



- 6th Framework Programme for R & D
- Topic: Integrated forest fire management



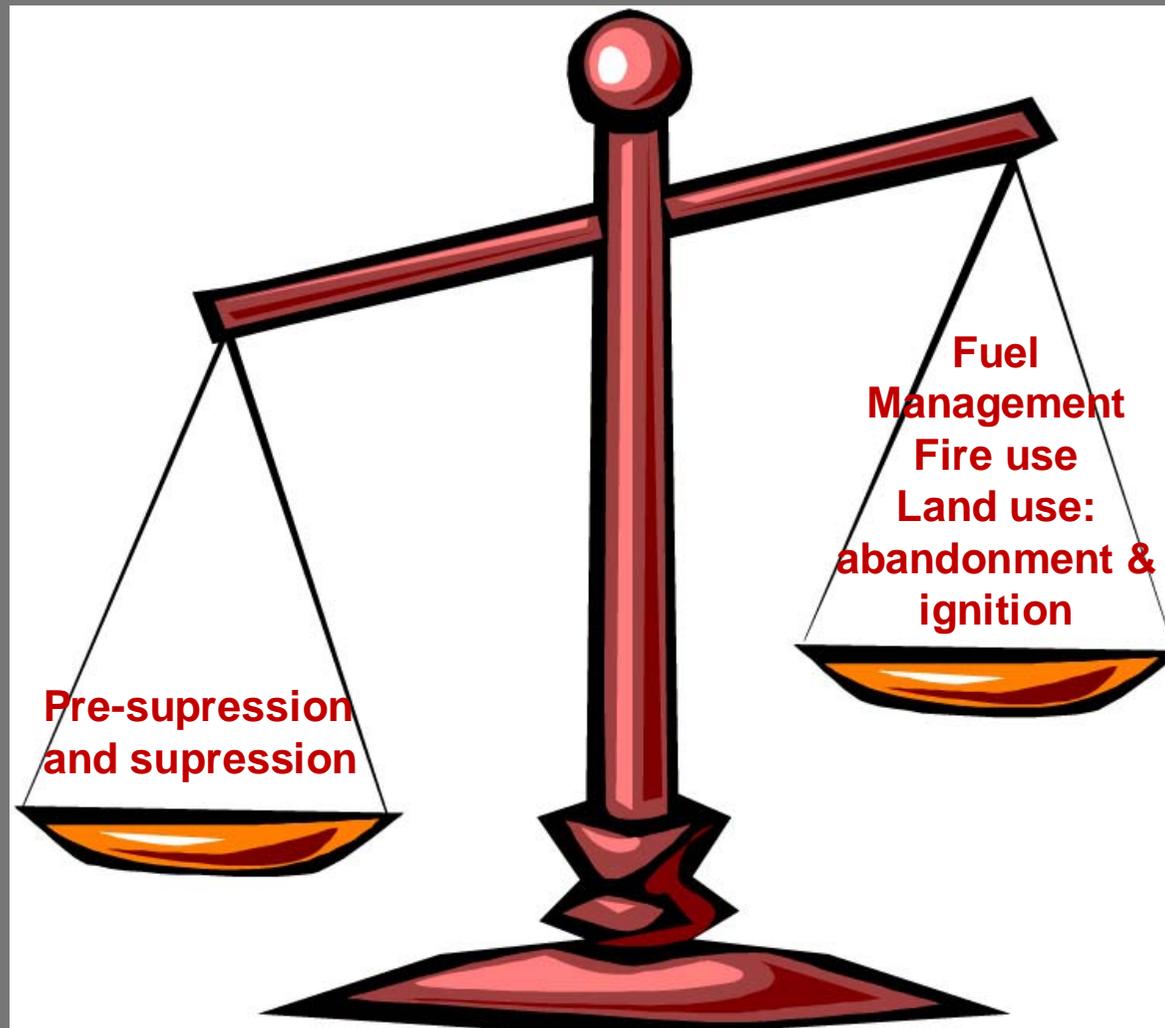
36 partners in 16 countries, including:

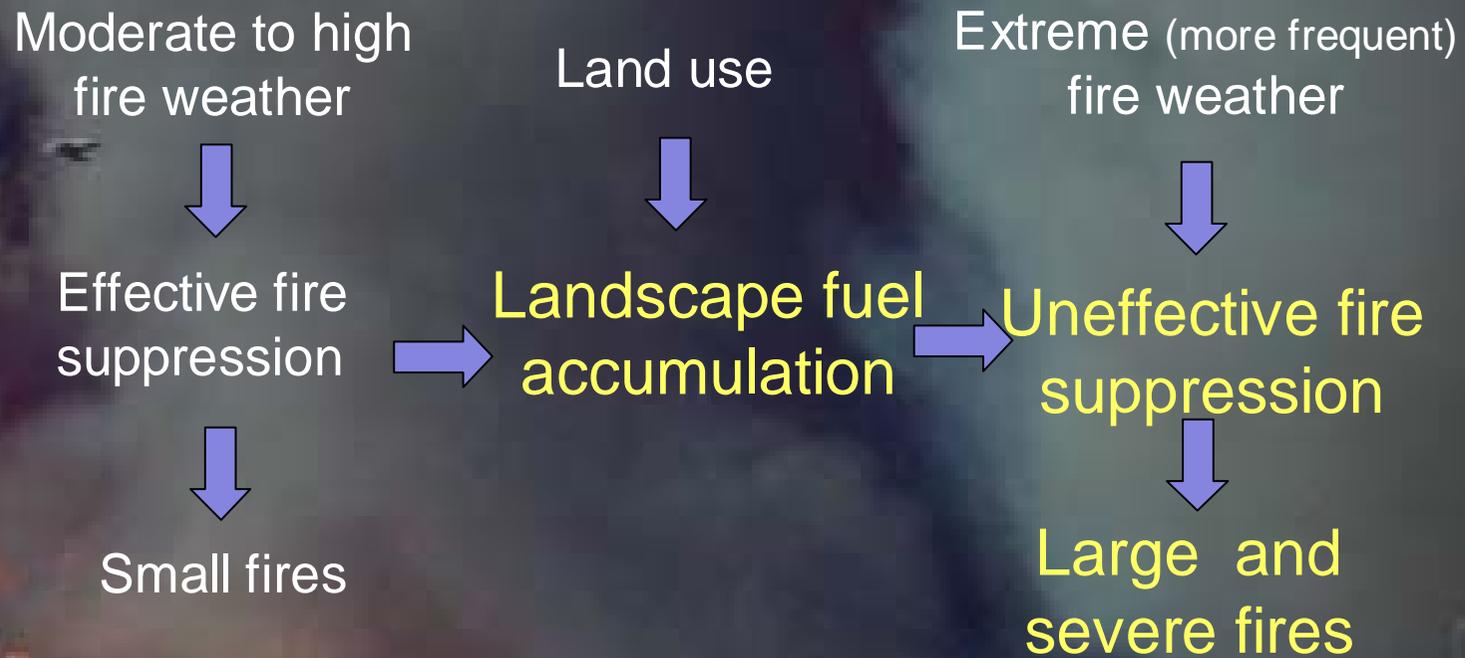
- Universities and forestry schools
- Research institutes
- Fire management agencies
- International organisations and networks
- Associations
- SMEs





The European problem: unbalanced fire management policy





Need for new strategy of fire management

The two faces of fire



Damaging



Beneficial



FIRE



The different views of fire



An emergency



A tool

Unfought Fires

The National Park Service used to fight all forest fires. Now fire is recognized as a natural process. At higher elevations lightning-caused fires are usually allowed to run their course.

Natural Fires

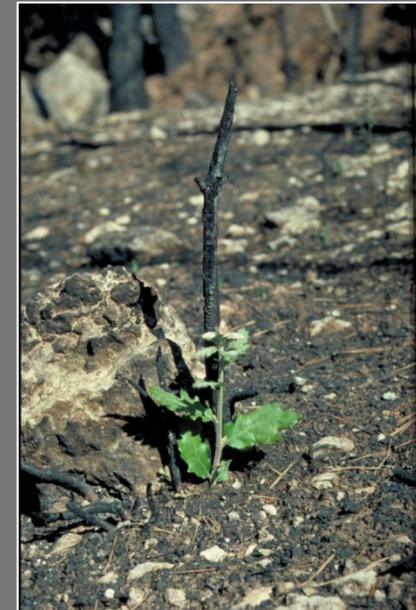
- Open a seedbed for new trees
- Reduce underbrush that could fuel a disastrous blaze
- Improve wildlife habitat
- Recycle nutrients into the soil
- Help control plant diseases

Under certain conditions the Park Service sets low, controlled burns in selected forests and meadows to maintain a healthy ecosystem.

For additional information inquire at any ranger station or Visitor Center.

An illustration of a firefighter in full gear, including a helmet and a bucket, walking towards a fire. The background shows a landscape with mountains and a lightning bolt striking a tree.

A process



Madrid (Spain), 2005



Mafra (Portugal), 2006



Las Palmas (Spain), 2007

Cabildo de Gran Canaria

Prescribed burning as a silvicultural tool at Pico de la Gorra Gran Canaria, Spain (2003-2006)

www.fireparadox.org http://ec.europa.eu/research/fp6

• **During the Rx**

Why a demonstration site?
to allow citizens to understand prescribed burning (PB or Rx) as a forestry tool

Why do we burn?
because we want to focus on green restoration, not just on restoration after wildland fire damage to lower fire hazard, to facilitate tree growth, to enhance grazing, to boost hunting, ...

• **4 months after the Rx**

Before Treatment
(cutting down & prescribed burning)

How to do it?:

- pruning to 2m,
- thinning locally & removing brush
- cutting some 100 dominant and co-dominant trees
- slash remains there to be burnt

After Treatment
(cutting down & prescribed burning)

Forest Stand Structure Goals to Get Resilient Stands

Our mid term **Goal:** 500-600 trees/ha & basal area 20 m²/ha

Our long term **Goal:** 200 trees/ha

Today's structure: 2000 trees/ha & 20yr-old stand

Appropriate timing matters: our actions should focus on the period **before** wildland fire occurs

Prescribed demonstration site open to public
Forest Fire employees igniting a prescribed burn

• **3 months after the Rx**

Main Species

Pinus canariensis

Teucrium micropetala (relama amarilla). Adults killed by fire. Fire seeder in sunny forest gaps.

Adenocarpus foliolosus (codoso). Tall shrub, deals fine with fire.

Chamaecytisus proflerens (escobón). Tall shrub that might die if seriously scorched.

Enhanced Sideritis dasycnaphala habitat after Rx - (endemic species).

• **10 months after the Rx**

Sampling for insects

Ranunculus cortusifolius (yellow flowers),
Argyranthemum adaequatum (white flowers), &
Erysimum spp (light purple flowers).

7 months after the Rx

References

- Molina-Terrén, D.M., Martínez-López, E.R., García-Marco, D. 2006. Farste simulations for cost-efficient wildland fire planning: case studies in Spain. V International Conference on Forest Fire Research, D. X. Viçegas (Ed.).
- Molina-Terrén, D.M., Grillo-Delgado, F., García-Marco, D. 2006. Uso del fuego prescrito para la creación de rodales costafuegos: estudio del caso de Las Mesas de Ana López, Vega de San Mateo, Gran Canaria, España. Revista de Investigaciones Agrarias, I.N.A.
- Shindler, B.A., Brunson, M., Stanley, G.H. 2002. Social acceptability of forest conditions and management practices: a problem analysis. Gen. Tech. Rep. PNW-GTR-537. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 68 p.

10 months after the Rx

1 month after the Rx

References

- **Fire Paradox (FP)** [www.fireparadox.org]
- FP is an Innovative Approach to Integrated Wildland Fire Management. Contract no: FP6-018505. March 2006 to March 2010. EU contribution: 12 M € (http://ec.europa.eu/research/fp6)
- Fire is a bad master but an excellent servant – Finnish proverb.
- Sharing experiences from Canary Islands (Spain) to Finland.

Dr. Domingo Molina, Unit of Forest Fires, University of Lleida, Spain
www.etsae2.udl.es/~UFF/ uk.ats

A new burn could be necessary to maintain the desired forest structure

Cagliari (Italy), 2007



Chania (Greece), 2008







FIFTH PLENARY MEETING



Puerto Madryn (Argentina), 2009





SIXTH (FINAL) PLENARY MEETING



Freiburg (Germany), 2010





What is the legacy of FIRE PARADOX ?

Handbook to Plan and Use Prescribed Burning in Europe





Hazard reduction (Portugal)



Hazard reduction (Canary Isl., Spain)

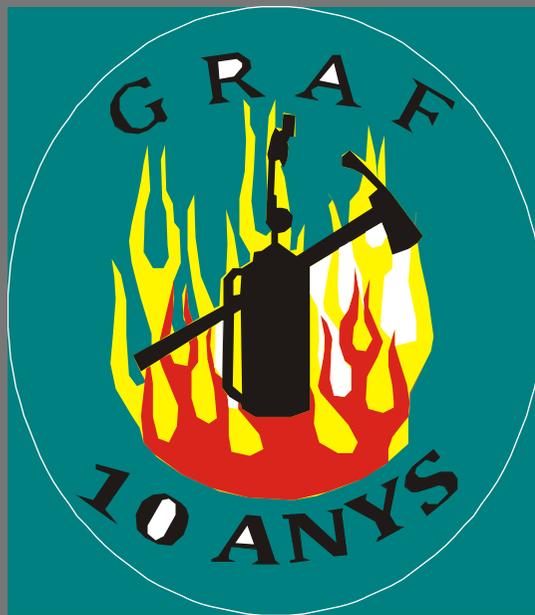


Habitat management (UK)



Hazard reduction & habitat mgt. (France)

Suppression fire database Case studies



1st page # Site: Aude. France#

3rd page # Site: Lousa. Portugal#

Basic actions



Orthophoto map



Image taken by the look out.

HIGHLIGHTS



State of the smoke column at the beginning of the exercise



Beginning of the storm (01.27p.m.). The fire behavior was changing.



You can observe the effect of a storm on a fire exercise.



The imminent storm suctionates the convection smoke of the exercise and address the fire towards her.



Aerial view of the burn out. The smoke column tends to become vertical and is moving towards the centre.



Moment when the left flank was opening and the burn out maneuver was initiated from the head to the rear in order to get speed.









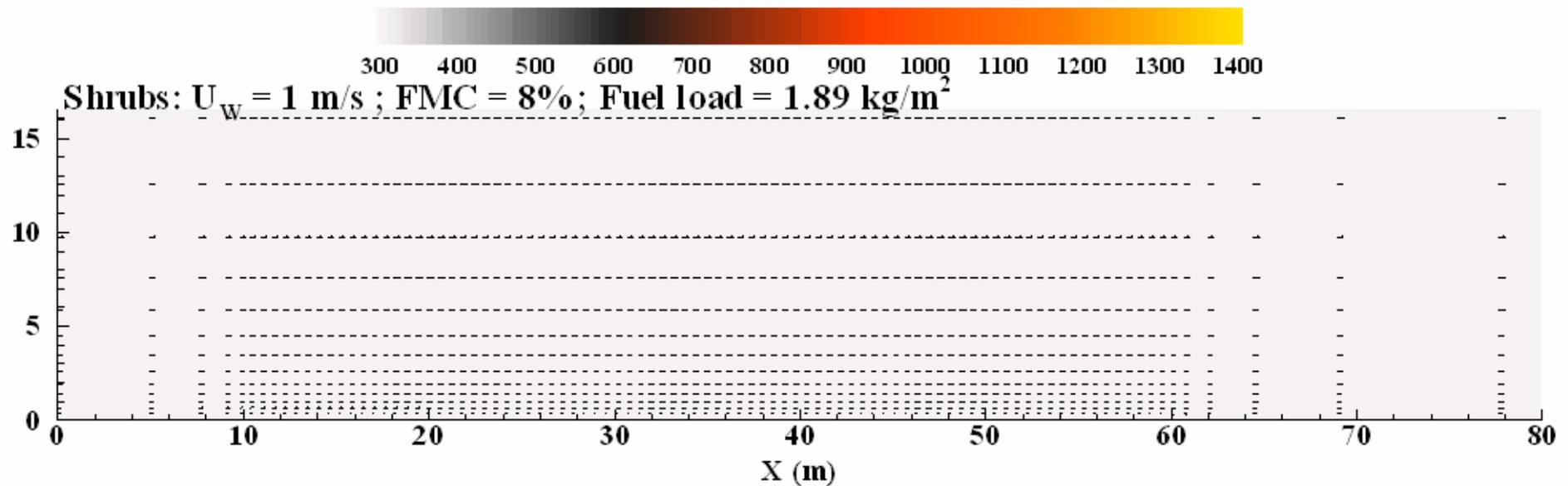




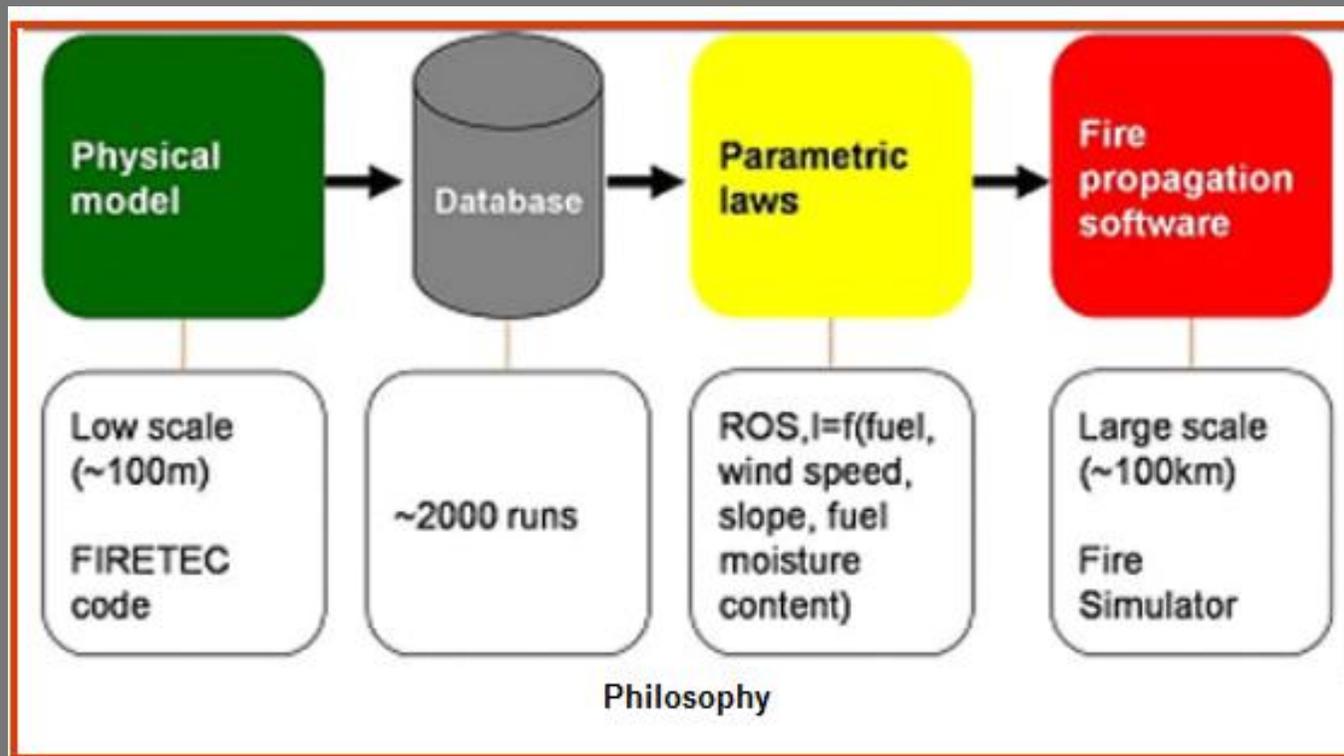








Firestar 2D



The screenshot displays the FIRE PARADOX simulation software interface. The main window shows a 3D topographic map of a mountainous region with three fire simulation areas highlighted in red. The interface includes a menu bar (File, Simulation, View, Settings), a toolbar with various simulation controls, and several panels for simulation data and layer management.

Info Panel:

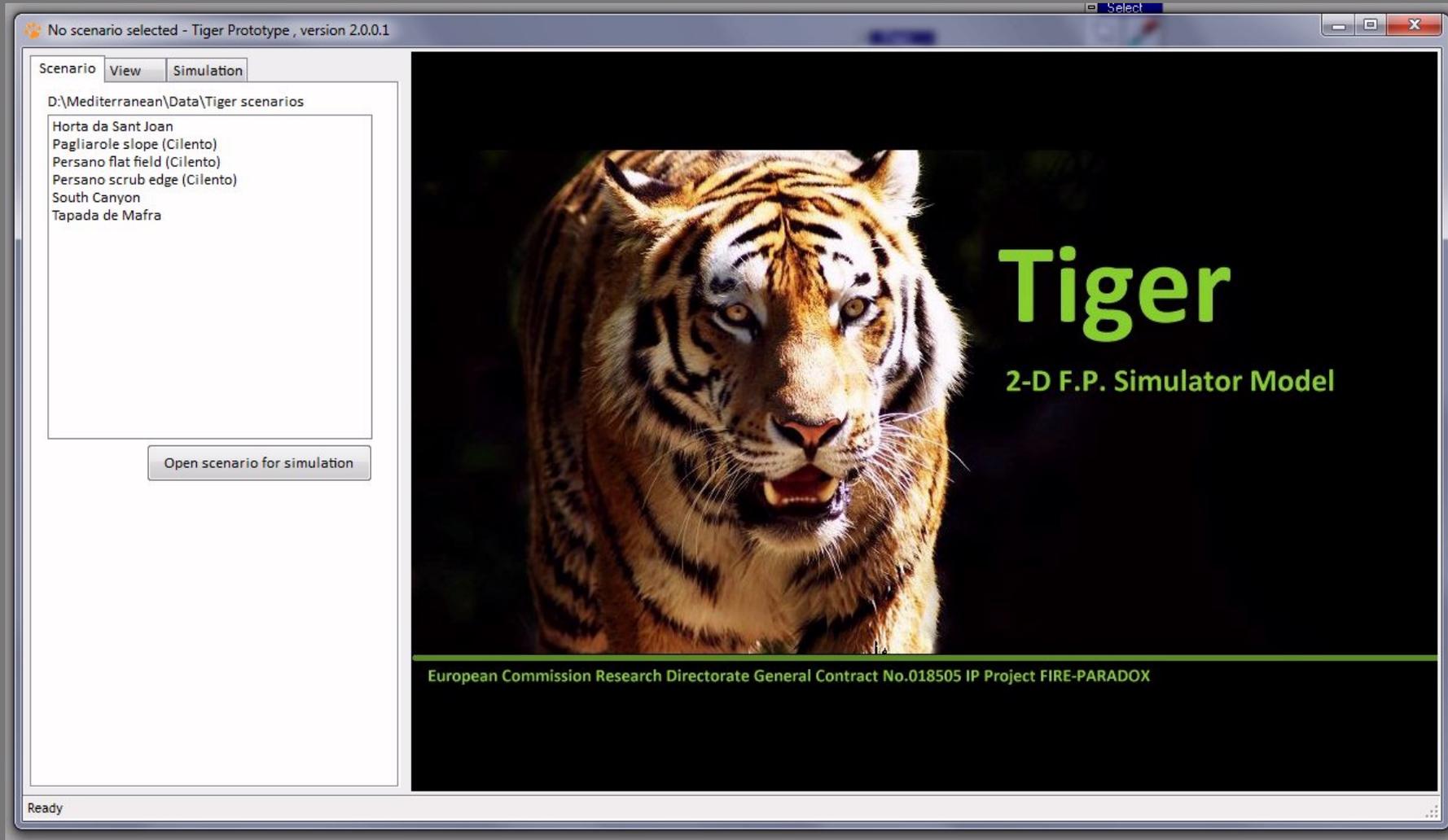
- Misc: X, Y
- Fire:
 - Burnt area: 15.8 km²
 - Fire contour length: 59.3 km
 - Maximum velocity: 0.84 m.s⁻¹
- System:
 - History size: 714.1 MB
- Messages: (empty)

Layers Panel:

- Typo_PPR_sans_arbres....
- C22_11.TIF
- dep_13_decoup
- direction-3m-360.ggd
- vitesse-3m-360.ggd

Layer properties Panel:

00:00 1:44:02 5:00:00

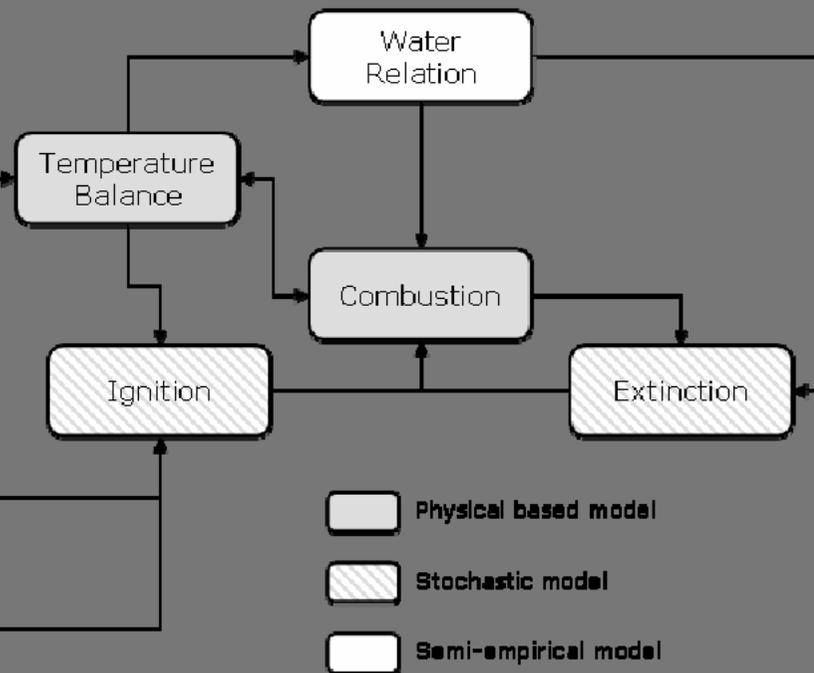


The model structure

2D models (spatial)



1D models (pixel)



- Physical based model
- Stochastic model
- Semi-empirical model

South Canyon - Tiger Prototype, version 2.0.0.1

Scenario View Simulation

Run controls

Start time: 2010-02-10 12:05:54

Simulation time:

Duration:

Run Pause Restart

Ignitions

Clear Spotting

Weather

Wind speed [m/s] 5,25

Wind direction [°] 230

This is an observed wind

X; Y; z:

Air temperature [°C]

Cloud cover [%]

188 m

29 T: 576789.04 m E: 4525674.18 m N

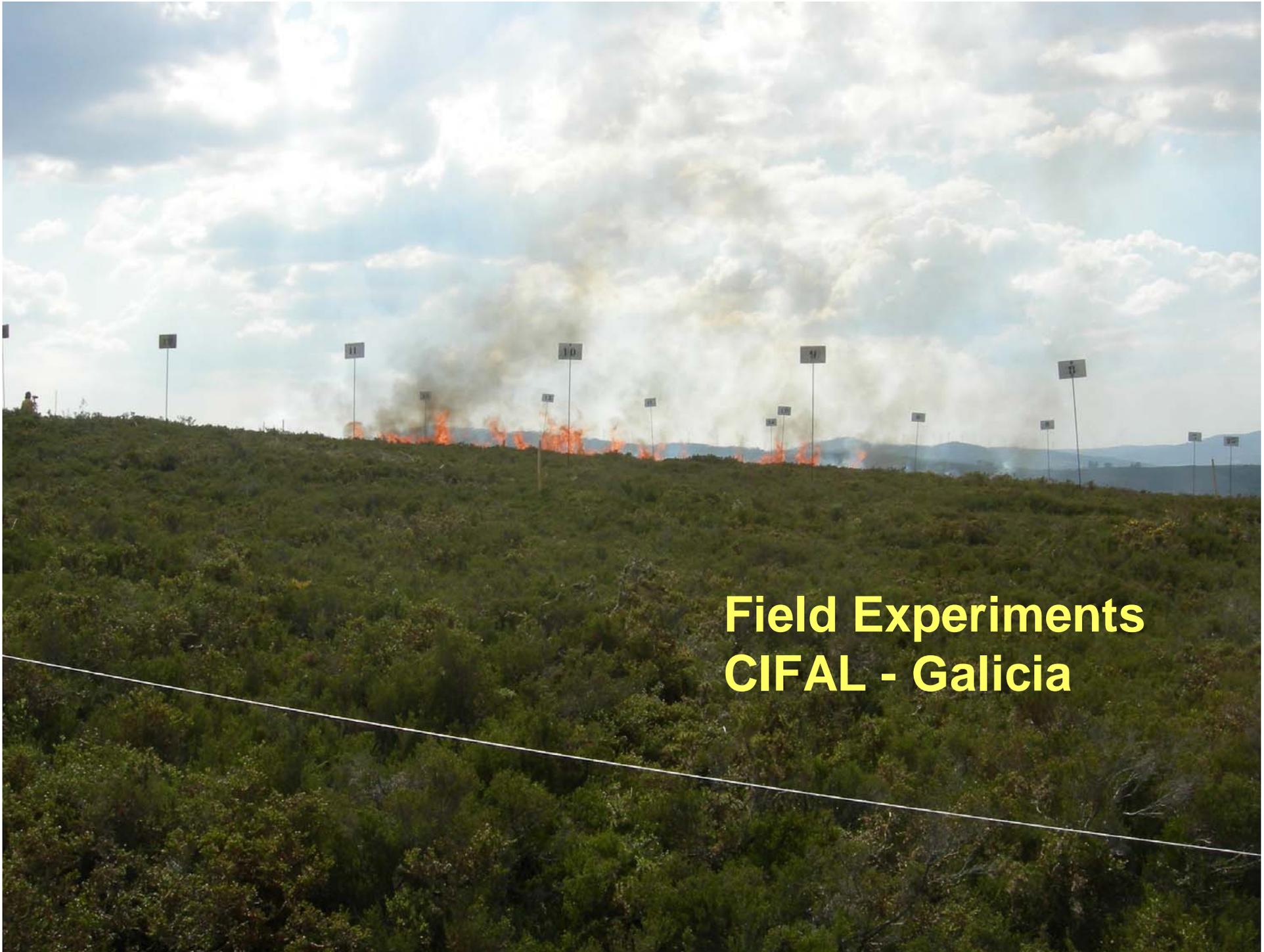
Image © 2009 DigitalGlobe
© 2008 Tele Atlas
Image © 2008 IGP/IGRF
© 2008 Europa Technologies

0.23 [m/s] 43.86

Google

Eye alt: 1.52 km

Scenario opened...



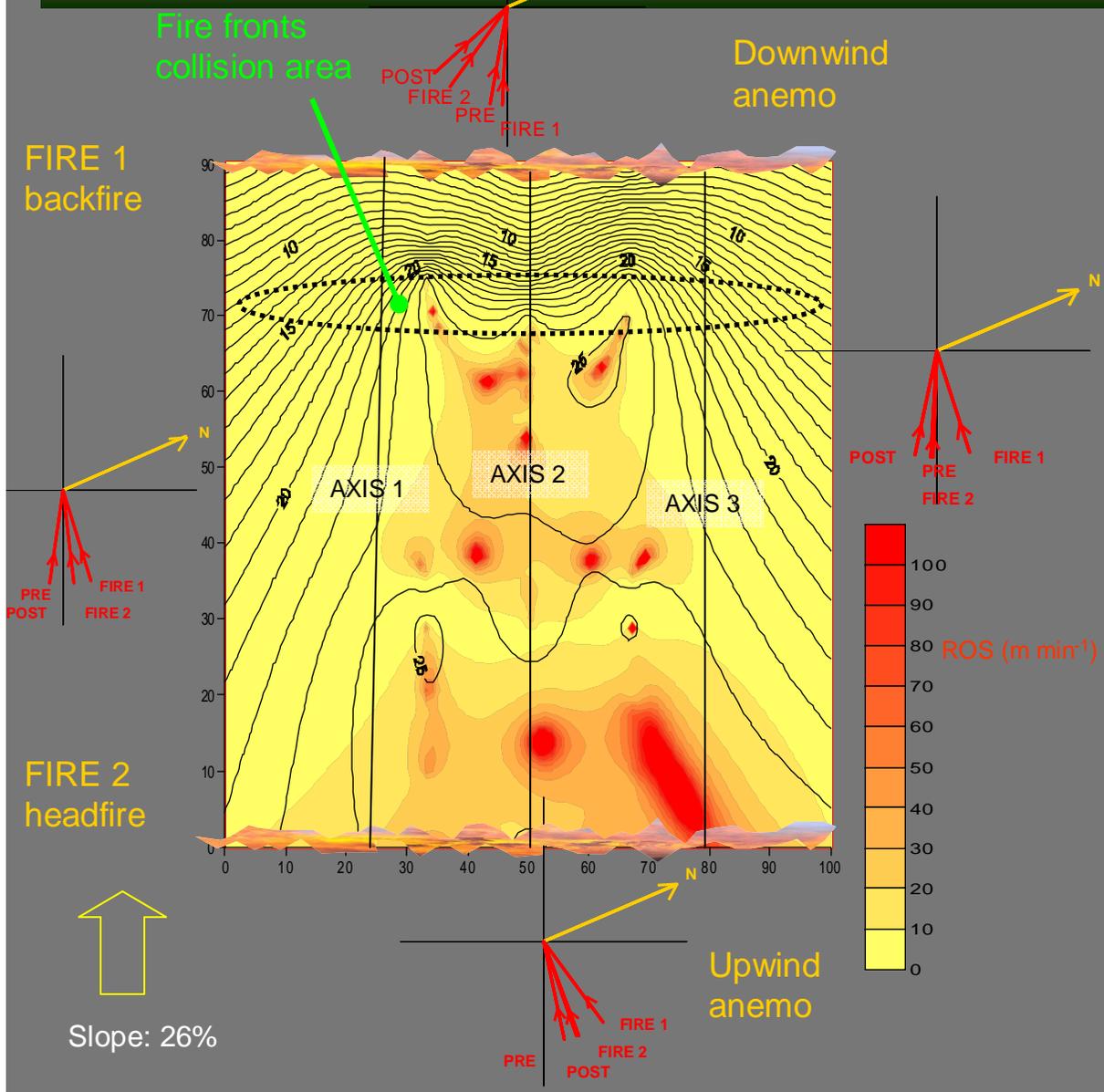
**Field Experiments
CIFAL - Galicia**



**Field Experiments
CIFAL - Galicia**



**Field Experiments
CIFAL - Galicia**



Slope: 26%

Anemometer position		Mean wind speed (m s ⁻¹)*	Gust factor
Upwind	PRE	2.00 a	1.73
	FIRE 1	1.60 a	2.21
	FIRE 2	2.40 b	1.46
	POST	1.73 a	1.60
Right	PRE	3.69 a	1.47
	FIRE 1	3.72 a	1.69
	FIRE 2	3.99 a	1.44
	POST	3.50 a	1.46
Left	PRE	2.66 a	1.57
	FIRE 1	2.21 a	1.91
	FIRE 2	2.01 a	2.12
	POST	2.40 a	1.50

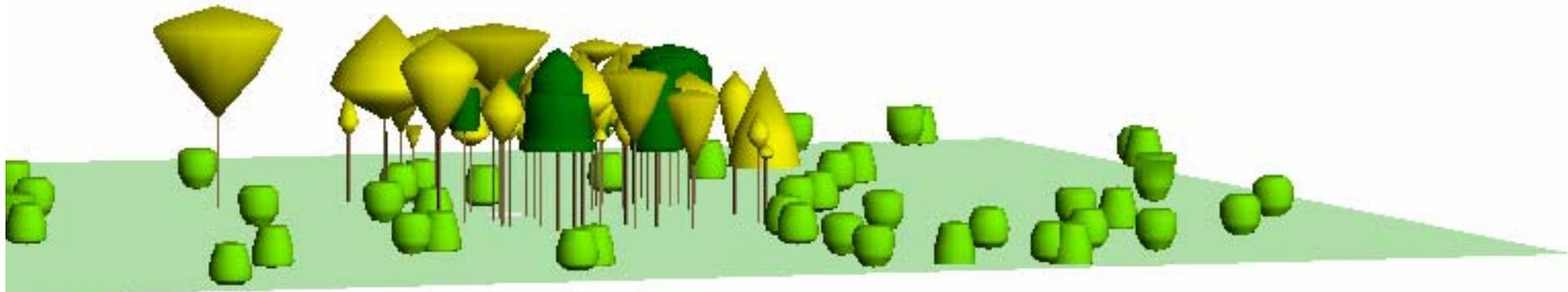
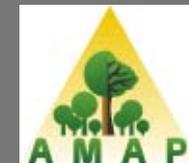
*Mean values for 30 s period

A fuel manager for wildland fire modelling

Philippe DREYFUS ; Isabelle LECOMTE; François PIMONT ;
Éric RIGOLOT; Oana VIGY
UR Mediterranean Forest Ecology, Avignon, France



François de COLIGNY; Sébastien GRIFFON
UMR AMAP, Montpellier, France



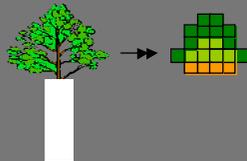
Field measurements

Destructive sampling

1) Particles

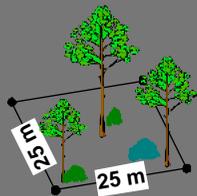


2) Crown



Architectural
Allometric models

Stand description



Composition
Cover
Structure

Fuel modeling

Data base

**EuroForestFuels
(WSL, UE)**



Vegetation scene

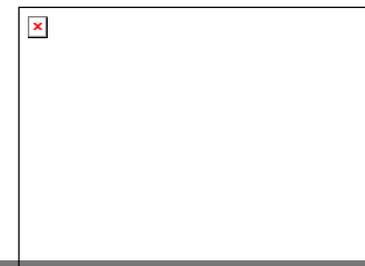
Fire Paradox Fuel Manager



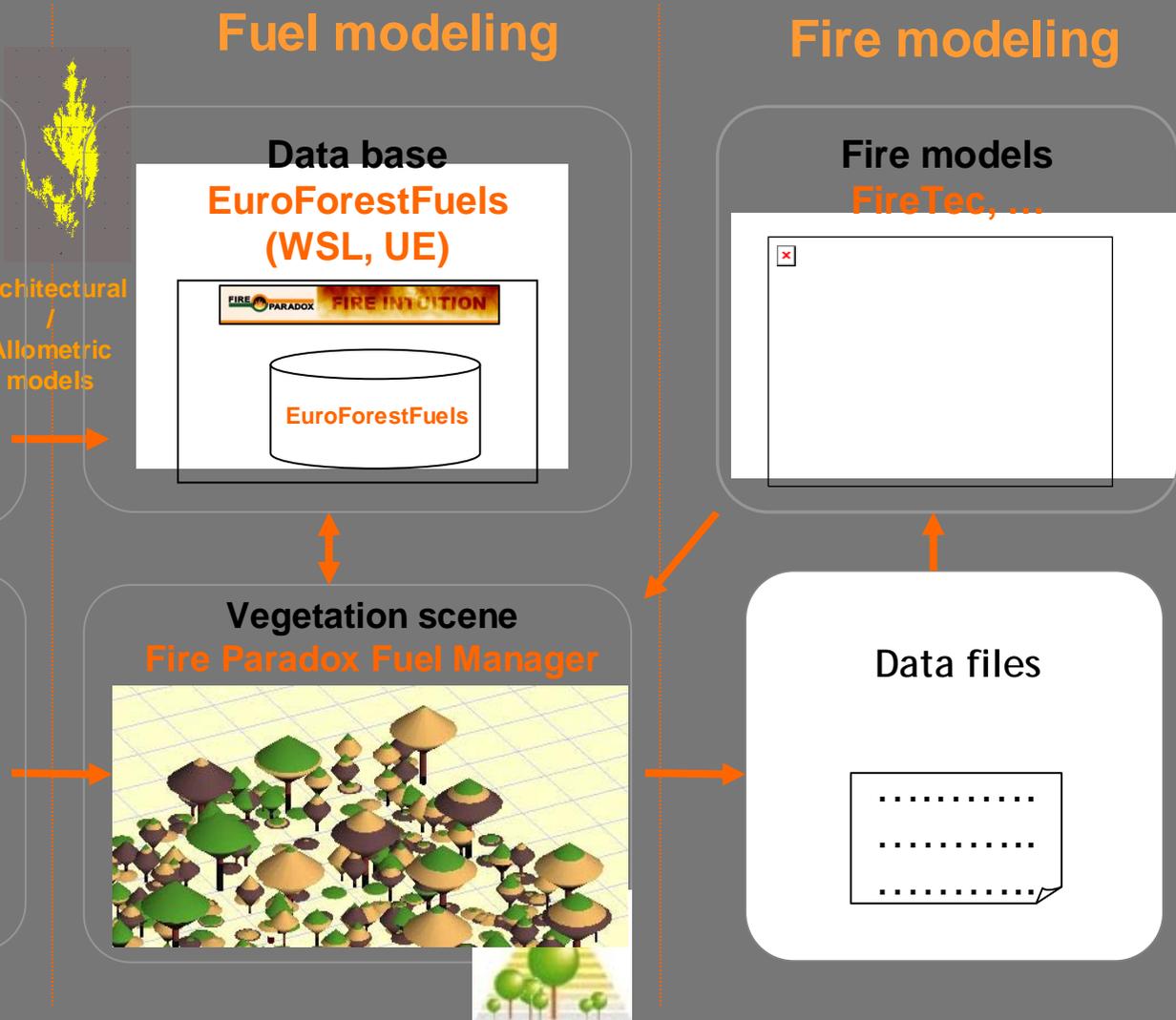
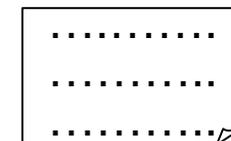
Fire modeling

Fire models

FireTec, ...



Data files





Menu → → Press

Forestier owner's space

ion of Members

Inform
slogar
Memb



Suppression fire : Basic principle - FireParadox Project (Europea...)
★★★★★

paradox VIVER E TRABALHAR COM O FOGO
O PARADOXO DO FOGO

EDIÇÃO 02 | NOVEMBRO 2009 JORNAL INTERNACIONAL PARA PROFISIONAIS DO USO DO FOGO

AUSTRÁLIA DEPOIS DA CATÁSTROFE ANALISAR E PENSAR O FUTURO

UMA FERRAMENTA NACIONAL NO INCREMENTO DO FOGO CONTROLADO NA DEFESA DA FLORESTA CONTRA INCÊNDIOS EM PORTUGAL

DFCI POR TODO O PAÍS

A grande família do fogo controlado da Europa e do Mediterrâneo

paradox pt O PARADOXO DO FOGO portugal

EDIÇÃO 01 | MARÇO 09 SUPLENTO DO JORNAL INTERNACIONAL PARA PROFISIONAIS DO USO DO FOGO RESPONSÁVEL DA PORTUGAL

GEFoco: UMA FERRAMENTA NACIONAL NO INCREMENTO DO FOGO CONTROLADO NA DEFESA DA FLORESTA CONTRA INCÊNDIOS EM PORTUGAL

DFCI POR TODO O PAÍS

A grande família do fogo controlado da Europa e do Mediterrâneo



EFI Discussion Paper 15, 2009

Living with Wildfires: What Science Can Tell Us

A Contribution to the Science-Policy Dialogue

Yves Birot (ed.)



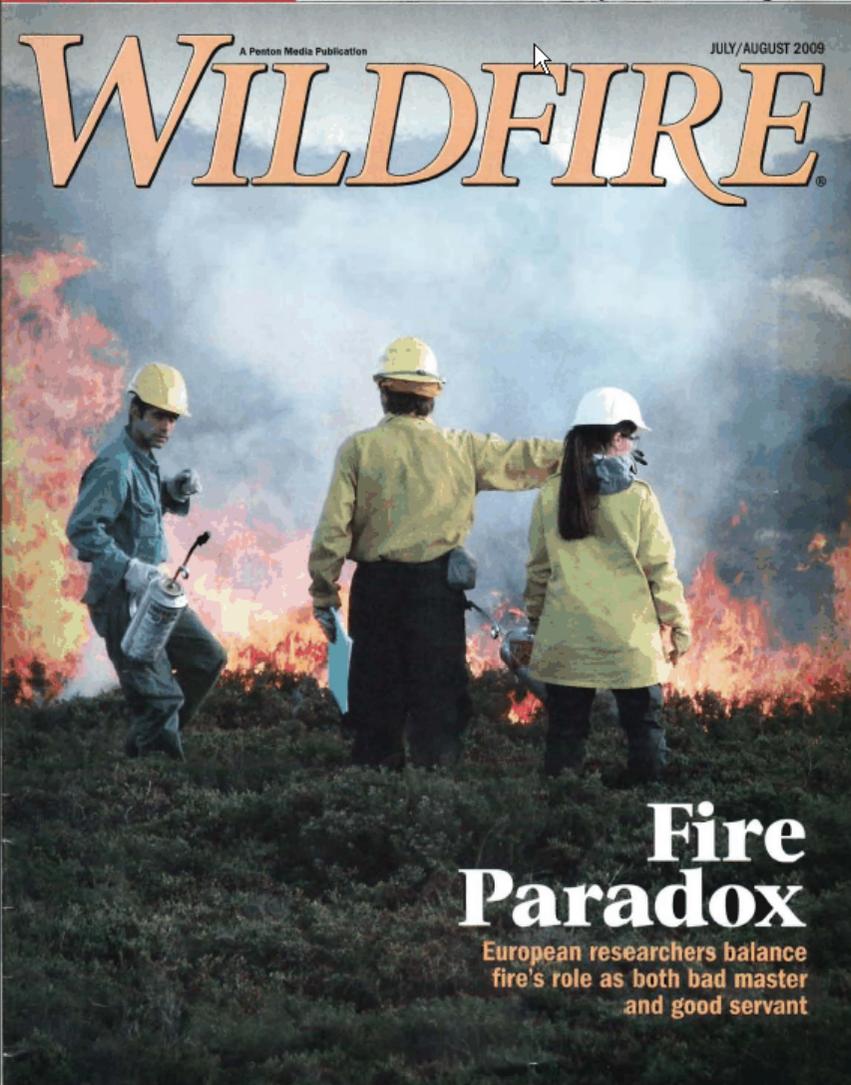
The Official Publication of the
International Association of Wildland Fire

CHANGES IN CHINA: Community-based fire management

A Penton Media Publication

JULY/AUGUST 2009

WILDFIRE

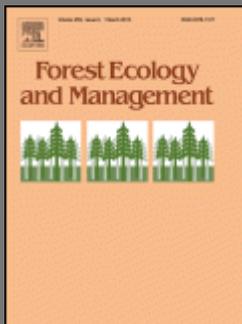
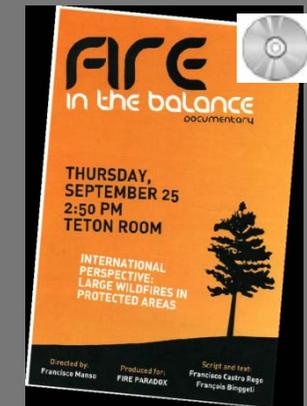
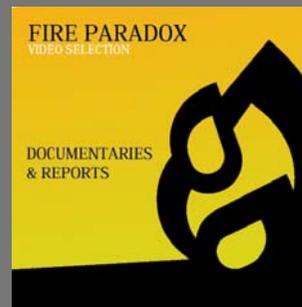


**Fire
Paradox**
European researchers balance
fire's role as both bad master
and good servant

KAIBAB TESTS FLEXIBILITY | WILDFIRE EMS

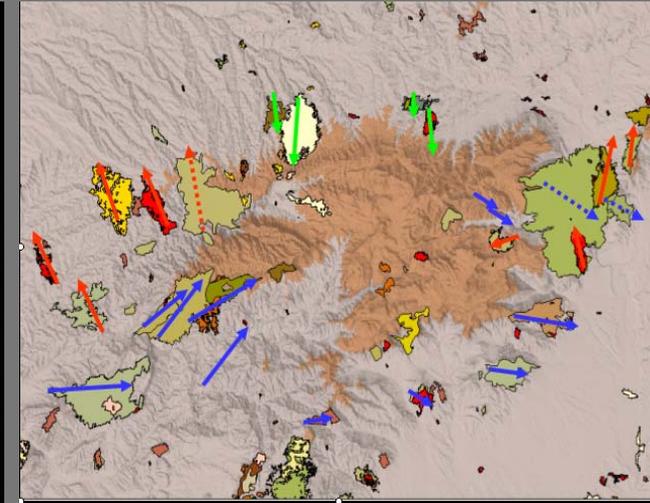
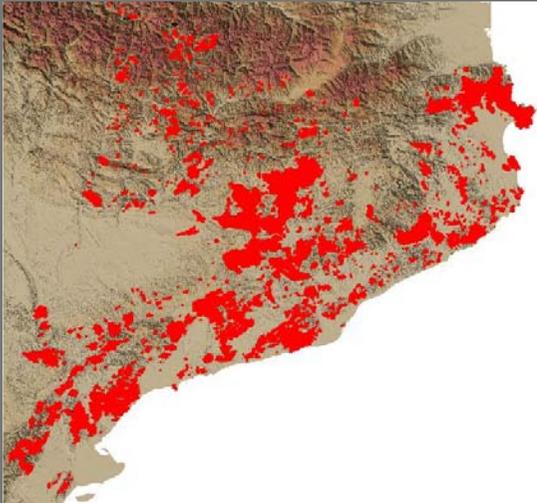


- Film production
 - Fire Paradox documentaries
 - Video-package



- Special issues of peer reviewed journals
 - Forest Ecology and Management
 - Forest Policy and Economics

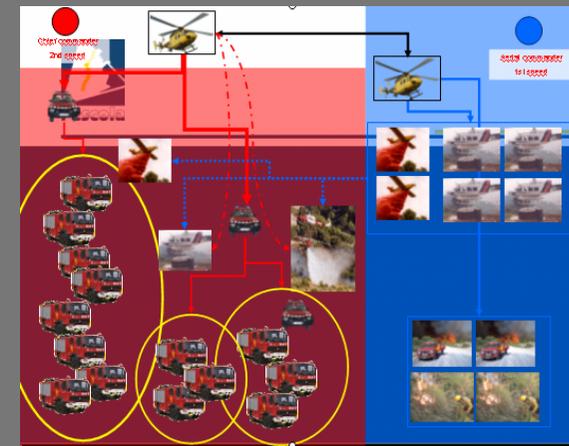
✓ Guidelines on fire management in forestry planning



- ✓ **Guidelines on incorporating fire management in self protection**



- ✓ Guidelines on structural setup for addressing large fires
- ✓ and applying fire management practices





Fire Intuition - Mediabase - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://fireintuition.efi.int/products/mediabase.fire

conservation technology

Definitions and terms ... Most Visited EFP Euroforest Portal Bestände forstlicher g... AltaVista - Babel Fish ... Google Translate Turkish to English Tra... InterTran - translation... Statistics for forestpo...

Environmen... GAF Home | ww... BBC - Home... CIRCA - Co... GAF Downloads | ... Fire Intutio... ToSIA Fire Parado... Main Page - ... Fire In... Fire Intutio... Gallery



FIRE INTUITION

Home
Metadata Browser
Integrated products
Fuel Knowledge Platform
Fuel Manager
Demo sites
Mediabase
Legislation and Policies
Practices
Fire Hazard Mapper
PB Mapper
Large-Scale Fire Simulator
Dendro
Contact us

Mediabase

Summer Bases - Lousã 2007

- Photo Gallery

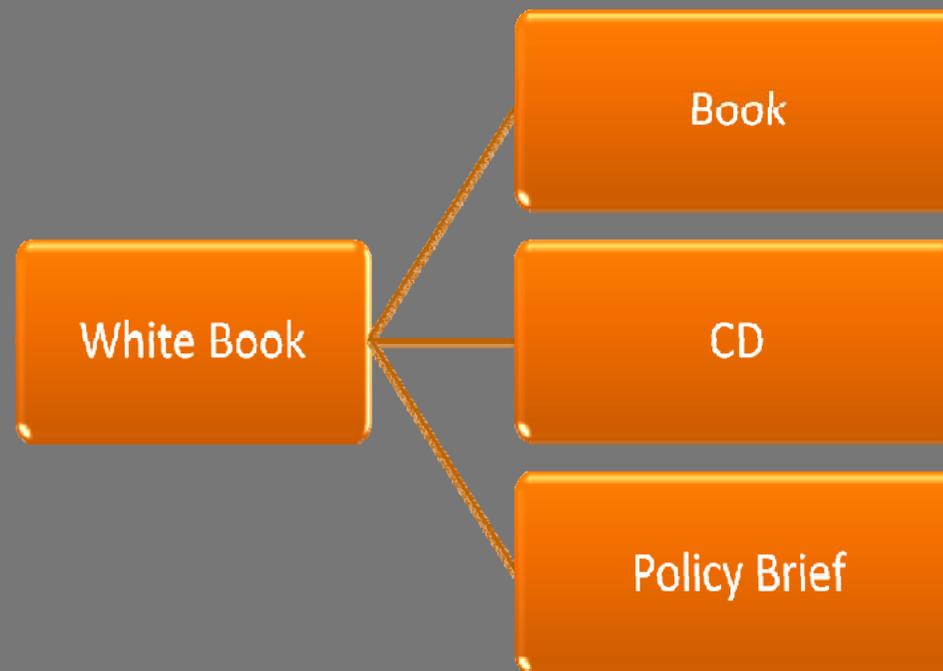


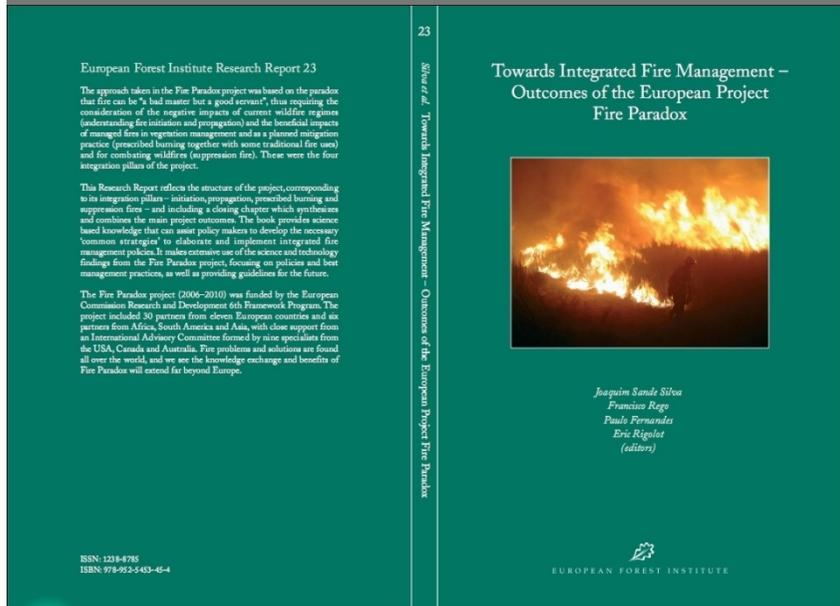
- Videos



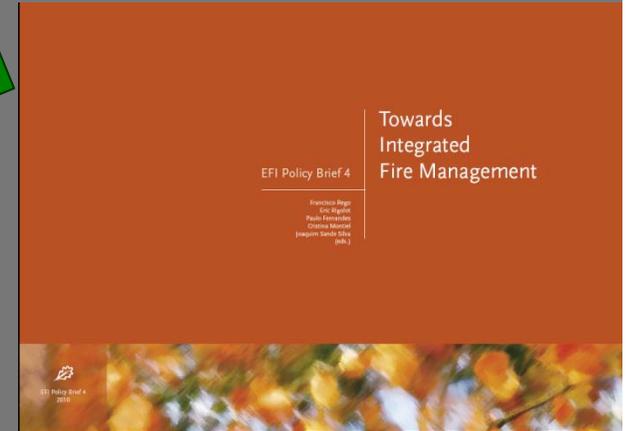
http://fireintuition.efi.int/metadata-browser.fire

Meta Product P12.3 – 1b





The EFI Research Report



The EFI Policy Brief



CD

European Forest Institute Research Report 23

The approach taken in the Fire Paradox project was based on the paradox that fire can be “a bad master but a good servant”, thus requiring the consideration of the negative impacts of current wildfire regimes (understanding fire initiation and propagation) and the beneficial impacts of managed fires in vegetation management and as a planned mitigation practice (prescribed burning together with some traditional fire uses) and for combating wildfires (suppression fire). These were the four integration pillars of the project.

This Research Report reflects the structure of the project, corresponding to its integration pillars – initiation, propagation, prescribed burning and suppression fires – and including a closing chapter which synthesizes and combines the main project outcomes. The book provides science based knowledge that can assist policy makers to develop the necessary ‘common strategies’ to elaborate and implement integrated fire management policies. It makes extensive use of the science and technology findings from the Fire Paradox project, focusing on policies and best management practices, as well as providing guidelines for the future.

The Fire Paradox project (2006–2010) was funded by the European Commission Research and Development 6th Framework Program. The project included 30 partners from eleven European countries and six partners from Africa, South America and Asia, with close support from an International Advisory Committee formed by nine specialists from the USA, Canada and Australia. Fire problems and solutions are found all over the world, and we see the knowledge exchange and benefits of Fire Paradox will extend far beyond Europe.

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Towards Integrated Fire Management – Outcomes of the European Project Fire Paradox



*Joaquim Sande Silva
Francisco Rego
Paulo Fernandes
Eric Rigolot
(editors)*



EUROPEAN FOREST INSTITUTE

- Deliverables, Internal Reports and products

- Easy consultation of documents on the web browser

- Search and sorting capabilities





EFI Policy Brief 4

Towards Integrated Fire Management

Francisco Rego
Eric Rigolot
Paulo Fernandes
Cristina Montiel
Joaquim Sande Silva
(eds.)



EFI Policy Brief 4
2010



✓ Europe's tradition of fire use



- ✓ Understanding and regulating traditional fire use



✓ Reinforcing the use of prescribed burning



Prescribed fire in a *Calluna* heathland in Germany. The use of prescribed fire for the conservation and restoration of the biodiversity heritage of former cultivated lands, or for the maintenance of open landscape elements with aesthetic or otherwise historic value are included in the activities conducted in the frame of the Eurasian Network for Fire in Nature Conservation and the Global Fire Monitoring Center (<http://www.fire.uni-freiburg.de>).

- ✓ Promoting suppression fire as an additional tool in fire fighting



Pedro Palheiro GAUF/DGRF Portugal





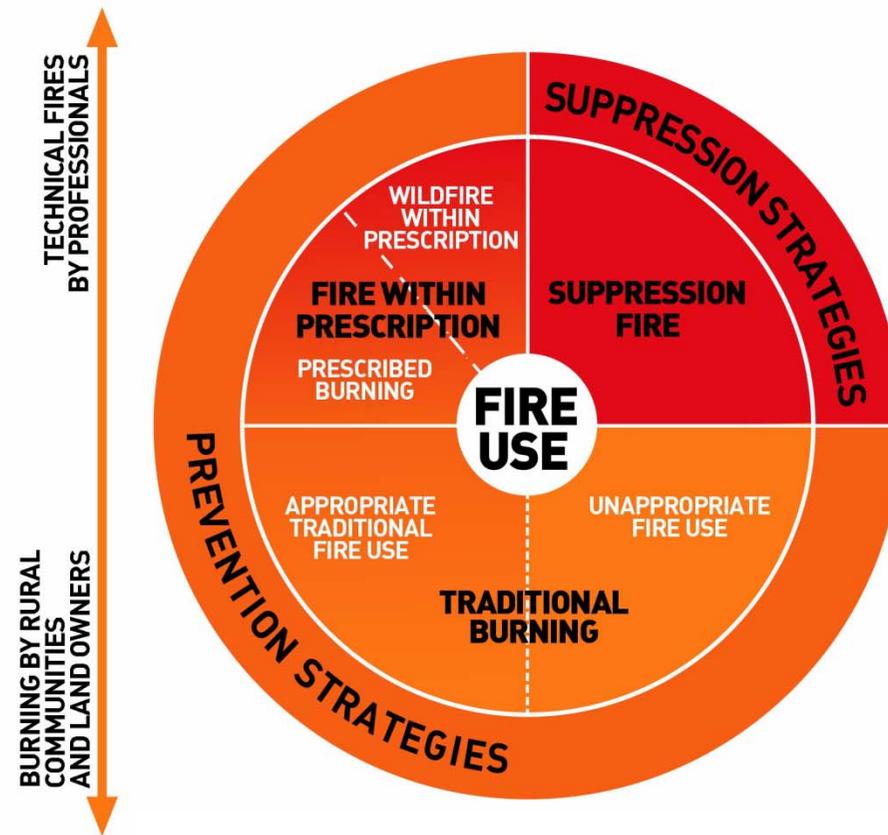




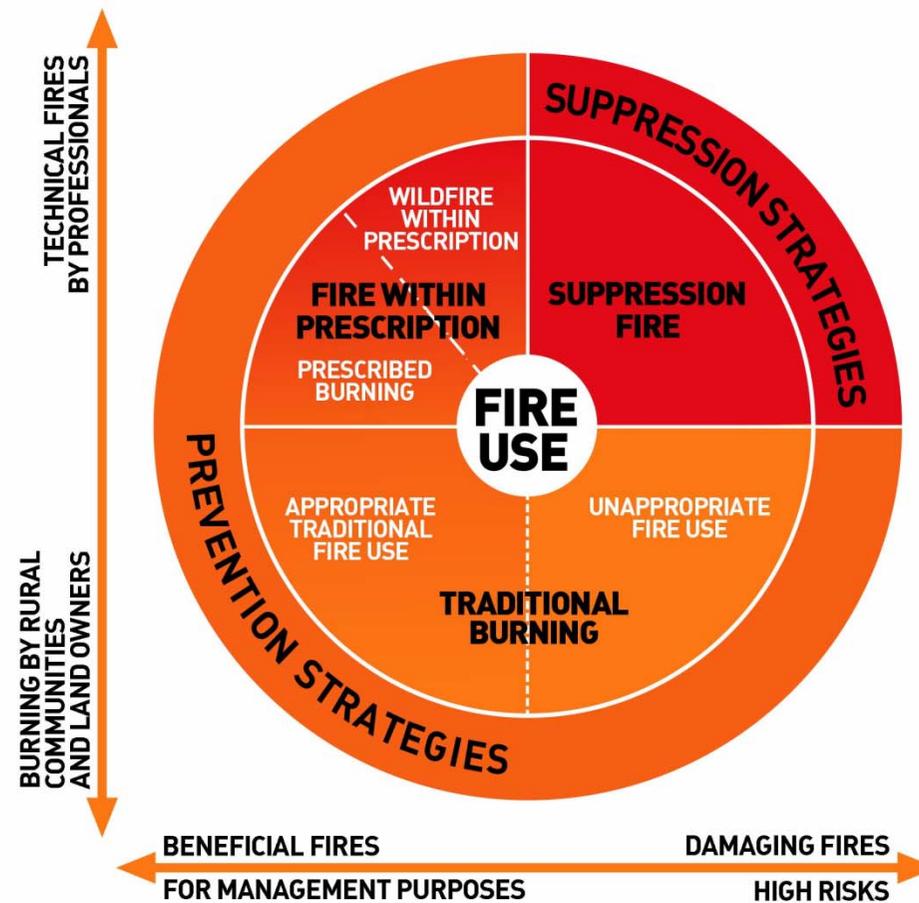
INTEGRATED FIRE MANAGEMENT



INTEGRATED FIRE MANAGEMENT



INTEGRATED FIRE MANAGEMENT





Fire policies in Europe

- Awareness of policy-makers towards fires has derived from catastrophic incidents
- Fire policies have generally been based on fire exclusion
- Legislation on fire use restrictive or inexistent

Legal_aspects_v48



Need for new policy approaches

Fire exclusion vs. Regulation of fire use practices



SALAMANCA



Junta de Castilla y León
 Delegación Territorial
 Servicio Territorial del Medio Ambiente

SOLICITUD DE PERMISO DE QUEMA DE MATORRAL O PASTOS

D. D.N.I. Residente en

T.º M. Calle C. Postal

NOTIFICA: Que es su deseo utilizar el fuego como operación cultural necesaria para el mejor aprovechamiento de la finca de su propiedad que se describe a continuación:

NOMBRE: **SITUACIÓN** (T.º Municipal, parcela, parcela y parcelas)

Objeto de la quema

Matorral Altura Superficie a quemar

Dedicada al cultivo de

Distancias	Características de los linderos respecto a la quema
A mts. de masa arbolada.	N
A mts. de carretera	S
A mts. de vivienda	E
	O

Y SE COMPROMETE: A realizar la quema, en caso de ser autorizada, de acuerdo con las condiciones que se establezcan.

Fecha y firma

Condiciones de la Autorización

- 1.º La quema se realizará:
- 2.º Tendrá que notificar al menos con 24 horas de antelación al Agente Forestal de la zona y a la Guardia Civil, señalando fecha exacta y hora de comienzo.
- 3.º Debe realizarse antes de iniciar la quema de cortafuegos de mts. de ancho.
- 4.º Dadas las características de la quema deberán permanecer presentes un mínimo de personas y tractores, con la siguiente herramienta:
- 5.º

Fecha y firma





Fire exclusion vs. Professional and technical use of fire



Wildfire caused by livestock farmers (Avila, Spain)



PRESCRIBED BURNING



SUPPRESSION FIRE



Need for new policy approaches

Fast and ad hoc reaction to a catastrophic situation



Proactive mitigation measures

Suppression-oriented policies



Preventive and integrative policies

Short-term policies



Long-term policies

Fire exclusion from the ecosystems



Integrated fire management

Selection of the Directive legal form:

Directives are frequent in environmental matters.

Regulations require uniform regulation and direct application, while Directives provide flexibility and margin of action.

The aim of a Framework Directive is to attain a basic approach or minimum legal harmonisation of Member States legislation.



Legal basis:

European Commission initiative

Co-decision Parliament and Council

Legally binding instrument

The Fire Framework Directive will be the basis for the policy shift in Member States, in order to achieve an integrated fire management system, adapted to the European context



Fire Framework Directive

FIRE PARADOX PROPOSAL FOR A FRAMEWORK DIRECTIVE ON WILDLAND FIRE MANAGEMENT:

CHAPTER I. General stipulations

CHAPTER II. Integrated wildland fire management

CHAPTER III: Regulation of fire use

CHAPTER IV. Social awareness, transfer of knowledge and professional training

CHAPTER V. Final stipulations

1. A clear concept of **INTEGRATED FIRE MANAGEMENT** where fire use has a central role
2. An European **FRAMEWORK DIRECTIVE on FIRE** based on the concept of Integrated Fire Management
3. A development of academic and professional **TRAINING AND EXCHANGE PROGRAMS** that use all the concepts and materials produced by the project

**Thank you
for your attention !**

