ResAlliance

Type of solution: Management Sector: Forestry

Good practice(s): Management alternatives, Protection against biotic and abiotic hazards

Wildfire prevention at communal scale through annual interventions of territorial preparation

Implementation of a replicable format for wildfire prevention carried out in the municipality of Bonorva, Sardinia, Italy.

Figure 1. Simulator output used to tailor fuel treatments. If fuels on the blue lines are eliminated the area between the blue and the red lines is not burned.
Author: Franco Casula, Tesei Giovanni | © CFVA

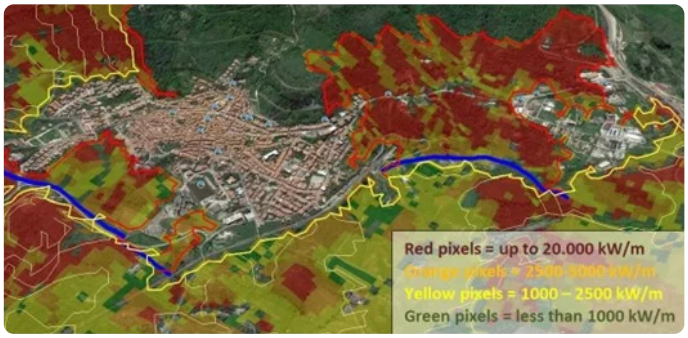

Figure 2. Simulated Fire Line Intensity (FLI) [kW/m]. The FLI is an important factor for firefighters as it conditions the possibility to directly attack the firefront.
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/// Context ///

Despite significant progress in judicial repression and an efficient and powerful firefighting apparatus, the island of Sardinia, one of the most fire-prone areas in Europe, continues to experience serious problems with extreme wildfires, both in terms of magnitude and related losses.

To attempt to solve this problem, we propose a methodology for designing and implementing a strategic oriented plan of mitigation actions. It involves a first preliminary studying phase of landscape/fire regime characteristics, the identification of areas and actions to carry out, and then the optimization of the treatments through the use of a fire spread simulator. The final phase is the fuel reduction treatment on the identified small but strategic areas. The developed methodology was already validated at municipal level in Bonorva (Sardinia – IT), where the study phase allowed to finally carry out tailored interventions on biomass contiguity, thus optimizing the area treated and the actions effectiveness in maximizing wildfire risk reduction.

Bonorva municipality was affected by large wildfires in the past years, with critical points at the rural-urban interface (WUI). This case study describes a fire prevention approach devised by the Group of Analysis and Use of Fire of the Corpo Forestale (GAUF-CFVA), together with the National Research Council – Institute for Bio Economy (IBE-CNR) and the Agency Forestas and carried out thanks to the collaboration of the Municipality of Bonorva.

/// Solution for a Resilient Future ///

The methodology develops, tests and implements consistent planning for wildfire prevention, with actions strategically oriented to the reduction of the fuel load and horizontal and vertical contiguity, creating a flexible format that can be adapted to fit the local characteristics in most of the contexts. The analysis of landscape, climate and local fire regime characteristics and the use of a wildfire propagation simulator (Figure 1), allow operators to identify key areas for prescribed burning, strategic grazing and prevention forestry. The methodology includes four steps:

1. Preliminary study: Characterization at the territorial scale of landscape features, climate, vegetation/fuel, urban features, local fire regime, and territorial peculiarities is essential to define objectives and identify critical issues. As a result of this step, four main criticalities have emerged for the municipality of Bonorva: the WUI problem, the wind farm area, the Mariani nature park, and the Santa Lucia plain, which is frequently traversed by large fires.
2. Planning the actions: The information collected in the first phase drives the different operational interventions hypotheses. The choice is refined through a wildfire propagation simulator, used to:
   - Identify key areas of intervention for prescribed burning, strategic grazing and preventive forestry actions;
   - Guarantee the optimal compromise between the minimization of treated surfaces and the maximisation of risk mitigation.

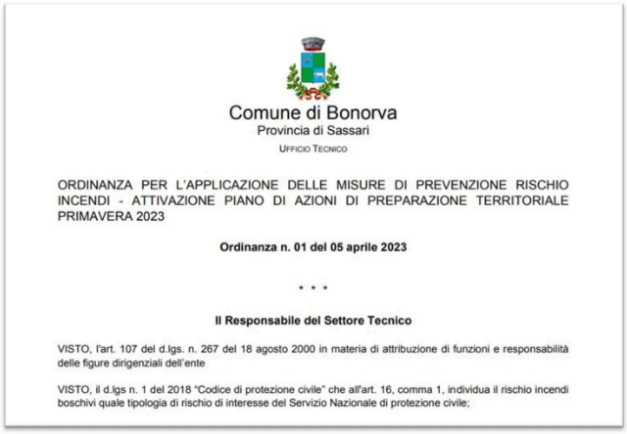
The fire propagation simulations were carried out with SWS (Sardinian Wildfire Simulator), a software developed by IBE-CNR, consisting of a modelling chain for real-time spatially explicit simulated forest fires propagation. In particular, the Action Plan developed for Bonorva identified four lines of intervention for risk mitigation:

- Fuel reduction at the interface, by winter controlled burnings of bramble (Rubus sp.) and other brushes adjacent to the houses and late spring burnings of grasses (Figure 2);
- Enlargement, by late spring controlled fires, of the street net in “Piana Santa Lucia”, where the wider fires usually spread. The net act as firebreaks and anchor points to set backfires in case of fire;
- Partitioning of fuels under the wind farm by creating separated sectors to facilitate firefighting strategy and tactics that must take into account that on those areas the aerial intervention is impossible;

- Creation of a firebreak to protect the “Parco Mariani”, using controlled fires and preventive silviculture techniques.

3. Engaging the community: The local community is involved by means of communication, information, training and education measures aiming to raise risk awareness and stimulate an active approach to mitigation. Eventually, as in the case of Bonorva, the municipal administration can issue an ordinance stating the need to mitigate the risks, which allows the operators to carry out the actions included in the plan, disregarding land ownership (Figure 3).

4. Carrying out the actions: Finally the action plan is carried out and wildfire risk is reduced. A cost-benefit assessment can be carried out aiming to evaluate the balance between prevention and response and possibly confirm what is reported in literature, i.e. that prevention is more cost effective than firefighting (Figure 4).



Comune di Bonorva
Provincia di Sassari
Ufficio Tecnico

ORDINANZA PER L'APPLICAZIONE DELLE MISURE DI PREVENZIONE RISCHIO INCENDI - ATTIVAZIONE PIANO DI AZIONI DI PREPARAZIONE TERRITORIALE PRIMAVERA 2023

Ordinanza n. 01 del 05 aprile 2023

* * *

Il Responsabile del Settore Tecnico

VISTO, l'art. 107 del d.lgs. n. 267 del 18 agosto 2000 in materia di attribuzione di funzioni e responsabilità delle figure dirigenziali dell'ente

VISTO, il d.lgs n. 1 del 2018 "Codice di protezione civile" che all'art. 16, comma 1, individua il rischio incendi boschivi quale tipologia di rischio di interesse del Servizio Nazionale di protezione civile;

Figure 3. Mayor’s order for conducting controlled burnings on private properties.
Author: Franco Casula, Tesei Giovanni | © CFVA

Figure 4. GAUF of CFVA conducting the controlled burnings at the interface of Bonorva.
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/// Always Moving Forward ///

The methodology is designed to be adopted by public administrations at the spatial planning level for the setting up and maintenance of “passively safe landscapes” through annual territorial preparation: according to the Italian Civil Protection Code, this type of intervention is considered “structural prevention.”

This type of intervention requires the definition of clear and shared objectives with the population, which plays a decisive role in the success of prevention interventions.

The widespread dissemination of similar projects contributes to the creation of “fire-smart” territories where the fire-fighting apparatus is enabled to control wildfire events because prevention works carried out on fuels are the way to avoid extreme wildfire behavior.

Moreover, literature reports that prevention is 5-7 times cheaper than firefighting, 1 euro invested in prevention saves ~5-7 euro in firefighting, damage and restoration.

This pilot case carried out in Sardinia by public administrations aims to create a format that can be replicated by other local communities, as the depopulation trend forces new ways of managing territories.

Further information

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