

**Let the
dialogue
begin**



WORKING GROUP INFRASTRUCTURE

SUMMARY OF THE WEBINAR “ANALYZING CURRENT TRENDS IN INTEGRATED WILDFIRE RISK MANAGEMENT AND CRITICAL INFRASTRUCTURE DYNAMICS. PREDICTING FUTURE CHALLENGES AND OPPORTUNITIES FOR RESILIENCE.”

Project: **Cross-sector dialogue for Wildfire Risk Management**

Acronym: **Firelogue**



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Emergency Management and Civil Protection Sector (KEMEA)

The activities and objectives of the Sector are:

- participation in research, development, testing, implementation and evaluation of methodologies, standards and technologies in topics related to crisis and disaster management (e.g., wildfires, floods, earthquakes, CBRN-E etc.).
- developing synergies through cooperation networks, among research projects, national and international, public and private organizations, networks, entities and emergency response agencies.
- developing policies, at a national and European level, to build resilient societies.
- Carrying out risk and crisis management studies at strategic level.
- organization of risk information and educational awareness programmes.
- documentation of crisis managers', first responders' and civil society representatives' operational needs, with the aim of developing proposals for policies and technological solutions.
- organization and evaluation of operational exercises for any type of entity (e.g., a public entity, a critical infrastructure, etc.)

The staff of the Sector consists of approximately 30 external scientific associates with high academic qualifications and long professional background in multiple, relevant to the Sector, disciplines, such as: Foresters, Geographers, Geologists, Mining and Metallurgical Engineers, Civil Engineers, Architect Engineers, Survey Engineers, IT specialists, Geoinformatics, Seismologists, Firefighters, Police Officers, Lawyers and Economists.

Over the last 10 years, the Sector has participated in approximately 35 EU and nationally funded research projects and has developed a portfolio of specialized knowledge, experience, tools, methodologies, standards and networking in the aforementioned topics and expertise.





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1. Context and general objective

The overarching objective of [Firelogue](#) is to create a network and a platform for the discussion on the future of European wildfire risk management (WFRM), engaging the entirety of the WFRM community. It focuses on supporting the Innovation Actions (IAs) funded under the same call while simultaneously coordinating the integration of actors and findings into cross-sectoral WFRM recommendations into a roadmap for 2030 and beyond. The project comprises five [working group](#) topics (Environment/Ecology, Civil Protection, Societal, Infrastructures, Insurances), which serve as the structure for the dialogue.

Within the [Working Group Infrastructure](#), the focus is on several key aspects:

1 INFRASTRUCTURE'S ROLE IN FIRE REGIME

Infrastructure plays a crucial role in the fire regime, with malfunctions, failures, or misuse potentially leading to wildfire ignition. Critical infrastructure, particularly electricity networks and roads, are highly susceptible to climatological threats, especially forest fires. Europe has experienced notable hazards in recent years, including escalating forest fires in both Southern and Northern Europe. An analysis of projected damages from single- and multi-hazard events on energy, transport, industrial, and social critical infrastructures in Europe up to the year 2100 is detailed. It is imperative to implement preventive measures such as upgrading and hardening assets and managing vegetation in the surrounding areas to mitigate these risks. Moreover, leveraging the positive contribution of various infrastructures in wildfire management, like utilizing road networks as fire breaks, should be further explored.

2 IMPACT OF WILDFIRES ON INFRASTRUCTURE

Wildfires can have detrimental effects on the operational functionality of infrastructure assets and networks, especially those located in fire-prone regions, leading to service disruptions. This impact has been exacerbated by the encroachment of human settlements and industrial activities into wildland areas.

3 CROSS-CUTTING TOPICS WITH OTHER WORKING GROUPS

Several intersecting themes have emerged between the Infrastructure Working Group and other groups, including: (i) The adoption of nature-based solutions by infrastructures to safeguard against wildfires. (ii) The imperative need for societal awareness and preparedness in handling emergencies resulting from service disruptions. (iii) Addressing insurance claims in scenarios of infrastructure-triggered fires and vice versa. (iv) The critical role of civil protection agencies in facilitating resilience planning and emergency training for operators of essential infrastructure. (v) Aligning with climate change projections and EU adaptation policies concerning infrastructures and the holistic management of wildfire risks.

This webinar delved into the critical nexus between wildfires, infrastructure, and resilience strategies, with a specific focus on delivering recommendations. Hosted by the [Working Group Infrastructure](#) on behalf of [KEMEA](#), this webinar is part of the Firelogue webinar series, fostering a Fire-dialogue.





2. Agenda

Wednesday 3 rd July	
Time (CEST)	Agenda Item
15:00 – 15:15 h	Welcome: Nikolaos Kalapodis & George Sakkas, KEMEA, WG Infrastructure Leaders Welcome and introduction to Firelogue: Sebastian Wagner FhG Webinar introduction (Moderators): Alexander Maranghides (NIST, USA) and Dionysis Kolaitis (NTUA, Greece)
15:15 – 16:15 h	Presentations Overview of the EU-CIP project for Resilient Infrastructures. Emilia Gugliandolo, Engineering Ingegneria Informatica S.p.A., Italy Wildfires and infrastructures: Understanding the challenges, managing the risk. Miltiadis Athanasiou, Institute of Mediterranean Forest Ecosystems of the Hellenic Agricultural Organization DIMITRA Navigating Wildfire Resilience: Trends, Firescapes, and Critical Infrastructure Dynamics. Mike Cox, Fire & EMS Solutions at Esri, USA and Anthony Schultz, Wildland Fire Solutions at Esri USA Enhancing Cross-Border Risk Assessment for Critical Infrastructure. Monica Cardarilli, European Commission, DG Joint Research Centre. Italy
16:15 – 16:50 h	Panel Discussion (open to the audience)
16:50 – 17:00 h	Sum-up and closure





3. Speakers and Audience

SPEAKERS

Dr Emilia Gugliandolo

She graduated as Doctor with Laude in Management Engineering from the University of Salento (Lecce, Italy). Currently she is working as Project Manager in the Data & Analytics R&I Lab at Engineering Ingegneria Informatica S.p.A. as part of Decision Support Systems unit. She deals with Security, Intelligent Systems & Internet of Things, Big Data Analytics & Business Intelligence, and Social Business.

Since 2015, she has focused her expertise in the Disaster Resilience and Critical Infrastructure Protection domains, being involved in numerous H2020 and Horizon Europe projects dealing with Security, Critical Infrastructure Protection and Disaster Resilience. She is the EU-CIP Project Coordinator. She is also specialised in the roles of Innovation and Exploitation Manager.



Dr Miltiadis Athanasiou

He holds a Ph.D. in Wildland Fire Science from the National and Kapodistrian University of Athens. He has been a volunteer firefighter for 25 years and have worked in aerial firefighting, as crew member of heavy-lift helicopters in Greece, for 5 fire seasons. His work includes documentation of wildfire behaviour in the field and analysis, fuel modelling, fire risk assessment and prediction, and past firefighting accidents' reconstruction. He trains firefighters on wildfire behaviour, hazards, firefighting tactics, human factors, safety and health on the fire line, and he tries to promote the use of fire in fire prevention in Greece, which for the time is not legally recognized.



Mike Cox

He is the Director of Fire, Rescue, and EMS Solutions for Esri, the world leader in GIS technology. Mike's responsibilities include advocating how fire and EMS agencies leverage geospatial information and technology to achieve their response and recovery goals. He retired from the Henrico County, VA Fire Department after 27 years of service. He served as the Deputy Chief with responsibilities including operations, emergency management, planning, accreditation, budget, and human resources. He was also a member of the Central Virginia All Hazard Incident Management Team, was the technical rescue team leader, and served as a haz mat specialist on the Virginia Department of Emergency Management's regional hazardous materials team.





Anthony Schultz

He is director of Wildland Fire Solutions at Esri. His background in wildland fire management and operations began as a wildland firefighter and progressed to responsibility for planning, program direction, and coordination of Wyoming's wildland fire program as the state's Fire Management Officer (FMO). During his tenure as Wyoming's FMO, he chaired the Western State Fire Managers and was a Rocky Mountain Coordinating Group member. He also served as an FMO with the State of North Dakota. As a wildland firefighter, he worked for several federal agencies including the Bureau of Land Management and the National Park Service.



Dr Monica Cardarilli

She is an advanced science for policy researcher at the European Commission's Joint Research Centre. She provides scientific advice to EU policy-making in the area of security, defence, critical infrastructure resilience and hybrid threats, supporting Commission Services, Member States and other relevant stakeholders.



MODERATORS

Alexander Maranghides

He holds a B.S. in Mechanical Engineering with Aerospace Concentration and an M.S. in Fire Protection Engineering from Worcester Polytechnic Institute. With a remarkable 30 years of experience in large-scale testing and 20 years in post-fire reconstructions, Mr. Maranghides is a true expert in the field. During his tenure at the US Naval Research Laboratory (NRL), Mr. Maranghides played a vital role in the Navy's Halon Replacement Program and served as the Test Director for the NRL Real Scale Halon Replacement Test Program. Transitioning to the US National Institute of Science and Technology (NIST), he led the NIST Large Fire Laboratory, overseeing the execution of numerous large-scale experiments.

For the past two decades, Mr. Maranghides has dedicated his research to the national Wildland Urban Interface (WUI) Fire problem, leading all four NIST WUI Fire reconstructions. His findings have significantly influenced national and regional codes, standards, and best practices in the field.

Currently, Mr. Maranghides is at the forefront of the NIST Investigation of the California Camp Fire and the Structure Separation Experiments cross-agency





research project. As a lead author of the recently released Hazard Mitigation Methodology and Evacuation and Sheltering Considerations (ESCAPE) methodology, he continues to provide invaluable technical input to multiple Federal and State agencies and NGOs.

With his extensive knowledge and leadership in WUI fire science and technology implementation, Mr. Maranghides is a pivotal figure in advancing research and practices in the US and overseas. We are truly privileged to have him as one of our moderators for today's discussion.

Dr. Kolaitis serves as an Assistant Professor at the School of Mechanical Engineering, National Technical University of Athens (NTUA), Greece. He holds a Diploma in Mechanical Engineering (1999) and obtained his Ph.D. from NTUA in 2005. With a focus on fire initiation, spreading, and suppression in various environments, Dr. Kolaitis' expertise extends to fire behavior of construction products, innovative combustion technologies, and energy efficiency in buildings.

With over 100 publications in international scientific journals and conferences, Dr. Kolaitis is a prolific researcher who has contributed to more than 30 research projects. He plays a pivotal role in teaching undergraduate and postgraduate courses at the School of Mechanical Engineering, NTUA, covering areas such as Fire Engineering, Combustion, Transport Phenomena, Numerical Simulations, and Building Energy Systems.

As the Technical Manager of NTUA's Fire Engineering Unit, Dr. Kolaitis leads the only accredited and notified laboratory in Greece conducting "reaction to fire" tests according to EN

13501-1. Since 2017, he has served as the National Representative for Greece in various Technical Committees of the International Organization for Standardization (ISO) and the European Committee for Standardization (CEN) concerning fire engineering.

Dr. Dionysios Kolaitis' profound expertise and dedication to advancing fire engineering make him a valuable asset as a moderator for our discussion today.





4. PARTICIPANTS

The Firelogue Infrastructure Working Group webinar attracted a diverse audience, encompassing experts in the field, scientists, practitioners, and policymakers. The event garnered substantial promotion through various channels, including social media platforms, the FIRELOGUE website, personal networking with experts, and engagement with relevant projects and the Union Civil Protection Knowledge hub.

A total of 213 individuals registered for the webinar, reflecting a notable interest in the subject matter. Among the registrants, 144 participants actively attended the webinar, engaging in the insightful discussions and exchanges. The geographic distribution of attendees is depicted in Figure 1, showcasing the countries represented during the event. Additionally, Figure 2 illustrates the distribution of attendees and registrants per country, offering a comprehensive overview of the international participation in the webinar.

The webinar served as a platform for enriching discussions and knowledge sharing among a global audience with diverse backgrounds and expertise. The interactive nature of the event facilitated meaningful exchanges of ideas, experiences, and innovative approaches to address challenges in wildfire risk management within the infrastructure sector. The engagement of participants from various countries underscored the widespread interest and importance of collaborative efforts in enhancing resilience and preparedness against wildfires on a global scale.

The robust participation in the Firelogue Infrastructure Working Group webinar exemplifies the commitment of stakeholders to fostering collaboration, sharing insights, and advancing best practices in wildfire risk management within the infrastructure domain. The event's success in attracting a broad audience signifies the collective dedication towards building sustainable solutions and enhancing resilience in the face of evolving wildfire challenges.

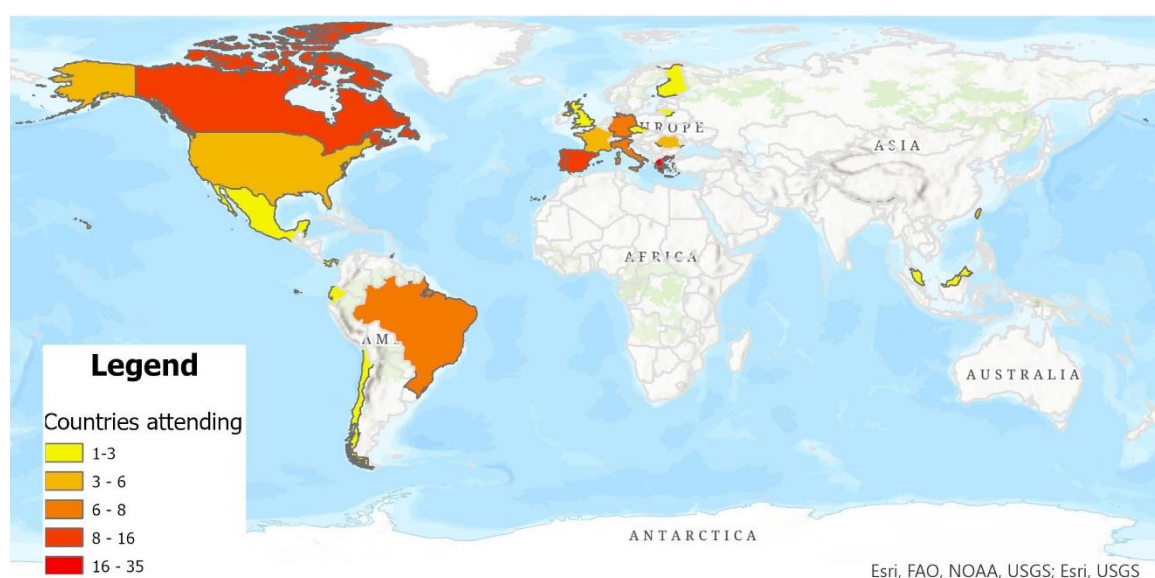


Figure 1. Map depicting the representative countries in the webinar.



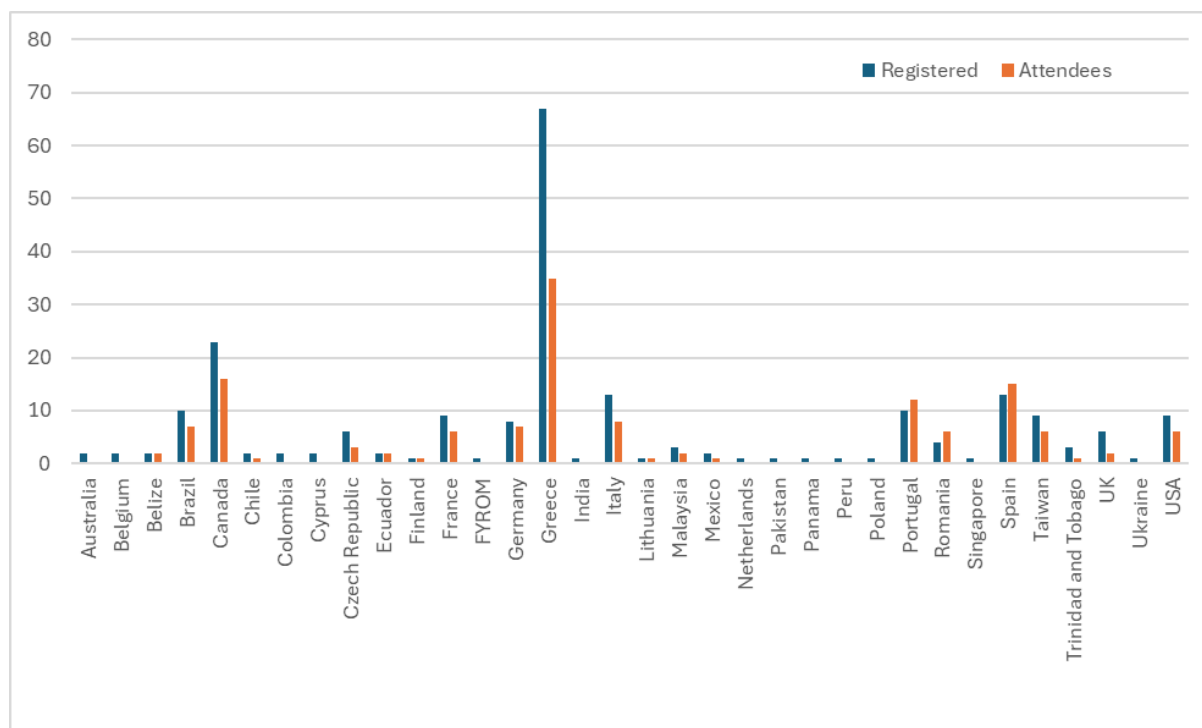


Figure 2. Graph representing the number of attendees and registered people per country.



5. Summary

PRESENTATIONS

Overview of the EU-CIP project for Resilient Infrastructures. *Emilia Gugliandolo - Engineering Ingegneria Informatica S.p.A.*

The presentation focused on an overview of the EU-CIP project and how this project deals with wildfires. The EU-CIP project is a Coordination and Support Action, funded by the European Commission, which commenced in October 2022 and will continue until September 2025. The consortium consists of 20 partners, including coordinators of previous European projects related to infrastructure resilience. The project represents a natural evolution of the of the European Cluster for Securing Critical infrastructures (ECSCI) which brings together more than 40 projects that collaborate in Critical Infrastructure (CI) Resilience.

EU-CIP mission is to provide data analysis and services to develop evidence-based research and innovation policies within the Critical Infrastructure Protection (CIP) domain. Understanding the landscape of CIP in the EU involves a multidisciplinary process engaging critical infrastructure operators, authorities, innovators, and technology providers. The main driver behind EU-CIP is to reduce information fragmentation, ensure structured analysis, and enhance evidence-based policy-making.

The primary goal of the EU-CIP is to establish a pan-European Knowledge Network for resilient infrastructure, enabling policymakers to shape data-driven, evidence-based policies while enhancing innovation capacity. EU-CIP aims to enhance the resilience of critical infrastructure against various types of threats, including wildfires. The challenges posed by wildfires on critical infrastructure are multifaceted. Vulnerabilities to fire damage, interconnectivity among infrastructures, resource allocation, adaptation, and resilience all play crucial roles in managing the risks associated with wildfires.

EU-CIP focuses on three main objectives: to enhance Europe's analytical capability, to maximize the impact of research and innovation in the CIP domain through innovation support and solution validation services and to create a vibrant ecosystem. By collecting and analyzing data, providing innovation support, and engaging stakeholders, EU-CIP strives to create a comprehensive approach to critical infrastructure protection and wildfire risk management, among other risks.

By integrating wildfire management into critical infrastructure protection, the project aims to promote safety, innovation, and collaboration among stakeholders. The [Knowledge Hub](#) serves as a central repository for information, fostering collaboration, innovation, and evidence-based policy-making in the realm of critical infrastructure protection.

Wildfires and Infrastructures: Understanding the challenges, managing the risk. *Miltiadis Athanasiou - Institute of Mediterranean Forest Ecosystems, Hellenic Agricultural Organization "DIMITRA"*

Miltiadis Athanasiou distinguished infrastructures into hard (e.g. roads, railways, electrical grids) and soft ones (e.g. educational programs, law enforcements agencies, emergency services). He clearly presented the two sides of the same coin; electrical grids cause wildfires while on the other hand wildfires cause electrical grids failures and pose threats to civilians and first responders during





evacuation efforts. He delved into the impacts of wildfires on critical infrastructures such as telecommunications and the challenges in managing and minimizing them.

Efforts to reduce wildfire hazard involve managing forest fuels such as creating greenbelts and maintaining fuel breaks by utilizing various fuel treatment methods like mechanical treatments, grazing, and prescribed burning. Policymakers play a crucial role in considering these preventive measures for a sustainable and resilient future.

Educating and informing citizens on preparedness, safety measures, and early evacuation when needed, can significantly impact the outcome of wildfire events. There is also a clear need to address the strengths and limitations of the Citizen Alert Systems. Moreover, the right decisions by the citizens on whether to evacuate or not are crucial, as they help avoid accidents and save firefighting resources. Preparing communities to recognize fire resilient structures and offering guidance on safety improvements also, are essential steps in enhancing wildfire resilience.

Learning from past experiences and employing scientific research are vital for effective wildfire prevention and suppression. Strengthening the role of Forest Services and building the capacity of local stakeholders on potential contribution to wildfire management are key recommendations. Addressing potential impacts of wildfires on critical infrastructures and mitigating wildfire risk require both leveraging scientific knowledge and involving local communities.

Finally, effective use of technology results in automating administrative tasks and frees up time for more strategic work which is crucial in managing wildfires efficiently, especially during challenging fire seasons.

Navigating Wildfire Resilience: Trends, Firescapes, and Critical Infrastructure Dynamics. *Mike Cox & Anthony Schultz – ESRI*

The presentation was focused on geospatial tools for risk mitigation and impact reduction especially in the Wildland Urban Interface. Geospatial components are integral in public safety operations. Data collection during incidents like fires is crucial for later analysis. Understanding the location component is vital for effective assessment and response strategies. Incorporating geospatial context allows for the integration of various data sets, such as geography and building information, to comprehend incident impacts comprehensively. Sharing this data with stakeholders, including other agencies and the public, enhances understanding of incident consequences. The utilization of geospatial technologies has become a critical aspect of preparedness, mitigation, and response efforts.

The planning process model, widely adopted internationally, includes the integration of technologies throughout incident management. FEMA's response branch and urban search and rescue program exemplify the use of technology in responses to disasters like hurricanes, earthquakes, and wildfires. The efficient utilization of technology enhances response effectiveness across various scenarios, emphasizing the importance of leveraging geospatial technologies for better outcomes.

Various organizations, such as the US Fire Administration and utility companies like Pacific Gas & Electric company (PG&E), are utilizing geospatial technologies for mitigation and prevention activities. From using drones and aircraft for data collection to implementing machine learning models for risk identification, these technologies offer precise insights for targeted actions. The focus on understanding vulnerabilities and risks to critical infrastructure ensures efficient resource allocation and enhances community safety.

Analyzing demographic data at a granular level enables a deeper understanding of impacted populations and vulnerable areas. Technologies like GIS and data visualization tools facilitate the





creation of informative products for decision-makers and the public. By integrating geospatial data into visual models and interactive platforms, stakeholders can access critical information to support informed decision-making and enhance community resilience.

Enhancing Cross-Border Risk Assessment for Critical Infrastructure. *Monica Cardarilli – European Commission, DG JRC.*

Monica Cardarilli, a Policy Officer at the Joint Research Centre, shared valuable insights on the evolving policy landscape regarding critical infrastructure resilience and what the JRC has been doing to support it. The focus is on the new Directive (Critical Entities Resilience - CER) that lays down obligations on Member States and critical entities to take specific measures for enhancing resilience.

The CER Directive aims to strengthen the resilience of critical entities against a range of threats, including natural hazards, terrorist attacks, insider threats, or sabotage, as well as public health emergencies.

The shift from critical infrastructure to critical entity reflects a broader perspective on resilience. This shift encompasses not only protection but also a comprehensive approach considering all-hazards and interdependencies across borders and sectors.

Risks are dynamic phenomena influenced by geopolitical changes and climate patterns. The assessment must consider risk drivers and evolving vulnerabilities, exposures, and frequencies over time. In order to address in a comprehensive manner the resilience of critical entities, the Directive creates an overarching framework in respect of all hazards, whether natural or man-made, accidental or intentional.

Assessing impacts involves considering external factors, intrinsic infrastructure aspects, and implications for users and surrounding areas. Understanding cascading effects more broadly is crucial, potentially resulting in a far-reaching and long-term negative impact on the delivery of services across the internal market. Time and spatial dependencies play a key role, considering simultaneous or interlinked hazards and their potential disruptive effects to the provision of essential services.

Adopting a holistic approach to assess risks is pivotal to fully grasp fast and slow onset phenomena and dynamic linkages. Additionally, risks that may have low likelihood but potentially high impact should be addressed systematically for a comprehensive risk assessment process.

Recommendations include ensuring service-oriented approaches, evidence-based decision-making, multi-stakeholder engagement, comparability of results and clearer risk ownership, producing the "evidence" needed for planning and implementation.





6. DISCUSSION

PANEL DISCUSSION/AUDIENCE QUESTIONS

The panel discussion commenced with an audience query regarding how homeowner exposure to wildfires is calculated in the USA, given the absence of a standardized methodology in the EU. Mike and Anthony elucidated that the United States Fire Administration project currently delineates Wildland-Urban Interface (WUI) areas and evaluates exposure by considering factors like topography, geography, and fuel abundance. While this approach offers a foundational understanding of exposure, it does not constitute a comprehensive risk analysis. It is imperative to acknowledge the myriad variables inherent in such assessments. Alexander accentuated the dynamic nature of wildfires, emphasizing their self-propagating tendencies and stressing the necessity of comprehending exposures at a precise spatial resolution (less than 5m) to effectively mitigate risks. Notably, wildfires uniquely afford a level of control over energy release unmatched by other disasters due to complete control over fuel sources.

CHALLENGES AND SOLUTIONS

Transitioning, the discourse delved into addressing the challenges posed by unprecedented extreme wildfire events and the requisite adjustments in regulations to enhance incident management. Panelists deliberated on the significance of elevating standards for enhancing resilience in existing structures against wildfires, advocating for a broader focus on engineering requirements, code compliance, and community education to bolster overall preparedness, instead of solely relying on response resources. Alexander drew attention to the deficiencies in current codes and standards, advocating for a substantial shift towards constructing standalone, resilient homes. The emphasis shifted from "ignitable structures with defensible space" to advocating for "fully standalone" residences.

IMPORTANCE OF COMPREHENSIVE EXPOSURE UNDERSTANDING

Panelists underscored the criticality of comprehensively grasping exposures and implementing strategies to mitigate risks, fortify resilience, and expedite recovery post-wildfires. The overarching theme highlighted the imperative nature of proactive measures and a holistic approach in managing exposure and fortifying resilience in the face of escalating wildfire threats.





PANEL DISCUSSION / PRESENTERS

INTERCONNECTED SYSTEMS AND DISASTER PLANNING

Emilia underscored the complexity of interconnected systems in crisis planning, highlighting the challenges posed by cascading effects in critical infrastructure. Emphasis was placed on the necessity of preparedness to address such interconnections, with a proposed strategy of providing resources on past incident management to enhance readiness. The EU-CIP project, as articulated by Emilia, expressed its intent to furnish white papers or reports elucidating cascading effects and interrelations among critical infrastructure to aid stakeholders in comprehending and managing these intricate dynamics effectively.

ROAD INFRASTRUCTURE IN DISASTER MANAGEMENT

Monica raised the question of the critical role of road infrastructure in crisis scenarios, often overlooked in discussions. Road infrastructures play a pivotal role in emergency management by ensuring service functionality and user accessibility during response time. The consideration of infrastructure in both operational and restoration capacities for emergency responders, such as firefighters, is paramount. Challenges like smoke, physical obstructions, or road destruction can hinder evacuation efforts, emphasizing the necessity of integrating road infrastructure into comprehensive resilience strategies.

AGRICULTURAL LANDSCAPE AND EVACUATION PLANNING

Alexander addressed Miltiadis regarding the significance of landscape-scale considerations in agriculture and their linkage to evacuation strategies. Miltiadis stressed the importance of diversifying tools and measures to reduce fire risks, protect infrastructure, and integrate fuel management with fire prevention, fostering societal resilience amidst climate crisis challenges.

DATA LAYERS AND STANDARDIZATION

Mike emphasized the criticality of standardized data schemas and unified approaches for assessing risks and hazards. A shared understanding among stakeholders is paramount to tackle significant issues and bolster community resilience effectively. Anthony supported this stance, highlighting the pivotal role of defined data schemas and coordination in addressing policy implications and streamlining wildfire management efforts.

CLOSING THOUGHTS ON EXPOSURES AND THE LINKS TO CRITICAL INFRASTRUCTURE

In concluding his reflections on exposures and their linkage to critical infrastructure, Alexander emphasized the paramount importance of accurately defining exposure, particularly in terms of national/state/regional and local municipalities definitions that influence funding for infrastructure hardening against wildfires. He stressed the impartial nature of fires in targeting properties, emphasizing the necessity of understanding exposures beyond property boundaries to proficiently manage risks (“fire doesn't discriminate based on ownership”). Alexander cautioned against misleading definitions and advocated for clear, consistent definitions across all stakeholders to ensure effective risk management.

Transitioning to the challenges posed by wildfires on infrastructure, the discussion highlighted the imperative of considering exposures originating from adjacent lands. Emphasis was placed on the need





to establish standards for defensibility, not solely for residences but also for critical infrastructure. Panelists underscored the importance of comprehending infrastructure-related hazards and implementing robust strategies to effectively mitigate risks posed by fires and embers.

Miltiadis shared insights on the dynamic nature of fire management, advocating for public education on preparedness and collaboration with authorities. Monica emphasized the necessity for governance frameworks centered on infrastructure and service-oriented aspects to ensure operational functionality and user safety. Emilia accentuated the application of risk management strategies to reduce vulnerability, enhance resilience, and expedite recovery in the aftermath of fire incidents.

The panel discussion culminated in a call for proactive measures to address exposure and fortify resilience effectively against wildfires. The imperative nature of understanding exposures, safeguarding critical infrastructure, and implementing strategies to mitigate risks comprehensively resonated throughout the discourse, underlining the critical need for a proactive and holistic approach in tackling wildfire challenges.





7. Final remarks - Recommendations

The following points summarize the main recommendations from the panel discussion relating to the presentations of the webinar:

1. Recognize the multitude of variables involved in exposure analysis, understanding the dynamic nature of wildfires, and the need for fine spatial resolution to manage risks effectively.
2. Enhancing resilience in structures against wildfires by raising standards for building resilience, emphasizing engineering requirements, enforcing codes rigorously, educating the community, addressing gaps in current codes by transitioning towards creating standalone, resilient infrastructures, and buildings.
3. Implement strategies to comprehensively understand exposures, mitigate risks, enhance resilience, and facilitate prompt recovery in wildfire events.
4. Study of past incident management practices - Increase the level of preparedness and deepen the understanding of the intricate interrelationships within critical infrastructure components. By analysing historical incidents, valuable insights can be gained to strengthen future response strategies.
5. Integrate road infrastructure into comprehensive disaster management methodologies to ensure services, user accessibility, and efficient evacuation procedures.
6. Leverage agroforestry systems to reduce fire risk, protect infrastructure, and enhance societal resilience in climate crisis management.
7. Utilize standardized data schemas and common approaches for measuring risks and hazards to ensure community resilience and effective wildfire management.
8. Define exposure accurately, secure funds for hardening infrastructure against wildfires, and maintain clear and consistent definitions across all stakeholders.
9. Focus on understanding hazards tied to infrastructure, implementing defensibility standards, and mitigating risks effectively for both fire and embers.

