

# State of the art on fire risk communication to communities and municipalities.

## Efficient fire risk communication for resilient societies (eFIRECOM)

*Project co-funded by ECHO -Humanitarian Aid and Civil Protection*

(Helena Ballart, Pau Costa Foundation, Taradell, October 2015)

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## Executive Summary

The purpose of this report is to present a state of the art on fire risk communication to communities and municipalities, a review on the knowledge and tools for communication, raising awareness and promotion of the social responsibility against wildfires risk.

Different situations will be analysed: Communication tools on forest fire risk prevention in WUI for homeowners, technicians, authorities and municipalities. The use of prescribed fire as a prevention tool in a participatory process in contexts where the fire is still present as a tool for environmental management. Show how to influence the risk awareness in different areas, traditionally and recently affected by fire or areas where the fire is interpreted as a sporadic event.

The analysis of the state of the art will take into account relevant national and regional experiences. In addition, interesting findings in the international level can be very useful for learning about the design and implementation of successful practices, and start thinking how can adapt to our Mediterranean context.

We intend to draw some conclusions for the eFIRECOM project by suggesting two different fire risk communication, one being addressed to homeowners and the other to local entities and municipalities. The other tool consists in dissemination materials addressed to local technicians, authorities and municipalities: it will comprise a guide on basic urban planning for mitigating fire risk.

## 1. Introduction

Communities and municipalities should be interested in building community resiliency and increasing their adaptive capacity to the impacts associated with wildfires and a changing climate. From flooding to severe storms, to wildfires, municipalities are increasingly aware of the vulnerability of their populations, operations, and infrastructure to the risks associated with a changing climate.

In the Mediterranean region are increasing the risk of forest fires affecting urban and peri - urban areas. Furthermore the Mediterranean forests have become subject to declining resilience and, consequently, increased vulnerability to catastrophic wildfires. These disturbances cause severe social and environmental damages and may dislodge the forest into a different ecological regime. Forests provide many valuable services, such as the provisioning of timber and the sequestering of carbon that would otherwise contribute to climate change. The high-severity wildfires that have become regular occurrences in many Mediterranean forests impinge the delivery of such benefits, particularly in the event of a regime shift. Therefore, in a proper urban planning and in a sustainable forest management should be taken these risks into account.

Throughout the Mediterranean region, it is increasingly common to see homes and other buildings located or being built in wildland environments. This expansion into wildland areas often results in homes located next to and among large volumes and areas of vegetation often untreated or unprepared for development. These homes become extremely vulnerable to wildfire in the surrounding area.

Identifying areas of the wildland-urban interface (WUI) that are prone to severe wildfire is an important step in prioritizing fire prevention and preparedness plans. It is essential to determine at a regional scale the relative risk of severe wildfire in WUI areas and people and houses in high-risk areas.

Wildfires in wildland-urban interface (WUI) are a serious threat to communities and forest homeowners in rural areas in the Mediterranean region. However, many actions to reduce the potential ignition of homes in existing housing developments are relatively simple and can be assumed by the homeowner.

## 2. Objectives

The purpose of this report is to present a state of the art in communicational tools that can be used to provide forest fire information to communities and municipalities as well as an overview of knowledge transfer in this ambit in different places around the world, where forest fires usually occur.

Concretely this process includes:

- To analyse the current situation of risk communication and the tools used, at local, national, regional and global levels, for communities and municipalities.
- To analyse and identify innovative experiences and lessons learned on the development of risk communication tools for communities and municipalities.
- To draw some conclusions related to the first step in the creation of communication material that can provide this task within the project: the two guides and their adaptation to other areas and translation to different languages.

### 3. Approach

This eFIRECOM project will help the communities and municipalities increase capacity and build awareness of how they can begin to build resilience, adapt to, or take advantage of a changing climate; and what municipalities are doing to build resilience in their communities.

A disaster is the result of insufficient capacity or measures to reduce or cope with potential negative consequences (UNISDR, 2009). The risk of natural hazards, that might become disasters, is influenced by social, political and economic issues, but depending on the perceptions of people the degree of risk is considered high or low. Every social group has different perceptions and responses in a different way to risk. Thus, it is necessary to understand risk as a mental construction, because risk is a cognitive conception. Risk means different things to different people.

Risk is a collective and cultural construction (Douglas, 1982). Several factors determine how the risk is seen by people and organizations. Individuals, institutions, communities or societies may perceive risks differently, due to diverse cultures or beliefs.

Factors that also influence the perception of risk in a community are: 1) the duration of a hazard, giving the degree of harm; 2) the acceptability of risk or recognition of impacts; 3) economic losses or death people; 4) studies on return periods; 5) access to existing information about risk; 6) education programs; 7) vulnerability; and/or 8) absence of preparedness. *Risk perception and risk cultures 15. Enhance project.*

Risk perception plays an important role when reacting to hazards and disasters. In cases in which people have a poor perception or no perception of risk, their reaction might be less convenient or even harmful (as e.g. building houses in wildfire prone areas). In other cases in which the perception of risk is shaped by historical and social events, the reaction to the hazards and disasters might be very appropriate to the event happening. This might reduce the possible harms.

For instance, if a community, located in an area where it is usual to have wildfires, has a prepared response to this event, the level of resilience might be high and thus the level of vulnerability decrease. This community might perceive a low risk. They may see the natural hazard, but not consider it an important risk.

This report has two approaches that need a different treatment: communities that use the fire as a management tool, and where the fire is interpreted as an ecological factor in the area, and others where the fire is portrayed as an enemy to fight against.

The general communication scheme that eFIRECOM follows is:

1. Why we want to communicate: the objective
2. At who we want to communicate: the receiver
3. What we want to communicate: the message
4. How we want to communicate: the tool

## 4. The analyse of the risk communication in different Mediterranean countries

### 4.1 Spain

#### Diputació de Barcelona. Barcelona Provincial Council. Catalan Government.

Forest Fire Prevention in WUI areas, the experience of the Barcelona Provincial Council.



Figure 1: *Example of fire in WUI in Catalonia. Diputació de Barcelona.*

Prevention: To caution something to prevent it, to avoid its effect → Actions: Catalan Law Implementation (5/2003 Law)

#### Law on prevention of forest fires in the urbanizations and villages (Ley 5/2003)

- Identify the area of wildland urban interface.
- Perimeter strip of 25 meters wide
- Tree density 150 trees/ha
- No built plots and green areas

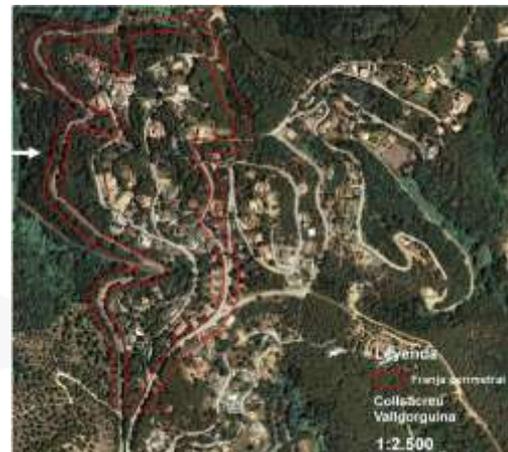
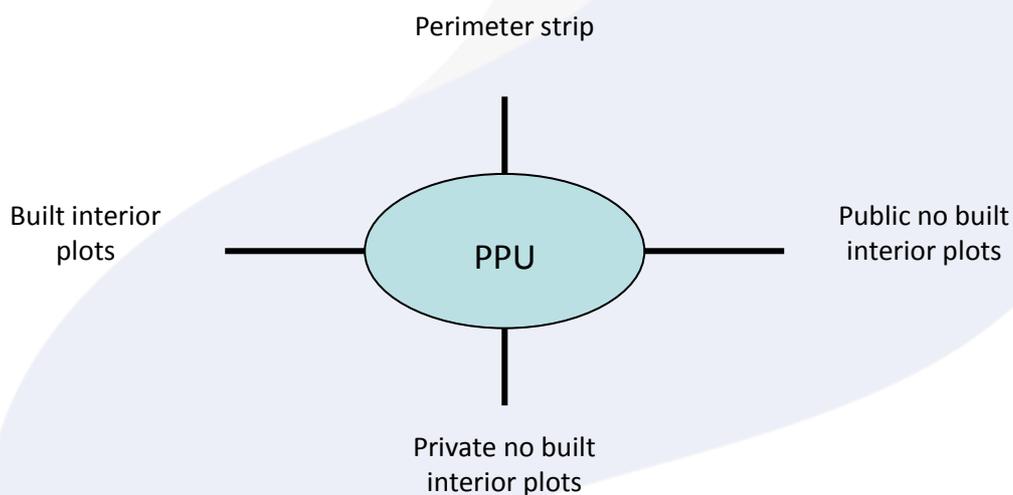


Figure 2: *Example of perimeter strip*



Figure 3: Example of 25 meters of strip

Forest Fires Prevention Plan in the urbanizations (PPU)



- Writing Project  
Phrase 1: Perimeter strip writing project and Interior plots writing project. Identify the area of wildland- urban interface. Forest Inventory of the strip area and interior plots.

The project details:

- Forest inventory
  - Forestry operations to be performed
  - The cost of implementation
  - Owner of the property
- Management.  
Phase 2: Project execution of Perimeter strips, Interior plots and green areas

- Public and private financing
    - Public financing.
      - Generalitat de Catalunya since 2005
      - Diputació de Barcelona since 2014. Physical implementation and Work Direction: DB certification
    - No built plots: Private ownership
      - What procedure for charging to use?
      - Procedure for obtaining permit for home entry
    - Administrative procedure of Subsidiary Implementation
    - There is no public subsidy line for the execution of interior plots
  - Property permits for home entry
  - Work execution
    - Cooperation with the City Council
      - Execution Order
      - Inspection Act
      - Subsidiary Implementation
      - Executive Administrative channels
  - Maintenance
- Approval of Fiscal Ordinance
- Establish a public service Regulation of annual maintenance
  - Compose an economic and financial report

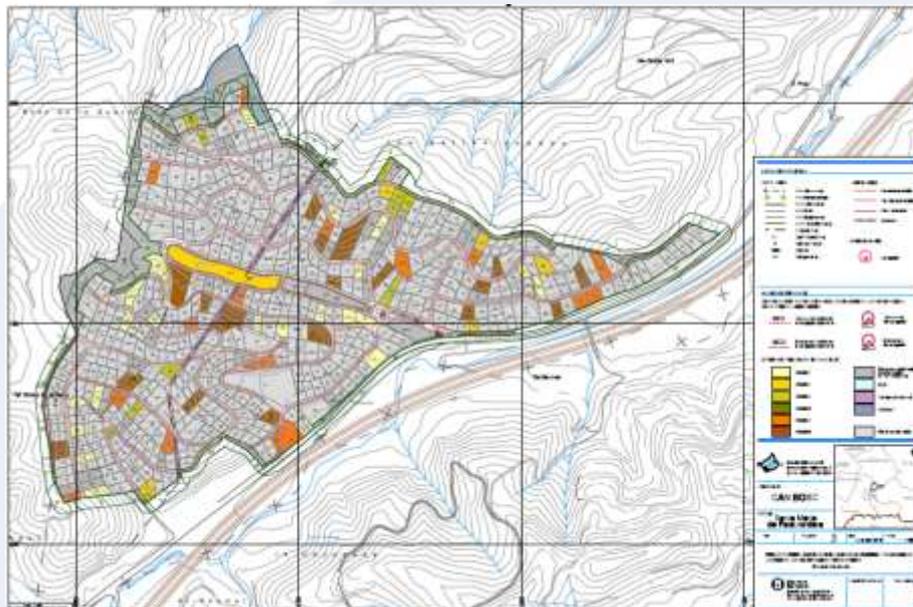


Figure 4: Writing project of interior plots

**Diputació de Girona. Girona Provincial Council. Catalan Government.**

**5/2003 Law**

- The Article 2 stipulates that municipalities have to make a map of delimitation with the realization of the settlements, urbanisations, buildings and facilities found in the municipality.

-The Article 3 sets out the fire prevention compulsorily measures to have to fulfill the settlements, urbanisations, buildings and facilities affected, which are, among others:

- a) Ensuring the presence of an external buffer zone of at least twenty-five meters wide around, free of dry vegetation and the tree mass clarified, that meets the characteristics established by regulation.
- b) Keep the soil of all interior plots and green areas of the strip zone under the same conditions as in buffer strips.
- b) Keep the soil of all interior plots and green areas of the strip zone under the same conditions as in buffer strips.



Figure 5: *Before and after the vegetation treatment*

The law amendment of 2014 includes the population settlements, all urbanisations have or no continuity with the urban grid, and all buildings and facilities without exception.

Objective: To protect persons and property that are on forest land or within 500 meters of forest land.

Technical conditions of buffer strips:

- Minimum width of 25 meters
- Spaced and pruned trees
- Prevent fuel continuity
- Minimum distance between trees 6 meter
- Canopy cover of 35%
- Shrub cover maximum 15%
- Isolated bushes at least three meters apart
- Prioritize species of low combustibility

Who must fulfil with the obligations of Article 3?

1. Community of owners
2. Individual owners
3. Town Councils (subsidiary)

Who helps at fulfilment?

1. Diputació of Girona (at the request of local council)
2. The regional councils will exercise the powers to fulfil the obligations of Law 5/2003, through delegation of authority or management order by the Council of Girona.

*11 years after in the Girona province...Degree of implementation of the law less than 20%*

### Conclusions

- It is vital the coordination between administrations
- The informative talks with mayors were very effective and is necessary the same for owners concerned.
- Casuistry timeshare and diversity of land uses, which hinder the implementation of the strip.
- Need to clarify concepts; who is the owner with obligations, who has to perform the strip, owner of the strip, etc.
- Risk prevention versus erosion risk, shadow, riverside species, etc.
- Very complex process and limited technical and financial resources.

### Challenges

- Generate agile tools to implement the stripes in all its complexity.
- Avoid to the maximum the subsidiaries executions because is a complicated and very difficult process.
- Regulate the possibility that the council may establish a fee.
- Incorporate communication strategies on fire and capacity management of forest fires to make the risk management policies more understandable.
- Encourage the awareness of the risk exposure, the ability of self-protection and individual responsibility.

### **Meteogrid. The use of fire hazard planning for education. Experience in the WUI.**

*Risk = Danger level x exposure x Vulnerability*

**Objective 1:** To change any of these three factors

- Reducing the level of danger (reduction of fuel load and continuity)
- Decreasing vulnerability (increasing the resistance, protection)
- Reducing exposure (removing vulnerable objects of the area of risk, or interposing barriers)

**Objective 2:** improve defence operations

- Vials Network, accessibility
- Water availability
- Communications
- Infrastructure of Forest Fire defence



Figure 6: *Fuel management. Meteogrid*

### The commitment

- Identify risk areas
- Assume that we live in a landscape of fire
- Develop Municipal Emergency Plans
- Develop Self-Protection Plans
- Contributing to the consolidation resistant and resilient communities over fire
- From the City Council to the neighbours
- Among the neighbours

### The communication

- Identification of scenarios and problems
- Generation of simulations "what if"
- Compilation of previous experiences
- Fire exemplification and solutions
- Explain without "scare"
- Testing and drills
- Communication from the devices and from local councils
- To promote communication between owners

### Creating Community

- Individual solutions
- Collective solutions
- Self-protection Plan
- Municipal Emergency Plan

### Solutions

- Spaces for dialogue
- Integrated society
- Risk culture

### Conclusions

- There are technological means to identify and quantify risk situations
- Local governments play a key role in the creation and consolidation of resistant and resilient WUI landscapes.
- It is necessary to reinforce communication and risk culture: know the problem
- To assume the individual part of prevention
- Strengthen the creation and consolidation of communities

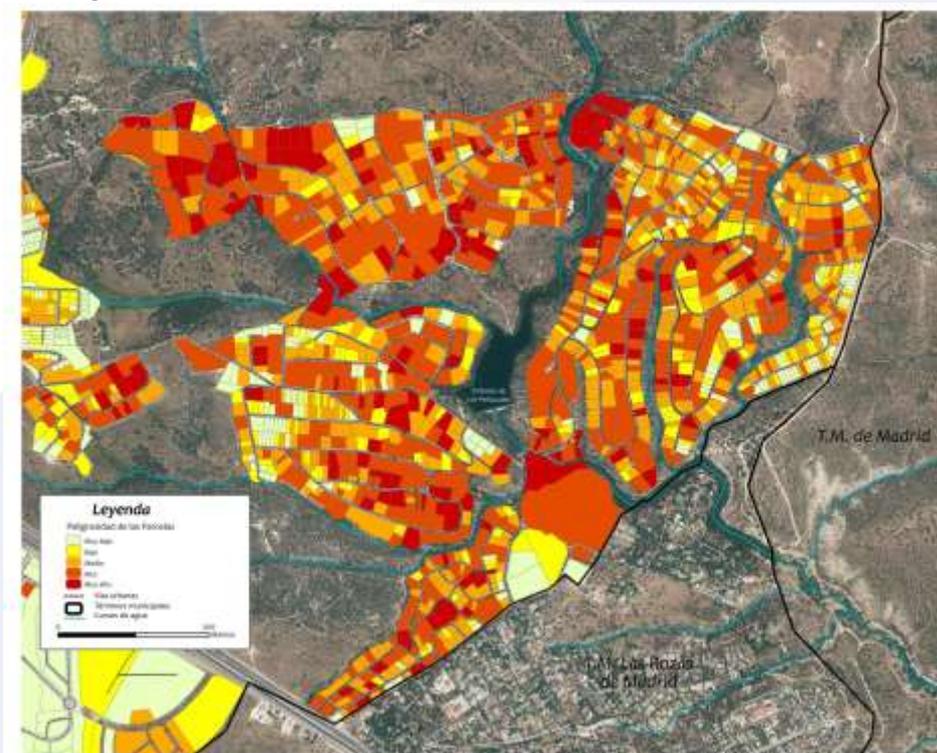


Figure 7: Example of hazardousness of the plots in Torredolones, Madrid. Meteogrid

In Spain, while the rural population may have a different view up close and in line with the complexity of the problem, the general perception of society, mostly urban seems to be simply that of a human unsolved problem that recurs every summer. This general view seems to move to the educational field, which continues to be a part of that society. From this habitual perspective, the approach to the subject in education can dangerously impoverished and limited to reproduce and transmit the aspects that again and again in the news are shown about. These are usually the human origin of the fire, the immense ecological loss caused, lack of means of extinction at one point or another of the fire, the need for mass evacuations and, unfortunately, too often the loss of human lives.

In the Spanish educational system the subject of forest fires does not appear directly in the curriculum of the primary stage, the term does not expressly appear wildfire risk nor natural. It does transversely, if considered as part of a general environmental education.

In order to know the curricular material generally available, it has conducted an extensive literature search, primarily via the web. All material found, initiatives of various institutions and organizations may be included in a series of groups according to their approach or so academic, and its content (LOS INCENDIOS FORESTALES EN EL SISTEMA EDUCATIVO: 10 IDEAS FUNDAMENTALES COMO BASE CONCEPTUAL NECESARIA. Martín Alcahúd Cortés. 2014)

## 4.2 France

### Département des Pyrénées-Orientales

The organization of defence against forest fires (DFCI) in Oriental Pyrenees. Communication actions.

- DFCI includes Prevention, Prediction and Combating
- Actors and multiple skills:  
State, local authorities, municipalities, SDIS (rescue services) and individuals.
- The municipality remains the basic unit of territorial organization DFCI (Application of the regulation, arrangements)

Objectives:

- To reduce the number and surface fires
- Risk plan and deal with the causes
- Monitor forest to detect fire outbreaks and rapid intervention
- Equip, develop and maintain the countryside with forest areas
- To inform the public and to train professionals

Prevention: Preventing a risk, it is prevented to exist

Several levels of intervention

- Regulation (Forestry Code, Government Code ...) - following regions
  - Clearing around homes and exposed infrastructure,
  - Use of fire: prescribed burning, fire place ...
  - Accessibility of the Massif (regulatory risk period)
  - Urbanisation: Risk Zoning (PPRIF ...)
  - ...
- Planning
  - Urbanisation (taking into account risk)
  - Preparing the ground for the surveillance and response (PDPFCI, PAFI)
  - Recommendations of forestry or agricultural managements to reduce the vulnerability of the territories concerned.
- Information actions and knowledge surrounding
  - Awareness campaign to a targeted audience (Risk Culture)
  - Application of lessons learned from experience feedback

In terms of communication DFCI. *Awareness, information and knowledge of the risk are key elements in the area of forest fire prevention*

Objective: To develop a culture of fire risk to the general public, elected officials and professionals:

- Bring the residents and users to behave responsibly: Information and public awareness,
- Encourage elected to take risk into account in their planning, to equip their territory and to become involved in the implementation of specific regulations DFCI: Information and training for elected representatives and staff of communities,
- Reduce the number of fire starts due to accidents or negligence: Awareness and preventive information for professionals

The prevention of forest fires in the Oriental Pyrenees. Internet site. A communication and information tool for all (<http://www.risque-incendie.com/>)

- Digital rather than paper selection (accessible 24h / 24h and 7/7)
- Regulatory information, contextual, general

Each year, thousands of hectares of forest affected by forest fires, causing the destruction of wildlife and flora, loss of personal or collective goods and unfortunately sometimes human lives ...

Often these disasters can be prevented through simple gestures and application of basic measures and common sense. Each of us is a key player in prevention.

This site initiated by the Departmental Directorate of Territory and the Sea of the Oriental Pyrenees, gets the most comprehensive manner possible, general information as well as more specific information about the Forest Fire Risk in the Oriental Pyrenees.

#### Information and awareness of the public.

Targeted audiences:

- Residents:
  - Training Day (Commons DDTM ...)
  - Background: DICRIM
- Hikers:
  - Information in guidebook,
  - Information panels at the start of the paths
- Woodland owners: training and information days

**PREVENTION DES FORETS CONTRE L'INCENDIE**  
[www.prevention-incendie66.com](http://www.prevention-incendie66.com)



**Feux interdits**  
du 1<sup>er</sup> juin au 30 septembre

Il est interdit à toute personne de fumer, de porter ou d'allumer du feu dans les massifs forestiers (bois, forêts, landes, maquis, garrigues), entre le 1<sup>er</sup> juin et le 30 septembre. En dehors de cette période, se référer à la réglementation en vigueur.

Seul est toléré l'emploi du feu dans des foyers spécialement aménagés ayant fait l'objet d'une autorisation préfectorale. Ces places à feu sont matérialisées par une signalétique appropriée faisant référence à cette autorisation et listant les règles de sécurité à respecter.

*Chaque année, plusieurs centaines d'hectares de maquis, de landes, de garrigues ou de forêts sont détruits par les incendies. Outre le danger qu'ils représentent pour la population ou les pompiers, les incendies ont un impact souvent irréversible sur les peuplements forestiers, sur les sols, sur la faune et sur le paysage.*

**Les IMPRUDENCES** représentent la principale cause des départs des feux. Une bonne connaissance de l'emploi du feu et une attention accrue doivent avoir un rôle déterminant dans la maîtrise du risque d'incendie.



Arrêté préfectoral en vigueur relatif aux mesures de prévention des incendies de forêts sur le département des Pyrénées-Orientales.  
**Toute infraction est passible d'une contravention de 4<sup>ème</sup> classe pouvant aller jusqu'à 750 €**

Figure 8: Example of leaflet of the internet site relating to the use of fire.

### Information and awareness of professionals.

Objectives: to raise awareness about precautions to take to avoid fire starts

- Provision of an online tool facilitating the statements of burning and raising awareness of operators,
- Training Day organized by consular chambers with professionals (foresters, farmers)
- Dissemination of awareness leaflets

### Information and awareness of the Elects

Objectives: Consideration of risk in the facilities / equip their territory / regulatory / encouraged to inform their populations

Campaign Conduct training and information on the fire risk:

- Training Day (State and COFOR)
- Technical support in the control (ONF) of brush clearing
- Development of a communication tool: Guide to organize information day on the brush clearing (DVD + explanatory booklet) nearby population



Figure 9: Example of training day

Encourage elected officials to regroup, to secure and equipping their territory:

- Planning Document (PAFI)
- Grouping by EPCI,
- Technical and financial support to the implementation of projects.

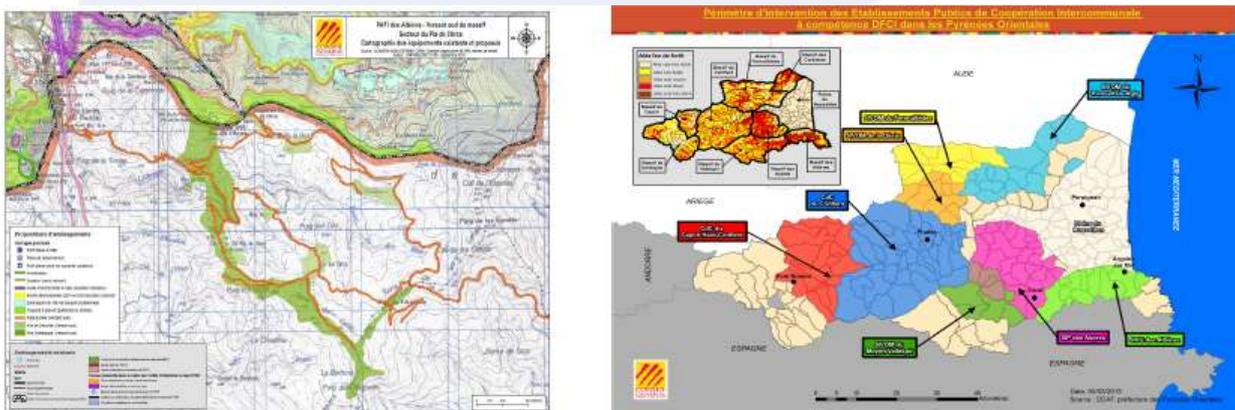


Figure 10: Examples of PAFI (right) and EPCI (left) documents.

Sensitization elected officials on prevention against fire and forest management within their territory:

- Charters Forest Territories: Forest established by Law of 2001

- Based on a diagnosis of forest land / building a shared project (validated by elected) doing the forest, a local development support.

Feedback (improving knowledge, use concrete examples to demonstrate) and burn authorization request Instruction on its municipality (Plate internet form).

European DFCI projects conducted in PO, with a communication component

-OCR Fire: Interreg III C - 2005/2008

Partner countries: Spain, Portugal, Italy, France and Greece.

Improved prevention policies and fight against forest fires - Awareness there was an item of work and exchange.

- Development of a children's advocacy website to the protection of the Mediterranean forest: Site SYCO <http://www.sycoenforet.com/>
- Practical Guide for clearing interfaces (forest areas / urban areas)

-PRINCALB: Transboundary Project for the Protection of the massif of Albère against large forest fires - Interreg IV - 2009/2013.

Mainly a communication project (conference, panelling, leaflet)

-Arc Latin: Local development and fire risk management of the WUI "urbanization / Forest": a growing and specific restriction on the Mediterranean territories? (2014).

Following a diagnosis, public awareness and improving risk perception by emerged politicians, as priority actions.

Entente pour la forêt Méditerranéenne. ENTENTE VALABRE, Conservatoire de la forêt méditerranéenne .

PREVENTION INCENDIE

Site édité et réalisé par le département information et prévention de l'Entente pour la forêt méditerranéenne.



Figure 11: Shot screen of the interactive web page.

It offers a fire prevention guide targeted to homeowners who live in the forest. The web site have three section:

- ANTICIPER. To anticipate



Figure 12: The first section. To anticipate, before the fire.

- FAIRE FACE. To face



Figure 13: The second section. To face, during a fire.

- RÉPARER. To Repair.



Figure 14: *The third section. To repair, after a fire.*

<http://www.prevention-incendie-foret.com/guide-resident/>

#### 4.3 Tunisia

During the Roman period (200 years BC) the Tunisian forest covers 3 million ha. In 1880, one year before the French occupation it covers 1.250.000 ha.

But in 1956, when the French colonial left Tunisia they destroyed about 2/3 of the area, because they kept only 368.000 ha. According to the last forest and pasture inventory (2006) the Tunisian forest land is about 5.8 ha.

#### **NATIONAL PLAN FOR FOREST PROTECTION**

The national plan for forest protection is based on different aspects and international conventions, it aims to:

- Reduce the fire risks in 1 Million ha forest and shrubs
- Reduce burnt area < 1 ha/fire
- Conciliate between administrative interest and population interest with its integration in the development process
- Protect the population, infrastructure and goods
- Promote researches and training on fire management & prevention.

Forest Fire in Tunisia: importance and prevention. Mohamed Lahbib BEN JAMAA & Samir BELHAJ  
INRGREF & DGF – Tunisia

#### 4.4 Algeria

Algeria is a Mediterranean country strongly conditioned by the physical, biological, climatic and environmental characteristics of the area. Wildfires can be so explosive, due to harsh climatic conditions (extreme temperatures and prolonged drought) that in a few hours they can annihilate wide surfaces (Madoui 2000).

According to the 2009 National Forest Inventory (Bneder 2009) the current situation of forests and other wooded lands (OWL) is of concern. Their combined total area is only 4,115,908 ha (1,702,818 ha forests and 2,413,090 OWL), representing only 1.72% of the country's 238,174,000 ha. Furthermore, 84% or 200 million ha of the total surface area is located in the Sahara region. Only the northern mountainous part of the country has a significant forestry cover of about 16.4%.

Climatic conditions are a significant predisposing factor for the forest fire situation in Algeria. Prolonged summers (June to October), with nearly no rain and average daytime temperatures well in excess of 30°C, and with daily peaks reaching up to 50°C (e.g., at In Salah in 2005), reduces forest litter moisture content way below 5%. Under these conditions, even a small addition of heat from natural (lightning) or human sources (a spark, a match, a cigarette butt) can be enough to start a violent wildfire.

In the context of the Mediterranean basin, Algeria is one of the countries with a significant forest fire problem whose impact requires consideration. Managers are facing upward trends in fire frequencies, area burned, fire intensity and severity, and increases in fire season length and risk resulting from changes in climatic conditions.

It list below a series of difficulties affecting fire management programs (prevention and suppression) in Algeria and propose recommendations for their resolution:

**In terms of prevention**

<b>Difficulties</b>	<b>Recommendations</b>
Lack of computerized databases on forest fires.	Create national and standardized fires database within Mediterranean countries.
Increased number of fires as a consequence of the general lack of prevention.	Development of a coordinated prevention policy across all jurisdictions to reduce forest fires.
Insufficient awareness of residents about the risk of forest fires.	Integration of population programs in forestry.
Increase in fires following the careless burning of stubble and weeds by farmers and ranchers.	Increase awareness campaigns among local residents based on mass communication.
Inadequate monitoring of preventive and dissuasive actions in wooded areas because of lack of personnel and equipment.	Authorization of prescribed fire in Algeria by an appropriate regulatory authority.
Lack of specific weather stations in forest areas to identify factors influencing fire in real time.	Recruitment of forest protection personnel, increase mobile surveillance in areas at highest risk, with a minimum density of 5000 ha per supervisor.
	Installation of an automatic weather stations network in forest areas by the National Meteorology Service to facilitate calculation of fire risk indices and help firefighting actions.

GENERAL TECHNICAL REPORT PSW-GTR-245. Wildfire Management Policies in Algeria: Present and Future Needs. Ouahiba Meddour-Sahar, Armando González-Cabán, Rachid Meddour, and Arezki Derridj

## 5. Findings: Interesting initiatives

### 5.1 FIREPARADOX PROJECT

The Fire Paradox is a European project originated in the 6th Development Research European program. It was inaugurated in March 2006, and brings together 36 partners from 16 countries for 48 months.

The project's objective is to create a scientific and technical basis in order to define which new practices and integrated management policies will ensure Europe's ability to prevent and fight fires most effectively.

#### Self-protection fire management guide (3 parts)

3 parts of the guide with advices for the self-protection in wildfires edited by European Project Fire Paradox, [see annexes](#):

- Risk awareness
- Preparing the property
- Surviving a forest fire

### 5.2 ENHANCE project

Risk management is highly dependent on risk perception. How we deal with risk is contingent largely to how well we understand it and how we perceive it. Risk perception has become an important topic to decision and policy makers concerned with risk management, and the psychological analysis of this construct has attracted much interest. This is important because perception affects behaviour towards management. Payments for Ecosystem Services

In the opposite, we may be able to change people's behaviour by influencing their perception of risk and their attitude towards a proper risk management. The main reason for that is the fact that the transaction cost of an improper managed risk might derivate in high economic and human losses. Research on risk perception has been dominated by main theories coming from psychology, like the protection-motivation theory or the framing theory; or from anthropology and sociology, like the cultural theory of risk. We show how to use these theories for understanding people's behaviour in the face of risk.

### 5.3 USA

#### CAL FIRE. State of California

*The Department of Forestry and Fire Protection serves and safeguards the people and protects the property and resources of California.*

The CAL FIRE Communications office mission is to provide information and education to people of all ages, in public forums, through the media and worldwide web, and the distribution and display of printed material. At every opportunity our best and brightest will represent the Communications Division and the Department in a manner that is professional and responsive.

Our commitment to this mission will mirror our commitment and dedication to the department and our constituents.

### **Wildfire is coming. Are you set?**

Give your household the best chance of surviving a wildfire by being ready to go and evacuating early. This includes going through [pre-evacuation preparation steps](#) (only if time allows) to increase your home's defenses, as well as creating a [Wildfire Action Plan](#) for your family. Being ready to go also means knowing when to evacuate and what to do if you become trapped.

Remember: When immediate evacuation is necessary, follow these steps as soon as possible to get ready to GO!

1. Review your [Evacuation Plan Checklist](#)
2. Ensure your [Emergency Supply Kit](#) is in your vehicle.
3. Cover-up to protect against heat and flying embers. Wear long pants, long sleeve shirt, heavy shoes/boots, cap, dry bandanna for face cover, goggles or glasses. 100% cotton is preferable.
4. Locate your pets and take them with you.

### **Fire Resistant Landscaping**

A fire-safe landscape isn't necessarily the same thing as a well-maintained yard. A fire-safe landscape uses fire-resistant plants that are strategically planted to resist the spread of fire to your home. Fire resistant plants are great in California because they are often drought tolerant too.

The good news is, you don't need a lot of money to make your landscape fire safe. And you will find that a fire-safe landscape can increase your property value and conserve water while beautifying your home.

#### **Choose Fire-Resistant Plants and Materials**

- Create fire-safe zones with stone walls, patios, decks and roadways.
- Use rock, mulch, flower beds and gardens as ground cover for bare spaces and as effective firebreaks.
- There are no "fire-proof" plants. Select high moisture plants that grow close to the ground and have a low sap or resin content.
- Choose fire-retardant plant species that resist ignition such as rockrose, iceplant and aloe.
- Fire-resistant shrubs include hedging roses, bush honeysuckles, currant, cotoneaster, sumac and shrub apples.
- Plant hardwood, maple, poplar and cherry trees that are less flammable than pine, fir and other conifers.

Check your local nursery, landscape contractor or county extension service for advice on fire-resistant plants that are suited for your environment, and help to plan your landscape.

Learn more about the different types of plants that are both [fire-resistant and drought tolerant](#).

Useful Links

[Firescaping – Landscape Design For Defensible Space](#)

[S.A.F.E. Landscapes](#)

[Home Landscaping for Fire](#)

[Fire-Resistant California Friendly Plants](#)

[Fire-Resistant Plants for Home Landscapes](#)



Figure 15: *Firescaping Landscape Design For Defensible Space. (Photo courtesy of Calif. Dep. Of Forestry & Fire Protection). University of Nevada.*



Figure 16: The three preparation guides. Wildfire is coming, are you ready? [See annexes](#)

- See more at: <http://www.readyforwildfire.org/landscaping#sthash.Qj5g2NVs.dpuf>

### One Less Spark—One Less Wildfire

Approximately 90% of all wildfires in California are caused by people. That is why fire agencies need the public's help to prevent them. Whether it's ensuring a campfire or landscape debris burn of leaves and branches is completely extinguished, or keeping a vehicle well maintained to prevent sparks, following just a few simple steps can help prevent wildfires.

#### Prevention Education

Help prevent wildfires by learning how to properly:

- [Use outdoor equipment](#)
- [Burn debris](#)
- [Start, maintain, and extinguish a campfire](#)
- [Maintain a vehicle and tow safely](#)

- See more at: <http://www.preventwildfireca.org/OneLessSpark/#sthash.rrExPrwS.dpuf>

## **Environmental Protection and Resource Program.**

### **Vegetation Management Program (prescribed fire)**

The Vegetation Management Program (VMP) is a cost-sharing program that focuses on the use of prescribed fire, and some mechanical means, for addressing wildland fire fuel hazards and other resource management issues on State Responsibility Area (SRA) lands. The use of prescribed fire mimics natural processes, restores fire to its historic role in wildland ecosystems, and provides significant fire hazard reduction benefits that enhance public and firefighter safety.

The Vegetation Management Program is derived from Senate Bill 1704, authored by then Senator Barry Keene, and ultimately signed by Governor Edmund G. Brown Jr. on July 16, 1980. The original legislation established the basic processes and procedures consistent with the need to manage chaparral-covered and associated lands within California. The laws enacted in support of this program are found in Title 14, California Code of Regulations, Chapter 9.8 Chaparral Management, Sections 1560 to 1569.6. The program is further defined in the Public Resources Code Sections 4461 to 4473, 4475 to 4480 and 4491 to 4494.

VMP allows private landowners to enter into a contract with CAL FIRE to use prescribed fire to accomplish a combination of fire protection and resource management goals. Implementation of VMP projects is by CAL FIRE Units. The projects which fit within a unit's priority areas (e.g., those identified through the Fire Plan) and are considered to be of most value to the unit are those that will be completed. The Vegetation Management Program has been in existence since 1982 and has averaged approximately 25,000 acres per year since its inception.

Landowners may choose to apply for participation in the Vegetation Management Program. The Unit VMP Coordinator will make the determination as to the suitability of a project for funding through the Vegetation Management Program. When approved as a VMP project, CAL FIRE assumes the liability for conducting the prescribed burn.

### **VMP PROGRAM GOALS (Board of Forestry and Fire Protection)**

The goal of the Chaparral Management Program is to reduce the chance of large, damaging wildfires by reducing fire hazards on wildland in California. The Departments' intent is to realize the best 'mix' of natural resource benefits from these lands, consistent with environmental protection and landowner/steward objectives. This includes three broad goals, which encompass most Chaparral

#### **Management objectives:**

1. Reduction of conflagration fires.
2. Optimization of soil and water productivity.
3. Protection and improvement of intrinsic floral and faunal values.

#### **Sub-Goals:**

1. Reduce the number and intensity of large, damaging wildfires with corresponding savings of suppression costs.

2. Increase public safety.
3. Increase water quantity and maintain water quality from managed watersheds.
4. Decrease the potential for damage from flooding and siltation.
5. Protect and improve soil productivity, and decrease erosion over the long term.
6. Improve wildlife and fisheries habitat.
7. Improve oak woodlands through fire management and regeneration.
8. Establish and maintain desired plant communities.
9. Propagate rare or endangered species of plants, which are fire dependent.
10. Improve air quality over the long term.
11. Improve forage and browse for livestock.
12. Increase opportunities for recreation and improve scenic vistas.
13. Decrease the risk to firefighters and other responders during wildland fires.
14. Provide training opportunities for personnel in incident organization, operations, fire behavior, firing methods and effects of weather influences.

**Homeowner's Wildfire Mitigation Guide. Division of Agriculture and Natural Resources, University of California. (<http://ucanr.edu/sites/Wildfire/>)**

Information on this website was compiled by individuals at the University of California, Berkeley, and is based on the results from laboratory fire tests, observations made during post-fire assessments and input from those who are involved in firefighting. It is important to realize that no house is completely fire proof, but you can make it more fire-safe.

The goal of the information contained in this website is to provide information on how homes ignite and are destroyed during wildfires, and to provide guidance on changes you can make to your home and its surroundings to make it better able to survive a wildfire, and to also help you understand why these changes are important.

Embers, also called firebrands, are the principle cause of home ignition and loss during wildfires. Embers can result in ignition directly, or indirectly by igniting combustible vegetation or materials on or near your home that would result either flames touching your house or a radiant heat exposure that may break glass in a window, or otherwise threaten your home.

As can be seen in this photograph, information about your house has been separated into 1) the roof and roof edge, 2) the sides and attachments and 3) other combustible materials and vegetation on your property. Although you can look at each of these items individually, it is important for you to

understand that when threatened by a wildfire, the survival of your home will depend on improvements you make to your home itself (both in terms of materials and design you have, and how well they are maintained), and the “residential fuels” that are on your property. “Residential fuels” include vegetation near your home, often referred to as your “defensible space” and other combustible materials such as fire wood piles and gazebos or other structures located near your home. Ignition of these residential fuels can result in fire spreading to and igniting your home.



Figure 17: *The fence shown above was responsible for substantial damage to both adjacent houses that were saved only through intervention by firefighters. Source: Homeowner's Wildfire Mitigation Guide.*

#### 5.4 Australia

Bushfires are different from controlled burning. Indigenous communities have traditionally used fire as a hunting and farming tool to assist with regeneration. Indigenous Australians used controlled burning and fire management is used to encourage the growth of new plants and to prevent the growth of long grass which contribute to the tinder or fuel for bushfires.

Fire management also allowed animals to escape, although some were lost to hunters. Eucalypts, for example, require occasional burns to regenerate. Fire stick farming used over tens of thousands of years created the fertile grazing plains west of the Blue Mountains. Long periods of dry, hot weather and natural vegetation that burns easily makes Australia particularly vulnerable to bushfire.

Australian bushfires can be particularly severe as eucalyptus trees contain large amounts of oil which can burn very fast and very hot. Other human management factors which have contributed to the severity of bushfires include high fuel loads, a change from fire prevention to fire fighting measures, and not building adequate buffer zones to protect built assets (Nairn Inquiry, 2003). As Australians learn to understand more about bushfires, bushfire prevention strategies are being adopted. (Natural disasters in Australia, Australian Government)

**Australian Government. Attorney-General's Department.**

## Australian Emergency Management Institute

The Australian Emergency Management Institute (AEMI) is a centre for education, research and training in national emergency management and disaster resilience. It is part of Emergency Management Australia within the Attorney-General's Department.

### Types of prevention activities

There are a number of bushfire arson prevention activities across Australia to reduce the incidence and potential damage of bushfire arson.

- Activities targeting the environment

These activities aim to increase the effort required to set a bushfire or reduce the rewards to the arsonist of doing so. Activities include:

- Fuel reduction and prescribed burning—this reduces the benefit to arsonists because the fires will not be as large. It also increases the risk that the arsonist will be caught if the fires are harder to light.
- Controlling access and reinforcing guardianship of property—this involves gaining an understanding of how arsonists are accessing high-risk areas, and preventing them from doing so. Approaches include locking gates and encouraging forestry workers and recreational users to report suspicious behaviour.
- Removing abandoned cars—bushfires are often caused by the burning of abandoned cars.

- Activities targeting the community

These activities focus on educating the community and raising awareness about the dangers of deliberately lit bushfires. Activities include:

- Arson education—this involves targeting a particular component of the community, either those likely to set fires or those who are in a position to prevent them, for example primary school presentations, shopping centre displays and door knocking.
- Reducing cigarette-caused bushfires—approaches include public education and campaigns to modify cigarettes making them less likely to cause a bushfire when discarded.
- Targeting arson-prone communities—this involves analysing incident data routinely collected by police and fire agencies to identify arson 'hot spots' and deliver targeted awareness and prevention programs.

- Activities targeting known offenders

These activities target known arsonists or high risk individuals. Activities include:

- Apprehension and sentencing of arsonists—this involves arson and bushfire sentencing that appropriately reflects the gravity of the offence and targeted prevention programs for better deterrence, capture and conviction rates of bushfire arsonists.
- Better identification of repeat or potential repeat arsonists—this involves information sharing across jurisdictions to make it quicker to identify convicted or suspected arsonists.
- Juvenile arson intervention programs—these programs target young people who have demonstrated they are at risk of more serious offending by their inappropriate use of fire.

### AFAC. Professionals in Fire and Emergency Management

Prescribed or planned burning is the controlled application of fire under specified conditions to achieve planned objectives.

Deliberate and purposeful vegetation burning has a history spanning more than 40,000 years in Australia. For aboriginal people, the use of fire was central to their way of life and a part of how they cared for country.

These days, state agencies across Australia undertake professional prescribed burning to protect the community, to maintain biodiversity values, and to achieve other land management objectives.

In order to build common understandings, develop tools and encourage best practice with regard to planned burning in Australasia, AFAC is undertaking the **National Burning Project** and the **Australian Bushfire Fuel Classification**.



Figure 18: Prescribed burning photo. <http://www.afac.com.au/>

### The National Burning Project

The National Burning Project has been jointly commissioned by AFAC and the Forest Fire Management Group (FFMG) and aims to:

- Build a National Framework for Prescribed Burning through common standards and approaches; and
- Establishing best practice guidelines

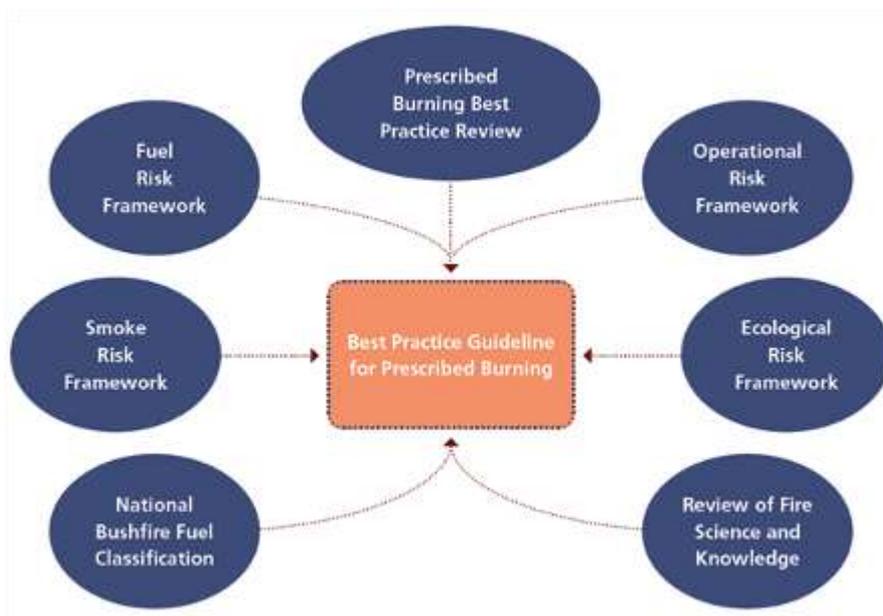


Figure 19: *Best Practice Guideline for Prescribed Burning.* <http://www.afac.com.au/>

### **Country Fire Authority (CFA)**

Country Fire Authority, or CFA, is the fire service that provides firefighting and other emergency services to all of the country areas and regional townships within the state of Victoria, Australia, as well as large portions of the outer suburban areas and growth corridors of Melbourne not covered by the Metropolitan Fire Brigade. In the event of an emergency in Australia, emergency services including the CFA can be called by dialling Australia's primary emergency service number, Triple Zero 000 or the secondary emergency service number of 112 which can only be dialled on a digital mobile phone.

CFA, as it is commonly known, draws the majority of its officers and members from the local community on a volunteer basis. The CFA employs professional career firefighters to support volunteer fire fighters in areas which are more heavily urbanized or more densely populated. These stations are manned on a full-time basis.

The CFA works closely with the other emergency services within Victoria namely being the State Emergency Service, Victoria Police, Ambulance Victoria and the Metropolitan Fire Brigade working together with unique skill sets and resources for the betterment and safety of all Victorians.

### **Plan & Prepare**

There are many available resources in this section, which are divided in different subsections:

- Am I at risk?
- Your local area – Info & advice
- Before and during a fire
- Prepare and maintain your property
- Fires in the home
- Building, Planning & Regulations

- My CFA

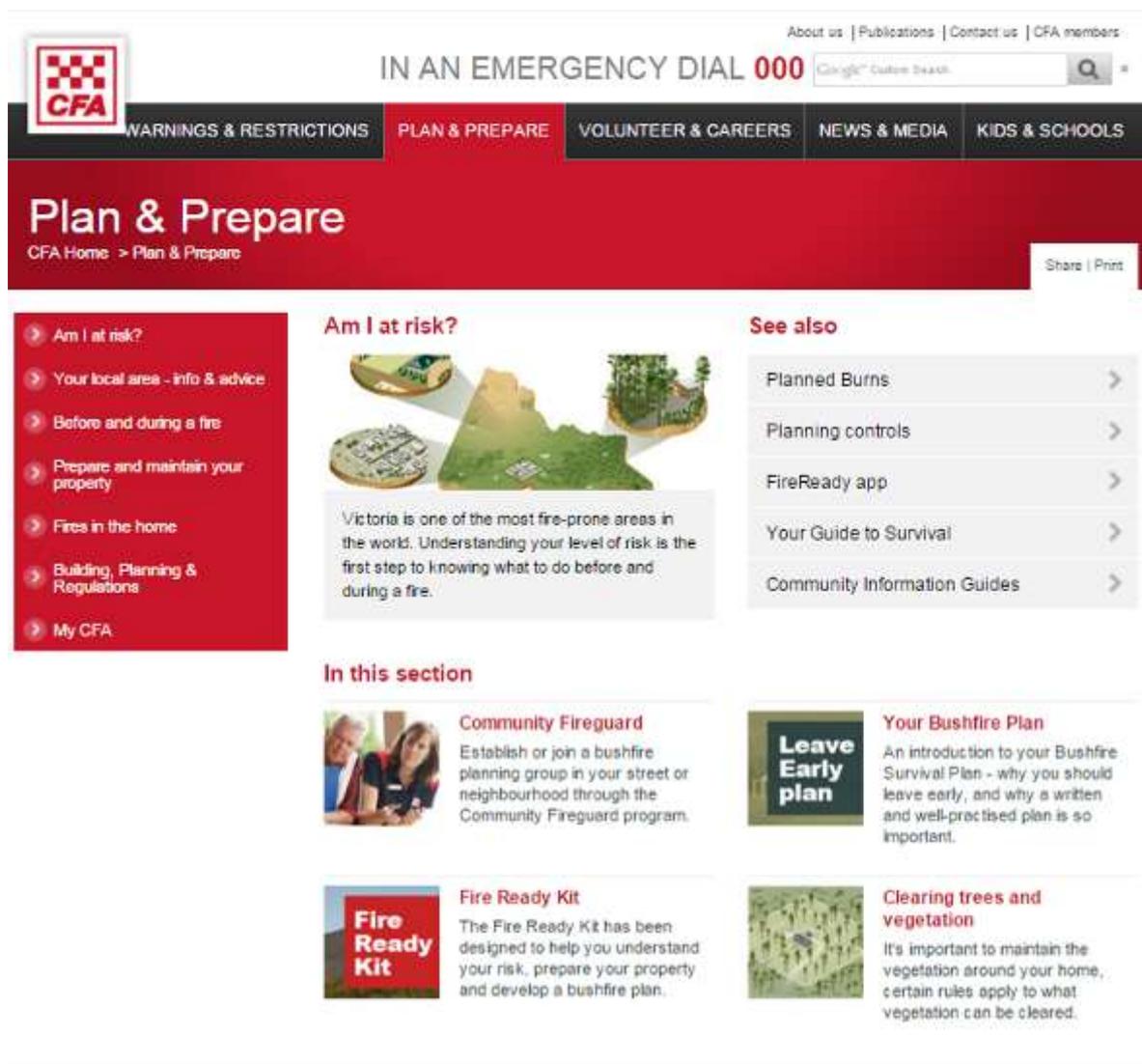


Figure 20: Example of a shot screen of the web site. <http://www.cfa.vic.gov.au/plan-prepare/>

### Am I at risk?

Victoria is one of the most fire-prone areas in the world. Understanding the level of risk is the first step in [knowing what to do before and during a fire.](#)

Have a look at the different types of fire risk environments above and see which one you live in. By recognising and understanding risk environment, this will also help to start [preparing the property](#) for fire and know what to do.

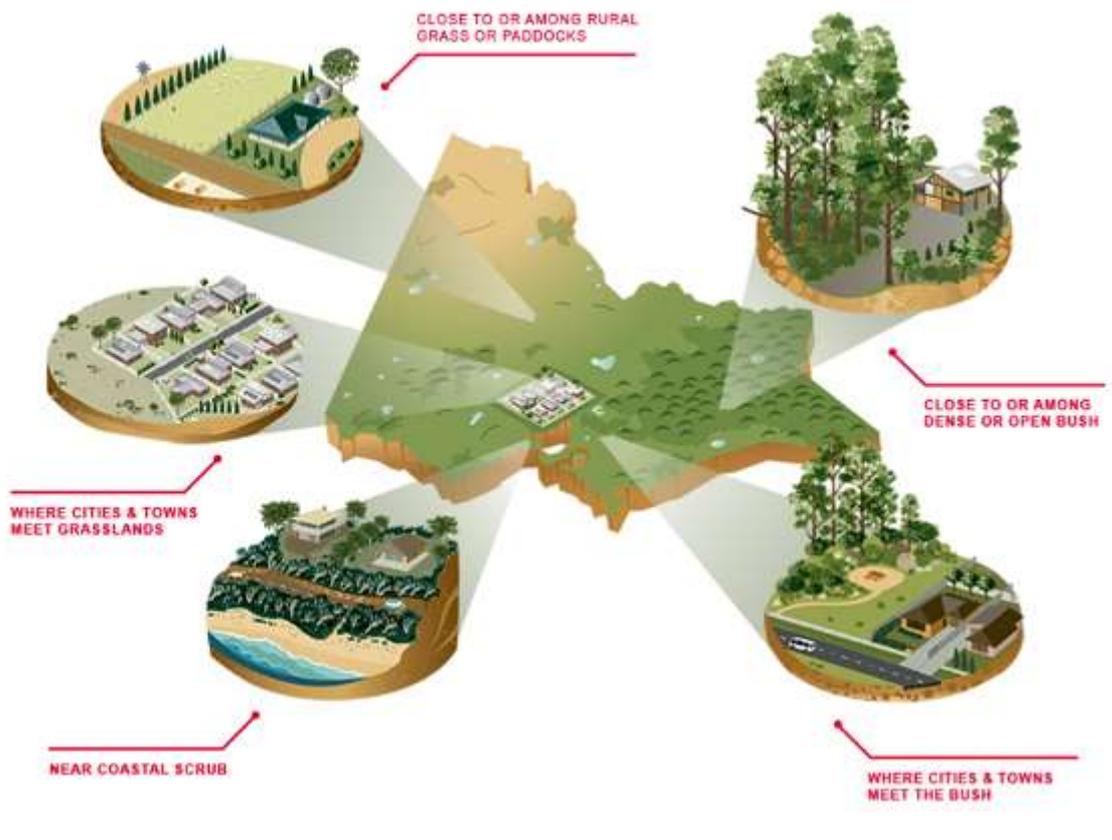


Figure 21: Example of web site resource. Different types of fire risk environments.  
<http://www.cfa.vic.gov.au/plan-prepare/am-i-at-risk/>

### Your local area – Info & advice

CFA has information and advice to help everyone prepare for bushfire and grassfire

Below is a list of resources to help people plan and prepare for fire including Community Information Guides, Fire Ready community meetings, Neighbourhood Safer Places, information on the FireReady app and more.

- CFA Local Search
- Community Information Guides
- Fire preparation meetings
- Practical Bushfire Planning Workshop
- Community Fireguard
- Fire Ready app.
- Neighbourhood safer places
- Private Bushfire Shelters or Bunkers
- Evacuation
- Community fire refuges

### Community Information Guides, in *Your local area – Info & advice* subsection

Community Information Guides - Bushfire (formerly known as Township Protection Plans) are a key source of information for the community and an important tool to emphasise the shared responsibility between the community, fire services and local government.

Guides have been developed for a number of communities statewide that are deemed to be at risk of bushfire or grassfire.

Community Information Guides are dynamic documents which are updated regularly, it is important to visit this page regularly to ensure that have the latest updated of the interesting town.

See also: Places of Last Resort. **Note:** Some townships will not have a Neighborhood Safer Place - Place of Last Resort or a Community Fire Refuge.

See annex an exemple of Anakie Community Information Guide – Bushfire

### **Before and during a fire**

Know what to do before and during a fire

CFA has a wealth of resources to help people understand their fire risk and know what to do before and during a fire.

This section discusses the importance of leaving early, and how a well thought out bushfire survival plan can help people if they live or holiday in high-risk bushfire areas of Victoria.

People don't have to live near bush to be at risk of fire. Grassfire can be just as dangerous as bushfire; know what to do if you live [close to grass in a rural area](#) or [where the suburbs meet grasslands](#).

More information in the subsection:

- Your Guide to Survival. [Seen annex](#)
- Leave and live
- Your Bushfire Plan
- Fire Ready Kit
- Pets and bushfires
- Back up plans
- Defending your property

### **Prepare and maintain your property**

Everyone in Victoria who lives near dense forest, bush, grassland or the coast needs to prepare their property for bushfire.

Tips and advice to prepare your property

The illustration below provides an overview of key preparation activities you can undertake before the bushfire season. Click on each of the icons to find out what you can do around different parts of your property to prepare for the fire season.



Figure 22: This photo shows what you can do around different parts of your property to prepare for the fire season. <http://www.cfa.vic.gov.au/plan-prepare/prepare-and-maintain-your-property/>

More information in this subsection:

- Clearing trees and vegetation
- Landscaping
- Home improvements
- Burning off
- Farms

### **Planning controls, in *Building, Planning & Regulations* subsection**

CFA's role in Victoria's planning system is to provide expert advice to Councils and the Minister for Planning.

CFA aims to ensure that new communities can be serviced by emergency services in the event of a fire. CFA also provides bushfire hazard advice to ensure that risks to life, property and infrastructure are considered as part of the planning process.

For general information about Victoria's planning system visit the [Department of Land, Water and Planning](#)

## 5.5 Canada

### **FireSmart**

FireSmart is living with and managing for wildfire on our landscape.

Preparing for the threat of wildfire is a shared responsibility. From home owners, to industry and government we all have responsibility to lessen the effects of wildfire. Wildland Urban Interface is a popular term used to describe an area where structures and forested areas meet.

Simply put, Wildland Urban Interface is where the urban lifestyle meets environments that are prone to wildfire. By choosing to extend our lifestyle and communities further into forested areas, we become more exposed to the danger of wildfire.

FireSmart Canada helps you understand the potential of wildfire affecting your home and your community.

### **Components of the Wildland Urban Interface**

Through partnerships, you can achieve your goals in an effective and timely manner. For example, your neighbour, community association, local industries, local municipal government, municipal fire department, local advisory committees and local wildfire management agency personnel can all be involved.

These partnerships play an important role in understanding how to manage wildfire in the Wildland Urban Interface. Partners in Protection Canada is a not for profit organization that brings these partners under one umbrella with the common goal to reduce the threat of wildfire.

The seven FireSmart disciplines help us to address the threat of wildfire:

- *Education*

People living in forested areas need to be aware of the wildfire threat and ways they take action to make their home and community become "FireSmart."

Partners in Protection Canada have developed educational materials to inspire FireSmart actions:

- Home (structure) hazard assessment

## STRUCTURE AND SITE HAZARD ASSESSMENT FORM

Factor	Page reference	Characteristics and point ratings				Score	
1 Roofing material	2-5	Metal, tile, asphalt, ULC-rated shakes or non-combustible material		Unrated wood shakes			
		0		30			
2 Roof cleanliness	2-5	No combustible material	Scattered combustible material, <1 cm in depth		Clogged gutter, combustible material ≥1 cm in depth		
		0	2		3		
3 Building exterior	2-7	Non-combustible stucco or metal siding	Log, heavy timbers		Wood or vinyl siding or wood shake		
		0	1		5		
4 Eaves, vents and openings	2-8	Closed eaves, vents screened with 3 mm mesh and accessible	Closed eaves, vents not screened with 3 mm mesh		Open eaves, vents not screened, debris accumulation		
		0	1		5		
5 Balcony, deck or porch	2-9	None, or fire-resistant material sheathed in	Combustible material, sheathed in		Combustible material, not sheathed in		
		0	2		5		
6 Window and door glazing	2-10	Tempered	Double Pane		Single Pane		
			Small/medium	Large	Small/medium Large		
		0	1	2	2		4
7 Location of nearby combustibles	2-11	None or >10 metres from structure		<10 metres from structure			
		0		5			
8 Setback from edge of slope	2-12	Adequate		Inadequate			
		0		5			
9 Forest vegetation (overstory)	2-14	Deciduous	Mixed wood		Coniferous		
			Separated	Continuous			
		<10 metres	0	30		30	
10-30 metres	0	10		10	30		
10 Surface vegetation	2-15	Lawn or non-combustible material	Wild grass or shrubs		Dead and down woody material		
			Scattered	Abundant			
		<10 metres	0	30		30	
10-30 metres	0	5		5	30		
11 Ladder fuels	2-17	Absent	Scattered		Abundant		
		0	5		10		
<b>Total Score for Factors 1 – 11</b>							
<b>Structure and Site Hazard Level</b>							

Hazard Level    Low <21 points    Moderate 21-29 points    High 30-35 points    Extreme >35 points



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- Area hazard assessment

# AREA HAZARD ASSESSMENT FORM

Factor	Page reference	Characteristics and point ratings				Score	
12 Forest vegetation (overstorey)	2-18	Deciduous	Mixed wood		Coniferous		
		0	15	Separated	Continuous	15	
13 Surface vegetation	2-18	Lawn or non-combustible material	Wild grass or shrubs		Dead and down woody material		
		0	5	Scattered	Abundant	5	
14 Ladder fuels	2-18	Absent	Scattered		Continuous		
		0	5	10			
15 Slope	2-19	0 - 10%	10 - 25%		>25%		
			0	4	5	8	
16 Position on slope	2-20	Valley bottom or lower slope	Mid-slope		Upper-slope		
		0	3		5		
<b>Total Score for Factors 12 – 16</b>							
<b>Area Hazard Level</b>							

**Hazard Level**      **Low <21 points**      **Moderate 21-29 points**      **High 30-35 points**      **Extreme >35 points**

**Remarks**

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- FireSmart Guide to Landscaping

By making some strategic choices in your yard you can create a FireSmart landscape. The manual includes an extensive list of fire resistant plants and tips from landscaping material. [See Annex 1](#)

- FireSmart – Protecting Your Community From Wildfire

This manual provides individuals with the necessary tools in planning and in mitigating the risk of fire in interface areas. This manual provides you with the tools and recommendations to implement FireSmart in communities across Canada. [See Annex 2](#)

- *Vegetation management*
- *Legislation and planning*
- *Development considerations*
- *Interagency cooperation*
- *Emergency planning*
- *Cross training*

FireSmart – Protection Your Community From Wildfire has detailed information on each of these disciplines.

## 6. Conclusions:

There are a huge variety of tools and resources for communication and raising awareness in forest fires risk. In this report appears interesting findings from Australia, USA and Canada, countries with a huge wildfire history. In these cases the perception of risk is shaped by historical and social events, the reaction to the hazards and disasters might be very appropriate to the event happening. This might reduce the possible harms.

In Europe exist also interesting activities related to community and municipalities communication, as can be the campaigns in France like " *Information and awareness of the professionals and Elects*", it is important to raise awareness of the professionals and elects who will take the decisions. In addition, in Catalan urbanisations exist the Forest Fires Prevention Plans (PPU), and owners who live in WUI areas have to fulfil the Law on prevention of forest fires in the urbanizations and villages (Ley 5/2003), which define the responsibility schemes, the definition of rights and duties of the different actors involved in it.

Social responsibility against wildfires is one of the key factors to enhance the resilience of the citizens to wildfires in interface areas from the Mediterranean region.

Related to the use of prescribed fire as a fuel management tool, it is important taking into account existing experiences of USA and Australia, where this is a participatory activity between public and private actors.

For the future development of the two different communication tools within eFIRECOM project, it is important to focus on the experience that are successfully implemented and useful in other countries.

To create a set of criteria for self-assessment of fire risk for the property and its inhabitants, in order to the homeowner will be able to identify his/her risk and the mitigation measures, it can be feasible adapt, the successful tools and best practices collected in annexes, to the Mediterranean region. For the adaptation it is important Taking into account social, economic, cultural, environmental characteristics and factors of the Mediterranean region, like which materials are used by build houses, the Mediterranean vegetation, evacuation protocols or improve the ability to stand a fire, ...

To create a guide, addressed to local technicians, authorities and municipalities, on basic urban planning for mitigating fire risk, where are including key aspects of fire behaviour patterns when interacting with homes, and related recommendations. This report gather a set of examples, which matches up with these objectives, adapting the existing material to the Mediterranean region.

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## 8. Annexe

