



What kind of environmental transition for the Mediterranean region?

Wildfire management adaptation to climate change: the challenges, the needs, and the barriers

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October 14th-16th, 2019, Marseille, France

October Fires , Portugal, 2017



46 fatalities

Pedrogão Grande , Portugal, 2017



66 fatalities

100 fatalities



Mati, Greece, 2018

The challenge

Wildfires are a major hazard in Mediterranean Europe and increasingly so in Central, Eastern and Northern European countries.

Areas at risk from wildfires are projected to increase by 200% in Europe by the end of the 21st century, due to:

- climate change
- development of urban areas in the vicinity of forest areas
- landscapes more fire prone

There is a limit in our capacity to deter fires, particularly when conditions are most severe.

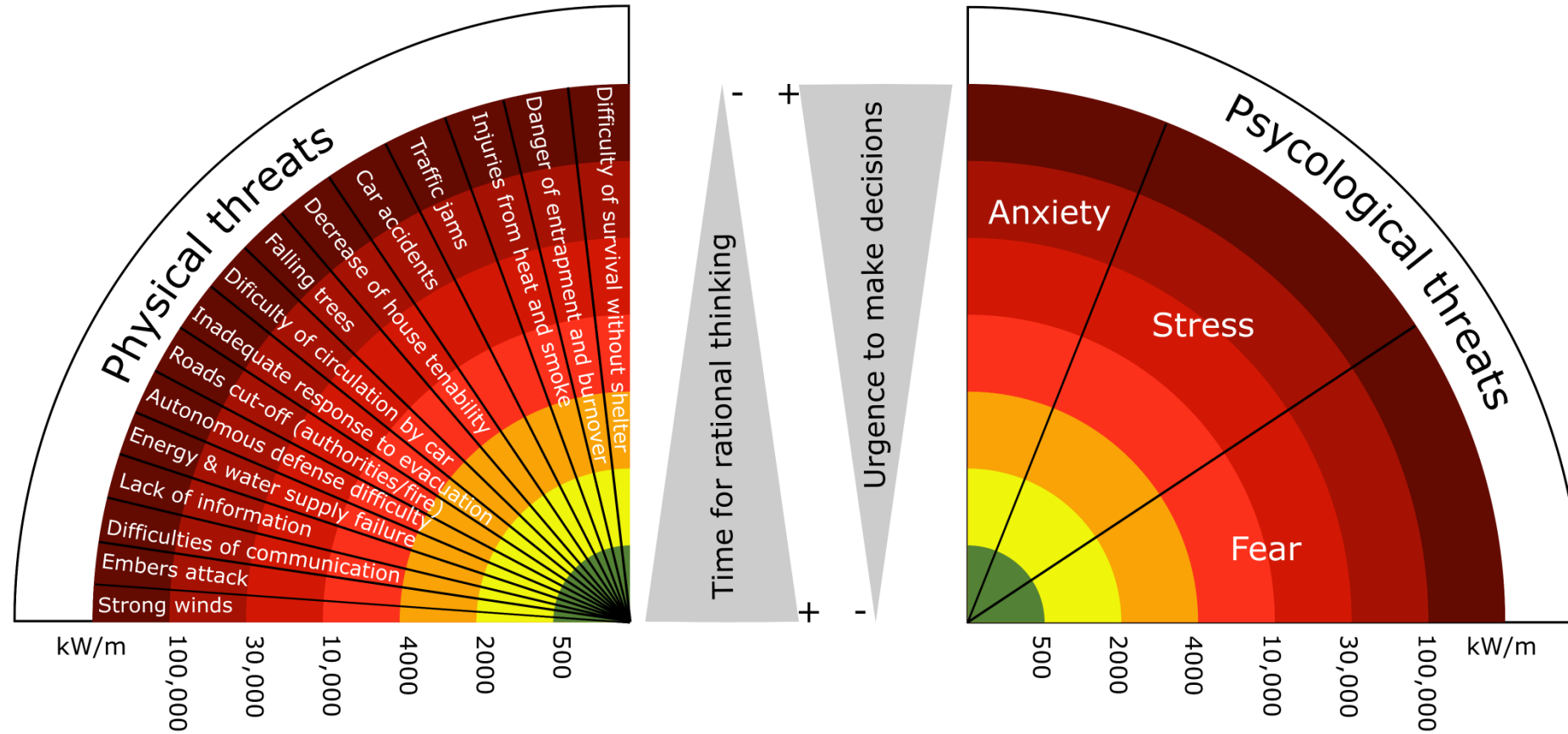
This is the result of unbalanced management strategies and policies that can be effective in fire suppression under normal weather conditions but are insufficient to deal with extreme wildfire events.

A wildfire classification

Fire Category	Real Time Measurable Behavior Parameters			Real Time Observable Manifestations of EFB				Type of Fire and Capacity of Control *	
	FLI* (kWm ⁻¹)	ROS (m/min)	FL (m)	PyroCb	Downdrafts	Spotting Activity	Spotting Distance (m)		
Normal Fires	1	<500	<5 ^a <15 ^b	<1.5	Absent	Absent	Absent	0	Surface fire Fairly easy
	2	500–2000	<15 ^a <30 ^b	<2.5	Absent	Absent	Low	<100	Surface fire Moderately difficult
	3	2000–4000	<20 ^c <50 ^d	2.5–3.5	Absent	Absent	High	≥100	Surface fire, torching possible Very difficult
	4	4000–10,000	<50 ^c <100 ^d	3.5–10	Unlikely	In some localized cases	Prolific	500–1000	Surface fire, crowning likely depending on vegetation type and stand structure Extremely difficult
Extreme Wildfire Events	5	10,000–30,000	<150 ^c <250 ^d	10–50	Possible	Present	Prolific	>1000	Crown fire, either wind- or plume-driven Spotting plays a relevant role in fire growth Possible fire breaching across an extended obstacle to local spread Chaotic and unpredictable fire spread Virtually impossible
	6	30,000–100,000	<300	50–100	Probable	Present	Massive Spotting	>2000	Plume-driven, highly turbulent fire Chaotic and unpredictable fire spread Spotting, including long distance, plays a relevant role in fire growth Possible fire breaching across an extended obstacle to local spread Impossible
	7	>100,000 (possible)	>300 (possible)	>100 (possible)	Present	Present	Massive Spotting	>5000	Plume-driven, highly turbulent fire Area-wide ignition and firestorm development non-organized flame fronts because of extreme turbulence/vorticity and massive spotting Impossible

Note: ^a Forest and shrubland; ^b grassland; ^c forest; ^d shrubland and grassland; *FLI classes 1–4 follow the classification by Alexander and Lanoville [125].

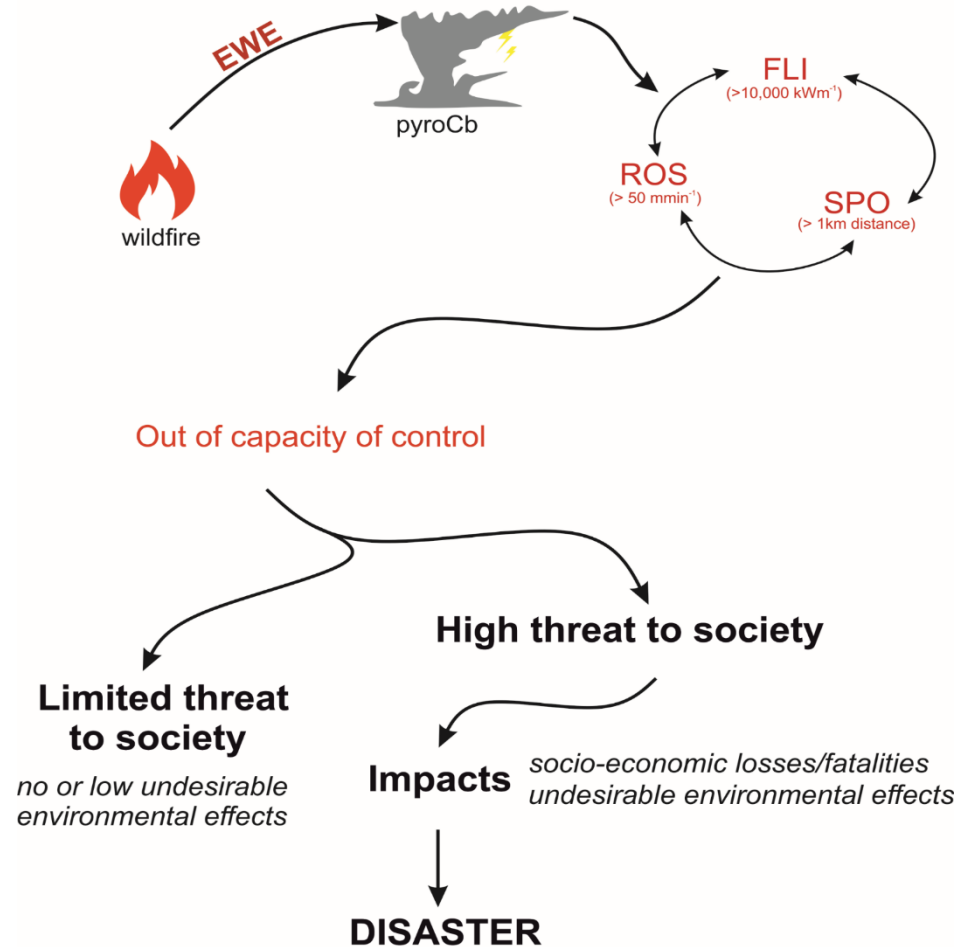
A wildfire classification: the integration of potential threats for people



Tedim et al., 2019

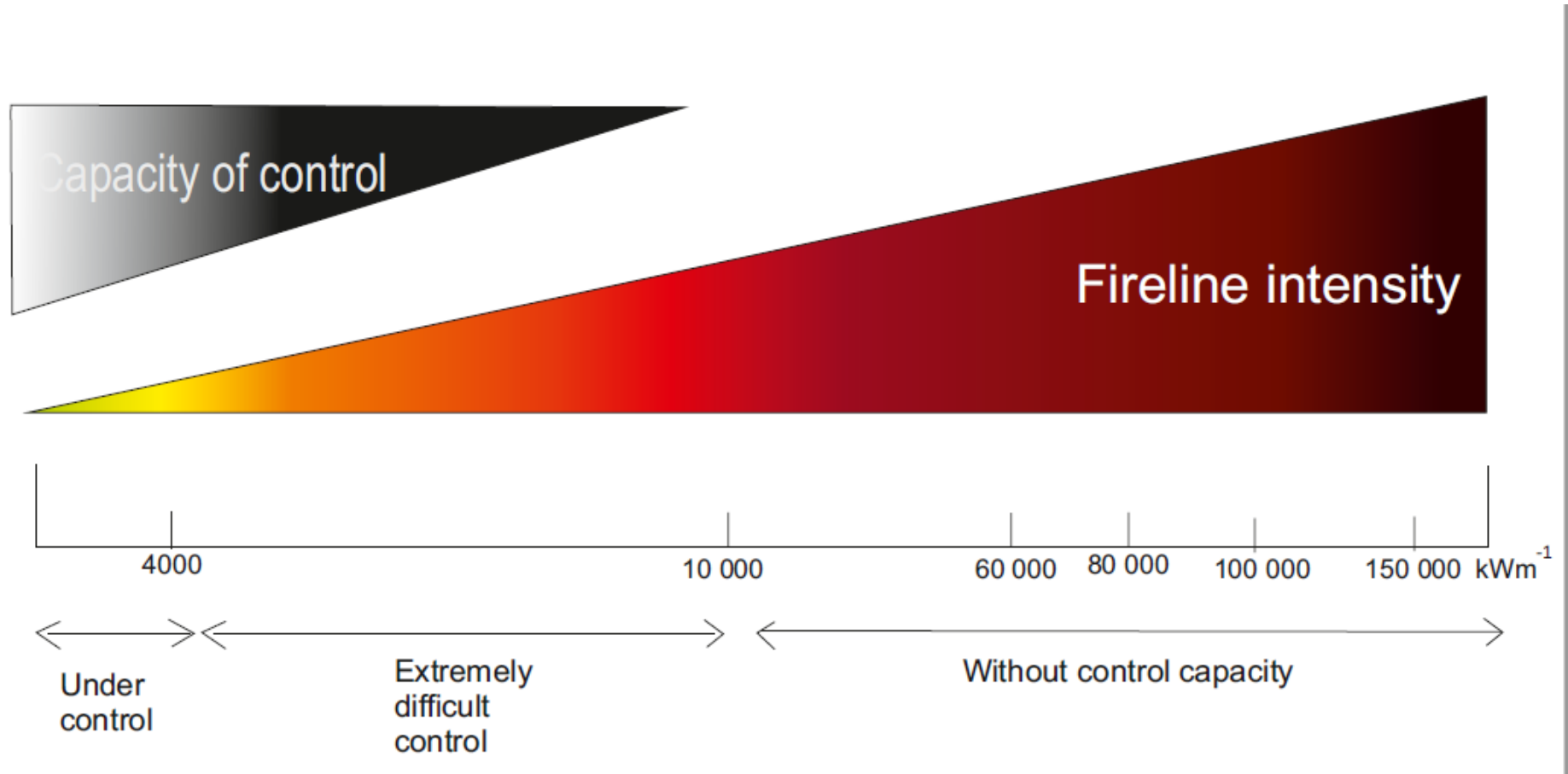
The addition to the wildfire classification (Tedim et al., 2018) of the potential threats for people, crews and assets

Extreme Wildfire Event definition (1)



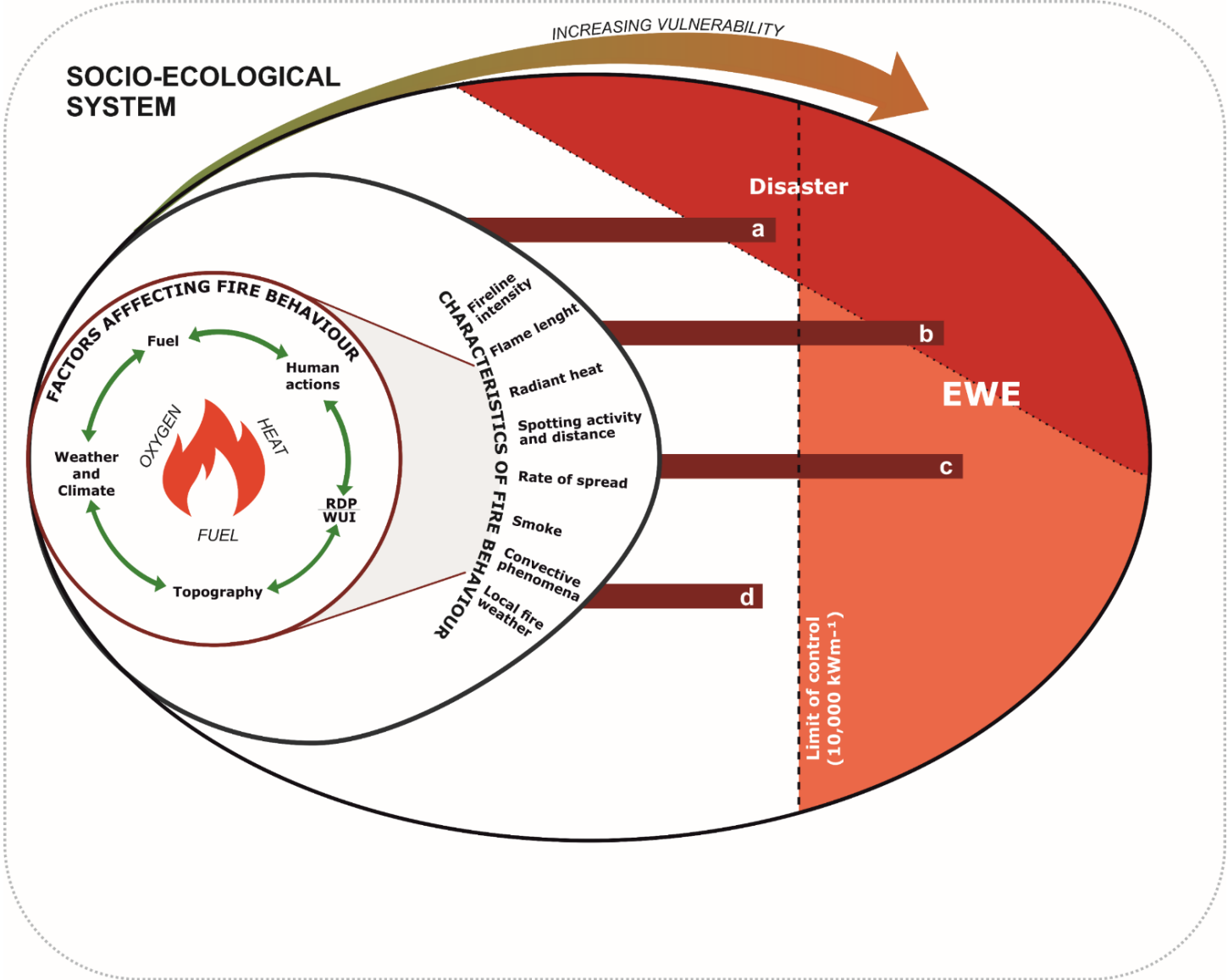
A pyro-convective phenomenon overwhelming the capacity of control (fireline intensity currently assumed $10,000 \text{ kWm}^{-1}$; rate of spread $> 50 \text{ m/min}$), exhibiting **spotting distance $> 1 \text{ km}$** , and **erratic and unpredictable fire behaviour and spread.**

Extreme Wildfire Event definition (2)

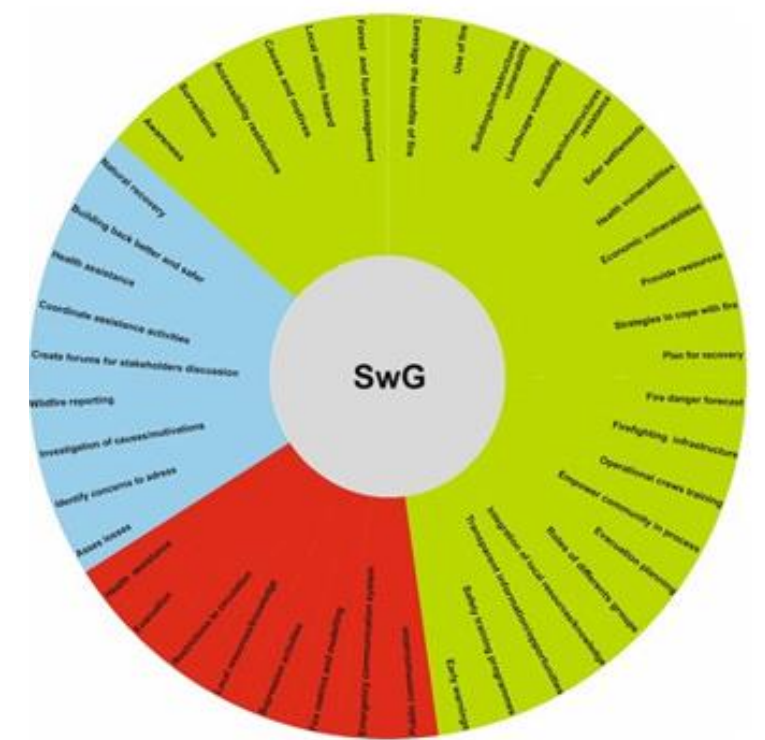
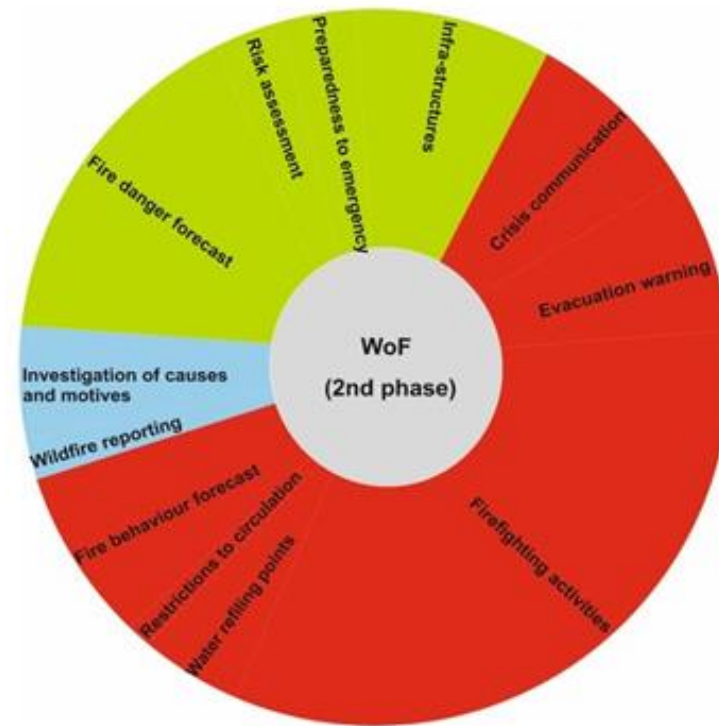
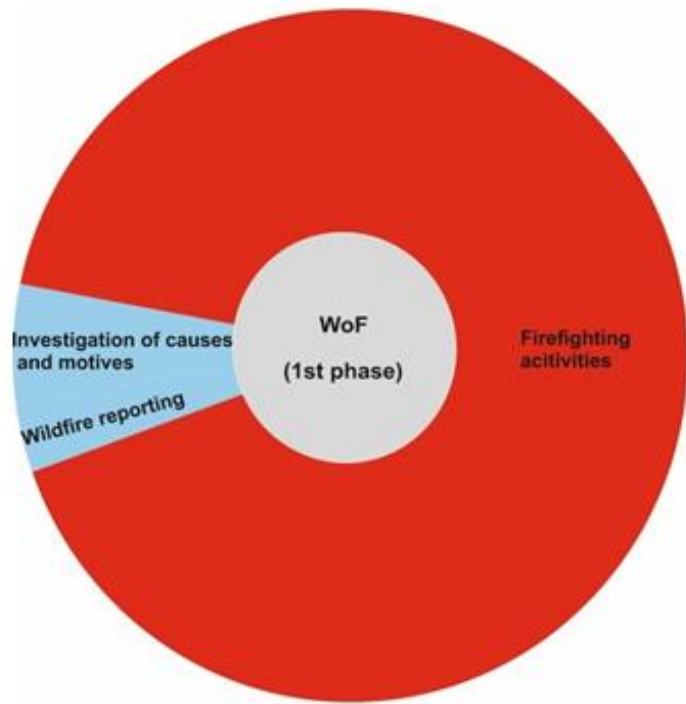


Vittorio and Tedim, 2019

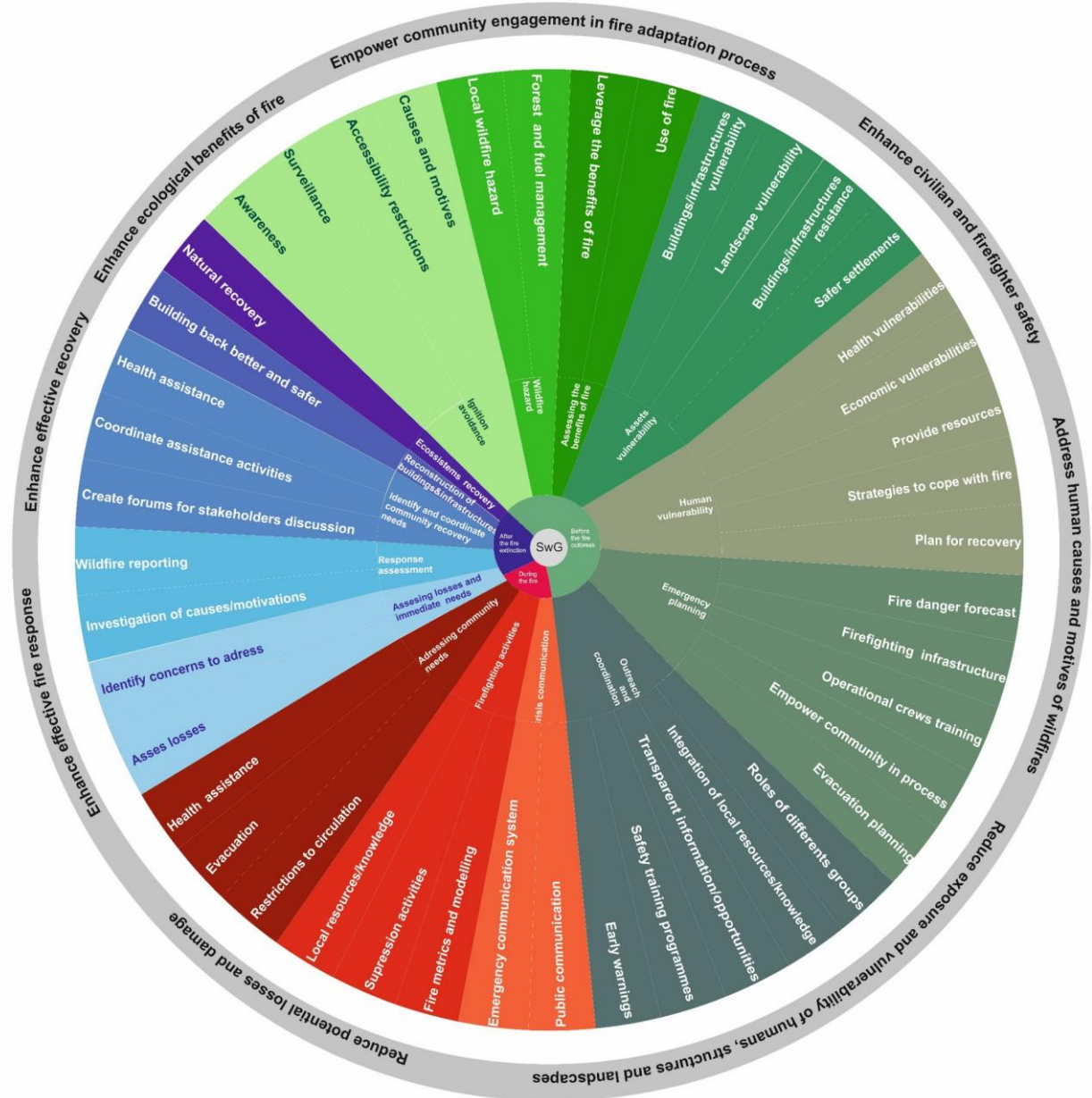
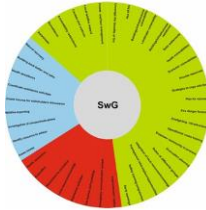
Extreme Wildfire Event definition (3)



Wildfire paradigms: From *War on Fire* to *Shared wildfire Governance*



Wildfire paradigms: Shared wildfire Governance (SwG)



Final remarks (1)

Extreme Wildfire Events (EWEs) identity results from their physical properties (e.g. fire line intensity, rate of spread) that reflect the interaction of natural and social processes

An EWEs does not necessarily become a disaster

The addition to the wildfire classification of the potential threats for people, crews and assets has the purpose to inform the scenario they can face

Our proposed scale does not consider the amount of consequences but the type of threats, as the consequences are influenced by the characteristics of the area affected by the fire and the level of vulnerability and preparedness of people.

Final remarks (2)

War on fire (WoF) paradigm is based on suppression that just addresses the symptoms but does not provide solutions for wildfire problems and is unable to control EWEs

SwG paradigm fosters pro-active strategies that combine multiple and complementary measures and have alternative measures, each of them with an identified objective, an approach more likely to lead to better outcomes than the reactive approach of the WoF

SwG paradigm holds more potential to find synergies with non-fire concerns, increasing the likelihood of developing effective and implementable solutions

The next step is to operationalize SwG paradigm

References

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Thank you for your attention!

