



## **Forest Fuels Management and Firewise Approach in Private Properties: The Pianacci Project, Italy**

### **Summary**

The Pianacci project is presenting prescribed fire as a land and risk management tool for European landowners. The project was initiated when a concerned landowner in Tuscany had a fire risk analysis conducted on her property. Taking the fire history, the current state of vegetation (fuel), local risk factors and the landowner's responsibility into account, a fire management plan has been developed. The severe fires that burned in Italy during the 2007 fire season triggered this initiative. The use of low- to medium-intensity controlled fire for environmental friendly fire break construction as well as fuel load management is playing a key role within the fire management plan, together with mechanical and social-economic measures. Although the regional forest law does provide for the use of prescribed fire, it is widely seen as "impossible" to implement the fire management plan. It appears the paragraph about the preventive use of fire had to be re-discovered. The project is demonstrating firstly the responsible and concerned private landowner that wants to act proactive and secondly the bureaucratic and legal process of the application of an official burn permit in Tuscany. Further, the project is demonstrating the potential cooperation of all relevant stakeholders, which is not always the rule in Italy or elsewhere in Europe. One has to note that Pianacci originated through private initiative, this could well serve as a role model for other land owners throughout Europe, where the (private) land owner could play a vital role in supporting Forest and Fire Services in their annual fire suppression efforts, as well as acting proactive to minimise own and insurance losses. Partners of the project include: Land owner and neighbours, WoF International, Universities of Padua and Florence, GFMC, Local Volunteer Fire Service, Corpo Forestale, Civil Protection and Volunteers.

### **Introduction and objectives**

2007 fire season has been one of the most severe ever recorded in Italy. The fire fighting resources had to face with two classic threats: simultaneity and large fires. On 24 July 2007 the National Civil Protection received one hundred calls for aerial support and fires larger than 100 ha covered 63% of the burnt area (Corpo Forestale dello Stato, 2008). Relevant damages have occurred in the urban interface and a heavy price has been paid in human lives. These data show that, when extreme conditions occur, the fire fighting activity can never be enough against fire. The prevention issue, often neglected because somehow "invisible", represents the real key point of a modern fire management system, together with fire danger rating systems, personnel training and investigation, that is particularly important where most of the fires are human-caused, as in Italy. Forest fuels management is the only practicable tool to reduce fire hazard, since both meteorological and topographical factors can not be changed. In many Countries, such as Spain, USA, New Zealand, Australia and South Africa, part of this burdensome work is tackled by private owners, supported by forestry agencies and government technicians. This management choice is defined firewise approach (Grillo et al., 2008)<sup>1</sup> and is based on citizens awareness that a proactive action is convenient both to preserve properties and to increase their economic value. Indirectly a series of benefits can be reached, defined landscaping goals (Randall et al., 2005)<sup>2</sup>, namely water - energy conservation and wildlife habitat creation or enhancement. An economic convenience is achieved also from a government point of view, by optimizing fire fighters training (fire use during prescribed fires programmes), enhancing citizens involvement, reducing social costs and pressure on people during active fight, above all when simultaneities occur. In Italy this approach is suggested by Civil Protection but, on the other hand, actors and methods to achieve this goal are not outlined.

<sup>1</sup> <http://www.firewise.org/> and <http://www.firewisesa.org.za/>

<sup>2</sup> <http://www.nature.org/initiatives/fire/files/thingsyoucando.pdf>

The lack of initiative by land owners can be explained in multiple ways:

- lack of financial resources, knowledge and time (it is not rare that owners come from a foreign Country or they live in another urban location)
- lack of technical tools
- lack of reference persons to address

At the end of 2007 summer season a private estate owner, Ms. Susanne Bücking, contacted the Global Fire Monitoring Centre and asked for advice on the wildfire risk on her property, which is located 20 km from Florence in a rural and forest environment. The risk assessment was entrusted to Working on Fire International<sup>3</sup>, an international private company considered a valid partner with adequate experience in fuel management.

The property was threatened in the past years, but never really affected, by wildfires occurred in the surroundings (for example during 2003). This represented the motivation to start a pilot project (Pianacci Project), co-funded by the Global fire Monitoring Center (GFMC).

The main goals of the project included:

- to introduce the use of fire to manage forest fuels in a private property, together with mechanical and manual tools;
- to study the prescription window and the prescribed burning effects;
- to promote the firewise concept for fire hazard reduction and to identify actors to achieve this objective.

### **Risk assessment and proposed actions**

Following a field survey at Pianacci private property, a Fire Prevention Burn Plan has been produced, evaluating at risk values respect to fire propagation. The property is placed in Lastra a Signa municipality, in Pianacci street (identifying the project) and covers 9.5 ha. A variety of vegetal species and structures are present, including an aged olive plantation; a pinewood (*Pinus pinaster*) which fuel load is dominated by litter and grass; a grown wild stand of *Robinia pseudoacacia* mixed to other broadleaves. On the eastern side (Figure 1) the estate borders with Mediterranean maquis owned by Florence Curia, highly flammable. Most of the area is south oriented and on a medium slope. Due to vegetation unevenness and to the fuel types, a potential fire would spread with different intensities, without producing long-term ecological damages. Nevertheless, the clerical maquis at the border is increasing considerably fire danger. On the opposite, the wild grown stand might be a natural green firebreak, since it grows on a humid floor.

The Burn Plan identifies some preventive actions, as following:

- fuel reduction and strategic firebreaks net;
- accessibility improvement, both internal and at the border;
- land owner education on an adequate fire equipment;
- water points maintenance;
- cooperation with neighbours and with volunteers La Racchetta (the closer Civil Protection association). The cooperation with neighbours is already standing and it is particularly important for maintenance and periodic mowing of the olive plantation.

As regards to specific fuel management, it has been suggested (Figure 1):

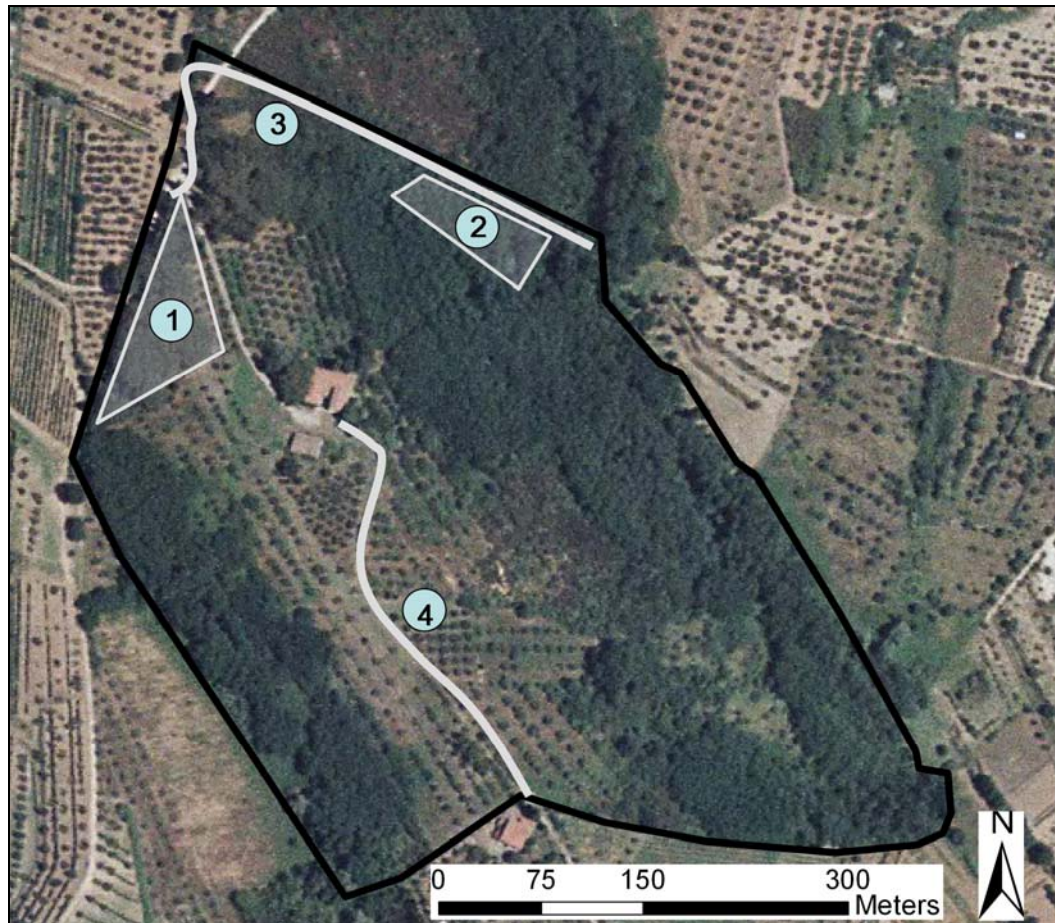
- to apply a prescribed burning of 0.5 ha in the pinewood, in order to keep the existing gap between crowns and surface fuels, and to enhance natural regeneration of pine by reducing litter amount (as desired by the land owner). It is required to remove dead trees or non stable individuals, thus promoting stand liveliness;
- to remove dead coarse fuels and woody debris from the wild grown stand of *Robinia pseudoacacia*;

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<sup>3</sup> <http://www.wof-int.com/>

- to create a firebreak along the northern boundary, by using both fire and mechanical tools, in particular close to the maquis;
- to burn the grass fuel invading the road passing through the olive plantation (and inside it), for an extent of 5-10 m on each road side. In this way a good working space for fire fighters would be available in case of fire.

Finally, it would be worth to join Pianacci property and the Church property in one collaborative fire management plan, and to reduce the dominance of maquis species.



**Figure 1.** Delimitation of the property on orthophoto (source: <http://www.pcn.minambiente.it/>): (1) pinewood where prescribed fire has been applied, (2) *Robinia pseudoacacia* dominated plot, (3) north-west boundary close to the ecclesiastic maquis, where a firebreak is needed (4) road between olive trees just partially handled with prescribed fire on the eastern side.

## Planning phase

In Tuscany, the use of fire is regulated by a forestry regional law (Regolamento d'attuazione della Legge Forestale Regionale LR 39/2000) and a specific form must be filled to get the permit to proceed. Even if, at first, to get that permit seemed to be something "impossible", finally it was issued by Florence Province, after a series of talks between applicants and authorities, and a field survey one week before the indicated date of the burning. Only for point 1 and 4 (see previous paragraph) the Province issued a burn permit.

Operations planning passed through three key issues: 1) climatic analysis and identification of a prescription window to test; 2) choice of fitting techniques and arrangement of resources and tools; 3) application of ICS (Incident Command System) to define personnel positions and roles, with a special remark to safety and communications.

## Prescription window

The winter season have been chosen to burn, after the analysis of monthly cumulated rains and mean temperatures for the weather station Sesto Fiorentino, placed close to the property. University of Florence has been asked for an opinion and cumulated drought of previous (in relation of the chosen week) two months has been taken into account. The prescribed burning could be applied only if some weather conditions were fulfilled: air temperature lower than 25°C; wind speed lower than 25 km/h; relative humidity higher than 40%. Finally, the Meteorological Service (IBIMET, LaMMA Regione Toscana) has been asked for the weather forecast, thus fixing the specific date when to keep on.

## Techniques, resources and tools

All burning had to be done as backburning (against the wind) from a fire control line. More than one burning line could be ignited, parallel to the others, to modulate frontal rate of spread. All personnel involved was volunteer, coming from the company Working on Fire International, universities, neighbourhood, La Racchetta association, who provided means and expertise, and the land owner. Fire equipments and hand tools were available (two drip torches, rake hoes, fire beaters, two brush cutters, a chain saw and knapsack sprayers), three pick-up with 500 l water tank, hoses, one fire engine, two hand held two way radios and a mobile hand held weather station.

## Incident Command System

Personnel preparation and localization has been the more challenging phase of the burning planning. Participation of people from different origin has been taken into account during assignation of tasks. Everyone had to get a specific role during the burning (Table 1). The operation had to strictly follow international accredited wildland fire safety guidelines, all personnel on the fire line had to wear full Personal Protective Equipment. A safety officer was appointed for the active operation and ignition was executed by a qualified Burn Boss under supervision of the Incident Commander / Operations Section Chief.

## Field surveys and sampling

An experimental protocol has been predisposed to collect data and describe the fire. Weather data (air temperature, relative humidity and wind speed) has been recorded by the meteorological service, providing a mobile weather station. Frontal rate of spread has been computed by time of arrival of flames to numbered and mapped trees; this task has been given to students. Fuel load has been measured before the burning by oven-dry technique (105°C for 24 hours).

**Table 1.** Personnel roles using the ICS scheme (Incident Command System)

Function	Role	Origin
<b>Command</b>	Incident Commander	Padua University
	Communications and Liaison Chief	Padua University
	Safety chief	Padua University
<b>Operations</b>	Operations Chief	Working on Fire Int.
	Division A	Padua University
<b>Planning</b>	Planning Chief	Florence University
	Resource Unit	Florence University
	Situation Unit	La Racchetta
<b>Logistics</b>		Land owner



## Burning performance and conclusions

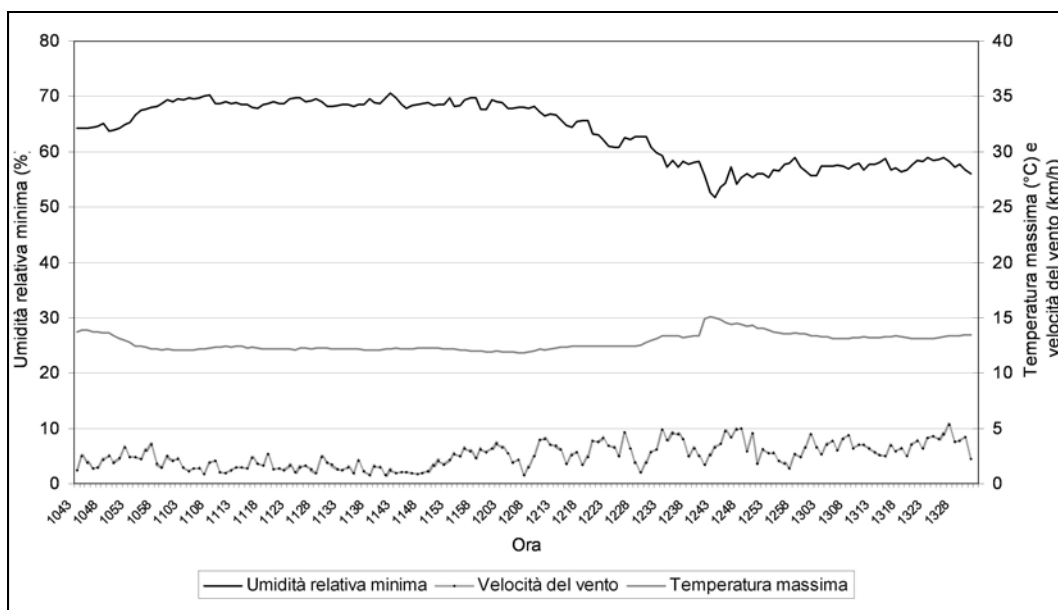
On 26 February 2008 at 11:00 a.m. the prescribed burning was initiated in the pinewood, after having set the area the day before. Florence University team removed the coarse woody material and cut taller shrubs. Other volunteers created bare defence lines, by using hand tools. On 26 February the prescription window, already a cautious one, closed and weather conditions (Figure 2) did not sustain fire advance as it was desired. A high number of ignition lines had to be drawn and the opportunity to assess the rate of spread expired. A second burning has been carried out on the eastern side of the olive plantation road, on a grassland.



**Figures 2 and 3.** Behaviour and effects of the prescribed fire varied with surface fuel loads and composition of the herb-shrub layer.



**Figure 4.** Behaviour and effects of the prescribed fire varied with surface fuel loads and composition of the herb-shrub layer.



**Figure 5.** Hourly trend of maximum air temperature, minimum relative humidity and wind speed, recorded by IBIMET mobile weather station inside the property on 26 February 2008.

Both treatments had a demonstrative value more than a fuel reduction effect. This is justified by the experimental trait of the burning, that was the first one in a private property in Tuscany, requiring to be even more careful than on normal mode. Representatives from the State Forestry Service (Corpo Forestale dello Stato) and from Tuscany Region have been invited as observers. They were especially interested in watching the burning and the human-resources coordination. An explanatory briefing took place before each burning to give details about objectives and operations, to enhance volunteers training and observers understanding.

One should not forget that prescribed burnings are still a pioneer technique in Italy, and most of the people, including the fire community, did not ever experience it.

Cooperation between different individuals has been satisfying and burnt areas perimeter has been adequately patrolled by La Racchetta volunteers.

All in all, the experimentation created a starting point to:

- better identify the prescription window, by avoiding unstable weather;
- cooperation between the land owner and neighbourhood in order to set a minimum area for fuel management and initial attack;
- involve Civil Protection volunteers (La Racchetta) in the firewise approach, by providing at the same time a training opportunity for young or un-experienced ones, under supervision of expert technicians, such as a Working on Fire team.

The principle goal of pilot projects like Pianacci is to show land owners the correct way to use fire to protect their properties. This process of training and education requires several learning sessions side-by-side with specialised fire technicians. Pianacci project is meant to be repeated in 2009, depending on weather conditions, since the permit lasts two years.

Giving responsibility to citizens respect to the environmental heritage could become one of the turning points to reduce large wildfires hazard and impacts on the Italian landscape as well as to lessen the existing pressure on the fire fighting system, that is more and more charged over its capacity. Thus, the safety level of fire fighters is supposed to increase. It would be worth to identify reference characters with sound experience in fuel management, if these objectives are aimed to be reached. Expertise is needed to support the training of both Civil Protection volunteers and land owners, asking for consultancy.

#### **IFFN contribution by**

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