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Wildland-Urban Interface Fire Group

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WUI Definitions

Traditional WUI Definitions

The common conceptual definition of wildland-urban interface (WUI) is the geographical area where human development, including structures and other infrastructure, meets or intermixes with undeveloped wildlands.

The WUI is often further distinguished into two WUI types based on housing densities:

- **Interface:** *High-density development adjacent to undeveloped wildland vegetation.*
- **Intermix:** *Lower-density housing mingled with undeveloped wildland vegetation.*

While these definitions can be useful to identify general areas, they do not focus on the parcel-level details that characterize parcel-to-parcel and structure-to-structure fire spread that is characteristic of many WUI fire disasters.

Scroll

Category	Definition Component	Federal Register	Common Implementation	CAL FIRE
Interface	Conceptual	There is a clear line of demarcation between residential, business, and public structures and wildland fuels; wildland fuels do not generally continue into the developed area	Developed land not dominated (i.e., < 50 %) by vegetation	High-density development adjacent to undeveloped wildland vegetation
	Housing density	≥ 3 structure/ac (741 structure/km ²)	≥ 1 HU/40 ac (6.18 HU/km ²)	>1 HU/20 ac (12.4 HU/km ²) in Moderate, High, or Very High FHSZ
	Population density	≥ 250 people/mi ² (96 people/km ²)		
	Vegetation cover	Structures directly abut wildland fuels	< 50 %	Not dominated by wildland vegetation
	Buffer from wildland	Up to 1.5 mi (2.4 km) from community border	< 1.5 mi (2.4 km) from land with > 75 % vegetative cover	Wildfire susceptible vegetation up to 1.5 mi (2.4 km) from interface
	Infrastructure	Fire protection of the structures from		

Category	Definition Component	Federal Register	Common Implementation	CAL FIRE
		both an interior fire and an advancing wildland fire provided by the local fire department.		
Intermix	Conceptual	There is no clear line of demarcation; wildland fuels are continuous outside of and within the developed area	Developed land dominated (i.e., > 50 %) by vegetation	Lower-density housing mingled with undeveloped wildland vegetation
	Housing density	≥ 1 structure/40 ac (6.18 structure/km ²)	≥ 1 HU/40 ac (6.18 HU/km ²)	1 HU/20 ac to 1 HU/5 ac (12.4 HU/km ² to 50 HU/km ²) or >1 HU/5 ac (50 HU/km ²) when dominated by wildland vegetation, in Moderate, High, or Very High FHSZ
	Population density	(28 to 250) people/mi ² [(11 to 96) people/km ²]		

Category	Definition Component	Federal Register	Common Implementation	CAL FIRE
	Vegetation cover	Structures are scattered throughout a wildland area	> 50 %	Dominated by wildland vegetation
	Buffer from wildland			Wildfire susceptible vegetation up to 1.5 mi from intermix
	Infrastructure	Fire protection districts provide life and property protection and may also have wildland fire protection responsibilities		
Note: HU = housing units				

WUI Definition by SSD and Parcel Size

More specific WUI definitions are established in the HMM by explicitly adding the concept of structure separation distance (SSD). These definitions provide perspective and can help develop effective parcel-level mitigation strategies based on housing density and potential fire exposures.

WUI Type 1 and Type 2:

High-density interface communities with an SSD as small as 6 ft and parcel size of less than 0.5 ac. Type 1 is characterized by Perimeter and Type 2 as Interior WUI community. Significant portions of communities can get consumed in fire even with

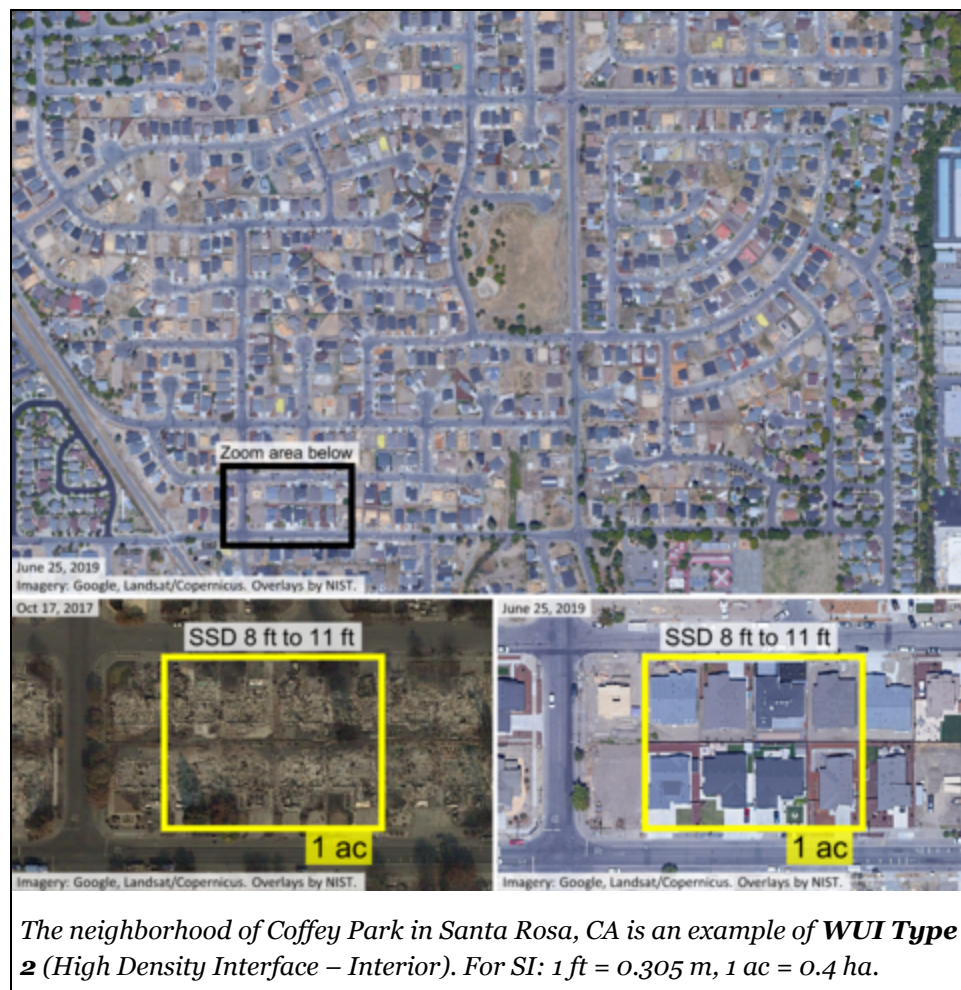
small number of ignitions in such settings.

WUI Type 3, Type 4, and Type 5:

Medium-density construction with SSD ranging from 30 ft to 100 ft with parcel size in excess of 1 ac. Type 3 and Type 4 are characterized as interface and Type 5 as intermix communities.

WUI Type 6 and Type 7:

Low structure density at the interface (Type 6) and intermix (Type 7).





*Scenario B, **WUI Type 4.** Moderate density interface. In some areas there is limited space for auxiliary fuels, shown by the agglomeration on the property boundaries (red highlights). The area highlighted in blue presents reduced impact on residential structures. The lower figures show before and after fire imagery with the actual fire spread pathway highlighted.*



***WUI Type 6.** Low Density Intermix, The Trails, Rancho Bernardo, CA. Note irrigated lawns, long paved driveways, pools and tennis courts. Some structure-to-structure distances are representative of Moderate Density Intermix (lower part of image). Also note limited high density non-irrigated vegetative loading.*

WUI Types classified by structure separation distance (SSD) and typical parcel size.

Type #	WUI Type Name	SSD (ft)	Typical Parcel Size (ac)	Typical Housing Density (struct/ac)
1	High Density Interface – Perimeter	6 ^a to 30	< 0.5	2 to 8 +
2	High Density Interface – Interior ^b	6 ^a to 30	< 0.5	2 to 8 +
3	Medium Density Interface – Perimeter	30 to 100	0.5 to 1+	< 2
4	Medium Density Interface – Interior ^b	30 to 100	0.5 to 1+	< 2
5	Medium Density Intermix	30 to 100	0.5 to 1+	< 2
6	Low Density Interface	100+	1+	< 1
7	Low Density Intermix	100+	1+	< 1

For SI: 1 ft = 0.305 m, 1 ac = 0.4 ha

^a representative of parcels with a 3 ft setback (common for new construction of sprinklered residences)

^b interior of community defined as > 0.25 mi (400 m) from wildlands

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- [◀ HMM vs Traditional Hazard Mitigation \(https://www.nist.gov/el/fire-research-division-73300/wildland-urban-interface-fire-73305/hazard-mitigation-methodology-5\)](https://www.nist.gov/el/fire-research-division-73300/wildland-urban-interface-fire-73305/hazard-mitigation-methodology-5)
- [Structure Survivability in the WUI ▶ \(https://www.nist.gov/el/fire-research-division-73300/wildland-urban-interface-fire-73305/hazard-mitigation-methodology-10\)](https://www.nist.gov/el/fire-research-division-73300/wildland-urban-interface-fire-73305/hazard-mitigation-methodology-10)

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