove the flammable stuff that has built up over the fall and winter. This is the simplest way to reduce your homes wildfire risk.

**Look for
fine fuels**



Install fire resistant materials in first 5 ft



- Life is full of trade offs!
- Flammable plants and mulch in the first 5 feet make your home vulnerable to fire.
- Mulch and bark is very flammable and receptive to embers

**Type of plants
and spacing
are important**



- The type of fuel and what's around it matter.
- See the Firewise planting guide for NM
- Green leafy plants are less flammable than resinous plants
- If a plant is separated by non-flammable material it also lowers the risk
- The type of fuel and what's around it matter.

Maintenance of landscaping

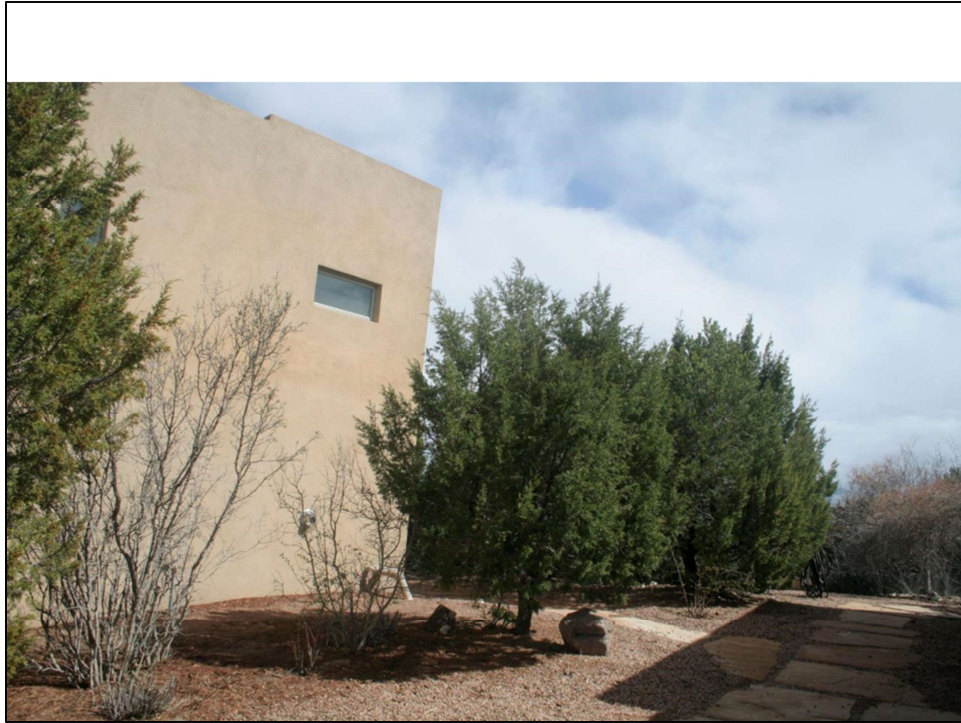


- How your yard is maintained matters.
- Removing fine fuels that might catch larger fuels is a great way to reduce overall risk
- Clean out litter from below you landscaping.

Don't store woodpiles or flammable things in the first 5 ft (or have a plan to move them quickly)



- Don't store or have a plan to move them quickly
- Patio furniture is ok by be able to remove cushions etc.



- Talk about how fire would move through this scene.

Structure Hazards

- Harden Home against both Flames and Firebrands (Embers)
- Construction Materials
- Continual Maintenance



- Keep embers out of structure and have them land on non flammable things.
- NFPA fact sheets.

Roof and Gutters Materials and Fuel Free

Class A

Metal

Asphalt Shingle

Clay Tiles

Concrete

Copper Shingles

Solar Panels



- Even if the covering is non-combustible, there is potential for the underlying materials to ignite if they are exposed. Valleys, Ridges, and Edges are places to pay attention to. These areas can have gaps in non-combustible materials. Complex roofs are areas where debris can accumulate.
- Embers tend to accumulate the same place as debris which completes the fire triangle leading to sustained fire.

Eaves



- Any time there is an overhang, there is an increased risk. Because heat rises, eaves can trap flames and heat. Something is more likely to ignite if it is directly over fire instead of adjacent to it.
- Campfire analogy you place what you want to burn on top of the flames, that's what happens with eaves.
- NFPA fact sheet for construction tips.

Vents

- 1/8th Inch Metal Screening
- Vulcan, Fireguard, Brandguard, O'hagin
- Where does the vent lead?



- Homes are much less ignition resistant on the inside. Drapes, carpet, furniture, and many other things inside a home are flammable. We always want to keep embers outside.
- 1/8 inch may not be completely effective but it keeps the worst out and ensures your home has good ventilation. Tradeoffs...

Walls

Combustible	Non-Combustible
Wood	Large Diameter Wood (Logs)
Vinyl	Treated Wood
Synthetic Stucco	Stucco or Cement Stucco
	Rock
	Metal (proper installation as it conducts)
	Fiber Cement (ex. Hardie Plank)
	Adobe
	Brick or Cinderblock
	Stone

- You can mitigate flammable walls by being extra cautious with ground fuels in that area.

Windows

- Single Pane vs. Double Pane vs. Tempered
- Vinyl vs. Aluminum Screen



- We talked about the importance of keeping embers outside during the vents section.
- Glass breaks because exposed glass expands but the glass in the frame stays cool and the same size.
- Single Pane windows are most likely to crack under extreme temperatures. Double Pane can withstand 2.5 times more energy than single pane.. Tempered is best because it can withstand the greatest temperature difference or 4.5 times more energy than single pane.
- The frame can melt or ignite if it is wood or vinyl and therefore it will cause the window to deform or break.
- If you leave windows open during the summer, consider aluminum screens. While embers will melt through vinyl, aluminum screens have a chance of stopping embers. Furthermore, either type of screen will absorb some energy from radiant heat and prolong the time it takes for a window to break.



- Complex and flammable with small pieces and bark
- Separate from structure with flashing or metal gate



Decks

- Combustible Vs. Non-Combustible Materials
- Solid Vs. Open Construction
- Enclose if possible



- Extend your five foot zone to include the deck.
- Top photo shows embers catching in a deck and igniting the deck.
- Enclose decks if possible to prevent fire from burning underneath the elevated surface. Do not let embers or flaming debris blow underneath a deck during a fire.
- NEVER keep firewood or any combustible material underneath a deck.

**Keep decks
clear of
combustible
debris**



- That debris will catch your deck on fire and then your house.



- **Extend your five foot zone to include the deck.**

Debris

aka your junk

- Door Mats
- Patio Furniture
- BBQ with Propane Tank
- Umbrellas or Awnings

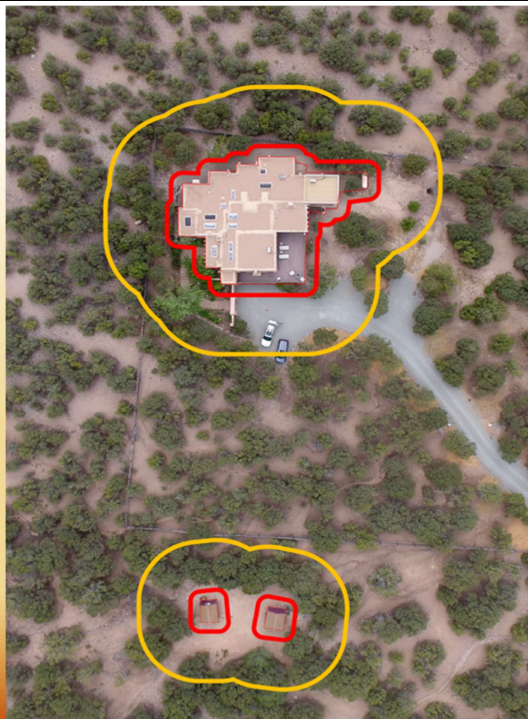


- Think about the snow storm of embers! What will catch fire.
- Don't have to get rid of everything but have a plan to mitigate these. Bring in door mats or patio cushions before you leave etc.



Beyond 5 ft (to 30 ft and beyond)

- Bring Fire to Ground
- Decrease Intensity
 - Flame Length
 - Temperature
- Decrease Speed of Progress
- Make it Safe for Firefighters to be at your home



- 30 ft is about crown fire and max flame lengths so if you keep crown fire out of that area you can do a good job of protecting your home from the worst.

- Ideally no surface fire
- NO crown fire

- *Vertical separation* - Remove ladder fuels and overhanging limbs

- *Horizontal separation* - vegetation separated enough so fire won't spread in crowns

- Choose fire resistant plants



- Have enough space between ground and trees so they won't ignite.
- Have enough space between trees so if one ignites others won't.
- Use picture to illustrate fire.
- None in the front= 5 ft zone
- Surface fire with good spacing
- BAD fire in the back ground, you don't want that next to your home.



- Tree on the right with limbs to the ground is a candidate for crown fire, tree on the right has been pruned so it's unlikely that surface fire would effect it.
- Lilac in the center is close to the house but is a leafy green plant, cleaning out underneath it will help.



- *Vertical separation* - Remove ladder fuels and overhanging limbs
- *Horizontal separation*- vegetation separated enough so fire won't spread in crowns
- As you move further from structure balance ecological forestry with fire risk.



What do we see about this house?

Trailer



Trailer



- Point out 30ft separation
- High fire intensity close to house, use trailer to relate two photos

What do we see about this house?



- Point out 5 ft separation

**Assessment tools
can help you
prioritize.**

Visit
[santafireshed.org/prepare-
your-home](http://santafireshed.org/prepare-your-home)



A Spatial Analysis of Factors Influencing Structure Loss and Survival Resulting from the 2018 Camp Fire in Paradise, California

		Variable	B	Wald	Sig.	Exp(B)	Δ Odds of destruction
Structure type		Mobile home	0.377	6.361	0.012	1.457	46% ↑ in odds
		Multi pane windows	-0.517	18.452	0.000	0.596	40% ↓ in odds
Construction of main building		Resistant siding	-0.172	2.381	0.123	0.842	16% ↓ in odds
		Unscreened vents	-0.890	7.063	0.008	0.410	59% ↓ in odds
		Water storage on property	-0.467	10.541	0.001	0.627	37% ↓ in odds
Yard, lot and associated structures		Wood deck, elevated	0.457	15.790	0.000	1.580	58% ↑ in odds
		Wood deck, grade	0.923	41.540	0.000	2.518	152% ↑ in odds
		Violation: cut grass	0.994	12.706	0.000	2.702	170% ↑ in odds
		Violation: rem. leaves/needles	1.466	15.323	0.000	4.330	330% ↑ in odds
		Constant	0.130	2.238	0.135	1.139	

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- Based on inspection data in California, pre fire, some unexpected data but generally supports the ideas we've talked about today.
- A lot of other factors were tested and rejected.
- For more information see the webinar on the Southwest fire science consortiums webpage.

	Variable	B	Wald	Sig.	Exp(B)	Δ Odds of destruction
Structure type and age	Mobile Home	2.022	134.823	.000	7.557	650% ↑ in odds
	Misc/ Utility Structure	.667	31.357	.000	1.949	95% ↑ in odds
	Built After 2005	-.675	28.295	.000	.509	50% ↓ in odds
	Built between 96 and 2005	-1.081	87.757	.000	.339	66% ↓ in odds
	Improvement value (100k)*	-.003	6.372	.012	.997	0.3% ↓ in odds/\$100k
Construction of main building	Roof Asphalt	.755	55.150	.000	2.128	110% ↑ in odds
	Enclosed Eaves	-.945	108.815	.000	.389	61% ↓ in odds
	No vents in eaves	-1.048	87.601	.000	.351	65% ↓ in odds
	Ignition resistant siding	-.587	53.698	.000	.556	45% ↓ in odds
	Multi pane window	-.408	21.267	.000	.665	33% ↓ in odds
Yard, lot and associated structures	Wood deck at grade	0.27	4.334	0.037	1.31	31% ↑ in odds
	Wood deck elevated	-0.31	10.656	0.001	0.734	27% ↓ in odds
	Veg clearance <30 ft.	.287	11.442	.001	1.332	33% ↑ in odds
	Fence	-.271	11.594	.001	.763	34% ↓ in odds
	Sloped property	.469	27.500	.000	1.598	60% ↑ in odds
	Constant	3.109	472.031	.000	22.399	

- Point out 30ft veg clearance

Actions to Take Today!

- Focus on the 0-5 foot zone
- Focus on flammable materials
- Raking, mowing, and cleaning gutters & roof
- Make sure vents are screened



Other Resources:

- santafefreshed.org/prepare-your-home
- Facnm.org/prepare
 - NFPA fact sheets
 - Fire Wise Planting Guides
 - More!
- NFPA website
- New Mexico State Forestry
 - Ready Set Go your personal plan for wildfire

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Hand out the flyers.