



# FireSmart™ Landscaping

BCRPA - Parks Professional Pathways

February 28, 2024



*KARLA HOFFMAN*

# Introduction & Overview



- **What** is FireSmart?
- **Who** are affected by wildland urban interface (WUI) fires?
- **When** should we be concerned?
- **Where** should FireSmart activities take place?
- **Why** bother? Does it make a difference?
- **How** does fire spread and intensify?
- **How** do we achieve a FireSmart landscape?
- **Q&A**



# What is FireSmart?



## FireSmart is about living with wildfire and managing for it on our landscapes

FireSmart is the Canadian standard recognized by all provinces and territories.

It's based on National Fire Protection Association (NFPA) standards and has evolved over 40 years.

It's backed by a vast amount of field, laboratory and modelling research.

FireSmart guidelines have proven their legitimacy as measures of hazard.

FireSmart methods have been demonstrated time and time again to reduce the risk of losses, under even the most extreme fire conditions.



# What is FireSmartBC?



- Directed by the BC FireSmart Committee (BCFSC); composed of 12 different agencies.
- Goal to collaboratively maintain and improve the delivery of the FireSmart BC program to better support:
  - Wildfire Preparedness
  - Prevention & Mitigation
  - Recovery

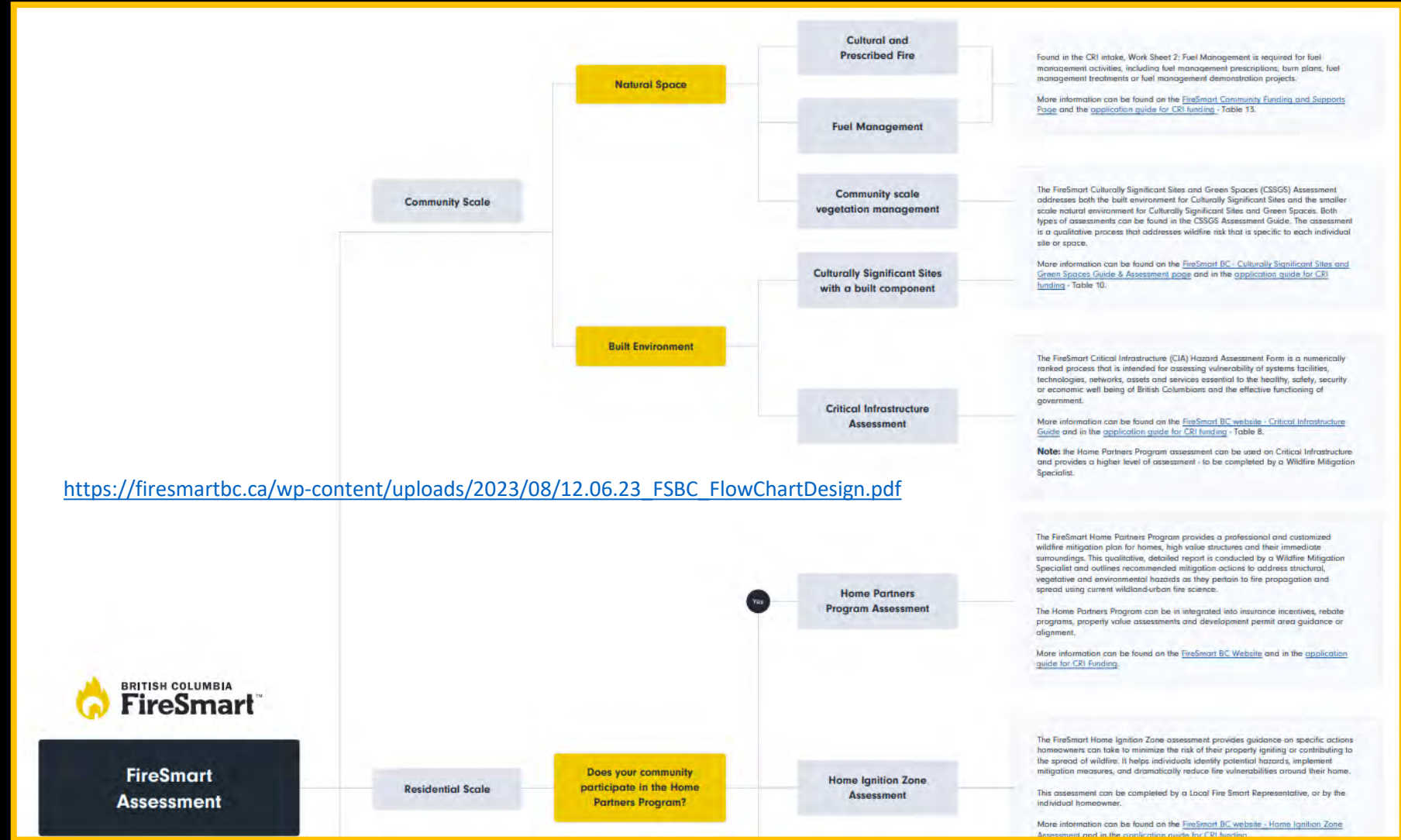


A grid of 12 partner agency logos and names, each with a "Learn More &gt;" link. The agencies are: FireSmart Canada, British Columbia Wildfire Service, Fire Chiefs' Association of British Columbia, BC Parks, First Nations' Emergency Services Society of British Columbia, Forest Enhancement Society of BC, Indigenous Services Canada, Union of BC Municipalities, Emergency Management BC, Ministry of Forests - Regional Operations, and British Columbia Office of the Fire Commissioner.

# Funding



<https://firesmartbc.ca/funding/>



[https://firesmartbc.ca/wp-content/uploads/2023/08/12.06.23\\_FSBC\\_FlowChartDesign.pdf](https://firesmartbc.ca/wp-content/uploads/2023/08/12.06.23_FSBC_FlowChartDesign.pdf)

<https://www.ubcm.ca/cri/firesmart-community-funding-supports>



# What is FireSmart?



The seven disciplines of **FireSmart**:

1. Education
- 2. Vegetation Management**
3. Emergency Planning
4. Cross-training
5. Interagency Cooperation
6. Development Consideration
7. Legislation & Planning



# What is FireSmart Landscaping?



**A FireSmart landscape is an attractive and functional space that is designed, installed, and maintained with the goal of limiting the ignition and spread of fire from landscape materials to structures.**



Source: FireSmart Canada, 2022

# Who are Affected?



2021 Kamloops <https://infotel.ca/news/medialibrary/image/orig-mediaitemid84095-7558.jpg>

**Not just the immediate WUI**



# Who Are affected?



The 2023 wildfire season was the most destructive in British Columbia's recorded history:

- 2.84 million hectares burned
- Tens of thousands of people forced to evacuate
- Hundreds of homes and structures lost or damaged
- B.C.'s most costly insured event ever
  - Okanagan and Shuswap area, Aug. 15–Sept. 25 alone: \$720 million
- Impacts to cultural and ecological values, infrastructure and local economies
- Indirect economic impacts to agriculture, tourism and other weather-dependent businesses
- Unquantifiable impacts to people's health and wellbeing
- Hottest year in over 100,000 years (*European Union's Copernicus Climate Change Service, 2024*)



# When Should We Be Concerned?



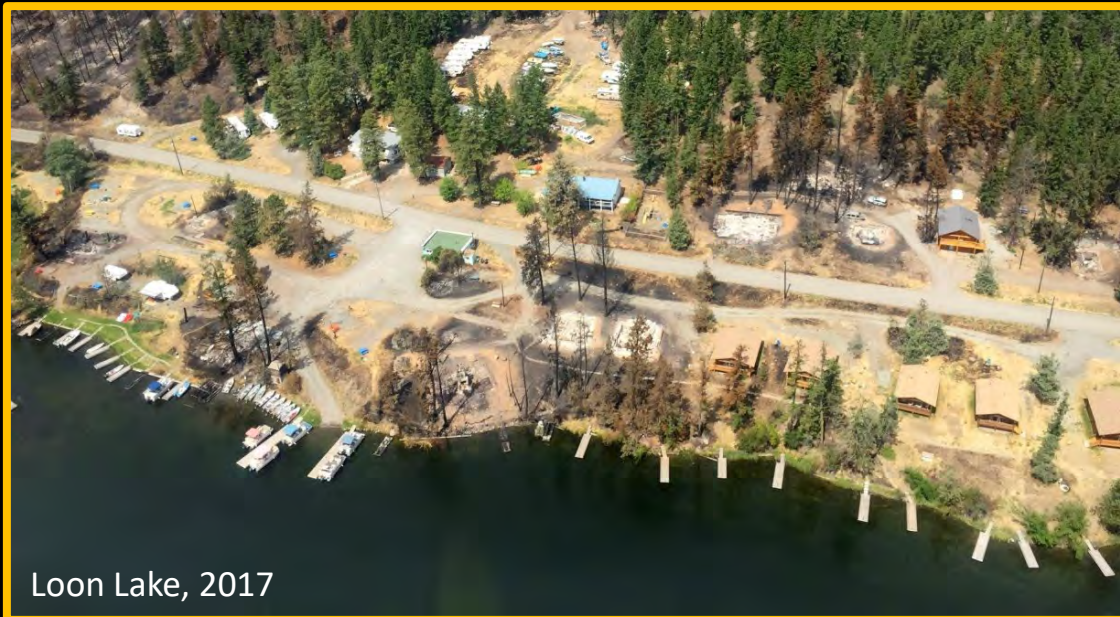
- Planning in all seasons
- Activities before, during, & after fire season



# Why Be Interested?



Provincial Wildfires at a glance - Source: BC Wildfire Service							
7 Years of wildfire	2017	2018	2019	2020	2021	2022	2023
Total wildfires	1,353	2,117	825	670	1,647	1,801	2,245
Hectares burned	1,216,053	1,354,284	21,138	14,536	869,270	135,235	2,840,545
Wildfires of note	70	111	9	6	67	17	60
Evacuation Orders	120	66	No data	No data	181	15	208
Evacuation Alerts	166	124	No data	No data	304	43	386
Suppression Costs	~\$649 million	~\$615 million	~\$182.5 million	~\$193.7 million	~\$718.8 million	~\$411.9 million	~\$817 million*
Structure loss	502	158	No data	No data	527	8	~400*
Total days on a provincial State of Emergency	71 July 07 - Sept. 15	24 Aug. 15 - Sept. 07	N/A	N/A	56 July 21 - Sept. 14	N/A	28 Aug. 18-Sept.14



Loon Lake, 2017



McDougall Creek Fire, West Kelowna, August 17, 2023

# Why Bother? Does it Make a Difference?



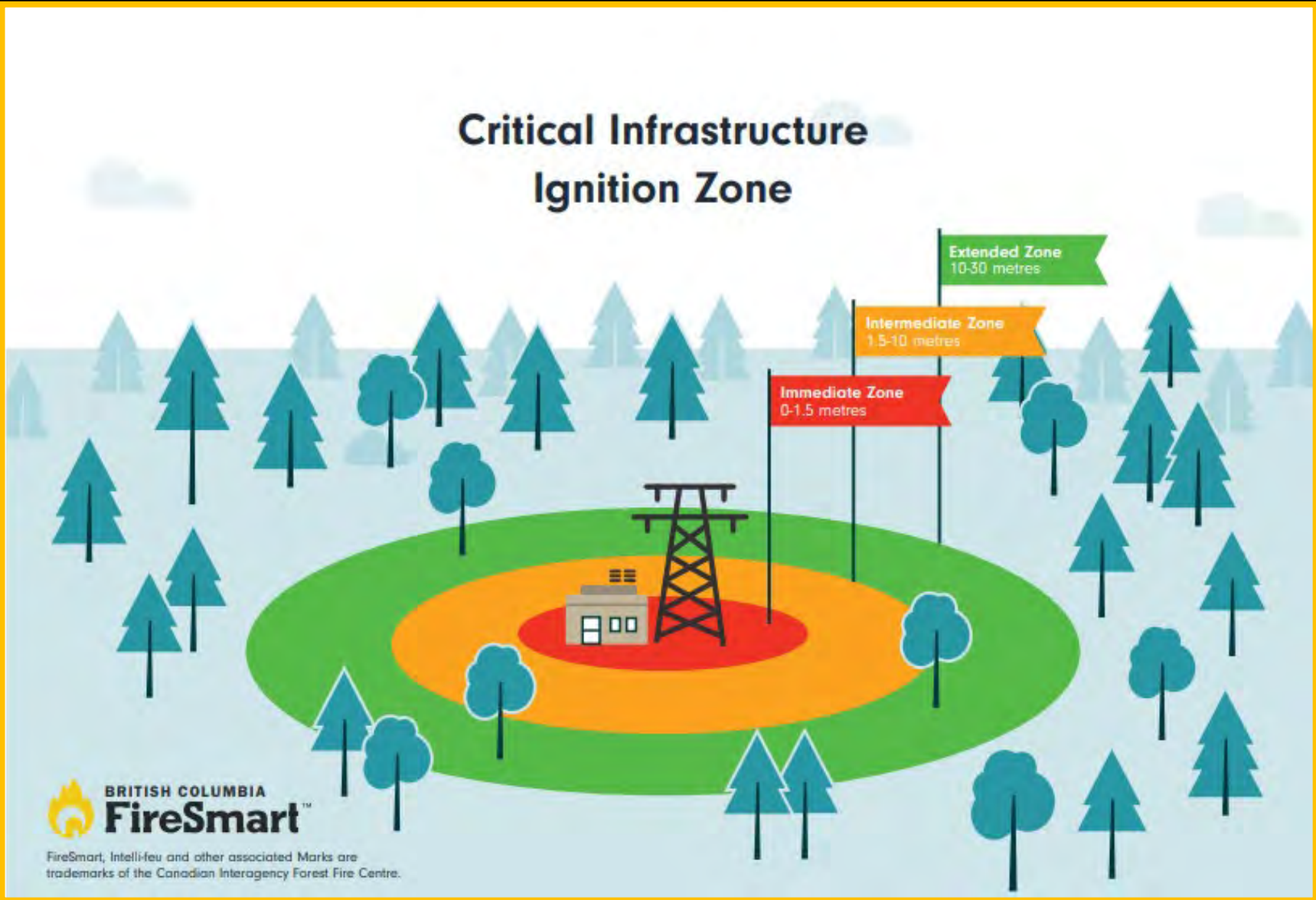
Source: Twitter photo via Jeff Andreas



# Where Should FireSmart Activities Take Place?



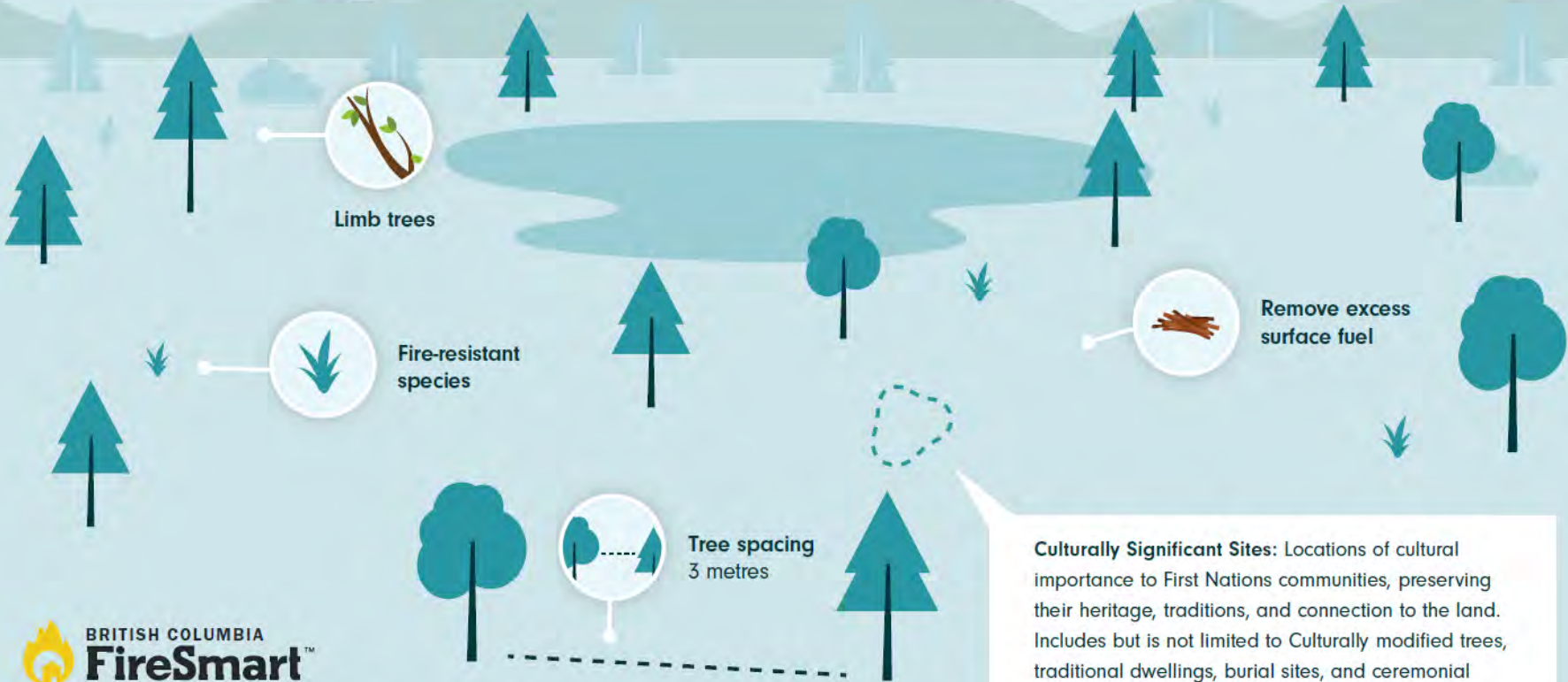
# Where Should FireSmart Activities Take Place?



# Where Should FireSmart Activities Take Place?



## Culturally Significant Site



**Culturally Significant Sites:** Locations of cultural importance to First Nations communities, preserving their heritage, traditions, and connection to the land. Includes but is not limited to Culturally modified trees, traditional dwellings, burial sites, and ceremonial sites.



FireSmart, Intelli-feu and other associated Marks are trademarks of the Canadian Interagency Forest Fire Centre.



# Where Do Embers Land?

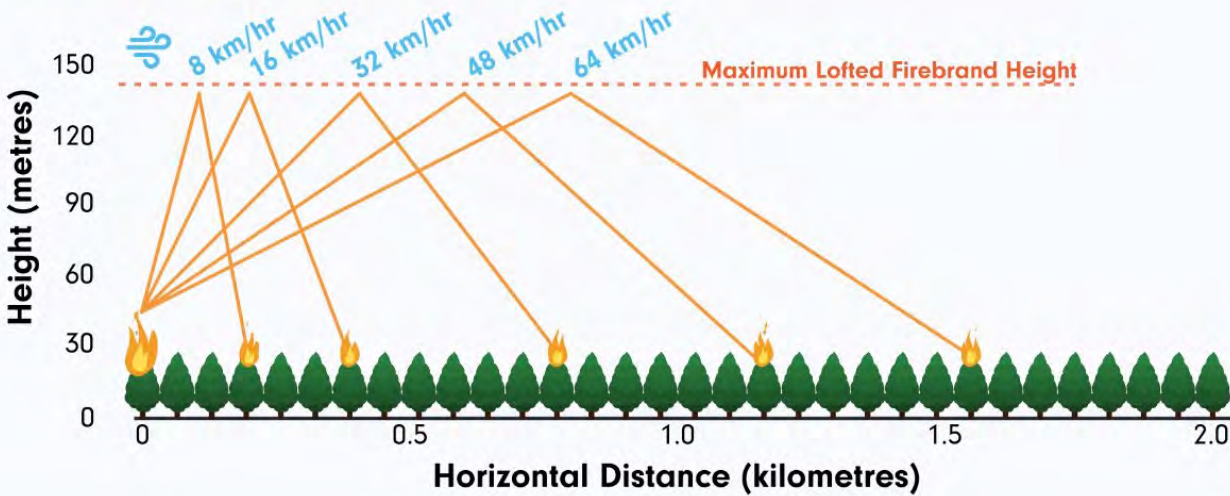


Creek Fire, Huntington Lake, Calif. 2020 (Eric Paul Zamora/The Fresno Bee via AP)



2km spotted firebrands, Adams Lake Complex, 2023

## Spotting Distance



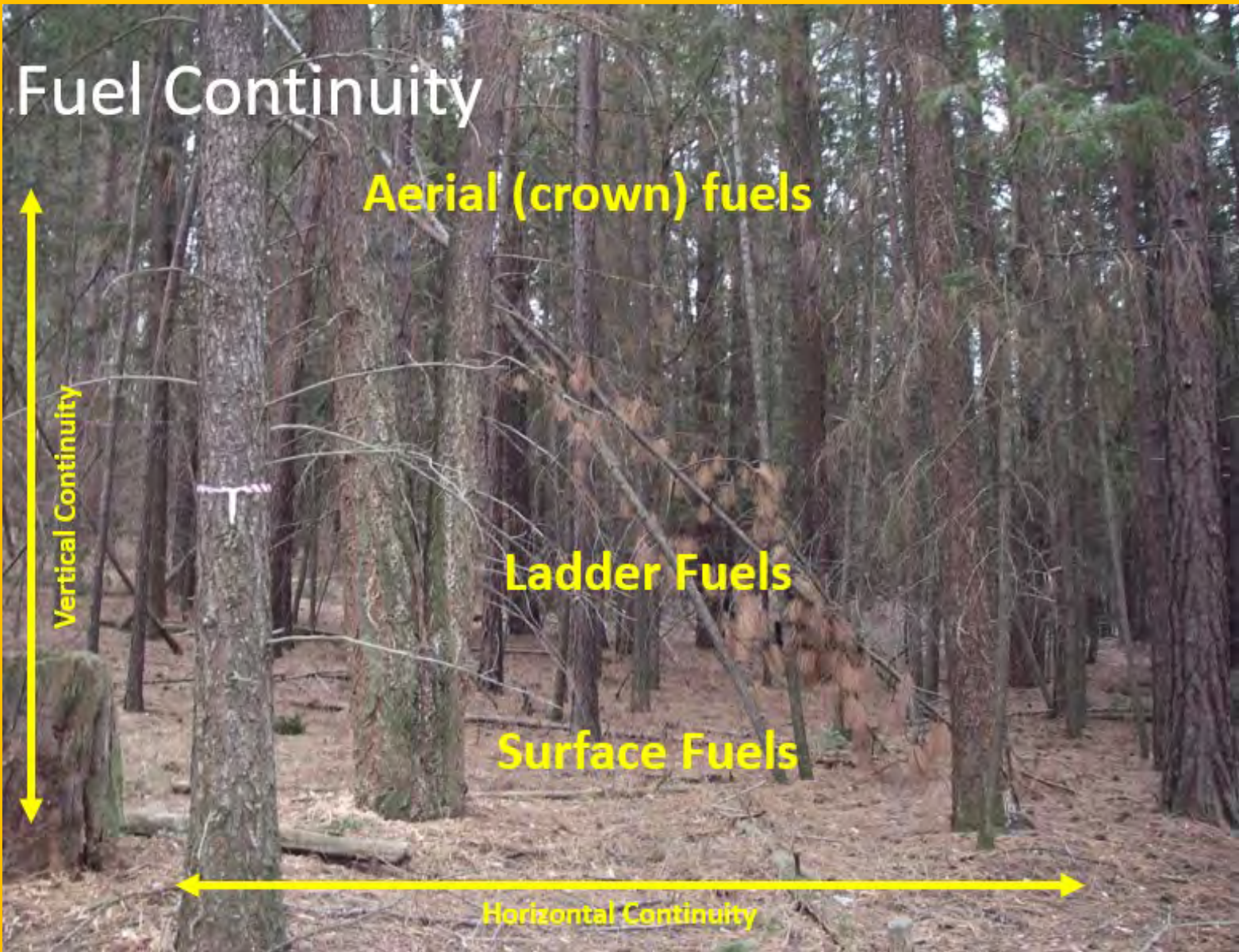
Structure protection failure due to firebrands, Adams Lake Complex, 2023



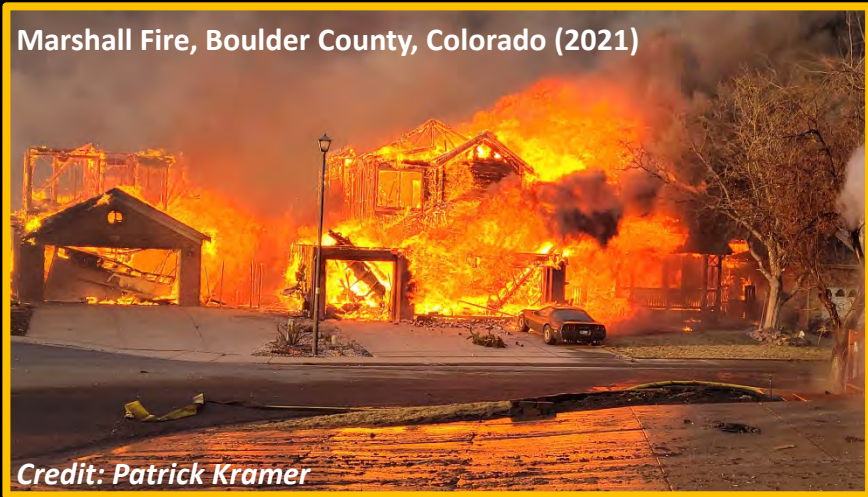
# Where? Ember Research



# Where? The Natural environment



# Where? The built environment



Marshall Fire, Boulder County, Colorado (2021)

Credit: Patrick Kramer



# Where? Immediate Zone 0 - 1.5m



- Includes combustible surface fuels, vegetation and other materials within 1.5m of a structure:
- Creates a pathway for fire to spread to the structure
- Provides ember receptors
- Creates radiant heat and further ember production



# Where? Intermediate Zone 1.5 – 10m



Surface fuels and flammable vegetation within 10m (33 ft) of a structure present a significant hazard, providing a potential:

- Pathway for fire to spread to the structure
- Become a significant radiant heat source
- Create short-distance ember production



# Where? Extended Zone 10 – 30m & beyond



Mitigated both wildland fuels and built/domestic fuels within 30m (100ft):

- Reduce fuel loading and ‘jackpots’
- Remove ladder fuels, suppressed, dead or diseased trees
- Break up fuel continuity vertically and horizontally
- Remove or store clutter away from structures and vegetative fuels



# How? Understanding Fire



## Fire behaviour is affected by:

### Fuel

- Moisture content
- Size
- Continuity

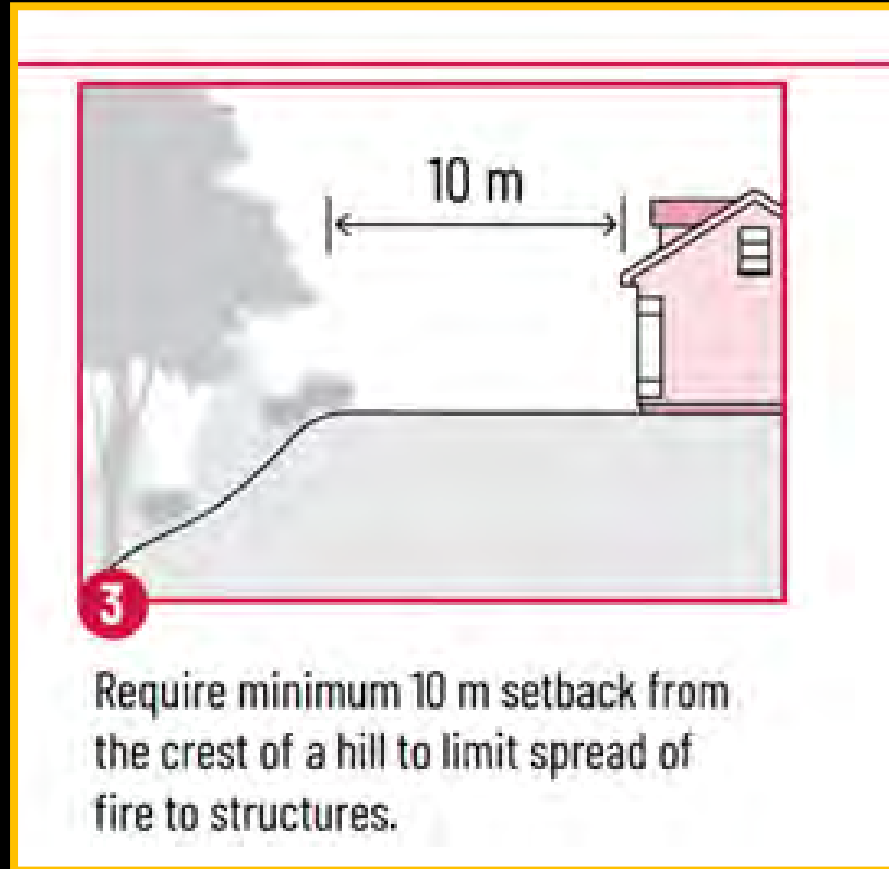
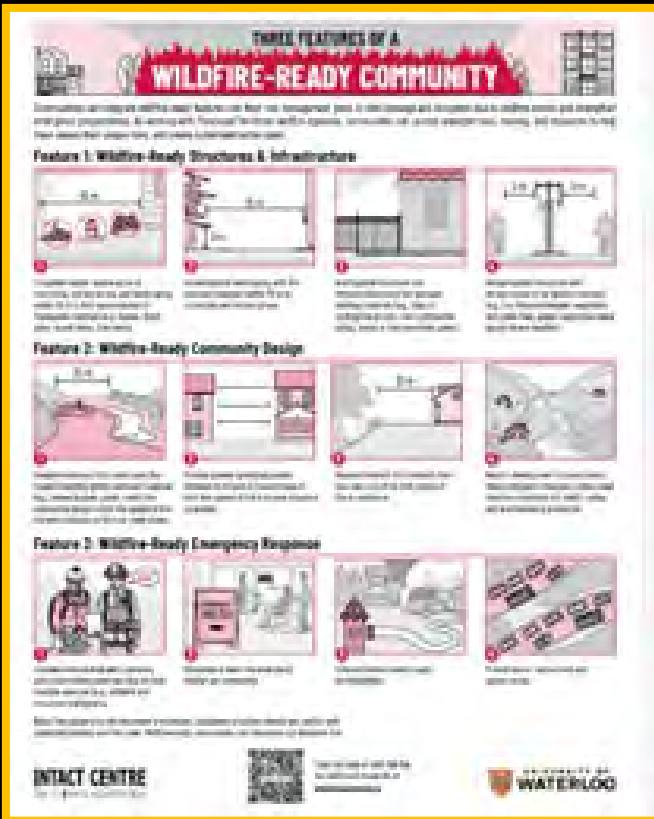
### Weather

- Wind
- Temperature
- Humidity

### Topography (the shape of the landscape)

- Slope
- Aspect
- Terrain

# How? Understanding Fire



**Require minimum 10 m setback from crest of a hill.**  
Require home/structure setback of no less than 10 m from the crest of a hill.

Require greater setbacks for structures on moderate (5-15%) to steep (15%+) slopes.

Where a 10 m setback is not possible, increase the fire-resistant requirements for the exposed building face.

Evans, C., Bonada, A., & Feltmate, B. (2023). Wildfire-Ready: Practical Guidance to Strengthen the Resilience of Canadian Homes and Communities. Intact Centre on Climate Adaptation, University of Waterloo.

<https://www.intactcentreclimateadaptation.ca/wildfire-ready-practical-guidance-to-strengthen-the-resilience-of-canadian-homes-and-communities/>





# How? Design Considerations



## Create Fuel Breaks

- Maintain at least 3m of space between the canopy of evergreens
- Use decorative rock, pathways, retaining walls
- Design ponds and streams
- Plant and maintain a healthy lawn

# How? Design Considerations



## Minimize fuel ladders:

- Tall grasses
- Shrubs
- Tree branches (both living and dead)

### Ladder Fuels and Continuity



Smith, E. 2005, Fuel Management Terms for Homeowners, Extension | University of Nevada, Reno

# How? The Bigger Picture



There are many sustainable messages out there

- Pollinators
- Birds and wildlife – from attracting to repelling
- Native plants
- Invasive species
- Edible landscaping
- Water conservation or xeriscaping
- **FireSmart**



**They can be compatible!**

# How? Plant Selection



## Highly Flammable Plants

- Fine dry dead material within the plant
- Plant parts contain volatile waxes, resins or terpenes
- Leaves are aromatic
- Gummy, resinous, odorous sap
- Loose papery bark



# How? Plant Selection



## Fire Resistant Plants

- Moist supple leaves
- Little dead wood or material within the plant
- Water-like sap with little or no odour
- Low amount of sap or resins

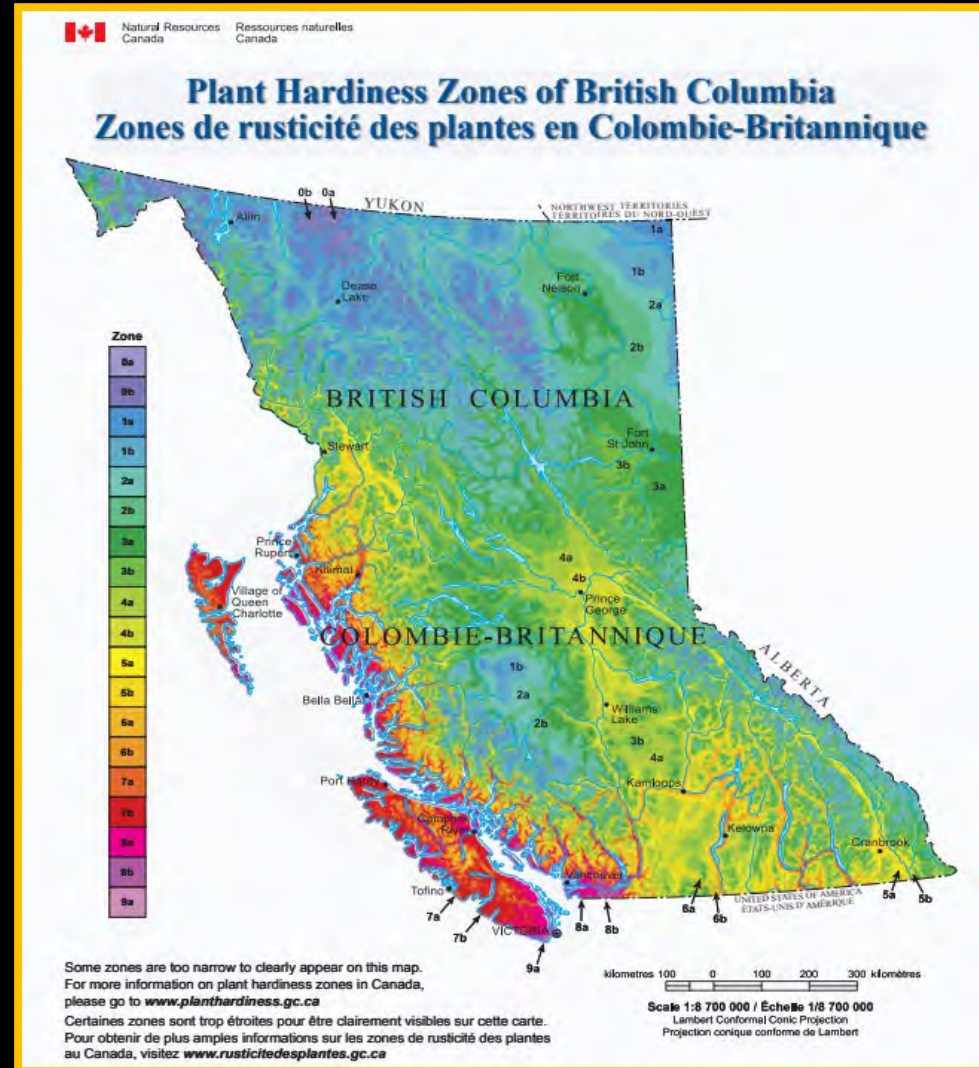


# How? Plant Selection – WHAT is Planted



## FireSmart Plant Program

Perennials & Biennials		Water Use Category				Attracts Pollinators
Common Name	Scientific Name	Very Low	Low	Medium	High	
Alfalfa	<i>Medicago sativa</i>		💧			
Aster	<i>Aster spp.</i>			💧		🐝
Balloon Flower	<i>Platycodon grandiflorus</i>			💧		
Basket of Gold	<i>Aurinia saxatilis</i>		💧	💧		
Beardtongue / Penstemon	<i>Penstemon spp.</i>		💧			
Beebalm (Native) / Wild Bergamot	<i>Monarda fistulosa</i>		💧			🐝
Bergenia	<i>Bergenia cordifolia</i>				💧	
Brown-eyed Susan	<i>Rudbeckia fulgida</i>			💧		🐝
Black-eyed Susan	<i>Rudbeckia hirta</i>			💧		🐝
Blanket Flower	<i>Gaillardia sp.</i>		💧			🐝
Blue Vervain	<i>Verbena hastata</i>			💧		
Boneset	<i>Eupatorium perfoliatum</i>			💧		
Canadian Violet*	<i>Viola canadensis</i> *				💧	
Candytuft	<i>Iberis sempervirens</i>			💧		
Catmint (Short-Stalked)	<i>Nepeta subsessilis</i>		💧	💧		🐝
Chives	<i>Allium sp.</i>		💧	💧		
Columbine	<i>Aquilegia sp.</i>			💧		🐝
Common Harebell	<i>Campanula rotundifolia</i>			💧		
Coneflower	<i>Echinacea spp.</i>			💧		🐝
Coral Bells / Heuchera	<i>Heuchera sanguinea</i>		💧	💧		
Coreopsis, Dwarf Mouse Ear	<i>Coreopsis auriculata</i> var. <i>Nana</i>		💧			
Coreopsis, Tickseed	<i>Coreopsis sp.</i>		💧			
Cranesbill, Blood-red	<i>Geranium sanguineum</i>			💧		



<https://firesmartbc.ca/landscaping-hub/fire-resistant-plants/>

# How? Plant Selection



Clover: green lawns with less watering



# How? Plant Selection

## Leaf types

- Deciduous
- Conifers
- Broadleaf evergreen





# How? Plant Selection



Where it is planted

Fire Behaviour

- Flame height
- Fire intensity
- Flame angle
- Embers



# How? Plant Selection



Screening & privacy



# How? Plant Selection



Screening & privacy



# How? Mulching



## To reduce fire risk:

- Choose non-combustible mulch for areas next to structures
- **MATURE** compost is relatively low risk for the intermediate zone
- May use bark or other organic mulch away from structures

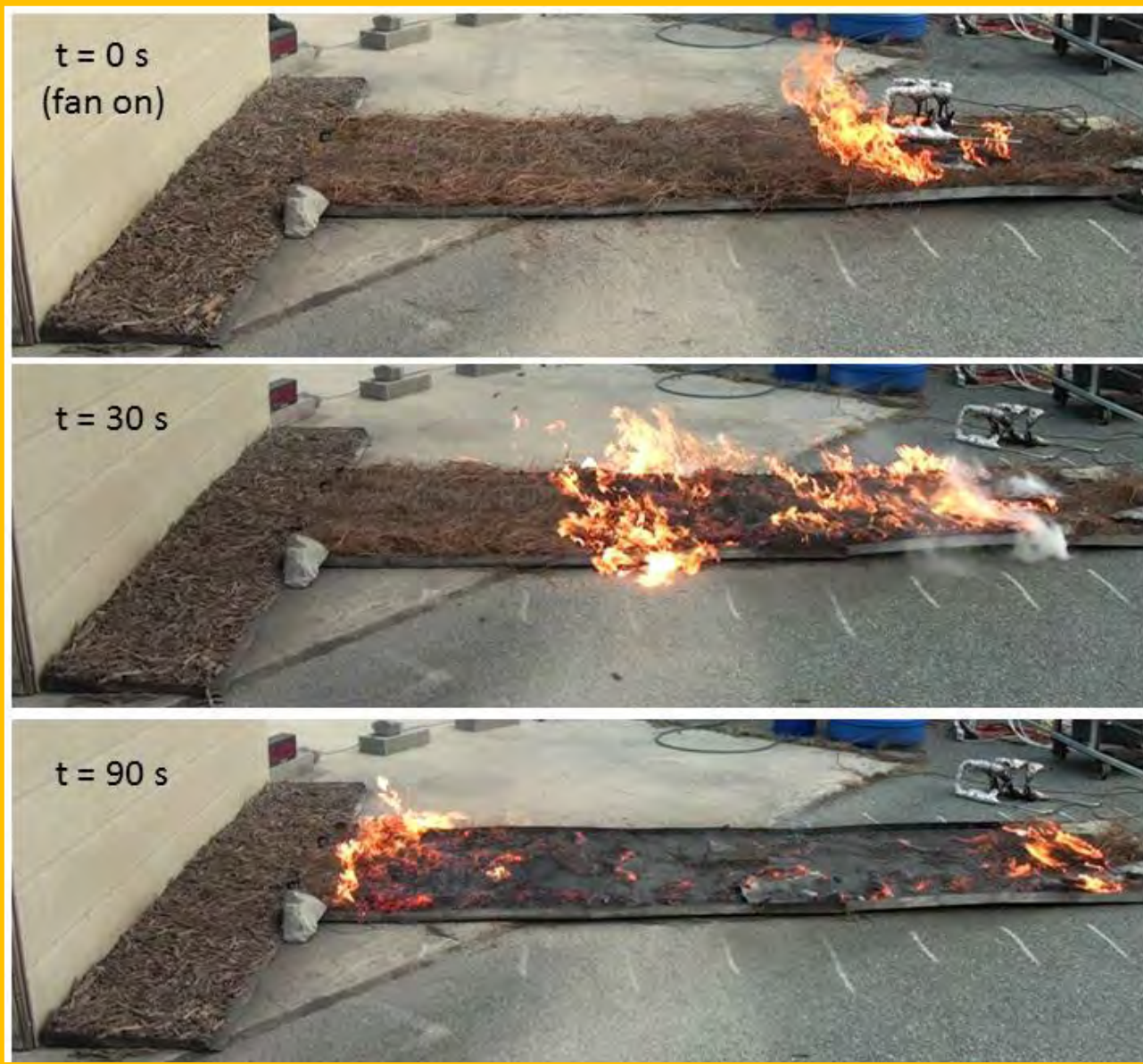
# Mulch & Fire



# Mulch & Fire



Pine Needles



**National Institute of Standards and Technology (NIST) Technical Note 2228 Wind-Driven Fire Spread to a Structure from Fences and Mulch**

This publication is available free of charge from:  
<https://doi.org/10.6028/NIST.TN.2228-upd1>



# Fences & Fire



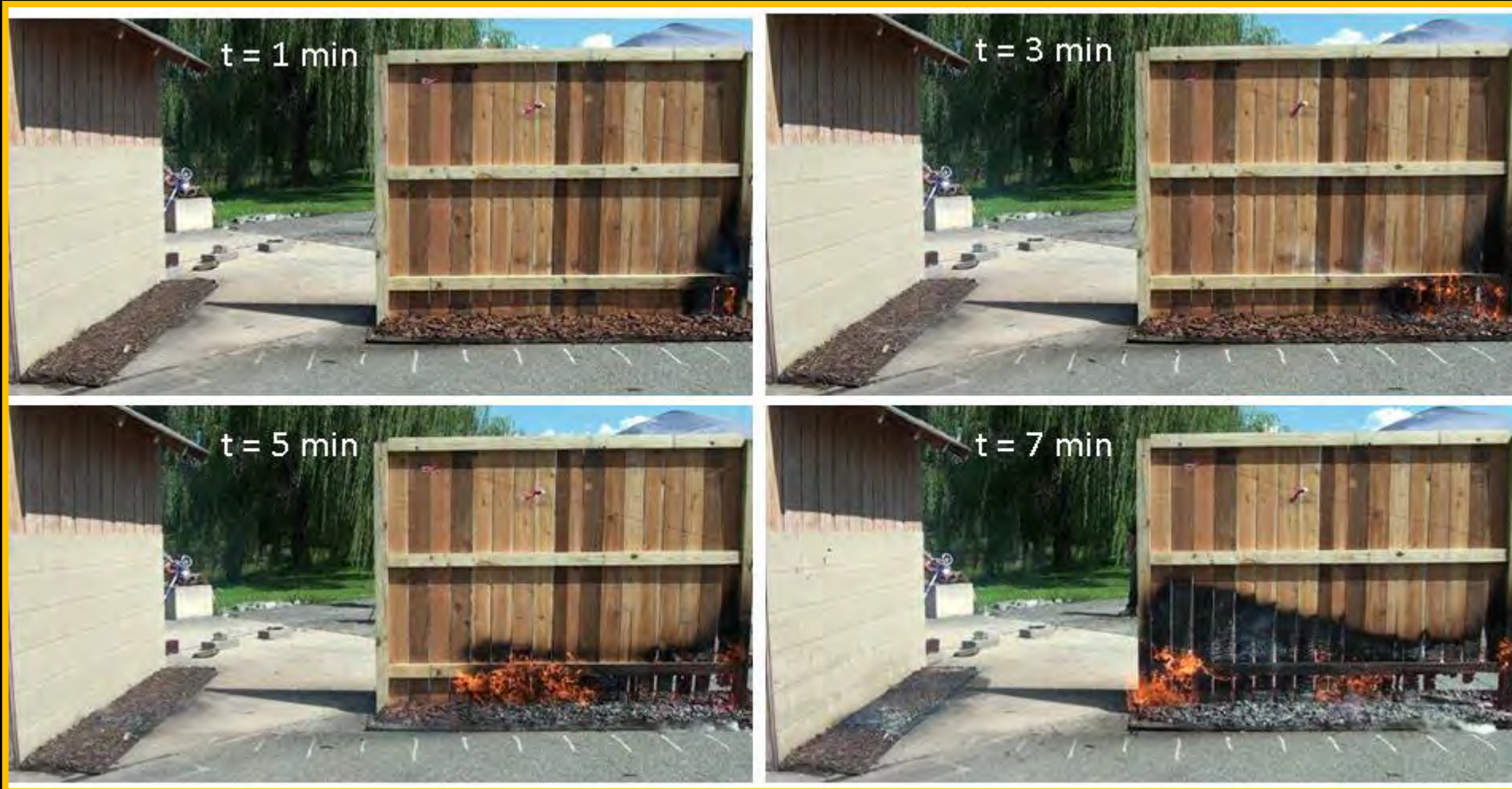
Fence burning in Magalia, California during Camp Fire, 8 November 2018. Photographs taken two minutes apart. CAL FIRE

**National Institute of Standards and Technology (NIST) Technical Note 2228  
Wind-Driven Fire Spread to a Structure from  
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# Fences, Mulch, & Fire



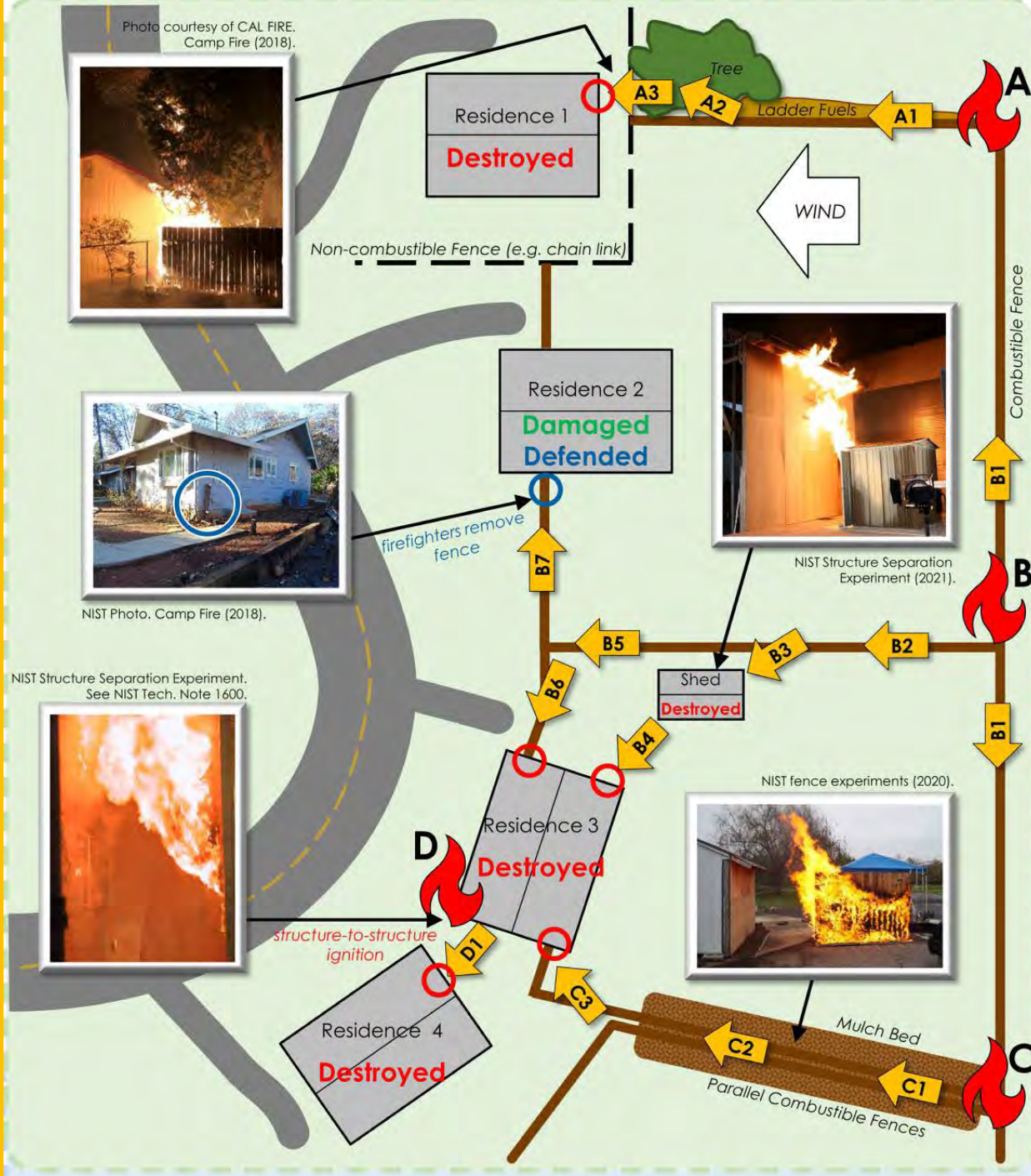
Time sequence for WRC privacy fence and PB mulch in medium wind speed.

National Institute of Standards and Technology (NIST) Technical Note 2228  
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# Fences, Mulch, & Fire



Embers can bring fire into communities. Once fire has started, fire spreads along multiple pathways:

- A:** Spot fire ignites fence, burning along ladder fuels (A1) to larger vegetation (A2), and ignites Residence 1 on adjacent parcel (A3).
- B:** Fence ignition propagates fire on multiple parcels (B1, B2). Fence ignites shed (B3). Exposures from shed and fence ignite Residence 3 (B4, B6). Fence ignites Residence 2 (B7). Defensive actions save Residence 2.
- C:** Parallel fences on adjacent parcels exponentially intensify fire exposure (C1, C2) which ignites Residence 3 (C3).
- D:** The exposure from burning Residence 3 ignites Residence 4 (D1).






## National Institute of Standards and Technology (NIST) Technical Note 2228 Wind-Driven Fire Spread to a Structure from Fences and Mulch

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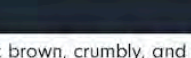
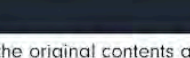
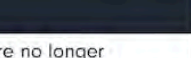
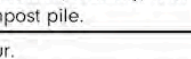


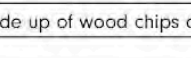
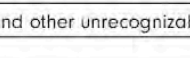
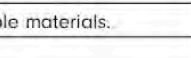
# Mulches and Fire Risk



FireSmart  
Plant Program

Colour Key	
	Very Low Risk
	Low Risk
	Moderate Risk
	High Risk
	Extremely high Risk

Levels of risk are based on the combined results from research regarding: ignition probability, flame height, rate of spread, and temperature.

Mulch Materials		Home Ignitions Zones		
		Immediate (0-1.5 m)	Intermediate (1.5-10 m)	Extended (10-30 m)
Inorganic	Rock, gravel, shale, stone, lava, etc. The inorganic materials noted will not burn, however combustible debris such as leaves could accumulate on the surface and ignite.			
Organic	Mature Compost			
	Composted Bark/Wood			
	Bark Nuggets			
	Medium Bark Mulch			
	Raw Wood Chips			
	Pine Needles			
	Shredded Cedar			
Shredded Rubber				

Description of Organic Mulch Materials	
<b>Mature Compost</b>	Formerly living plant materials that have decomposed to the point of being dark brown, crumbly, and the original contents are no longer recognizable. Not typically commercially available, but found in a backyard compost pile.
<b>Composted Bark/Wood</b>	Bark and/or wood pieces that have partially decomposed and are dark in colour.
<b>Bark Nuggets</b>	Bark pieces that are predominantly about 2.5 cm in diameter, with a portion made up of wood chips and other unrecognizable materials.
<b>Medium Bark Mulch</b>	Undecomposed bark mulch pieces of varying sizes.
<b>Raw Wood Chips</b>	Undecomposed or freshly chipped tree pieces, often a product of arborist operations.
<b>Pine Needles</b>	Made up mostly of pine needles of varying lengths with a small amount of other woody debris.
<b>Shredded Cedar</b>	Cedar wood that has been shredded into stringy, fibrous material, with a small portion of wood chips.
<b>Shredded Rubber</b>	Recycled rubber that has been processed to mimic wood mulch products.

This chart is meant to be a general guide and is based on research done to date. Research is ongoing and additional information will be provided when available. Please take into consideration the risk of wildfire to your individual property and follow all FireSmart landscaping best practices.

# How? Maintenance



- Keep all plants healthy - unhealthy plants are a greater fire risk
- Remove dead plant material - whole plants, or branches and leaves from living plants
- Prune all lower tree branches 2.0 metres from the ground



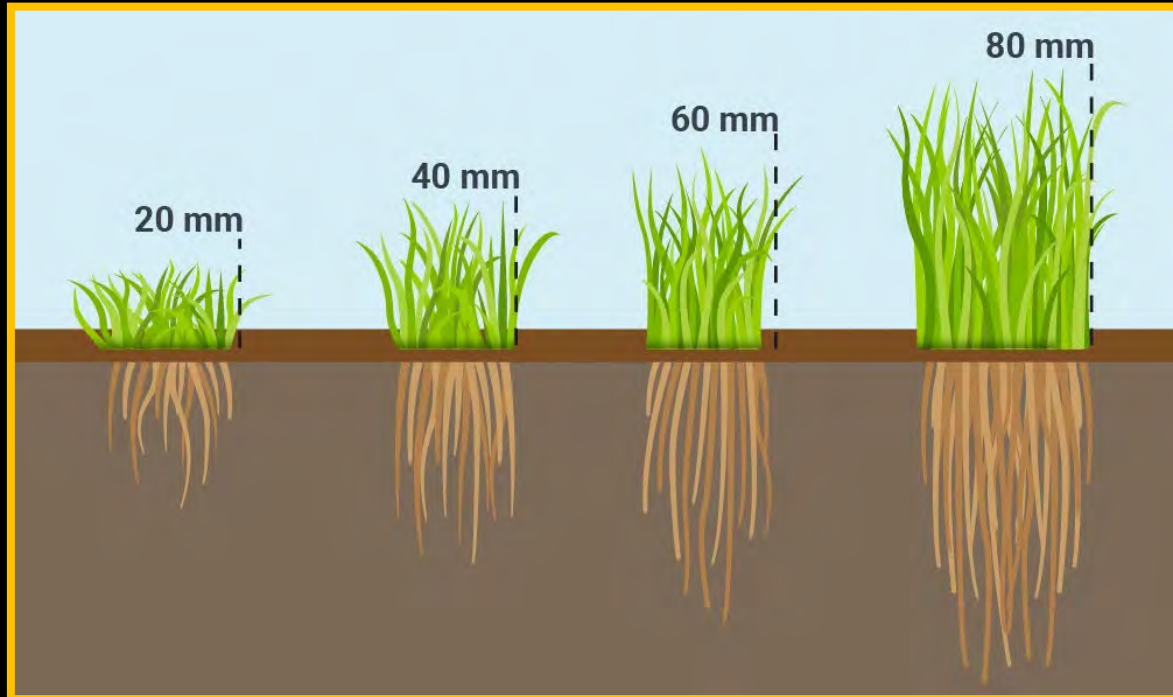
# How? Maintaining Healthy Lawns



Water properly – dry grass has higher flammability potential



Keep grass cut below 10 cm – less likely to burn intensely



# Signage



<https://firesmartbc.ca/resource/brand-guidelines/>



# Learn More – FireSmart Landscaping Course



## Goal

Meet the need for standardized training for FireSmart landscaping.

## Objectives

**Raise awareness** of FireSmart landscaping with industry professionals

**Make the business case** for promoting FireSmart landscaping services to clients

**Train landscaping professionals** to provide FireSmart landscaping services to clients

**Empower trainees to promote** FireSmart Landscaping to property owners and managers



Grouse Fire Complex, August 2023

# Who Will Take the Course?



## Landscape Professionals - Do & Promote the Work

- Landscape horticulturists,
- Landscape and horticulture technicians,
- Contractors,
- Landscape architects,
- Landscape designers,
- Arborists,
- Horticulture students,
- Environmental students,
- Master gardeners,
- Nursery producers/growers/retailers, and
- Parks and forestry staff.

## Community Champions- Promote the Work

- Insurance professionals,
- Realtors,
- Property appraisers,
- Home inspectors,
- Mortgage lenders,
- Canadian Red Cross and other non-governmental organizations,
- Government (local, provincial, federal governments and Indigenous rights holders),
- Property managers,
- Home Builders, and
- Media outlets.

Successful *FireSmart* landscaping reduces the risk of ignition while maintaining a functional and enjoyable space.





# Stay in Touch

# Thank You!

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