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FIREURISK - DEVELOPING A HOLISTIC, RISK-WISE STRATEGY FOR EUROPEAN WILDFIRE MANAGEMENT

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D6.4 – Training organisation - v.1

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Executive Summary

Deliverable D6.4, entitled "Training organization - v.1", is the fourth Deliverable of WP6 ("Policy integration & outreach – Networking & dissemination") of the FirEURisk project. The Deliverable describes the activities carried out by CNR in A6.2.2, aimed at supporting the sharing and inception of the project's results through the organization of several training activities in different forms (e.g., practitioners' workshops, focused webinars, online discussions with policymakers, web-based simulation exercises) targeting different types of actors (e.g., practitioners, professionals, researchers), and supported by the development of specialized training materials. The final aim of the Deliverable is thus to present the main steps towards the organization of the training activities, and the main results of the organized events.

Firstly, CNR revised the FirEURisk project activities to define a possible list of results suitable for training activities and then engaged WP leaders to evaluate the suitability of the identified WP project results to be presented and treated as training activities, also asking for feedback and possible other interesting FirEURisk results that could be exploited as training activities. 5 training activities were then proposed: “Fuel mapping” and “WUI mapping” for WP1, “Guidelines to face extreme fires” for WP2, “Future fire risk and adaptation measures” for WP3, and “Roadmap for an integrated strategy” for WP4. Furthermore, CNR defined the structure of a factsheet representing the backbones of the training activities (e.g. objectives, expected results, training format, targets), to be also used as dissemination material shared with the targeted audiences, and the steps to plan the identified training activities.

Out of the 5 defined events, two were organized by M24. The first focused on “The FirEURisk fuel classification system and the European fuel map” and was delivered by UAH on February 2, 2023. 240 people attended and one third were represented by "Actors involved in wildfire risk management". The second training, hosted by UH on February 22, 2023, focused on “Mapping the Wildland Urban Interface (WUI)”. 200 people attended. Approximately 45% of the attendees were "Actors involved in wildfire risk management". Concerning the training materials (publicly available at the FirEURisk website, section "Resources": https://fireurisk.eu/training-event-materials/), at M24, the training event recordings had, in total, more than 300 views, while the slides and the other shared material had about 300 and 280 downloads, respectively.

Upon completion of all proposed events, this Deliverable will be updated on M48.

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Table of Contents

1 Introduction 9
1.1 Purpose of the document 9
1.2 Structure of the document 9
2 Setting the ground (methodology) 10
2.1 Identification of possible training activities 10
2.2 WP leaders' engagement 11
3 Planning training activities 13
4 Selected training activity factsheets 16
5 Organised training events [by M24] 25
5.1 FirEUrisk Training event #1 - The FirEUrisk fuel classification system and the European fuel map 25
5.2 FirEUrisk Training event #2 – Mapping the Wildland – Urban Interface (WUI) 27
6 Concluding remarks 30
Annex A: Q&A Transcript 32
FirEUrisk Training event #1 - The FirEUrisk fuel classification system and the European fuel map 32
FirEUrisk Training event #2 – Mapping the Wildland – Urban Interface (WUI) 34

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List of Figures

Figure 1. Factsheet structure of the training activities 15
Figure 2. Prof. Emilio Chuvieco (UAH) presenting the background on fuel research in the FirEURisk project to the +200 participants of the first online training event (Feb. 2, 2023) 25
Figure 3. The description of the first training in the FirEURisk event page at https://fireurisk.eu/events/.....26
Figure 4. The percentage (%) of participants per target group.....27
Figure 5. Prof. Avi Bar-Massada (UH) discussing the Mapping of Wildland-Urban Interface during the second online training event 28
Figure 6. The description of the second training on the FirEURisk event page at https://fireurisk.eu/events/ 29
Figure 7. The percentage (%) of participants per target group.....30

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List of tables

Table 1: List of Acronyms....8
Table 2 - First draft of training activities proposed by CNR in January 2022 10
Table 3 - Second draft of training activities proposed by CNR in June 2022....11
Table 4 - Third draft of training activities proposed by CNR in October 22 12
Table 5 - Factsheet of the training activity #1 related to WP1, conducted by UAH....17
Table 6 - Factsheet of the training activity #2 related to WP1, conducted by UH....19
Table 7 - Factsheet of the training activity #3 related to WP2....21
Table 8 - Factsheet of the training activity #4 related to WP3....23
Table 9 - Factsheet of the training activity #5 related to WP4....24

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List of Acronyms

Table 1: List of Acronyms

List of Acronyms	
WP	Work Package
CNR	National Research Council of Italy
FIRE-RES	Innovative technologies and socio-ecological-economic solutions for fire-resilient territories in Europe
FIRELOGUE	Cross-sector dialogue for Wildfire Risk Management
SILVANUS	Integrated Technological and Information Platform for wildfire Management
TREEDS	A Holistic Fire Management Ecosystem for Prevention, Detection and Restoration of Environmental Disasters
FIRE-ADAPT	The Role of Integrated Fire Management on Climate Change Adaptation for Ecosystem Services in Tropical and Subtropical Regions
Pyrolife ESRs	Pyrolife Early Stage Researchers
Med-Star	Strategie e misure per la mitigazione del rischio di incendio nell'area Mediterranea (Strategies and measures for fire risk mitigation in the Mediterranean area)
ICFBR2022	III International Fire Behaviour and Risk Conference, 2022
SISEF	Italian Society of Silviculture and Forest Ecology

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1 Introduction

The main goal of Work Package 6 is to define, establish and perform highly effective communication, dissemination and exploitation actions to ensure the project's success and long-term legacy in achieving its goals across all EU regions and beyond. WP6 receives inputs from all WPs to share and promote knowledge, experience and expertise generated and validated within FirEURisk, concerning alternative wildfire management practices to best address the changing risks across Europe. This includes effective communication, dissemination, and integration of the integrated strategy for holistic risk-based fire management across Europe" (O1, FirEURisk Grant Agreement, Annex 1)[1]. In this framework, and in particular in Activity 6.2.2, the National Research Council of Italy (CNR) organizes several training activities, supported by the development of specialized training materials, in different forms (e.g., practitioners' workshops, focused webinars, online discussions with policy-makers, web-based simulation exercises) targeting different types of actors (e.g., practitioners, professionals, researchers). The final aim is to support the sharing and inception of the project's results.

1.1 Purpose of the document

Deliverable D6.4 "Training organization – v.1" presents the main steps towards the organization of the training activities, and the main results of the organized events. Indeed, CNR first identified a possible list of project results suitable for training activities [M12-M16]. Several suggestions accompany each item, such as the training type, the activity's month, the responsible partners, and the possible targets. Then, CNR started a preliminary discussion on the activities with WP leaders, asking for feedback and possible other interesting FirEURisk results that could be exploited as training activities [M17-M20]. Finally, CNR defined the factsheet representing the structure of the training activities [M19]. Following the developed communication and exploitation plan (D6.6), the factsheet is also used as dissemination material shared with the targeted audiences.

1.2 Structure of the document

The present Deliverable is organized into six sections. After the Introduction (section 1), the document illustrates the preliminary steps and discussions with WP leaders to define the possible list of project results suitable for training activities (section 2). Then, the document presents the structure of the training activities factsheet (section 3) and the planning of the identified training activities (section 4). The training events that were organized by M24 are described in the fifth section. Lastly, section 6 proposed some main conclusions. The reports on the “questions and answers” session of the trainings are presented in Annex A. Upon completion of all proposed events, this Deliverable will be updated on M48.

[1] FireEURisk O1 – Objective 1: Develop and validate a novel and integrated strategy for holistic risk-based fire management, addressing all phases of wildfire challenges (prevention, monitoring, preparedness, response, and restoration) (WP1 to WP6).

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2 Setting the ground (methodology)

2.1 Identification of possible training activities

CNR revised the FirEURisk project activities to define a possible list of results suitable for training activities (including workshops/ webinar/online discussions/web-based simulation exercises).
Although the A6.2.2 officially started in M12 (March 2022), a first draft of training activities was proposed in January 2022 to the partners involved in WP6 during the WP6 monthly meeting. The first draft included the activities summarized in Table 2. The potential training topics mainly referred to activities and results included in WP2.

Table 2 - First draft of training activities proposed by CNR in January 2022

WP	TRAINING ACTIVITY	FORMAT	POSSIBLE RESPONSIBLE PARTNER(S)
1	GIS db for exposure, vulnerability and risk	training course	METEOGRID
2	Guidelines to reduce communities' vulnerability to extreme fires and fires in WUI	training course	METEOGRID
2	Presentation and discussion of the results coming from the training sessions aimed at reducing probability and potential of ignitions	focused webinar	SAFE, KEMEA, CNR
2	Land management strategies to reduce fire risk	focused webinar	VUA, JHI, CSIC
2	Practitioners' workshop based on the guidelines to face extreme fires, fires in WUI, fires in high latitude/altitude	case studies, strategies, lessons learnt, discussion	SAFE
3	Future fire risk and integration of effective adaptation measures	Possible blended co-production meeting, with priority evaluation from stakeholder experience	IRD, PIK, ISIG
4	From the review of fire risk management in Europe to the development of a new conceptual framework and integrated strategy	Presentation and discussion with policy-makers	ADAI, UAH

After a specific meeting with the coordinator of Task 6.2 (UAVR) on May 25, 2022, the following points were set as priority to advance in the training organization:

- Engage WP leaders to better select the most interesting contents to be presented and used as training activities;
- Reduce the number of training events to four/five (ideally one for each WP) instead of seven - as per the first draft - due to budget availability;

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- Identify the timing for training activity based on results' releases and target groups.

Taking into account the above points, CNR refined the first draft of training activities and proposed a second version of the draft list, as shown in Table 3.

Table 3 - Second draft of training activities proposed by CNR in June 2022

ACTIVITY N°	WP	TRAINING ACTIVITY	FORMAT	TARGET	MONTH	POSSIBLE RESPONSIBLE PARTNER(S)
1	1	Development of a fuel classification scheme and mapping methods	Hands-on training course	PhD students and researchers	M20-M21	UAH
2	2	Land management strategies to reduce fire risk	Focused webinar	Forest agencies, landowner associations	M31	VUA, JHI, CSIC
3	3	Future fire risk and integration of effective adaptation measures	Possible blended co-production meeting, with priority evaluation from stakeholder experience	Researchers and stakeholders	M43	IRD, PIK, ISIG
4	4	From the review of fire risk management in Europe to the development of a new conceptual framework and integrated strategy	Presentation and discussion with policy-makers.	Stakeholders and policy-makers	M47-48	ADAI, UAH

2.2 WP leaders' engagement

Based on the second draft of the possible training activities, CNR engaged WP leaders [M16-M17] to:

- evaluate the suitability of the identified WP project results to be presented and treated as training activities;
- stimulating further proposals from the WP leader side;
- defining the timing, the target, and the training formats.

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TRAINING ACTIVITY #1 – UdL, leader of WP1, agreed on a possible training course on fuel classification and mapping and suggested also considering: (i) impacts caused by smoke and emissions (A1.1.5); (ii) fuel moisture outputs (A1.1.1); (iii) probability of ignition models; and (iv) WUI classification (T1.2).
The topic selection was based on two main elements: (1) the availability of results ready to be shared and incepted among the actors involved in wildfire management; and (2) the recognition of the need for these results to integrate a continental wildfire risk assessment (one of the main FirEUrisk objectives). In particular, European fuel and WUI mapping presents several limitations since mostly developed for local and regional scales. Considering these elements, CNR finally decided to focus on fuel and WUI classification and mapping, and thus contacted the responsible partners to check their availability.

TRAINING ACTIVITY #2 – At first, SAFE, leader of WP2, and VUA agreed that a focused webinar on land management strategies to reduce fire risk (related to T2.2 results) could be interesting for policy-makers/stakeholders. Due to previous commitments, they preferred to focus on a practitioners' workshop based on the guidelines to face extreme fires, fires at WUI and in high latitude/altitude (case studies, strategies, lessons learnt, discussion) (related to T2.3 results). Organising the meeting in person would be preferable (for example, in the continuity of a general FirEURisk meeting to minimise the partners' travels and expenses). Still, due to budgetary constraints, CNR and SAFE opted for an online workshop to be held by M30-32, so that feedbacks from the workshop can be integrated into deliverable D2.6 (due on M36).

TRAINING ACTIVITY #3 – Concerning the third possible training activity (based on the results of T3.1 on future fire risk), PIK (WP3 leader) agreed on presenting their results through a dynamic approach, allowing the participants to explore the different results for each scenario. This training activity will combine the presentation of the required theory and material for explaining the following issues, as well as a practical hands-on section:

- understanding the climate models;
- how can those differ based on the considered climate scenarios;
- how the above models are translated to simulate vegetation and fire changes.

Further details will be discussed after the second year once the simulations are analysed.

TRAINING ACTIVITY #4 - TUD (WP4 leader) agreed on the possible presentation of the Roadmap for an integrated strategy for Europe based on the various risk components related to A4.2.2. The training event will be a webinar or a discussion with European policy-makers. The use of the FirEUrisk open portal for data and the description of the content of any produced documents (such as fire-fighting techniques or specific land management techniques) will be presented. Furthermore, if the European strategy framework identifies specific national/regional components, TUD will be ready to replicate the event in Germany around the same time, alongside any other information regarding the tools and research findings.

Based on this first round of feedback, CNR reviewed the second draft of training activities and proposed a third version of the draft list, as shown in Table 4, at the 4th Project Meeting in Dresden (October 2022).

Table 4 - Third draft of training activities proposed by CNR in October 22

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ACTIVITY N°	WP	TRAINING ACTIVITY	FORMAT	TARGET	MONTH	POSSIBLE RESPONSIBLE PARTNER(S)
1	1	WP1 - Development of a fuel classification scheme and mapping methods	Webinar + hands-on experience	PhD students and researchers	M21-M24	UAH
2	1	WP1 - Development of WUI mapping	Webinar + hands-on experience	PhD students and researchers	M21-M24	UH
3	2	WP2 – Guidelines to face extreme fires, fires in WUI, fires in high latitude/altitude	Focused webinar OR practitioners' workshop (case studies, strategies, lessons learnt, discussion)	Forest agencies, landowner associations	M30-M32	VUA, SAFE
4	3	WP3 – Future fire risk and adaptation measures	Webinar + training course	Project partners	M43	PIK
5	4	WP4 – Roadmap for an integrated strategy	Presentation and discussion with policy-makers	Stakeholders and policy-makers	M47-48	ADAI, UAH, TUD

3 Planning training activities

To plan the proposed activities, CNR defined the structure of a factsheet representing the structure of the training activities at M19. The factsheet describes how training activities should be visible to the trainees with clearly articulated aims, activity structures, and development paths. To define the factsheet structure, CNR followed the steps below.

Step 1: Define training objectives and expected results – The first step requires specifying what the trainees can learn from the training, so it is necessary to provide the most important concepts or skills that trainees need to understand by the end of the training event.

Step 2: Clarify Key Topics and Related Concepts – It is necessary to explain related concepts to reach the training objectives. For this aim, the trainer partner should provide a general overview of the theme and introduce the developed approach, including the tools and the data needed for the training.

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Step 3: Organize Material – The third step implies drafting the training session outline and comparing the outline with the session's objectives to ensure that they will be achieved.

Step 4: Define the Presentation Techniques – Several different formats can be selected according to the training objectives and the main targets (e.g., workshops, focused webinars, online discussions, web-based simulation exercises); several presentation approaches can be used to keep trainees and audience engaged (e.g., lectures, demonstration, discussions, case studies, etc.).

Based on these steps, CNR drafted the factsheet structure of the training activities (

	TITLE	
General description		
Main objectives		
Expected results/outcomes		
Format	*N. of hours*	*Presentation technique*
Audience		
Agenda/Outline of the Training Session		
Date		
Speaker(s)		
Agenda	*List of the points to be covered*	
	List of the points to be covered	
	List of the points to be covered	
Training material		
Slides	*Provide the presented slides*	
Scripts (if any)	*Provide the scripts needed for the training*	
Data and tools	*Describe the tools and the data needed for the training*	
Q&A Transcript	*Report on the question-and-answer session*	

Figure 1). Following the developed communication and exploitation plan (D6.6), the factsheet is also used as dissemination material shared with the targeted audiences.

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	TITLE	
General description		
Main objectives		
Expected results/outcomes		
Format	*N. of hours*	*Presentation technique*
Audience		
Agenda/Outline of the Training Session		
Date		
Speaker(s)		
Agenda	*List of the points to be covered*	
	List of the points to be covered	
	List of the points to be covered	
Training material		
Slides	*Provide the presented slides*	
Scripts (if any)	*Provide the scripts needed for the training*	
Data and tools	*Describe the tools and the data needed for the training*	
Q&A Transcript	*Report on the question-and-answer session*	

Figure 1. Factsheet structure of the training activities

Once the events have been defined in detail, we started with the publicity phase of the event. The first step involved the development of a summary banner of the event, which was then disseminated on social networks and published on the FirEUrisk events page (https://fireurisk.eu/events/). The event branding development was handled by Scienseed, under the defined graphics of the project.
The banner, the agenda with detailed factsheet, and the registration link were then disseminated through a mailing list compiled by the CNR, which included:

- FirEUrisk project partners;
- Coordinators and participants in fire-related projects founded by the European Horizon 2020 (FIRE-RES, FIRELOGUE, SILVANUS, TREEDS);
- Other fire-related networks, such as FIRE-ADAPT (Marie Curie Rise), Pyrolife ESRs (Early Stage Researchers), Med-Star and the four related simple projects (EU Italy-France Maritime Programme), the III International Fire Behaviour and Risk Conference (ICFBR2022), the Italian Society of Silviculture and Forest Ecology (SISEF), to name some of them.

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4 Selected training activity factsheets

This section presents the selected training activities according to the factsheet structure defined in section 3. The first two have been held by M24, thus the factsheet is completed in each section and presented in Tables 6 and 7. The other planned training activities are only drafted (Table 8, 9, and 10) and will be better defined once the corresponding results will be released and the training approaches will be defined.

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Table 5 - Factsheet of the training activity #1 related to WP1, conducted by UAH

	The FirEURisk fuel classification system and the European fuel map
General description	Accurate and spatially explicit information on forest fuels is essential for **designing integrated fire risk management strategies**, as fuel characteristics are critical for fire danger estimation, fire propagation and emissions modelling, among other aspects. The first FirEURisk training, delivered by Elena Aragoneses and Emilio Chuvieco from the University of Alcalá (Spain), will first provide attendees with the importance of fuel types and fuel models in fire risk assessment and other fire-related applications, and then will give an overview of the project's **new fuel classification system.** During the training event, the attendees will be provided with the **knowledge and tools** necessary to use it and explore the related European fuel map to assess fire risk in Europe. Data access and tools to analyse the dataset, along with examples of potential usage, will also be presented to help attendees **adapt the FirEURisk classification system to different spatial scales and different purposes**.
Main objectives	• Provide an overview of the basics of how to use the FirEURisk fuel classification system and the European fuel map to assess fire risk in Europe. • Understanding the FirEURisk fuel classification system to facilitate its usage. • Exploring the FirEURisk European fuel map. • Understanding how fuel parameters can be assigned to the FirEURisk fuel classification system and using them to model fire behaviour. • Inspire for potential usage of the products.
Expected results/outcomes	Provide the audience with the basic tools (knowledge and materials) to start working in fire risk reduction using the FirEURisk fuel classification system and the European fuel map. After the training, participants will be able to: • Understand the legend of the FirEURisk fuel classification system. • Work with the FirEURisk European fuel map, understanding its characteristics and limitations. • Map fuel parameters for Europe using the crosswalk to FBFM.
Format	2 hours: The webinar will be based on frontal presentation and hands-on training exercise to be completed on attendees' computers (requiring the installation of the free QGIS software https://qgis.org/es/site/forusers/download.html). Specific documents and files will be shared with the attendees few days before the training.
Audience	Graduate and PhD students, researchers, and actors involved in wildfire risk management
Agenda/Outline of the Training Session	
Date	February 2, 2023. Morning, 10-12h CET
Speaker(s)	Elena Aragoneses (UAH) (e.aragoneses@uah.es) Emilio Chuvieco (UAH) (emilio.chuvieco@uah.es)
Agenda	• Introduction: What are fuel types and fuel models? Role of this information in fire risk assessment and other fire-related applications.

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	• The FirEURisk fuel classification system and the European fuel map: possible uses.
	• Basis of the FirEURisk fuel classification system. Concepts behind the definition of categories. Overview of the FirEURisk fuel classification system (understanding the legend). How it was built and why it is useful – main characteristics (hierarchical, scalable, integration, etc).
	• The European fuel map:
	  ○ Basic characteristics: format, layer, projection, etc. Hands on: open the map in a GIS and explore it.
	  ○ Overview of how it was developed: input layers (land cover datasets and bioclimatic models), where information was extracted from, custom resampling method.
	▪ BONUS: Limitations of the methods: Why could the European fuel map not work well for local study areas?
	  ○ Validation of the European fuel map: overview of the two validation approaches, results, limitations.
	▪ BONUS: Where can errors come from? Possible sources of errors in the European fuel map.
	• How can we model fire behaviour?
	  ○ Fuel parameters: what are they and why are they necessary?
	  ○ Crosswalk from FirEURisk to FBFM. Hands on: join the crosswalk table to the European fuel map to generate maps of fuel parameters (using an already-prepared table by UAH).
	  ○ Alternative approaches (theoretical): custom crosswalks and completing with detailed information (datasets, LiDAR, etc) for smaller regions.
	• Expansion of the fuel classification to other scales.
	• Hands-on: Where can we find the FirEURisk fuel classification system and the European fuel map? (repository and paper).
	• Summary: product strengths and weaknesses, final recommendations and acknowledgements.
	• Q&A.

Training material	
Slides	Presented slides (available at https://fireurisk.eu/training-event-materials/)
Scripts (if any)	
Data and tools	Data: PUM, European fuel map, paper, fuel parameters' table to join (available at https://fireurisk.eu/training-event-materials/)
Q&A Transcript	Report on the question-and-answer session (available at https://fireurisk.eu/training-event-materials/)

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Table 6 - Factsheet of the training activity #2 related to WP1, conducted by UH

	MAPPING THE WILDLAND – URBAN INTERFACE (WUI)
General description	The wildland-urban areas (WUI), where human settlements are in or near patches of flammable vegetation, make up areas exposed to high wildland fire risk. In the past two decades, considerable effort has been devoted to **identifying these high-risk locations**, following different mapping approaches and concepts, with the objective of informing better fire management and policy aimed at reducing fire risk to human lives and property. Therefore, understanding the concepts and the rationale behind different WUI mapping approaches is essential before the WUI can be effectively mapped in a given region. In this webinar, hosted by Prof. Avi Bar-Massada from the University of Haifa (Israel), attendees will learn the current state-of-the-art in WUI mapping, discussing the rationale behind **different mapping approaches**, the **pros-and-cons of each strategy** and its **data requirements**. Participants will gain hands-on experience in mapping the WUI in a single demonstration region and acquire knowledge to create WUI maps for their region of interest, so they can contribute to **better fire management and policies aimed at reducing fire risk** to human lives and property.
Main objectives	1. Understand what the WUI is, and some of the processes operate within it 2. Gain an understanding of the most common WUI mapping approaches 3. Understand data requirements for WUI mapping 4. Practice the mapping of the WUI in a single region
Expected results/outcomes	Webinar attendees will understand the rationale behind the current state-of-the-art WUI mapping approaches. They will be able to identify the benefits and limitations of different approaches, so that they will be able to choose which approach to utilise given the need. Attendees will be able to create their own WUI maps (assuming the required input data are available).
Format	*1.5 hours* — The webinar will be based on three components: frontal presentation, discussion, and a hands-on training exercise.
Audience	Graduate and PhD students, researchers, and actors involved in wildfire risk management
Agenda/Outline of the Training Session	
Date	February 22nd 2023, 10.30 – 12.00 CET
Speaker(s)	**Prof. Avi Bar-Massada, University of Haifa, Israel (avi-b@sci.haifa.ac.il)**
Agenda	• What is the WUI? • The rationale of WUI mapping • Common WUI mapping approaches • Data requirements • Application • Discussion
Training material	
Slides	Presented slides (available at https://fireurisk.eu/training-event-materials/)
Scripts (if any)	
Data and tools	Links to repository (available at https://fireurisk.eu/training-event-materials/)

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Q&A Transcript	Report on the question-and-answer session (available at https://fireurisk.eu/training-event-materials/)

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Table 7 - Factsheet of the training activity #3 related to WP2

	Guidelines to face extreme fires, fires in WUI, and fires in high latitude/altitude	
General description	Past events and research have identified firefighter's weaknesses in facing extreme fires and fires in Wildland Urban Interface (WUI) area. Meanwhile, based on scientific predictions, it is very likely that in the future there will be more extreme fires and more fires in the WUI area. Therefore, guidelines are needed to provide firefighters and managers with a proper understanding of extreme fire behavior and WUI challenges. This workshop is devoted to practitioners on how to deal with extreme fires, fires in WUI, and fires in high latitude/altitude based on the guidelines and to get some feedback from the practitioners regarding to the guidelines that have been developed.	
Main objectives	i. To provide an overview of extreme fires, fires in WUI, and fires in high latitude/altitude (definition, risks, past fire, future challenge, etc) ii. To Introduce and test guidelines for extreme fires, fires in WUI, and fires in high latitude/altitude iii. Understanding the appropriate strategy that should be taken in different conditions based on the guidelines	
Expected results/outcomes	i. Practitioners will get a better understanding in term of extreme fires, fires in WUI, fires in high latitude/altitude and it is hoped that when they encounter one of these conditions, they can overcome it by following the guidelines provided ii. Obtaining input or feedback from practitioners related to the guidelines provided	
Format	***N. of hours (TBD)***	Case studies, strategies, lessons learnt, discussion
Audience	Fire professionals	
Agenda/Outline of the Training Session		
Date	M30-32 **(the exact date: *TBD*)**	
Speaker(s)	**To be confirmed** 1. Miguel ALMEIDA, ADAI 2. ADAI 3. UAVR 4. Kirsten Thonicke, PIK 5. SAFE CLUSTER	
Agenda	• **Introduction** • **Presentation** • *Scientific description of Extreme Fire and Fire in Wildlife Urban Interface. Feedback from T.2.4* • **Discussion**	
	• **Presentation** • *Modeling tool for extreme fire, a product from (T2.3.1)* • *Smoke dispersion component Modeling tool, a product from (T2.3.2)* • **Discussion and Practice**	
	• *Break*	
	• **Presentation**	

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	• *Describing the evolution of fire risks in EU from 2020-2100 (WP.3)* • *Screening of strategies/tactics to fight fires (T.2.3.3)* • **Discussion** • **Feedback**
Training material	
Slides	Presentation slides (in pdf)
Scripts (if any)	
Data and tools	i. Fire risk foreseen data from WP3 ii. Extreme fire Modeling tool from T2.3.1
Q&A Transcript	Report on the question and answer session

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Table 8 - Factsheet of the training activity #4 related to WP3

	Future fire risk	
General description	This training will focus on future fire risk and integration of effective adaptation measures. Participants will be guided through the different results of each scenario to understand what climate models are, how they differ from climate scenarios and how that translate to simulated vegetation and fire changes.	
Main objectives	• To provide attendees with guidance and tools to understand future fire risk	
Expected results/outcomes	• Practitioners will get a better understanding of future fire risk scenarios and how interpret the results	
Format	***N. of hours (TBD)***	*focused webinar plus a possible online discussion with policy makers*
Audience	policy and decision-makers	
Agenda/Outline of the Training Session		
Date	**M43 (the exact date: *TBD*)**	
Speaker(s)	**TBD**	
Agenda	•	
	•	
	•	
	•	
Training material		
Slides		
Scripts (if any)		
Data and tools		
Q&A Transcript		

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Table 9 - Factsheet of the training activity #5 related to WP4

	The Roadmap for an integrated fire risk management strategy	
General description	The last training event of FirEURisk project will provide information on the definition of a roadmap for developing an integrated fire risk management strategy for Europe. The fire risk components and possible alternatives for reduction will be presented, taking future scenarios into account. Furthermore, possible changes that could be made in addressing the issue of wildfires in pilot sites will be also illustrated and discussed. The participants will be involved in proposing future improvements and alternative fire policies and practices for risk mitigation.	
Main objectives	• To provide information towards the Roadmap for developing an integrated fire risk management strategy in Europe • To involve participants in proposing future improvements in fire risk management • To discuss with participants about alternative fire policies and practices for risk mitigation	
Expected results/outcomes	• Practitioners will get a better understanding of how to develop an integrated fire risk management strategy • Obtaining input or feedback from practitioners related to fire policies and practices for risk mitigation	
Format	***N. of hours (TBD)***	*Presentation technique - TBD*
Audience	stakeholders, policy, and decision-makers	
Agenda/Outline of the Training Session		
Date	**M47-48 (the exact date: *TBD*)**	
Speaker(s)	**TBD**	
Agenda	•	
	•	
	•	
	•	
Training material		
Slides		
Scripts (if any)		
Data and tools		
Q&A Transcript		

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5 Organised training events [by M24]

Section 5 illustrates the training events that were organized by M24. Upon completion of all proposed events, this Deliverable will be updated by M48.

5.1 FirEURisk Training event #1 - The FirEURisk fuel classification system and the European fuel map

The first FirEURisk training event was held online on February 2, 2023, from 10 am to 12 am CET (Figure 2). The event was advertised through the channels described in section 3 (an example in Figure 3), and through an email sent on January 18, 2023.
392 people signed up for the training event before the deadline; of these, about 240 attended. Approximately one third of the attendees were Researchers, and another third was represented by "Actors involved in wildfire risk management". PhD students were about 26% (Figure 4).

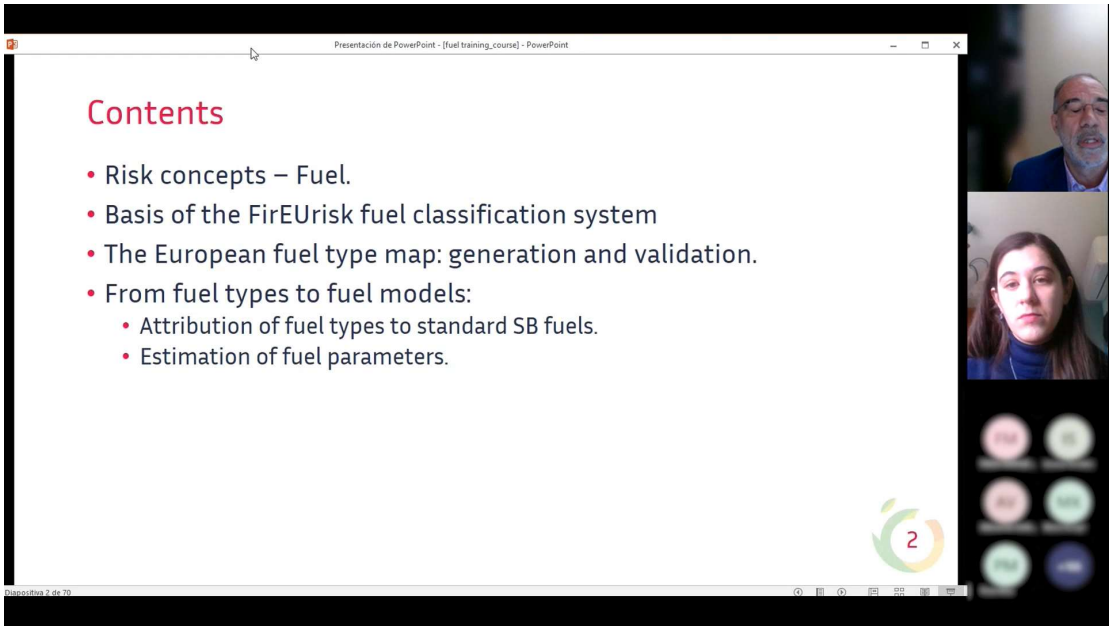


Figure 2. Prof. Emilio Chuvieco (UAH) presenting the contents of the first online training event to the +200 participants (Feb. 2, 2023)

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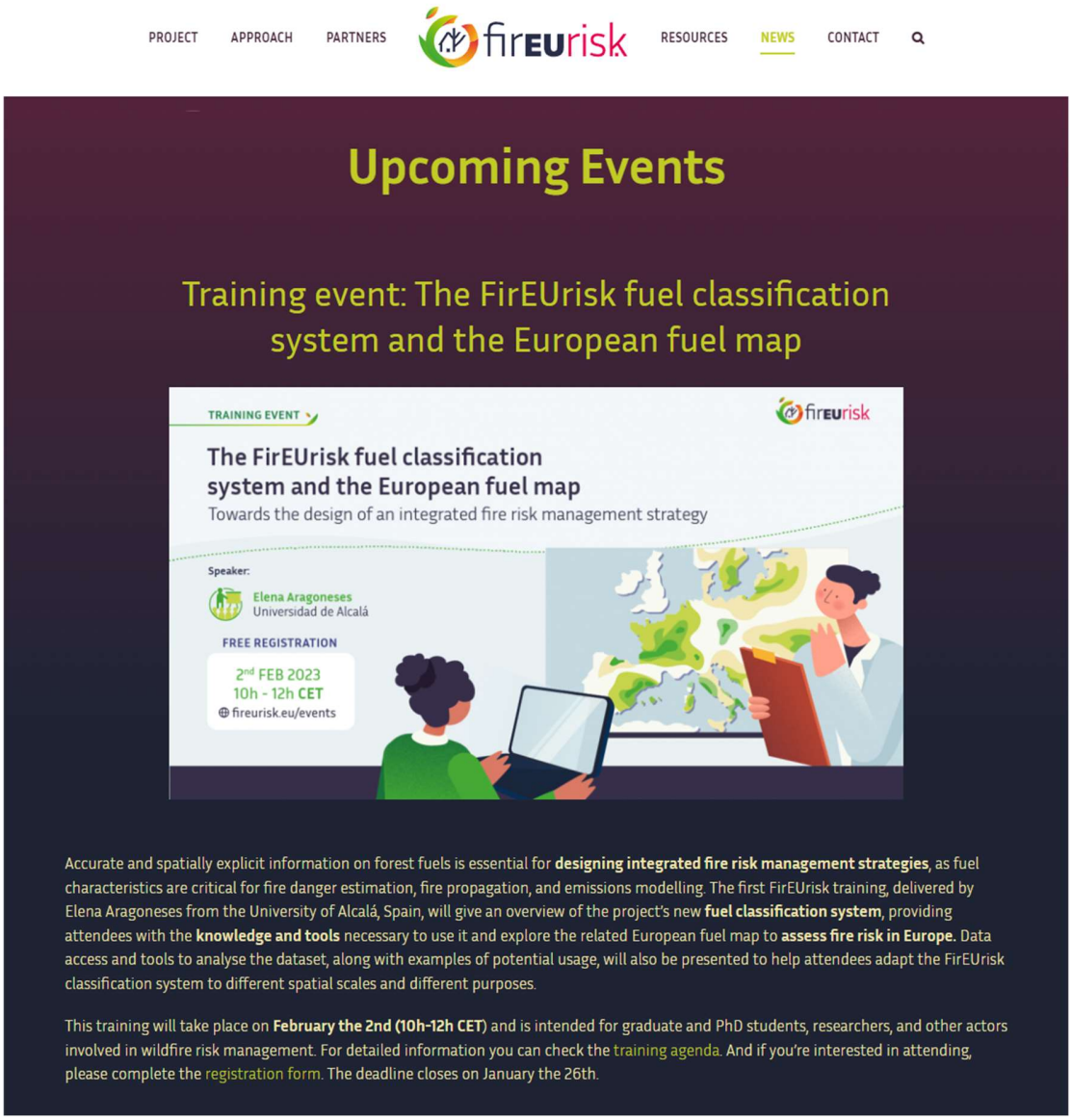


Figure 3. The description of the first training in the FirEURisk event page at https://fireurisk.eu/events/

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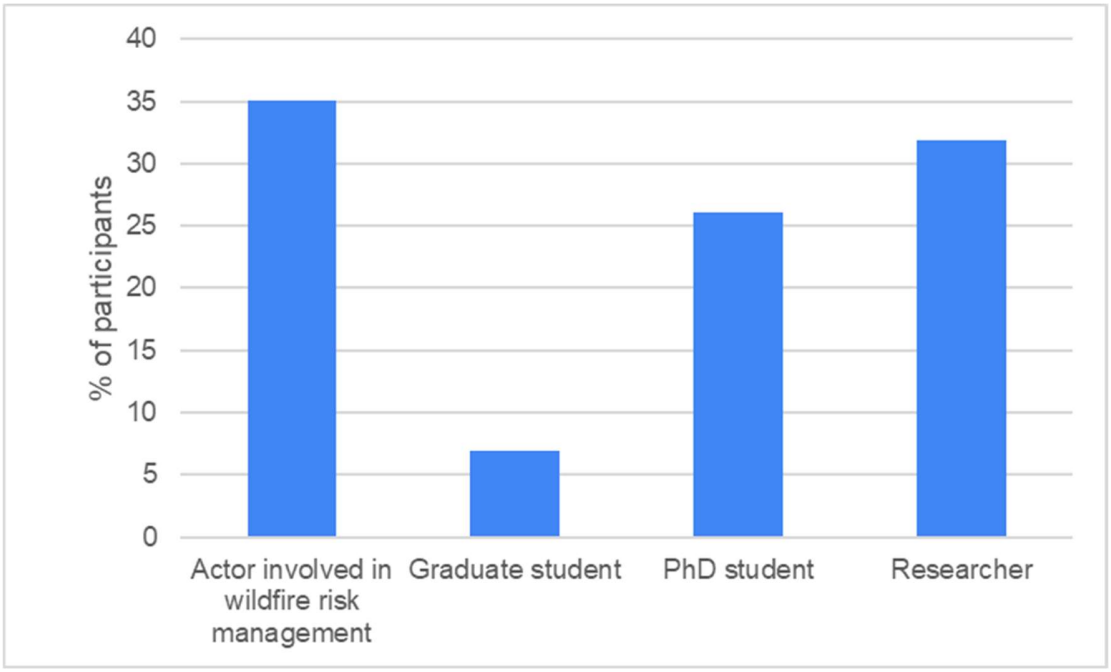


Figure 4. The percentage (%) of participants per target group

The countries most represented are Portugal (29%), Spain (24%), and Italy (17%).

With the aim of understanding FirEURisk's popularity and visibility across other consortiums and networks (e.g., those funded under the topic LC-GD-1-1-2020 - Preventing and fighting extreme wildfires with the integration and demonstration of innovative means), we asked participants if they are involved in any fire related project. Among the participants (so not considering the organizers and the speakers), 17 declared to be involved in FirEURisk. 19 participants informed the organizer to be engaged in one of the following projects: FIRE-RES, FIRELOGUE, SILVANUS, and TREEADS. Finally, 29 other participants indicated their involvement in other fire-related projects (e.g., Life, Interreg, and other H2020).

The registration of the first training event and the material shared with the audience are publicly available at the FirEURisk website, section "Resources": *https://fireurisk.eu/training-event-materials/.* By M24, the training event recording had 203 views, the slides had 157 downloads, and the other material had 143 downloads.

5.2 FirEURisk Training event #2 – Mapping the Wildland – Urban Interface (WUI)

The second FirEURisk training event was held on February 22, 2023, from 10.30 am to 12 am CET (Figure 5). The event was advertised through the channels described in section 2 (an example in Figure 6), and through an email sent on February 6, 2023.

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407 people signed up for the training event before the deadline; of these, about 200 attended. Approximately 45% of the attendees were "Actors involved in wildfire risk management", while the category "Researcher" represented 28% of the total participants. Graduate and PhD students were about 27% (Figure 7).

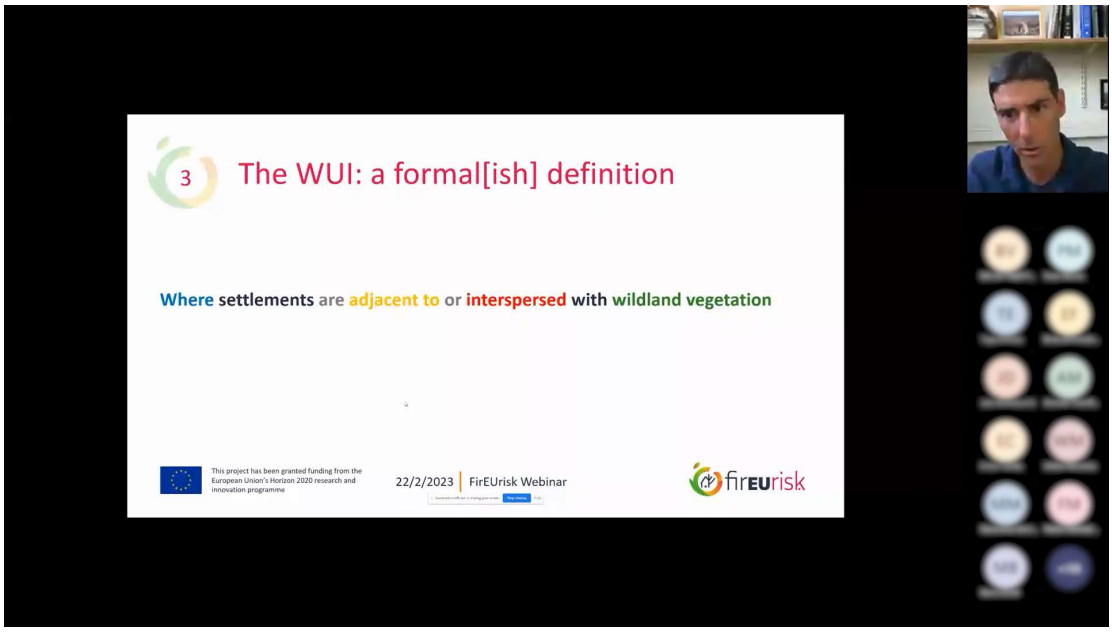


Figure 5. Prof. Avi Bar-Massada (UH) discussing the formal definition of Wildland-Urban Interface during the second online training event (Feb. 2, 2023)

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Figure 6. The description of the second training on the FirEUrisk event page at https://fireurisk.eu/events/

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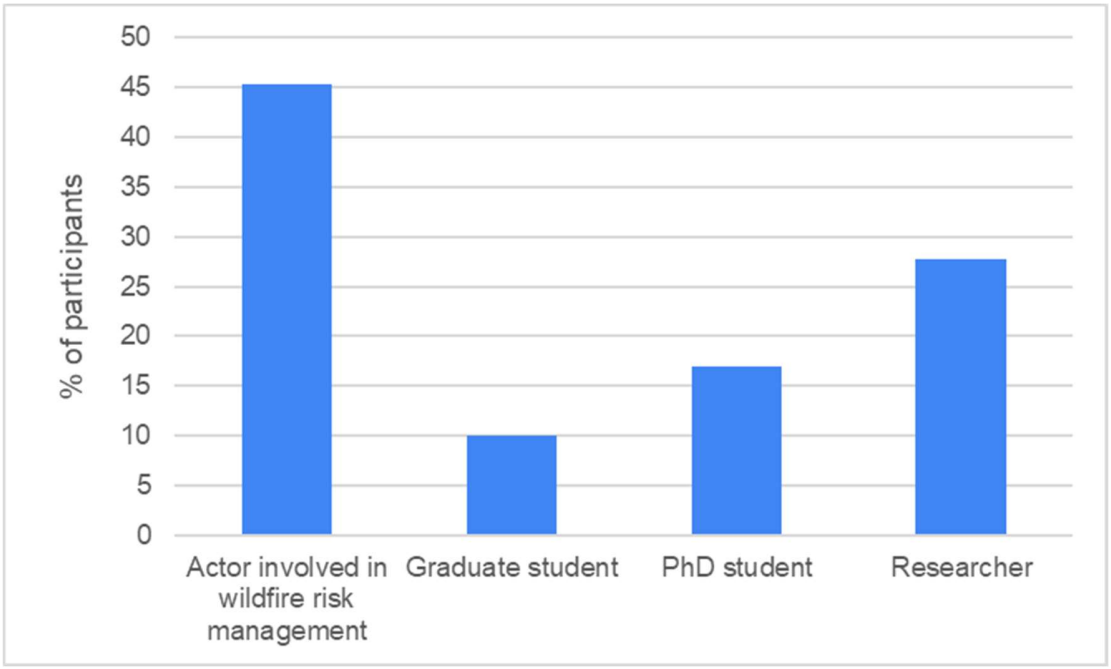


Figure 7. The percentage (%) of participants per target group

During the second training event, the countries most represented were Portugal (45%), Spain (17%) and Italy (16%). Among the participants (so not considering the organizers and the speaker), 9 declared to be involved in FirEURisk. 18 participants informed the organizer to be engaged in one or more of the four projects funded under the topic LC-GD-1-1-2020 (Preventing and fighting extreme wildfires with the integration and demonstration of innovative means), such as FIRE-RES, FIRELOGUE, SILVANUS, and TREEADS. Finally, 56 other participants indicated their involvement in other fire-related projects (e.g., Life, Interreg, other H2020).

About 16% of the participants received information about the webinar at the end of the first FirEURisk training event; 27% were informed by a friend/colleague, while 23% received information via email by CNR. Finally, only 6% of the attendees were informed about the training event by the FirEURisk website. The remaining participants (28%) received this information through other sources.

The registration of the first training event and the material shared with the audience are publicly available at the FirEURisk website, section "Resources": *https://fireurisk.eu/training-event-materials/*. Furthermore, by M24, the event recording had 109 views, the slides had 145 downloads, and the other material had 135 downloads.

6 Concluding remarks

Deliverable 6.4 – *Training organisation - v.1* lays the foundations for organising the training events foreseen in WP6 to share and incept the FirEURisk project's results. It (i) discusses, in a descriptive form, the methodology followed to identify the project results suitable for training activities; (ii) describes, through specific factsheets, the objectives and the expected results of the proposed training events; and (iii) finally presents the main results of the first two online

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events organized by M24, in terms of attendees and material produced. Overall, the first two events addressing WP1 gathered about 400 attendees, and the material shared with the audience is publicly available on the FirEURisk website, section "Resources": *https://fireurisk.eu/training-event-materials/*. Together, the event recordings had more than 200 views, while the presentation slides had more than 300 downloads, and the other produced material (e.g., scripts, maps, articles, methodological schemes, interpretation keys) had about 280 downloads.

From M24 to M48, the training activities concerning WP2, WP3, WP4 will be better planned and carried out mostly accordingly with the proposed roadmap. Future steps entails: (i) increasing in the number of participants; (ii) reaching new target groups such as decisions and policy-makers; (iii) expand the participation from northern and eastern European countries, where the risk of wildfires is projected to be exacerbated by climate change; (iv) include a satisfaction questionnaire with respect to the type of the event and the content explorations to further refine the format of the events and provide guidance for similar activities.

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Annex A: Q&A Transcript

FirEUrisk Training event #1 - The FirEUrisk fuel classification system and the European fuel map

- **Is there a chance to access the 100-meter resolution version?**

Not at the moment because not all the input sources have the exact high resolution. Some of the land cover datasets had 300-meter resolution, and the precipitation data used for bioclimatic modelling had 1 km resolution. So even if any of this layer is resampled to 100 meters, it won't be very accurate. Furthermore, the 100-meter resolution map is not validated, only the one at 1 km resolution.
In addition, 1 km resolution map is enough to have an overview of fire risk; we intend not to model a single fire with the European fuel map. Indeed, that would be done with the high-resolution maps for the pilot site.

- **How did you estimate forest cover/canopy cover a trees height?**

We used Lidar data to obtain the vertical structure of the forest. We calibrated some models first with airborne Lidar and related them with satellite Lidar. In this case, we used GEDI and with this model calibration we applied it to the rest of Europe using all the auxiliary data, such as optical and radar data, to have this continuous map of European parameters. This work is ongoing.

- **Are you considering creating maps also for past periods such as those of CLC? (i.e. 1990, 2000, 2006, 2012) It will prove useful for studying several issues related with past fire events.**

For the moment, we have not planned this activity because we are relying on pre-existing external datasets. For example, Corine Land Cover (CLC) has previous versions but not all the input datasets we use. In this work, we used GEDI, which maps for previous periods are not available. So, it is more likely that we would update the fuel type map in the future instead of looking at the past.

- **Why did you decide to consider as open forests those ones with FCC between 15-70%?**

The thresholds used for all the categories of the fuel classification system were based on expert knowledge. So, we asked people working on fuel types for fire behavior and applied these same thresholds in the case of open and closed forests. I guess this definition comes from the United Nations definition or the Copernicus Global land cover map with the same definition on the closed and open forest.

- **Do you think this method can be applied in tropical regions? limitations regarding fuel loads, forest types?**

The answer is positive. The general method and the idea behind the method can be easily applied to other parts of the world. But of course, depending on the region you are working at, you might have to change some things depending on data availability or better data available instead.

- **Could you explain in detail the validation process?**

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The validation was quite complex. I suggest you all read our paper describing all steps in detail. In a few words, the primary reference source was the Lucas dataset. We use the information and photos provided by this reference data to compare with our results. Furthermore, we considered 1 km resolution, so we complemented the Lucas dataset with other types of information, such as the Google Earth images, to check Lucas representativeness.

- **Talking about next steps you mention propagation models. What models are you considering, keeping in mind that such models are designed for specific fuel classifications?**

One of the good things about adapting the fuel classification system to Scott & Burgan models is that we can use prepared models for this field classification. But the ideal thing would also be to develop models that could use other fuel classification systems as input data. The product is not meant to be used for modelling a specifier but rather to analyse propagation potential at the European scale.

- **Will you consider future scenarios accounting for changes in fuel loads under climate and socioeconomic change? if yes, what time horizon?**

Future time horizons considered by the FirEUrisk project are 2050 and 2100. In the project's framework, another partner is dealing with adaptation to future conditions and is using dynamic global vegetation models with a fire module, such as LPJ. Furthermore, another group will model future land use. The idea is to combine global vegetation models' results with land use scenario modelling to estimate the potential conditions of future fields.

- **Are you planning on expanding the dataset's spatial extent (to cover entire EEA) specifically towards the east to include Mediterranean forest ranges in full?**

Not at the moment. Some inputs are available just for Europe, for example, CLC. But if similar data is available, then the methodology applies to other parts of the world.

- **Is there any component about the ecosystem services?**

Not in this map, but in the frame of FirEUrisk another group is analysing ecosystem services values.

- **How did you decide to rely on mapped data when creating the fuel maps mostly? Are you considering including more "measured" data for better class discrimination, as e.g. DESIS?**

At the moment, we are more or less happy with the discrimination of classes that we did. We are now focusing on field parameterisation. We believe that one of the most interesting things is to have this parameterisation with the pixel detail so that we have values for parameters for every pixel of the map.
The idea of the classification scheme is to be scaling-dependent. So, you can use the same classes and usually go to more detail as more input data you have. The Scott & Burgan is just a way of starting the parameterisation, but you can derive from your ground data. The most sensitive measurements came from drones or airborne Lidar. So, the more data you have, the more detailed and accurate the map will be.

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FirEURisk Training event #2 – Mapping the Wildland – Urban Interface (WUI)

- **Is this approach of housing density based on a kernel density function?**

It's a moving window analysis, so it's a kind of density but not a Gaussian kernel. We used to say maximum, so it's sufficient to be defined. The build-up area, it's adequate to be within 100 meters of any build-up structure.

- **WUI mapping results: what about the Iberian Peninsula, why does it show minimal WUI?**

You have tons of weeds if you go to northern Portugal, Barcelona, or any coastline within 50 or 100 km. It's only the central part of the high regions where we have no open areas, more agricultural landscapes, and few settlements, obviously not discounting Madrid and the big cities.

- **Is there a specific reason for using the ESA landcover as an input for the WUI mapping? Have you tested other land cover datasets, such as dynamic world?**

We tested a few. Not a formal accuracy assessment, but we read the documents, and the accuracy seemed to be pretty high compared to others nowadays. The critical point is that, in the framework of FirEURisk, we started working right away with available datasets. Now that the project has delivered a European fuel map, I would use it because it has more details. But when we started working on WUI, it simply wasn't available.

- **The definition of WUI is mainly related to the presence of buildings. Do you have any advice on considering another kind of anthropic structures (e.g., roads, electric lines, railroads) that can be very strategic from an economic point of view but also surrounded by vegetation only and not buildings. How is this considered in the EU mapping you did?**

We focused specifically on building structures, ignoring the railroads, roads, parking lots, etc. If you want to focus on other anthropic structures, don't use just buildings when you create the initial build-up map.

- **Don't you think it could be great to produce a seasonal WUI map, depending on Fire Weather Index (drought conditions)? This would affect vegetation flammability and thus the extent of WUI areas.**

That's possible as well! Right now, people are creating a static map. But exposure and flammability change with conditions throughout the year, from peak fire season to shoulder fire season. Although, at a fine scale is very difficult to map different exposure situations; you could create multiple maps per season. The smaller the area you are mapping, the better the data you will have to evaluate actual exposure. What people have been doing until now in terms of dynamic WUI maps is decadal. So we have a map of 1992, 2010, and 2020, and they report on the general growth of the WUI during these years. But you can analyse the WUI within a single season. What will happen is that we'll see buildings won't change much, but the buildings that are considered exposed will maybe switch according to changes in the condition of fuels around them.

- **You presented a way to develop WUI maps for fire management purposes. In terms of fire protection of individual buildings, is there a way to map or identify specific properties of individual buildings (building**

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materials, construction standard, etc.) to assess the direct risk of ignition from radiation, flame contact, or firebrands?

This should be done at a fine scale because you will need information for every building. Although, in many cases it is difficult to get this information. This has been done, as a test, by David Caballero from Spain. He ran fire simulation models, at super high resolution, within individual settlements on the outskirts of Barcelona. The product is a 1-meter resolution. You can see which side of a building, which part is exposed to fire. This approach is highly innovative but requires tons of information and effort. It is an effort that can be done by local authority having settlement at risk. In our case, we are working at European level.

On the other hand, from the European map, it's possible to identify the hotspot areas on which institutions or authorities competent in fire management can focus their attention and then look at detailed data only for the risky areas, in a multiscale approach.

- **How to set the data for the different scale, e.g. state, region and city? The question is linked to the various visualisations and queries, for example at the level of interpretation therefore cells 100x100 km at the state level and 1x1 km at the city level. So, the vegetation and building data are different for the different scales? on the 1:700,000 scale they will lose the information on the isolated houses and will visualise the large aggregates more, while on the city level they will also visualise the isolated buildings. Is it correct to keep the two Region/City maps separate?**

When we talk about scale, we have two components to consider, grain and extent. Grain is the pixel size; extent is how much area is covered. In our study, we are covering the entire European Union with 10-meter resolution. In this case, we are not losing fine-scale information. I suggest not aggregating too much if you still want to see the fine-grained details.

- **Are there distance variations for fire-sensitive and non-sensitive areas in WUI mapping?**

If I may rephrase the question, can we change and use different distance thresholds according to fire behavior?
It is possible, but you will need no information about the distances. I can envision creating a spatially dynamic map where you would tweak the distant thresholds depending on your fuel type and potential exposure to that fuel. On the other hand, this is not easy because you will need lots of good information about these fuels and the spatial behavior exposure according to which fuels.

- **When is it worth assessing settlements that are surrounded mainly by grass?**

It's always worth it. It's just a matter of if you want to do that. When we analysed WUI globally, we saw that 1/3 of the settlements are surrounded by grasslands. In fact, in the United States, most housing losses in recent years were because of grassland fires.

- **And the distance radius threshold, are the 600m rule suitable for different types of fuelbeds?**

This is just an average. So, this is an average across all fuel types, and it's just a number. You could create a different one, only if you have data, sufficient information about fuel bids and the spotting behavior of these fields of fires that

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emerge from these little bits. All the numbers I've shown you are coarse averages and rules of thumb because that's how you do a coarse gateway.

- **Neighbourhoods can have the same density but complex shapes: connected to the main urban area, in a hamlet/cluster, or in a line along a road... To characterise the vulnerability of the settlements more precisely, is there a way of looking at the type of shape of the neighbourhoods?**

This work has been done by my colleague Alex Siphard in Southern California (San Diego). We looked at actual patterns of settlements and how they are related to exposure and likelihood of house burning. Also, Patricia Alexander has a lot of paper about what causes actual buildings to burn in fires. And she related that statistically to the type of settlement in the shape, the structure, and the configuration of houses in settlements.

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