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Defensible Space, Zone Zero, and Urban Heat: Separating Physics from Assumptions

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A Question About Aesthetics

Green.
Shaded.
Irrigated.
Well maintained.
Beautiful.



If Zone Zero Is Implemented...

If vegetation within five feet of structures is removed...
What will these properties look like?



Will They Become Hotter?

- Will canopy be lost?
- Will shade disappear?
- Will temperatures rise?



They Already Comply

Every property just shown already complies with Zone Zero.



Correcting the Premise

Zone Zero DOES NOT EQUAL Wholesale Vegetation Removal
Zone Zero IS ONLY A 5-Foot Ember-Ignition Buffer

A photograph of a residential street at night during a fire. A large fire is burning in the background, illuminating the scene with a bright orange glow. A car is visible in the foreground, and a large tree is on the right side. The air is filled with falling embers.

Urban conflagrations generate billions of embers



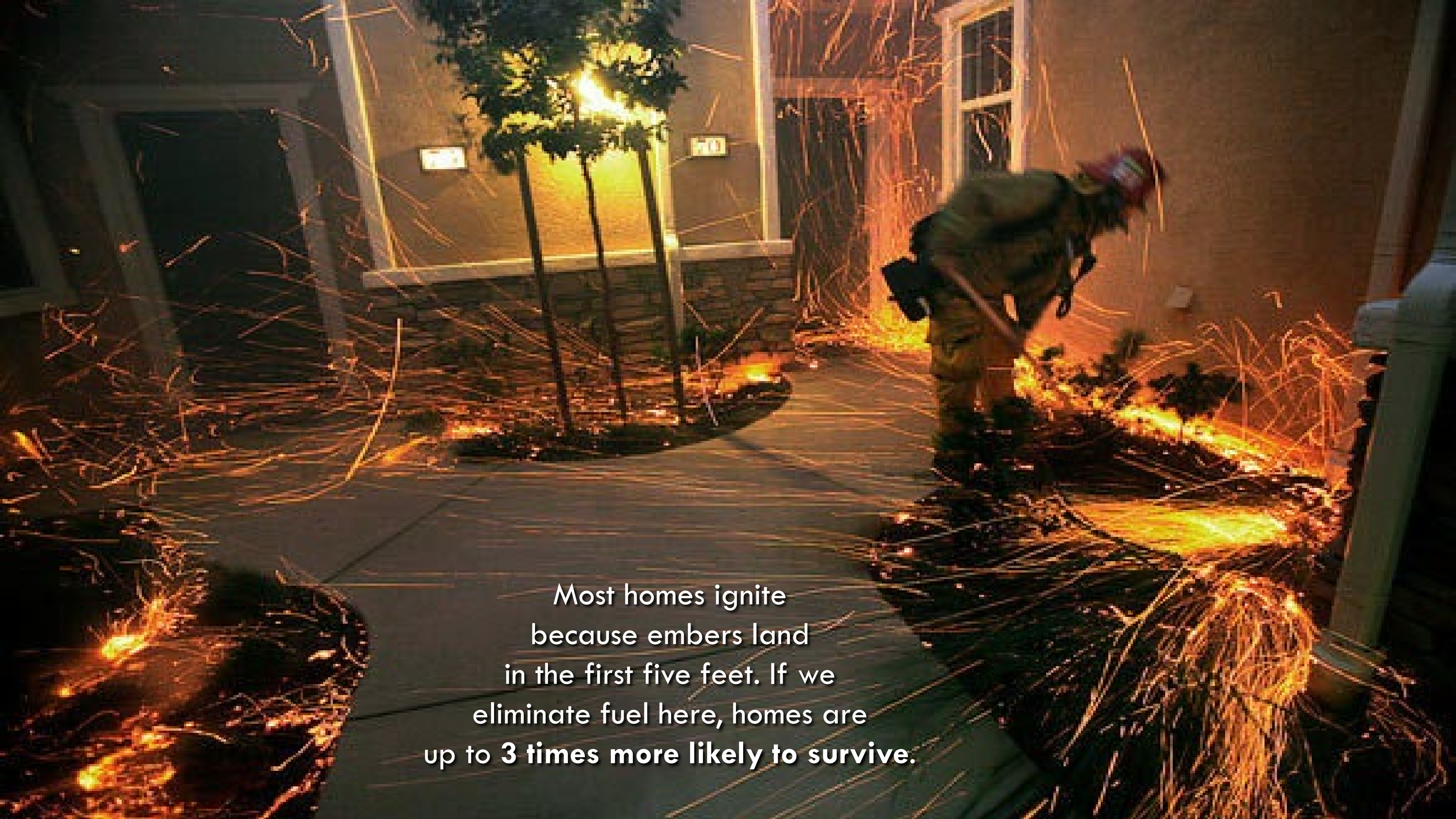
60%-90% of home ignitions are from embers

A firefighter in full gear, including a yellow helmet and jacket, is running across a street towards a large, two-story house. The house is engulfed in flames, with bright orange and yellow fire visible from the roofline. The sky is filled with thick, dark smoke, and the overall scene is illuminated by the fire's glow. A black SUV is parked on the street to the right of the firefighter. In the foreground, there are green and black trash bins and some landscaping. The text "This one ignited from embers..." is overlaid in white on the image.

This one ignited from embers...

A modern, single-story house with a dark grey roof and light blue-grey siding. The house features a large white garage door with four small windows at the top. To the left of the garage is a dark blue door and a window. The house is surrounded by a well-maintained lawn and landscaping, including a gravel bed with several potted plants and a large, ornamental grass plant in the foreground. The sky is clear and blue.

This one will not...

A firefighter in full gear is working on a residential property at night. The firefighter is positioned on a concrete walkway, surrounded by burning brush and debris. In the background, a house is visible with a lit window and a small tree. The scene is illuminated by the fire and the house's lights.

Most homes ignite
because embers land
in the first five feet. If we
eliminate fuel here, homes are
up to **3 times more likely to survive.**

An aerial photograph showing a neighborhood that has been almost completely destroyed. The ground is covered in rubble, charred remains, and debris. Many trees are bare and skeletal, while a few evergreens stand as dark silhouettes against the lighter, desolate landscape. The scene is captured from an elevated perspective, looking down on the devastation. The lighting is soft, suggesting early morning or late afternoon, with long shadows and a hazy atmosphere.

**Hardening a single home isn't enough—
whole neighborhoods need to be ember-
resistant.**



“Zone Zero” Origins

Early 1990s: Concept first introduced by *Ed Smith* (Univ. of Nevada Cooperative Extension, Tahoe Basin).

Late 1990s–2000: *Jack Cohen* develops and publishes the **Home Ignition Zone (HIZ)** framework (*Journal of Forestry*, 2000).

2000s: UC Cooperative Extension promotes the 0–5 ft “*non-combustible zone*.”

2010s: IBHS and NFPA *Firewise USA*® popularize the “*Immediate Zone (0–5 ft)*” concept.

2018: Term “**Zone Zero**” first used in Marin.

1990s–present: PRC 4291 defines **Zones 1 & 2**; Zone 0 fills the missing gap closest to structures.

2015–2025: Real-world validation—over **135,000 homes lost** in western U.S. wildfires—finally provides large-scale data confirming the science behind Zone 0.



Public
Perception VS
Policy Reality



Public fears: *“They’ll make me cut my trees”* or *“I’ll lose my insurance.”*

By this interpretation, PRC 4291 would have resulted in the loss of all canopy from 0-100 feet over the last 50 years. In reality, canopy cover has INCREASED.

Reality:

Zone 0 ≠ tree removal — focuses on noncombustible buffer and stored fuels.

Implementation **supports insurance retention**, not cancellation.

Fire agencies enforce slowly and fairly; insurers act faster but in parallel.

Insurance, Education, and Zone Zero Compliance



Public Misconception:

Homeowners often fear *Zone 0* laws will cause insurance loss — **no evidence supports this.**

Industry Awareness:

Today's Zone 0 originated with **IBHS** and is already integrated into insurance risk models.

Marin Experience:

In **30–60K annual inspections**, **no insurer has ever requested results** from local agencies.

Insurers perform **their own inspections** and set requirements independently.

Enforcement Reality:

Fire agencies require warrants and hearings; insurers can achieve near-instant compliance with a single letter.

Outcomes:

Zone 0 implementation correlates with policy retention and rate stability — never the reverse.



The Framing Question

Will an ember resistant Zone Zero requirement for a limited subset of wildfire vulnerable vulnerable homes increase urban temperatures, particularly in disadvantaged communities? communities?

What Zone Zero Actually Addresses

Primarily removes or relocates:

- Patio furniture
- Recycling & trash cans
- Stored building materials
- Firewood
- Storage under decks
- Combustible mulch
- Items beneath eaves







Fences and Gates

Spread fire to house.



MAR 19

Mulch

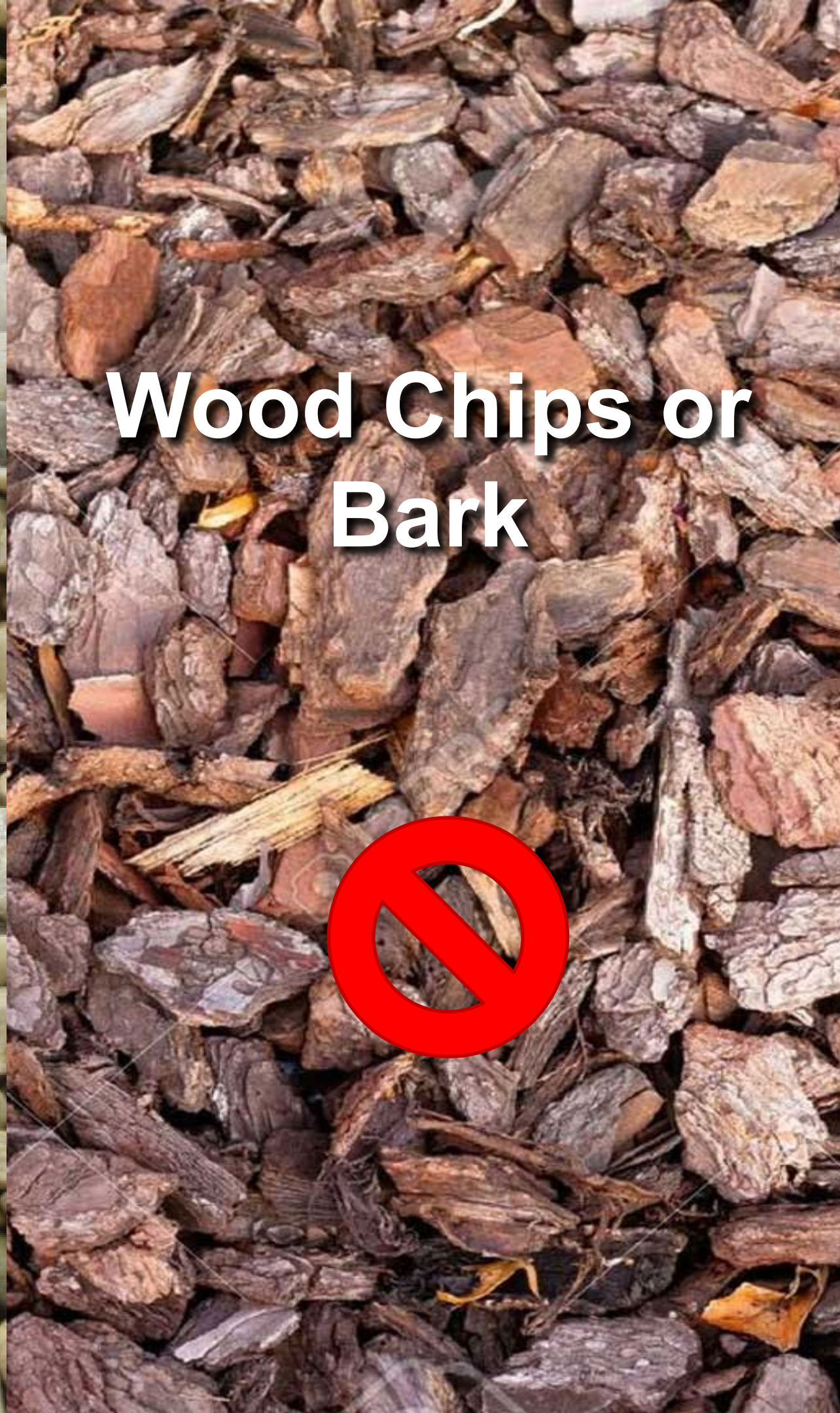
Use only **noncombustible mulches**, such as gravel, decomposed granite, or compost.

Avoid: Bark, “Gorilla Hair”





**Rock or
Gravel**



**Wood Chips or
Bark**



**Shredded
Bark**





Fences and Gates

Prop open driveway, fence, and side gates that attach to house to create a fuel -break.





Fences and Gates

Use noncombustible
materials.





Fences and Gates

Use noncombustible
materials.



Decks and Porches

Use **WIRE MESH** screen to prevent ember entry.





Leaf Litter

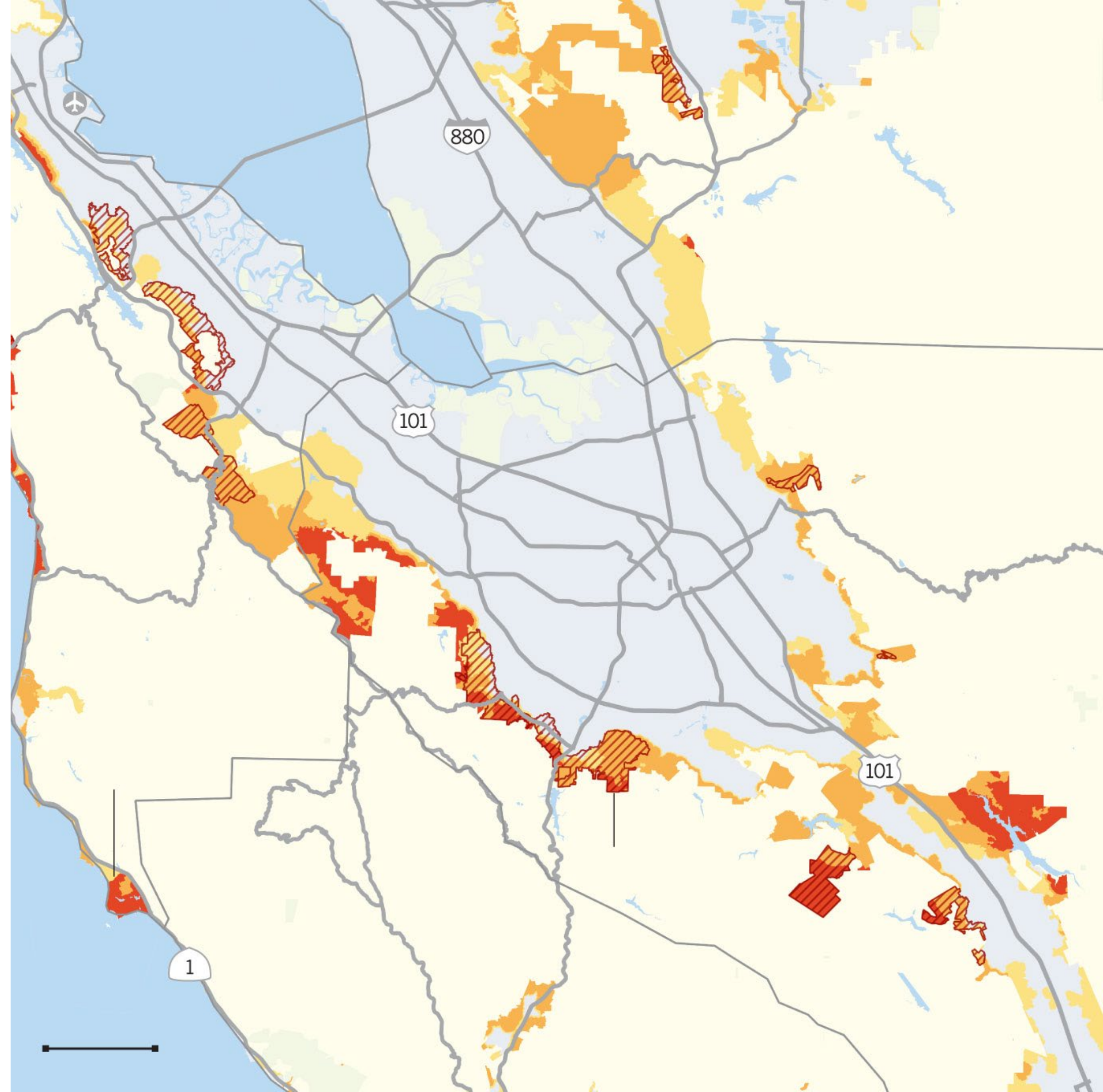
Remove leaf litter regularly, more frequently in the fall.



Geographic Scope

Applies only in: High & Very High Fire Hazard Severity Zones.

Most dense urban areas are not included.



Scale Matters

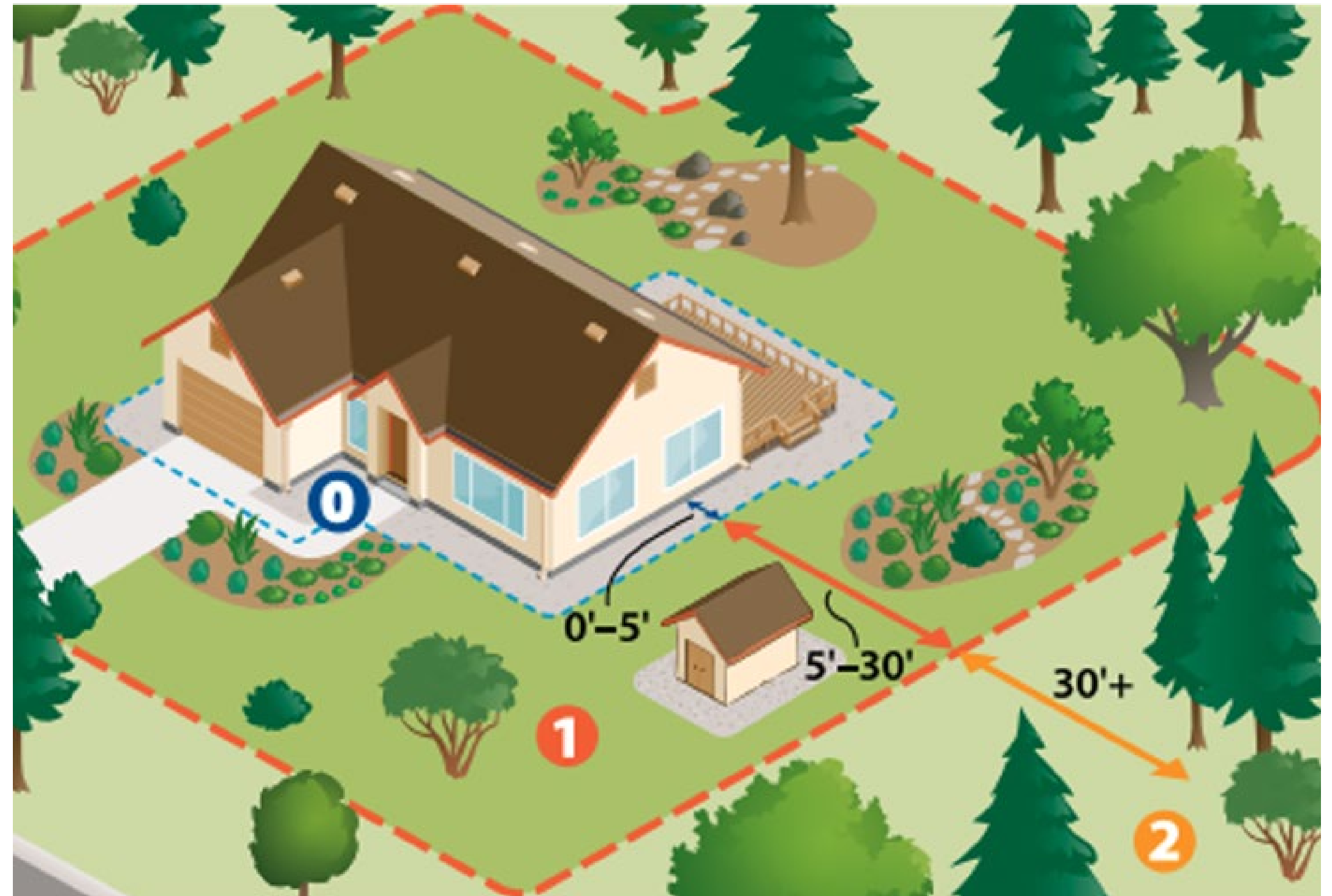
Zone Zero = 0–5 feet from structure

Typically 5–15% of parcel area on small lots

Trees beyond 5 feet remain

Shade remains

Canopy remains



Urban Heat Island Drivers

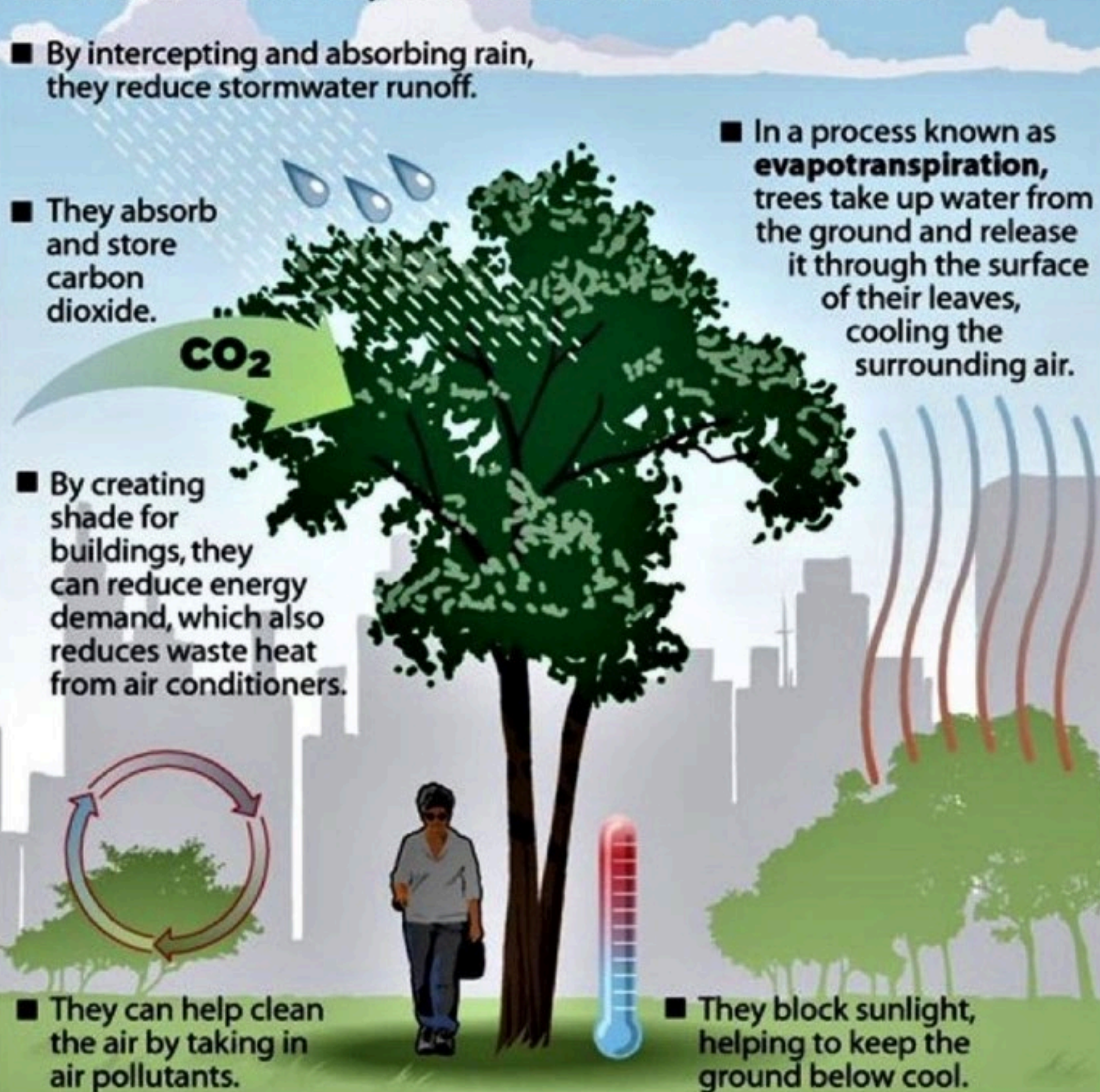
- Pavement
- Roofing materials
- Surface albedo
- Block-scale canopy loss

Ground vegetation within 5 feet does not drive UHI.

Zone Zero is **NOT** about removing trees!

Why Trees Are So Cool

Experts say trees should be considered urban infrastructure, every bit as important and useful as sewage, drinking water and transportation systems. They are an important tool for cities to reduce urban heat island effects. Here are a few ways trees benefit our urban environments:

- By intercepting and absorbing rain, they reduce stormwater runoff.
 - They absorb and store carbon dioxide.
 - In a process known as **evapotranspiration**, trees take up water from the ground and release it through the surface of their leaves, cooling the surrounding air.
 - By creating shade for buildings, they can reduce energy demand, which also reduces waste heat from air conditioners.
 - They can help clean the air by taking in air pollutants.
 - They block sunlight, helping to keep the ground below cool.
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Small Lots & Vulnerability

Small setbacks = highest wildfire risk

- Radiant heat from nearby homes burning
- Direct flame spread
- Fences
- Storage and debris threatens multiple homes

Zone Zero is even MORE important here.

Most common in 0–5 ft zone:

Stored combustibles

Weeds

Deferred maintenance

Woody growth near siding



Environmental Cost of Urban Wildfire

Urban wildfire releases:

Toxic smoke

Carcinogens

Heavy metals

Contaminated runoff

Destroys:

Homes

Infrastructure

Tax base

Housing security



Environmental Justice Reality

Wildfire disproportionately harms disadvantaged communities through:

- Limited retrofit capacity
- Evacuation constraints
- Insurance vulnerability
- Housing displacement

Structure ignition reduction is an equity issue.



Fire-Resilient Landscapes

- Right vegetation
- Right placement
- Right irrigation
- Right maintenance

Green, shaded, compliant landscapes are achievable.



Separating Myth from Physics

Zone Zero is a targeted ignition buffer.

It does not eliminate canopy.

It does not drive urban heat islands.

It reduces structure ignition probability.

