A toolkit for fostering co-creation and participative community engagement with vulnerable communities at risk





Deliverable D17

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Abbreviations

- **ACIF:** Agrupaciones Contra Incendios Forestales
- **CUIDAR:** Cultures of Disaster Resilience among children and young people Project
- **CTFC**: Forest Science and Technology Centre of Catalonia
- **EFI**: European Forest Institute
- **ESR**: Early Stage Researcher
- **EUC:** European University of Cyprus
- **IFM:** Integrated Fire Management
- **FAC-net**: Fire Adapted Communities Learning Network
- **NFPA**: National Fire Protection Association
- **PCF**: Pau Costa Foundation
- **WKR**: Waldbrand Klima Resilienz

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Executive Summary

Aim and structure of the deliverable:

This deliverable aims at presenting the **challenges of, and recommendations for, communicating in an era of extreme wildfires**.

The starting point of this deliverable is **Wildfire Risk Communication, and the need to go beyond focusing just on risk** by expanding our communication efforts into the broader arena of Wildfire Communication.

Therefore, the core of this deliverable provides specific **recommendations for doing Wildfire Communication**, by responding to the challenges of our times, and particularly, **by engaging and communicating *with* communities in their local contexts.** These recommendations are articulated around the why, who, what, how, when, and where, and are enriched by a diverse array of examples and further readings.

Audience:

This deliverable is particularly useful for those people and organisations **working locally with communities at wildfire risk.** This includes, amongst others, **community facilitators, rural development workers,** and **environmental educators**, who are knowledgeable on conducting a more inclusive, participatory, and locally situated type of communication, as this deliverable proposes.

Moreover, we also encourage others to read this deliverable and consider other ways of communicating about wildfire. For instance, **local and regional governments** in elaborating projects around wildfires, further building relationships of trust with citizens, as well as supporting citizen's involvement in local wildfire risk mitigation and prevention actions; **communicators from other risks** (like floods), as many of the recommendations have a cross-risk nature; the **media** to further tailor wildfire news to the needs and interests of communities, as well as portray wildfires not just as a risk and a disaster, but develop much richer and broader narratives around wildfires; and **researchers** to support Wildfire Communication practice with well-founded scientific knowledge.

The main takeaway:

There are **no silver bullets nor shortcuts for transitioning from a Fire Suppression paradigm towards Living with Wildfires**. This is unlikely to be achieved as long as we only use Wildfire Risk Communication, as it focuses mainly on the risk dimension, leaving out all other aspects of how wildfires are intrinsically interwoven in our socioenvironmental systems and thereby overlooking potential ways of living or coexisting with it. For this reason, **we propose to expand towards a broader Wildfire Communication. This requires working *with* communities, putting their experiences, knowledges, and needs at the centre**, and not vice versa. Therefore, this deliverable aims to provide inspiration and resources for such an endeavour.

1. Introduction – Wildfire (Risk) Communication in an era of extreme wildfires

There are **increasingly extreme wildfires*** despite wildfire suppression* efforts and resources. It is often called the **'wildfire paradox'**, whereby the "wildfire suppression to eliminate large and damaging wildfires induces the inevitable occurrence of these fires" (Tedim et al., 2020). This is because many ecosystems need a certain amount of wildfire to thrive. By continuously putting out all wildfires as quickly as possible, vegetation[1] builds up over time (Calkin et al., 2015; Fernandes et al., 2019). Then, when a wildfire *does* happen, there is so much fuel that the wildfire surpasses suppression capacities and becomes uncontrollable. Such wildfires only come to a halt when weather conditions change or fuel runs out. In recent times there have been many examples of such extreme wildfires: Australia (2009, 2019-20), Portugal (2017), Chile (2017 & 2023), the USA (2018 & 2020), Greece (2019), and Spain (2022).

Extreme wildfires ≠ wildfires

We refer in this deliverable to 'extreme wildfires', and *not* wildfires in general, as the core focus of risk reduction actions. Wildfires are part of many ecosystems (Galizia et al., 2021; Keeley et al., 2011), and its exclusion is one of the drivers for the extreme wildfires seen in recent times, with their great socioenvironmental impacts.

When such disasters happen, **communities are often impacted disproportionately**. Extreme wildfires can go hand in hand with great – and often unequal – impacts on people's safety and well-being (Davies et al., 2018). This entails e.g. loss of lives, homes, or health, impacting people's well-being and livelihoods. Also, it **affects the global environment**, e.g. by further contributing to climate change and damaging ecosystems (Moreira et al., 2020; Otero et al., 2018). Extreme wildfires can therefore be seen as a form of **socioenvironmental injustice*** (Pineda-Pinto et al., 2021; Tierney, 2019).

Figure 1. Examples of reports and news articles on the socioenvironmental injustice dimension of extreme wildfires. Sources: (Headwaters Economics, 2021; NY Times, 2020; The Guardian, 2020)

There is an **urgent call for different ways to deal with, and relate to, wildfires.** That is, going from focusing on **Wildfire Suppression** – which has paradoxically increased extreme wildfires – towards a different paradigm built upon the understanding that **wildfires are part of socioenvironmental systems***, instead of an external element that should be eliminated. As such, different terms for such alternative paradigms have appeared, such as **Integrated Fire Management*** or **Living with Wildfire*** (Birot, 2009; Ganz & Moore, 2002; Moritz et al., 2014; Stoof & Kettridge, 2022).

This change of paradigm influences how we understand, research, and communicate about wildfires. In this deliverable – as part of the first author's[2] research project – the focus is on the **communication** part.

* All terms with an asterisk (*) can be found in the Glossary at the end of this document.
[1] In the context of wildfires, vegetation is often referred to as 'fuel'
[2] The first author is Isabeau Ottolini, Early Stage Researcher 15 from the PyroLife ITN project

2. Methodological approach

This deliverable is based on the first author's PhD thesis, and forms part of the Work Package 3 activities within the PyroLife Innovative Training Network. Main findings presented here come from:

- 2020-2022: **Literature review** on Wildfire Risk Communication, including what similar terms are used in research and practice on communicating wildfire risk; the challenges it faces; and how it has developed over the years.
- 2021-2022: **Semi-structured interviews** with wildfire communication practitioners and scientists across Europe, the USA, and South Africa. These interviewees provide different perspectives and experiences on Wildfire Risk Communication, as they come from different sectors (private, non-profit, public), working on varying levels (from international organisations to regional levels) either as practitioners or in academia.
- 2021-2023: **Case study** with the citizen association, Pego Viu[1], in southeast Spain. Through interviews, focus groups and participatory observation, key insights have emerged around the need for a communication approach that is more locally situated, and based on the idea of communicating *with* communities, instead of *to* communities.
- 2020-2023: **Secondments** at the **National Fire Protection Association** (NFPA) in the USA, the **European Forest Institute** (EFI) in Germany, and the **Forest Science and Technology Centre of Catalonia** (CTFC) in Spain, which included many informal conversations with wildfire communication practitioners and experts; field visits to communities taking wildfire risk reduction actions; and discussions at multiple conferences and seminars.
- 2021-2023: **Two PyroLife workshops[2] on Risk Communication**, aimed at training ESRs to become effective communicators on risks, particularly wildfires, and the **Joint workshop[3] "Communicating the important role of sustainable forest management to prevent wildfires"** by Forest Europe, EFI and CTFC.

[1] https://pegoviu.org/
[2] https://pyrolife.lessonsonfire.eu/events/
[3] https://foresteurope.org/event/joint-workshop-communicating-the-important-role-of-sustainable-forest-management-to-prevent-wildfires/

3. Wildfire Risk Communication, and the need to go beyond

In this deliverable we **differentiate between 'Wildfire Risk Communication'** and **'Wildfire Communication'**. Whilst much effort is put into communicating about wildfire *risk,* there is a much broader field that goes beyond this risk dimension (see Figure 2). As such, **Wildfire Communication** includes ***all* the aspects of wildfires and our relations to it**, based on the understanding that **wildfires are an inherent part of our socioenvironmental systems**, and *not* just a risk to manage (Ottolini, Forthcoming).

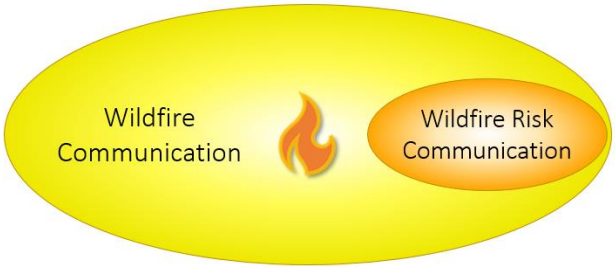

Figure 2. Wildfire Risk Communication is part of the much broader field of Wildfire Communication. Elaborated by I. Ottolini

In this section, firstly we look at what is generally meant by Wildfire Risk Communication. Secondly, we explore the challenges it faces, particularly in the current context of increasingly extreme wildfires. As a way forward, we propose to go beyond just focusing on reducing and mitigating risk, into the broader arena of Wildfire Communication. This links with Section 4, where specific recommendations, examples and resources for Wildfire Communication are provided.

3.1. What is Wildfire Risk Communication?

In a nutshell, **Wildfire Risk Communication** concentrates on the ***prevention*** and ***preparedness*** of wildfire disasters, whereby generally *"information is conveyed by experts and governments to lay citizens to educate the citizens about risk"* (da Silva et al., 2019, p. 530) to thereby "*reduce the damage caused by disasters"* (Yamori, 2020, p. xxxi).

Different terms are used when talking about Wildfire Risk Communication, as Table 1 below shows. All these terms evolve around wildfires, and have varying levels of focus on wildfire risk, hence proposing slightly different ways to accomplish risk reduction.

Table 1. Different terms related to Wildfire Risk Communication as found in the literature. Elaborated by I. Ottolini

Concept	Authors	Objective
Awareness raising	(Shrestha et al., 2021)	*Raising awareness* on the economic impacts of wildfires can prompt landowner *participation* in wildfire mitigation efforts
	(Puente, 2018)	*Encourage* social participation and *favour* the co-responsibility of the population
	(Vélez Muñoz, 2000)	*Warn* about the risk of fire and thereby avoid its incorrect use
Wildfire communication	(Wilson et al., 2017)	*Encourage* risk mitigation at household level, and to *foster support* from the public on the topic of fire as a disaster risk reduction tool
	(Christianson et al., 2011)	*Cause* social change
Social marketing		*Inform* the public so they can *make good decisions* about risk
	(Butler et al., 2007)	Positively *influence* people's behaviours & attitudes

Crisis communication	(Steelman & McCaffrey, 2013)	*Minimise* the inherent uncertainty of a natural hazard
	(Öhman et al., 2016)	*Informing* people at risk during wildfire events
Wildfire risk communication	(Hano et al., 2020)	*Convincing* the intended audience to *adopt a recommended behaviour* that will reduce their risk of adverse outcomes associated with exposure
	(Eriksen & Prior, 2013)	*Enable* people being well-prepared for wildfire
(Environmental or public) education	(Ganz et al., 2007)	*Educate, motivate, and empower* people to make their homes, neighbourhoods, and communities safer from wildfires
	(Mockrin et al., 2018)	*Promote* residential mitigation around homes
Outreach	(Butry et al., 2010)	*Limiting* the amount of unintentional human-caused ignitions
	(Toman et al., 2006)	*Influence* public understanding & *change* citizens' attitudes

All in all, Wildfire Risk Communication is essential in preventing people (accidentally or deliberately, directly or indirectly) from igniting wildfires; keeping them safe in wildfire emergencies; and reducing losses of lives and property (Ballart et al., 2016; Höppner et al., 2012).

In the next section, we will see the challenges of Wildfire Risk Communication, specifically in the context of increasingly extreme and negatively impacting wildfires.

3.2. Challenges of Wildfire Risk Communication

Wildfire Risk Communication is largely informed by the currently dominant paradigm of Wildfire Suppression, influencing *who* communicates to *whom*, *what* is communicated *how*, and *when* and *where* this communication occurs. This is because dominant paradigms tend to shape communication practices (Allen, 2017). As such, wildfires are seen as a risk to be managed, in order to prevent disaster. This can be observed, for instance, through wildfire risk-awareness campaigns (see Figure 3).

Figure 3. Examples of Wildfire Risk Communication posters from the USA, UK, Spain, Netherlands, and Australia, during 2020

Many of these communication efforts tend to be top-down, whereby experts use mass campaigns to unidirectionally convey generic messages on the '*do's and don'ts'* to non-experts. This happens mainly during the fire season, by calling to the nonexperts' sense of individual responsibility and framing wildfires as 'natural' disasters. See Table 2, column A, for a summary of this from the literature.

Whilst many resources are put into communicating about wildfire risk (such as the campaigns above), seemingly many citizens continue to be unaware of their wildfire risk, and/or are not taking (enough) action to sufficiently reduce such risk. This is clearly expressed both in the literature (e.g. Christianson et al., 2011; Velez et al., 2017; Wilson et al., 2017) and by experts interviewed for the first author's research. That is, **Wildfire Risk Communication is not achieving its goal of reducing people's wildfire risk**. This is especially worrying, as citizens' exposure to wildfires has further increased in recent decades, e.g., with the growing Wildland Urban Interface (WUI). In addition, the potential for wildfire disaster is increasing due to new wildfire behaviours and changing wildfire regimes (i.e. happening more frequently and in increasingly more places across the globe (UNEP, 2022)).

This combination of increased wildfire risk and unaware/unprepared communities prompts scientists and practitioners to explore a myriad of **improvements for Wildfire Risk Communication**. Examples are: fostering two-way communication or dialogue (Eriksen & Prior, 2013; Kuhlicke & Steinführer, 2010; Velez et al., 2017); considering local contexts (Christianson et al., 2011; Mccaffrey, 2015; Paveglio et al., 2009) and complementing expert knowledge on wildfire risk reduction with local knowledge and input from residents (Höppner et al., 2012; Paveglio et al., 2009). See Table 2, column B, for an overview of this from the literature.

Table 2. Literature review overview on the evolving field of Risk Communication. Elaborated by I. Ottolini

	A. Traditional Risk Communication	B. Improvements to Risk Communication
WHO communicates to who?	From official sources: **experts** (like fire and risk management agencies) **and scientists** (Paton & Buergelt, 2012; Plana & Font, 2015; Toman et al., 2006; Wilson et al., 2017) to the **general public** (Gijselaar, 2020)	Also **involve residents** (FAO, 2013; Paveglio et al., 2009) – recognising they are **heterogeneous groups** (Gijselaar, 2020; Toman et al., 2006) – to foster mutual learning (Plana & Font, 2015)
WHAT is communicated?	**Generic messages** (Gijselaar, 2020; Wilson et al., 2017) based on **specialized expert knowledge** on wildfire Risk reduction (Plana & Font, 2015), with often negative tone (FAO, 2013)	Complement expert knowledge on wildfire Risk reduction with specialized **local knowledge** and input from residents (Höppner et al., 2012; Paveglio et al., 2009) and adapt messages to the target audiences (Plana & Font, 2015)
HOW to communicate?	**Unidirectional, top-down approach**, (FAO, 2013; Toman et al., 2006), through **channels** like brochures, pamphlets, mass media campaigns, lectures, websites, social marketing (Gijselaar, 2020; Johnston & Lane, 2020; Kuhlicke & Steinführer, 2010; Paton & Buergelt, 2012; Toman et al., 2006)	**Two-way communication** (Velez et al., 2017) or **dialogue** (Christianson et al., 2011; Kuhlicke & Steinführer, 2010), that is **interactive** (Mccaffrey, 2015; Remenick, 2017; Toman et al., 2006; Wilson et al., 2017) More **interactive channels** include social media, stakeholder and community engagement (Johnston & Lane, 2020; Plana & Font, 2015), visitors centres, guided field trips (Toman et al., 2006), face-to-face discussion (Höppner et al., 2012), as well as art and museums (Morales & Camarena, 2010)
WHEN to communicate?	**Prior** to and **during** an event (Plana & Font, 2015), during the period when **risk is high** (Gijselaar, 2020)	**Longer timeframes** (Gijselaar, 2020), combining a focus on the **risk cycle** and day-to-day issues (Höppner et al., 2012)

WHERE to communicate?	**General settings** (FAO, 2013), unrelated to the message (Toman et al., 2006)	Taking into account **local contexts** (Christianson et al., 2011; Mccaffrey, 2015; Paveglio et al., 2009)
WHY to communicate?	Raise **awareness** and **inform** people to increase **preparedness** and **prevent** wildfires (Gijselaar, 2020; Höppner et al., 2012)	Stimulate **proactive citizen actions** to reduce their risk (Christianson et al., 2011; Wilson et al., 2017) **decrease potential for conflict** (Paton & Buergelt, 2012) as well as **influencing citizens' attitudes** (Toman et al., 2006) – like in public support for using fire as a management tool (Wilson et al., 2017) – through **engagement** (FAO, 2013; Plana & Font, 2015)

The abovementioned developments are important for **communicating more effectively to the publics[1] on how to prevent and prepare for wildfires**. However, it continues to be largely based on seeing wildfires only as a *risk*, and citizens as unknowledgeable/unwilling to reduce their wildfire risk, therefore requiring persuasive messaging from experts to change their behaviours. This limited view of wildfires has a series of implications, the most important of which are described here:

- In Wildfire Risk Communication **disasters are generally framed as events** in a specific moment of time, rather than the "consequence of long-term political, economical and environmental processes" (Tierney, 2019). Not considering these more long-term dynamics presents a missed opportunity for learning and engaging with the – often invisibilized – complexities of wildfires and socioenvironmental vulnerability (Coates, 2019; González-Hidalgo et al., 2014). Strongly related is the enduring frame of **wildfires as 'natural disasters'**, leading to focusing "almost exclusively on how to prevent [wildfires] without recognizing the factors that create and intensify the social and environmental injustices" (Enríquez-Loya & Léon, 2020)

- At the same time, Wildfire Risk Communication often includes overly simplified messages, leading to the **generalisation that all fires have dramatic consequences** and should therefore be avoided - further feeding into a Fire Suppression mentality. Examples of historically famous campaigns portraying wildfires only as *disastrous* events are Smokey Bear in the USA, and *Todos contra el fuego* ('all against the fire') in Spain (see Figure 4 below). Instead, it is key to differentiate between the different kinds of wildfires and their impacts – both positive and negative – on ecosystems and societies (Kaufmann et al., 2005; Tozer, 2013).

Figure 4. Left: Smokey Bear campaign. Right: 'All against the fire' campaign.

[1] We use the term 'publics' (and not 'public'), to acknowledge that society is inherently heterogeneous, and thus communicating about wildfires should address this diversity.

- Moreover, Wildfire Risk Communication **insufficiently recognises and addresses the underlying processes** of **extreme wildfires**, thereby sustaining the present status quo and further contributing to their occurrence (Davies et al., 2018; Kim & Dutta, 2009; Tedim et al., 2018; Winter, 2022). Such processes include, for instance, the artificial human vs nature framing of wildfires as 'natural disaster events' (Enríquez-Loya & Léon, 2020; Lloro-Bidart & Finewood, 2018); increasing social inequalities (Collins, 2008) shaped by the intersection of multiple attributes like gender, class and ethnicity (Walker et al., 2020), and exacerbated by capitalism (Tierney, 2019). In addition, Risk Communication generally overlooks the publics' existing "interpretations, practices, and communicative strategies" (Kim & Dutta, 2009, p. 146) as well as their knowledges, experiences, and needs, thereby potentially further **increasing people's vulnerability towards disasters** (Coates, 2019).

- Lastly, even though many Wildfire Risk Communication initiatives exist, there is a **continued lack of empirical evaluation and validation**, as authors like Balog-Way et al. (2020), Höppner et al. (2012) and Macintyre et al. (2019) point out. This makes it hard to know *if* - and to what extent - these communicative efforts actually have (the desired) effect, as well as what should be changed. For instance, how effective is it really in educating people on the role of fires in the ecosystems, the importance of Integrated Fire Management, and the fact that humans need to cope with a certain residual risk that cannot be prevented? Without proper evaluation, this is hard to know.

Table 3 below summarises the abovementioned characteristics of Wildfire Risk Communication and its implications on communities at risk.

Table 3. A summary of Wildfire Risk Communication characteristics and its implications. Elaborated by I. Ottolini

Wildfire Risk Communication characteristics	Implications on communities at risk

• Top-down, expert-driven, unidirectional
• Generic & simple messages (e.g. that *all* wildfires are bad and must be prevented)
• Mass campaigns mostly during fire season
• Particular framings:
  ○ Disasters as specific events at a certain time
  ○ Wildfires as 'natural' disasters
  ○ Predominant focus on individual responsibility
	• Insufficiently recognizing & addressing underlying and long-term (political, economic, and environmental) processes of extreme wildfires
	• Not embedded within local contexts nor long-term, collective vision
	• Excludes voices, knowledge & expertise of 'non-experts'
	Overall: increased vulnerability to wildfires

Further readings: (Coates, 2019; Enríquez-Loya & Léon, 2020; FAO, 2013; Wilson et al., 2017)	Further reading: (Christianson et al., 2011; Davies et al., 2018; McCaffrey, 2015; Paveglio et al., 2009)

3.3. Going beyond risk: Wildfire Communication

As seen above, there are **several implications to doing Wildfire Risk Communication**, many of them evolving around an overly focus on risk, particularly by being embedded within a Fire Suppression paradigm. Therefore, we here **propose to go beyond the risk dimension, and step into the broader arena of Wildfire Communication**. This includes *all* the aspects of wildfires, and is based on the understanding that wildfires are intrinsically part of our societies and ecosystems.

As such, Wildfire Communication does not consider wildfires only a risk to manage, but instead **endeavours to find ways to live or coexist with fire** (Ottolini, Forthcoming). In this sense, Wildfire Communication is an essential piece for Integrated Fire Management[2].

Examples of Wildfire Communication are the processes of creating and sharing of stories, knowledges, and experiences around wildfires. This can happen in all sorts of ways, like through storytelling, media coverage, or through community-based initiatives[3], and for diverse reasons, from sharing knowledges on the traditional uses of fire; to pondering over human-nature relationships; creating a sense of belonging; or extricating reflections on desirable (wildfire) futures in a changing world.

Wildfire Risk Communication will always be needed, as it is unlikely (nor desirable) that the world will ever be without wildfires, and people certainly do need to take wildfire risk reduction actions. However, **what we propose is to *expand* towards a broader Wildfire Communication**. Through this, we hope to create space for communicating about wildfires in a way that is more up to the challenges of our times, and particularly, by engaging and communicating *with* communities, putting at the centre their lived experiences, stories, and needs, as well as being fully embedded within local contexts. In the next section a series of recommendations, examples and resources are given on how to precisely do that.

[2] It is beyond the scope of this report to mention all of the purposeful human-generated fires for a diversity of socio-cultural and land management goals (i.e. cultural burns, prescribed burns, agricultural burns, etc), but these are certainly key dimensions touched upon through Integrated Fire Management.

[3] Particularly, in the first author's PhD dissertation more on Community-based Wildfire Communication can be found.

4. Recommendations for Wildfire Communication

There are many great handbooks and guides on communicating about wildfires, and particularly wildfire risk (a selection can be found in Annex 1). This section provides recommendations that are specifically geared towards moving away from top-down, expert-driven, communication practices, towards a Wildfire Communication that is more inclusive, participatory, and locally embedded. As detailed in the Methodology section, these results derive from a combination of literature review, interviews with wildfire communication experts and practitioners, and a case study with a community-based initiative as part of ERS15's research.

In this sense, the recommendations are especially relevant for those people and organisations working locally with communities at risk of experiencing extreme wildfires, which often entail considerable negative impacts on society and/or ecosystems. At the same time, many of these recommendations can also be useful for communicating with[1] communities about wildfires in general. By taking a step beyond purely Wildfire *Risk* Communication, space is created e.g., for shared meaning-making and community action; inspiring critical reflections around living with wildfires; and engaging with underlying tensions revolving around wildfires and their management.

This section is organised around the broad dimensions of ***why, who, what, how, where,*** *and* ***when to communicate about wildfires*****.** At times the recommendations go accompanied by **quotes[2]** from interviewees, to illustrate their reflections and experiences around Wildfire Communication. At the end of each section is also a **thematic table with references to further readings**.

[1] Note: we talk about "communicating *with* communities", not "communicating *to* communities". One of the basic principles behind the communicative approach presented in this deliverable is to make communication more inclusive, horizontal, and engaging.

[2] These quotes detail the country of the interviewee, as well as their professional role, to provide context from which such reflections have emerged

4.1. Why do wildfire communication

Traditionally, Wildfire Risk Communication aims at **informing the public about wildfire prevention and preparedness actions**, and **changing their behaviours and perceptions so that they carry out necessary risk reduction actions** (Christianson et al., 2011; Okada et al., 2020; da Silva et al., 2019).

However, Wildfire Communication can be done for many reasons that go beyond this risk focus. Some reasons that might be worth considering are the following:

- **Strengthen community-action and engagement** by identifying and prioritising communities' needs, interests, and knowledges. In this, processes of empowerment and social learning* are key, as it "further builds community capacity and improves planning for future events, contributing to a community's resilience and fostering adaptation" (Jakes & Sturtevant, 2013). An example is the EduFire Toolkit project[10], whereby – based on a Project Based Learning methodology – high school students engage with their communities and develop activities to respond to the real and local challenges of climate change and wildfires.

> *"The goal is not to scare people into compliance, it's to help make them aware and to empower them […] The first reaction is fear, and fear is rarely productive and rational decisions don't come out of fear […]. So how to empower them? By coupling their awareness with tools and resources that they can use"*
> USA, Municipal Fire Department

- **Create opportunities for conversations that dive into the complexity, uncertainty & ambiguity of wildfires**. Wildfires are far from simple and straightforward and show ever more unpredictable behaviour. Nonetheless, oftentimes Wildfire Risk Communication campaigns use fairly simple slogans and convey basic messages. This might be valuable as a very first step for people who are totally unaware of wildfire risk. However, it can also lead to people not understanding more complex matters (like the ecological role of wildfire and the cultural uses of fire), or even directly opposing management actions (like prescribed burns). Hence, it is important to create spaces that allow for dialogues addressing the complex, uncertain and ambiguous nature of wildfires.

> *"I feel like all the messaging is starting to shift toward "more good fire means less bad fire!" You know, "a little bit of smoke now so that we don't have all of the smoke later". When the reality is, we're choking on smoke from California homes burning, three states away. Well, try to say we also want you to have this extra smoke in the springtime, when we're doing prescribed fires"*
> USA, Wildfire Community Outreach

  One such space is in the classroom. For example, the Living With Fire Program in Nevada, USA, has developed a Wildfire Science Curriculum, prompting students to explore and reflect upon both the beneficial and harmful roles of wildfire (for more information, see here[11]). Another example by the Pau Costa Foundation in Spain is MeFiTu[12], an environmental awareness project on fire ecology for kids in primary and secondary school.

- **Create spaces that allow sharing emotions and validating lived experiences**. Wildfires are deeply impacting events in people's lives. Often Wildfire Risk Communication is focused so much on the prevention and emergency phase, that the post-wildfire phase is neglected in terms of communication. This whilst it is a critical moment for expression, reflection, and sense-making of what has happened in the local community. Moreover, it can start the conversation about wildfire

[10] https://www.edufiretoolkit.eu/en/home-2/
[11] https://www.unr.edu/nevada-today/news/2022/fire-education-grant
[12] https://www.paucostafoundation.org/proyectos/mefitu/

risk and mitigation measures with other communities that have not yet experienced wildfires. Examples from California, USA, are the Dixie Fire Stories Project (on the 2021 Dixie Fire)[13], and the From the Fire book (on the 2017 Thomas Fire)[14], and from Australia The Letterbox Project[15] (after the Black Saturday bushfire of 2009)

- **Mitigate conflicts & tensions**. Oftentimes, conflicting views exist on *what is the problem exactly, what solutions exist for it, and who is responsible for the problem and/or carrying out the solution(s)?* However, rarely are such tensions addressed. Wildfire Communication can contribute to shared meaning-making and responsibilities among all actors, which might help to alleviate (part of) the tensions. In this, inclusive and participatory processes are key, validating the emotions and views of all those involved.

> *"A human against a wildfire. It seems like an insurmountable foe, right? […] a lot of people feel this sense of powerlessness, which creates like conflict and otherness. […] me vs this fire, me vs the people who aren't doing something about it. And so, how do you create a sense of community around fire?"*
> USA, Municipal Fire Department

Table 4. Further readings – section 'Why do wildfire communication'

Topics	Reference
Wildfires as a complex and ambiguous risks	(Brenkert-Smith et al., 2017; Essen et al., 2022; Tedim et al., 2018)
Dealing with uncertainty	(Corner et al., 2015; Morrow, 2009; Sword-Daniels et al., 2016)
Social / mutual learning	(Brummel et al., 2010; Eriksen & Prior, 2011; Jakes & Sturtevant, 2013; Madge, 2021; Plana & Font, 2015; Rodríguez-Carreras et al., 2020)
Empowerment	(Coates, 2019; Cooper et al., 2020; Ganz & Moore, 2002)
Conflicts	(González-Hidalgo & Zografos, 2020; Paton & Buergelt, 2012; da Silva et al., 2019)

* Full references and links to publications can be found in the References section at the end of this deliverable

[13] https://www.facebook.com/dixiefirestories/
[14] https://www.fromthefirebook.com/
[15] http://www.strathewen.com.au/strathewen-story/the-mosaic-letterbox-project/

4.2. Who communicates to whom

There are generally three options with Wildfire Communication as to who communicates to whom: **One-way communication, two-way communication, and horizontal communication.** Our recommendations on the 'who' are:

- **Move away from one-way communication.** This continues to be the predominant form of Wildfire Risk Communication. It is a **top-down, expert-driven process**, and often takes the form of campaigns on wildfire prevention and preparedness, from the public administrations to the public (see Figure 5), with a series of important implications in the face of increasingly extreme wildfires, as explained in Section 3.2.

> *"Like those [communicators] 'I know what I'm talking about and all you have to do is listen'. Well, it doesn't work"*
> Spain, Wildfire Consultant

CONAF, 2022 (Chile)

Western Cape Government, 2022 (South Africa)

AGIF, 2022 (Portugal)

Figure 5. Examples of Wildfire Risk campaigns from Chile, South Africa, and Portugal during 2022

- **Foster two-way communication (between experts & communities)** Two-way communication is increasingly becoming more common, e.g. through public engagement/ participation processes. The idea is not to communicate '*to*' citizens, but '*with*' (for more, see this Policy Brief on Communicating with Citizens in a Crisis[16]). Bidirectional communication is based on the acknowledgement that all those involved have valuable knowledges and experiences to share, and that everyone can learn from each other. Moreover, it allows for a shared and multidirectional learning between all those involved, building trust, and taking decisions together on managing the wildfire risk.

> *"it's not about 'injecting' information or knowledge to communities, but to share, cooperate and understand from the territory, by going there, talk with the people, know their problems, [and] learn"*
> Spain, Communication expert

An example of this are Service-Learning projects, like Plantando Cara al Fuego[17], and Facing Fire[18]. Through these educational projects, students collaborate with relevant stakeholders (e.g. research organizations, local and regional administrations, environmental associations, NGOs…) to organize an activity that meets the needs of their community – in this case, related to wildfires.

[16] https://www.project-engage.eu/wp-content/uploads/2020/11/ENGAGE-Policy-Brief-1.pdf
[17] https://www.plantandocaraalfuego.org
[18] https://facingfire.eu/

- **Acknowledge and support horizontal communication (within the community)**. Communities often have valuable knowledge on wildfires (for more, see Section 4.4), that is fully embedded within the local context (for more, see Section 4.5) and shared within the community itself without the need for external intervention or input. However, due to the rather informal nature of horizontal communication, and operating at such local levels, it is rarely researched nor supported adequately to reach its full potential. There are many examples of such local initiatives, such as the land stewardship association, Pego Viu, that actively involve local citizens in wildfire management and beyond, connecting to the local needs, interests, and knowledges.

> *"The natural communications on the ground works very very effectively. The people [at those local fire partnership meetings], are leaders of farm groups in those localities, and they relay that information on to their own members directly. It's very effective"*
> Ireland, Forest Service

- **Recognise and acknowledge the social diversity that exists between *and* within communities**. Communities are *not* homogeneous groups, but widely diverse in their multiple and intersecting[19] dimensions of cultural (e.g. religion, language…), demographic (e.g. gender, ethnicity, age), geographical (e.g. rural, urban, WUI…) aspects and more. All these (and more) social identities intersect, leading to unique circumstances of each person in terms of discrimination and privilege (see Figure 6). Overlooking this can increase the vulnerability and marginalisation of certain groups in less privileged positions, like women, the young and elderly, people with disabilities, neurodivergent individuals, homeless people, and LGBTQI+ communities (Zaidi & Fordham, 2021); (Baker, Dinh, Foxfoot, Ortiz, & Sells, 2022). As such, using an intersectional lens when engaging with communities is essential. For more on this topic, see this article on positionality & intersectionality[20].

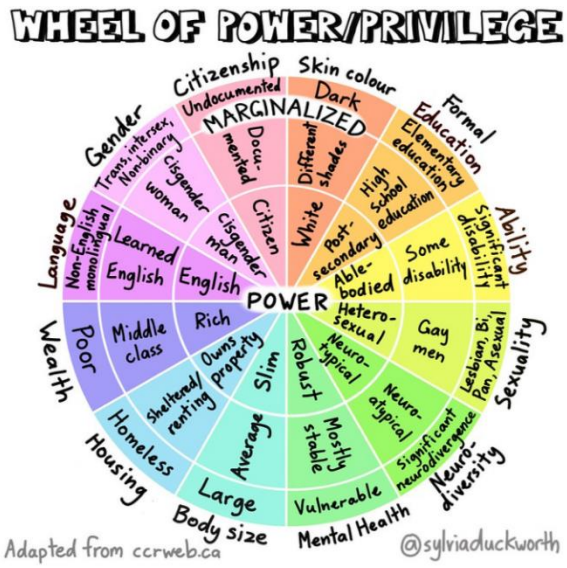

Figure 6. A visual representation of power-privilege. Source: Duckworth, 2020. https://flic.kr/p/2jWxeGG

[19] *Intersectionality* is an analytical framework that helps to visibilise how different dimensions of a person's social and political identities (e.g. ethnicity, class, gender, ability, neurodiversity, and many others) intersect and overlap with one another, creating layered experiences for people along the lines of oppression or privilege.
[20] https://ecampusontario.pressbooks.pub/universaldesign/chapter/positionality-intersectionality/

- **Support and facilitate (in)formal networks and social interactions**. Information, knowledge, and experiences on wildfires are communicated way beyond official Wildfire Communication campaigns, making their way throughout communities through all sorts of formal and, especially, informal networks. Think of, for instance, hiking groups, homeowner associations, cultural associations, etc. Supporting and facilitating such social interactions can encourage, for instance, risk reduction action at the community level, as well as mitigate conflicts (both described in Section 4.1). As Wilson et al. (2017) explains, by "build[ing] interpersonal relationships and social networks, [this can] foster shared goals and a collective sense of responsibility that can increase motivation to prepare for future fires"

"We have the official channels […]. But people use their own networks to get themselves ready a little bit as well. I think for fire it's been really important"
Ireland, Forest Service

"it was that social network of making sure that we're all taking care of each other and we're all accountable for each other, and that actually made them more resilient to a wildfire than a community that might be investing 10.000's of dollars every year on gardening, retrofits, and whatever else. Because the social component was there in one neighbourhood and just wasn't there in another"
USA, Wildfire Social scientist

Table 5. Further readings - section 'Who communicates to who'

Topics	Reference
Bidirectional communication or dialogue	(Christianson et al., 2011; Kuhlicke & Steinführer, 2010; McCaffrey, 2015; Remenick, 2017; Toman et al., 2006; Velez et al., 2017; Wilson et al., 2017)
Horizontal, community-based communication	(Frank et al., 2015; Ganz et al., 2007; Morales & Camarena, 2010; Morris, 2003)
Diversity and intersectionality	(Paton & Buergelt, 2012); (Lennie & Hearn, 2003); (Zaidi & Fordham, 2021); (Elliott, 2022); (IAWF, 2018); (Davies et al., 2018)
(in)formal networks and social interaction	(Eriksen, 2010; Fairbrother & Tyler, 2018; Joshi et al., 2022; Wilson et al., 2017) (Toomey, 2023)

* Full references and links to publications can be found in the References section at the end of this deliverable

4.3. What to communicate

When considering *what* to communicate, often the focus of Wildfire Risk Communication is on conveying messages to the public **on how to prevent wildfires, or how to act in case there is one.** That is, the messages are centred on wildfire risk prevention and preparedness. Going beyond such focus on risk, there are several other recommendations to consider on *what* to communicate:

- **Adapt the words and messages to people's present level of understanding, interests, and concerns.** This is often overlooked when developing generic Wildfire Risk Communication campaigns. As described in Section 4.5, it is key to consider local contexts and adapt the message to it. This is done through, e.g. identifying common starting points; giving relatable, concrete examples; connecting with values that are important to the community; and creating shared understandings of the issue at hand. For instance, when communicating with people in a country that is not so familiar with wildfires – as the Netherlands – about 'living with wildfire', it could help to first talk about 'living with water' (people there are more familiar with that).

  > *"here in South Africa probably about 70% […] do not use electricity to keep them warm or for cooking. They use open fire. So you can't say to people, "OK, you are not allowed to use fire".*
  > South Africa, Wildfire Non-Profit

  As an example of how words and messages can be adapted, FAC made a tip sheet[21] on communicating with the general public. Another example – also linked to the topic of inclusivity in Section 4.4 – is communicating in the language and dialect(s) of the local peoples, such as is done through the *We Are Fire* Toolkit[22] from northern Saskatchewan (Canada), wherein the local Swampy Cree dialect is weaved throughout the toolkit materials.

- **Adapt the words and messages to where we are in the disaster cycle at that moment in time.** Are we communicating during the prevention and preparedness phase? Is there a wildfire happening right now? Or is the community recovering from a recent wildfire? In each phase, the communicative needs are vastly different. For instance, during a wildfire event, people need clear, reliable information on aspects such as where the fire is and how they can remain safe. However, this information is not always available, accessible and/or easy to understand. In response to this, are emerging examples of community-focused news sources, like The Lookout Station[23] in California, USA – to create visual narratives illustrating what is happening on the ground during wildfire events, and the Wildfire Watch[24] app in Spain – where official reporting on wildfire events is complemented by communities' observations on the ground to create comprehensive, timely and useful information for everyone.

- **Be aware of what (underlying) messages are conveyed**. Depending on how wildfire (risk) messages are framed, this will shape the ways wildfires are seen, whether and in how far they are problematized, what solutions are proposed, and

  > *"I think a lot of people, myself included, use the phrase Living with Fire because it's so evocative, of this like, "yes, we can do it", you know?"*
  > USA, Wildfire Social scientist

[21] https://fireadaptednetwork.org/wp-content/uploads/2018/02/Fire_FAC_Language_Reccs_Online-02.12.2018.pdf
[22] https://wearefire.ca/
[23] https://the-lookout.org/
[24] https://www.wildfirewatch.app/en

who is pointed out as responsible for the issue and its solutions. For instance, when wildfires are framed only as bad and destructive, people will find it hard to understand it has an ecological role, and might not accept a certain level of (prescribed / cultural) fire in the landscape. As such, it is important to be aware and acknowledge that no message is neutral, but instead conveys (often implicitly) certain values and assumptions, and to take care in framing messages in one way or another.

- **Select topics that are relevant for the community – even if they only peripherally touch on wildfires**. Risk communication is often focused on developing *specific resilience* to one particular risk – like wildfires. But communities tend to gravitate towards creating *general resilience*, as wildfires are far from the only risk they face. Especially in times when rare and unprecedented disturbances, like wildfires, can happen, priority should be given to developing a more general resilience. In that sense, it is helpful to identify with communities which other topics are relevant to them, and work from there to connect to wildfire risk reduction actions, instead of solely focusing on wildfires. For instance, the local Spanish association, ABAI[25], was founded in 1993 to prevent and mitigate wildfires, and nowadays has various projects linked to the ecosystem's general resilience, way beyond the topic of wildfires.

> *"This [wildfire] problem is an urban problem, it is an educational problem, it is an environmental problem, it is an economic problem, it is a social problem, and it requires a broader framework than strictly wildfires"*
> Spain, Wildfire Consultant

Table 6. Further readings - section 'What to communicate'

Topics	Reference
Adapt words and messages to local contexts	(Christianson et al., 2011; McCaffrey, 2015; Moser, 2014; Paveglio et al., 2009)
Message framing	(Agrawal et al., 2022; Castelló & Montagut, 2019; Hulme, 2009; Morrow, 2009; Tropeano, 2020; Walker et al., 2020)
Specific and general resilience	(Carpenter et al., 2012; Hertz, 2018; Schoennagel et al., 2017)

* Full references and links to publications can be found in the References section at the end of this deliverable

[25] http://abaibenissa.blogspot.com/ Asociación Benissera Anti Incendios (ABAI)

4.4. How to do wildfire communication

As to *HOW* to communicate about wildfires, often in Wildfire Risk Communication this is focused on which channels to use, like social media, posters, in-person meetings, etc. There are myriads of handbooks and articles on how to communicate (see Annex 1 for a selection). This deliverable does not intend to repeat what is said there, but instead adds some additional recommendations that can inform more meaningful and situated Wildfire Communication:

- **Acknowledge and integrate everyone's knowledges and experiences**. Predominantly western scientific knowledge informs risk management, including Wildfire Risk Communication. However, there are many other knowledge systems – like Indigenous Ways of Knowing and Traditional Knowledge – and many communities have valuable, locally situated experiences of living with fire. Exclusion of such knowledges and experiences is a form of *epistemic injustice**, and increases people's vulnerability towards wildfire risk. Aforementioned bidirectional and horizontal communication (Section 4.2) can help to acknowledge that *everyone* can make valuable contributions to mitigating and reducing wildfire risk. Moreover, Campbell et al. (2019) explains, solutions that "incorporate community-based knowledge and are culturally appropriate, [are] more likely to be embraced and implemented".

> *"We couldn't do anything without the knowledge of the community there because we don't know the soil. We don't know how the forest has developed […or] what consequences are there from the fires […]. So the knowledge the locals have, cannot be covered by outsiders"*
> Germany, Science communicator

- **Foster inclusivity so that no one is left behind**. Certain groups are marginalised and excluded, be it due to their skin colour, religion, socioeconomic standing or otherwise, making them particularly vulnerable to wildfire disasters (Baker, Dinh, Foxfoot, Ortiz, & Sells, 2022). To foster inclusivity within wildfire communication, there are many different options. For instance, Elliott (2022) advocates for paying attention to the dynamics of power and position (of all actors involved, including communicators, researchers, public administrations, communities, etc), and prioritise outcomes such as "change-making strategies, empowerment, and capacity building", as well as "engage with structural causes of inequality and recognition of multiple forms of knowledge" (Elliott, 2022, p. 4).

  For instance, young people are often overlooked and excluded from disaster management, but there are now increasingly more projects – like CIUDAR[26] – aimed at fostering their inclusion and participation in disaster management. Further examples of fostering inclusivity of diverse communities are the National Resource Center on Advancing Emergency Preparedness for Culturally Diverse Communities[27], this blogpost on 'who's missing?'[28] from FAC, and these recommendations on adapting emergency response to the diversity of our society[29] from the Catalan Civil Protection.

[26] https://www.lancaster.ac.uk/cuidar/en/
[27] https://diversitypreparedness.org/about-us/about-the-center/
[28] https://fireadaptednetwork.org/whos-missing-thinking-wildfire-resilience-equity-inclusion-lens/
[29] https://interior.gencat.cat/web/.content/home/030_arees_dactuacio/proteccio_civil/plans_de_proteccio_civil/plans_de_proteccio_civil_a_catalunya/documents/Guia-DINA4__rev_ling_access.pdf

- **Listen to people**. As Wildfire Risk Communication tends to happen unidirectionally, often something as simple yet powerful as truly listening to communities is neglected. As Kearns (2012) mentions, listening actively and deeply allows us "*to connect, empathize, and support rather than antagonize and change others' behaviors*", as well as unearth what is not yet known and what is really being said. Moreover, it allows situating the needs, interests, and values of communities at the centre of Wildfire Risk Communication, to inform more meaningful and relevant wildfire risk prevention actions.

> *"We have to listen to the communities, we have to give the communities the power of their choice. because we are always "you do, you do" and this sometimes works and other times don't work, but probably is better now to hear and do what people ask"*
> Portugal, Local Civil Protection

- **Foster community-building and collaboration** (and if it can be done in a fun way, even better). This can be done in a myriad of different ways – to be adapted according to the local context – such as through inclusive, engaging, and multi-stakeholder processes, creating shared understanding and building mutual trust from which collaborative relationships and partnerships can emerge. The Sites of Excellence[30] pilot project from NFPA is an example of this.

> *"it's done in this social fun way and it's not a "here are all the things you're doing wrong" lecture, "fix all your problems". It's this "we're all going to get together and try to save our neighbourhood! It's going to be awesome. It's a party!" and it's just a different way of spinning it, that really promotes togetherness, instead of this feeling of you're doing something in isolation or because you have to"*
> USA, Wildfire Social scientist

- **Prioritise building trust.** Many of the processes mentioned throughout this deliverable – like collaboration, mutual learning, and shared decision-making on wildfire risk reduction action - require trust between those involved. For this, honesty, transparency, credibility, open-mindedness, and willingness to learn from others are important elements towards building trust. However, it is essential to remember that trust building takes time – it cannot be rushed, as Neale et al., (2019) explain: "in any collaboration 'the relationship is critical, and you just need to take the time to build the relationship'".

> *"Co-creation is not generated one day by gathering people at a table and asking for opinions. Co-creation is the result of a process, where trust, credibility and tools are built"*
> Spain, Wildfire Governance & Communication expert

- **Show and inspire, not just tell.** Often, we think of the 'what' in terms of specific words or images to convey. But a very powerful type of messaging is by **showing people and letting *them* do things**, such as doing demonstrations of fuel management, like prescribed burning, in forest properties or around people's houses. An example of this is the demonstration sites of the WKR (Waldbrand Klima Resilienz) project[31]

> *"It takes away some of the complexity, […] if I can just take you to a [prescribed burn] demonstration, I show you in one hour: "here's what we're doing" and then all of a sudden it becomes apparent."*
> Ireland, Forest Service

- **Incorporate storytelling, art, and other creative methods**. As Campbell et al. (2019) explain, these can help to "shift the power dynamics between professional "experts" and community members, and encourage local residents to share more openly what they know and what they need". In addition, it allows diving into the aforementioned complexity, uncertainty & ambiguity of wildfires

[30] https://www.nfpa.org/-/media/Files/Firewise/Research/FirewiseSOE.ashx
[31] https://www.waldbrand-klima-resilienz.com/demonstrationsflaechen

(Section 4.1), as well as sharing emotions and lived experiences around wildfire events. For more on this, see this IAWF article[32]. Stories can be told, for instance, through maps (see this blogpost[33] from FAC on Story Maps), or oral history projects (see the Smokey Generation project[34], dedicated to collecting, preserving, and sharing the stories of wildfires).

Other great examples of using art and creativity, is fire journaling – there are several great artists sharing tricks and tips on how to do this, like Marley Peifer[35] and John Muir Laws[36] – and colouring sheets, like these Wildland Fire Coloring Sheets[37] created as an educational activity for kids in lockdown during the height of the COVID-19 pandemic

Table 7. Further readings - section 'How to do wildfire communication'

Topics	Reference
Traditional, indigenous, and local knowledges	(Abreu, 2022; Ganz & Moore, 2002; Mason et al., 2012; Tengö et al., 2014)
The power of listening	(Kearns, 2012; Mason et al., 2012; Moser, 2019)
Demonstration sites	(McGee, 2011; Silva et al., 2010; Steelman & Kunkel, 2004; Toman et al., 2006)
Building trust	(Fernandez-Gimenez et al., 2008; Neale et al., 2019; Steelman et al., 2015; Yamamoto, 2012)
Community-building, collaboration, and engagement	(FAO, 2013; Hamilton et al., 2020; Hannah et al., 2017; McGee, 2011; Paveglio et al., 2009; Williams et al., 2009)
Inclusion and diversity	(Elliott, 2022) (Lennie & Hearn, 2003) (Baker, Dinh, Foxfoot, Ortiz, & Sells, 2022) (IAWF, 2018); (Davies et al., 2018)
On storytelling	(Boulianne et al., 2018; Campbell et al., 2019; Hannah, 2015; Snow et al., 2021) (Ottolini & Hannah, 2023)
On wildfire journaling	(Morrill, 2023; Ottolini, 2021)

* Full references and links to publications can be found in the References section at the end of this deliverable

[32] https://www.iawfonline.org/article/fire-stories-a-case-for-community-based-communication/
[33] https://fireadaptednetwork.org/fire-adaptation-in-southern-appalachia/
[34] http://thesmokeygeneration.com/
[35] https://www.youtube.com/playlist?list=PLQmEfhMZXgCjIoSGi1mtH8-E0OPXyrXKS Video playlist from Marley Peifer on Nature Journaling Fire
[36] https://www.youtube.com/watch?v=GMvYANxBNKw Video from John Muir Laws on Wildfire Journaling
[37] http://thesmokeygeneration.com/coloring-sheets/?fbclid=IwAR3TgAOcuYlJH9MgjmP2k1KEhWmMAz5-2jKpEn4vYeu-E3pxUbhJRSTNyrw

4.5. When and where to communicate

Lastly, is the question of *when* and *where* to communicate about wildfires and risk reduction actions. Wildfire Communication can occur **before, during or after a wildfire** (i.e. the preparedness and prevention, emergency, and recovery phases). But there are further considerations:

> *"So you find that after a big fire, people are quite motivated to go and do something. And then it's amazing how quickly it recedes into history, and then you're sort of back to the status quo"*
> South Africa, Wildfire Non-Profit

- **Use the window of opportunity after a wildfire**. During and shortly after a wildfire event is when the wildfire topic often becomes more of a priority in people's lives. As such, this is the moment in the risk cycle when communities tend to be most interested in learning about how to prevent future wildfires. This can be both the community that has experienced the wildfire up close, but also nearby communities. However, it is essential to be sensitive in communicating, as wildfires also cause emotional impact and trauma, and contributing to additional distress must be avoided at all costs. The FAC has a useful blogpost[38] on communicating after a wildfire, and this podcast[39] from the Living with Fire Program talks about trauma-informed communication about wildfires.

- **Engage in more continuous communication over time**. Recognizing that Wildfire Communication is an ongoing process – and not a one-time event – allows us to dive much deeper into the wildfire topic, open up conversations about its complexities, ambiguities, and uncertainties, as well as identify and work together with the community on what dimensions of wildfire risk are relevant for them. Moreover, conversations can start around wildfire risk, but can open up many other avenues of communication about values and needs in the community, wherein wildfires are just one part of the bigger picture.

> *"When you go to the coffee shop, people are talking about fire [and] that's a lot more valuable, to have those kinds of conversations, than to just […] broadly broadcast messages that are really simple"*
> USA, Wildfire Community Outreach

> *"Let's not be so immediate-focused, let's not plan things to happen when it suits ME, because technically it has to happen now […]. Through participation, you start processes, and these may need time. We start working with those who are most motivated, the leaders [and] if things make sense, in time more people will join"*
> Spain, Wildfire Governance & Communication

Also, more continuous interaction with communities over time, allows people to join at their *own* pace. This is important, as some folks will be early adopters, but others might need more time to understand the need for wildfire prevention measures and how to incorporate this practically into their lives.

- **Combine wildfire events and activities with some other events already being organised**. That way, it is more likely to reach more people. Moreover, it gets people together from different groups and networks in the community. This allows for further building of social networks, and hence more opportunities for social learning, mutual support, and collaborative activities around wildfires and beyond.

> *"I still think the best way is the community meetings - whether it's like I said, that pool party they throw every year to bring in the kids, so if you bring in the kids, the parents have to come, that kind of thing"*
> USA, Wildfire Liaison officer

[38] https://fireadaptednetwork.org/talking-about-lighting-fire-near-recently-burned-communities-communications-at-the-southern-blue-ridge-trex/
[39] https://www.livingwithfire.com/podcast/episode-11-trauma-informed-communication-about-wildfire/

- **Go outdoors and foster place-based pedagogy**. Oftentimes, Wildfire Communication happens in formal, indoor settings (like meeting rooms or classrooms) that are disconnected from the places where wildfires actually happen and pose a risk to humans. Therefore, going outside, walking around, using all senses to observe the landscape (before or after a wildfire), observing risk factors and discussing jointly on how to reduce risk, is strongly recommended.

  "We try to get people out of the classroom, to show what we're talking about on the ground [...] The truth is that it worked very well. People loved it [...] it is better to take them outdoors" Spain, Wildfire Consultant

  Towers (2018) calls this 'a place-based pedagogy to risk', and it is key, amongst others, for people to develop deeper ways of knowing and understanding wildfire and risk *in situ*, enhance people's fire awareness in the place they live /work, and develop a stronger sense of place. This can be further enhanced by combining it with creative approaches such as wildfire journaling, to stimulate sensory and full-bodied awareness. Pyrosketchology[40] is a great resource on wildfire journaling before, during and after wildfires.

- **Embed Wildfire Communication in local contexts.** As seen in section 3.2, Wildfire Risk Communication is often limited to only conveying generic messages about the do's and don'ts of wildfire prevention and preparedness. Now, each context is different, with different problems, needs, knowledges, experiences, and so forth. As such, wildfire relation actions, such as risk reduction, will be most successful when they are locally embedded, informed by the context in situ. This includes, for instance, "clearly defining desired outcomes, identifying the information desired by citizens, and choosing communicators carefully" (Johnson, 1987). An example of this are a diversity of community-led wildfire initiatives, such as the ACIF[41], local volunteer firefighting groups in Southeast Spain that carry out all sorts of educational activities around wildfires and the broader socioenvironmental system.

Table 8. Further readings - section 'When and where to communicate'

Topics	Reference
Window of opportunity	(Höppner et al., 2010; Koebele et al., 2015; McGee, 2011)
Communicating over longer timeframes	(Balog-Way et al., 2020; Gijselaar, 2020; Höppner et al., 2012; Steelman et al., 2015)
Outdoors and place-based pedagogy	(Krauß & Bremer, 2020; Morrill, 2021, 2023; Ottolini, 2021; Towers, 2018; Velez et al., 2017) (Towers, 2018)
Embed in local contexts	(Christianson et al., 2011; Huntington et al., 2006; Johnson, 1987; Moser, 2014; Paveglio et al., 2009; Paveglio et al., 2015)

* Full references and links to publications can be found in the References section at the end of this deliverable

[40] https://www.pyrosketchology.com/
[41] https://www.facebook.com/FEDERACIONACIF Federación de Agrupaciones Contra Incendios Forestales

Conclusions

There are **increasingly extreme wildfires** despite fire suppression efforts, entailing disaster and socioenvironmental injustices. In response to this worrying situation, wildfire practitioners and scientists **call for different ways to deal with, and relate to, wildfires.** This implies moving away from Wildfire Suppression – which has paradoxically increased extreme wildfires – towards considering wildfires are part of our socioenvironmental systems: Living with Wildfires.

As such, practice and theory on **communicating about wildfires must accompany and support this paradigm shift.** However, **Wildfire Risk Communication continues to be largely embedded within the Fire Suppression Paradigm**, informing particular ways of communicating about wildfires. That is, by focusing mainly on the *risk* dimension of wildfires, and communicating in a manner that is generally top-down, expert-driven, and generic messaging. Especially in the face of extreme wildfires that are increasingly impacting communities and ecosystems, such communication appears to be limited in preventing and mitigating disasters.

As such, it is key to go beyond focusing only on wildfire risk, to instead understand that wildfires are part of our socioenvironmental systems, and the result of long-term, complex processes. This requires communicating **about wildfires (and risk) in ways that are more inclusive, locally situated, and participatory**. And this implies **working *with* communities**.

Whilst technical knowledge about fire is important (and has strongly informed Wildfire Risk Communication practices), working with **communities requires first and foremost people trained in working *with* people**. These professionals play a key role in **putting at the centre the communities' experiences, knowledges, and needs.** To help in such an endeavour, this deliverable has presented **a series of recommendations** for Wildfire Communication, articulated around the why, who, what, how, when, and where. In addition, this deliverable includes lists of further readings on core topics (at the end of each recommendations sub-section) and further resources on communicating about wildfires and risk (Annex 1).

Annex 1. Extra resources on communicating about wildfires & risk

Policy Brief - Communicating with Citizens in a Crisis. By ENGAGE, 2020

Steps are shared on developing a new communication ecosystem- one that is inclusive, take the diversity of citizen needs into account, and recognizes their invaluable contributions to disaster management.

A Reporter's Guide to Wildland Fire. By Timothy Ingalsbee, 2009

This guide is intended to help journalists improve the accuracy, quality, and value of their stories on wildfire events and fire management

The Uncertainty Handbook: A practical guide for climate change communicators. By Climate Outreach and University of Bristol, 2019

The Uncertainty Handbook provides scenarios and suggestions to help improve how to talk about climate change and handle scientific uncertainty, with 12 practical and easy-to apply principles for smarter communication (also applicable for other contexts, like wildfires)

Risk Communication and Social Vulnerability: Guidance for Practitioners. By the Natural Hazards Center, 2020

The guide highlights how general risk communication principles can be thoughtfully applied to groups that are often marginalized, overlooked, or difficult to reach. It incorporates practice-oriented tips and examples. Moreover, the worksheet booklet breaks each of the core principles down into three steps with questions and considerations to guide users in applying the principles to their own work.

Language to Use with the General Public. by FAC-net, 2017

A guide by the Fire Adapted Communities Learning Network (FAC-net) on Knowing Your Audience and Choosing Your Words Wisely. A further guide is: Nine Tips for Talking about Fire and FAC-net

Getting to the Heart of Science Communication - A Guide to Effective Engagement. By Faith Kearns, 2021

Kearns walks readers through the evolution of science communication, reflecting on the role of diversity, equity, and inclusion in science, and offering key tools for communicators: listening, working with conflict, and understanding trauma, loss, and healing.

Efficient fire risk communication for resilient societies. by EFIRECOMM, 2015-2016

A series of guidelines on efficient fire risk communication, for different groups: community and municipalities; children, young people, and their teachers; and journalists and media

Comunicar sobre incendios forestales (cómo el periodismo puede mitigar los impactos de la crisis climática). By Greenpeace, 2020 (in Spanish)

This guide presents a series of recommendations to ensure adequate media coverage of forest fires and thus, not only to inform correctly, but also to raise public awareness of fires as a social and environmental problem

Annex 2. Glossary

- **Epistemic injustice**: the systematic marginalisation of "alternate knowledge holders and systems [thereby] perpetuating inequity and cognitive injustice" (Timler & Sandy, 2020, p. 4).
- **Extreme wildfire**: "a wildfire event that has a high potential for disaster through the socioenvironmental impacts it entails, and should thus be the focus of disaster risk reduction efforts, including communication. Therefore, it is not just *any* kind of wildfire, as many do not reach the scale and severity of extreme wildfires" (Ottolini, Forthcoming).
- **Fire Suppression paradigm**: a wildfire management approach "which seeks to minimize burned area in the short-term, treats fire as delivering only negative impacts, and tends to react to public opinion with ever-greater investment in firefighting capacity" (Moreira et al., 2020).
- **Integrated Fire Management**: this is a proactive wildfire management approach, to "accommodate the complex spatial-temporal, ecological, and social context of wildfire [in ecosystems]. This requires integrating fire and rangeland science, social values, and fire management technologies in the strategic selection of land management activities to produce long-term ecosystem benefits" (Wollstein et al., 2022).
- **Living with Wildfire:** "this implies allowing fire to once again form part of the socioenvironmental landscapes, accepting that zero wildfires are neither feasible nor desirable, and through context-specific and place-based approaches reducing wildfire's potential for disaster, while also increasing the many benefits stemming from the fire's presence" (Ottolini, Forthcoming).
- **Social learning**: this is a process through which individuals and communities acquire, use, and share diverse knowledges, skills, know-hows and experiences – for instance on (wild)fire – through social interactions, dialogue, and collaboration.
- **Socioenvironmental injustice**: the "unequal and unfair distribution of environmental bads, lack of recognition of social-ecological actors and networks, hindered participation in political, planning, and decision-making processes, and obstruction of the capabilities (flourishing and existence) of unrecognised, and devalued people and nature" (Pineda-Pinto et al., 2021).
- **Socioenvironmental systems:** this comprises the complex and dynamic interactions between social and environmental factors. As such, wildfires are not considered merely as natural phenomena, but are deeply entwined with social systems, and therefore influenced by a wide range of social, economic, cultural, historical and political factors.
- **Wildfire communication**: *any* communication endeavour on wildfires, going beyond the mere risk dimension of wildfires, to instead include *all* its aspects. This is underpinned by the understanding that wildfire is part of our socioenvironmental systems (Ottolini, Forthcoming).
- **Wildfire Risk Communication**: a communicative endeavour that concentrates on the prevention and preparedness of wildfire disasters, whereby generally "information is conveyed by experts and governments to lay citizens to educate the citizens about risk" (da Silva et al., 2019) to thereby "reduce the damage caused by disasters"(Yamori, 2020).

References

Abreu, S. J. De. (2022). Toward a Holistic Approach: Considerations for Improved Collaboration in Wildfire Management. *Open Journal of Forestry*, *12*(01), 107–121. https://doi.org/10.4236/ojf.2022.121006

Agrawal, S., Ambury, H., Parida, D., & Joshi, N. (2022). Understanding risk communication in practice: Insights from municipalities in Alberta, Canada. *International Journal of Disaster Risk Reduction*, *79*, 103175. https://doi.org/10.1016/j.ijdrr.2022.103175

Allen, M. (2017). The SAGE Encyclopedia of Communication Research Methods. In *The SAGE Encyclopedia of Communication Research Methods* (Volume 1). SAGE Publications, Inc. https://doi.org/10.4135/9781483381411

Ballart, H., Vázquez, I., Chauvin, S., Gladine, J., Plana, E., Font, M., & Serra, M. (2016). *Forest fires risk communication. Operational recommendations to improve social prevention. eFIRECOM project (DG ECHO 2014/PREV*/13). http://efirecom.ctfc.catorwww.lessonsonfire.eu

Baker, B., Dinh, Y., Foxfoot, I., Ortiz, E., & Sells, A. (2022). *Equity & Wildfire Resilience: Recommendations for Inclusive Wildfire Management in Ventura County*. Ventura Regional Fire Safe Council. https://bren.ucsb.edu/projects/equity-wildfire-resilience-recommendations-inclusive-wildfire-management-ventura-county

Balog-Way, D., McComas, K., & Besley, J. (2020). The Evolving Field of Risk Communication. *Risk Analysis*, *40*, 2240–2262. https://doi.org/10.1111/risa.13615

Birot, Y. (2009). *Living with Wildfires: What Science Can Tell Us. A Contribution to the Science-Policy Dialogue*. European Forest Institut.

Boulianne, S., Minaker, J., & Haney, T. J. (2018). Does compassion go viral? Social media, caring, and the Fort McMurray wildfire. *Information Communication and Society*, *21*(5), 697–711. https://doi.org/10.1080/1369118X.2018.1428651

Brenkert-Smith, H., Meldrum, J. R., Champ, P. A., & Barth, C. M. (2017). Where you stand depends on where you sit: qualitative inquiry into notions of fire adaptation. *Ecology and Society*, *22*(3). https://doi.org/10.5751/ES-09471-220307

Brummel, R. F., Nelson, K. C., Souter, S. G., Jakes, P. J., & Williams, D. R. (2010). Social learning in a policy-mandated collaboration: Community wildfire protection planning in the eastern United States. *Journal of Environmental Planning and Management*, *53*(6), 681–699. https://doi.org/10.1080/09640568.2010.488090

Butler, B. J., Tyrrell, M., Feinberg, G., VanManen, S., Wiseman, L., & Wallinger, S. (2007). Understanding and reaching family forest owners: Lessons from social marketing research. *Journal of Forestry*, *105*(7), 348–357. https://academic.oup.com/jof/article/105/7/348/4598797

Butry, D. T., Prestemon, J. P., & Abt, K. L. (2010). Optimal timing of wildfire prevention education. *WIT Transactions on Ecology and the Environment*, *137*, 197–206. https://doi.org/10.2495/FIVA100181

Calkin, D. E., Thompson, M. P., & Finney, M. A. (2015). Negative consequences of positive feedbacks in us wildfire management. In *Forest Ecosystems* (Vol. 2, Issue 1, pp. 1–10). SpringerOpen. https://doi.org/10.1186/s40663-015-0033-8

Campbell, L. K., Svendsen, E., Sonti, N. F., Hines, S. J., & Maddox, D. (2019). *Green Readiness, Response, and Recovery: A Collaborative Synthesis*. https://doi.org/10.2737/NRS-GTR-P-185

Carpenter, S. R., Arrow, K. J., Barrett, S., Biggs, R., Brock, W. A., Crépin, A. S., Engström, G., Folke, C., Hughes, T. P., Kautsky, N., Li, C. Z., Mccarney, G., Meng, K., Mäler, K. G., Polasky, S., Scheffer, M., Shogren, J., Sterner, T., Vincent, J. R., … de Zeeuw, A. (2012). General resilience to cope with extreme events. *Sustainability*, *4*(12), 3248–3259. https://doi.org/10.3390/su4123248

Castelló, E., & Montagut, M. (2019). Framing forest fires and environmental activism: A storytelling contest about human intervention in nature. *Communication and Society*, *32*(4 Special Issue), 291–306. https://doi.org/10.15581/003.32.4.291-306

Christianson, A., McGee, T., & Jardine, C. (2011). Canadian wildfire communication strategies. *Australian Journal of Emergency Management*, *26*(3), 40–51.

Coates, R. (2019). Educational hazards? The politics of disaster risk education in Rio de Janeiro. *Disasters*. https://doi.org/10.1111/disa.12399

Collins, T. (2008, December 1). *The political ecology of hazard vulnerability: marginalization, facilitation and the production of differential risk to urban wildfires in Arizona's White Mountains*. Journal of Political Ecology; University of Arizona. https://doi.org/10.2458/v15i1.21686

Cooper, V., Fairbrother, P., Elliott, G., Walker, M., & Ch'ng, H. Y. (2020). Shared responsibility and community

engagement: Community narratives of bushfire risk information in Victoria, Australia. *Journal of Rural Studies*, *80*, 259–272. https://doi.org/10.1016/j.jrurstud.2020.09.015

Corner, A., Lewandowsky, S., Phillips, M., & Roberts, O. (2015). *The Uncertainty Handbook. a Practical Guide for Climate Change Communicators*. https://www.culturehive.co.uk/resources/the-uncertainty-handbook-a-practical-guide-for-climate-change-communicators/

da Silva, N., Fra.Paleo, U., & Ferreira Neto, J. A. (2019). Conflicting Discourses on Wildfire Risk and the Role of Local Media in the Amazonian and Temperate Forests. *International Journal of Disaster Risk Science*, *10*(4), 529–543. https://doi.org/10.1007/s13753-019-00243-z

Davies, I. P., Haugo, R. D., Robertson, J. C., & Levin, P. S. (2018). The unequal vulnerability of communities of color to wildfire. *PLoS ONE*, 13(11). https://doi.org/10.1371/journal.pone.0205825

Elliott, T. (2022). Learning from wildfire: understanding the social dimensions of community response. PhD Thesis. University of Saskatchewan. Retrieved from https://harvest.usask.ca/handle/10388/14012

Enríquez-Loya, A., & Léon, K. (2020). Transdisciplinary Rhetorical Work in Technical Writing and Composition: Environmental Justice Issues in California. *College English*, *82*(5), 449–459.

Eriksen, C. (2010). Playing with fire? Bushfire and everyday life in changing rural landscapes. In *Environmental Sciences*. https://ro.uow.edu.au/theses

Eriksen, C., & Prior, T. (2011). The art of learning: wildfire, amenity migration and local environmental knowledge. *International Journal of Wildland Fire*, *20*, 612–624. https://doi.org/10.1071/WF10018

Eriksen, C., & Prior, T. (2013). Defining the importance of mental preparedness for risk communication and residents well-prepared for wildfire. *International Journal of Disaster Risk Reduction*, *6*, 87–97. https://doi.org/10.1016/j.ijdrr.2013.09.006

Essen, M., Mccaffrey, S., Abrams, J., & Paveglio, T. (2022). Improving wildfire management outcomes: shifting the paradigm of wildfire from simple to complex risk. *Https://Doi.Org/10.1080/09640568.2021.2007861*, 1–19. https://doi.org/10.1080/09640568.2021.2007861

Fairbrother, P., & Tyler, M. (2018). Wildfire and Power. In *Wildfire and Power*. https://doi.org/10.4324/9780429428142

FAO. (2013). *Communication Strategy for Community Based Fire Management Engaging Communities to Sustain their Natural Resources*.

Fernandes, P. M., Delogu, G. M., Leone, V., & Ascoli, D. (2019). Wildfire policies contribution to foster extreme wildfires. In *Extreme Wildfire Events and Disasters: Root Causes and New Management Strategies* (pp. 187–200). Elsevier. https://doi.org/10.1016/B978-0-12-815721-3.00010-2

Fernandez-Gimenez, M. E., Ballard, H. L., & Sturtevant, V. E. (2008). Adaptive management and social learning in collaborative and community-based monitoring: A study of five community-based forestry organizations in the western USA. *Ecology and Society*, *13*(2). https://doi.org/10.5751/ES-02400-130204

Frank, M., Bowyer, J., Bratkovich, S., Erickson, G., Fernholz, K., Groot, H., Howe, J., & Pepke, E. (2015). *Fire Adapted Communities: Nationwide Efforts and Community---Based Tools for Living with Wildfire*. http://www.fs.fed.us/openspace/fote/reports/GTR-

Galizia, L. F., Curt, T., Barbero, R., Rodrigues, M., Galizia, L. F., Curt, T., Barbero, R., & Rodrigues, M. (2021). Understanding fire regimes in Europe. *International Journal of Wildland Fire*, *31*(1), 56–66. https://doi.org/10.1071/WF21081

Ganz, D., & Moore, P. (2002). Living with fire: summary of Communities in flames. In Communities in flames: proceedings of an international conference on community involvement in fire management. In P. Moore, D. Ganz, L. Cheng Tan, T. Enters, & P. Durst (Eds.), *Communities in flames: proceedings of an international conference on community involvement in fire management*. Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific.

Ganz, D., Troy, A., & Saah, D. (2007). Chapter 9 Community Involvement in Wildfire Hazard Mitigation and Management: Community Based Fire Management, Fire Safe Councils and Community Wildfire Protection Plans. In A. Troy & R. G. Kennedy (Eds.), *Advances in the Economics of Environmental Resources* (Vol. 6, pp. 143–164). Emerald Group Publishing Limited. https://doi.org/10.1016/S1569-3740(06)06009-3

Gijselaar, M. (2020). *Naar een brandveiligere natuur: Aanbevelingen voor een preventief beleid rond ontstaan en escalatie van natuurbranden*.

González-Hidalgo, M., Otero, I., & Kallis, G. (2014). Seeing beyond the smoke: The political ecology of fire in Horta de Sant Joan (Catalonia). *Environment and Planning A*, *46*(5), 1014–1031. https://doi.org/10.1068/a45600

González-Hidalgo, M., & Zografos, C. (2020). Emotions, power, and environmental conflict: Expanding the 'emotional turn' in political ecology. *Progress in Human Geography*, *44*(2), 235–255. https://doi.org/10.1177/0309132518824644

Hamilton, M., Salerno, J., Fischer, A. P., Tanguay, L., Bissonnette, J.-F., Turgeon, K., Charnley, S., Kelly, E. C., & Fischer, A. P. (2020). Fostering collective action to reduce wildfire risk across property boundaries in the American West. *Environmental Research Letters*, *15*(2), 025007. https://doi.org/10.1088/1748-9326/AB639A

Hannah, B. E. (2015). The Smokey Generation: A Wildland Fire Oral History and Digital Storytelling Project. *ProQuest Dissertations and Theses*, *May*, 610. https://search.proquest.com/docview/1689680779?accountid=11664

Hannah, B., Smith, B., & Fire, T. S. (2017). *Near Misses and Far-Sightedness Boulder Fire Is a Reminder of the Need for Community*. https://hazards.colorado.edu/article/near-misses-and-far-sightedness-boulder-fire-is-a-reminder-of-the-need-for-community-collaborations

Hano, M. C., Prince, S. E., Wei, L., Hubbell, B. J., & Rappold, A. G. (2020). Knowing Your Audience: A Typology of Smoke Sense Participants to Inform Wildfire Smoke Health Risk Communication. *Frontiers in Public Health*, *8*, 143. https://doi.org/10.3389/fpubh.2020.00143

Headwaters Economics. (2021). *The unequal impacts of wildfire*. https://headwaterseconomics.org/natural-hazards/unequal-impacts-of-wildfire/

Hertz, T. (2018). Comparing Specific and General Resilience Approaches to Climate Change Adaptation in the Framework of Nested Adaptive Cycles. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3262567

Höppner, C., Buchecker, M., & Bründl, M. (2010). Risk Communication and Natural Hazards. *CapHaz-Net WP5 Report. Birmendsdorf: WSL*, 1–120. https://www.researchgate.net/publication/228451235

Höppner, C., Whittle, R., Bründl, M., & Buchecker, M. (2012). Linking social capacities and risk communication in Europe: A gap between theory and practice? *Natural Hazards*, *64*(2), 1753–1778. https://doi.org/10.1007/s11069-012-0356-5

Hulme, M. (2009). Why We Disagree About Climate Change. *Why We Disagree About Climate Change*, *January 2010*. https://doi.org/10.1017/cbo9780511841200

Huntington, H. P., Trainor, S. F., Natcher, D. C., Huntington, O. H., DeWilde, L., & Chapin, F. S. (2006). The significance of context in community-based research: Understanding discussions about wildfire in Huslia, Alaska. *Ecology and Society*, *11*(1). https://doi.org/10.5751/ES-01723-110140

IAWF. (2018). *International Association of Wildland Fire.* Retrieved from https://www.iawfonline.org/wp-content/uploads/2018/05/IAWF-Diversity-and-Inclusion-Policy.pdfJakes, P. J., & Sturtevant, V. (2013). Trial by fire: Community wildfire protection plans put to the test. *International Journal of Wildland Fire*, *22*(8), 1134–1143. https://doi.org/10.1071/WF12156

Johnson, B. B. (1987). Accounting for the Social Context of Risk Communication. *Science & Technology Studies*, *5*(3/4), 103–111.

Johnston, K. A., & Lane, A. B. (2020). Communication with intent: A typology of communicative interaction in engagement. *Public Relations Review*, *August 2019*. https://doi.org/10.1016/j.pubrev.2020.101925

Joshi, N., Agrawal, S., & Lie, S. (2022). What does neighbourhood climate action look like? A scoping literature review. *Climate Action*, *1*(1), 1–13. https://doi.org/10.1007/s44168-022-00009-2

Kaufmann, M. R., Shlisky, A., & Marchand, P. (2005). Good fire, bad fire: how to think about forest land management and ecological processes. In *USDA*. http://treesearch.fs.fed.us/pubs/20296

Kearns, F. R. (2012). From science communication to relationship-building: Contemplative practice and community engagement in the environmental sciences. *Journal of Environmental Studies and Sciences*, *2*(3), 275–277. https://doi.org/10.1007/s13412-012-0083-y

Keeley, J. E., Bond, W. J., Bradstock, R. A., Pausas, J. G., & Rundel, P. W. (2011). Fire in mediterranean ecosystems: Ecology, evolution and management. In *Fire in Mediterranean Ecosystems: Ecology, Evolution and Management* (Vol. 9780521824). https://doi.org/10.1017/CBO9781139033091

Kim, I., & Dutta, M. J. (2009). Studying Crisis communication from the subaltern studies framework: Grassroots activism in the wake of Hurricane Katrina. *Journal of Public Relations Research*, *21*(2), 142–164. https://doi.org/10.1080/10627260802557423

Koebele, E., Crow, D. A., Lawhon, L. A., Kroepsch, A., Schild, R., & Clifford, K. (2015). Wildfire Outreach and Citizen Entrepreneurs in the Wildland–Urban Interface: A Cross-Case Analysis in Colorado. *Society and Natural Resources*, *28*(8), 918–923. https://doi.org/10.1080/08941920.2015.1054975

Krauß, W., & Bremer, S. (2020). The role of place-based narratives of change in climate risk governance. *Climate Risk Management*, *28*, 100221. https://doi.org/10.1016/j.crm.2020.100221

Kuhlicke, C., & Steinführer, A. (2010). *Knowledge Inventory. State of the art of natural hazards research in the social sciences and further research needs for social capacity building.* (D10.1-Version 1.4).

Lennie, J., & Hearn, G. (2003). Designing inclusive communication and participation processes:. *ANZCA03 Conference,.* Brisbane.

Lloro-Bidart, T., & Finewood, M. H. (2018). Intersectional feminism for the environmental studies and sciences: looking inward and outward. *Journal of Environmental Studies and Sciences*, *8*(2), 142–151. https://doi.org/10.1007/s13412-018-0468-7

Macintyre, E., Khanna, S., Darychuk, A., Cope, R., & Schwart, B. (2019). Evaluating risk communication during extreme weather and climate change: A scoping review. In *Health Promotion and Chronic Disease Prevention in Canada* (Vol. 39, Issue 4, pp. 142–156). https://doi.org/10.24095/hpcdp.39.4.06

Madge, C. (2021). *The social learning processes involved in incorporating wildfire risk reduction strategies into forest harvesting plans in northern Saskatchewan*. Dalhousie University.

Mason, L., White, G., Morishima, G., Alvarado, E., Andrew, L., Clark, F., Durglo, M., Durglo, J., Eneas, J., Erickson, J., Friedlander, M., Hamel, K., Hardy, C., Harwood, T., Haven, F., Isaac, E., James, L., Kenning, R., Leighton, A., … Wilder, S. (2012). Listening and learning from traditional knowledge and western science: A dialogue on contemporary challenges of forest health and wildfire. *Journal of Forestry*, *110*(4), 187–193. https://doi.org/10.5849/jof.11-006

McCaffrey, S. (2015). Community Wildfire Preparedness: a Global State-of-the-Knowledge Summary of Social Science Research. *Current Forestry Reports*, *1*(2), 81–90. https://doi.org/10.1007/s40725-015-0015-7

McGee, T. K. (2011). Public engagement in neighbourhood level wildfire mitigation and preparedness: Case studies from Canada, the US and Australia. *Journal of Environmental Management*, *92*(10), 2524–2532. https://doi.org/10.1016/j.jenvman.2011.05.017

Mockrin, M. H., Fishler, H. K., & Stewart, S. I. (2018). Does Wildfire Open a Policy Window? Local Government and Community Adaptation After Fire in the United States. *Environmental Management*, *62*(2), 210–228. https://doi.org/10.1007/s00267-018-1030-9

Morales, T., & Camarena, C. (2010). The community museum: A space for the exercise of communal power. *Cadernos de Sociomuseologia*, *38*, 135–152. http://revistas.ulusofona.pt/index.php/cadernosociomuseologia/article/view/1664/0

Moreira, F., Ascoli, D., Safford, H., Adams, M. A., Moreno, J. M., Pereira, J. M. C., Catry, F. X., Armesto, J., Bond, W., González, M. E., Curt, T., Koutsias, N., McCaw, L., Price, O., Pausas, J. G., Rigolot, E., Stephens, S., Tavsanoglu, C., Vallejo, V. R., … Fernandes, P. M. (2020). Wildfire management in Mediterranean-type regions: Paradigm change needed. *Environmental Research Letters*, *15*(1). https://doi.org/10.1088/1748-9326/ab541e

Moritz, M. A., Batllori, E., Bradstock, R. A., Gill, A. M., Handmer, J., Hessburg, P. F., Leonard, J., McCaffrey, S., Odion, D. C., Schoennagel, T., & Syphard, A. D. (2014). Learning to coexist with wildfire. *Nature*, *515*(7525), 58–66. https://doi.org/10.1038/nature13946

Morrill, M. (2021). *The REDI Jedi Master Program - Nature journaling and place-based learning to enhance fire awareness*. Butte County Fire Safe Council. https://buttefiresafe.net/education-programs/fire-redi-master-program/#

Morrill, M. (2023). *Pyrosketchology. An illustrated Guide to Nature Journaling about the Fire Environment*.

Morris, N. (2003). A comparative analysis of the diffusion and participatory models in development communication. *Communication Theory*, *13*(2), 225–248. https://doi.org/10.1111/j.1468-2885.2003.tb00290.x

Morrow, B. (2009). *RISK BEHAVIOR AND RISK COMMUNICATION: SYNTHESIS AND EXPERT INTERVIEWS - FINAL REPORT FOR THE NOAA COASTAL SERVICES CENTER*. https://www.researchgate.net/publication/255629423

Moser, S. C. (2014). Communicating adaptation to climate change: The art and science of public engagement when climate change comes home. *Wiley Interdisciplinary Reviews: Climate Change*, *5*(3), 337–358. https://doi.org/10.1002/wcc.276

Moser, S. C. (2019). Not for the faint of heart: Tasks of climate change communication in the context of societal transformation. In F. Giuseppe, H. Geoghegan, & A. Arnall (Eds.), *Climate and Culture: Multidisciplinary Perspectives on a Warming World*. Cambridge University Press.

Neale, T., Carter, R., Nelson, T., & Bourke, M. (2019). Walking together: A decolonising experiment in bushfire management on dja dja wurrung country. *Cultural Geographies*, *26*(3), 341–359. https://doi.org/10.1177/1474474018821419

NY Times. (2020). *Wildfire Smoke Is Poisoning California's Kids. Some Pay a Higher Price*. https://www.nytimes.com/interactive/2020/11/26/climate/california-smoke-children-health.html?smid=tw-share

Öhman, S., Giritli Nygren, K., & Olofsson, A. (2016). The (un)intended consequences of crisis communication in news media: a critical analysis. *Critical Discourse Studies*, *13*(5), 515–530. https://doi.org/10.1080/17405904.2016.1174138

Otero, I., Castellnou, M., González, I., Arilla, E., Castell, L., Castellví, J., Sánchez, F., & Nielsen, J. Ø. (2018). Democratizing wildfire strategies. Do you realize what it means? Insights from a participatory process in the Montseny region (Catalonia, Spain). *PLOS ONE*, *13*(10), e0204806. https://doi.org/10.1371/journal.pone.0204806

Ottolini, I. (Forthcoming). *A shifting wildfire communication paradigm. From communicating Wildfire Risk to communicating about Wildfires (and beyond)*. PhD Thesis. Open University of Catalunya.

Ottolini, I. (2021). *Fire journaling: communicating creatively about wildfires*. PyroLife Blog. https://pyrolife.lessonsonfire.eu/fire-journaling-communicating-creatively-about-wildfires/

Ottolini, I., & Hannah, B. (2023). Fire Stories. A case for Community-Based Communication. IAWF Wildfire Magazine. Retrieved from https://www.iawfonline.org/article/fire-stories-a-case-for-community-based-communication/

Paton, D., & Buergelt, P. T. (2012). *Community engagement and wildfire preparedness : the influence of community diversity*. *December 2018*.

Paveglio, T. B., Moseley, C., Carroll, M. S., Williams, D. R., Davis, E. J., & Fischer, A. P. (2015). Categorizing the Social Context of the Wildland Urban Interface: Adaptive Capacity for Wildfire and Community "Archetypes." *Forest Science*, *61*(2), 298–310. https://doi.org/10.5849/FORSCI.14-036

Paveglio, T., Carroll, M. S., Absher, J. D., & Norton, T. (2009). Just Blowing Smoke? Residents' Social Construction of Communication about Wildfire. *Environmental Communication*, *3*(1), 76–94. https://doi.org/10.1080/17524030802704971

Pineda-Pinto, M., Nygaard, C. A., Chandrabose, M., & Frantzeskaki, N. (2021). Mapping social-ecological injustice in Melbourne, Australia: An innovative systematic methodology for planning just cities. *Land Use Policy*, *104*. https://doi.org/10.1016/j.landusepol.2021.105361

Plana, E., & Font, M. (2015a). *eFIRECOM - State of the art on fire risk communication amongst journalists and media*. http://efirecom.ctfc.cat/

Puente, J. (2018). Educación Ambiental e Incendios Forestales en España. *[Tesis de Grado]*. https://bit.ly/3gfVF8L

Remenick, L. (2017). *The Role of Communication in Preparation for Wildland Fire: A Literature Review*. https://doi.org/10.1080/17524032.2017.1346519

Rodríguez-Carreras, R., Úbeda, X., Francos, M., & Marco, C. (2020). After the wildfires: The processes of social learning of forest owners' associations in Central Catalonia, Spain. *Sustainability (Switzerland)*, *12*(15). https://doi.org/10.3390/su12156042

Schoennagel, T., Balch, J. K., Brenkert-Smith, H., Dennison, P. E., Harvey, B. J., Krawchuk, M. A., Mietkiewicz, N., Morgan, P., Moritz, M. A., Rasker, R., Turner, M. G., & Whitlock, C. (2017). Adapt to more wildfire in western North American forests as climate changes. In *Proceedings of the National Academy of Sciences of the United States of America* (Vol. 114, Issue 18). https://doi.org/10.1073/pnas.1617464114

Shrestha, A., Grala, R. K., Grado, S. C., Roberts, S. D., & Gordon, J. S. (2021). Landowner Concern about Wildfires and Implementation of Fuel Reduction Treatments. *Journal of Forestry*, *119*(3), 251–265. https://doi.org/10.1093/jofore/fvaa060

Silva, J. S., Rego, F., Fernandes, P., & Rigolot, E. (2010). *Towards Integrated Fire Management. Outcomes of the European Project Fire Paradox*.

Snow, T., Murikumthara, D., Dusseldorp, T., Fyfe, R., Wolff, L., Mccracken, J., Graham-Latrobe, A., & Ferguson-Maranguka, A. (2021). *Storytelling for Systems Change: insights from the field*. https://www.centreforpublicimpact.org/partnering-for-learning/storytelling-for-systems-change

Steelman, T. A., & Kunkel, G. F. (2004). Effective community responses to wildfire threats: Lessons from New Mexico. *Society and Natural Resources*, *17*(8), 679–699. https://doi.org/10.1080/08941920490480697

Steelman, T. A., & McCaffrey, S. (2013). Best practices in risk and crisis communication: Implications for natural hazards management. *Natural Hazards*, *65*(1), 683–705. https://doi.org/10.1007/s11069-012-0386-z

Steelman, T. A., McCaffrey, S. M., Velez, A. L. K., & Briefel, J. A. (2015). What information do people use, trust, and find useful during a disaster? Evidence from five large wildfires. *Natural Hazards*, *76*(1), 615–634. https://doi.org/10.1007/s11069-014-1512-x

Stoof, C. R., & Kettridge, N. (2022). Living With Fire and the Need for Diversity. In *Earth's Future* (Vol. 10, Issue 4, p. e2021EF002528). John Wiley & Sons, Ltd. https://doi.org/10.1029/2021EF002528

Sword-Daniels, V., Eriksen, C., Hudson-Doyle, E. E., Alaniz, R., Adler, C., Schenk, T., & Vallance, S. (2016). Embodied uncertainty: living with complexity and natural hazards. *Journal of Risk Research*, *21*(3), 290–307. https://doi.org/10.1080/13669877.2016.1200659

Tedim, F., Leone, V., Amraoui, M., Bouillon, C., Coughlan, M. R., Delogu, G. M., Fernandes, P. M., Ferreira, C., McCaffrey, S., McGee, T. K., Parente, J., Paton, D., Pereira, M. G., Ribeiro, L. M., Viegas, D. X., &

Xanthopoulos, G. (2018). Defining extreme wildfire events: Difficulties, challenges, and impacts. *Fire*, *1*(1), 1–28. https://doi.org/10.3390/fire1010009

Tedim, F., McGee, T. K., & Leone, V. (2020). Extreme wildfire events and disasters: Root causes and new management strategies. In *Extreme Wildfire Events and Disasters: Root Causes and New Management Strategies* (Issue December). Elsevier. https://doi.org/10.1016/C2017-0-03309-8

Tengö, M., Brondizio, E. S., Elmqvist, T., Malmer, P., & Spierenburg, M. (2014). Connecting diverse knowledge systems for enhanced ecosystem governance: The multiple evidence base approach. In *Ambio* (Vol. 43, Issue 5, pp. 579–591). Springer. https://doi.org/10.1007/s13280-014-0501-3

The Guardian. (2020). *Almost 3 billion animals affected by Australian bushfires, report shows*. https://www.theguardian.com/environment/2020/jul/28/almost-3-billion-animals-affected-by-australian-megafires-report-shows-aoe

Tierney, K. J. (2019). *Disasters : a sociological approach*. Polity Press. https://books.google.es/books?hl=en&lr=&id=HY2ZDwAAQBAJ&oi=fnd&pg=PT8&dq=Disasters.+A+sociological+approach&ots=idK_4pVSgy&sig=VvcJ8ZYUL-sOi1MZzw969MhwVlk#v=onepage&q=Disasters. A sociological approach&f=false

Timler, K., & Sandy, D. W. (2020). Gardening in Ashes: The Possibilities and Limitations of Gardening to Support Indigenous Health and Well-Being in the Context of Wildfires and Colonialism. *International Journal of Environmental Research and Public Health*, *17*(9), 3273. https://doi.org/10.3390/ijerph17093273

Toomey, A. (2023). Why facts don't change minds: Insights from cognitive science for the improved communication of conservation research. *Biological Conservation*. doi:10.1016/j.biocon.2022.109886

Toman, E., Shindler, B., & Brunson, M. W. (2006). Fire and Fuel Management Communication Strategies: Citizen Evaluations of Agency Outreach Programs. *Society and Natural Resources*, *19*(4), 321–336. https://doi.org/10.1080/08941920500519206

Towers, B. (2018). School-based bushfire education: advancing teaching and learning for risk reduction and resilience. *Australian Institute for Disaster Resilience*.

Tozer, M. (2013). Good Fire vs. Bad Fire: Progressing the Debate from Value-Based Judgements to Evidence-Based Management. *NCCs 9th Biennial Bushfire Conference*.

Tropeano, L. (2020). *It's Only Natural-Assessing the framing of the 2019/20 Australian bushfires* [LUCSUS]. http://lup.lub.lu.se/student-papers/record/9030972

UNEP. (2022). *Spreading like Wildfire – The Rising Threat of Extraordinary Landscape Fires. A UNEP Rapid Response Assessment.*

Velez, A. L. K., Diaz, J. M., & Wall, T. U. (2017). Public information seeking, place-based risk messaging and wildfire preparedness in southern California. *International Journal of Wildland Fire*, *26*(6), 469–477. https://doi.org/10.1071/WF16219

Vélez Muñoz, R. (2000). Campañas de sensibilización rural. *Cuadernos de La Sociedad Española de Ciencias Forestales*, *9*, 179–181. https://doi.org/10.31167/CSEF.V0I9.9195

Walker, H. M., Reed, M. G., & Fletcher, A. J. (2020). Wildfire in the news media: An intersectional critical frame analysis. *Geoforum*, *114*, 128–137. https://doi.org/10.1016/j.geoforum.2020.06.008

Williams, D. R., Jakes, P. J., Burns, S., Cheng, A., Nelson, K., Grayzeck, S., & Saeli, E. (2009). *Community wildfire protection plans: enhancing collaboration and building scoial capacity*. http://digitalcommons.unl.edu/jfspresearchhttp://digitalcommons.unl.edu/jfspresearch/144

Wilson, R. S., Mccaffrey, S. M., & Toman, E. (2017). Wildfire Communication and Climate Risk Mitigation. *Oxford Research Encyclopedia of Climate Science*. https://doi.org/10.1093/acrefore/9780190228620.013.570

Winter, C. J. (2022). Disaster? No surprise. *Environmental Politics*, *31*(1), 70–88. https://doi.org/10.1080/09644016.2020.1865726

Wollstein, K., Creutzburg, M. K., Dunn, C., Johnson, D. D., O'Connor, C., & Boyd, C. S. (2022). Toward integrated fire management to promote ecosystem resilience. *Rangelands*, *44*(3), 227–234. https://doi.org/10.1016/J.RALA.2022.01.001

Yamamoto, Y. T. (2012). Values, objectivity and credibility of scientists in a contentious natural resource debate. *Public Understanding of Science*, *21*(1), 101–125. https://doi.org/10.1177/0963662510371435

Yamori, K. (2020). *Disaster Risk Communication: A Challenge from a Social Psychological Perspective*. Springer. https://doi.org/https://doi.org/10.1007/978-981-13-2318-8

Zaidi, Z., & Fordham, M. (2021). The missing half of the Sendai framework: Gender and women in the implementation of global disaster risk reduction policy. *Progress in Disaster Science, 10*. doi:https://doi.org/10.1016/j.pdisas.2021.100170