

Island vulnerability and resilience to wildfires: A case study of Corsica

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Abstract

The number of wildfires occurring globally is exacerbated by urbanisation and changes in weather patterns. In response, researchers have conducted studies of wildfires and human behaviour in regions such as Australia and the USA. Regions in Europe have received less attention, despite facing the same issues. Even more overlooked are one particular type of territory: islands. With their climates, islands across the Mediterranean remain attractive second home and tourist destinations, resulting in urban development. Yet due to certain features (e.g. cultural, socio-political, geographical), the ways in which their people deal with wildfires may differ somewhat from that in some mainland territories. This paper explores human behaviour in wildfire emergencies in the context of island vulnerability and resilience in Europe, with the Mediterranean island of Corsica as a case study. Qualitative analysis of semi-structured interviews (n = 8) with Corsican professionals involved in wildfire management and quantitative analysis of around 100 surveys from civilians was conducted. This analysis revealed that Corsica's population approach to wildfire safety is shaped by available information as well as a strong risk culture, which stands in contrast with new/temporary residents moving into the island each summer season. The results drawn from the analysed sample suggest potential social vulnerability in wildfires when a decision to evacuate the population is taken by emergency managers as the most effective emergency response. Population behaviour were not influenced by property attachment, perceived risk, hazard knowledge, community closeness and locus of control, suggesting that island WUI resident characteristics may not be generalised from human behaviour in wildfires studies carried out in the USA or Australia.

Keywords: forest fire, wildfire, human behaviour, Corsica, island resilience, wildland-urban interface

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62 **1. Introduction**
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64 Wildfires are a recognised major risk to communities across Europe [1], especially in the
65 Mediterranean region [2], and more research is attending to the effects of wildfires on
66 populations' vulnerability in the wildland-urban interface (WUI) [3]. Nonetheless, less research
67 is focused on understanding these populations' preparedness for and their lived experiences
68 in responding to wildfire events, for example having to evacuate their homes. While current
69 studies on human responses to wildfires are mostly focused on North American and Australian
70 populations [4,5,6], studies particular to the context of European populations are rare,
71 particularly so for the islands at-risk from wildfires [7,8].
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76 This paper begins by reviewing the occurrence of wildfires in the islands in the
77 Mediterranean and across Europe, as well as contextualises important features of WUI
78 communities, recognised by wildfire research, to islands. Key elements widely reported to
79 influence human behaviour in disasters are outlined and their importance for one European
80 island with a WUI population, Corsica, is explored. The results highlight the differences and
81 convergence between the findings across risk culture, wildfire management and response to
82 a developing fire, comparing the results with those from previous studies and their implications
83 for policy.
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90 **1.1 Island wildfires**
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92 Wildfires are a major challenge connected to urban sprawl. Growing cities force humans
93 further into natural territories, both through the outward extension of the city limits and through
94 generating a desire in some to permanently or temporarily escape densely built-up areas
95 [9,10]. Growing cities also draw people in from rural communities, with forestation replacing
96 their now abandoned farmland, resulting in wider areas covered in more combustible
97 vegetation [9]. This movement, of city limits, of people to and from more isolated settlements,
98 and of vegetation, results in a clash between wildland and urban areas, the so-called wildland-
99 urban interface (WUI) [11]. Proximity between human habitats and wildland causes
100 abnormalities in natural land cover, subsequent changes in weather patterns, posing the risk
101 of fires to WUI residents [2], and depreciation of landscape resulting after fire affected
102 environmental degradation [12]. In addition, it is predicted that climate change will have a
103 significant effect on lengthening the fire season across Europe and the number of fire danger
104 days in the Mediterranean region is going to increase [1,2]. In fact, extreme weather anomalies
105 and low precipitation have already resulted in an unusual number of wildfires in Scandinavian
106 and Baltic regions in 2014 and 2018-2019 [13,60,61,62,63], as well as caused an
107 unprecedented number of wildfire-related deaths recently in Greece (91 fatalities) and in
108 Portugal (exceeding 100 fatalities over two wildfire events) in 2017 [64], along with mass
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121 evacuations throughout Europe's southern regions that same year [83], for which official
122 evacuation records are still unavailable.
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125 Each year, from 2000 to 2009, south-western Europe (specifically Italy, France, Spain,
126 Portugal, and Greece) experienced around 57,000 wildfires, resulting in 430,000 hectares
127 being burned [67]. While no official statistics exist on how many of these fires disrupted the
128 lives and affected the well-being of the populations on each of the aforementioned countries'
129 islands, available research indicates that such effects may indeed be substantial [3,65,66].
130 Along with research into wildfire occurrence and dynamics, recent media coverage illustrates
131 some of the impact to the communities: Madeira (Portugal) [79], Ibiza (Spain) [78], Corsica
132 (France) [83], Sicily (Italy) [80], and Zante (Greece) [81] are a just few examples of extreme
133 fire events requiring mass evacuations and claiming individual lives on European islands.
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139 Environmental changes are particularly problematic on islands, where topography is often
140 complicated [12] and as a result in the event of fire civilians or their vehicles can block fire
141 vehicle access (P. Colombani & O. Tomi 2017, personal communication, 18 April). Islands
142 may experience challenges in adaptability to climate change and local disaster management
143 capacity [14]. Moreover, islands may be isolated in terms of the physical distance involved for
144 the mainland to provide often required support by air [15], as well as have a limited capacity
145 to relocate individuals requiring the use of alternative evacuation methods such as boats [16],
146 thereby increasing the risk for both local resident and tourist populations. Nevertheless,
147 islands may also have a good capacity for resilience [17], possessing local knowledge systems
148 [18] that may allow for personal and community resilience in the face of a disaster. Historical
149 memory is often at the core of such resilience and emergency response awareness [19,20],
150 but changes in policies or housing and emergency response planning uncover new
151 vulnerabilities. Identifying such effects in time before the next disaster happens could help
152 improve community safety.
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162 **1.2 WUI community vulnerability and resilience**

163 A disaster is formed of a combination between a hazard and vulnerability [21] and is
164 followed by multiple consequences, such as a loss of lives and livelihoods, and traumatic
165 experiences [22]. Wildfires – referred to as forest fires in places – are rapidly claiming their
166 place among other highly devastating disasters [79] caused by human activity, both unthinking
167 and malicious behaviour, and natural phenomena (e.g. lightning).
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171 Vulnerability to a wildfire is particularly evident in communities that have little or no capacity
172 to cope or adapt in response to the hazard. Vulnerability traits are not entirely opposite to
173 resilience [23], but they coexist at the expense of one another. For example, official safety
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180 regulations for disaster can conflict with habituated responses by populations in at-risk areas,
181 as is deeply rooted in the understanding of sociology of everyday practice [24]. It suggests
182 that communities' relationship with the environment cannot merely be defined through
183 evacuation policies and mitigation of fire hazards; a deeper connection should be
184 acknowledged.
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188 Thus, apart from geographical features of the WUI, it is recognised that WUI communities
189 differ in their social and economic aspects that influence their response to disasters [20,25].
190 To illustrate this, some suggest that individuals living in WUI, compared to city dwellers,
191 possess specific characteristics, such as adaptability, informal relationship and knowledge
192 fostering, often related to "generational ties" [25, p.1089]. The authors further argue that WUI
193 residents differ in their special local spatial knowledge, are networked and understand the
194 wildfire risks [25]. Thus, cultural and social ties within the community are somewhat a
195 distinguishing feature of WUI residents (also noted by [26]) that contribute to their resilience
196 to disasters.
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202 The arguments around distinguishing features of WUI communities are attributed to the
203 variety of land use types and ownership in the WUI, meaning that populations with a "different
204 set of values, lifestyles, and land ethics" are coming into coexistence [27, p.705]. This often
205 results in tension arising from the conflict between the newcomers and established
206 communities and their culture [27]. Conceptually, a community's core idea is social interaction
207 [28] which potentially shapes individuals' involvement in wildfire risk mitigation [25]. Studies of
208 social cohesion analyse how such social interaction and social organisation may positively
209 influence community resilience [29] in response to disasters. However, such research more
210 often looks at communities from a geographical perspective [30], not accounting for dynamic
211 population changes such as those observed in small islands due to summer tourism and
212 recreational seasons, and do not raise questions of the possibility of non-uniform wildfire
213 knowledge and conflicting population interests.
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222 **1.3 Human behaviour in wildfires**

223 Research on human behaviour in wildfires has already shown that individuals tend to act
224 on their own 'agenda' when it comes to responding to evacuation warnings [20,31]. For
225 example, often people will delay evacuation, evacuate when it is not needed, create traffic
226 congestion in vulnerable areas, or simply take too long to understand the risks that they are
227 facing [32], including returning to their homes before it is safe to do so [33]. Such behaviour is
228 found to be consistently reported by the media throughout the recent (2016–2018) wildfire
229 disasters in Portugal, Spain and France, as well as in the USA and Australia [34,35,36,82,83].
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239 Nevertheless, there is little research looking at the core challenges and particularities of island
240 WUI populations and their behavioural responses to a wildfire. Such quantitative studies are
241 relatively scarce, even more so for parts of Europe and, further still, for European islands.
242 Qualitative studies exist but mostly for larger wildfire regions such as the USA and Australia
243 [18,37]. Therefore, to identify key factors to explore, ones that might influence the behavioural
244 responses of the island WUI populations to wildfires, more expansive literature on other types
245 of disaster that could prompt evacuation, such as hurricanes, was consulted, as well as the
246 existing studies on wildfires from other regions. Five such variables, outlined below, have been
247 repeatedly explored across these studies: property attachment, risk perception, hazard
248 knowledge, community closeness, and locus of control [20,44,47,48]. These variables were of
249 particular interest due to their relation to aforementioned WUI community features, risk culture,
250 wildfire preparedness, and possible connections with evacuation decision-making.
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257 Attention is often drawn to individuals' property attachment, where greater attachment,
258 according to the literature, is associated with a reluctance to evacuate [44,45]. It has mostly
259 been measured in 'years' of residence [20] but could also be captured by type of resident, e.g.
260 permanent resident living in their primary residence vs. temporary resident staying somewhere
261 on vacation. Perception of personal risk when residing in an at-risk area has shown to be a
262 significant factor for deciding to evacuate in studies of both actual and hypothetical wildfire
263 situations [44]; on the other hand, separate research found that perceived threat was not a
264 sign of early mobilisation [48]. Thus, this factor needs further exploring. Another important
265 factor is seen to be individuals' hazard knowledge, which increases both the likelihood of
266 receiving warnings [48] and the likelihood of perceiving risk [47]. At the same time, official
267 information sources during the disaster also result in greater population compliance [49].
268 Nevertheless, there seems to be little exploration of a connection between where knowledge
269 of a hazard comes from and preparation for a potential emergency. In addition, studies also
270 find that involvement in one's community and close relationships within communities increase
271 the likelihood of receiving a warning in an emergency as well as the likelihood of evacuation
272 [20,48]. Finally, locus of control (LOC), which relates to a belief about who or what has control
273 over what happens to people, is seen to matter in decision-making in response to disasters.
274 For instance, individuals with a strong internal locus believe they themselves can control the
275 outcome of events while those with a strong external locus believe outside forces, for example
276 spiritual beings, are in control (see [50]). Even when rejected as non-significant in disasters
277 such as hurricanes [44], LOC is a relatively unexplored concept in groups with non-uniform
278 beliefs [51,52] in which religiousness seems to decrease the likelihood of evacuation [20], but
279 there is no data on the role of such beliefs in wildfire response.
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Thus, whilst a body of literature analysing human responses to disasters is growing, insufficient attention is paid to WUI communities' preparedness and response to wildfires on European islands. Such knowledge is paramount to the safety of these communities given the wildfire risks projected for the future. Therefore, this study aimed to take a first step at addressing that gap. The objective was to understand what factors may influence responses to wildfires and what cultural aspects of a WUI island population may affect their capacity to cope in the event of a wildfire. The case of Corsica, located in the South of France, was chosen. To answer the research questions, interviews with professionals involved in wildfire management and questionnaire surveys with civilians were conducted in Corsica. This offered a rich view that contextualised human behavioural responses to wildfires in an island WUI, provided an insight into official aspects and observations of the people's culture and behaviour, as well as offered first-hand accounts of behaviours and motivations to compare with those observations. The findings are targeted primarily at policymakers, to highlight areas for consideration when shaping wildfire management policies, as well as at practitioners who implement the policies, to assist their understanding of what behaviours and challenges they may or may not encounter when attempting to protect WUI island populations.

2. Materials and Methods

2.1 Study area

As part of the Mediterranean region, Corsica is the fourth largest island in the basin. Over the period of 2013-2017 there have been around 2,663 wildfires in Corsica, although some data remains unprocessed by the main database used for this research [38]. The 'hotspots' of fire occurrence over this 4-year period can be seen in Fig. 1. Thus this island provides a unique study area for risk culture research, as it is estimated that out of 360 Corsican communes, 200 are exposed to wildfires [12] and have high probabilities of wildfires affecting people, their livelihoods and infrastructure.

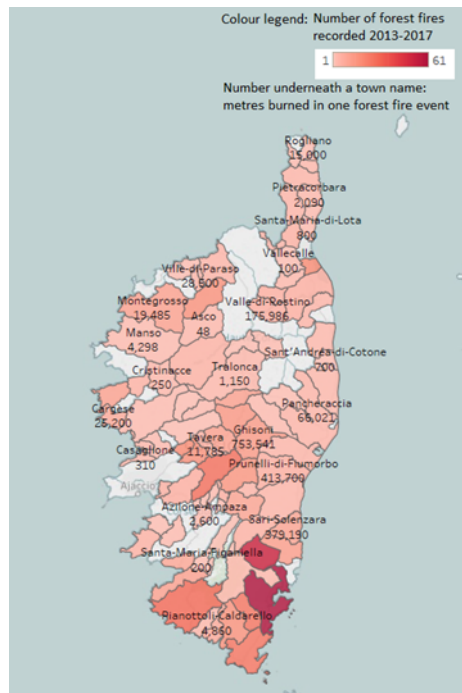


Fig. 1 Corsican communes where wildfires occurred during 2013-2017 (based on data available at <http://www.promethee.com/incendies>).

The northern part of the island (which until recent political changes was known as the Haute-Corse department) has seen the largest wildfire occurrence, while the southern part (until recently known as the Corse-du-Sud department) has suffered the largest burned area by such fires. Areas burned here vary from a mean fire size of 0.08 km² to 55.32 km² burned in a single event (data based on the period from 1995 to 2009) [67]. The north's driest region, Balagne, as well as being one of the more largely populated parts of Corsica, is also considered to be most susceptible to wildfires [39]. Susceptibility to wildfire may be due to climatic conditions and, with cool winters and hot, dry and windy summers, Corsica's vegetation types are typical examples of the Mediterranean land cover (i.e. in terms of their nature and, importantly, combustibility). Additionally, the decline in agriculture as an economic source, and accompanying land abandonment, has meant vegetation growth has been less controlled in Corsica [85]. It is predicted that due to changes of land use and climate change, ecosystems will change and colonise the areas that are not yet exposed to wildfires, increasing ecosystem vulnerability [12]. However, it is not only vegetation that is growing. Despite only 2% of the Corsican island being covered by urban or other anthropic areas, populated by 0.3 million inhabitants [67], urbanisation is continuously expanding [73], and the population almost doubles in summer peak periods [69,70], with tourists staying in the cities and towns as well as more isolated settlements such as villages, campsites and refuges on hiking trails [68]. Thus, in Corsican WUI areas, the associated wildfire risks are similar to the rest of southern

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416 Europe, which sees large numbers of local and tourist populations during the peak wildfire
417 seasons [71].
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420 Therefore, Corsica's geography, dynamic demographic and socio-economic profiles make
421 it a useful case study for island vulnerability research. Nevertheless, Ganteaume and Jappiot
422 [40] note the lack of available studies on large fires in southern Europe, particularly in France,
423 compared to the South West of Australia, California (USA) and South Africa. In the case of
424 Corsica, underrepresentation is often prominent due to the island being seen simply as part
425 of the Mediterranean territory [41]. Vilain-Carlotti [41] identified the specific issues surrounding
426 the contemporary wildfire risk in Corsica, such as change in land use, new clusters of
427 settlements in the WUI and their increased exposure to wildfire hazard, making it one of the
428 few studies that only begin to explore relationships between socio-economic and cultural
429 factors, the natural environment and wildfires on this island [54].
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437 **2.2 Semi-structured interviews**

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439 To contextualise human behaviour in wildfire within an island WUI context, semi-structured
440 interviews with representatives of Corsica's wildfire management network were conducted.
441 The interviews (n = 8) were carried out throughout April 2017 before that year's wildfire season
442 commenced, allowing optimal access to the participants' time. The participants were
443 purposefully sampled [33] to engage in face-to-face audio-recorded (with consent)
444 discussions, which were conducted at participants' workplaces lasting 30-45 minutes on
445 average.
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450 The interviewees were from multiple organisations with diverse responsibilities including
451 the emergency services, voluntary services, forest management agencies, local government,
452 plus others responsible for areas of habitation. They were the chief of a fire service, two
453 incident commanders, a fire officer whose duties covered frontline firefighting and prevention
454 work, a co-ordinator of civilian reserves, an official from the National Forests Office, a mayor,
455 and a campsite owner. The interview sampling stopped early when saturation of answers was
456 reached. Saturation was seen to be achieved when responses did not deviate from each other,
457 therefore no new themes were arising from the collected data [72]. Despite the interviewees'
458 backgrounds representing different branches of the wildfire management network, the
459 responses received were all in line with the national policy and risk plans.
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465 The interviewer's question schedule – constituting two parts (I) behavioural responses of
466 individuals and (II) emergency planning, preparedness and response (Table 1) – was
467 designed to capture information on risk, planning, and observations of common patterns of
468 adult (and child) behaviour in wildfires and evacuations. The questions in this schedule were
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prompts that elicited lengthy answers from the interviewees; follow-up questions were asked where appropriate. Thus, the interview format allowed for more in-depth discussion of the behaviours' context such as risk culture, policy and compliance. Typically, discussions were in French and relevant points written-up into English subsequently.

Table 1. Interview questions for professionals.

Item	Part I – Behavioural responses
1	What are your main tasks, roles and responsibilities during emergencies and evacuations?
2	Could you describe your observations of inappropriate responses to forest fires by individuals in this community?
3	Could you describe what would be the appropriate behaviours for what you have just mentioned?
4	What are the actions of individuals that make your response difficult or complicate it?
	Part II – Emergency planning, preparedness and response
1	What are the main disaster risks that Corsica faces?
2	What would you say resilience and vulnerability mean in Corsica?
3	Does island status compromise or enhance Corsica's capacity in fighting forest fires and protecting civilians? If so, how?
4	How is Corsica's resilience to forest fires different to that of the rest of France's?
5	Do you feel that you can get substantial support from mainland France if needed when fighting fires and protecting civilians in forest fires?
6	Do you feel that there is enough understanding among people in Corsica on what to do in the case of a forest fire?
7	When is the decision to shelter-in-place taken over the decision to evacuate?

Thematic analysis was employed to reduce and clarify interview data [42], and to derive the national context [43], i.e. help elicit indications of potentially more abstract concepts such as Corsica's risk culture and its people's general attitudes towards forest fires. The following themes were derived, each highlighting elements of human behaviour: (1) risk culture, (2) wildfire management and (3) responses to a developing wildfire, including evacuation.

2.3 Questionnaire Survey

To gain first-hand accounts of the behaviours and motivations of people when faced with the threat of a WUI wildfire, as well as explore the influence of the five key factors identified in section 1.3, a questionnaire survey was employed with civilians in Corsica. As the intended responses of civilians living in at-risk areas but with no recent/any experience of wildfires was as much of interest as the actual responses of civilians with recent experience, two complementary versions of the questionnaire were designed; the first posed hypothetical

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534 wildfire scenarios while the second asked about real, experienced scenarios. The use of actual
535 experience (AE) and hypothetical (H) case questionnaires was encouraged by past results
536 showing a “degree of similarity between the effect sizes” [44, p.1014] calculated from data
537 from both types of questionnaire as well as the finding that individuals’ intentions (e.g. to
538 evacuate in the event of emergency) are usually eventually realised [59].
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542 The questionnaire was disseminated online via the social media channels Facebook and
543 Twitter, where an official account for the research study was created and civilians across
544 Corsica were targeted using a geo-targeting tool. In addition, participant recruitment was
545 facilitated by engagement with the French regional news outlet Corse-Matin, which ran a
546 feature advertising the study’s aims and objectives, and by engagement with a Corsican fire
547 and rescue service (until recently known as SDIS 2B, now SIS 2B), who disseminated the
548 survey via their own social media channels. Non-probabilistic sampling was chosen due to the
549 difficulty in reaching wildfire survivors, because no public or private list of such individuals and
550 their contact details exists in Corsica, and because survivors may be protective of their privacy
551 in order to avoid press intrusion. Therefore, the sampling method known as self-selection was
552 used, recognising that while it may over-represent certain segments of the population, in the
553 past this method has shown to nevertheless sufficiently inform study findings [74]. Because
554 participants were difficult to reach in this sense, as well as in a physical sense given their
555 locations across Corsica, an online survey was the most feasible data collection method,
556 reducing time, effort and costs, as well as offering a paperless solution. The questionnaire was
557 available in both English and French. All participants were informed that their participation
558 would be anonymous and voluntary, with no financial incentives offered. The data was
559 collected during the peak forest fire season in Corsica 2017 – August to September; in the
560 past, studies have shown this to be a good time to capture participants’ attention, since many
561 individuals are actively interested in the ongoing phenomena [75]. Data collection stopped
562 once all available channels of dissemination were exploited and a wide coverage of Corsican
563 communes was observed.
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575 The design of survey questions were guided by the Bushfire CRC questionnaire
576 administered to survivors of the Black Saturday bushfires in Australia, 2009 [46]. The
577 questions were comprehensive, taking around 25 minutes to complete in total, and covered
578 topics such as: experience and preparedness; socio-demographic and other personal factors;
579 behavioural responses (actions, emotions and cognitions) to various environmental and social
580 cues, including whether the participant decided to evacuate or stay, both in relation to the
581 actually experienced/hypothetical scenario in question and in relation to if a similar wildfire
582 event were to occur in the future; plus situational factors. Given the subject matter, participants
583 were advised from the outset to consider if they would be comfortable answering questions
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on wildfires and were provided with links at the end of the questionnaire to local providers of confidential support and advice.

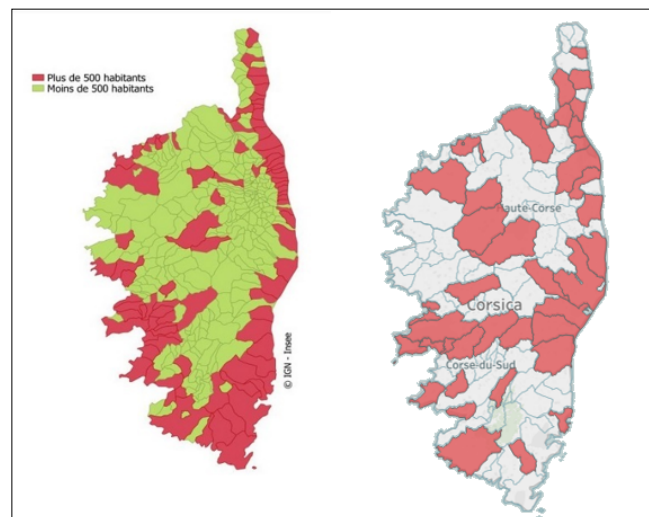
Table 2. Codes used for the statistical analysis.

Variables	Codes	Definitions
Property attachment	Permanent resident = 1	Participant owned or rented the property and it was their primary residence.
	Temporary resident = 0	Participant was staying over at the property as a visitor/vacationer/worker/in some other capacity.
Perceived risk	High risk = 1	Participant rated themselves as either being 'to a great extent' or 'somewhat' concerned.
	Low risk = 0	Participant rated themselves as either being 'to a very little extent' or 'not at all' concerned.
Planning for wildfires	Had a plan = 1	Participant/their household had formally prepared a plan.
	Had no plan = 0	Participant/their household had not formally prepared a plan or had made no plan at all.
Community closeness	High closeness = 1	Participant rated themselves as either being 'to a great extent' or 'somewhat' close.
	Low closeness = 0	Participant rated themselves as either being 'to a very little extent' or 'not at all' close.
Locus of control	Internal LOC = 1	Participant chose one or more answers that included the option 'myself'.
	External LOC = 0	Participant chose one or more answers that did not include the option 'myself'.

For the first of the five key factors, the questionnaire asked participants to describe their relationship to the property in which they were residing, to attain a proxy measure of attachment to that property. Answers were coded into two dichotomous categories (see Table 2 for codes and their definitions). For perceived risk, participants were asked for the extent to which they were concerned about a wildfire affecting them or their property, while for community closeness participants were asked for the extent to which they were close, in a social sense, to those in their community (i.e. their neighbours). Answers to both these questions were on a Likert-type scale and were again coded into two categories. For hazard knowledge, participants were asked to describe the sources (if any) from which they gained information in the last 12 months about how to prepare for a wildfire, and also were asked if, in the same time period, they (or their household) had prepared a plan to take some action, be it to evacuate or stay, in the event of a wildfire. Answers about information sources could be multiple and remained so. Answers about a plan were coded into two categories. Finally, for locus of control, participants were asked about who they believe has control over wildfire consequences to them and their property. Answers on this question could also be multiple, with options including 'myself', 'luck', 'spiritual being', 'government authorities', 'emergency services', and 'other'. However, the answers were coded into two categories. Note, the AE

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652 sample were asked to answer the questions about the above variables in relation to their pre-
653 fire situation rather than their current situation.
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656 A total of 98 completed questionnaires were included in the following analysis. Participants
657 were from a variety of Corsican communes (see Fig. 2), including Ajaccio, Biguglia and Borgo,
658 which are relatively larger towns or towns that have historically been affected more by forest
659 fires. The ages of AE participants (n=48) ranged from 20 to 71 years (M=45.93, SD=14.91).
660 For males (51% of AE sample), the mean age was 46.71 years (SD=14.20) and for females
661 (49% of AE sample), the mean age was 45.09 years (SD=15.93). Similarly, the age range for
662 H participants (n=50) was 21 to 75 years (M=43.50, SD=13.47), with a mean age of 44.37
663 years (SD=14.44) for males (38%) and 42.97 years (SD=13.06) for females (62%). The ratio
664 of males to females did not differ significantly between the AE and H samples ($X^2(1) = 1.68$, p
665 = .196), nor did the mean age of participants ($t(94) = 0.84$, $p = .403$).
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688 **Fig. 2.** Population distribution (left; source: IGN © Insee; red colour denotes areas with more than 500
689 habitants, green with less than 500 habitants); questionnaire respondent distribution (right: based on
690 data available at <http://www.promethee.com/incendies>).
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694 2.4 Statistical analysis

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696 For the questionnaire data, statistical analysis of relationships between variables typically
697 took the form of tests of 2 x 2 cross-tabulations. An alpha level of .05 was used as the cut-off
698 for statistical significance in all tests. Using the tool G*Power v3.1 [77] to conduct a power
699 analysis – with degrees of freedom = 1, alpha level = .05, power = .8, and effect size = .4 (i.e.
700 medium to large) – it was calculated that a minimum sample size of around 50 participants
701 would be sufficient for this type of analysis. While there is some debate amongst statisticians
702 regarding which specific test is best for analysing cross-tabulations (see for example [84]), this
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711 paper followed the procedure common in the social sciences, i.e. used Chi-Square Test except
712 for where expected frequencies were lower than five; then Fisher's Exact Test was used (Field,
713 2015). The associated p-values and effect sizes (Cramer's V) are reported. Data was analysed
714 using SPSS statistics v25 software.
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720 **3. Results**

721 722 **3.1 Risk culture**

723 **3.1.1 Interviews**

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725 To a certain degree, the understanding of risks among the Corsican population seems to
726 have come as a generational inheritance, noted in the literature as part of the features
727 depicting island resilience [17]. It is currently sustained through the local fire services' initiative
728 to educate schoolchildren about wildfire risk mitigation and behaviour during wildfires:
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733 *"Culture of risks begin at school and it is better understood by adults if they have the first*
734 *information very early. Children talk also to their parents [about] what is good and what is not*
735 *good and presumably it has a bigger effect."* – civilian reserves co-ordinator.
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739 Emphasis was put on inherent knowledge (*"It's our culture – people are sensitized to*
740 *wildfires, they know what they have to do. We have more problem with summer vacationers*
741 *than local people"* – incident commander) but it was noted to be currently challenged by
742 growing urbanisation. For example, individuals often insist on building homes in the high
743 wildfire risk areas, for which permissions are not granted. In addition, a fire officer noted that
744 people are now starting to build wooden structures, instead of making homes from highly
745 popular rock material, which increases vulnerability in wildfires.
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749 Since Corsica is considered to be an attractive holiday place for people from mainland
750 France as well as the rest of Europe, the population in peak summer periods (July-September)
751 almost doubles. Local school holidays also coincide with these peak periods (July-August),
752 when families often choose to go camping. A change in risk culture was noted by most of the
753 interviewees as a result of the influx of new permanent residents to the island as well as
754 growing tourism. While tourists were said to be more rule-obedient compared to local residents
755 in the presence of authority such as firefighters, tourists were also less equipped with
756 knowledge of what to do when the firefighters were not present.
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761 *"As there is a lot of people [in summer] there is a lot of imprudence; they do barbeque and*
762 *they don't know that it's dangerous to make fire here"* – fire officer.
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Nevertheless, the local population was generally thought to be desensitized to wildfires and capable of protecting themselves from hazards. In essence, the local population who have been living in Corsica for a few generations have useful knowledge, such as regarding the direction and speed of wind and the behaviour of fire. For this reason, they are able to make more informed decisions compared to tourist and transient populations:

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“If we have a knowledge that 1, 2 or 3 people in the village can be alone in the fire, maybe we say there is no more risks because they have the culture of wildfire, but if we have 1 or 10 people who are new inhabitants here it would be more dangerous because of them” –
civilian reserves co-ordinator.

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Wildfire risk mitigation issues seem to rest with long-term local populations rather than transients, while the latter are more obedient regarding rules:

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“First, for the new habitants it is easier to make them clear the field grounds [i.e. engage in mandatory land clearing activities, such as pruning or removing vegetation around buildings] but in case of wildfires there is panic; with the older habitants, it is more difficult to make them clean their fields but in case of wildfire or smoke there is no panic, people are safer.” –
town mayor.

798 799 3.1.2 Questionnaires

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As the interviews highlighted factors such as being a long-term local vs. transient, wildfire exposure, and associations with risk perception and decision-making behaviour, the analysis of questionnaire data first focused on these issues.

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Although the questionnaire was administered during the peak tourist season, the majority of respondents (AE: 59%; H: 69%) were in the ‘permanent resident’ category. The remaining AE respondents who were a ‘temporary resident’ were more likely to perceive ‘high’ (75%) rather than ‘low’ (25%) risk, i.e. have a greater level of concern about a wildfire affecting them or their property; however, so too were respondents who were a ‘permanent resident’ (high risk = 76%; low risk = 24%). As such, no significant relationship was found between AE participants’ property attachment and their perceived risk ($p = 1.00$, $V = .01$). A similar situation was revealed for H participants’ property attachment and perceived risk (temporary resident: high risk = 57%, low risk = 43%; permanent resident: high risk = 55%, low risk = 45%; $p = 1.00$, $V = .02$). When it came to their evacuation decision, AE participants who were a ‘permanent resident’ more often stayed (72%) than evacuated (28%); however, so too did participants who were a ‘temporary resident’, and at a somewhat greater frequency than the former group (stayed = 88%; evacuated = 12%). No significant relationship was found between

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829 AE participants' property attachment and the decision to evacuate or not ($p = .628$, $V = .17$).
830 Note, H participants were asked for their evacuation decision across multiple related scenarios
831 rather than a single scenario, thus a similar test was not conducted for them.
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834 In terms of wildfire exposure, 54% of H respondents had never experienced a wildfire, 18%
835 had experienced a fire once but in the distant past, and a slightly larger proportion (28%) had
836 experienced a fire more than once but again in the distant past. With AE respondents, 19%
837 reported that their recent wildfire experience was their only one while 81% had experienced a
838 wildfire more than once. Additionally, 40% of all AE respondents had experienced an
839 evacuation due to a wildfire, whereas 60% had not. Those AE respondents who had
840 experienced multiple wildfires did not perceive a significantly different level of risk (high risk =
841 75%; low risk = 25%) than those with just a single recent wildfire experience (high risk = 78%;
842 low risk = 22%; $p = 1.00$, $V = .03$). Likewise, the level of perceived risk reported by H
843 respondents was not significantly associated to their wildfire exposure (never experienced:
844 high risk = 58%, low risk = 42%; experienced once: high risk = 57%, low risk = 43%;
845 experienced more than once: high risk = 50%, low risk = 50%; Fisher-Freeman-Halton $p =$
846 $.917$, $V = .08$). Regarding decision making, AE respondents who had experienced multiple
847 wildfires did not choose to evacuate (27%) during their recent wildfire experience at a
848 significantly different frequency than those with just a single recent wildfire experience (0%)
849 ($p = .542$, $V = .23$); nor were they significantly more or less likely to choose to evacuate in
850 future (29%) than those with a single experience (33%) ($p = 1.00$, $V = .03$). However, AE
851 respondents who had prior evacuation experience were significantly more likely to choose to
852 evacuate in future (56%) than those with no evacuation experience (9%) ($p = .050$, $V = .50$).
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863 A relationship between risk perception and decision making was explored next. Regarding
864 concern about a wildfire affecting them or their property, AE and H respondents were not
865 significantly different in this respect: the majority (76% and 56%, respectively) perceived a
866 'high' level of risk ($X^2(1) = 3.80$, $p = .051$, Cramer's $V = .21$). In the AE sample, 100% of
867 participants who perceived the risk to be 'low' stayed at their property during their recent
868 wildfire experience, whereas 71% of those who perceived the risk to be 'high' stayed, but there
869 was no significant relationship between perceived risk and evacuation decision ($p = .298$, $V =$
870 $.27$).
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875 **3.2 Wildfire management**

876 **3.2.1 Interviews**

877 Currently, the only emergency communication tools used are television (France 3) and
878 radio (Bleu RCFM, 101.7). For some communes (administrative division comparable to a
879 municipality), government projects involving text message notifications are being developed,
880 as well as text message alerts by insurance companies, although these are still relatively rare.
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In the case of a wildfire emergency on camping sites, site managers use megaphones to alert the campers. In most cases affecting areas where people are residing, homeowners would be visited by a firefighter or a police officer and informed face-to-face about the need to leave their property. Fire and rescue service officers would also communicate the wildfire risks and events to the prefecture (the administration that carries out governmental work at the departmental level) and the prefecture would put up the relevant information on their website (e.g. haute-corse.gouv.fr) for the public to access. Such information is regularly checked by the tourist information centres, who may advise people against their trekking plans in certain areas if the fire danger is high or a wildfire is present.

Wildfire risk is assessed each day at 9.30 am and 5.30 pm. In the case of an emergency in Corsica, the command centre at the fire and rescue service headquarters, called CODIS, serves two functions: (1) alert processing through an alert management system, which draws upon calls staff receive from the European emergency number 24/7; and (2) operations management, which can involve receiving communications from the ground as well as communicating with their GPS-tracked vehicles. CODIS staff numbers increase during the summer due to the increased fire risk. The call centre receives approximately 100,000 calls every year and carries out 15,000 operations.

While Corsican fire response training is extensive and support from mainland France was noted to be strong and reliable, some disparity between Corsican and mainland France's response capacity exists:

“we have people who are ready to face fire catastrophes, but we don't have structures and materials and proximity with the rest of the France to be [as] well prepared as them” –
incident commander.

In addition, the inability to receive support from other EU countries was highlighted as a potential drawback, since countries such as Italy or Greece use a different type of equipment that cannot be used in conjunction with the equipment in Corsica. At the same time, Corsica's isolation with regards to time taken to receive support via air and by ferries due to island geography also impacts the capacity to fight fires.

Another vulnerability of the island comes down to its changing climate (stronger winds and higher temperatures), growing urbanisation and the change of land use:

“There is no more presence in the field, like agriculture and people who have farms, [...]; a lot of people now want to work in the beach, in the city, and the shops, and not as farmers; the field is abandoned, there is no cleared areas and if you have a fire, it could be a very big fire” – civilian reserves co-ordinator.

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947 Overall, tourists' and the general population's safety depends significantly on fire safety
948 planning, evacuation operation plans and strategic firefighting, all of which is detailed for each
949 of the communes in the communal information document on major hazards called DICRIM (Le
950 Document d'Information Communal sur les Risques Majeurs) and in a forest protection plan
951 against fires called PPFENI (Plan de Protection des Forêts et des Espaces Naturels Contre
952 les Incendies). Nevertheless, cooperation from people in danger is essential to make the most
953 of the fire safety services' work. For example, there exists a regulation to clear 50m of
954 vegetation and debris around structures and homes, with occupants collaborating with
955 neighbours when such 50m overlap or stem into a territory beyond ownership. People are also
956 asked to be vigilant in times of a total fire ban (July-September) and in cases of fire to follow
957 emergency services' orders. Such expectations are conveyed to people through information
958 at schools and in public spaces, but limitations to absorbing such information are seen as
959 depending on 'human nature':

966
967 *“when fire arrives, people are stressed and panic, so it is important for us to speak to people*
968 *[to tell them] what to do in wildfires; it is a long-term work because it is complementary to the*
969 *work of firefighters and it is important to let people know they are responsible for their own*
970 *security” – civilian reserves co-ordinator.*

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973 Firefighters' priorities are divided in order of (1) saving lives, (2) saving property, and (3)
974 fighting fire; but, as vocalised in the interviews, the population does not always seem to
975 understand that and mistake the third priority as the most important one.
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979 980 **3.2.2 Questionnaires**

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982 Factors arising from this part of the interviews included the communication of information,
983 planning, collaboration within the community, and the importance of individuals realising that
984 they themselves play a role in what happens when a fire occurs. So, the analysis of the
985 questionnaire data now addressed these factors.
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989 When survey respondents were asked whether they had received any information from a
990 range of sources about preparing for wildfires, either in the 12 months before the fire in
991 question (AE) or simply in the last 12 months (H) (see Fig. 3), newspapers were identified as
992 the main information source. Television, radio, internet, as well as social media, were also
993 identified as information sources by a sizeable proportion of participants. Also, approximately
994 one third of AE respondents said that they had not received information from any of the
995 suggested sources, while just under one quarter of H respondents highlighted such a lack of
996 information (although some did report that they had received information from other kinds of
997 information (although some did report that they had received information from other kinds of
998 sources such as “experience” or “family”). When compared to the H sample, more than four
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times as many AE survey participants had received information from their workplace and more than twice as many from community meetings. School was the least commonly identified source of information for both AE and H respondents.

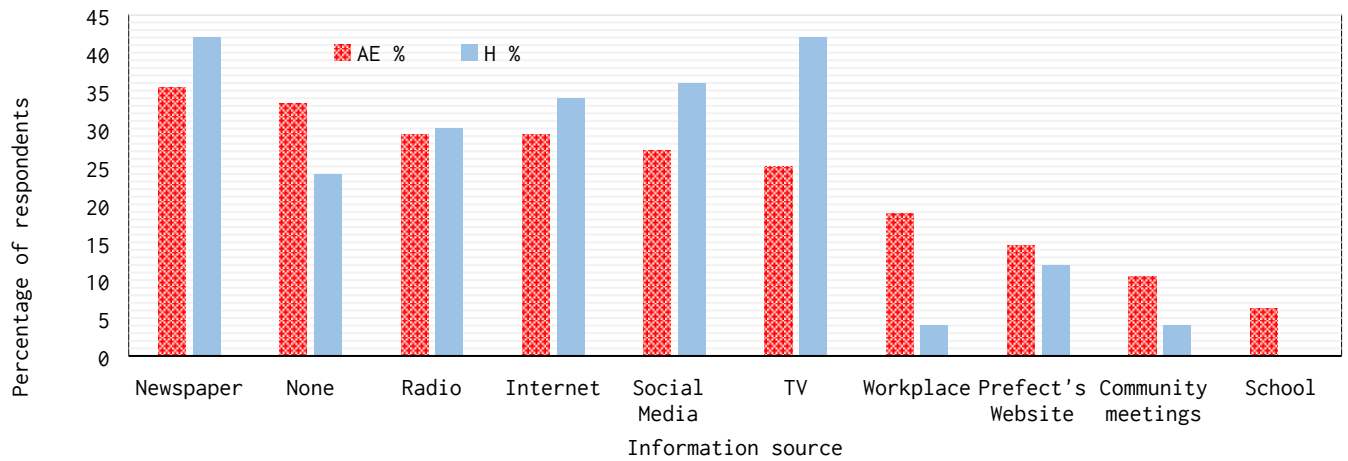


Fig. 3. Information sources aiding preparedness for actual experience (AE) and hypothetical (H) survey participants.

When asked if they had, in the 12-month period of interest, prepared a plan of action should a wildfire occur, very few respondents in either the AE or H surveys reported that they had done so (AE: 19%; H: 10%), although quite a number nevertheless felt they knew what to do, even if they had not taken the further step of developing that into a formal plan (AE: 42%; H: 32%). Despite H respondents appearing slightly less prepared than AE respondents, the difference between the two samples regarding having a formal plan vs. no formal plan or plan at all did not reach statistical significance ($X^2(1) = 1.64, p = .200, V = .13$). Since the top two most common sources of information were newspapers and TV, acquiring knowledge from these sources vs. others was compared against whether or not an individual had a formal plan. Neither of these sources were significantly associated with having a plan (AE Newspaper: had a plan = 29%, had no plan = 71% vs. AE Other Source: had a plan = 13%, had no plan = 87%; $p = .252, V = .20$; H Newspaper: had a plan = 14%, had no plan = 86% vs. H Other Source: had a plan = 7%, had no plan = 93%; $p = .638, V = .12$; and AE TV: had a plan = 25%, had no plan = 75% vs. AE Other Source: had a plan = 17%, had no plan = 83%; $p = .674, V = .09$; H TV: had a plan = 19%, had no plan = 81% vs. H Other Source: had a plan = 3%, had no plan = 97%; $p = .148, V = .26$). However, individuals who had received no information from any of the suggested sources were significantly more likely to have no plan at all (AE: $X^2(2) = 6.03, p = .049, V = .36$; H: $p = .030, V = .39$). Nevertheless, probing further into AE respondents' behaviour, the lack of a plan was not found to be significantly associated

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1065 with one's evacuation decision (had a plan: stayed = 100%, evacuated = 0%; had no plan:
1066 stayed = 73%, evacuated = 27%; $p = .542$, $V = .23$).
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1069 As noted above, some survey respondents highlighted that not all information comes from
1070 official or organised channels and may instead come through more social channels, while the
1071 interviewees highlighted that everyone in the community must contribute actions to improve
1072 safety, for others' as well as for their own sakes; in other words, community closeness is
1073 important. As a particularity of WUI communities, the majority of participants were expected
1074 to report close ties to their neighbours; this was indeed the case, with 64% of AE respondents
1075 and 58% of H respondents reporting a 'high' degree of community closeness. However, while
1076 this closeness might play a role in the prevention and preparedness stages of wildfire
1077 management, it did not result in a significant association with evacuation decision, where the
1078 minority (14%) of AE participants reporting 'high' community closeness evacuated and the
1079 majority (86%) stayed, and the same pattern was observed with those reporting 'low'
1080 closeness (evacuated = 38%, stayed = 62%; $p = .309$, $V = .27$).
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1087 Turning to individuals, it appeared that not everyone believed they had the ability to control
1088 the outcomes of wildfires on them and their property: a significantly larger proportion (53%) of
1089 H participants than AE participants (23%) reported an internal LOC ($X^2(1) = 4.99$, $p = .025$, V
1090 $= .30$). Of those who reported an external LOC, control was most commonly attributed to luck
1091 (AE = 52%; H = 50%) and least commonly attributed to a spiritual being (AE = 9%; H = 6%).
1092 Due to the latter result, no test could be conducted specifically on religiousness and
1093 evacuation decision making. However, a test was conducted for a relationship between AE
1094 participants' locus of control more generally and their evacuation decision and the result was
1095 not significant (internal LOC: stayed = 100%, evacuated = 0%; external LOC: stayed = 71%,
1096 evacuated = 29%; $p = .290$, $V = .29$).
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1104 **3.3 Responses to a developing wildfire**

1105 **3.3.1 Interviews**

1106 Generally, in Corsica, evacuation is considered to be the last resort and the official
1107 preferred response to a wildfire is sheltering in place or, as described by the incident
1108 commanders, 'confinement'. However, exceptions are made for populations that are
1109 considered to be vulnerable to wildfire effects and of limited self-efficacy, such as children and
1110 the elderly. These populations would be evacuated first in advance and it would be the
1111 responsibility of the mayor of the commune to identify such households where vulnerable
1112 people reside (communities are seen as very close and the mayor is often familiar with the
1113 population).
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“The appropriate response is to go inside, shut the windows, shutters, close gas, to open the gates for firefighters’ vehicles to be able to come in and protect the homes; put the wet towels at the doors, close chimneys so that fire cannot go inside; to put the car behind the building so that the car is protected by the building and does not burn; there is no time for cleaning [outdoors] – it’s too late. If you have automatic sprinklers you can turn it on.” – fire officer.

Sheltering indoors is also a preferred option after the evacuation of individuals’ homes is chosen. In such cases, the evacuation destination is a safe structure in the town, rather than any place outside the area. This is due to mainly three reasons: (1) people’s homes and/or other town buildings, such as churches, are architecturally robust stone structures which are capable of withstanding most fires; (2) narrow roads, varied topography (hills and slopes), as well as vegetation close to the roads, present challenges for road traffic; and (3) most camping areas and town surroundings are cleared and thus adequately prepared for firefighting, making it relatively safe for people to stay within their homes, or shelter in camping areas; nevertheless, it has to be noted that structures such as camper vans, cars, tents and wooden homes are seen as unsuitable shelters and thus people are confined within other structures such as any concrete/stone buildings or swimming pool areas if such buildings are absent or unable to contain large numbers of people.

Another option for campsite occupants is confinement on the beach, if one is available nearby. For areas that are not cleared, such as forests, shelters are available and marked, and are used as assembly points from which individuals are rescued by fire service transport before the fire front arrives. In towns, once people are evacuated and inside a local durable structure, such as gymnasium, church or other house known to the authorities, people are counted, and their needs assessed.

General patterns of population behaviour in response to wildfires observed by the interviewees most of the time included a distinction between the ‘locals’ and ‘tourists’. Certain behaviours were described as ‘panic’. These were indicated in the interviews as tunnel-focus own priorities (such as putting one’s self at risk to collect belongings, e.g. passport).

“they are vulnerable to accidents, they focus on one thing and cannot listen” – incident commander.

Interviewees emphasised irrational aspects:

“When people are stressed, they don’t realise the danger of fire; when they see fire, they become completely out of their mind and don’t have fair judgement, the reaction is very irrational” – incident commander.

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1183 This 'panic' behaviour reportedly manifested in potentially hazardous actions such as
1184 driving fast down the narrow roads:
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1187 *"sometimes they are going on the road to escape but it's very dangerous because they drive*
1188 *fast because they are afraid"* – fire officer.
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1190 Among all types of resident, lack of experience in evacuation, or in confinement for some
1191 groups, as well as attachment to one's home, was an emerging theme in the interviews:
1192 ("people here are not used to evacuating their home" – incident commander); at the same
1193 time, when people are told to go indoors and they refuse to do this, it is because "they think
1194 they will burn in their home" (fire officer).
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1198 *"Typical for Mediterranean culture is that their house is often the fruit of their work life, it is*
1199 *[their] inheritance or [a] work tool for the farmers"* – incident commander.
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1202 Thus, specifics of dealing with locals in an evacuation was commonly contrasted to tourist
1203 behaviour, which was often depicted as careless and disconnected from the local risk culture:
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1205 *"the way of dealing with locals and tourists is different; first we need to deal with locals who*
1206 *don't want to leave their home, second we deal with summer vacationers who don't realise*
1207 *the danger of the fire and sometimes it's problematic; you can see tourists on the road taking*
1208 *pictures; tourists when they come here they think that Corsica is a forest, that there are no*
1209 *rules to follow and they are the king here"* – incident commander.
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1215 **3.3.2 Questionnaires**

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1217 Here, the interviews broached the subject of the rationality, or irrationality, of behaviours
1218 during a wildfire. Interviewees offered opinions on what might drive people's behaviour; the
1219 following analysis of the questionnaire data turned attention to what the people themselves
1220 said about what drives their behaviour. This analysis also examined whether behaviours in
1221 the latter stages of evacuation (i.e. where people go when they evacuate and whether they
1222 stay there until safe to return to their residences) appeared to follow policy and logic.
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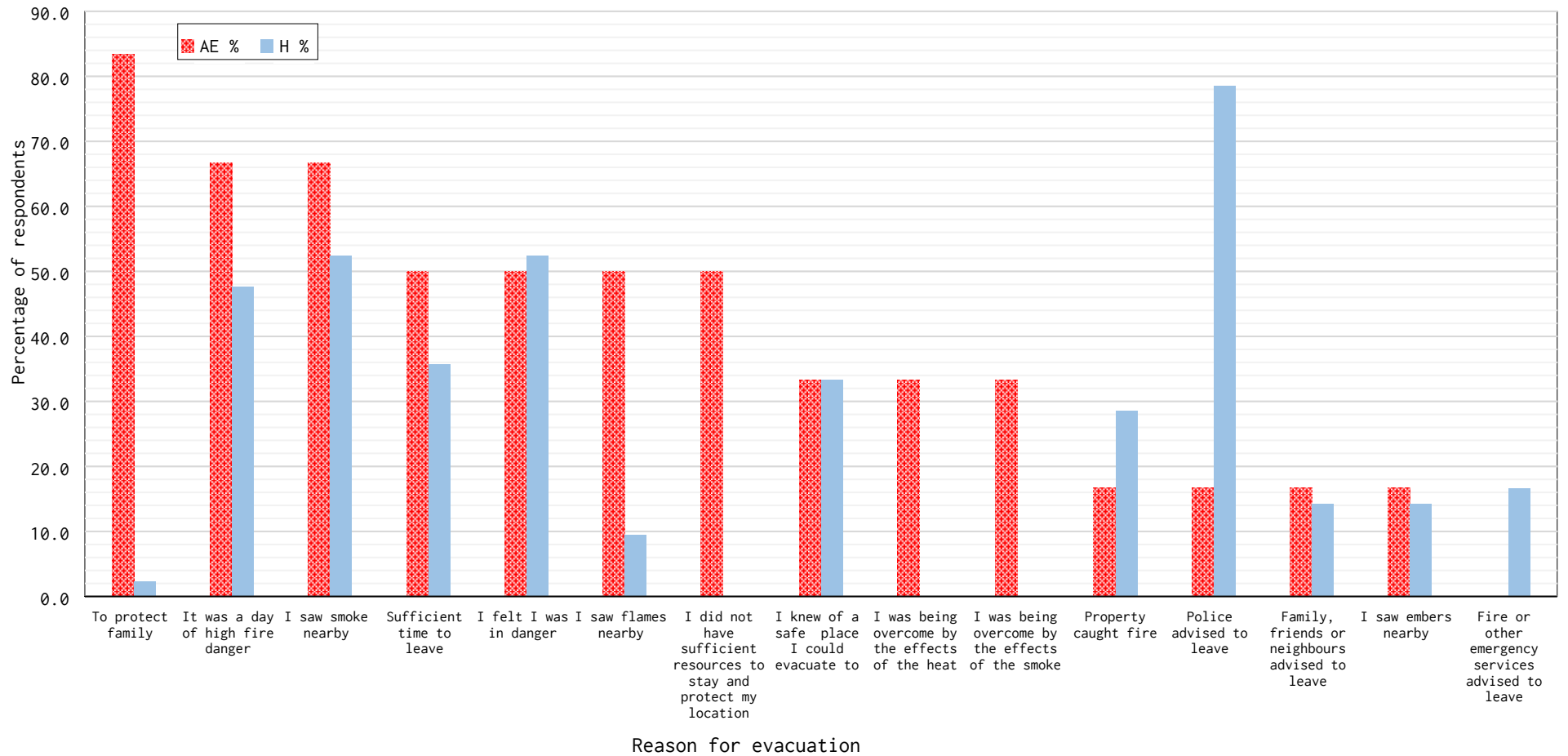


Fig. 4. Reasons for evacuation among actual experience (AE) and hypothetical (H) survey participants.

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Of those AE survey participants who evacuated during their wildfire, a small number (n=6) provided reasons for why they evacuated at the particular moment they did, while all H survey participants answered what their reasons would be for choosing evacuation during a wildfire. The majority of AE participants who provided reasons stated that one reason was to protect their family (83%). In the H sample, only 2% stated they would choose to evacuate for this reason. Instead, the majority of H participants stated they would choose to evacuate if advised by police (79%) – a reason only reported by 16% of the aforementioned AE participants (see Fig. 4). Other reasons for evacuating given by half or more of the aforementioned AE participants were: it was a day of high fire danger (67%), seeing smoke (67%), having sufficient time to leave (50%), feeling in danger (50%), seeing flames (50%) and not having sufficient resources to stay (50%). Seeing smoke and feeling in danger (52% each) were the only other reasons cited by half or more of the H sample.

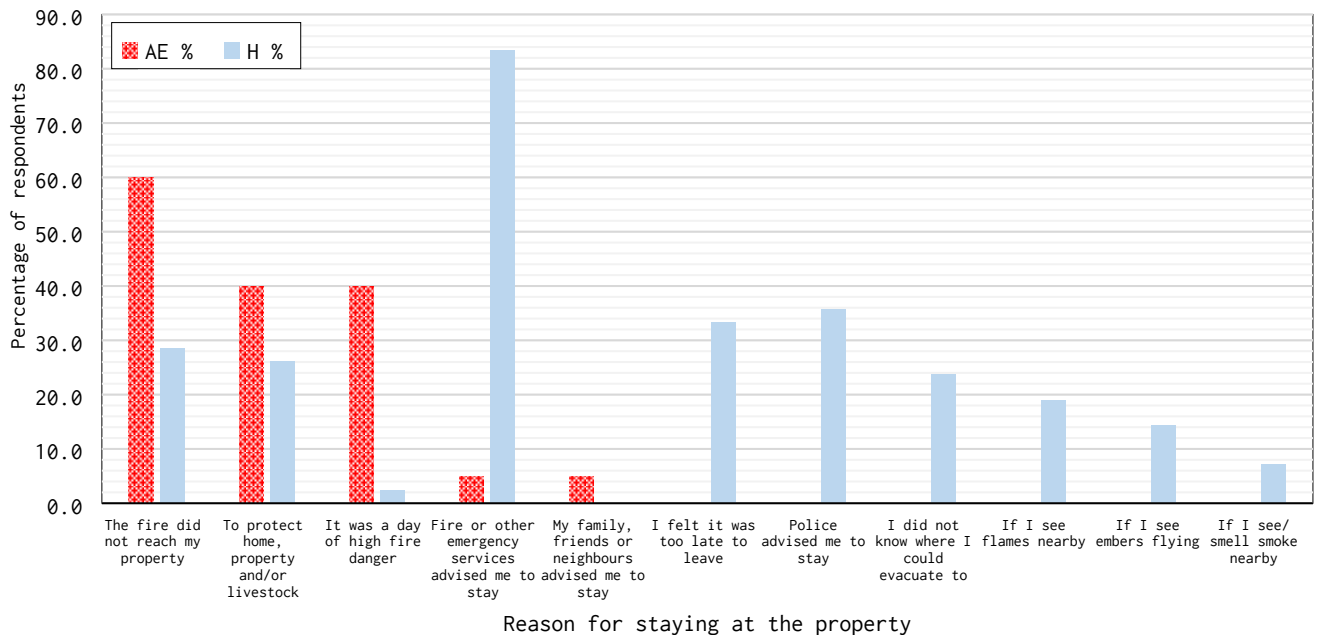


Fig. 5. Reasons for staying among actual experience (AE) and hypothetical (H) survey participants.

Since the official policy in response to a wildfire in Corsica is confinement, reasons for staying were also explored. Of the AE respondents who stayed during their wildfire and provided reasons for this (n = 20), the most frequent motivation was because the fire did not arrive at their property (60%). Additional reasons included that respondents wanted to protect their property or livestock (40%), and because it was a day of high fire danger (40%). Again, all H participants provided answers on this subject and the majority of that sample stated that they would stay if the fire service or other emergency services (excluding the police) advised them to do so (83%), while the next most common reason was staying if advised to do so by the police (36%) (see Fig. 5).

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When evacuation was the chosen option, the evacuation destination for the majority of respondents in both surveys was a nearby town/village (AE: 80%; H: 28%); 24% of H respondents indicated an open area such as a beach would be their place of refuge (which was not chosen by any of the AE respondents), 12% stated they would seek refuge in another building such as a hall or church (again, not chosen by any AE respondents), and 8% stated they would go to another residence nearby (also not chosen by any AE respondents, the remaining 20% of whom chose an evacuation destination beyond the locations listed). Finally, 12% of H respondents stated they did not know where they would go in the event of evacuation.

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When it comes to returning to one's evacuated residence before being officially notified that it is safe to do so, only two AE respondents said they tried and accomplished this, whereas 87% of H respondents said they would try and return. Of the AE respondents who returned early, their motivation was solely based around a concern for their property: i.e. to see if it had survived up to this point and to defend it. Neither respondent reported any concerns about looting. The main reason H respondents gave for choosing to return early was they would want to check on the safety of family and friends (50%). A sizable proportion also said they would return early if, in their opinion, the threat had passed (41%). A concern for defending property was the next most common reason (28%). More than a fifth of H respondents stated they would return early over a concern about looting (22%).

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Corsica is an island highly populated with WUI areas and a large number of its communes are deemed to be at risk of experiencing wildfires. The island's disaster response strategy is seen to be self-sufficient to face any risk to a certain degree. The reason for self-sufficiency was explained by the interviewees to be the available expertise of the firefighters and the training that they, as incident commanders, receive in mainland France. However, the main challenges for resilience and the vulnerability of the Corsican island seem to be related to limited infrastructure capacity to manage multiple fire emergency events at the same time, inhibited by relative isolation from the mainland and changing weather conditions, which is consistent with findings from other island studies of disasters in general [53].

As well as considering the professional disaster response to wildfires, this study contributes novel findings regarding how civilians respond. Several key variables, ones believed to influence the behavioural responses of civilians, were identified from previous literature on wildfires and other disasters. However, the results here indicate those previous findings should not automatically be generalised to populations residing in island WUI areas.

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1401 For example, despite previous studies [44,45] showing a relationship between property
1402 attachment and evacuation decisions, the results here suggest that both permanent residents
1403 (who should have greater attachment to their property) and temporary residents (who should
1404 be less attached) are more likely to stay at their locations rather than evacuate in response to
1405 a wildfire. The divergence in these findings are likely explained by Corsica having and
1406 commonly practicing a wildfire management policy of 'confinement' of individuals within their
1407 residences, as described by the interviewees.
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1412 Regarding the perception of risk and risk culture, this study indicated a certain level of
1413 confidence among interviewees that locals are better equipped to deal with both the threat
1414 and presence of wildfires compared to tourists. This emphasised division of locals' and others'
1415 risk perceptions and their behaviour in wildfires in broader terms was also shown by Candea's
1416 anthropology of Corsicans [54]. The current study revealed that neither being a permanent vs.
1417 temporary resident nor wildfire exposure (i.e. occasions of direct experiences with wildfires)
1418 had a significant association with risk perception. Given all groups were more likely to perceive
1419 themselves to be at 'high' risk, this suggests that the timing of the study (during peak wildfire
1420 season and therefore during peak media coverage of fires) might have played a role, i.e.
1421 inflated the ratings of those with less experience of wildfires and from transient populations
1422 during this time to a level similar to that of more experienced and permanent residents.
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1429 While this presumed hazard knowledge – or hazard awareness at least – may have
1430 influenced the perception of risk (cf. [47]), across wildfire literature it has nonetheless been
1431 observed that individuals who feel at risk may not necessarily plan their emergency response
1432 or even have access to information for such preparedness [45]. Indeed, the interviewees in
1433 this study put an emphasis on reaching out to communities to educate them on how to respond
1434 in a fire, and while at least two-thirds of survey participants reported receiving information
1435 about wildfires from a range of sources, predominantly the mass media, the type of information
1436 source had no significant impact on reported preparedness (having a plan). The exception
1437 was those who said they had received no information from the listed sources; they were
1438 significantly less likely to have prepared a plan of any kind. Indeed, most participants lacked
1439 a plan, although around a third or more believed they nevertheless 'knew what to do'. These
1440 findings somewhat affirm the 'inherent' resilience of Corsicans, and island communities in
1441 particular (discussed in the Introduction) but, as also discussed earlier in this paper, such
1442 'resilience' may additionally indicate underlying vulnerabilities of island communities.
1443 Furthermore, these findings probably explain why no significant relationship was found
1444 between perceived risk and evacuation decisions, a result which also contradicts previous
1445 research findings [44], or between having a plan and evacuation decisions. That is, people in
1446 Corsica may be aware that they face wildfire risks and may be aware (if they have access and
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1460 have paid attention to information sources) that there is a policy of staying in one's residence
1461 rather than evacuating when a wildfire occurs. Since 'confinement' could be interpreted as a
1462 more passive than active response, this may lead people to not contemplate further what may
1463 actually be required of them should they stay and, in the event of staying not being feasible,
1464 what may be required of them should they go. Thus, those with even an informal 'plan' (which
1465 may most likely be to stay) may only be prepared for situations where such a plan is suitable,
1466 while those with no plan at all may be completely unprepared for either staying or evacuating
1467 and therefore their behavioural response may be unpredictable.
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1472 Therefore, community closeness may not have the kind of influence on evacuation in
1473 Corsica in the event of a wildfire as it has been found to have in studies of other regions and
1474 types of disaster [20,48] – not because it may not exist in Corsica, but because even where
1475 people are close to their neighbours, those neighbours may be similarly without a plan or only
1476 have heard about the authorities' policy to stay. Indeed, a form of community closeness –
1477 community collaboration (with the authorities, in the form of obeying official wildfire mitigation
1478 rules, as well as with other civilians) and community cohesion – was a recurring theme in the
1479 interviews, as well as in the literature on island and WUI communities [57]. It was also
1480 supported by the questionnaire data where the majority of both surveys' respondents reported
1481 a 'high' degree of social closeness to their neighbours. Yet, the majority of AE survey
1482 respondents, irrespective of whether they reported high or low closeness, seemed to go along
1483 with the official policy, i.e. in most cases stayed and sheltered indoors rather than evacuated.
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1490 The final key variable explored in relation to behavioural responses was LOC. Despite a
1491 number of survey participants expressing a belief that they knew what to do in the event of a
1492 wildfire, fewer among the AE respondents believed that their own actions could control what
1493 happens to them in a wildfire, i.e. AE respondents tended more towards an external LOC,
1494 which was more commonly identified as luck than government authorities or emergency
1495 services. Luck was also far more commonly identified as the external LOC than was a spiritual
1496 being, which suggests that any future research on the topic of LOC and disaster responses
1497 may need a broader scope than that seen to date [20,51,52]. This was one of the few areas
1498 where AE respondents answered differently to H respondents, who tended more towards an
1499 internal LOC. Such disparity is somewhat intuitive since while AE respondents were asked to
1500 answer the LOC question based on what they believed prior to their recent wildfire experience,
1501 most AE respondents had already experienced other incidents before that, possibly with
1502 diverse outcomes, and these experiences could have left respondents with a sense of
1503 helplessness against the forces of fire. Indeed, several interviewees from the fire services
1504 reported that people often discovered they had overestimated their chances of standing
1505 against the fire and the outcomes were 'unexpected'. This then likely explains the lack of a
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1519 significant relationship between LOC and AE respondents' evacuation decisions, and further
1520 highlights the potential vulnerability raised by a lack of planning, particularly for evacuation
1521 where staying is not viable.
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1524 Overall, it is important to note that while neither property attachment, perceived risk,
1525 planning for wildfires, community closeness, nor LOC predicted whether AE participants
1526 evacuated or stayed, those participants nonetheless did reveal the actual motivations for their
1527 behaviour, such as leaving due to a wish to protect their families and/or because they
1528 recognised signs of risk (e.g. noted it was a day of high fire danger, saw smoke), whereas the
1529 majority of H participants stated they would choose to evacuate if advised by the police. H
1530 participants' motivation for choosing to stay was also predominantly based around emergency
1531 service advice. It is possible that the dissimilarity between AE and H participants' answers
1532 here reflect the fact that the intentions of practiced behaviours can tend to be thought of more
1533 in terms of why an action is ultimately performed (for the protection of one's family), whereas
1534 intentions that have not been put into practice yet, as in hypothetical scenarios, may be
1535 thought of more in terms of how an action is initiated (by the emergency services issuing
1536 advice) [58]. The results on motivations also suggest that situational factors manifesting close
1537 to or during the wildfire may have been more influential here on decision making than
1538 situational or trait factors manifesting some time earlier.
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1546 Behavioural responses do not end with the decision to evacuate or stay, and this study
1547 explored what issues may arise with the island's WUI populations after a decision to evacuate
1548 is made. When a fire actually occurs, the reactions of 'others' (identified as newcomers from
1549 mainland France or tourists) while more easily managed in one sense, since they are
1550 reportedly more obedient than locals when given official evacuation orders (also evidenced in
1551 [55]), were noted by interviewees to be dangerously emotional when acting on their own
1552 instincts. For example, interviewees described tourists displaying 'panic', driving on the roads
1553 in a state of fear without being aware of the complexity of the topography and narrow roads
1554 and therefore of the risks (e.g. of getting trapped, of approaching instead of withdrawing from
1555 hazards, or of causing a crash), and risk-taking when stopping for photographs of the fire or
1556 engaging in other forms of careless behaviour. Although scholars (e.g. [56]) reject the notion
1557 that people panic *en masse* when faced with a disaster, these observations suggest there
1558 could be some groups more prone to hasty and unthinking behavioural responses. If so, on
1559 an island where such groups comprise a considerable portion of the overall population during
1560 the wildfire season, this could be particularly problematic. The reason why a division between
1561 locals and tourists may seem to exist can be found in the interviewees' claim that locals'
1562 awareness of wildfires begins early, during their school education, and continues through
1563 adulthood with exposure to wildfires, thus increasing their understanding of how fire behaves
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1578 and how people can and should behave in turn. In contrast, tourists' awareness of wildfires
1579 may be more recent and their understanding cursory. Note, while the questionnaire data
1580 revealed school to be the least frequent source of information about wildfires, this is likely an
1581 artefact of the study's inclusion criteria requiring survey participants to be adults aged 18 years
1582 or older while the question asked about information gained in a 12-month period, i.e. a time
1583 when many participants will have no longer been in school.
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1588 Compared to those with no prior experience of evacuation, AE participants who had
1589 evacuated previously were more likely to state they would evacuate in a future fire. This
1590 indicates that evacuation had a successful outcome for them, ensuring their safety. However,
1591 two other findings indicate that the safety of evacuees could potentially be compromised. First,
1592 the lack of AE (and H) participants selecting to evacuate to a building such as a hall or church
1593 suggests that they are not aware of the official evacuation shelters in their locality or such
1594 shelters have not been designated. In addition, upon arrival at an evacuation destination, a
1595 willingness to attempt to return to residences before receiving official notification that it was
1596 okay to do so – an issue widely recognised in the literature [33] – was reported by
1597 questionnaire respondents as well as interviewees, although few AE participants actually
1598 accomplished this feat. Given the high proportion of H participants who expressed this
1599 tendency, this challenges the interviewees' assertion that locals inherently know what is
1600 appropriate in a wildfire and highlights that human behaviour, not just fire behaviour, is
1601 dynamic (i.e. people may get away but not always stay away). To ensure the best outcomes
1602 in a wildfire, both civilians and professionals need to consider and understand – in advance –
1603 the various permutations of how a situation may develop, as well as the risks and resources
1604 each one entails.
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1615 **5. Conclusions**

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1617 Analysis showed that Corsica is facing wildfire safety risks due to population increase
1618 during peak tourist seasons, growing urban areas and drier and warmer weather conditions
1619 due to changing land use. The interviews opened up for discussion further vulnerabilities such
1620 as logistical challenges in receiving practical support from the EU and mainland France, which
1621 have not received much attention in the research literature to date. Factors which have
1622 received more attention, i.e. reported behavioural influencers such as property attachment,
1623 perceived risk, hazard knowledge, community closeness and locus of control, were not found
1624 to play a significant role here in survey participants' wildfire responses, suggesting that island
1625 WUI residents have specific characteristics and/or different determinants. Therefore, while
1626 policymakers in other at-risk European islands should consult existing studies of human
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behaviour in wildfires carried out in regions with considerable expertise in such matters (i.e. USA, Australia), they should also commission further research to be conducted in their own regions, in order to establish which behavioural responses can be generalised and which are more specific to their particular settings. That way, policies and ensuing practices can be shaped to best meet the circumstances of the people at whom they are directed.

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The main behavioural response studied in the survey analysis was evacuation decision-making. Most participants – regardless of whether they had actually experienced at least one wildfire recently or lacked experience and were answering about hypothetical scenarios – chose to stay and shelter indoors rather than evacuate, demonstrating that official policy was being successfully communicated to residents and complied with. However, this reliance on confinement suggests that the island’s residents, particularly those who have not experienced a wildfire, recently or ever, would not be well prepared for a situation where evacuation became the best option. Thus, policymakers should consider means of including evacuation as a more viable option under suitable circumstances, and consider whether it is often viewed as a last resort measure because environmental aspects (e.g. speed and severity of the fire, wind, etc.) hinder its enactment or because human aspects (e.g. lack of preparedness and planning) are the hindrance. Especially since a lack of planning was evident, with H survey participants displaying that further through a heavy reliance on the emergency services to make the decision about whether to stay or evacuate, and through some indecisiveness with regards to an evacuation destination. While it is understandable that such decisions would depend on the situation, a lack of certainty and intuitiveness in respondents may indicate that more information on how to independently assess the risks and on available options for evacuation sheltering is needed. Another potentially unsafe behaviour highlighted was ingress attempts. If carried out in the proportions suggested by H participants, this would put a serious drain on emergency service resources regarding traffic management and life protection. In addition, since the main reasons for return were related to concerns about either property or others, communities should be assured by the authorities regarding their property security and receive better education with regards to how to contact loved ones during an emergency (e.g. preparing in advance a plan of where to meet if not initially together, using phone and online single-click apps that allow people to notify others that they are safe and well).

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Ultimately, the findings suggest disparity in some areas between expected (“[Corsican locals] know what we have to do”) and actual behaviours and strategies. Moreover, given the dynamics in the socio-cultural climate and new/temporary residents moving to the island each year, who reportedly have less developed risk cultures and are more emotionally driven, levels of resilience may alter as a result. Thus, as vulnerabilities are uncovered, it is important that communities develop an ability to adapt in response to hazards, as mass evacuations are

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1696 increasingly being observed in European islands. If the frequency of disruption to communities
1697 due to wildfire evacuations continues to rise, then island WUI communities must be mentally
1698 and physically prepared for such an eventuality.
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