

NEWS

PROJECT

GUARDIAN - Green
Urban Actions for
Resilient fire Defence of
the Interface Area

📍 Riba-roja de Túria,
Spain

TOPIC

Climate adaptation

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Prescribed burning in GUARDIAN project: what could have been but never was...

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In this article the UIA expert Elsa Pastor delves into the significance of prescribed fire, an activity initially programmed in GUARDIAN, a vital component of Integrated Fire Management projects.

After highlighting all the successful tasks completed within GUARDIAN through previous posts, we now turn our attention to a notable activity that unfortunately couldn't be realized as part of the project. The work plan of GUARDIAN encompassed the potential execution of a prescribed fire in an abandoned cropland, aligning with the comprehensive Integrated Fire Management approach implemented across our sites in these last years. Thorough preparations were meticulously undertaken to transform the prescribed fire concept into reality in Riba-roja de Túria. However, despite putting in a lot of effort, we weren't able to make it happen because of meteorological limitations. In this article, we delve into the utilization of fire for wildfire management, briefly exploring its historical usage and digging into the contemporary role and perception of prescribed fires as a pivotal tool for mitigating wildfire risks. We will give you a closer look at how this particular task was planned within the GUARDIAN project and we will detail the circumstances that demanded its unfortunate cancellation mere hours before its scheduled occurrence.

The traditional use of fire

Fire has long been employed as a traditional tool for managing wildfires in various regions, including, among others, the United States, Australia, and Europe. In the United States, Native American tribes have practiced controlled burns for centuries, using fire to clear underbrush, regenerate vegetation, and reduce fuel loads. Similarly, Indigenous Australians (Figure 1) have a rich history of utilizing fire to shape landscapes, promote biodiversity, hunting and mitigate the severity of wildfires. As a matter of fact, a recent study from the [UNSW in Sydney](#) reveals that indigenous burning helped suppress bushfires 10,000 years ago! These traditional fire practices exemplify the harmonious relationship between indigenous communities and the natural environment, fostering a profound understanding of fire's role in shaping and maintaining landscapes.



Figure 1: Joseph Lycett, Aborigines using fire to hunt kangaroo (c.1817). Image: National Library of Australia.

In [Europe](#), countries such as Spain and Portugal have (shyly) embraced prescribed burning as a means of reducing fuel buildup. Rural societies practiced controlled burns back in the days, to clear land for agriculture, stimulate the growth of desired vegetation, and reduce the risk of large-scale wildfires. These fires were often integrated into cultural practices and closely tied to the seasonal rhythms of the Mediterranean climate. Across various regions, while techniques and cultural contexts may differ, there is a shared understanding that fire can be a valuable tool in promoting ecological resilience and mitigating the destructive effects of uncontrolled wildfires. This recognition serves as convincing evidence that fire can indeed have positive impacts on ecosystems when managed under specific conditions and pursued with particular objectives.

The “Good fire” and “Bad fire” current dichotomy

Despite the so well-known benefits of traditional use of fire, in present time researchers, practitioners and emergency managers are having a tough time [getting policymakers and society in general to understand](#) that fire can be both good and bad, depending on how it is handled. Indeed, fire can have both positive and negative impacts based on the context and how it is managed. As our ancestors perfectly knew, fire can be good if it is intentionally and carefully applied for specific management purposes. This is the case of prescribed burns conducted under controlled conditions, planned by trained professionals, which serve several beneficial purposes:

- **Ecological benefits:** good fires help maintain ecosystem health and promote biodiversity. They can rejuvenate forests, clear out accumulated vegetation and debris, release nutrients into the soil, and promote the growth of fire-adapted plant species. These fires play a vital role in maintaining natural processes, such as nutrient cycling and habitat diversity.
- **Fuel reduction and prevention:** controlled burns are used to reduce the build-up of flammable materials, such as dead vegetation, which can decrease the intensity and spread of future wildfires. By reducing fuel loads, good fires can help prevent uncontrolled, destructive fires from occurring.
- **Cultural and traditional practices:** in many regions, indigenous communities have employed controlled burning as part of their traditional land management practices for centuries. These practices are deeply rooted in cultural beliefs, ecological knowledge, and sustainable land stewardship.

In contrast, “bad fires”, such as the devastating events unfolding in many parts of the world today, and [particularly in Europe](#), represent uncontrolled and destructive wildfires that jeopardize human lives and property. They threaten communities (which are usually unprepared to handle the impact of fire), contribute to air pollution posing health risks, and inflict considerable ecological harm, leading to habitat loss, vegetation destruction, and displacement or loss of wildlife. It is important to note that these fires are far from being the same as controlled or planned burns. This understanding helps us coming up with smart ways to manage fires that take advantage of their positive effects on nature while reducing the negative impacts. And this is exactly what was planned in the framework of GUARDIAN.

The prescribed burn planned in GUARDIAN

Planning a prescribed burn involves careful consideration of [various factors](#) to ensure its safe and effective execution. Here are key steps involved in planning a prescribed burn:

- **Objectives:** Define clear objectives for the prescribed burn, such as reducing fuel loads, enhancing ecosystem health, promoting biodiversity, or restoring a specific habitat.
- **Site assessment:** Conduct a thorough assessment of the burn site, including its topography, vegetation types, fuel conditions, and proximity to sensitive areas like residential areas, water bodies, or cultural sites.
- **Weather conditions:** Analyse weather patterns and choose optimal conditions for the burn. Consider factors such as temperature, relative humidity, wind speed and direction, atmospheric stability, and the potential for precipitation.
- **Burn plan:** Develop a detailed burn plan that outlines specific strategies, tactics, and safety protocols. This plan should include the desired burn area, the ignition pattern, the expected fire behaviour, contingency measures, and smoke management strategies.
- **Permits and notifications:** Obtain the necessary permits and inform relevant authorities, neighbouring landowners, and stakeholders about the planned burn. Comply with any legal requirements, local regulations, and community guidelines. Maintain open lines of communication with the public to address concerns and provide information about the burn's purpose and expected impacts.
- **Personnel and equipment:** Assemble a skilled and trained team of firefighters and support staff to execute the prescribed burn safely. Conduct pre-burn briefings to review roles, responsibilities, and safety protocols.
- **Monitoring and contingency plans:** Establish monitoring procedures during the burn and after its completion to assess the effectiveness of the prescribed fire and identify any unforeseen impacts.
- **Post-Burn evaluation:** Evaluate the outcomes of the prescribed burn against the defined objectives. Assess the ecological response, fuel reduction effectiveness, and any lessons learned to improve future prescribed burn planning and implementation.

Preparation phase

One of the most anticipated activities within GUARDIAN was the execution of a prescribed burn in “Mas d’Escoto”, located in Riba-roja del Túria. This area comprises abandoned crops with overgrown vegetation, as well as scattered woody shrubs and dead trees of agricultural origin (Figure 2).



Figure 2: The “Mas d’Escoto” plot, in Riba-roja de Túria.

The main objectives of GUARDIAN prescribed burning were:

- Operational training of personnel assigned to the Municipal Action Plan for Wildfire Risk, including local police, civil protection, municipal technical staff, and municipal managers.
- Reduction of the wildfire risk at the wildland-urban interface (WUI) area of Mas d’Escoto.
- Technical and research experiments on the effects of prescribed irrigation for creating fire safety zones.

Furthermore, the prescribed burn was expected to yield additional benefits, such as positively impacting the reduction of pests affecting the WUI area of Mas d’Escoto. Additionally, it aimed to enhance the habitat for amphibians and small mammals by promoting a mosaic vegetation pattern and encouraging the regrowth of specific plant species favourable to this fauna. The predetermined prescribed fire “window”, which denotes the

optimal period characterized by suitable weather conditions to achieve the objectives, was scheduled in February 2022. This period seemed to strike a balance—neither overly wet, hot, nor windy—creating an ideal scenario for moderate fire intensity and minimal fire severity on the ground to successfully meet all the purposes. The burn plan had been meticulously prepared, documented, and accepted by local authorities. All necessary permits, notifications, trained personnel (Figure 3), and equipment were in place, ready for execution on February 18th, 2022.



Figure 3: The Medi XXI team (on the left) during a training session for the Riba-Roja de Túria local police (on the right) a few days before the scheduled prescribed fire date.

The prescribed burn process begins well before igniting the fire. As mentioned earlier, a pre-burn briefing is imperative to thoroughly review and assess the various roles and responsibilities, as well as to establish and ensure strict adherence to safety protocols. All stakeholders were convened at the premises of Medi XXI, in Carcaixent, the day before the burn. This gathering included representatives from the municipality's public environmental services, members of the GUARDIAN consortium, the [CERTEC-UPC](#) wildfire research team (which I am privileged to lead), local media journalists, and, of course, all the operational personnel involved, such as civil protection, local police, and fire brigades and fire analysts (Figure 4).

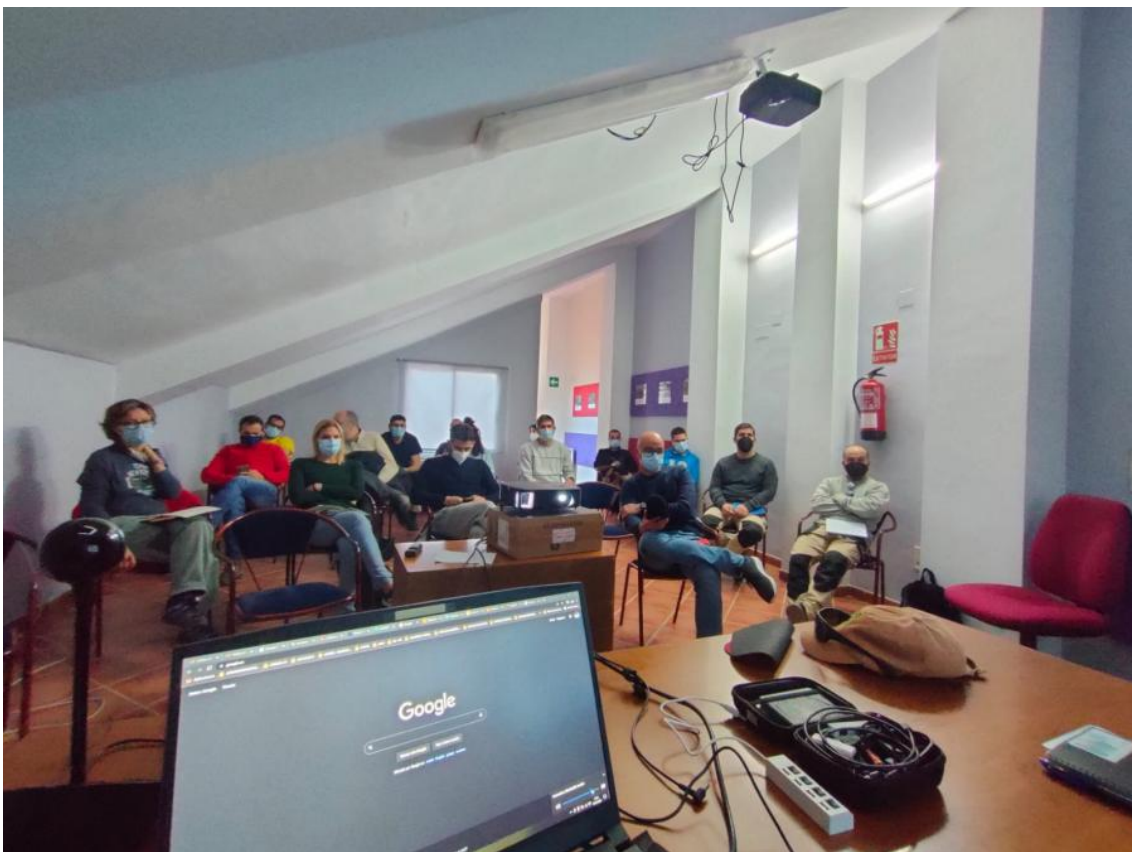


Figure 4: Briefing session on February 17th 2022, one day before the scheduled prescribed fire date.

The call-off

However, the possibility of having to call off a prescribed burn is always present. Prescribed fires, though meticulously planned and controlled, are not exempt from a range of challenges and risks, as it was the case with the GUARDIAN project. The foremost challenge for a prescribed burn undeniably lies in weather conditions.

Weather plays a pivotal role in prescribed fires. Unfavourable weather (e.g., high winds, low humidity, or extreme temperatures) can lead to uncontrolled fire spread, rendering the management and containment of the burn a difficult task. Who could have anticipated that on February 18th, 2022, an Alert Level #2 of (out of 3) would be issued in the area due to the high risk of wildfire? Strangely enough, the day preceding the burn saw an unexpected surge in wind and temperature, exhibiting a fire weather typical from early summer. Perhaps we must attribute this anomaly to climate change, but sadly, all preparations had to be dismantled. There was nothing within our control to alter the situation; thus, the prescribed burn was officially cancelled at 5:00 PM on February 17th, 2022. Even though we knew this kind of thing could happen, as it is often the case when planning prescribed fires, this did not diminish the frustration and disappointment it brought...

Future perspectives

Rescheduling the prescribed fire during the lifetime of GUARDIAN project turned out to be impossible. The specific timelines and goals related to testing and operating the GUARDIAN watering infrastructure took precedence over the burning activity. Moreover, rescheduling the prescribed burn would have required rearranging firefighting resources (both personnel and equipment), revisiting and renewing permits, conducting additional communication and coordination efforts to gather everyone again, and having weather conditions aligned once more with the prescribed fire objectives. Unfortunately, these complexities prevented its rescheduling... until now! Another opportunity appears to be on the horizon. October 2023 seems to offer a promising window for all the necessary factors to come together. Let's keep our fingers crossed and hope for suitable weather conditions!

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