



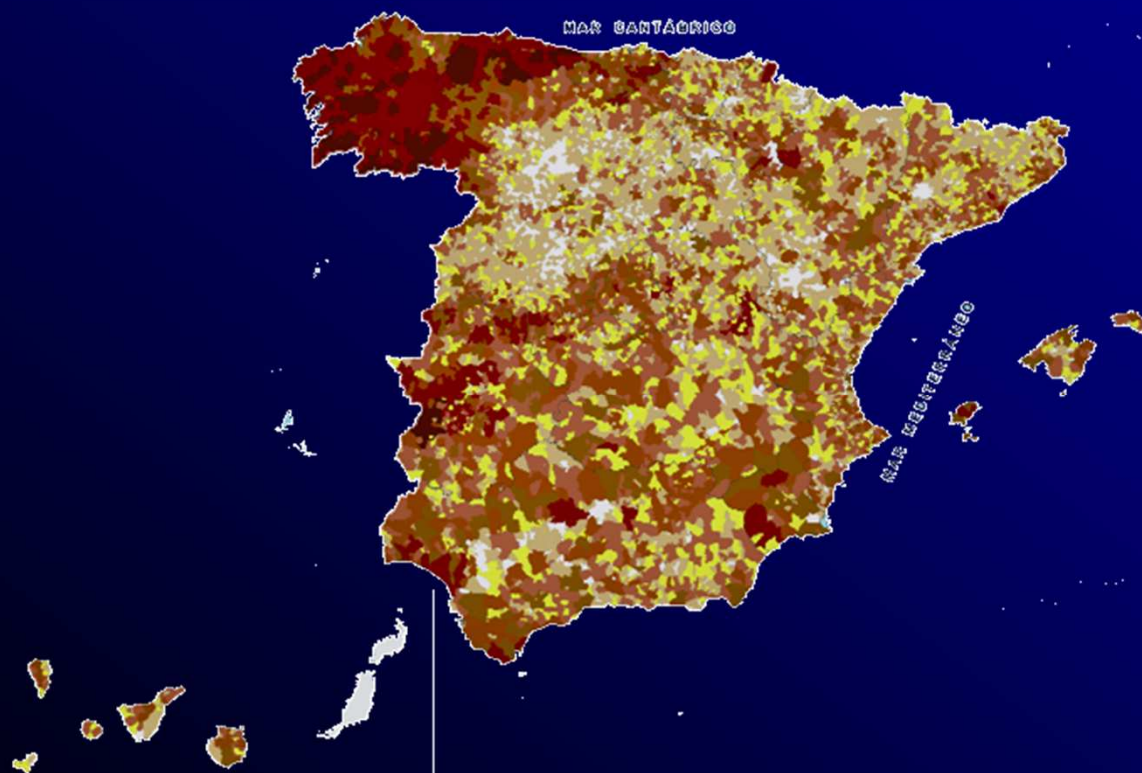
An integrated approach to the management in prevention and fighting against forest fires

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→ FOREST FIRES

A MAJOR RISK FOR SPAIN

- Forest area: 14,4 Millions Ha (30% of the territory of Spain).



Forest fires by Municipality (2000-2010).

- 66% private property.
- 30% Municipalities property.
- 4% Regions property.

→ FOREST FIRES

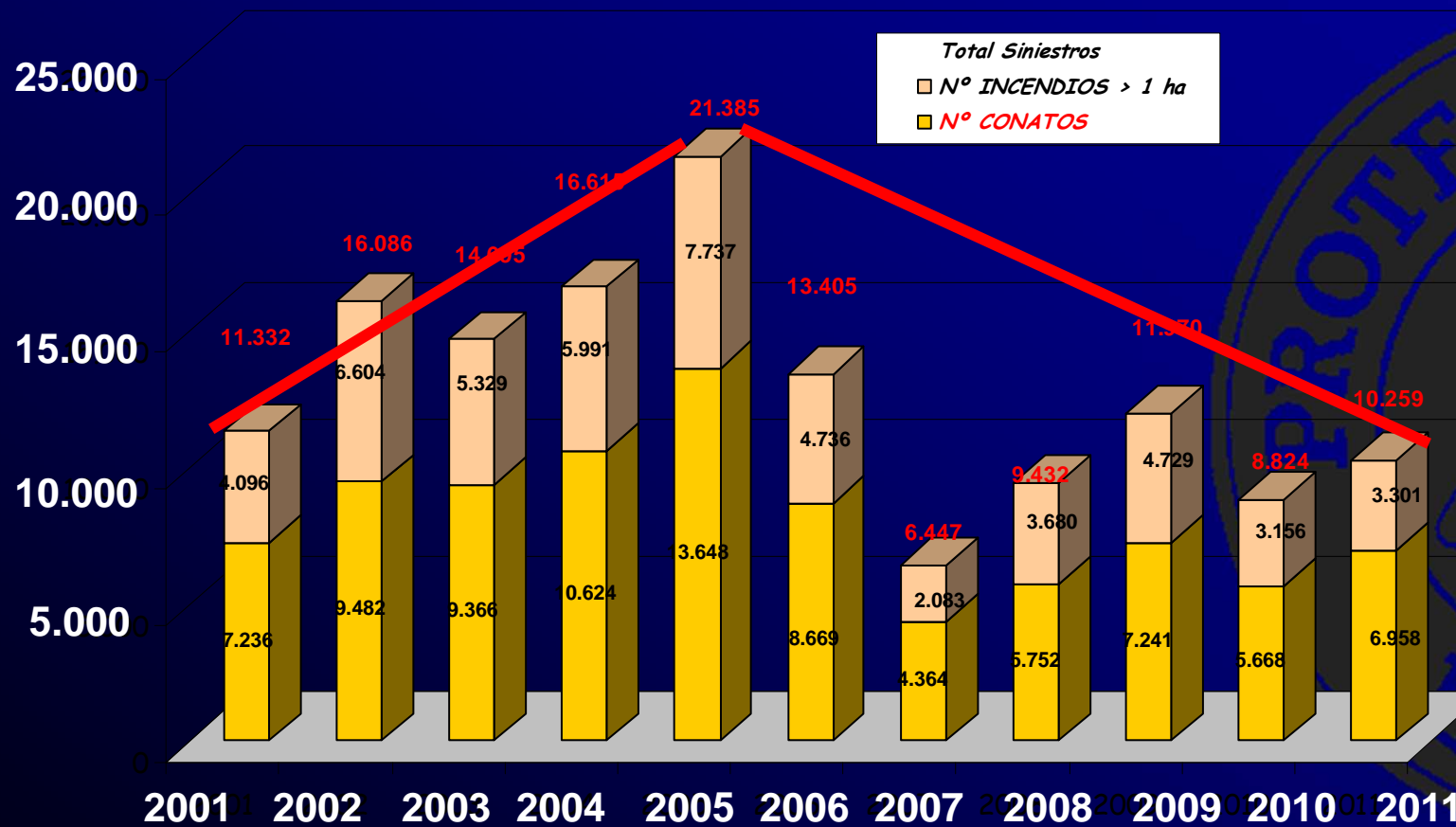
ÁREAS IDENTIFIED AS OF HIGH RISK OF FOREST FIRES

- 50% of Spanish forest territory has been declared area of high risk forest fires
- Each field or forest of high risk is covered by a Forest Management Plan
- Central Administration and the regional governments have a common Civil Protection Emergency Plan against Forest Fires (from 1994)



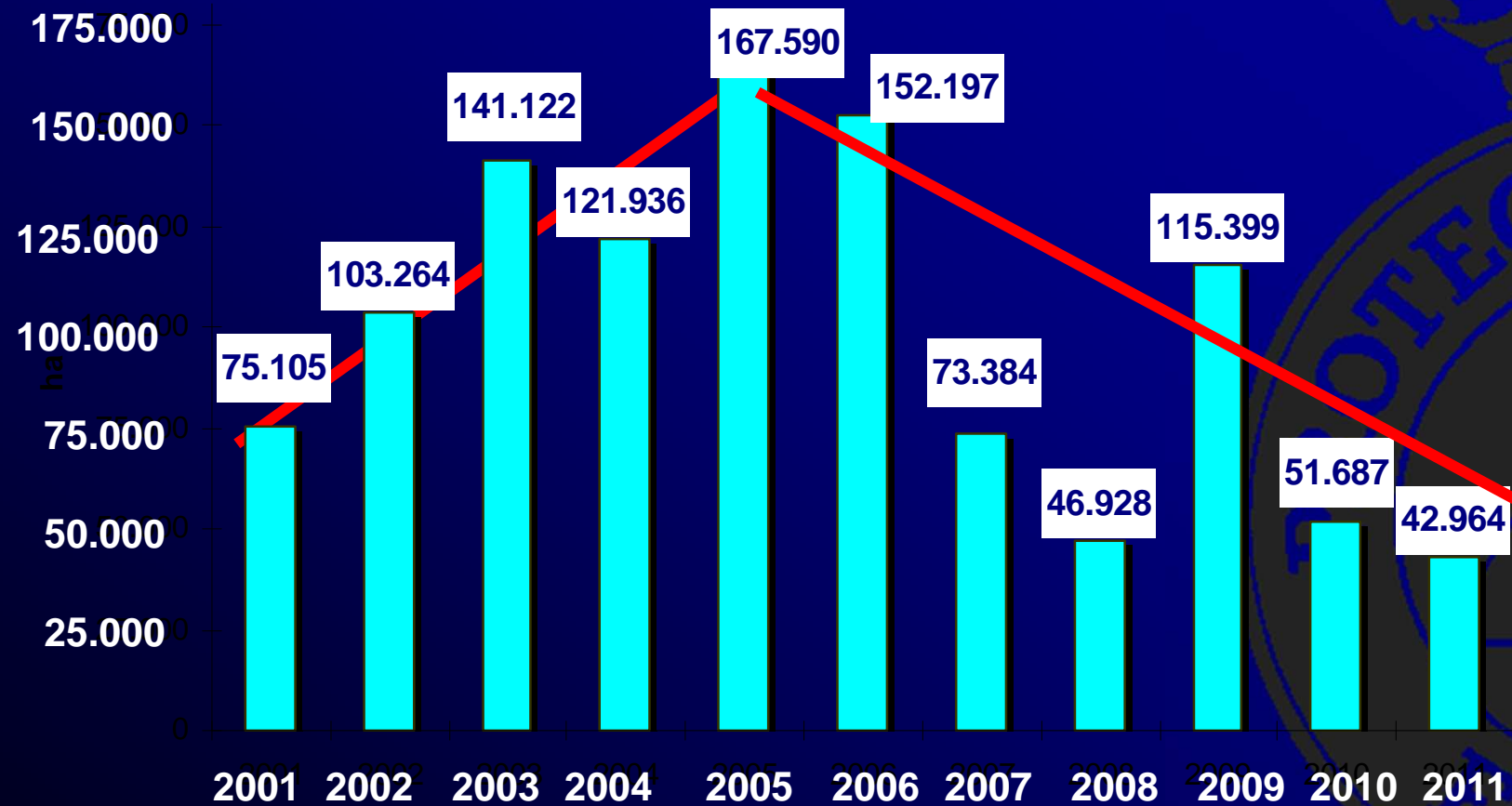
➔ STATISTIC EVOLUTION (2001-2011)

NUMBER OF FOREST FIRES.



➔ STATISTIC EVOLUTION (2001-2011)

BURN FOREST AREAS (HA)



→ CAUSES AND MOTIVATIONS

PREVENTIVE MEASURES

X Increased use of forest areas

Lack of danger awareness
from urban population

Public awareness

Training, education, media
and prevention culture

X Fuel building up

Rural area's depletion

Low forest productivity

Preventive forestry

Harvesting and
use of Biomass

Sustainable forestry and
forest management

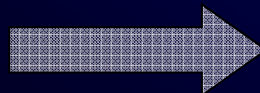
X Climate

Temperature, humidity, wind

Early Warning

Remote sensing

Daily risk maps



➔ CAUSES AND MOTIVATION

PREVENTIVE MEASURES

X Motivation

Conflicts over protected areas

Labor conflicts

Revenge

Surveillance and prosecution

Penalties

Conciliation of interest

X Uncontrolled burning

Pasture regeneration

Extensive agriculture

Decreased surveillance

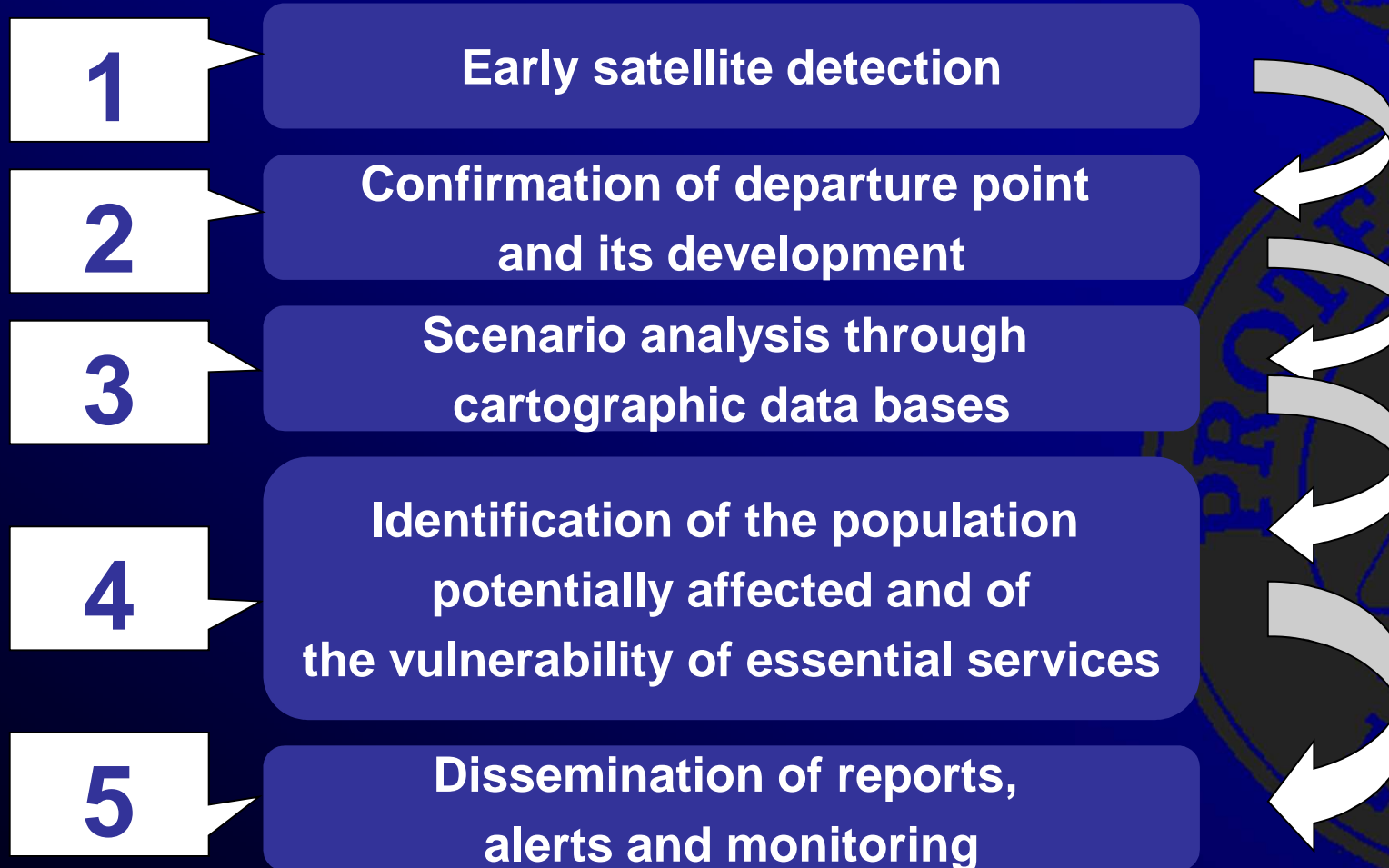
Burning procedures regulation

Risk Maps

Technical counseling

→ EARLY WARNING

INDEX



→ EARLY WARNING

SATELLITE DETECTION

1

Space detection based upon Modis (UN/FAO) and Meteosat satellites.

- Integration of data on topography, meteorological forecast, fuel models and satellite observation on humidity through geographical information systems.

2

Estimation of the potential fire path and evaluation of potential effects on population and properties.



2

Automatic e-mail reception of reports and modelling results

De: SACOP

Enviado el: viernes, 06 de mayo de 2011 10:00

Para: Gallego Berruete, Pilar

Asunto: Hotspot MODIS

Se ha detectado un hotspot MODIS en la siguiente localización:

- Lugar: Abadín, Lugo, Galicia
- Coordenadas UTM-30: 132968, 4812375
- Fecha de detección: 27/04/2011 11:29 UTC
- Probabilidad: 73 %

Se ha realizado una simulación automática, el resultado es que la superficie afectada es de **2012.16 Ha.**

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→ EARLY WARNING

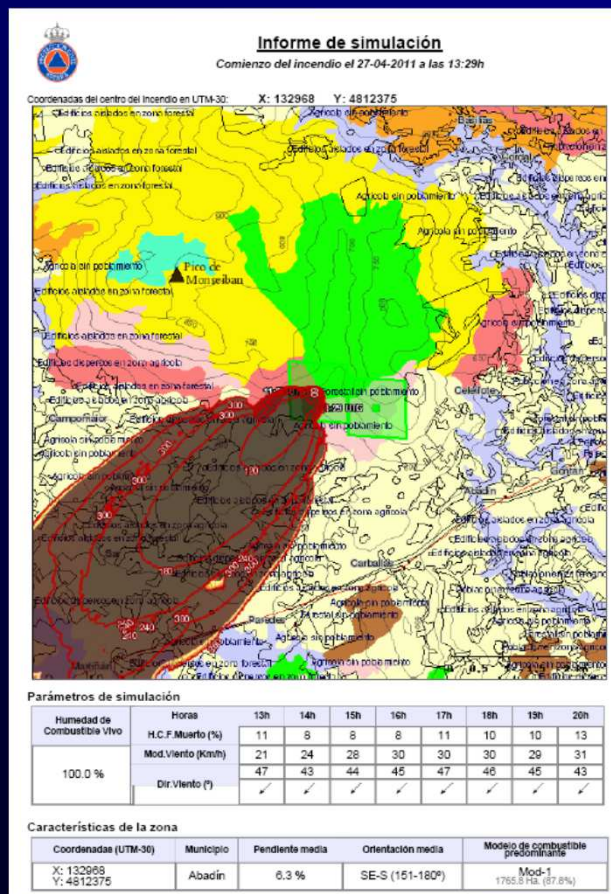
SCENARIO ANALYSIS

3

Automatic e-mail reception of reports and modeling results

&

4



Resultado de la simulación

Superficie afectada	Dirección dominante de máxima propagación	Velocidad media de propagación	Longitud de llama media
2012.16 Ha.	SO(211-240°) (100.0%)	27.8 m/min	122.7 cm

Superficie afectada	Tipo de vegetación
1517.9 Ha.	Cultivos agrícolas
244.2 Ha.	Prado de siega
191.4 Ha.	Fraga de la de Quercus robur y Betula celtiberica
58.5 Ha.	Tojar extramediterráneo. Mezcla de spp. de Ulex o bien tojar con matorral mixto
0.1 Ha.	Pinus pinaster

Combustibles afectados (Ha.) y porcentaje sobre el total de la superficie quemada

Minuto	Mod-1	Mod-6	Mod-6	Mod-7	Mod-9
30	---	0.32 0.1 %	---	---	---
60	---	1.8 0.1 %	---	---	---
90	7.04 0.4 %	4.08 0.2 %	---	---	---
120	70.16 3.9 %	3.36 0.2 %	---	---	---
150	146.66 7.3 %	4.62 0.3 %	---	---	---
180	247.72 12.4 %	4.8 0.3 %	---	---	---
210	349.26 17.4 %	6.32 0.3 %	---	---	---
240	54 2.7 %	3.88 0.2 %	---	---	---
270	158.2 7.8 %	2.36 0.2 %	---	---	---
300	308.76 15.4 %	2.16 0.1 %	0.24 0.1 %	29.6 1.5 %	0.08 0.1 %
330	231.24 11.5 %	3.16 0.2 %	0.8 0.1 %	87.16 4.4 %	0.12 0.1 %
360	194.88 9.7 %	3.12 0.2 %	18.4 1.0 %	90.96 4.6 %	0.12 0.1 %
Total	1765.8 Ha. 87.8%	38.9 Ha. 2.0%	19.4 Ha. 1.0%	187.7 Ha. 9.4%	0.3 Ha. 0.1%

Velocidad de propagación (m/min) y porcentaje sobre el total de la superficie quemada

Minuto	1-5	6-15	16-25	26-35	36-50	Media (m/min)
30	0.1	---	---	---	---	2.7
60	0.1	0.1	---	---	---	5.4
90	0.1	0.2	---	0.4	---	22.6
120	0.1	0.2	---	1.4	2.2	34.3
150	---	0.3	---	0.2	7.2	37.2
180	0.1	0.3	---	---	12.4	40.0
210	---	0.3	---	---	17.4	40.0
240	1.0	0.2	0.4	---	1.4	24.0
270	3.1	0.1	4.8	---	---	16.3
300	2.3	1.5	13.3	---	---	20.5
330	0.6	3.4	11.2	---	---	20.7
360	0.4	5.5	9.0	---	---	19.4
Total	7.2 %	11.7 %	39.1 %	1.8 %	40.4 %	27.8 m/min

Longitud de llama (cm) y porcentaje sobre el total de la superficie quemada

➔ **EARLY WARNING**

MODELLING AND SIMULATION OF FIRES

3

&

4



→ EARLY WARNING

ALERT DISSEMINATION (I)

5

Dissemination from the National Emergency Center



Government

Members of the
national
coordination center

Organizations in charge
at regional level.
Representatives
of Central Government,
in regions and provinces

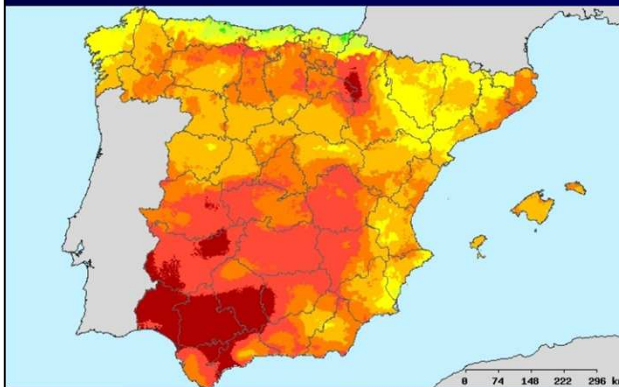
To the population
through media and
Web portals

➔ EARLY WARNING

ALERT DISSEMINATION (II)

5

Publication of daily forecasts on the meteorological and fire risks webs and media



www.proteccioncivil.es

www.inforiesgos.es

mass media

➔ COORDINATION

NATIONAL COMMISSION: ANNUAL PLAN ON FIGHTING AGAINST FOREST FIRES

Annual timetable from 15th June to 30th October

11 Ministries of State

Regions

UME (Military Emergency Unit)

→ FIGHT AGAINST FOREST FIRES

ASSETS AND HUMAN RESOURCES

CENTRAL GOVERNMENT ASSETS

Human resources: about 500 persons

Aerial means: Total 62

Amphibious planes (5 in reserve)	28
Land water resupply	9
Helicopters (3 from UME)	31
Communications and observation planes	2
Total	70

TOTAL OF SPANISH ASSETS



Human resources:	20.916
Aerial assets:	286

REGIONAL ASSETS

	Human resources	Assets					Aerial Assets	
		Fire vehicles	Meteo mobile unit	4x4 Vehicles	Heavy duty public work equipment	Others	Helicopters	Planes
TOTAL	20.416	931	10	1.536	48	3	170	46



GOBIERNO
DE ESPAÑA

MINISTERIO
DEL INTERIOR



→ FIGHT AGAINST FOREST FIRES

MILITARY EMERGENCY UNIT

Human resources: 30 sections:
1.500 personnel + 1.500 personnel support.

Assets

Fire fighting vehicles: 170

Feeders: 42

Helicopters: 3

Command, control and
logistic support equipment



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