ROADMAP

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Third periodical bulletin

ROADMAP in a nutshell

The ROADMAP (EuROpean observAtory on Disaster risk and crisis MAnagement best Practices) Project, is a 18 months project funded by DG-ECHO under the call UCPM-2020-KN-AG. The project started on the 1st January 2021 and the main objective is to establish a European "Doctrine on disaster risk and crisis management", funded on the mutual cooperation between scientific communities and DRM authorities. The doctrine, that is intended as "a shared understanding of disaster management between decision-makers and scientific actors", will be based on selected experiences, best practices and implemented solutions in EU Member States.

- **Advisory Group**
  The Advisory Group (**https://roadmap.ci3r.it/advisory-group/**) is formed by selected experts on both science and decision-making in DRM from several Countries, covering different risks and phases of DRM cycle. The networking activities between the Project Consortium, that is composed by recognized research institutes, competence centres for disaster risk reduction and Civil Protection authorities, and the Advisory Group will result in the establishment of a European think tank/ observatory on disaster risk and crisis management good practices that could represent a first step towards a Community of Practice to operate within the Union Civil Protection Mechanism, in collaboration with the Disaster Risk Management Knowledge Center.

Project updates

In these last months of the project many activities have been carried out, in particular:

- on-going work on the definition of the Solutions Explorer web platform: a mockup will be presented at the 5th DRMKC annual seminar on 18th November - SESSION 5: Co-designing the Science Pillar;
- on-going work on the content of the three thematic papers that will be publish in December 2021, February and April 2022 respectively;
- organization of the 2nd webinar "Communication issues in DRM" in the first week of December (follow the website of the project for the final date!);
- constant engagement with the AG through the AG meetings, to achieve the objectives of the project.

RISK – Good practices

Earthquake	**Forest fires**	Industrial accident
Hydrogeological	Biological	**Climate**

In 2021 the world was hit hard by extensive forest fires; Italy, Greece, Turkey, Spain, France, Lebanon, Syria, Siberia, Canada, California are just some of the Countries overwhelmed by this emergency. The main aim of this ROADMAP bulletin is to report the strategies and the good practices defined worldwide in order to reduce the impact of this hazard.
Current policies in wildfire management in Mediterranean-type climate regions (MCRs) have largely ignored climate warming and landscape-scale buildup of fuels[1], thus leading to the so-called 'firefighting trap' [2, 3]. In brief, the trap results from allocating to fire suppression most of the investment in fire management. Paradoxically, this exacerbates the problem, as it contributes to ongoing fuel accumulation and landscape-level fuel continuity, which then precludes suppression under extreme fire weather, and results in more severe and usually larger fires.
Wildfire management strategies include long and short-term fire prevention, fire suppression and post-fire management. To be effective, all the above phases should be linked and integrated in a comprehensive fire management. More in detail, the following measures can be distinguished:

FIRE PREVENTION

- Short-term fire prevention
- Long-term fire prevention

FIRE SUPPRESSION

- Pre-suppression of fires
- Detection of fires
- Suppression of fires

POST-FIRE MANAGEMENT

Figure 1 - Source: Müller M.M., Vilà-Vilardell L., Vacik H. (2020): Forest fires in the Alps – State of knowledge, future challenges and options for an integrated fire management. EUSALP Action Group 8. White Paper for policy makers.

1 Fuels, in forest fire terminology, are anything that can burn. Fuel load is a term used to describe the amount and types of fuels present. Ladder fuels are materials that can enable a ground fire to climb into the tree canopy and increase wildfire spread and intensity. Ladder fuels include: low dead branches, dead shrubs, briars, brambles, vines, and/or dead wood on the ground.
2 Francisco Moreira et al 2020 Environ. Res. Lett. 15 011001.
3 R.D. Collins at al 2013 Forest fire management to avoid unintended consequences : a case study of Portugal using system dynamics J. Environ. Manage.130 1–9.

Long-term fire prevention includes scientific research on fire dynamics, awareness-raising, identifying forest fire hotspots and fuel treatments (e.g., prescribed burning, grazing or forest management).
Short-term fire prevention is associated with periodic fire danger assessment, the dissemination of a daily fire danger information and related fire restrictions.
The **pre-suppression of fires** encompasses the work of action forces and includes all activities on planning, recruitment and training, but also the maintenance of firefighting equipment and the improvement of a system of fuelbreaks, firebreaks, roads and water supplies. Below is reported a concrete example of good practices for a wildfire fuelbreak in conjunction with firebreak.
The (early) **detection of fires** is crucial for effective firefighting. It can be achieved by automated smoke detection systems, surveillance flights, video control systems, and monitoring service.
During **fire suppression**, firefighters, helicopter teams and other action forces actively fight a fire with different techniques and equipment.
Post-fire management includes securing forest cover and settlement areas, avoiding natural hazards, restoration of the forest areas and monitoring of burned sites.

Wildfire fuelbreak: a good practice of pre-suppression of fires

The main goal of a wildfire fuelbreak is to change the continuity of the vegetation so that as a wildfire enters the fuelbreak treatment area, the fire behaviour changes becoming less intense and slower to spread. To accomplish this, existing vegetation should be treated to reduce its density and distribution.
A fuelbreak serves three valuable functions, it:

- Creates an obstacle to prevent fire from spreading.
- Creates a safe means for firefighters to access the fire.
- Provides separation between large areas of forest.

The effectiveness of a fuelbreak is dependent upon its location, space between canopy trees, separation between ladder fuels and treetops, and frequency of follow up treatments. In general, a wider fuelbreak with less residual vegetation will be more likely to slow a fire. A basic rule of thumb is that the width of a fuelbreak should be equal to 2 to 3 times the height of the tallest trees present or a minimum of 70 meters.
It is recommended that a fuelbreak be constructed in **conjunction with defensible space (firebreak)** as part of a planned wildfire management strategy. Based on the following three wildfire hazard ratings, the following fuelbreak standards are indicated in the following.
Management of fuelbreaks should include:

- Maximizing distance between the lower limbs of forest canopy trees and shrubs.
- Maximizing distance between the crowns of canopy tree.
- Reducing the density and height of shrubs and other ground vegetation.

To be functional, a fuelbreak should be maintained periodically (annually in some ecosystems) to prevent significant fuels buildup.
A concrete example of fuelbreak application is reported in the section “Stories of good practice”.

Figure 2 - Fuelbreaks are often created next to a road. The road in this photo serves a firebreak. The right side of the road has been treated to create a fuelbreak. The left side of the road remains untreated.

Other good practices in wildfire management

It is understandable that the good practices and lessons learnt from forest fire disasters are inevitably event specific. Each disaster may be dictated by a unique demand and supply mechanism. From the demand side, the fire has its characteristics, the landscape may be of a particular style, the climate may also be of a specific type, etc. On the other hand, from the supply side, the response may have a disaster management scheme native to the country and location in which the disaster has struck. This section aims to briefly summarize some "general" good practices that have been retrieved from the analysis of the literature on forest fire disasters management consulted and listed in the "Further documents" section hereinafter.

- Maintain clean the vegetation removing dead, dying, or dry vegetation, leaf litter, and other debris in the area and creating separation between low-level vegetation and tree branches by removing ladder fuels, reducing the height of low-level vegetation, and/ or trimming low tree branches (at least 2 meters from the ground). This includes also clearing grass, bushes and plant residues from the sides of roads and railways and the elimination of highly flammable vegetation that covers uncultivated terrains on private properties located near urban areas.
- When removing vegetation for wildfire preparedness, avoid the use of chemical herbicides and opt for more environmentally-friendly, manual removal methods. Herbicides negatively impact the water quality of local streams and aquifers. Chemicals used in popular herbicides are easily transported in groundwater and surface water. When herbicide use is determined to be necessary, the manufacturer instructions must be always followed.
- Creating parking areas for fire-fighting vehicles in forests.
- Creating water supply areas.
- Creating fire barriers (see previous section on fuelbreaks and firebreaks).
- Carrying out maintenance and cleaning operations.
- Educating and training teams of volunteers at the municipal level.
- Providing instruction manuals for forest fire fighting operations to fire fighters and assisting in their training.
- Increasing prevention against the principal causes of fire by better informing the public of regulations regarding agricultural, forestry, and grazing activities.

Stories of good practice

- **Hazard Reduction burn in Goonoo National Park**[4]

  On 9th October 2021, in Goonoo National Park a planned burn was conducted. The objective of the burn is to reduce the fuel load in an area, which has not been burnt for 25 years. By lowering the amount of fuel on the ground, the risk of fire can be reduced over the coming months. Operations were conducted in a COVID-19 safe manner, in fact during the operations, all staff wore masks in addition their normal fire personal protective equipment and contact tracing was enabled via the QR code.

- **Fuelbreak Success Story**[5]

  On 3rd June 2016, in California the Highway 162 fuelbreak was tested during a roadside fire event. The test demonstrated how fuelbreaks are successful in helping fire suppression resources by significantly slowing the forward motion and intensity thus allowing sufficient time far resources to respond and provide initial attack. The fuelbreak has proven to prevent wildfires from becoming established in the wildlands adjacent to the highway, thus providing protection to the many residences located adjacent to the highway as well as to transmission lines, and to Highway 162, itself a critical infrastructure providing an evacuation route for Elk Creek residents and rural landowners.

Further documents:

Before and After the Fire - Environmental Best Management Practices for Wildfire Risk Reduction and Recovery - City of Austin / Travis County Joint Wildfire Task Force (2014)
https://www.austintexas.gov/sites/default/files/files/Watershed/wildfire/Firewise-before-and-after-the-fire.pdf

Wildfire - Best Management Practices for Creating and Maintaining Wildfire Fuelbreaks in New Jersey's Wildland Urban Interface (2011).
https://capemaycountynj.gov/DocumentCenter/View/266/Wildfire-Best-Management-Practices-PDF

4 https://www.environment.nsw.gov.au/news/hazard-reduction-burn-in-goonoo-national-park
5 https://www.fire.ca.gov/media/5585/fuel_break_case_studies_03212019.pdf

Moreira F., AscoliD., SaffordH., Adams M.A., Moreno J.M., Pereira J.M.C. (2020) Wildfire management in Mediterranean-type regions: paradigm change needed Environmental Research Letters 15 (1), 011001.

A.G. Colombo, A.L. V. Arellano (Editors) (2003) NEDIES Project - Lessons Learnt from Forest Fire Disasters (pp. 82), Report EUR 20662 EN.

Müller M.M., Vilà-Vilardell L., Vacik H. (2020) Forest fires in the Alps – State of knowledge, future challenges and options for an integrated fire management. EUSALP Action Group 8. White Paper for policy makers.

Cal fire fuel breaks and use during fire suppression – Call Fire (2019). https://www.fire.ca.gov/media/5585/fuel_break_case_studies_03212019.pdf

Mauri E., Pons P. (2019) Handbook of Good Practices in Post-wildfire Management. 2nd ed., Anifog Project I+D+iCGL2014-54094-R, Universitat de Girona.169. https://8ffd82c4-7ae0-4b51-ac03-0f19d3876e85.filesusr.com/ugd/d5dc49_ec7a5c36a0c14f32a3d9a35fe04ab763.pdf

Nuijten D., Onida M., Lelouvier R. (2020) Directorate-General for Environment (European Commission). Land-based wildfire prevention. ISBN 978-92-76-28758-2. DOI 10.2779/695867. https://op.europa.eu/en/publication-detail/-/publication/4e6cc1f1-8b8a-11eb-b85c-01aa75ed71a1

DRM Initiatives & News

Within the ROADMAP project goal of establishing a European observatory on disaster risk and crisis management good practices, some recent initiatives at international level have been scanned and pertinent information was collected and hereafter briefly summarized.

- **Full Scale Exercise (FSX) #SIQUAKE2020**[6]
  Thanks to the financial instrument of the Union Civil Protection Mechanism , this exercise took place from 4th until 8th October 2021, and reproduced a seismic scenario 10 kilometres southeast of Ljubljana (Slovenia). Several hundred participants from seven countries were included in the exercise, namely: civil protection commanders, deputy civil protection commanders and civil protection headquarters at the local, regional and national levels, civil protection staff, firefighters, Urban Search And Rescue capacities (USAR), dog handlers, scouts, Slovenian Red Cross, Slovenian Police, Slovenian Armed Forces, as well as foreign units for first assessment, shoring and stabilization of damaged buildings. Engineering capacities and mass shelters, water purification, first aid and foreign USAR capacities were provided. European Union Civil Protection Teams (UCPT) participated in the exercise.

- **UN Climate Change Conference (COP26)**[7]
  In Glasgow, the 2021 United Nations Climate Change Conference is taking place (from 1st to 12th November 2021): a crucial summit in which Member Countries are updating their plans for reducing emissions, in order to achieve the goals of the Paris Agreements.

- **5th DRMKC annual Seminar**[8]
  From 17th to 18th November 2021, the 5th DRMKC annual seminar will be held virtually. The annual seminar is an opportunity to launch a new phase of dialogue between civil protection authorities and the scientific community and to start building the network together. The scope is to establish the core community of scientists who will help constructing the knowledge base for supporting DRM activities and actions.

- **European Forum for Disaster Risk Reduction (EFDRR2021)**[9]
  From 24th to 26th November 2021, the European Forum for Disaster Risk Reduction (EFDRR) will be held virtually. The conference enables governments and stakeholders to exchange experiences on successful practices and innovative approaches to prevent, reduce and manage disaster risk.

6 https://www.siquake2020.eu/en/dogodek/full-scale-exercise-fsx-siquake2020/
7 https://www.cdp.net/en/cop26
8 https://drmkc.jrc.ec.europa.eu/Partnership/Annual-Seminar/5th-DRMKC-annual-Seminar#registration
9 https://efdrr.undrr.org/

- **8th Africa Regional Platform for Disaster Risk Reduction**[10]
  The Government of the Republic of Kenya will host the 8th Africa Regional Platform for Disaster Risk Reduction and the Seventh High-Level virtual Meeting on Disaster Risk Reduction from 16th to 19th November 2021. The events are organized by the United Nations Office for Disaster Risk Reduction in collaboration with the African Union Commission (AUC) and the Intergovernmental Authority on Development (IGAD). The Africa Regional Platform will be held under the over-arching theme: "Towards Disaster Risk-Informed Development for a Resilient Africa in a COVID-19 Transformed World".

- **The International Emergency Management Society (TIEMS) 2021 Annual Conference**[11]
  From 6th to 10th December 2021 the TIEMS 2021 Annual Conference will be held virtually. The main topic of the event is: New Emergency Management in a Resilience Era Facing Health, Climate and Energy Challenges. The best papers and the videos of the conference will be available on HCFRN and TIEMS websites.

- **15th International Conference on Natural Disaster Management (ICNDM 2021)**[12]
  From 6th to 7th December 2021 in Kuala Lumpur, Malaysia, the 15th International Conference on Natural Disaster Management will be held. The aim of the conference is to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results on all aspects of Natural Disaster Management. It also provides a premier interdisciplinary platform for researchers, practitioners and educators to present and discuss the most recent innovations, trends, and concerns as well as practical challenges encountered and solutions adopted in the fields of Natural Disaster Management.

10 https://indico.un.org/event/1000257/
11 https://www.tiems.info/index.php/tiems-2020-virtual-annual-conference-videos
12 https://waset.org/natural-disaster-management-conference-in-december-2021-in-kuala-lumpur