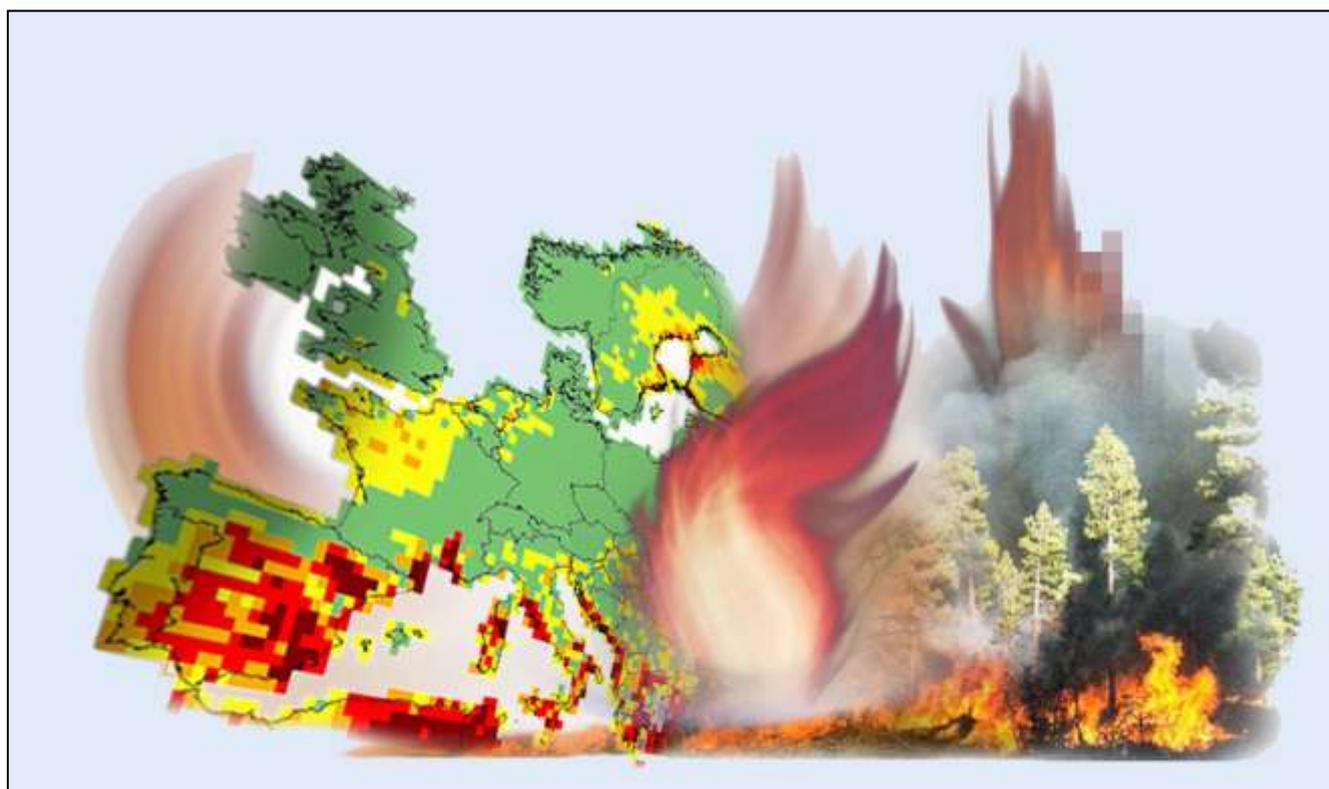




Report No 11

# Forest Fires in Europe 2010



EUR 24910 EN - 2011



# Forest Fires in Europe 2010

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## 1. INTRODUCTION

The present report is based on the European Forest Fire Information System (EFFIS) established by the Joint Research Centre and Directorate General for Environment of the European Commission (EC) to support fire management in Europe and on the contributions by the national forest fire services in the countries.

Over the years, EFFIS has become a focal point for information on forest fires in Europe; it delivers data and information to support forest fire prevention, preparedness and fire fighting activities on a daily basis since 2000.

Competent national authorities of EU Member States and of European neighbour countries work together with EC services on a purely voluntary basis to sustain the EFFIS system; this year they have provided, as in the previous years, important contributions to this report.

The report is the 11<sup>th</sup> of the “Forest Fires in Europe” report series. It provides a summary of the 2010 fire season following the usual structure, a first part containing individual country reports and a second part with EFFIS assessments. Summary statistical tables with historical fire data by country are given in the appendix.

2010 has been overall a relatively mild year for forest fires in Europe, except for Portugal that was affected by remarkable fire activity especially in the first half of August. The total burnt area in Europe (274 000 ha) was quite below the long term average. However about 50% of the burnt land was concentrated in Portugal, where the meteorological fire danger conditions assessed by EFFIS in the first half of August 2010 were among the worst of the last decade for the country.

In 2010 EFFIS has continued including Northern African countries in the mapping of burnt areas and the assessment of fire danger forecast. This is intended to be a first step towards the enlargement of EFFIS to the non-European countries of the Mediterranean basin in the context of the collaboration between the EC and the Food and Agriculture Organization of United Nations (FAO).

This year, for the first time, the report also includes a contribution from Russia. In European Russia, the 2010 fire season was the worst on record. A severe drought combined with record-high temperatures and strong winds led to a large number of fires that burnt simultaneously

producing large smoke clouds with a strong impact on the city of Moscow and nearby urban areas.

At the time of drafting the present report (July 2011) the new fire season in Europe is on-going. During 2011 spring, unusually hot and dry weather over temperate Europe induced remarkable fire activity in this region, significantly affecting countries like Belgium, Ireland and United Kingdom, which are normally safely excluded from the main forest fire arena.

On other hand, the Mediterranean countries, normally far more affected by forest fires, have been relatively cool and wet in the first part of the summer, and therefore have not suffered major damages so far. However, most of the summer still remains in this fire season and we have to wait before making a final assessment of the season.

The competent Commission departments are continuing to seek out the best solutions for limiting the impact of forest fires within the EU and neighbouring countries, and the members of its “Expert Group on Forest Fires” meet regularly to exchange the lessons learnt from previous fire campaigns and to contribute to the further development of EFFIS.

National authorities are seeking ways to prevent fires and for combating them as early as possible. Together, the European Commission and the national forest fire authorities are working on finding the best ways to avoid unnecessary fire impacts. Despite this, basic forest fire prevention measures applied so far with EU funding, including awareness-raising campaigns and training of those involved in the forest fire issue, are sometimes not always as effective as they could be, in particular in Mediterranean high risk areas. Additional efforts are needed to make the use of EU budget available for prevention, fire-fighting and restoration as efficient as possible.

In the future, we need to continue to be prepared and stay vigilant to minimise the impact of forest fires. We can achieve this by launching yearly awareness-raising campaigns, using early fire detection tools, carrying out forest fire prevention measures of all kinds, forecasting and assessing fire danger, and last but not least, by developing further fire research activities. Furthermore, the maintenance fire-fighting equipment and human resources and the mutual assistance between Member States in coordination with the European Commission's Monitoring and Information Centre are essential in forest fire fighting.

## 2. FOREST FIRES 2010 IN THE EUROPEAN COUNTRIES

### 2.1. SOUTHERN MOST AFFECTED MEMBER STATES (1980 – 2010)

The long time series of forest fire data available for these 5 southern countries (Portugal, Spain, France, Italy, and Greece) justifies a separate analysis as has been the case in previous reports.

During 2010, fires in these 5 countries burned a total area of 253 664, which is less than the area burnt in 2009, and the fourth lowest value since 1980 (only 1996, 1999 and 2008 were lower). The number of fires that occurred (43 584) is also below the average of the last decades (see Table 1 for details)

Figure 1a shows the total burnt area per year in the five Southern Member States since 1980. The statistics vary considerably from one year to the next, which clearly indicates how much the burnt area depends on seasonal meteorological conditions. Overall, the total burnt area for all 5 countries in 2010 is only 61% of the average for the last decade and just over half the long term average (31 years; Table 1)

Figure 1b shows the yearly number of fires in the five southern Member States since 1980. After the increasing trend during the 1990s, which was also partly due to the improvement in recording procedures, the number of fires was stable for around one decade, and in the last years a decrease has been observed. This trend seems to continue, but will have to be confirmed in the next years. Overall, 2010 was a better than average year in terms of number of fires. The number of fires in each of the 5 countries was less than in 2009 and is amongst the lowest in the last 20 years.

Figure 1c shows the yearly average fire size in the 5 countries since 1980. There is a clear difference in average fire size before and after 1990. This is a similar trend to that observed in the number of fires and is also partly due to the same reasons (the additional fires that are recorded thanks to the improvements in the statistical systems are the smallest ones). But it is also largely due to the improvements of the fire protection services of the countries. (Figure 1a and Figure 1b).

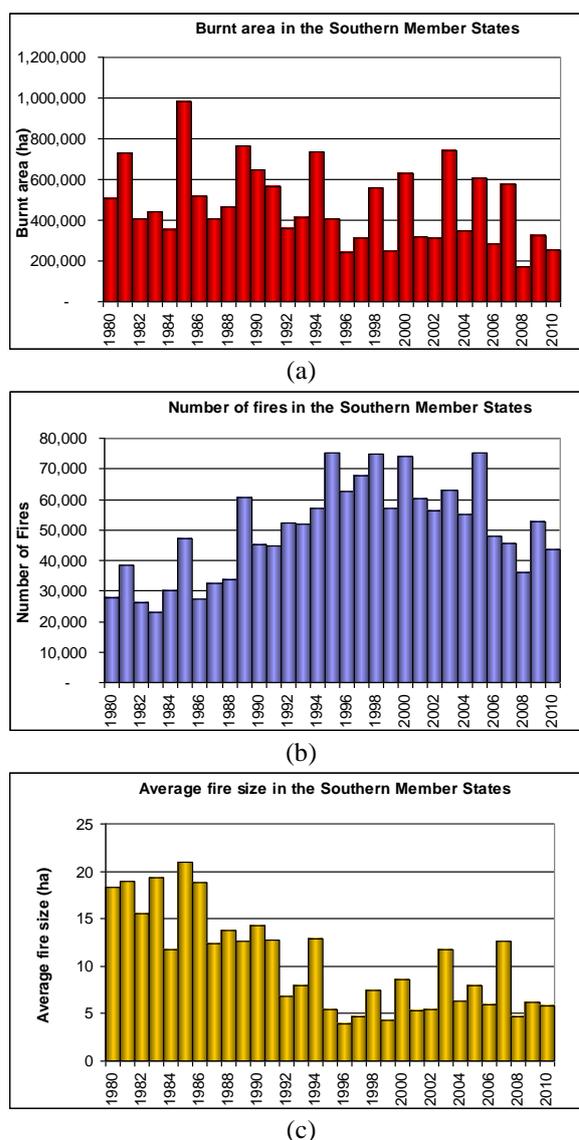


Figure 1. Burnt area (a) number of fires (b) and average fire size (c) in the five Southern Member States for the last 31 years.

Figure 2 compares the yearly averages for burnt areas, number of fires and average fire size for the periods 1980-89; 1990-1999 and 2000-10 with the figures for 2010. It shows each of the 5 countries separately and also their total. It shows that 2010 was a good year for southern Europe as a whole. The overall figure for the five southern Member States is below the averages of previous periods for average fire size, number of fires, and burnt area.

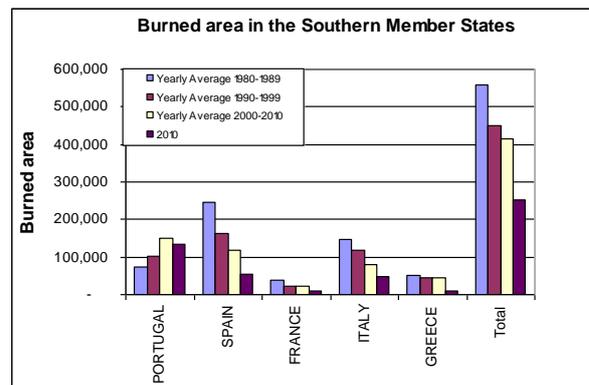
Figure 3 shows the contribution of each of the five Member States in terms of burnt areas and number of fires to the overall figures for all the considered Southern Member States in 2010.

Table 1 gives a summary of the burnt areas and number of fires for the last 31 years, the average for the 1980s and 1990s, and the average for the last 11 years, together with the figures for 2010.

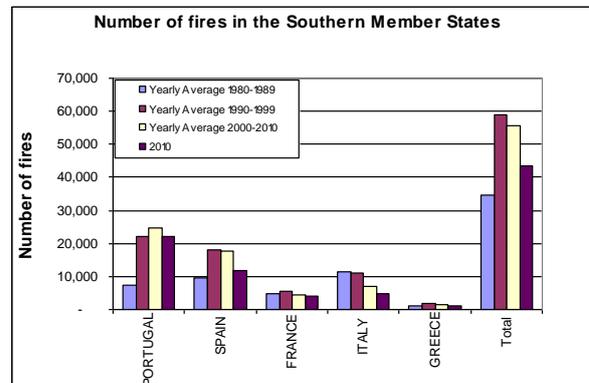
As mentioned, a total of 253 664 ha were burnt in the five southern Member States in 2010, which is well below the average of the last 31 years. The number of fires in 2010 was 43 584, which is also below the long term average.

Since the area of each country is different, and the area at risk within each country is also different, the comparisons among countries cannot be absolute. It should also be borne in mind that since 2009 the figures for numbers of fires in Greece are incomplete and are therefore an under-representation of the true figure. During 2010 Portugal was the worst affected country, recording half the fires and burnt area for the whole of the five southern Member States. However, this is also a function of the low fire incidence in the other countries (which all registered lower numbers of fires and burnt area than they did in 2009), and Portugal's figures are not far from its average of the last 20 years.

Over the last decade, the previous tendency of the five southern Member States towards an increase in the number of fires seems to be stabilized and some decrease has been observed. This may possibly be due to the positive effect of the public information campaigns carried out in all the countries and the improvements in the prevention and fire-fighting capacities. It remains to be seen whether these improvements can be continued during the next decade.



(a)



(b)

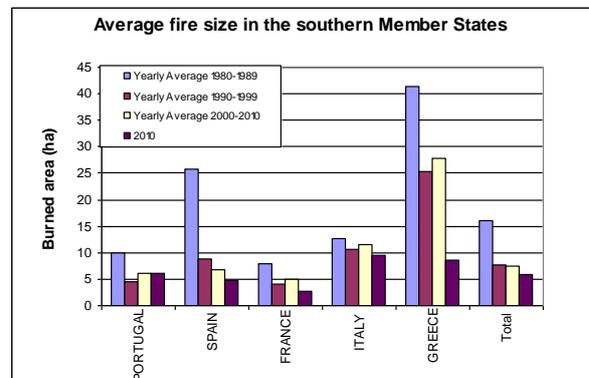


Figure 2. Burnt areas (a), number of fires (b) and average fire size (c) in the five Southern Member States in the year 2010 as compared with average values for previous decades.

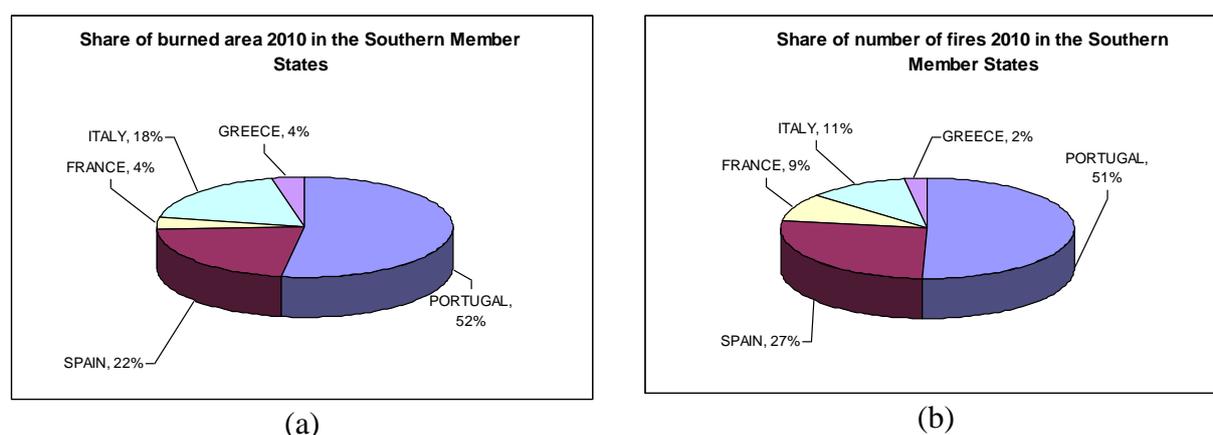


Figure 3. Share of the total burnt area (a) and the total number of fires (b) in each of the Southern Member State for 2010.

Table 1. Number of fires and burnt area in the five Southern Member States in the last 30 years.

Number of fires	PORTUGAL	SPAIN	FRANCE	ITALY	GREECE <sup>(*)</sup>	TOTAL
2010	22 026	11 475	3 900	4 884	1 052	43 584
% of total in 2010	51%	27%	9%	11%	2%	100%
Average 1980-1989	7 381	9 515	4 910	11 575	1 264	34 645
Average 1990-1999	22 250	18 152	5 538	11 164	1 748	58 851
Average 2000-2010	24 684	17 736	4 360	7 043	1 636	55 458
Average 1980-2010	18 317	15 218	4 917	9 834	1 552	49 838
TOTAL (1980-2010)	567 831	471 760	152 431	304 861	48 110	1 544 993

Burnt areas (ha)	PORTUGAL	SPAIN	FRANCE	ITALY	GREECE	TOTAL
2010	133 090	54 770	10 300	46 537	8 967	253 664
% of total in 2010	52%	22%	4%	18%	4%	100%
Average 1980-1989	73 484	244 788	39 157	147 150	52 417	556 995
Average 1990-1999	102 203	161 319	22 735	118 573	44 108	448 938
Average 2000-2010	148 555	118 833	21 247	80 483	45 577	414 695
Average 1980-2010	109 386	173 169	27 504	114 276	47 309	471 644
TOTAL (1980-2010)	3 390 976	5 368 227	852 632	3 542 542	1 466 591	14 620 968

<sup>(\*)</sup>Numbers of fires are incomplete since 2009.



Table 2. Forest fires in Portugal (monthly distribution)

Month	Number of Fires	Burnt Area (ha)		
		Wooded land	Shrub land	Total
Jan	38	0	13	13
Feb	83	11	80	91
Mar	401	99	537	636
Apr	608	211	713	924
May	799	334	758	1 092
Jun	1 428	392	355	747
Jul	5 107	10 747	11 396	22 143
Aug	8 949	33 127	66 453	99 580
Sep	2 992	754	3 382	4 136
Oct	1 459	388	3 237	3 625
Nov	91	1	36	37
Dec	71	15	51	66
<b>TOTAL</b>	<b>22 026</b>	<b>46 079</b>	<b>87 011</b>	<b>133 090</b>

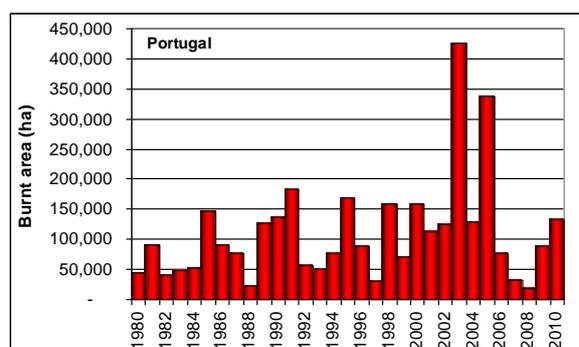
Fire occurrence prevailed mostly in the urban districts, such as Porto, Braga, Viana do Castelo, Viseu (Northern region) and Aveiro, (Center Region), which registered 69% of the total number of fires (mainly very small fires). The Northern and Central regions of Portugal were the most affected by forest fires (128 664 ha – 96.7% total); Table 3. In these regions are concentrated the main areas of Eucalyptus and Pine stands and mountainous areas, where the usage of fire for pasture renewal of shrubs pastures still has a strong prevalence.

Table 3. Number of fires and burnt area in Portugal (NUTSII - 2010).

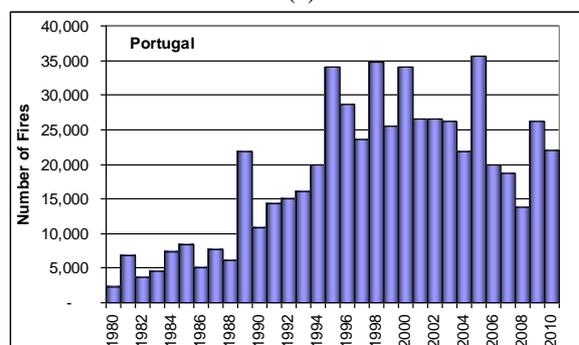
NUTS II Region	Number of fires			Burnt Area (ha)		
	≥ 1ha	< 1ha	Total	Shrub land	Wooded land	Total
Norte	2802	11780	14582	57006	27488	84494
Centro	842	4182	5024	28383	15787	44170
Lisboa	155	1436	1591	667	126	793
Alentejo	147	355	502	877	2 651	3528
Algarve	24	303	327	78	27	105
<b>TOTAL</b>	<b>3970</b>	<b>18056</b>	<b>22026</b>	<b>87011</b>	<b>46079</b>	<b>133090</b>

The analysis of the yearly trends in the number of fires and burnt areas in Portugal shows a decrease in the total number of fires but an increase of the burnt areas (Figure 6).

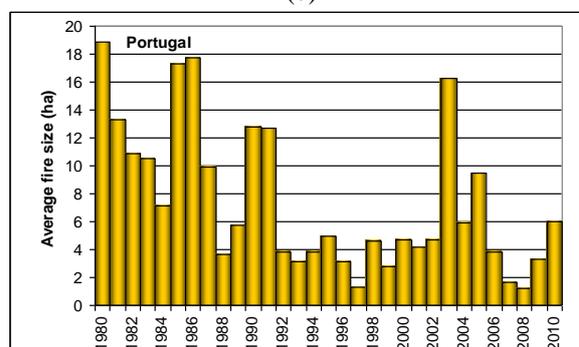
Portugal registered 186 large fires ( $\geq 100$ ha), which corresponded to 76% of the total burnt area. There were 26 fires larger than 500 ha, which burned 73 244 ha. The largest fire of 2010 occurred in the Viseu district, with 5 066 ha burnt, on 6<sup>th</sup> August and during 3 days.



(a)



(b)



(c)

Figure 6. Burnt areas (a), number of fires (b) and average fire size (c) in Portugal for the last 31 years.

### Fire fighting means and information campaigns

In order to cope with forest fires and to define an integrated fire-fighting strategy, the Portuguese National Authority for Civil Protection (ANPC), as is customary, established an Operational Directive for the forest fire season of 2010, with the following main purposes:

- Define a unique structure for Direction, Command and Control, and a Special Structure to Fight Forest Fires (DECIF);
- Regulate institutional coordination and the cooperation and involvement of the organizations belonging to the Portuguese Integrated System for Relief Operations (SIOPS).

The Operational Directive applies to all organizations and institutions which play a role in this field and is used as a base to elaborate both district and municipal emergency plans. It is also used as a reference to elaborate all directives, plans and orders that are applied to organizations involved in the Special Structure to Fight Forest Fires (DECIF).

The Directive defines an operational concept based on the following principles:

- Unique command structure;
- Anticipation ability;
- Integrated response;
- Permanent safety;
- Dissuasive surveillance;
- Well-timed detection;
- Immediate dispatch;
- Strong initial attack;
- Unity of command;
- Operation maintenance;
- Unified public information management.

Under the scope of the Operational Directive, the distribution of the available means for surveillance, detection and fire-fighting operations, in 2010, was made into engagement phases. The number of means applied in each phase depended, amongst other factors, on the forest fire hazard and territory vulnerability expected for a given period. For example, during the most critical period, Charlie Phase (1JUL-30SEP), there were around 9 985 human resources, 2 177 vehicles and 56 aerial means available.

In order to improve and assure the fire fighting operations outside the critical period, terrestrial and aerial means were made permanently available during the Alfa and Echo phases.

In Table 4, there is a summary of all the fire-fighting means distributed by phases:

Table 4. . Fire-fighting means available per phase

<i>Phases</i>	<i>Elements</i>	<i>Vehicles</i>	<i>Aerial Means</i>
Alfa (< 15MAY)	Means available on demand		2 - 7
Bravo (15MAY-30JUN)	6 651	1 528	34
Charlie (1JUL-30SEP)	9 985	2 17	56
Delta (1OCT-15OCT)	5 460	1 230	19
Echo (> 15OCT)	Means available on demand		2 - 7

With respect to the aerial means they were of the following types:

- 35 Helis for initial attack;
- 14 Aircrafts for initial attack;
- 5 Helis for enlarged attack;
- 2 Amphibious aircrafts for enlarged attack.

All means were guaranteed by different public and private entities/organizations (around 11) such as the National Authority for Civil Protection (ANPC), Fire Fighter Corps, National Guard (GNR), National Forest Authority (AFN), Biodiversity and Environmental Conservation Institute (ICNB), Police (PSP), Army and Forest Producers Associations (AFOCELCA).

In the case of Fire Fighter Corps, they were responsible for the development of fire fighting operations covering all the Portugal districts (18), with a force of around 4 933 fire fighters and 1 182 vehicles.

There were also a group of special teams that were involved in missions related mainly to surveillance, detection and initial attack actions. Their actions allowed the surveillance of suspicious and negligent activities, the early detection of forest fires and the timely development of initial attack actions. They were the Relief, Protection and Intervention Group (GIPS) and the Special Fire Brigade Force (FEB).

In the case of the GIPS, dependent on the National Guard, this force had around 638 elements and 102 vehicles, distributed among 11 districts. They performed around 3 947 initial attack missions (3 269 airborne and 678 terrestrial), as well as around 11 300 terrestrial patrols.

With respect to the FEB, dependent on ANPC, it had around 269 elements and 44 vehicles, distributed among 7 districts, and they were involved in approximately 3 273 initial attack missions (1 817 airborne and 1 456 terrestrial), as well as around 53 assessment and reconnaissance missions.

Relative to the development of initial attack actions in the scope of forest fire fighting operations, the average time registered for the arrival of the first forces to the incident area was around 7 minutes in terms of aerial means and 14 minutes for terrestrial means. It should be noted that the target time defined for this same purpose in the 2010 Operational Directive was 20 minutes.

There were other entities that had an important role in the implementation of the 2010 Operational Directive. They were the Forest Sapeurs and the Fire Analysis and Utilization Group (GAUF), dependent on the National Forest Authority (AFN), the Army Forest Sapeurs, dependent on the Portuguese Army, and the Surveillance and Initial Attack Teams dependent on the Biodiversity and Environmental Conservation Institute (ICNB).

In the case of the Forest Sapeurs, this force had around 1 494 elements and 299 vehicles, and they performed 3 217 actions (973 initial attack actions, 870 fire fighting supporting operations, 1 116 mop up actions and 258 post mop up surveillance actions).

With respect to the GAUF teams, this group had around 24 experts and 8 vehicles, acting all over the country, which intervened on 158 occasions.

Relatively to the Army Forest Sapeurs, acting mainly on national forests, under the scope of a protocol established between the AFN and the Army, this force had around 144 elements and 24 vehicles, and they performed around 131 actions (35 initial attack actions, 37 fire fighting supporting operations, 41 mop up actions and 18 post mop up surveillance actions).

Finally, there are the Surveillance and Initial Attack Teams, acting mainly on environmental protecting areas, with a force of around 137 elements and 41 vehicles, which intervened on 448 occasions (163 initial attack actions, 190 fire fighting supporting operations and 95 mop up actions).

Besides the means already described as available for surveillance, detection and fire-fighting operations, as well as missions developed, due to the extremely demanding 2010 forest fire season, especially during the month of August, it became necessary to deploy and/or to engage additional national resources in order to reinforce the fire fighting means which were already dealing with fire fighting actions in order to cope with several complex forest fires.

In this context, the Portuguese Authorities decided to deploy in different situations, mainly to the north part of Portugal, the following kind of means:

- 65 GAUF missions (195 elements involved, between the 22<sup>nd</sup> of July and the 20<sup>th</sup> of August);
- 31 Army platoons (2 610 elements involved, between the 24<sup>th</sup> of July and the 1<sup>st</sup> of September);
- Naval Marines (100 elements involved, between 6<sup>th</sup> of August and the 24<sup>th</sup> of September);
- Air Force (Ovar Air Force Base available between the 27<sup>th</sup> of July and the 31<sup>st</sup> of August, in order to provide logistical support to aerial means deployed to Portugal in the scope of the EU-Mechanism for Civil Protection);
- 6 FEB groups (320 elements involved, between the 3<sup>rd</sup> and the 26<sup>th</sup> of August);
- 6 GIPS groups (174 elements involved, between the 3<sup>rd</sup> and the 26<sup>th</sup> of August);
- 4 Ecureuil Light Helibombers, 2 KAMOV Heavy Helibombers and 2 ALLOUET III for aerial coordination operations (belonging to the Portuguese Air Force)

#### *Loss of human lives in the 2010 fire campaign.*

Forest fires in Portugal caused, during 2010, the death of 4 fire fighters (2 of them due to car accidents), and the injury of several others during fire fighting operations, mainly in the months of July and August.

Some fire fighting vehicles were also destroyed after being caught by forest fires.

Finally, there were a few civilians injured during forest fires.

#### *Operations of mutual assistance*

During 2010 Portugal requested assistance through the EU-Mechanism for Civil Protection three times. The assistance received was in terms of aerial means and is presented in Table 5.

- 81 fire fighter reinforcement groups (6 591 elements involved, between 29<sup>th</sup> of July and 3<sup>rd</sup> of September);

Table 5. Assistance received during 2010

Request	Requested Means	Mission	Period	Flight Hours	Water Drops
27JUL	2 Canadairs (Italy)	Forest Fire Fighting Operations	28-30 JUL (3 days)	34 h	234
10AUG	2 Canadairs (EUFFTR)	Forest Fire Fighting Operations	12-17 AUG (6 days)	93 h	413
29AUG	2 Canadairs (Spain)	Forest Fire Fighting Operations	30-31 AUG (2 days)	16 h	54

The bilateral agreement with Spain for reinforcement of aerial means and ground fire-fighting forces in and outside the border area (15 km to each side of the border) was also activated, several times. In this context, there were around 18 forest fire fighting missions involving Spanish Canadairs and 22 forest fire fighting missions involving Spanish helicopters and terrestrial means in the Portuguese territory. On the other hand, Portuguese Authorities provided helicopters and terrestrial means to Spain for four times.

#### Fire causes

In 2010 the National Guard proceeded with the criminal investigation of 13 515 forest fires (61% of the total of forest fires registered in 2010). Intentional fires corresponded to 48% of the determined causes and Accidents or negligence were present in the ignition of 50% (Figure 7). Pasture renewal and agricultural burnings represented 68% of the accidental or negligence fires.

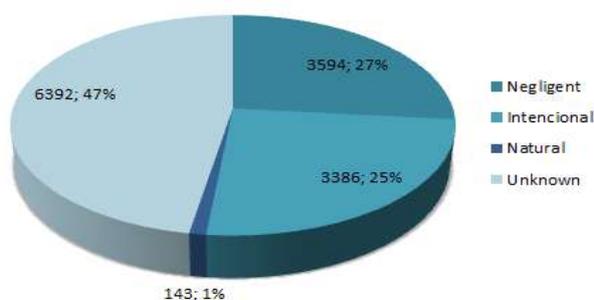


Figure 7. Main causes of forest fires in 2010

#### Policy measures

*Decree-Law 124/2006, with the changes introduced by the Decree-Law 17/2009*

In 2010, the publishing of Regulation no. 269/2010, established the period between 1<sup>st</sup> July and 15<sup>th</sup> October, as the critical period, where special preventive measures prevailed.

*Bilateral Commission on Forest Fires Prevention and Suppression (Portugal/Spain)*

There were no follow-up progresses in the Commission works.

#### Forest fire prevention and information campaigns

##### (a) Information and Public awareness campaigns

Portugal developed a public awareness campaign for forest fires prevention under the slogan “Portugal without forest fires depends on all of us”. Under funding by the National Forest Fund, several actions were taken, following four main strategic axes: National and regional awareness campaigns in the media, warning for hazardous behaviours, promoted by the National Authority for Civil Protection, National Forest Authority and municipalities.

In the public information domain, the National Authority of Civil Protection (ANPC) and the National Forest Authority (AFN) made significant efforts on the availability of on-line information. To reach that goal, AFN published seven reports, between 14<sup>th</sup> July and 15<sup>th</sup> October (critical period) and the ANPC services displayed on-line information of the most relevant forest fire incidents. Also, the Meteorological Institute (IM) provided online information concerning FWI and its forecast. The AFN also provided its partners with an online service for FWI mapping.

##### (b) Forest Fire Prevention

###### (b).1. Forest fire planning

The National Forest Authority kept its efforts in the forest fire planning at the local, municipal and regional (district) levels.

The municipal planning objective is pursued by the technical support to the municipalities forest offices, based in the Municipal Plans for Forest Fire Prevention (5 years planning) and the Municipal Operational Plans, which are part of the previous plans and are updated on a yearly basis.

The municipalities' forest offices provide technical support to the Municipal Commission for forest defence. By the end of 2010 there were 262 municipal forest offices established and 266 Municipal Plans for Forest Fire Prevention and 259 Municipal Operational Plans approved. 96% of the municipalities are covered by Forest Fire Prevention Municipal Plans.

*(Sources: Ministry of Agriculture, Rural Development and Fisheries - National Forest Authority and National Authority for Civil Protection, Portugal)*

The regional level planning is assured by 16 Regional Forest Plans (for the entire continental land) and by regional maps of fire pre-suppression, updated each summer in cooperation with municipalities and District Commands for Relief Operations, at the district level.

### **(b).2. Forest fuel management**

Forest fuel management is one of the key-actions in the forest fire prevention domain. A total area of 22 174 ha were managed of which 2 069 ha with prescribed burning.

### **(c). Forest fires operational prevention**

The National Guard is responsible for the coordination of the surveillance of critical forest areas, detection of forest fires and for the law enforcement and the initial criminal investigation of forest fires.

#### **(c). 1. Surveillance and detection**

The National Guard deployed the "Secured Forest Operation", between 15<sup>th</sup> May and 31<sup>st</sup> October, and has some 160 634 troops in that action, which promoted the realization of over 60 812 patrolling operations in the most critical forest areas. These patrolling operations represented 74.1% of a total of 81 999 operations.

The National Guard performed 1 975 awareness actions, to alert the population for the need of prevention.

In 2010, the Lookout Towers National Network was responsible for an increase of 6.75% in the detection of forest fires (first alert).

#### **(c).2. Law enforcement**

The application of the preventive measures defined in the Decree-Law 124/2006, altered by de Decree-Law 17/2009, was the main action of the National Guard. A total of 3 486 infractions were detected, mostly related with illegal agricultural use of fire and the lack of vegetation clearance around houses, keeping the same trend of 2009.

In the same period there were 4 873 crimes reported, 71 suspects of crimes related with forest fires identified, and 3 arrested.

## 2.1.2. Spain

### *Fire danger in the 2010 fire season*

The first three months of the year were cooler and wetter than normal with a generally low fire danger, apart from periods of high winds.

In April it was very warm with temperatures around 2 or 3 degrees above the long term average. The month was also generally dry across the northern third of Spain as well as in parts of the south-east. In the coastal areas of Asturias and Cantabria and inside the Basque Country, rainfall remained below 25% of its average value.

In May the temperature anomaly over the whole of Spain was +0.2°C, although the minimum registered temperatures were lower than those in April. The month was slightly dryer than normal, with about 20% less rainfall than the long term average (1971-2000). The fire danger became moderate in Castilla-La Mancha, Extremadura and the Balearic islands due to rising temperatures and lack of rainfall at that time.

The temperature anomaly in June was +0.4°C compared with the 30 year average; however despite this, following the very high temperatures that have characterised June in recent years, it was the coolest June since 1997. It was also very humid, with rainfall of around 75% more than the 1971-2000 average making it the wettest June since 1992. Fire danger was consequently moderate for most of the month, although high at certain times in areas of Andalusia, Catalonia, Extremadura and the Ebro Valley because of local high temperatures and winds.

In general July was a very warm month in most of Spain. Temperature anomalies were +3°C in some places, and the southern half of the peninsula reached 40°C or higher temperatures at many points throughout the month. It was also very dry in most of the country. The fire risk was also high for most of the country except in Galicia, Cantabrian and the Pyrenees. In the southern half and western third of the peninsula and in the Ebro Valley, fire danger was extremely high on several days that suffered heat waves.

August was another very warm month with average temperatures 1.5°C above normal. This August was the 5<sup>th</sup> warmest recorded since 1971. The rainfall was slightly below normal (average 18 mm in Spain, compared with the 30 year average of 23 mm). The fire danger started high in the month, reducing mid-month, before rising

again at the end when it was driest and with a heat wave.

In September it was generally a little warmer than normal, especially in Galicia. However there were also strong temperature fluctuations, with a relatively warm first half and a second with near-normal temperatures that included a relatively cold spell, and even saw the first frosts of autumn. Precipitation was about 20% below normal but with an uneven distribution across the region. Fire danger started high and reduced during the month, apart from a small rise at the end of the month.

Temperatures in October were slightly cooler than normal with average temperatures around 0.3°C below the average for the month. Throughout the month of October there was a decline in temperatures with the lowest temperatures recorded at the end of the month. Rainfall was slightly higher than normal, with precipitation across Spain of around 25% more than the long term average. The month was very wet in northern regions and the Balearics. Fire danger started at a moderate to high level in most of the country, declining with the falling temperatures and incidence of rain.

The month of November was colder than normal for most of Spain. With precipitation values of around the average, the fire danger was generally low. December was also colder than average and also rather wet, with rainfall 60% more than the average. Only in the East, the Balearic Islands and Galicia was it relatively dry. Fire danger was also low in most of the country throughout the month.

### *Number of fires and affected surfaces*

Both the total number of fires and the burnt area are below the average for the previous 10 years (2000-2009), down by 36% for the total number of fires and by 42% for those over 1 ha (Table 6). The numbers of fires and burnt areas for 2010 by region are shown in Table 8.

Table 6. Fires in 2010 compared with 10 year average

	<i>10 year average 2000-2009</i>	<i>2010</i>
Number of fires <1ha	11 675	7 812
Number of fires ≥1ha	6 692	3 910
Total Number of fires	18 367	11 722
Burnt area total (ha)	127 207	54 770

The trend in number of fires over the course of the year has followed that of the previous decade with a relative peak in March and another in August, but with lower values each month. Figure 8 shows monthly values distinguishing between fires above and below 1 ha in size.

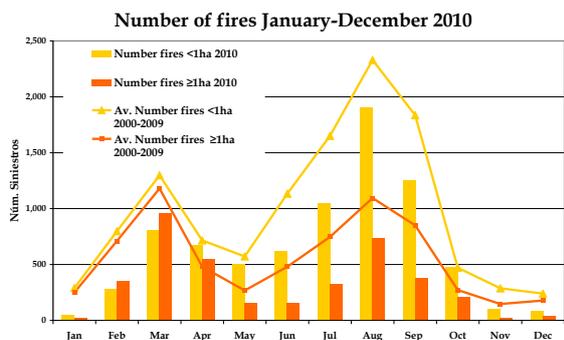


Figure 8. Annual progression of number of fires 2010

The total burnt area affected in 2010 was 53% less than the ten year average. Figure 9 shows the burnt area for each month of the year compared with the average of the decade 2000-2009, for both wooded and total area. It is notable that the difference is significantly more in the summer months than in winter.

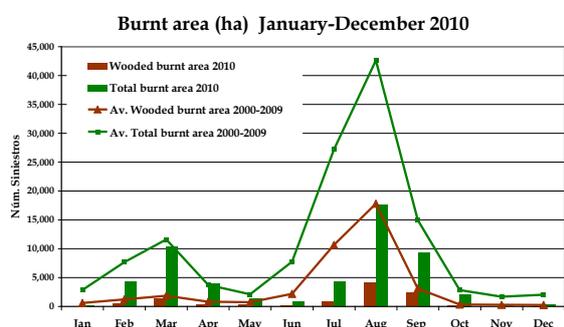


Figure 9. Annual progression of burnt area 2010

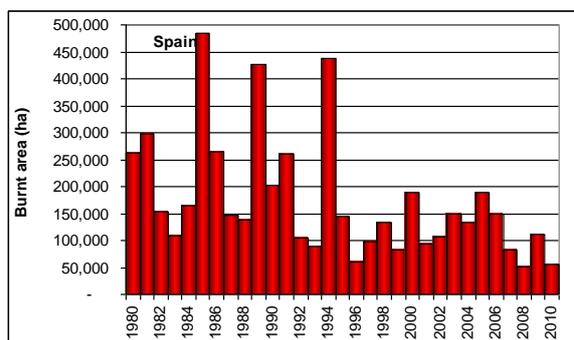
The analysis of the figures compared with the last decade shows a decreasing trend in number of fires (both those of <1 ha and larger fires of ≥ 1 ha) with a minimum value reached in 2007, followed by the values obtained for 2008. For total burnt area the trend is also decreasing, while remaining stable for burnt wooded area.

In 2010 there were 11 large fires according to information supplied by the Department of wildland fire management of the Autonomous Communities. The percentage of forest land affected by this type of fire was around 29% of the total forest burnt area in 2010. Table 7 gives the location, date and burnt area of these large fires.

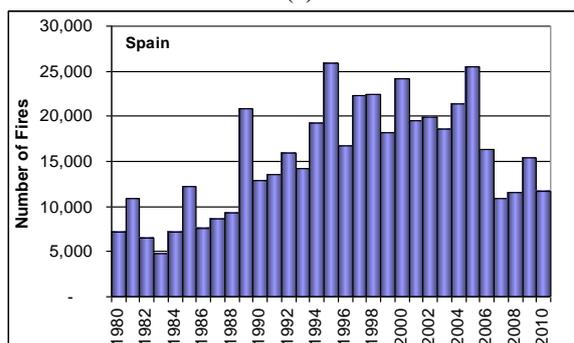
The yearly trends in terms of number of fires and burnt areas during the last 31 years in Spain are shown in Figure 10.

Table 7 Large fires in 2010

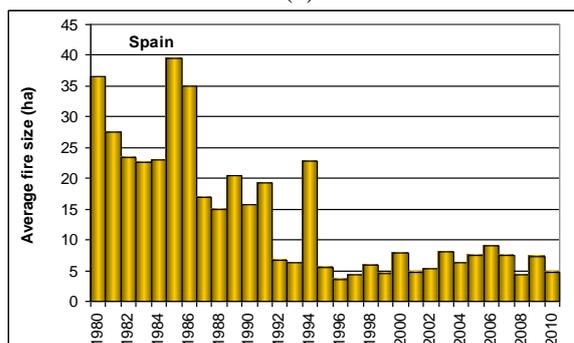
Start date	Province	Municipality	Burnt area (ha)
27/02/2010	GUIPUZCOA	HONDARRIBIA	500.00
17/03/2010	ZARAGOZA	SOS DEL REY CATÓLICO	794.13
30/07/2010	SALAMANCA	VILLARINO DE LOS AIRES	982.53
08/08/2010	LEON	BARJAS	1,077.66
09/08/2010	LEON	ENCINEDO	577.00
24/08/2010	LEON	BENUZA	990.00
29/08/2010	OURENSE	LAZA	1,715.00
30/08/2010	OURENSE	CHANDREXA DE QUEIXA	698.06
06/09/2010	VALENCIA	ONTINYENT	2,512.06
07/09/2010	MURCIA	CALASPARRA	633.00
07/09/2010	VALENCIA	RAFELGUARAF	2,059.35
TOTAL			12,538.79



(a)



(b)



(c)

Figure 10. Burnt areas (a), number of fires (b) and average fire size (c) in Spain for the last 31 years.

### *Prevention measures*

Defense against forest fires is the competence of the Autonomous Regions. The Ministry of Environment coordinates and implements prevention and suppression measures to support the Regions. The measures are the following:

#### Awareness and information campaigns

**School campaigns** - During 2010 there were more than 1 000 presentations in schools and colleges in Spain, giving information to raise awareness on environmental issues, social and economic factors caused by fires, its causes and how it can be avoided. Between 7 and 11 June, there was the final trip for the winners of the competition of this school campaign in the National Centre of Environmental Education (Centro Nacional de Educación Ambiental CENEAM-Valsaín).

**Rural Campaigns** - In these campaigns direct actions are intended for the rural population and include theatrical performances trying to sensitize the population about the most common types of negligence. They transmit a message about the importance of human action to prevent fires. During the campaign 2010-2011, which started in March, a book written by the naturalist and environmental communicator Joaquin Araujo was launched.

#### Coordination Centre (Spanish Forest Fire Service, Ministry of Environment)

The Spanish Forest Fire Service is the administrative body responsible for providing state support to the Autonomous Communities to cover the forest fire under Article 7.2.c) of the Act 43/2003 on Forestry.

During the year 2010, the results of the activities of the different working groups, concerning the coordination of aerial means, forest fire statistics, safety and prevention, were presented and resulted in a document with 17 actions and recommendations. This document was presented in the *Conferencia de Protección de Bosques* held in Valsaín and later approved by the governmental Commission.

A new group for training and management of emergency systems was created, aiming to facilitate the collaboration between the different departments responsible for fire extinction and to promote the sharing of material and human resources.

#### Preventive Work Brigades (Brigadas de Labores Preventivas: BRIF)

The BRIF staff work on prevention measures during the months in which the risk of fire is lower, outside the extinction season. This preventive silvicultural work includes the reduction and control of forest fuels, making the mountains more resistant to the start and spread of fire, and facilitates extinction in the event of a fire. Fuel control is achieved mainly by the breakdown of spatial continuity between the layers of vegetation, through clearings, pruning, thinning, etc. The brigades are made available to government and forest owners, performing those tasks that are necessary to reduce the risk of fire in the mountains. To work on prevention during the season when the fire risk is lower makes it possible to keep the staff that works in extinction activities during the main fire season, increasing the experience of the human resources of this public service.

#### Integral Prevention Teams (EPRIF)

In 1998, after several years of experience and preventive practices, EPRIF were created to develop an intervention in territory that directly affects the population and the problems and causes that often lead to fires. During the 2009/2010 season there were 18 EPRIF teams distributed nationally, in counties and areas of high fire risk. Its main actions are prescribed burning, scrub clearance, awareness and expertise. During this season the 18 teams performed 206 prescribed burnings, 149 awareness activities and collaborated in the extinction of 32 forest fires, among other activities.

### *Extinction activities*

#### Human resources: Teams of reinforcement against Forest Fires (BRIF)

10 BRIF teams were placed throughout the country during the summer season and 5 BRIF teams were placed in the northwest regions during the winter-spring high risk season. These teams comprise highly specialized personnel that are able to act in highly demanding situations. During the 2010 fire season, 415 interventions were carried out by these teams, with a total of 1 554 working hours.

### Aerial means

The aerial means under the responsibility of the Ministry of Environment, Rural and Marine Affairs (MARM) carried out 1 700 fire interventions, with a total of 3 864 flight hours and 20 676 discharges.

### *Expenses*

For the year 2010, the budget for fire extinction reached around 61 million Euro, about 6 million Euro less than the previous year. Of this, 0.7% was used in the Forest Fire Compensation Fund (Fondo de Compensación de Incendios Forestales). For fire prevention, 41.5 million Euro were assigned, 2.5 million Euro less than the previous year. From these, 10 million Euro were allocated to the “removal of residual biomass” and nearly 4 million Euro to silvicultural practices aimed at watershed restoration.

### *Operations of mutual assistance*

In response to requests for assistance, Spain has intervened in 47 cases in Portugal with a total of 200:19 hours of flight time and 401 discharges, using several types of aircrafts, including amphibious CANADAIR of high capacity, military and civil, and also an aircraft of communications and observations.

Israel also received assistance from Spain, in a total of 4 cases, 11:40 hours of flight time and 40 discharges, with 4 amphibious aircrafts CANADAIR.

### *Loss of human lives*

During the 2010 fire season, there were 5 deaths of personnel belonging to the suppression teams.

Table 8. Forest fires in Spain from January 1st to December 31st 2010

PROVINCIAS / COM. AUTONOMAS	SINIESTROS			SUPERFICIES FORESTALES AFECTADAS (ha.)				
	Número		Total Siniestros	ARBOLADA	NO ARBOLADA			TOTAL FORESTAL
	Conatos	Incendios			LEÑOSA	HERBÁCEA	TOTAL	
Alava	22	7	29	8.16	8.66	8.08	16.74	24.90
Guipúzcoa	25	21	46	173.01	438.35	0.90	439.25	612.26
.30Vizcaya	22	19	41	66.11	22.34	57.68	80.02	146.13
PAIS VASCO	69	47	116	247.28	469.35	66.66	536.01	783.29
Barcelona	172	7	179	51.01	94.18	1.17	95.35	146.36
Girona	104	5	109	72.31	19.87	5.59	25.46	97.77
Lleida	74	18	92	47.56	128.40	22.42	150.82	198.38
Tarragona	84	11	95	89.70	78.73	7.94	86.67	176.37
CATALUÑA	434	41	475	260.58	321.18	37.12	358.30	618.88
A Coruña	669	256	925	1,394.10	1,975.69	38.31	2,014.00	3,408.10
Lugo	360	111	471	278.41	745.43	3.90	749.33	1,027.74
Ourense	953	463	1,416	831.92	8,226.99	20.46	8,247.45	9,079.37
Pontevedra	893	147	1,040	530.55	758.03	3.55	761.58	1,292.13
GALICIA	2,875	977	3,852	3,034.98	11,706.14	66.22	11,772.36	14,807.34
Almería	48	35	83	0.76	359.10	6.84	365.94	366.70
Cádiz	44	12	56	12.12	87.95	16.59	104.54	116.66
Córdoba	34	19	53	2.27	24.26	234.46	258.72	260.99
Granada	59	20	79	35.29	204.06	33.49	237.55	272.84
Huelva	67	18	85	30.77	70.81	26.69	97.50	128.27
Jaén	41	23	64	8.33	118.31	68.31	186.62	194.95
Málaga	26	28	54	2.38	71.57	14.84	86.41	88.79
Sevilla	63	16	79	8.80	15.06	39.60	54.66	63.46
ANDALUCÍA	382	171	553	100.72	951.12	440.82	1,391.94	1,492.66
ASTURIAS	848	1,014	1,862	672.21	7,000.23	323.19	7,323.42	7,995.63
CANTABRIA	148	616	764	631.61	5,866.30	1,423.63	7,289.93	7,921.54
LA RIOJA	90	24	114	22.98	235.06	23.80	258.86	281.84
MURCIA	122	17	139	490.29	262.63	10.57	273.20	763.49
Alicante	81	27	108	343.59	482.89	21.67	504.56	848.15
Castellón	52	11	63	19.89	8.21	2.73	10.94	30.83
Valencia	128	29	157	1,141.96	3,611.36	17.20	3,628.56	4,770.52
COM. VALENCIANA	261	67	328	1,505.44	4,102.46	41.60	4,144.06	5,649.50
Huesca	58	24	82	8.31	54.64	10.14	64.78	73.09
Teruel	62	13	75	37.26	3.53	31.29	34.82	72.08
Zaragoza	140	46	186	528.17	391.52	79.18	470.70	998.87
ARAGÓN	260	83	343	573.74	449.69	120.61	570.30	1,144.04
Albacete	73	6	79	14.44	6.76	4.09	10.85	25.29
Ciudad Real	44	27	71	5.58	45.28	71.28	116.56	122.14
Cuenca	91	5	96	6.71	3.26	11.81	15.07	21.78
Guadalajara	81	10	91	19.75	23.87	10.90	34.77	54.52
Toledo	78	50	128	122.99	79.26	181.27	260.53	383.52
CAST. LA MANCHA	367	98	465	169.47	158.43	279.35	437.78	607.25
Las Palmas	52	4	56	6.71	73.51	0.02	73.53	80.24
S.C. de Tenerife	49	6	55	5.79	108.83	3.82	112.65	118.44
CANARIAS	101	10	111	12.50	182.34	3.84	186.18	198.68
NAVARRA	498	100	598	266.21	345.48	40.57	386.05	652.26
Badajoz	82	85	167	114.31	179.27	535.74	715.01	829.32
Cáceres	250	133	383	120.88	622.02	672.55	1,294.57	1,415.45
EXTREMADURA	332	218	550	235.19	801.29	1,208.29	2,009.58	2,244.77
ILLES BALEARS	85	15	100	431.17	158.31	16.36	174.67	605.84
MADRID	158	21	179	0.67	14.97	85.82	100.79	101.46
Avila	113	24	137	27.50	130.02	66.04	196.06	223.56
Burgos	103	37	140	236.17	318.41	268.39	586.80	822.97
León	129	164	293	961.03	3,897.73	191.73	4,089.46	5,050.49
Palencia	37	9	46	11.24	8.78	7.39	16.17	27.41
Salamanca	194	67	261	160.68	1,287.89	395.75	1,683.64	1,844.32
Segovia	35	9	44	2.34	9.20	22.81	32.01	34.35
Soria	39	6	45	2.02	8.92	9.42	18.34	20.36
Valladolid	43	2	45	5.76	25.12	6.94	32.06	37.82
Zamora	89	73	162	123.13	568.21	148.79	717.00	840.13
CASTILLA Y LEÓN	782	391	1,173	1,529.87	6,254.28	1,117.26	7,371.54	8,901.41
CEUTA	0	0	0	0.00	0.00	0.00	0.00	0.00
<b>TOTALES</b>	<b>7,812</b>	<b>3,910</b>	<b>11,722</b>	<b>10,184.91</b>	<b>39,279.26</b>	<b>5,305.71</b>	<b>44,584.97</b>	<b>54,769.88</b>

(Source: Ministerio de Medio Ambiente y Medio Rural y Marino, Área de Defensa Contra Incendios Forestales, Spain).

### 2.1.3. France

#### *Fire danger in the 2010 fire season*

Meteorological conditions were not generally at a high intensity in the Mediterranean regions during summer 2010: the summer was a little warmer and windier than normal, but thanks to abundant rainfall in spring, especially in Provence and Corsica, the vegetation only started to dry out in the second half of July. Heavy rainfall occurring at the beginning of September helped to limit the danger period. The Hérault region, which experienced the largest fires in 2010, is an exception, since the rainfall was deficient during the spring and summer and in general the danger level was higher than in recent years.

However, in the southwest of France, and particularly in the Landes forest, already more vulnerable to fires after the storm of 2009, the fire danger was higher than normal, although not exceptional, due to a marked rainfall deficit during the spring and summer and high temperatures.

#### *Fire occurrence and affected surfaces*

In 2010, 10 300 ha were affected by 3 900 fires in France (10 year average: 22 400 ha, 4 410 fires):

6 180 ha in the Mediterranean regions, of which 5 350 ha (780 fires) were during the summer (compared with 8 360 ha affected by 1 060 fires in the summer of 2009). This represents only 40% of the average burnt area of the last 10 summers, and 65% of the average number of fires, which confirms the progress in this area since 2003;

3 510 ha in the southwest (average 5 000 ha), of which 1 100 ha were in the Landes forest (550 ha for the summer only) against 1 000 ha on average,

710 ha in the other metropolitan departments,

800 ha of tropical forests and woody vegetation were affected by forest fires in the overseas region of Reunion Island.

83% of these fires were less than 1ha in size.

The yearly trends in terms of numbers of fires and burnt areas during the last 31 years in France are shown in Figure 11.

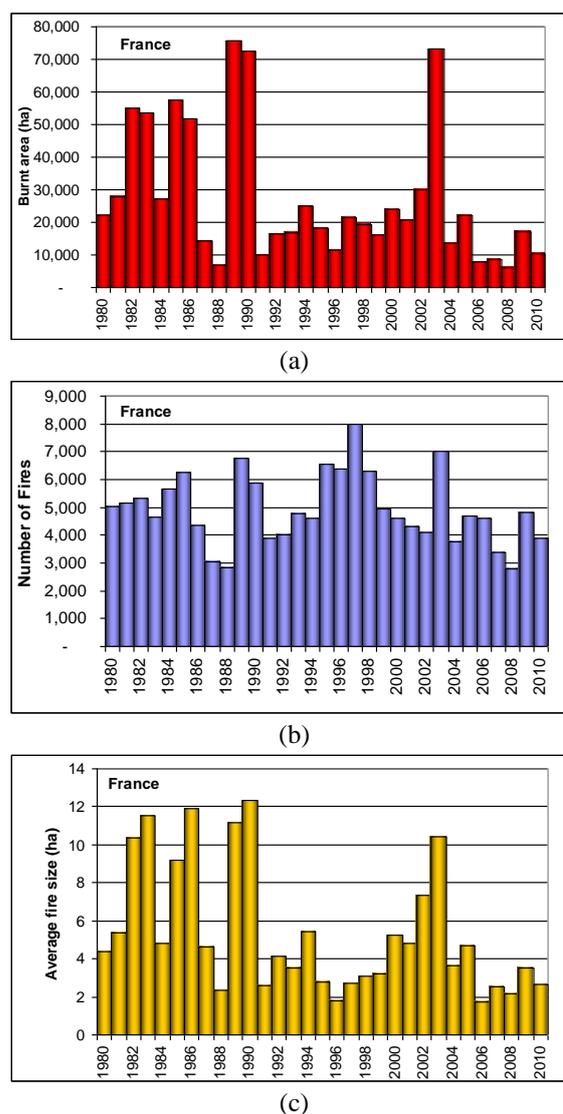


Figure 11. Burnt areas (a), number of fires (b) and average fire size (c) in France for the last 31 years.

#### Mediterranean zone:

The total recorded in the Mediterranean departments is largely influenced by fires that developed in the Hérault on 30<sup>th</sup> August and which burned 2 540 ha in Fontanes and 400 ha in Villeveyrac.

In total, during the summer, only 5 out of a total of 780 fires were more than 100 ha in size (contrasting with an average of 16 over the last 10 summers).

Major fires include those that occurred in Chateaufort in the Bouches-du-Rhône on the night of July 24 (915 ha affected), in Armissan in the Aude, 29 July (225 ha affected), and Cassis (Bouches-du-Rhône) on the night of August 30 (185 ha).

The two fires that developed in the Hérault region on August 30 spread simultaneously in the Mediterranean area most severely affected by drought, along with relatively strong winds and low humidity (below 20%). The outbreak of the Fontanes fire (which was caused deliberately) occurred while the fire at Villeveyrac (407 ha) directly threatened built-up areas, thus requiring a strong mobilization of local and national response teams.

The two large fires that developed in the Bouches-du-Rhône region, (at Châteauneuf-les-Martigues and Cassis), began in the evening when air power could not intervene.

#### Southwest:

This area, contrary to the South zone, had harsher weather than normal.

#### Notable points:

- For fires that developed in the Landes forest, the risk is greatly increased by the effects of the storm Klaus of January 2009, where fallen wood hinders land intervention means and where there is an increased mass of combustible vegetation. The introduction of aerial water bombers in Bordeaux-Merignac helped offset this situation, and consequently the area affected by fires is only slightly higher than the 10 year average (1 100 ha against 1000 ha on average). Three of the 1 110 fires were recorded as burning more than 100 ha (2 in the Landes region at Sanguinet, 170 ha, and Garosse, 130 ha and the third in the Gironde region: Le Teich, 110 ha);
- Fires that have developed in the Pyrenees, especially in late winter. These are most often associated with pastoral practices. They affected 1 550 ha of natural areas, including nearly 900 ha in the Pyrenees-Atlantiques.

#### Overseas regions:

A large fire occurred at Réunion in October, threatening a primary forest in the UNESCO National Park World Heritage Site. To contain the fire, which covered 800 ha, reinforcement means were sent from the mainland, including:

- Support for the command team,
- 94 military formations of civil protection,
- 31 firefighters from Mediterranean departments
- A water-bombing Dash aircraft, crew and maintenance team.

#### *Fire fighting means*

To support the local fire brigade, the direction of civil defence has mobilized:

23 water-bomber aircraft (12 Canadair CL415, 9 Tracker, dedicated to aerial lookout, 2 Dash whose primary mission is to provide a retardant containing line). The water-bombing aircraft intervened in 200 fires in the Mediterranean regions and 40 times in the Southwest, where a detachment of two CL415 was already positioned. In half of the cases, these interventions occurred during aerial watch missions.

725 military sections of the civil defence system contributed in the fight against forest fires. In particular, they formed detachments for fire retardant interventions, a helicopter detachment, and provided two support elements on site. In total, they carried out 570 monitoring field missions, mainly in Corsica, and performed 120 operations.

In the name of national solidarity, a dozen columns of reinforcements, or 900 men with 140 fire engines, can be mobilized in the regions less sensitive to the risk of forest fires, strictly respecting the qualifications and authority of those personnel running these detachments, to reinforce firefighters having to deal with a high hazard or a significant operational activity. They represent a total of 8 800 man-days. On the occasion of the fire in the Hérault region in late August, columns of reinforcements came to strengthen the Mediterranean contingent, at the request of COGIC, from the east, west, Paris, Southeast and Southwest regions, representing a total of 800 men.

Under a protocol between the Ministry of Interior and the Ministry of Defence, 3 helicopters and 260 military operations contributed to surveillance and fire-fighting.

In total, the national means were engaged during the summer in 230 of the 780 fires recorded in the South Défense area, responding to all requests for assistance and participating actively in operational prevention activities.

#### *Forest fire prevention*

##### Prevention Action Planning

The Plan for the Protection of forests against fires (Plan de Protection des Forêts Contre les Incendies - PPFCE) is the cornerstone of prevention action planning for the zones most

sensitive to fire: both forest and similar vegetation (landes, maquis and garrigues). This plan is developed at the departmental or regional level under the Forest Code and can be translated into detailed plans per region, and allows the implementation, monitoring and evaluation of annual priority programs during the time allowed. All the departments of the two Defence and Security zones in the South and South-West of France (32 departments) must have an approved PPFCl.

Outside those territories with a departmental PPFCl there are areas deemed sensitive to fire and which can be subject to a decree for each forested zone with an indication of the communes containing the forest.

All of these provisions also take into account some of the actions to be programmed through the *Plan de Développement Rural Hexagonal* (HRDP).

#### Programming 2010

In total, the actions of prevention and monitoring use a block grant of about 30 million euro of national (Ministry of Forestry MAAPRAT) and European funds in 2010 for the whole of France. The Mediterranean area includes 15 regions, and employs from 1000 to 1300 specialised forest defence personnel against forest fires (DFCI) according to the season. The Aquitaine region, which contains the forest of the Landes de Gascogne, and which is a region characterized by its timber production, has a specific organization of foresters and forest owners organized into syndicates authorized by DFCI.

#### Mediterranean

In the Mediterranean zone, the decentralized services of MAAPRAT and the National Forestry Board (*Office national des Forêts* - ONF) perform general interest missions dedicated to the DFCI. In this area more than 500 forestry staff of the ONF and decentralized services of MAAPRAT can be mobilized and are working in support of the SDIS, through various actions:

- DFCI equipment created or maintained (forest tracks, water points, watchtowers, cutting fuel) ;
- Surveillance patrols and first intervention for emerging fires (area <1 ha) in sensitive areas;

- Managing a network of experts in forest and natural land (anticipation of changes in water content of vegetation);
- The use of sworn forest officials responsible with the support of mayors, the courts and jurisdiction, for reinforcing controls on legal provisions contained in the DFCI Forest Code (conditions for use of fire outdoors, access to forest, clearing operations especially around homes in sensitive areas) or in the environmental code (prevention plans for forest fire risk) ;
- Forestry officers specially trained and responsible at the request of tribunals to cooperate with departmental analysis teams, and research into causes with the firefighters and the services of the Gendarmerie and National Police in search of the causes of fire.

The preventive actions of forest personnel aim to prepare increasingly effective campaigns.

#### *Loss of human lives*

Some fires threatened populated areas. Around 10 buildings were destroyed or severely damaged, but the actions of the emergency services protected the population. In total, there were no deaths among those involved, although about thirty were injured.

#### *Operations of mutual assistance*

The management of the civil security participated in three operations against forest fires abroad:

At the fires that developed in Russia from August 9 to 18, it provided to the authorities a team of experts, a Dash water-bombing aircraft (which performed 51 hours of flight), and 78 000 respirators in response to the request by Russia;

2 CL415 and their crews were made available to Portugal, August 11 to 18, which performed 119 hours of flight.

A team of experts, and a Dash 4 CL415 were made available to Israel from December 3 to 9. The water-bombing aircraft made 121 hours of flight.

*(Sources: Ministère de l'Intérieur - Direction de la Défense et de la Sécurité Civiles; Ministère de l'Agriculture et de la Pêche - DGPAAT, France)*

## 2.1.4. Italy

### *Forest fires in the 2010 fire season*

Forest fires in Italy in 2010, as for 2009, occurred much less in comparison to previous years: the period can be therefore considered one of the best in the last 30 years.

In 2010 4 884 fires were recorded, for a total burnt area of 46 537 ha, of which 19 357 were wooded land.

The yearly trends in terms of numbers of fires and burnt areas in Italy since 1980 are shown in Figure 12.

In Italy forest fires occur in all regions. In winter they are located mostly in the Alpine regions (especially the North-western regions), while in summer they are mostly concentrated in the Mediterranean regions (Southern regions and islands). In Liguria fires occur both in summer and winter at about the same frequency.

Table 9 contains the distribution of fires in 2010 by region. An analysis of such data shows that 2010 was not a critical year, except in the case of Sicily. Indeed, the comparison with historical data on an annual basis shows that only exceptionally there have been fewer fires.

In 2010 the number of fires was about 10% less than in 2009, while the wooded burnt area was about 38% less. As usually, forest fires mainly occurred in Southern regions.

Sicily was the most affected region, with 1 159 fires and the worst burnt area figure occurred (total: 20 258 ha; wooded: 7 242 ha) due to extreme weather conditions.

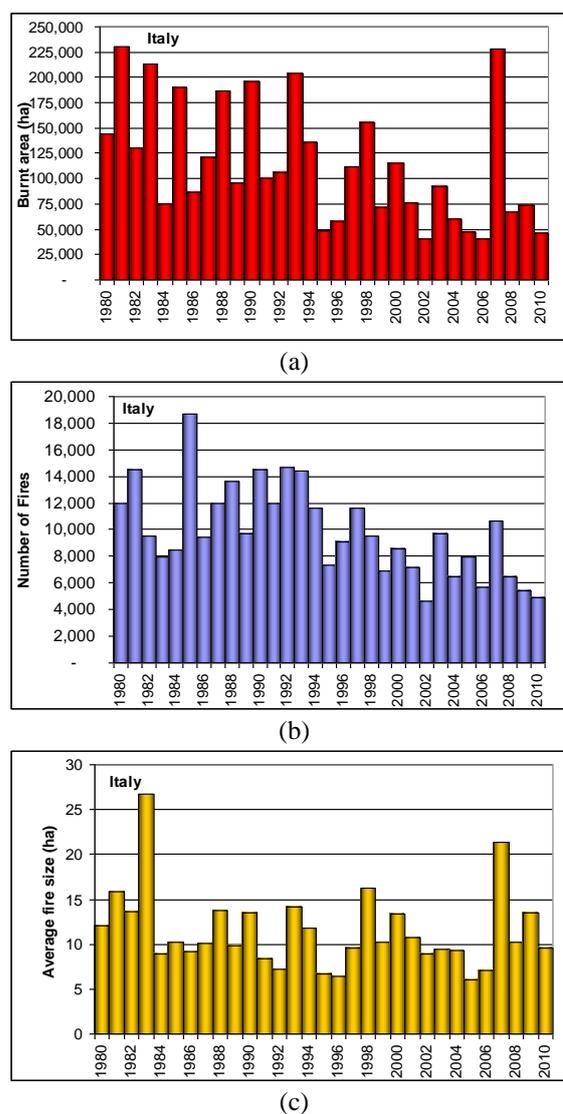


Figure 12. Burnt areas (a), number of fires (b) and average fire size (c) in Italy for the last 31 years.

Table 9. Forest fires by region in Italy 2010.

Region	Number	Surface area affected by fire (ha)			
		Wooded	Non wooded	Total	Average
VALLE D'AOSTA	7	2	1	3	0.4
PIEMONTE	66	132	99	231	3.5
LOMBARDIA	82	151	167	318	3.9
TRENTINO A. A.	39	2	3	5	0.1
VENETO	25	8	4	12	0.5
FRIULI V. G.	53	12	25	37	0.7
LIGURIA	113	162	7	169	1.5
EMILIA ROMAGNA	19	16	5	21	1.1
TOSCANA	165	82	60	142	0.9
UMBRIA	40	80	30	110	2.8
MARCHE	9	41	5	46	5.1
LAZIO	354	2 460	689	3 149	8.9
ABRUZZO	64	160	219	379	5.9
MOLISE	74	87	290	377	5.1
CAMPANIA	543	1 800	551	2 351	4.3
PUGLIA	473	2 066	2 954	5 020	10.6
BASILICATA	150	481	1 638	2 119	14.1
CALABRIA	652	2 439	2 769	5 208	8.0
SICILIA	1 159	7 242	13 016	20 258	17.5
SARDEGNA	797	1 934	4 648	6 582	8.3
<b>TOTAL</b>	<b>4 884</b>	<b>19 357</b>	<b>27 180</b>	<b>46 537</b>	<b>9.5</b>

#### Major fires in 2010

- Calabria region. On July, 23<sup>rd</sup> a big forest fire broke out in Caulonia (Reggio Calabria province). An unknown illegal hunter set the fire before dawn. Reported at 6:00 a.m., the fire was extinguished 30 hours later by means of aerial support comprising 10 Canadair and 1 helicopter. The fire spread over 510 hectares, 120 of which were wooded land.
- Apulia region. On July, 30<sup>th</sup> an arson fire was set in Spinazzola (Bari province). It burned 428 hectares of pasture and posed a serious threat to 1 000 hectares of valuable woodlands.
- Calabria region. On August, 5<sup>th</sup> a fire started due to negligence from cultivated land behind the village of Montalto Uffugo (Cosenza province). The farmer, who probably attempted to weed his property by means of fire, died when the fire burned out of control.
- Apulia region. On August, 12<sup>th</sup> in Alta Murgia National Park an arson fire broke out due to illegal hunting. The fire spread over 298 ha, 233 of which were in an oak wood.

- Basilicata region. On August, 27<sup>th</sup> in Pietragalla (Potenza province) a fire due to negligence started on cultivated land, quickly spreading over 30 hectares, 10 of which were in a wood of turkey oak (both high forest and coppice). This incident is an excellent case-study, as an experimental investigative technique was used. A computer model created on the spreading of the fire and based on the aerial photos of the fire led us to the point of origin. The land-owner confessed the crime and was thus taken to Court.

#### Fire fighting means and information campaigns

Despite the reduction in number of fires and forest fires, Italy is among the European countries where the phenomenon is particularly serious.

In many Italian regions, the majority of fires are detected and extinguished when the fires are of minimal size, so that only few fires escape control. However, these few fires are those determining the greater part of the burnt area and often also affect urban areas and infrastructures, causing serious damage and particular concern.

In synthesis in Italy:

- the number of fires has tended to decrease, although modestly, since 1985;
- there are significant variations from year to year and among regions;

The phenomenon of forest fires is not generalized throughout the country, as about 50 out of the 110 provinces are the most affected and therefore these should receive special attention. The fire fighting system, which in some regions has reached levels of excellence, is globally speaking, rather fragile.

According to the existing national legislation in Italy the Regions have the primary responsibility in the field of forest fires: through conventions and program agreements they can empower the Italian State Forest Service to contribute to prevention, preparedness, coordination in the regional operations rooms and in the survey of burnt areas, and the National Service of Fire Brigades to active firefighting and coordination in the regional operations rooms.

The Italian State Forest Service is also involved in the adoption of forest fire prevention plans for national and regional parks and protected natural areas.

For environmental emergencies (such as forest fires) there is the public phone number **1515** (Italian State Forest Service), active 24 hours a day, which coordinates the activities of specific emergency territorial centres and that is additional to the specific number 115 (Fire Brigades).

Land-monitoring for fire prevention, investigation and law enforcements are carried out independently by highly specialized staff to identify causes of ignition, and are of major importance. Monitoring and analysis of forest fires are supported by computerized procedures that enable the updating of the “LandDossier”, built up for the management of all the territorial information, used both by police and civil protection authorities.

Over the last year the Italian State Forest Service has given special attention to the professional training of staff.

Entrusted by Foreign Affairs Ministry and coordinated by Civil Protection Department, the Italian State Forest Service has also organized a Forest Fire Fighting Course for Al-Shouf Cedar Reserve Officers of Lebanon.

Italian State Forest Service also participated in a decision making program for the “Determination of forest fire causes and harmonization of methods for reporting them”, on behalf of the European Commission and Cemagref (public agricultural and environmental research institute).

#### *Fire causes and investigation activities*

Overall, the investigations against forest fire crimes in 2010 carried out by the territorial offices of the Italian State Forest Service resulted in the reporting of 253 people to the Court of Justice, including 9 taken under arrest or under custody measures for fire arson.

Three motivational levels are usually at the basis of the phenomenon:

- a) negligence, that sometimes appears as irresponsibility, caused above all by the destruction of plant residue or cleaning land and wasteland;
- b) widespread illegality, linked to poaching wild boar; events caused by the people responsible and volunteers for extinguishing; reprisals;
- c) rural criminality, in situations where shepherds are linked to criminal contexts; intention to depreciate lands and woodland; intimidations; interests in subsequent construction and reforestation.

Regarding unintentional fire causes, the trend of previous years is confirmed.

In 2010 fires due to negligence were caused by either the removal of crop residues (123 – 48.5%), the burning of stubble (7 – 6.6%), the cleaning of fallow (27 – 10.5%) or the negligent use of electrical or mechanical motor equipment in wooded or rural areas (19 – 7.6%) which developed sparks causing fires.

Overall, during the period 2000-2010 the actors who have been identified and reported to the Court of Justice correspond to 7.9% of the total number of deliberate fires. In 2010 the percentage was 8.9%. This percentage may be considered satisfactory given the high number of crimes, the framework of widespread illegality characterizing the phenomenon, the broad size of the territories in which they committed the offenses and the multiplicity of motives and causes behind forest fires.

The arrests were all made as a result of complex investigative work in areas repeatedly affected by forest fires. Main investigations were carried out in the regions of Basilicata, Calabria, Campania, Puglia, Marche, where the ignition points were identified, in order to collect evidence of traces of weapons or primers or combustion accelerators, in the search for the forest fire origin and cause.

#### *Loss of human lives*

In Table 10 the number of people that suffered injuries or lost their lives in forest fires during the period 1978-2010 in Italy is given. In 2010, 3 victims and 55 injured people were reported.

Table 10. Injured people and victims of forest fires in Italy (1978-2010)

	<i>Injured</i>	<i>Victims</i>
1978	47	3
1979	32	10
1980	31	4
1981	40	9
1982	27	6
1983	39	15
1984	19	6
1985	93	16
1986	38	9
1987	104	3
1988	80	6
1989	80	12
1990	119	10
1991	55	6
1992	50	6
1993	76	12
1994	37	1
1995	12	1
1996	14	2
1997	97	5
1998	81	6
1999	34	6
2000	70	2
2001	23	3
2002	37	5
2003	75	7
2004	35	2
2005	43	3
2006	17	1
2007	26	23
2008	30	4
2009	12	4
2010	55	3
<b>Total</b>	<b>1628</b>	<b>211</b>

*(Source: Italian Ministry of Agriculture, Food and Forest Policies, Italian State Forest Service, Italy).*

### 2.1.5. Greece

#### *Fire danger in the 2010 season*

From the provisional results of 2010, it is indicated that the burnt area this year was very low in comparison to the annual mean of the last decade.

The 2010 summer was mild without extreme weather conditions and with significant precipitation, especially in the north and west part of the mainland of Greece and the damages were also very low in this area. In southern Greece and the Islands more damage occurred with a larger fire of about 1 200 ha in Kythira Island (Region of Attica), which is located south of Peloponnesus Region. In Samos Island also about 90% of the total damage of the north Aegean Region occurred (Samos is located in the south of this region).

#### *Fire occurrence and affected surfaces*

The provisional results of the fire campaign of 2010 in Greece are shown in Table 11. This comprises combined information according to data available from local Forest Service units and the availability of a mapping of burnt areas for 2010 based on 10 TM satellite images with spatial resolution of 30m. And so, while the available information about the number of forest fires is not complete for some regions (see \*), the respective information about areas burnt with the additional information of the mapping with satellite images should be satisfactory.

During 2010, around 8 967 ha, of which 69% occurred in wooded areas, was burnt (compared with a mean of 49 000 ha over the last 10 years).

Table 11. Number of fires and burnt area in 2010 by regional forest administration (provisional)

FOREST ADMINISTRATION AUTHORITIES	Total number of fires	# fires <1 ha	# fires 1-5 ha	# fires 5-100 ha	# fires 100-500 ha	# fires >500 ha	Total Burnt area (ha)	Wooded Burnt area (ha)	Non wooded Burnt area (ha)
REG. EAST MAC. THR.	17	10	4	2	1		155.30	144.40	10.90
REG. CENT. MACEDONIA	48	19	24	4	1		483.40	451.50	31.90
REG. W. MACEDONIA	39	32	6	1			29.40	23.60	5.80
REG. IPEIROU	133	109	14	10			170.00	141.80	28.20
REG. THESSALIAS	57	43	11	3			90.40	62.00	28.40
REG. IONIAN ISLANDS	95	60	20	13	2		909.84	734.60	175.24
REG. W. GREECE	*92	77	9	6			185.43	135.58	49.85
REG. ST. GREECE	207	160	25	20	1	1	1313.30	814.60	498.70
REG. ATTIKIS	*2	2					2053.97	1873.31	180.66
REG. PELOPONISOU	327	283	29	15			504.62	421.70	82.92
REG. N. AIGAIUO	*11	10	1				1323.44	801.68	521.76
REG. S. AIGAIUO	*4	3	1				959.98	277.58	682.40
REG. KRITIS	*20	10	5	5			788.22	316.84	471.38
<b>TOTAL</b>	<b>1052</b>	<b>818</b>	<b>149</b>	<b>79</b>	<b>5</b>	<b>1</b>	<b>8967.30</b>	<b>6199.19</b>	<b>2768.11</b>

\* Counts not complete

#### *Fire fighting means*

14 555 personnel are involved in suppression efforts, from which 9 168 are permanent personnel of the Fire Brigade which deals also with structural fires. There are 5 387 seasonally hired personnel just for forest fire suppression activities. The Fire Brigade of Greece owns 1 649 engines, which are involved in both structural and forest fire suppression efforts. A few other small engines owned by Municipalities of high risk areas were involved occasionally in some incidents.

The aerial means used in the 2010 campaign are indicated in Table 12.

Administratively this year Greece experienced changes and a reduction in the number of Municipalities (from 910 to 325) in the Country. Given these changes and their involvement in the application of the preventive measures against forest fires, our Service (Ministry of Environment, Energy and Climatic Change – Special Secretariat of Forests) has taken several measures in order to

facilitate cooperation and further improve effectiveness in fire prevention measures:

- developed new standards for fire prevention planning projects,
- will integrate into the forest service the personnel of rural police (about 1300 staff), leading to a higher effectiveness of the patrols to prevent forest fires and other illegal activities that damage forests :
- decentralized further the process of the actions taken by local Authorities to prevent forest fires,
- and managed to increase the fire prevention budget respectively to that of the last year despite the austerity measures due to the economic crisis.

Table 12. Aerial means participating in the 2010 campaign

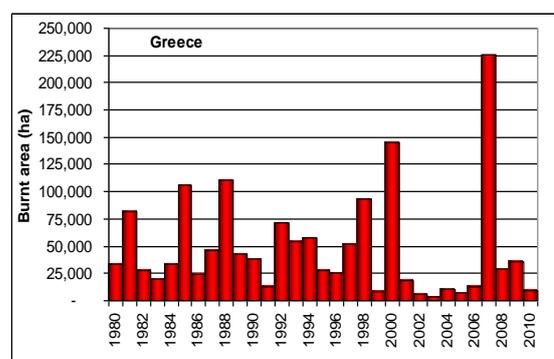
STATE OWNED MEANS			
AIRCRAFTS	LARGE	CL-215	13
		CL-415	8
	SMALL	PEZETEL	18
		GRUMMAN	3
HELICOPTERS		H/P PK 117	3
		SUPER PUMA	2
		H/P CHINOOK	2
		<b>TOTAL</b>	<b>49</b>
HIRED MEANS			
HELICOPTERS		H/P MI-26	3
		H/P SIKORSKY 64	3
		H/P KA-32	1
		H/P MI-8	5
		H/P MI-171	1
		<b>TOTAL</b>	<b>13</b>

#### Operations of mutual assistance

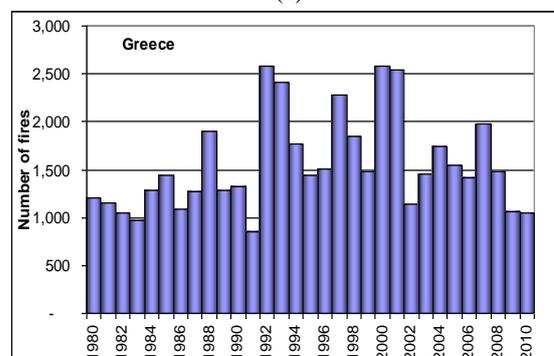
There were no operations of mutual assistance during 2010.

#### Injuries and loss of human lives

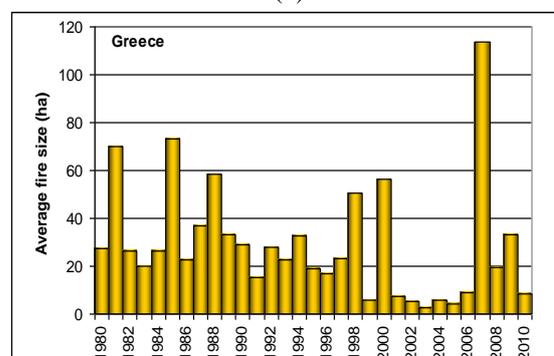
During the 2010 fire season, there were no deaths and no major accidents.



(a)



(b)



(c)

Figure 13. Burnt areas (a), number of fires (b) and average fire size (c) in Greece for the last 31 years

#### 2011 season

In the current campaign (2011) we have experienced up to now (first days of July) significant amounts of precipitation in many parts of the country, which has delayed until now the “real” beginning of the fire season, however also increasing fuel loading.

(Source: Ministry of Environment, Energy and Climatic Change. Special Secretariat of Forests, General Directorate for Development and Protection of Forests and Natural Environment, Greece)

## 2.2. OTHER MEMBER STATES

The situation in the Other Member States of the EU is analysed separately because the figures in terms of numbers of fires and areas burnt differ significantly from those of the Southern States as presented in the previous chapter.

### 2.2.1. Austria

#### *Fire occurrence and affected surfaces*

In 2010, in the east and south of Austria there were several days with a high level of forest fire danger. However, it generally rained after two or three days.

The area of Austria is 83 858 sq km and it is divided into 9 provinces, 15 towns with separate charter, 84 administration districts, and 2 350 municipalities. There are 4 567 voluntary fire brigades and 6 professional fire brigades (Vienna, Graz, Linz, Salzburg, Innsbruck, Klagenfurt). On average there are 2 fire brigades per municipality and a total of around 290 000 fire-fighters. Fire-fighters can follow special courses for forest fire fighting, in particular for actions in the mountain areas, and some of them are specialized for working with helicopters and airplanes. The response time for a fire is between 10 and 15 minutes (except for mountain areas) leading to a very small burnt area per fire (e.g.: ~1 000 m<sup>2</sup>). Largest burnt area was about 7 ha.

Table 13. Number of fires and burnt area in Austria in 2010.

<i>Fire type</i>	<i>No. of Fires</i>	<i>Burnt area(ha)</i>
<i>Wildland fires</i>	537	26
<i>Forest fires</i>	192	37
<b><i>Total</i></b>	729	63

#### *Fire fighting means and information campaigns*

An average of two fire departments per community is standard. They have no special equipment. In the districts there is special equipment in store; for example extinguishing containers for helicopters etc. In the Alps and other mountains they will be supported by helicopters from the army or private companies.

In 2010 there were no special information campaigns for forest fire danger.

#### *Fire prevention activities*

The risks for forest fires in Austria are not a particularly sensitive topic for the Austrian inhabitants. But in the last years there has been a change in this topic.

- The communities write more **regulations** on forest fire danger.
- TV and radio **reports** on current forest fire hazard in Austria. (for example based on EFFIS database)
- A **working group** of ÖBFV (Österreichischer Bundesfeuerwehrverband) worked intensively with the issue of forest fire danger.
- ÖBFV is planning an **EU module** for forest fire fighting with helicopter support. We have special equipment for forest fires in the mountains.
- We are creating a new **database** for the Austrian fire service in cooperation with the University for Agricultural Science in Vienna. This is a part of an interregio project “ALP FFIRS”.

#### *Injuries and loss of human lives*

In 2010 there were no deaths (either firefighters or civilians) during forest fires.

(Source: The Austrian Federal Fire Brigade Association, Austria)

## 2.2.2. Bulgaria

### *Fire occurrence and affected surfaces*

The year 2010 contained two peaks for the number of fires, but the second one was in November – a different period from usual. The spring peak was mainly connected with burning of stubble and vegetable residuals by farmers, and the autumn peak with pasture burnings.

The most affected regions in 2010 were Lovech – 3 000 ha burnt, and Sofia – 2 500 ha.

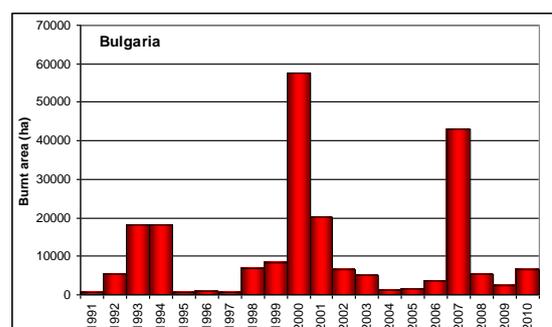
Figure 14 shows trends in the number of fires and burnt areas in Bulgaria from 1991 to 2009. Detailed figures on burnt area and fire causes since 2000 are presented in Table 14.

The main causes of forest fires during 2010 are as follows:

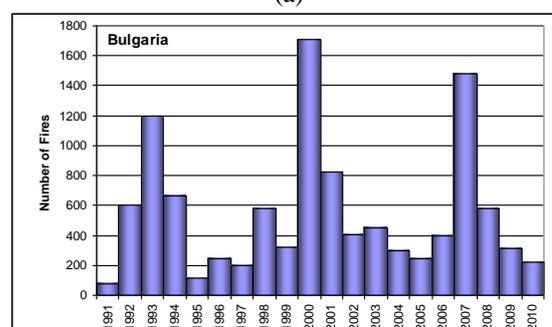
- Carelessness – 175
- Arson - 16
- Natural - 1
- Unknown – 30

The direct losses for 2010 are very low - 40 000 Euro (average costs for the last 15 years are 6 500 000 Euro per year).

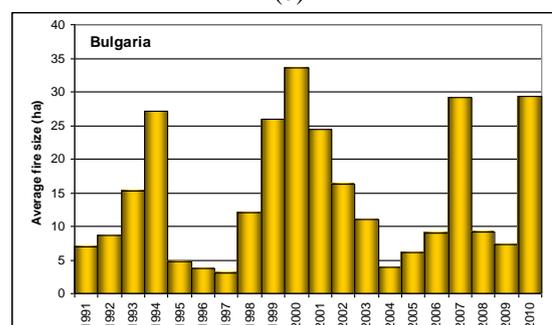
Almost all the activities for forest fire prevention, monitoring, forecasting, suppression, etc. are financed by the state and municipality budget. The Executive Forest Agency in coordination with the National Fire Brigades within the Ministry of Interior are the main responsible authorities on combating forest fires. Through their Regional and Local Units and with the help of the Volunteer Formations, Army, and other stakeholders they organize and implement all the activities against forest fires



(a)



(b)



(c)

Figure 14. Burnt areas (a), number of fires (b) and average fire size (c) in Bulgaria from 1991 to 2010.

Table 14. Forest fire statistics for Bulgaria for the period 2000-2010

Year	Total number of fires	Burnt area [ha]		Fires causes (number of fires)		
		Total	forest lands	human activities	Natural	Unknown
2000	1710	57406	37431	385	18	1307
2001	825	20152	18463	187	19	619
2002	402	6513	5910	150	7	245
2003	452	5000	4284	281	9	162
2004	294	1137	881	172	5	117
2005	241	1456	1456	125	7	109
2006	393	3540	3540	190	9	194
2007	1479	42999	42999	1163	18	298
2008	582	5289	5289	482	8	92
2009	314	2271	2271	242	2	70
2010	222	6526	6526	191	1	30
<b>Mean</b>	<b>691</b>	<b>15229</b>	<b>12905</b>	<b>357</b>	<b>10</b>	<b>324</b>

(Source: Forest Fire Management, Executive Forest Agency, Bulgaria)

### 2.2.3. Cyprus

#### *Fire danger in the 2010 fire season*

After 2009, one of the best years on record for forest fires in Cyprus, 2010 was a worse fire season with a number of fires of great severity. Both the number of forest fires and the total burnt area were considerably higher than 2009, although below the average of the decade 2000-2009. In August 2010, extreme weather conditions prevailed in the island with no precipitation and air temperature reaching 45.6°C, the highest temperature ever recorded in Cyprus during the last 100 years.

#### *Fire occurrence and affected surfaces*

During 2010 in Cyprus, 133 forest fires burnt a total area of 2 000 ha. Most of these fires (55%) were smaller than 1 ha. However, a total number of 11 forest fires with burnt area equal to or greater than 50 ha were recorded.

The trends regarding both the number of fires and burnt areas over the last 10 years (2000-2010) are shown in Table 15 and Figure 15.

Table 15. Number of forest fires and burnt areas in Cyprus from 2005 to 2010

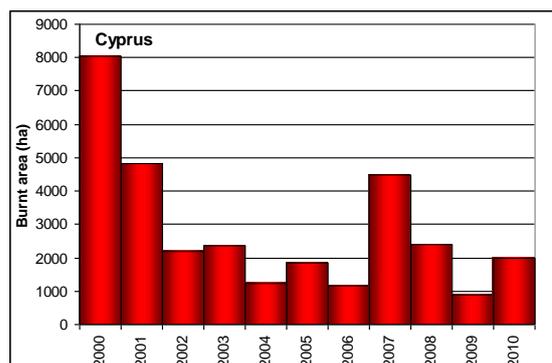
Year	Number of fires	Burnt area (ha)		
		Total	Forest and other wooded land	Agriculture and other artificial land
Average 2000-2009	215	2939	1310	1629
2000	285	8034	2552	5482
2001	299	4830	778	4052
2002	243	2196	166	2030
2003	427	2349	921	1428
2004	221	1218	667	551
2005	185	1838	962	876
2006	172	1160	888	272
2007	111	4483	3704	779
2008	114	2392	1997	395
2009	91	885	460	425
2010	133	2000	1559	441

#### *Injuries and loss of human lives*

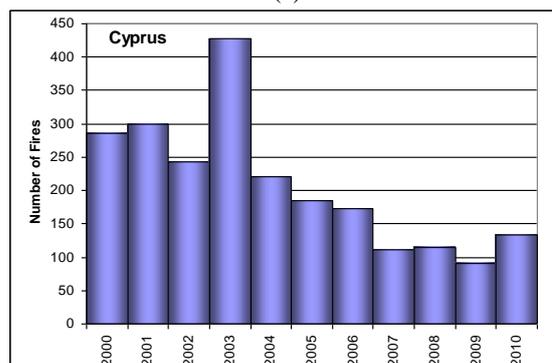
During 2010, one fire fighter was injured.

Out of the total number of forest fires in Cyprus, 59% were caused accidentally or by negligence. Intentional fires (arson) corresponded to 28% and natural caused fires to 8%. Fires caused by agricultural activities represented 29% of the total number of forest

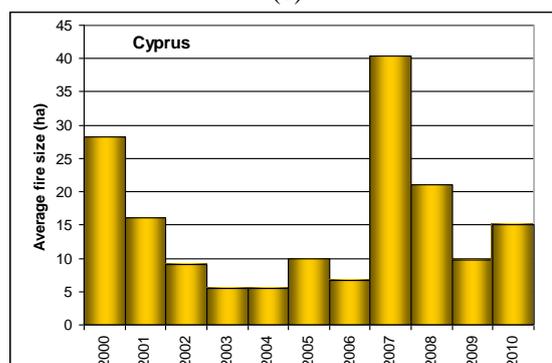
fires (48% of the accidentally caused fires) and were by far the main causes of forest fires in the island.



(a)



(b)



(c)

Figure 15. Burnt areas (a), number of fires (b) and average fire size (c) in Cyprus from 2000 to 2010.

#### *Fire fighting means and information campaigns*

Throughout the year, a campaign aiming to inform the public about forest fire prevention measures and raise environmental awareness was undertaken, especially during the summer period. During this campaign, information was given to the public through television, radio and newspapers in an attempt to raise environmental awareness and concern of the population. Through presentations at schools and army camps, young people were informed about the importance of forests and the necessity and ways to protect them from fires.

Moreover, training programmes on fire prevention and suppression methods were organized for the members of the fire fighting ground forces, as well as for members of other governmental services and volunteer groups.

For the detection of forest fires, 27 lookout stations operated. A number of fires were also detected by forest officers on patrol as well as by citizens living nearby or passing through forested areas.

420 forest fire fighters were recruited during 2010 and were positioned in forest stations all over Cyprus. A large number of fire engines, crawler tractors and agricultural tractors were used in fire fighting operations during the summer of 2010. Additionally, in many fire incidents were used the two fire fighting aeroplanes of the Department of Forests and the three fire fighting helicopters that are leased by the Ministry of Interior every year.

#### *Operations of mutual assistance*

In response to request for assistance, one fire fighting aeroplane and one helicopter were sent from Cyprus to Northern Israel, to help battle the massive forest fire which spread out of control near Haifa, in December 2010.

*(Source: Ministry of Agriculture, Natural Resources and Environment, Department of Forests, Cyprus).*

## 2.2.4. Estonia

In 2010 a total number of 1 737 forest fires and wildfires were recorded; 30 of these were classified as forest fires. Forest fires and wildfires destroyed 1 building. In 2009 there were recorded 2 045 forest fires and wildfires, 47 of these were classified as forest fires. Forest fires and wildfires caused the death of 1 person and destroyed 13 buildings.

Table 16. Forest fires in Estonia 2000-2010

Year	Number	Area (ha)	Average area (ha)
2000	158	683.9	4.3
2001	91	61.8	0.7
2002	356	2081.7	5.9
2003	111	206.6	1.9
2004	89	378.9	4.3
2005	65	86.5	1.3
2006	250	3095.6	12.4
2007	64	292.4	4.6
2008	71	1279.8	18.0
2009	47	59.3	1.3
2010	30	24.7	0.8

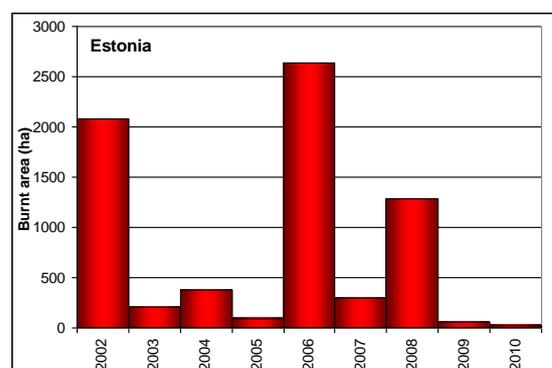
Forest fires in 2010 were recorded in 7 counties. The highest number of fires (13) was in Ida-Viru county. The first fire in 2010 was recorded in April, the last one in August. The largest fire of 2010 occurred in Juli in Ida-Viru county Lügánuse, burning an area of 4.8 ha.

The burnt area, number of fires and average fire size for the years 2002 – 2010 are shown in Figure 16.

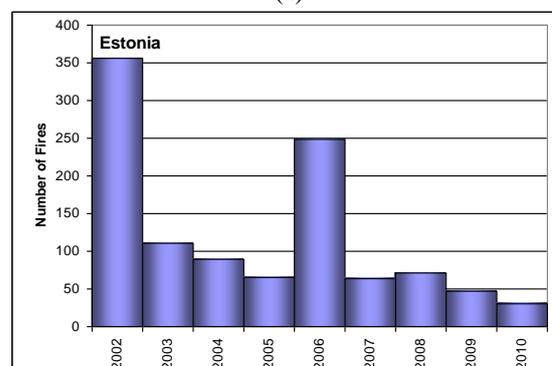
The Estonian Rescue Board is responsible for fighting forest and wildfires. The Estonian Rescue Board cooperates in its operations with the Police and Border Guard Board, Estonian Defense Forces, Environmental Board, State Forest Management Centre, Private Forest Centre, Environmental Inspectorate and local governments. Regional cooperation training sessions in fighting forest fires and wildfires are held for institutions engaged in the process. Forest fires are evaluated as one of the largest emergency situations in Estonia.

### Fire causes

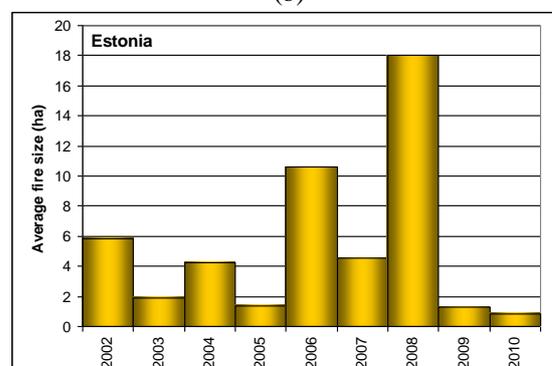
In 2010, 97% of forest fires were of human direct or indirect origin. 53% fires were caused by careless smoking and making fire.



(a)



(b)



(c)

Figure 16. Burnt areas (a), number of fires (b) and average fire size (c) in Estonia from 2002 to 2010

(Source: *The Estonian Environment Information Centre, Estonia*).

## 2.2.5. Finland

### *Fire danger in the 2010 fire season*

Based on information from the Finnish meteorological institute, the summer of 2010 was hot and dry in July, especially in the southern part of Finland. The forest fire index was very high for almost the whole of July. On the other hand, in Lapland there were hardly any fire danger days in the whole year. Figure 18 shows a map displaying forest fire warning days in Finland in 2010.

### *Fire occurrence and affected surfaces*

The forest fires for the year 2010 in Finland were at the normal and average level. The amount of wildfires increased a little and the average size was almost same as previous years. There were 3 100 wildfires in Finland in 2010, of which 1 412 were reported as forest fires (Table 17). The total burnt area was 919 ha, of which 519 ha was forest land. The average burnt forest area per fire was 0.37 ha. Burnt area, number of fires and average fire size are presented in Figure 17.

### *Fire fighting means and information campaigns*

- Finnish military forces acquired seven new NH 90 helicopters, which were available for extinguishing forest fires.
- We also started more initiatives for co-operations between other authorities such as the border guard
- New forest fire aerial officer education started
- Instructions for extinguishing fires by helicopter were published
- Development and integration between operative forest fire management system and prediction system for smoke spread.

### *Fire causes*

The most common causes of wildfires in 2010 were human actions (2 out of 3 fires), mainly by accident. The second most common cause was natural (12% of fires), with thunderstorms being reported as the cause for 328 cases in 2010. In 2010, the fire cause could not be found for just over 10% of the fires.

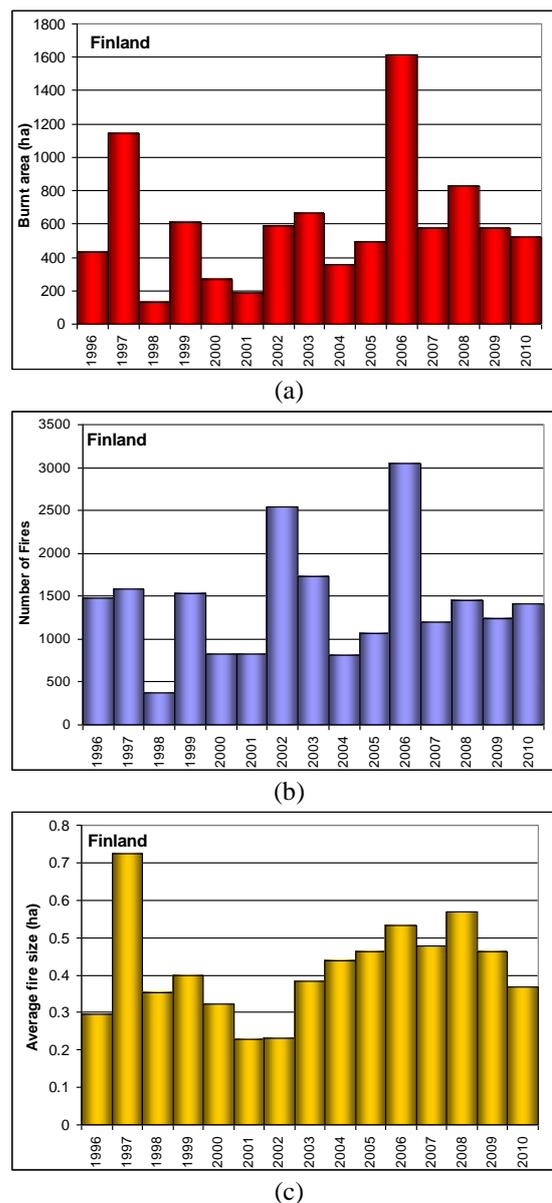


Figure 17. Burnt areas (a), number of fires (b) and average fire size (c) in Finland from 1996 to 2010.

Table 17. Number of forest and wildland fires in Finland (2000-2010)

Year	Forest fires	Non forest fires	Total wildland fires
2000	826	1315	2141
2001	822	1134	1956
2002	2526	2679	5205
2003	1734	2169	3903
2004	816	1453	2269
2005	1069	1628	2697
2006	3046	3360	6406
2007	1204	1714	2918
2008	1456	1784	3240
2009	1242	1599	2841
2010	1412	1688	3100

### *Loss of human lives*

In Finland one person died in forest fires in 2010. Also twelve people were injured in eight different wildfires, resulting in minor burns. Some of the wildfires caused damage to buildings and also a few wildfires were caused by fires in buildings or vehicles.

### *Fire prevention activities in 2010*

There was more cooperation with the meteorological institute and other organisations, and more cooperation with the Russians over forest fires.

### *Operations of mutual assistance*

Forest fire experts were sent to the fires in Russia. There was also other information sharing with the Russians.

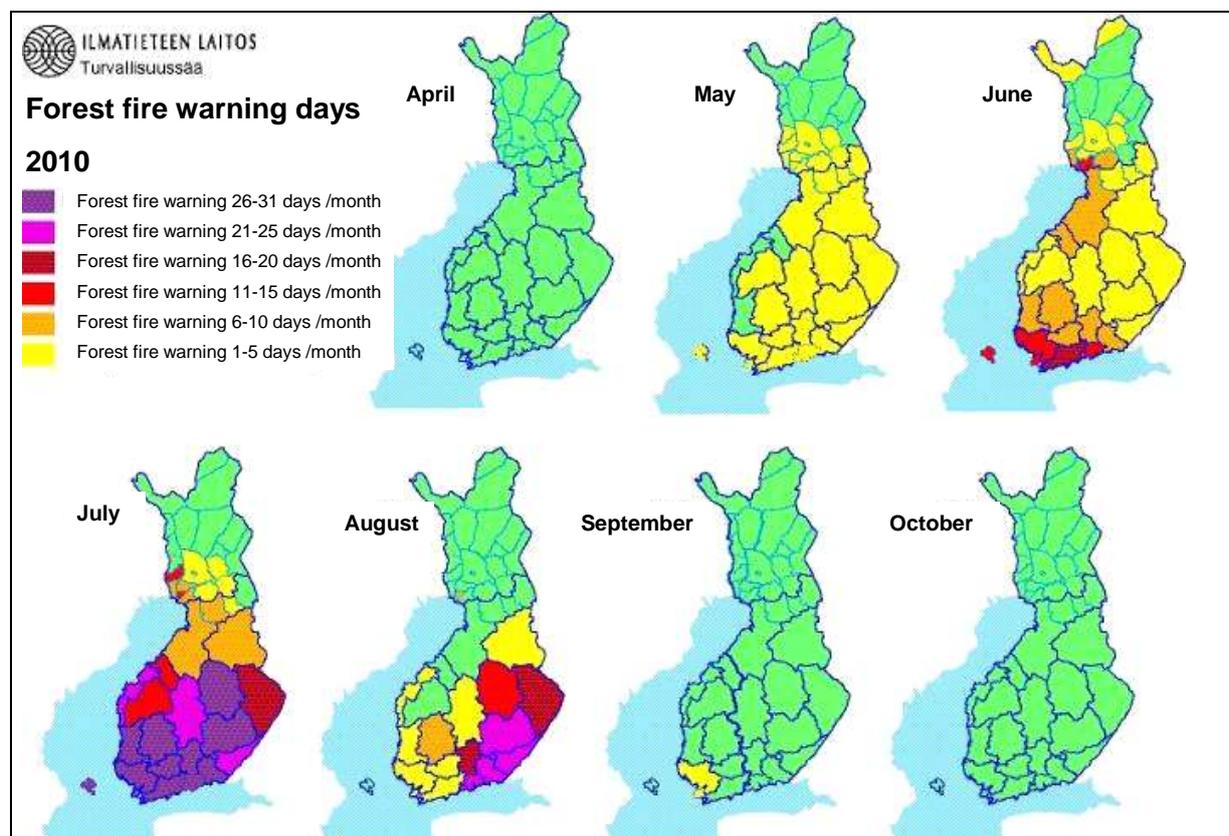


Figure 18. Forest fire warning days in Finland in 2010

(Source: Ministry of Interior, Department for Rescue Services, Finland)

## 2.2.6. Germany

### *Fire occurrence and affected surfaces*

A total of 780 forest fires were reported in Germany in 2010, corresponding to a burnt area of 521.9 ha (353.5 ha in deciduous forests and 168.4 ha in coniferous forests).

The majority of fires occurred in July (362 ignitions), followed by June (160) and April (128).

The trend of the burnt areas, number of fires and average fire size in Germany for the years 1991-2010 are shown in Figure 20.

### *Fire causes and impacts*

The main causes of forest fires during 2010 are shown in Figure 19.

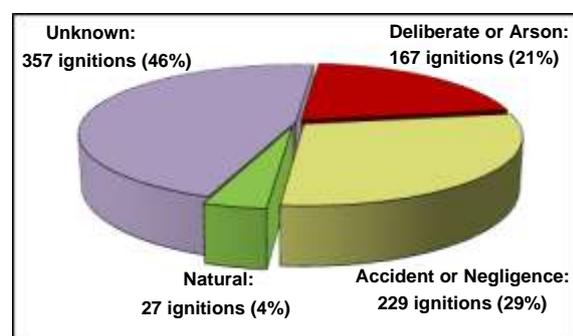
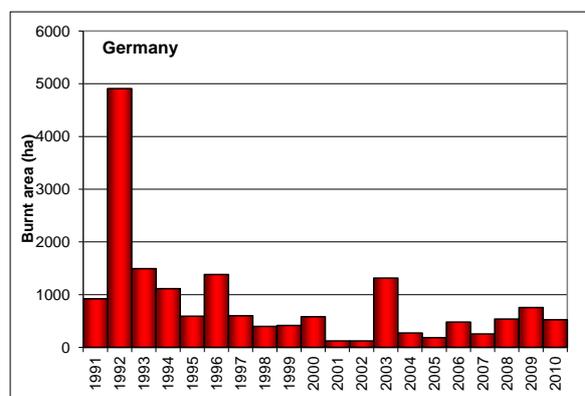


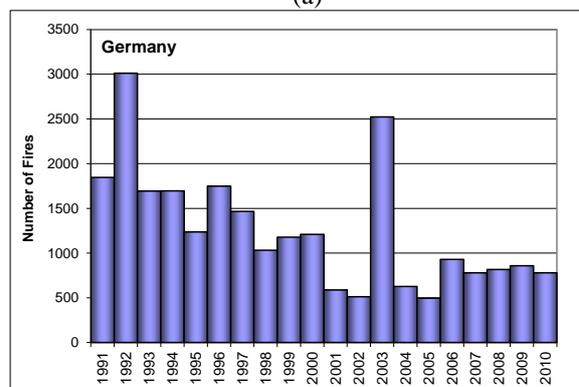
Figure 19. Causes of forest fires in Germany in 2010

The province (Land) most affected in terms of burnt area was Brandenburg with 298.3 hectares resulting from 253 ignitions. Niedersachsen was the second most affected province, with a total of 131 ignitions and 69.2 ha of burnt area (See Table 18).

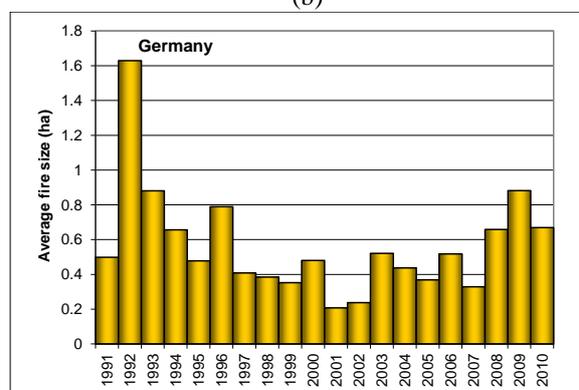
The economic damage caused by forest fires in 2010 is estimated to be 1.2 million EUR, an increase of 93% in relation to 2009. The yearly average from 1991 to 2010 is 2.2 million EUR. In 2010, 2.6 million EUR were spent on prevention measures and surveillance activities.



(a)



(b)



(c)

Figure 20. Burnt areas (a), number of fires (b) and average fire size (c) in Germany from 1991 to 2010.

(Source: Federal Agency for Agriculture and Food, Germany)

Table 18. Burnt area in total and by forest type, and total number of fires, Federal Republic of Germany, 2010

	Burnt area (ha)			Number of fires
	Coniferous forest	Broadleaves forest	Total	
<i>Baden-Württemberg</i>	4.6	2.1	6.7	18
<i>Bayern</i>	23.1	11.1	34.2	102
<i>Berlin</i>	1.0	0.1	1.1	9
<i>Brandenburg</i>	202.7	95.6	298.3	253
<i>Bremen</i>	0.0	0.0	0.0	0
<i>Hamburg</i>	0.0	0.0	0.0	0
<i>Hessen</i>	0.5	0.6	1.1	26
<i>Mecklenburg-Vorpommern</i>	5.7	0.7	6.5	28
<i>Niedersachsen</i>	57.8	11.4	69.2	131
<i>Nordrhein-Westfalen</i>	7.8	0.0	7.8	24
<i>Rheinland-Pfalz</i>	7.7	7.2	14.9	21
<i>Saarland</i>	0.0	3.0	3.0	1
<i>Sachsen</i>	14.1	2.6	16.7	77
<i>Sachsen-Anhalt</i>	27.8	33.4	61.2	70
<i>Schleswig-Holstein</i>	0.4	0.0	0.4	3
<i>Thüringen</i>	0.4	0.5	0.9	17
<b>Germany</b>	<b>353.5</b>	<b>168.4</b>	<b>521.9</b>	<b>780</b>

### 2.2.7. Hungary

#### *Fire danger in the 2010 fire season*

In 2010, the annual rainfall was significantly higher than in previous years. The rain occurred during most of the vegetation period and – similar to the former practice – FWI values were reported throughout the summer.

In July, the fire danger started to rise but it did not reach a very high level until the end of summer. The number of fires was significantly less than in recent years, except for a period in spring.

#### *Fire occurrence and affected surfaces*

Table 19. Number of fires and burnt areas

Year	Total number of wildfires	Forest fires		Other land types
		Number	Burnt area (ha)	Number
<b>2007</b>	6691	603	4636	6088
<b>2008</b>	6639	502	2404	6137
<b>2009</b>	8658	608	6463	8050
<b>2010</b>	3120	109	878	3011

Although the years shown in the table are different, the number of fires, excluding the rainy 2010, was not much less than in 2007 and 2009 when the weather was dry. Table 19 above shows

that only 9-10% of the vegetation fires are forest fires in annual average in Hungary.

Two-thirds of the burnt areas are short grass vegetations burned by the forest fire, as shown in Table 20 below. The numbers of forest fires are in close connection with vegetation fires. The causes of fire are often poorly handled wasteland or grass fires spreading to the forest, or bad handling during slash burning in the intensively managed forests.

Table 20. Burnt area in 2010 by land type

Burnt fuel types in forest fires	Total burnt area (ha)
Forested land	<b>251</b>
Other wooded land	<b>116</b>
Other land	<b>511</b>
<b>Total</b>	<b>878</b>

The yearly trends in terms of number of fires and burnt area during the last 12 years in Hungary are shown in Figure 21.

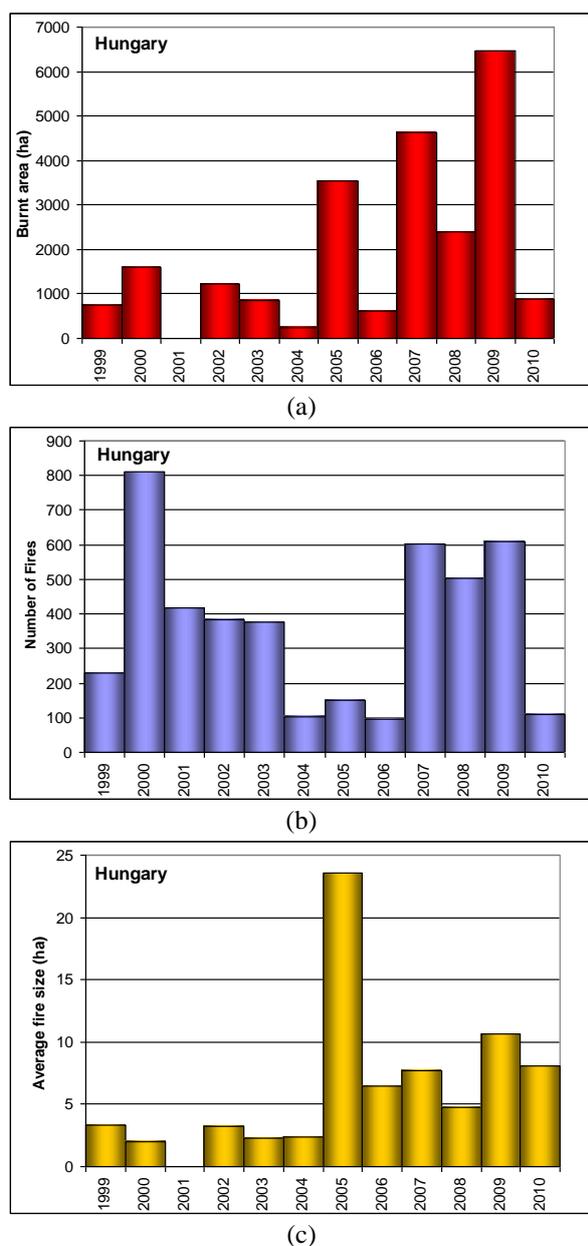


Figure 21. Burnt areas (a), number of fires (b) and average fire size (c) in Hungary from 1999 to 2010.

The data of 2010 demonstrate the trend that there are two separate forest fire danger periods in Hungary. Between 2002 and 2010, most forest fires occurred in February-April and July-August. In 2010, the interval between February and March was the most critical. 70% of fires occurred in this time of the year (Figure 22).

Most of the spring fire events started in Northern Hungary. The number of non-forest fires also is very high. One third of vegetation fires start in this region. During 2010 a total of 878 ha of forest was burnt down. Further, more than 511 ha of grass vegetation and more than 110 hectares of bush vegetation were destroyed in forest fires.

The average burnt area decreased in proportion to previous years. During the rainy summer, a smaller area was burnt than in previous years and there were no extended, long-term forest fires in 2010.

Fires in Hungary can be classified into two categories. Fires smaller than 5 ha (fires in afforestation, surface fires) are in the first category, while crown fires and bigger surface fires are in the second one. The sizes of forest fires in 2010, excluding some special fire events, were not bigger than 2-5 hectares.

The proportion of fires smaller than 2 hectares is more than 40%. The fires are detected early so that the fire service can start the fire-fight quickly. These are usually low-intensity surface fires where dry grass and small branches are burning.

Nearly 95% of fires are between 1-50 hectares. The cause of human-induced fires is usually negligence. Fires above 100 hectares occur very rarely in Hungary. There was only one case of such a fire in 2010.

Ground fires are not significant. 97% of the forest fires registered in 2010 were surface fires. This is the most common type of fires in Hungarian forests. This means more than 90% of the affected area.

There were no crown fires; all fires were surface fires in forested areas in 2010.

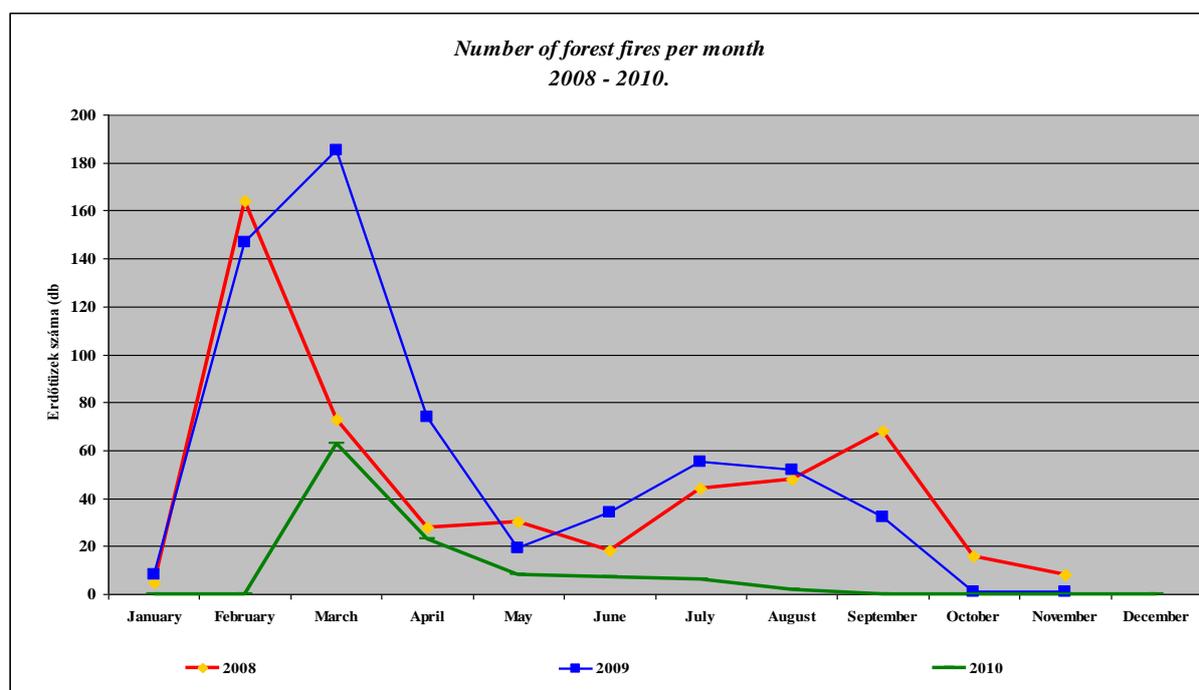


Figure 22. Forest fires by month 2008-2010

#### *Fire causes*

95 % of fires are human-induced. Most fires are induced by (adults' and infants') negligence, and only a small proportion of fires are caused by arsonists. Typical forest fire causes are incorrectly extinguished fires of hikers, and illicit agricultural fires. Natural cause is not relevant in Hungarian forest stands. The majority of the total burnt area was the result of incorrectly extinguished fires.

There are a lot of fires with unknown causes. The cause of the fire is not verifiable directly in many cases. The Hungarian fire investigators register them as "unknown" if the circumstances of the forest fires are undetermined.

#### *Fire fighting means*

On average, fires were extinguished in 1-3 hours after the alarm was raised. Fire service arrived at the fire in 30 minutes on average. Small fires are extinguished in one hour.

#### *Fire prevention activities and fire campaigns*

The forest authority and Disaster Recovery Directorates jointly controlled the forest areas where the forest managers had to make forest fire protection plans in 2010.

The use of FWI was integrated in the fire ban system in 2010. Before issuing the fire ban, Central Agricultural Office (CAO) takes into consideration the FWI values provided by EFFIS.

Fire prevention and fire fighting activities were presented very well by spokesmen of disaster management and forest authority and by media in the frame of awareness-raising campaigns in the last fire season. Media events such as two press conferences, short reports and announcements in newspapers and on the radio and TV were organised accordingly. Supplying data from fire database is a daily task to forest owners, managers and to the media.

The forest fire information system of forest authority was linked to the disaster management's system in the autumn of 2010. The CAO can immediately get information about fire events and make GIS analyses using fire data from 2011. Expert presentations and demonstrations about forest fire prevention and suppression were organised by CAO FD for fire management and forest managers. The webpage of CAO FD is continuously updated with fire prevention information.

#### *Injuries and loss of human lives*

There were no casualties either among fire fighters or civilians during fire fighting in 2010. Fire service equipment was not heavily damaged. There were no deaths or personal injuries during fire fighting in 2010.

(Source: Central Agricultural Office, Forestry Directorate, Hungary)

## 2.2.8. Latvia

### *Fire danger in the 2010 fire season*

In 2010 the forest flammable period was set from April 28 and continued until September 26.

### *Fire occurrence and affected surfaces*

In total, 316 forest fires were discovered and extinguished in 2010, during which 92.2 hectares were burnt. Of these, 38.4 hectares of forest, 37.9 hectares of young stands and 15.9 hectares of other wooded land were affected. Table 21 shows the distribution of numbers of fires and burnt areas by month during the fire season, and Figure 23 shows the locations of the fires in 2010.

In 93 % of cases the fires were detected and put out before the burnt area had reached 1 hectare.

Traditionally, the highest number of forest fires was in the vicinity of the two biggest cities in Latvia – Riga and Daugavpils (93 fires, 38 ha affected area, and 97 fires, 12 ha, respectively).

2010 was the best year in terms of forest fires in Latvia in 20 years.

Table 21. Number of fires and burnt areas by month

Month	Number of forest fires	Burnt area (ha)
April	106	54.7
May	63	7
June	34	9
July	93	21.1
August	15	0.2
September	5	0.2
<b>Total</b>	<b>316</b>	<b>92.2</b>

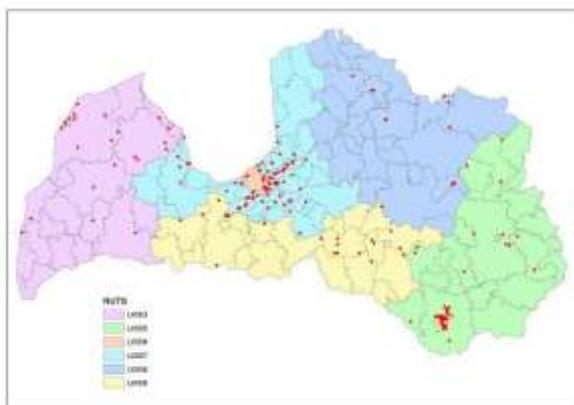


Figure 23. Map of forest fire locations in Latvia in 2010

The yearly trends in terms of number of fires and burnt area during the last 18 years in Latvia are shown in Figure 24.

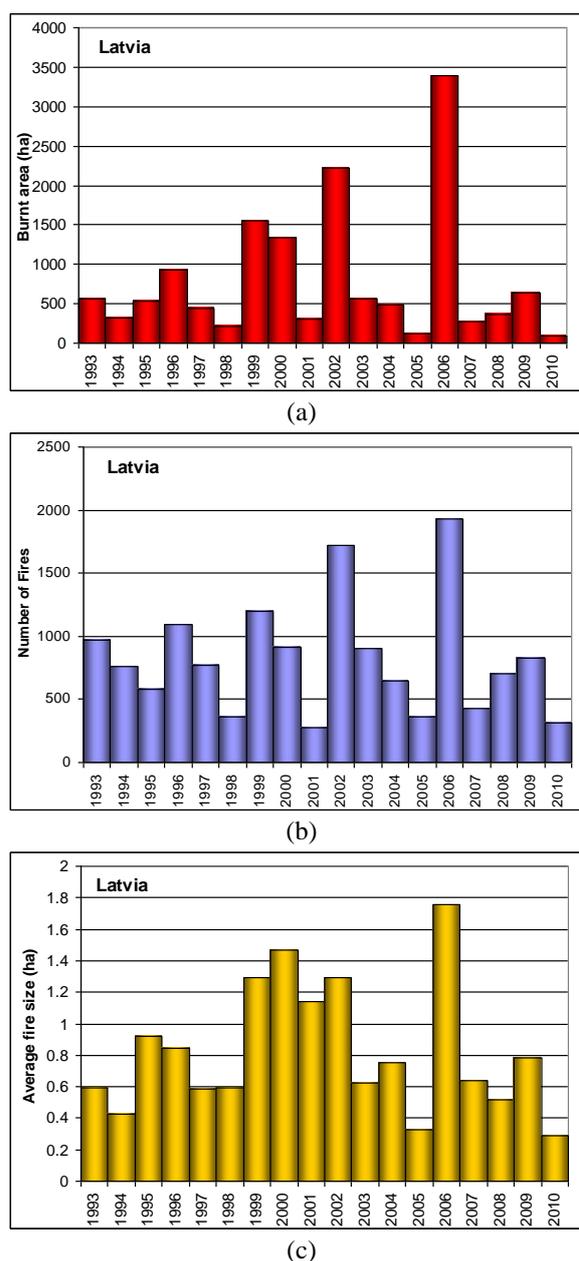


Figure 24. Burnt areas (a), number of fires (b) and average fire size (c) in Latvia from 1993 to 2010.

(Source: State Forest Service, Forest and Environment Protection Division, Latvia)

### 2.2.9. Lithuania

In 2010, according to the data of the Directorate General of State Forests, 104 forest fires occurred and damaged 21.5 ha of forest. Most of the fires (60 %) were in April. All fires were less than 1 ha. Average burnt area was approximately 0.2 ha. Compared with the previous 18 years, both the number of the fires and the total burnt forest land area were the lowest recorded. The total damage was estimated to be 15 000 euro. The yearly trends in terms of number of fires and burnt area during the last 19 years in Lithuania are shown in Figure 25.

#### *Injuries and loss of human lives*

No casualties were reported in Lithuania during the fire season of 2010.

*(Source: Ministry of Environment, Forests Department, Lithuania)*

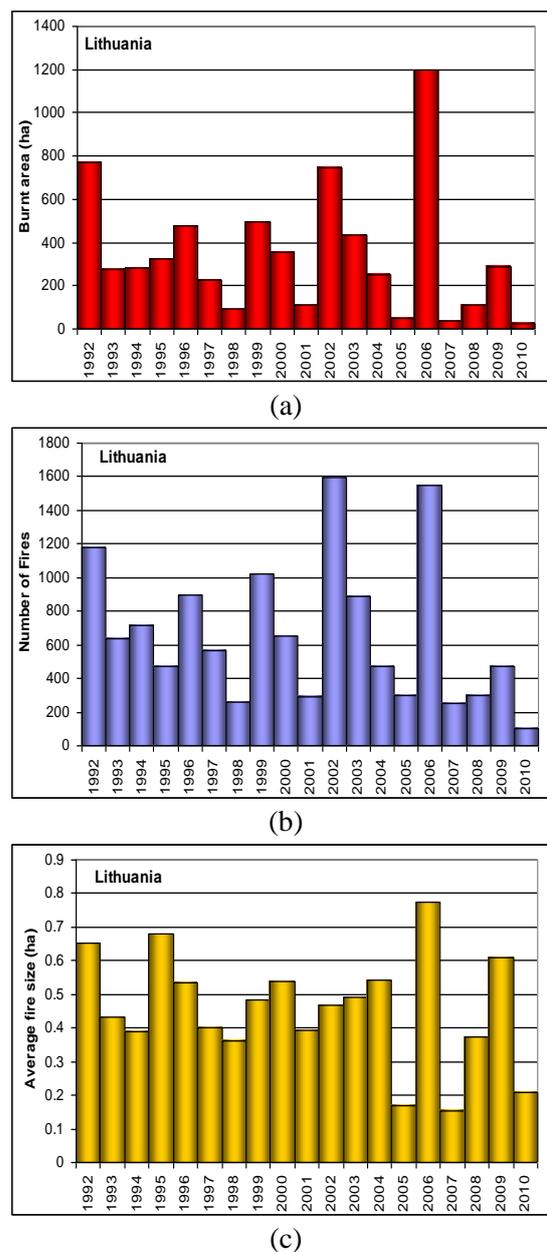


Figure 25. Burnt areas (a), number of fires (b) and average fire size (c) in Lithuania from 1992 to 2010.

## 2.2.10. Poland

### *Fire danger in the 2010 fire season*

The seasonal nature of the occurrence of fires is strictly related to the weather conditions. The diagrams (Figure 26 - Figure 29) show the variations of air temperatures, precipitation, pine (*Pinus sylvestris* L.) litter moisture and the the national degree of forest fire danger risk (NDFFFDR) in the 2010 fire season. They also present the number of fire outbreaks.

The mean monthly air temperatures in 2010 were higher (by about 1°C) than the long-term mean values in the entire country. In April temperatures began to exceed the long term averages. Air temperatures at 9 a.m. generally exceeded 10°C, and reached 15°C in the second part of the month. At 1 p.m. the air temperature oscillated around 15°C, and in last days increased to 20°C. In May the air temperature at 9 a.m. increased by 4°C, however at 1 p.m. it was around 17°C. In June the air temperature increased by another 7°C. In the last days of June at 1 p.m. the temperature reached 30°C. The temperature continued to increase in July reaching 30°C in the morning hours, and 35°C at 1 p.m. In August the air temperature decreased by an average about 4°C, and in September by a further 8°C

The precipitation levels during the fire season in 2010 varied both in terms of the occurrence of precipitation events in time and their geographical distribution. In April it rained every day, and on 6 days average rainfalls were greater than 2.0 mm. The average daily precipitation in April (1.3 mm) considerably differed from May (4.8 mm). In June rainfall decreased to 2 mm daily, and on 18 days there was <2 mm precipitation. In July only one day was without precipitation, 16 days with less than 2 mm of rain and at the end of the month there were 7 days with abundant rainfall. Daily and usually abundant rainfalls appeared throughout August and September.

The mean litter moisture values at the national scale varied between 10 and 59%. Through the first half of April and all May the litter moisture in both terms of the observation was found above thresholds of fire-safety. In comparison to April the litter moisture in May increased from 30% to 42% at 9 a.m. and from 24% to 38% at 1 p.m. In June it decreased to about 12% at 9 a.m. and about 14% at 1 p.m. The lowest litter moisture value occurred in July, when at 9 a.m. the value amounted to 27%, and was only 23% at 1 p.m.

Increased rainfall and reduced air temperature caused the large litter moisture in the last days of July, through all August, and maximum values reached in September.

The highest forest fire danger occurred in July and June. April was a month with the average forest fire danger risk (NDFFFDR = 1.7 in both terms of observations). In May the forest fire danger considerably decreased and seldom exceeded the level 1.0. In June it again increased and reached a level of 1.9 at 9 a.m. and 1.8 at 1 p.m. In July it was higher by 0.1 and was the highest in the fire season. Then in August the forest fire danger again decreased to 1.0, and in September to 0.6. The average national degree of forest fire danger (NDFFFDR = 1.4) in the season 2010 was lower by 0.2 compared with the long-term period 2001-2005.

The percentage share of the occurrence of the third degree of forest fire danger for the fire season was 19% on average, and was 7% lower compared with the period 2001-2005. In July it reached its maximum value of 46%; i.e. it was greater by a factor of about two compared with the period 2001-2005; in June 35% and in April 27%. In turn, in May it was only 3-4%, in August 6% and in September there was not one day with the third degree of forest fire danger.

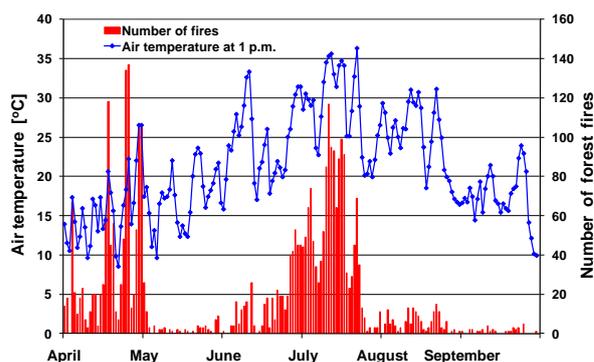


Figure 26. Air temperatures and numbers of forest fires in fire season 2010

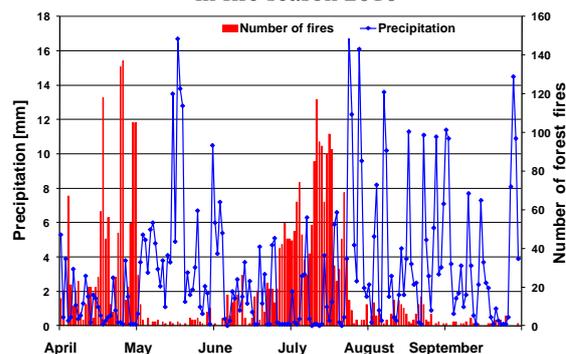


Figure 27. Precipitation and numbers of forest fires in fire season 2010

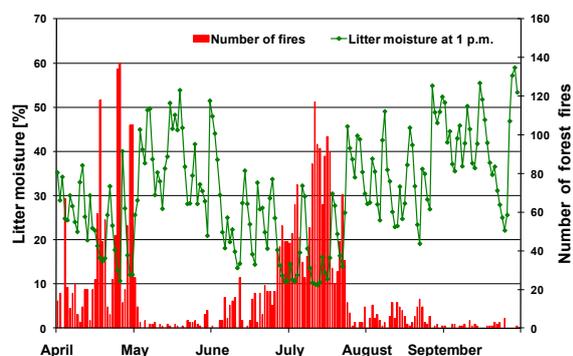


Figure 28. Litter moisture and numbers of forest fires in fire season 2010

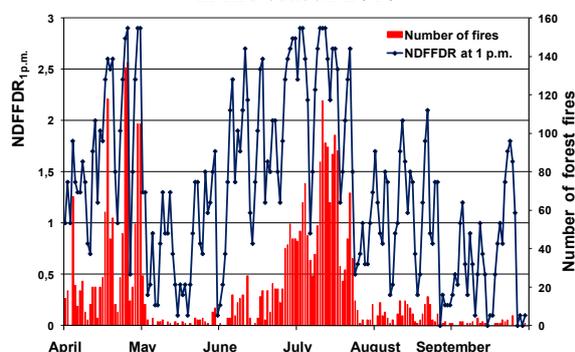


Figure 29. The National Degree of Forest Fire Danger and numbers of forest fires in fire season 2010

#### Fire occurrence and affected surfaces

In 2010 in Poland, a total of 4 680 fires broke out (2 975 forest and 1 705 other non wooded natural land) with a surface area of 2 126 ha (1 358 ha forest and 768 ha other non wooded natural land (Table 22 and Figure 31), about 52% less than in 2009.

The greatest proportion of fires occurred in July (39%, i.e. 1 807 fires) - Figure 30. July was followed by April (29%) and June (12%). The lowest number of fires in the fire season (April – September) occurred in September (1%) and May (2%). 88% of fires occurred in the fire season.

The largest number of fires in 2010, similarly to last year, occurred in Mazowieckie Province (23%, i.e. 1 057 fires). The lowest number of forest fires occurred in Opolskie Province (100) and Podlaskie Province (122). The largest burnt forest areas were recorded in Warmińsko-Mazurskie Province (404 ha), Podlaskie Province (298 ha), Mazowieckie Province (281 ha), Śląskie Province (182 ha) and Dolnośląskie Province (172 ha), with the smallest areas in Opolskie Province (25 ha), Kujawsko-Pomorskie Province (40 ha) and Małopolskie Province (47 ha). These data are illustrated in Figure 32-Figure 34.

Small forest fires, i.e. with a surface area of less than 1 ha, represented 91% of all the forest fires in 2010 (Figure 35), with the burnt area amounting to 31%. The largest share of the burnt area (38%) was recorded for fires of more than 1 ha and less than 10 ha, with their number representing 8%.

Table 22. Forest fire database for Poland in the period 1994-2010

Year	Number of forest fires	Burnt area [ha]	Forest fires average area [ha]
1994	10 710	9 171	0.86
1995	7 681	5 306	0,69
1996	7 924	14 120	1.78
1997	6 818	6 598	0.97
1998	6 166	4 019	0.65
1999	9 820	8 307	0.85
2000	12 428	7 013	0.56
2001	4 480	3 429	0.77
2002	10 101	5 593	0.55
2003	17 088	28 554	1.67
2004	7 219	4 338	0.60
2005	12 803	7 387	0.58
2006	11 828	5 912	0.50
2007	8 302	2 841	0.34
2008	9 090	3 027	0.33
2009	9 161	4 400	0.48
2010	4 680	2 126	0.45
<i>Yearly Average in the Period</i>			
1996-2000	8 631	8 011	0.93
2001-2005	10 338	9 860	0.95
2006-2010	8 613	3 662	0.43

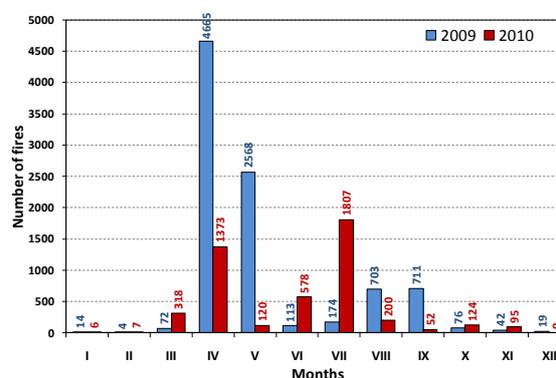


Figure 30. Distribution of number of forest fires by months in 2009 and 2010 in Poland



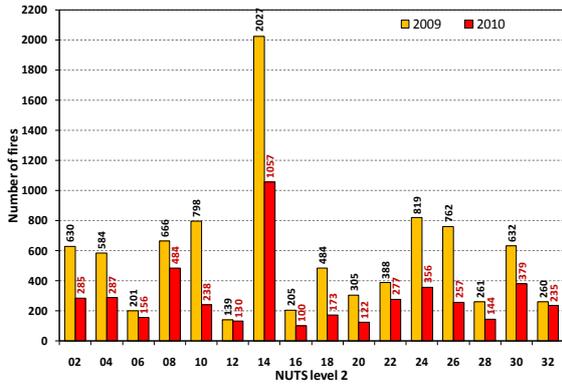


Figure 34. Distribution of the number of forest fires by province (NUTS level 2) in 2009 and 2010 in Poland

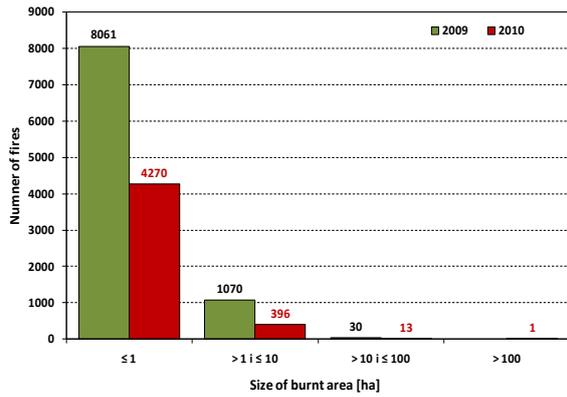


Figure 35. Distribution of the number of forest fires by size of burnt area in the years 2009 and 2010 in Poland

*Fire causes*

Human activity was the main cause of forest fires; specifically arson represented almost half of the fires (43%), followed by carelessness (39%) and unknown causes (more than 16%) (Figure 36).

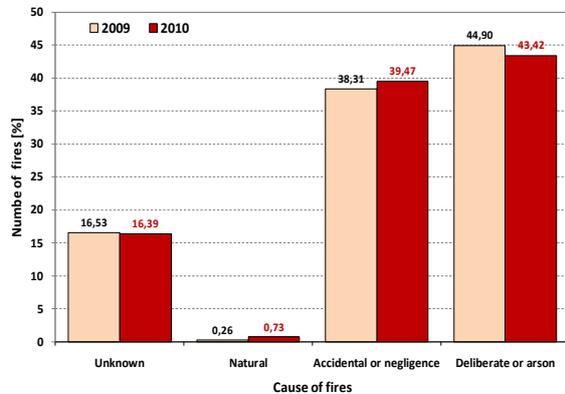
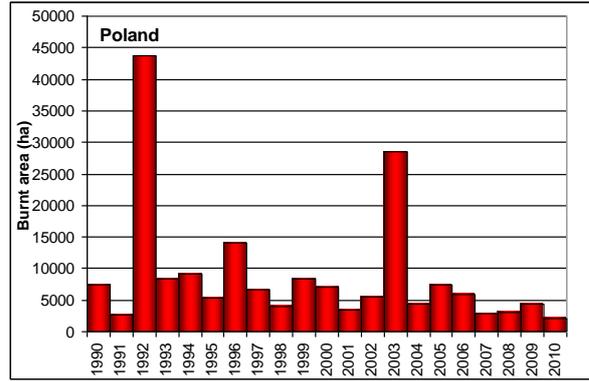
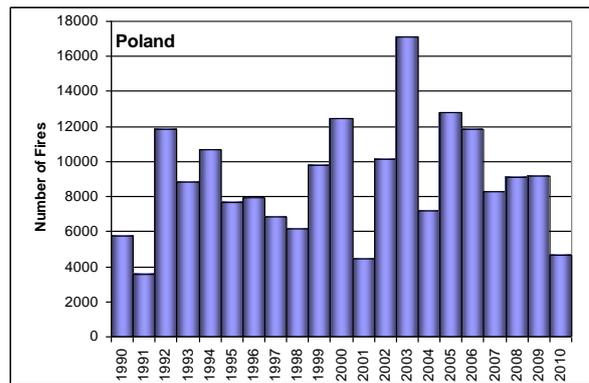


Figure 36. Distribution of the number of forest fires by causes in 2009 and 2010 in Poland

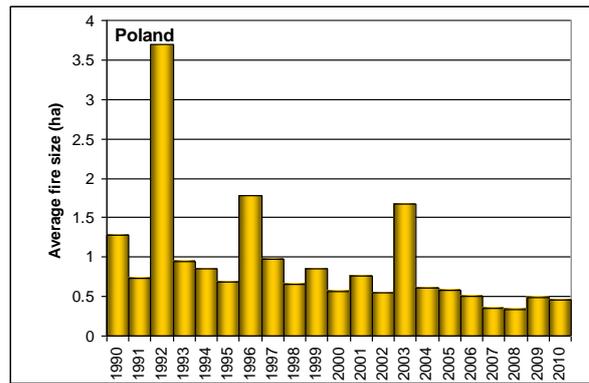
The burnt area, number of fires and average fire size for the years 1990 – 2010 are shown in Figure 37.



(a)



(b)



(c)

Figure 37. Burnt areas (a), number of fires (b) and average fire size (c) in Poland from 1990 to 2010.

### *Fire fighting means and information campaigns*

In 2010, as part of information and promotion activities, the following measures in the State Forests National Forest Holding (State Forests NFH) were taken:

- about 10 000 lectures in schools and youth camps,
- 7 000 information boards were erected,
- 800 communications were provided in the mass media on fire danger and the principles of safe behaviour in forests,
- 90 000 posters, information leaflets and calendars related to forest fires were disseminated,
- 270 competitions on fire protection were organised for children and youth.

In forest areas, works were carried out to prevent the conditions for fire outbreaks and to reduce their spread, by repairing 5 000 km of fuel breaks and building 41 km of new fuel breaks; in addition, forests were cleaned over a surface area of 25 800 ha, by reducing the quantity of inflammable biomass.

The observation system of the State Forests NFH consisted of:

- 646 fire protection lookout points, including 193 equipped with a system of TV cameras;
- 7 patrol airplanes.

The effectiveness rate of fire detection by fire protection lookout points was 38%, airplanes detected 2% of fires and civilians notified 50%. The other 9% of fires were detected by fire protection patrols.

The communication and alarm network in the State Forests NFH consisted of: 7 729 radio-telephones, including 1 286 base sets, 3 073 mobile sets and 3 370 hand held sets.

Water supply for fire suppression purposes was provided by 12 520 water supply points, including 4 699 natural points and 2 673 artificial ones. Moreover, water was supplied by about 5 000 hydrants located in the vicinity of forests.

The State Forests NFH had its own equipment, consisting of:

- 25 fire suppression airplanes and 7 helicopters,
- 378 patrol and fire suppression vehicles,
- 17 medium vehicles,
- 4 heavy vehicles,
- 265 portable pumps.

These means were used to extinguish 6% of all the fires, whereas the other fires were suppressed by units of the State Fire Service and voluntary fire brigades.

In 2010, the fire protection costs incurred by the State Forests NFH amounted to 63 million PLN.

Information on Poland's National Forest Fire Information System can be found on [https://bazapozarow.ibles.pl/ibl\\_ppoz/faces/index.jsp](https://bazapozarow.ibles.pl/ibl_ppoz/faces/index.jsp) and Poland's Forest Fire Danger Map, which is updated daily from April to September (at 9 a.m. and at 1 p.m.), is shown on <http://bazapozarow.ibles.pl/zagrozenie/>.

*(Source: Forest Research Institute, Forest Fire Protection Department,, Poland)*

**2.2.11. Romania**

In Romania, a small deficit of rainfall in the Eastern part of the country was recorded during the spring of 2010 (Figure 39-Figure 41).

At the level of the whole country the thermal regime in 2010 was above the climatological norm. The positive deviation to the normal values was 0.7°C higher than the average reference period 1961-1990 (Figure 38).

The precipitation regime during 2010 was over normal, and the average quantity fallen at the level of the whole country (846.3 mm), compared with climatological norm (637.9 mm), resulted in an excess of 33 %. The high rainfall in the months: January, February, March, May, June, July, September, October, November and December compensated for the precipitation deficits in April and August (Figure 42).

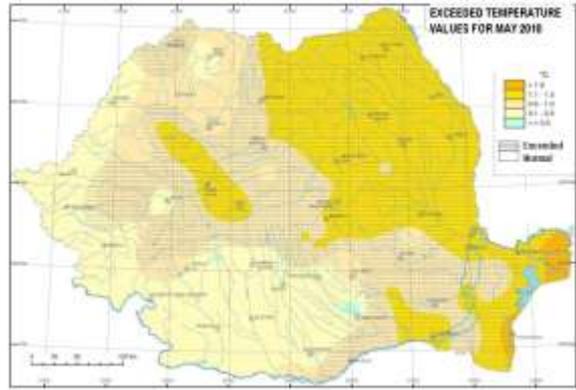


Figure 40. The deviation of the monthly average temperature in May 2010 comparing with the multiannual average temperature (1961-1990).

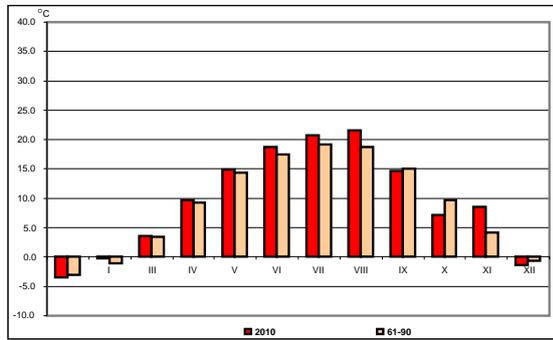


Figure 38. Average monthly temperature in Romania during 2010, compared with the climatological norm (1961-1990)

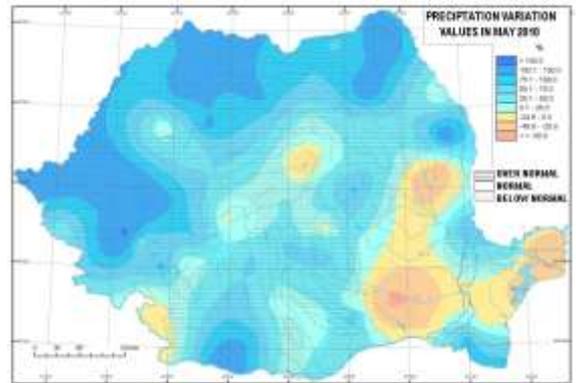


Figure 41. The deviation of the total monthly precipitations in May 2010 comparing with the multiannual average values (1961-1990).

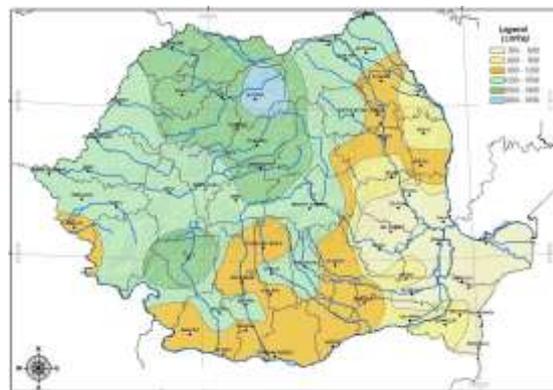


Figure 39. Water soil reserve in May 2010 in the depth layer of 0-100 cm

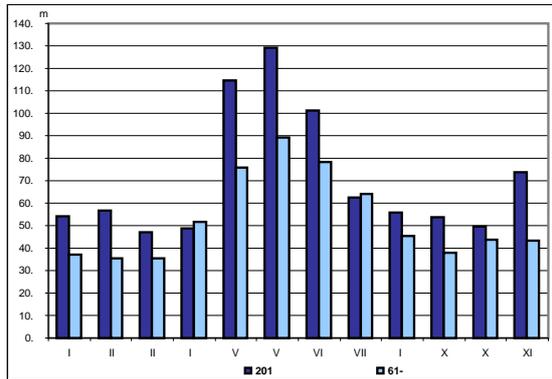


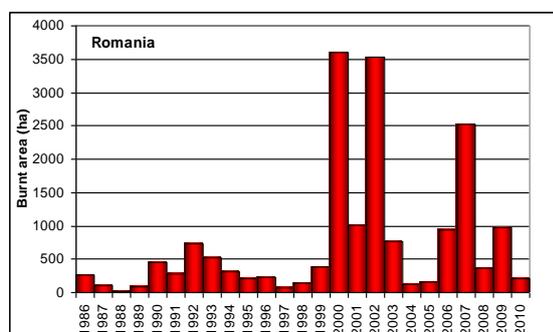
Figure 42. The monthly average precipitations recorded during 2010 compared with the normal climatological values (1961-1990)

*Fire occurrence and affected surfaces*

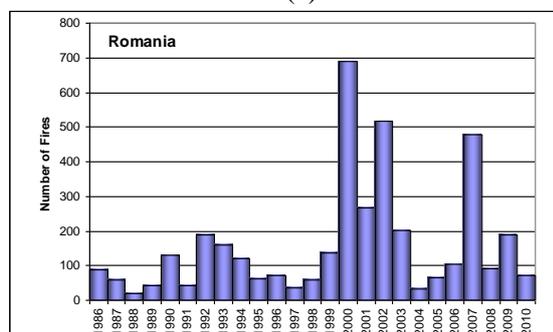
The trend of the burnt areas, number of fires and average fire size in Romania for the years 1986-2010 are shown in Figure 43.

### Fire damages and injuries

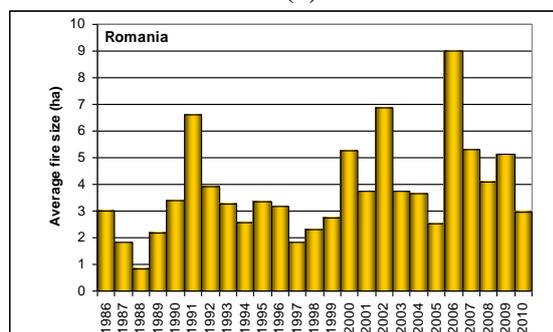
The economic losses due to forest fires were not very high in 2010, because the population and the authorities intervened for extinguishing the forest fires at an early phase. The low economic losses are also determined by the geographic condition of our country, and also by the composition of the forests, because the damages are calculated only for substitution forest value and timber values, and also because young forests were the most affected by fires (Figure 44).



(a)



(b)



(c)

Figure 43. Burnt area (a), number of fires (b) and average fire size (c) in Romania from 1986 to 2009

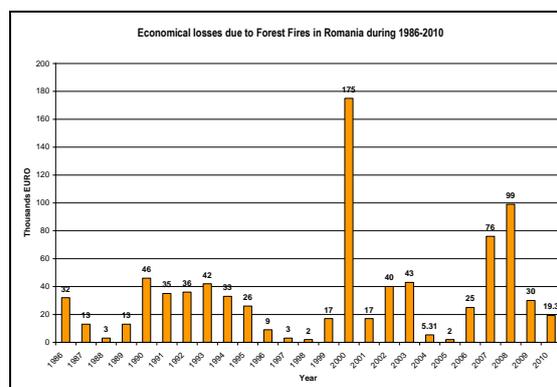


Figure 44. Economic losses due to forest fires in Romania from 1986 to 2010

### Fire fighting means and information campaigns

The prevention and extinguish measures are assured by the Ministry of Agriculture and by the Ministry of Administration and Interior, with their structures (ROMSILVA, Forest Inspectorates (ITRSV), Emergency Situation Inspectorate (ISU) and county and local responsible authorities). A collaboration protocol is also established between these structures at both national and at county (provincial) level.

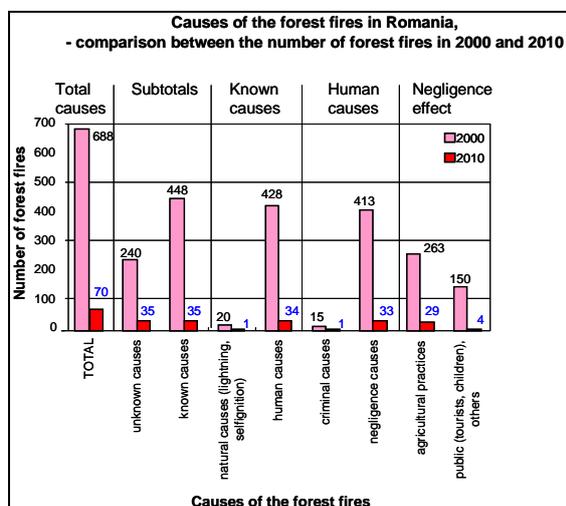
ROMSILVA is responsible for the national (3 467 000 ha) and private forests (1 126 000 ha) that are under its administration and ITRSV is responsible for the private forests that are administrated by private structures (private forest districts) (1 807 000 ha).

(Source: [www.madr.ro](http://www.madr.ro), [www.mmediu.ro](http://www.mmediu.ro)).

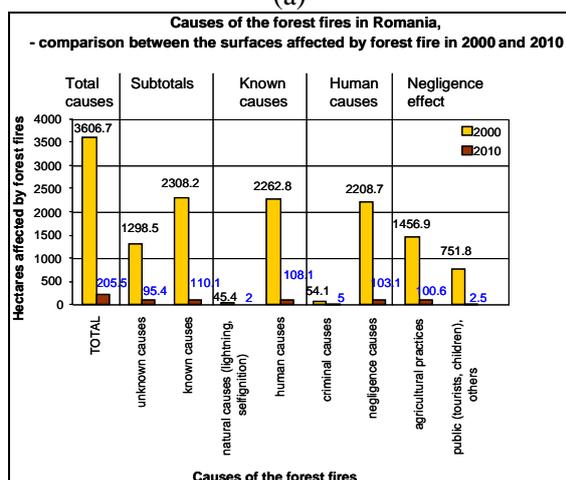
The main legal base is assured by Law 46/2008, also called The Forest Code.

### Fire causes

During 2010, as in recent years, the major causes of forest fires were represented by the agricultural practices of people from rural areas, including uncontrolled ignition of dried plant wastes during vegetation management. The major causes of forest fires with respect to both number of fires and burnt area, compared with 10 years ago, are presented in Figure 45.



(a)



(b)

Figure 45. Comparison of forest fires causes in Romania: 2000 and 2010. (a) Number of fires; (b) Burnt area (ha)

(Source: Ministry of Environment and Forests, Romania)

## 2.2.12. Slovak Republic

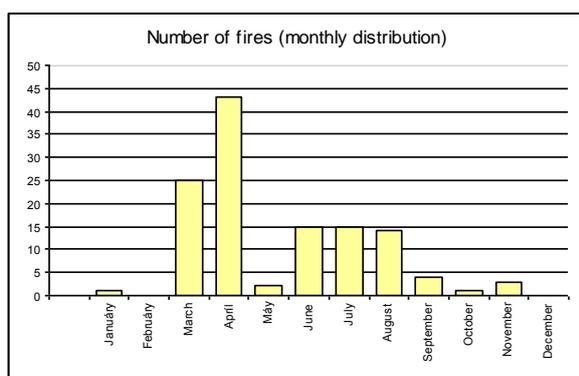
### *Fire danger in the 2010 fire season*

In Slovakia the 2010 fire season was not critical from the point of view of fire danger. The amount of wildfires decreased and the average size was almost the same as in previous years. The number of fires was influenced substantially by the weather, the number of days with rain and the human factor (negligence, particularly) in spring and summer.

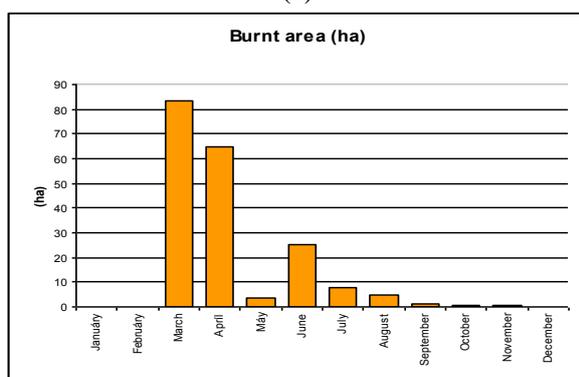
### *Fire occurrence and affected surfaces*

The total number of 127 forest fires was reported in Slovakia in 2010. The total burnt area was 192 ha. The average burnt forest area per fire was 1.6 ha. The largest recorded fire started on the 28<sup>th</sup> March in the district of Hlohovec (Horné Zelenice). In this event, about 50 hectares of forest were burnt.

Figure 46 shows the pattern of fire occurrence and burnt area by month during the year. The burnt areas, number of fires and average fire size for the years 1999–2010 are shown in Figure 47.



(a)

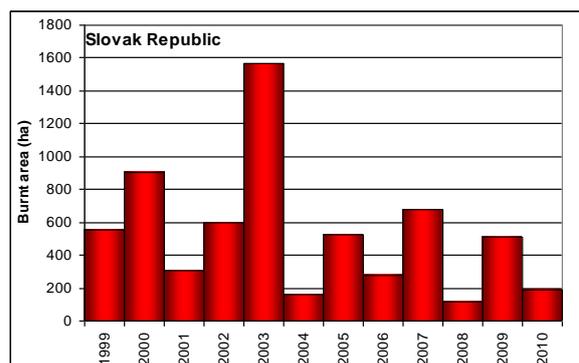


(b)

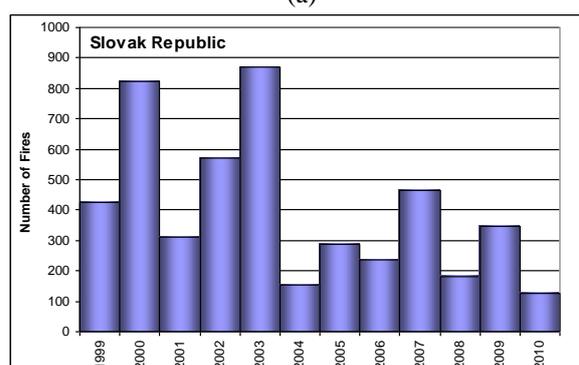
Figure 46. Number of fires and burnt areas by month in 2010

### *Injuries and loss of human lives*

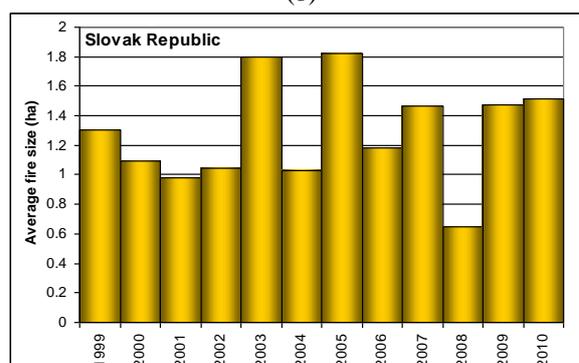
No casualties were reported in Slovakia during the fire season of 2010.



(a)



(b)



(c)

Figure 47. Burnt areas (a), number of fires (b) and average fire size (c) in the Slovak Republic from 1999 to 2010.

### *Fire causes*

Forest fire causes for the years 2002–2010 are shown in Table 23.

(Processed: National Forest Centre - Forest Research Institute Zvolen, Slovakia; Source: Institute for Fires and Expertise of the Ministry of Interior of the Slovak Republic)

Table 23. Fire causes in Slovak Republic in 2002 – 2010 (number of forest fires).

	<i>Year</i>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
<i>A. Basic information</i>	Total fires	570	852	155	286	237	463	182	347	123
<i>Known causes (Human)</i>	Arson	18	31	8	7	8	11	7	18	6
	Negligence (see also B below)	525	780	138	261	201	416	154	286	94
<i>Known causes (Natural)</i>	Lightning	4	3	1	2	3	6	1	3	2
<i>Unknown causes</i>	Unknown	23	38	8	16	25	26	20	40	21
<i>B. Supplementary information: Total negligence</i>	Agricultural operations	239	280	38	91	22	110	25	51	25
	Logging and forest operations	4	2	2		10	23	19	52	25
	Other industrial activities	13	12	0	1	3	2	20	12	5
	Communications (railways, electricity lines, etc.)	2	3	1	2	2	3	3	7	2
	General public (campers, other visitors, children)	263	477	96	163	163	278	81	161	66
	Other (military, etc.)	4	6	1	4	1	0	6	3	0

### 2.2.13. Slovenia

In 2010, according to the data of the Forest Service, 32 forest fires were reported, with a total burnt area of 120.53 ha, of which 23.85 were of forest land. The number of fires was the lowest recorded in the last 9 years and the burnt area was lower only in 2008. The average fire size was 3.77 ha, following an increasing trend during the last 4 years and similar to the figure in 2005.

The yearly trends in terms of number of fires and burnt area during the last 9 years in Slovenia are shown in Figure 48.

Table 24. Number of fires and burnt area by forest management unit in Slovenia in 2010.

<i>Forest management unit</i>	<i>Number of fires</i>					<i>Burnt area (ha)</i>			
	<i>&lt;1 ha</i>	<i>&gt;=1 ha</i>	<i>&gt;100 ha</i>	<i>&gt;500 ha</i>	<i>Total</i>	<i>Wooded area</i>	<i>Bushes</i>	<i>Non wooded area</i>	<i>Total</i>
<i>Tolmin</i>	1	1				4.5	14.8	24.5	43.8
<i>Bled</i>		1				1	0.3		1.3
<i>Kranj</i>									0
<i>Ljubljana</i>									0
<i>Postojna</i>									0
<i>Kočevje</i>									0
<i>Novo mesto</i>	2					0.02			0.02
<i>Brežice</i>									0
<i>Celje</i>	4					0.45	0.04		0.49
<i>Nazarje</i>	1					0.01			0.01
<i>Slovenj Gradec</i>									0
<i>Maribor</i>	1					0.02			0.02
<i>Murska Sobota</i>									0
<i>Sežana</i>	15	6				17.85	13.07	43.97	74.89
<b><i>Total</i></b>	<b>24</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>32</b>	<b>23.85</b>	<b>28.21</b>	<b>68.47</b>	<b>120.53</b>

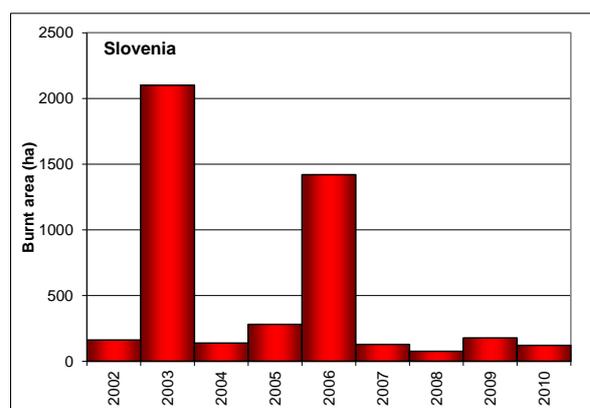
In the year 2010, about 47% of the fires were caused by negligence (Table 25).

Table 25. Fire causes in Slovenia in 2010 (number of forest fires and burnt area).

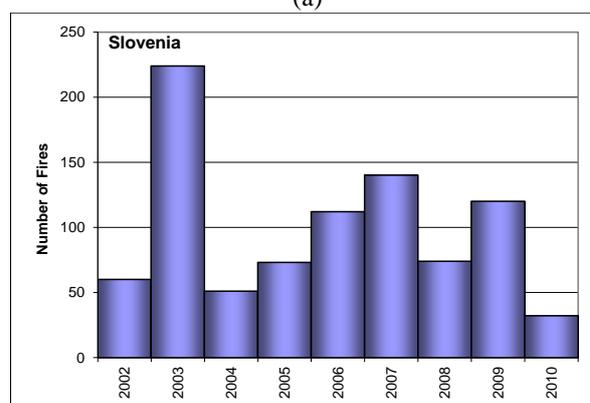
<i>Fire Cause</i>	<i>Number</i>	<i>Burnt area (ha)</i>
Arson	5	2.63
Negligence	15	69.75
Natural (lightning)	3	43.71
Unknown causes	9	4.435
<b>Total</b>	<b>32</b>	<b>120.53</b>
<b>Negligence subcategories:</b>		
Agricultural operations	3	1.65
Logging and forest operations	2	0.02
Other industrial activities	0	0
Communications (railways, power line etc.)	10	68.08
General public (campers, children etc.)	0	0
Other (military, etc.)	0	0

#### *Injuries and loss of human lives*

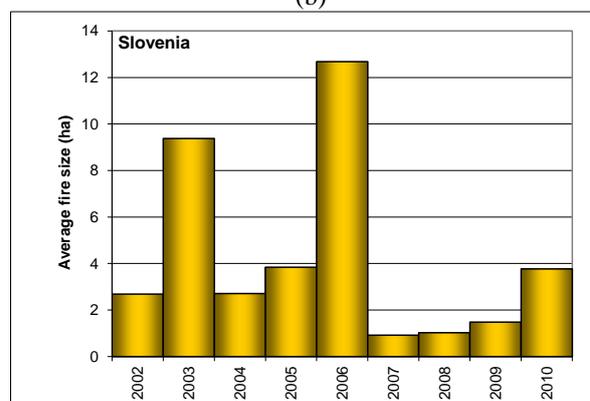
No casualties were reported in Slovenia during the fire season of 2010.



(a)



(b)



(c)

Figure 48. Burnt areas (a), number of fires (b) and average fire size (c) in Slovenia from 2002 to 2010

(Source: Slovenia Forest Service, Slovenia)

## 2.2.14. Sweden

### *Fire danger in the 2010 fire season*

The period of highest fire danger was short and started rather late in the season. This year there was a rather hot period at the beginning of the summer and a lot of precipitation in the middle of the summer in the west part of the country. At the end of the summer only the east part of the country was at high risk. The fire season of 2010 had remarkable fewer fires and a lower burnt area than the mean of the last 14 years.

### *Fire occurrence and affected surfaces*

During 2010 the number of fires recorded was 3 120, burning 144 ha of forest land, 147 ha of other wooded land and 249 ha of other land.

The largest fire recorded in 2010 started on the 22<sup>nd</sup> of July. In this event about 35 ha were burnt.

Below are some images from the forest fire danger maps in the middle of the season where the difference in fire danger from east to west is shown. The risk decreases some weeks later. The hot weather with high fire risk in the east was probably an effect of the impact from the Russian heat wave. The left hand maps show the HBV (Hydrologiska Byråns Vattenbalansavdelning) model and those on the right display FWI (Fire Weather Index).

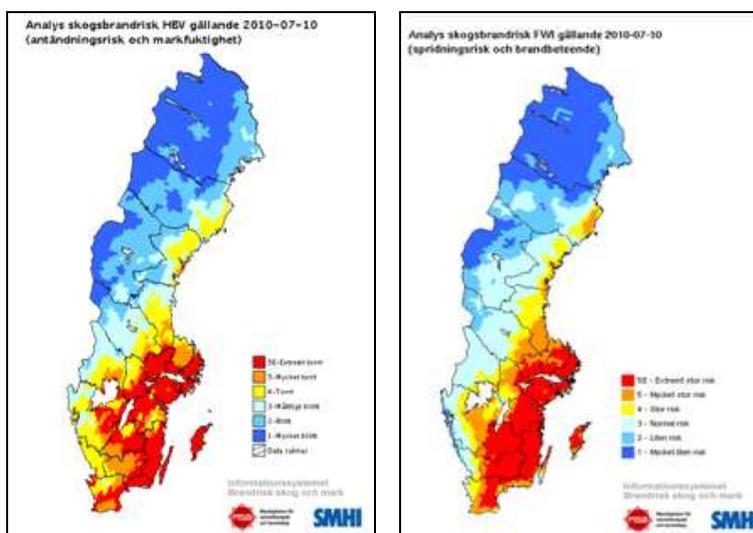


Figure 49. Fire danger maps 10<sup>th</sup> July 2010

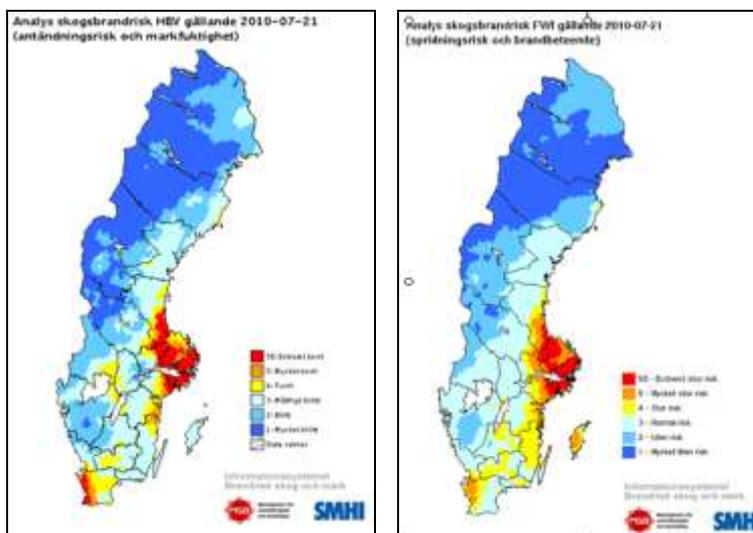


Figure 50. Fire danger maps 21<sup>st</sup> July 2010

Figure 51 and Figure 52 show the pattern of fire occurrence and burnt area by month during the year. Figure 53 shows the dates and areas burnt for the 16 largest fires of the season.

The burnt area, number of fires and average fire size for the years 1996 – 2010 are shown in Figure 54.

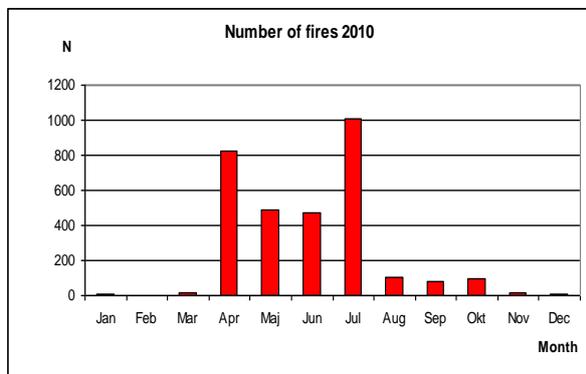


Figure 51. Fire frequency by month in 2010

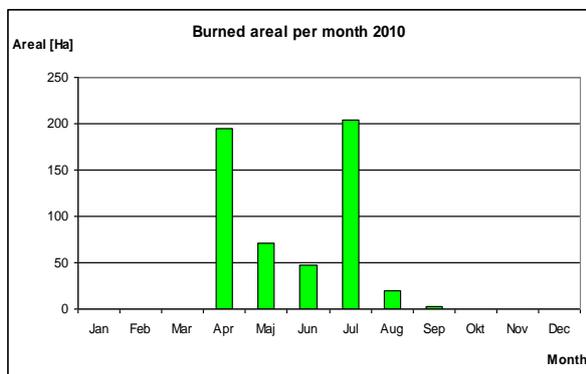


Figure 52. Burnt area by month in 2010

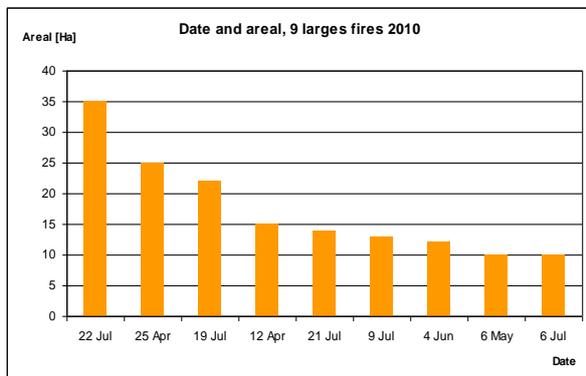
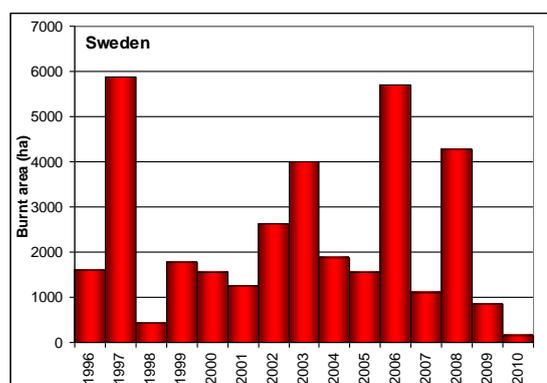
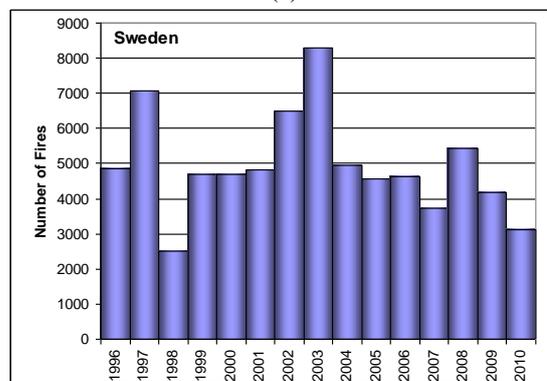


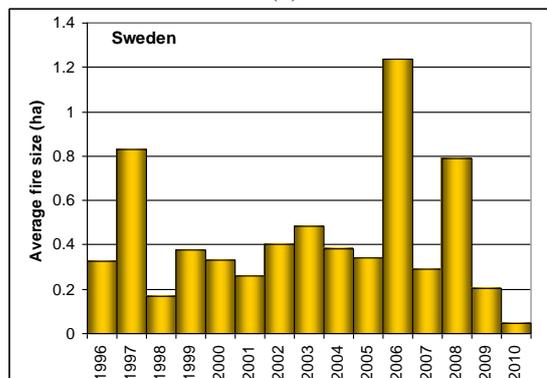
Figure 53. Date and area of the 9 largest fires in 2010



(a)



(b)



(c)

Figure 54. Burnt areas (a), number of fires (b) and average fire size (c) in Sweden from 1996 to 2010.

(Source: Swedish Civil Contingencies Agency - MSB. Risk & Vulnerability Reduction Department, Natural Hazards & Critical Infrastructure Section, Sweden).

### 2.3. OTHER COUNTRIES

#### 2.3.1. FYROM

The Republic of Macedonia covers a total area of 25 713 km<sup>2</sup>, with 997 000 ha of forest land and 1 244 000 ha of agricultural land.

As a result of very specific natural and geographical features there are two climatic types that collide in Republic of Macedonia: Mediterranean and Continental, which results in cold and severe winters and hot and dry summers. The annual average air temperature is 11.3 degrees Celsius with average precipitation of 983.7 mm/m<sup>2</sup> and average sunshine period of 2 450 hours per year.

#### *Fire danger in the 2010 fire season*

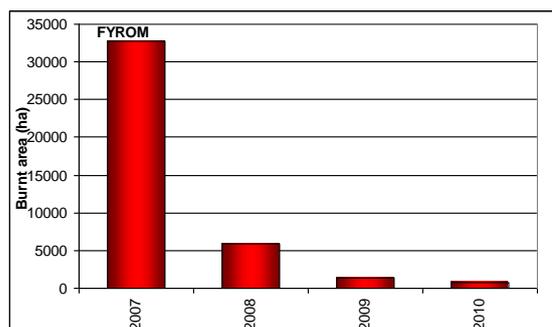
The fire danger in the 2010 season in Macedonia was at a minimum level. The majority of fires occurred in the late spring and during the summer months.

#### *Fire occurrence and affected surfaces*

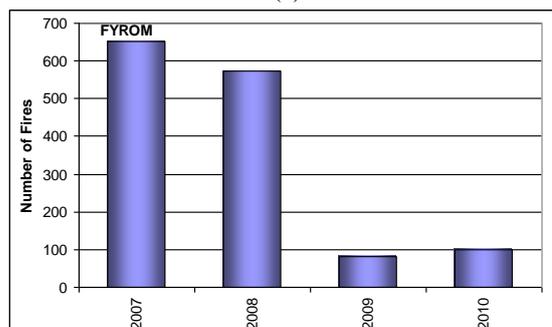
During the year 2010 there were 662 fires, of which 99 were forest fires. The forest land affected was 737.22 ha and 14.95 % of the total numbers of fires were forest fires.

Comparing to the 2009 fire season there were 19 forest fires more in 2010 and the damage from the fires was significantly lower. The comparative charts for burnt area, number of fires and average fire size for the years 2007-2010 are shown in Figure 55.

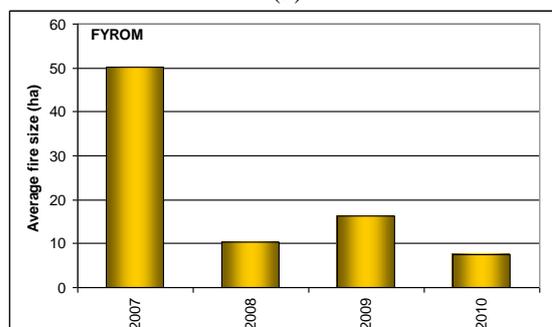
The number of fires and burnt area according to types of fires for the year 2010 are shown in Figure 56.



(a)

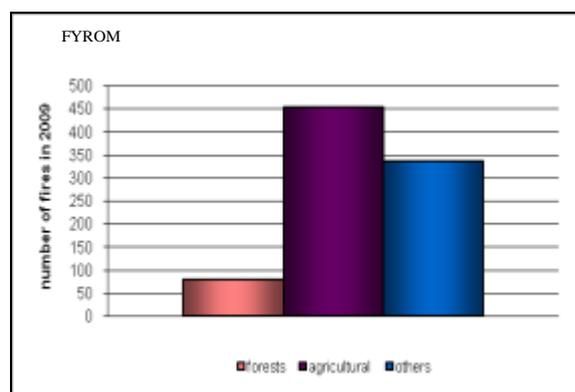


(b)

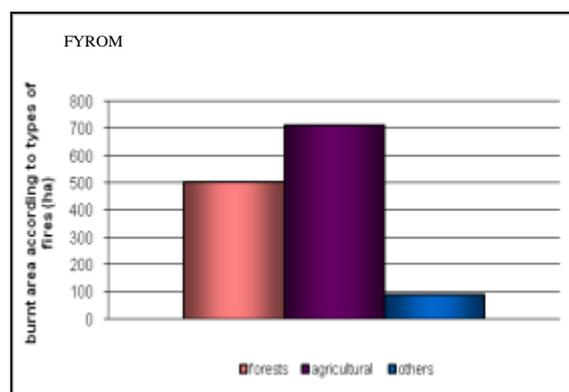


(c)

Figure 55. Burnt areas (a), number of fires (b) and average fire size (c) in FYROM from 2007 to 2010



(a)



(b)

Figure 56. Number of fires (a) and burnt area (b) according to the type of fires in FYROM in 2010

### *Fire fighting means and information campaign*

#### *(a) Information and Public awareness campaigns*

Macedonia developed a public awareness campaign for forest fire prevention under the slogan “*Only you can protect the forest*” under funding of the Protection and Rescue Directorate and Fire Union of Macedonia.

The Protection and Rescue Directorate also promoted a general awareness campaign through TV, radio, press, warning for risky behaviours along with preparation and distribution of leaflets and posters.

#### *(b) Forest fire Prevention*

- 1) Meetings were organized with relevant stakeholders at local level to undertake preventive measures for forest protection;
- 2) Within the Protection and Rescue Directorate a Unit for specialized services with aircrafts was established on 1<sup>st</sup> February 2010 with a total staff of 5 pilots, 2 aviation engineers, 2 coordinators, 4 aircraft technicians and a dispatcher;
- 3) All the necessary training was completed, including: Training of personnel for maintenance and use of the aircraft; Basic Training for pilots on water at Lake Como in Italy with an engine piston aircraft; and Training of the technical structure of the aircraft maintenance. Regular flight training was completed as well with learning ratio of 354/102:09 hours. Annual inspection of all aircraft was conducted along with procurement of critical spare parts and fire extinguishing foam. Practicing the procedures for operation of surface water and discharge of water on purpose was completed.
- 4) 30 firefighting vehicles were procured and preparatory activities were undertaken for the upcoming fire season.

### *Injuries and loss of human lives*

During the 2010 fire season there were no injured or lost lives during rescuing and protecting from fires.

*(Source: Protection and rescue Directorate, Sector for analysis and research, FYROM)*

## **2.3.2. Russia**

### *Fire occurrence and affected surfaces*

The 2010 wildfire season in Russia was the most extreme since 1972. Nationwide, about 2.3 million hectares burned as a result of 32 300 fires (Figure 57).

Across 19 regions of the country, more than 2 000 homes burned in over 100 villages.

Sixty-two lives were lost, including those of three firefighters.

In European Russia, the 2010 fire season was the worst on record. A severe drought combined with record-high temperatures and strong winds occurred between 21 June and 19 August. It is believed that most of these wildfires were caused by carelessness. The general area was represented by conifer and mixed forests, with some areas of peat bogs. The smoke impacts to Moscow, Nizni Novgorod, Cheboksary, and other areas lingered for weeks and, along with the heat, caused pulmonary problems among the population. Russia responded to the wildfire emergency with over 200 000 firefighters, 30 000 trucks and engines, and about 200 aircraft. Fourteen other countries provided assistance. All villages were re-constructed under a government program by 1 December 2010.

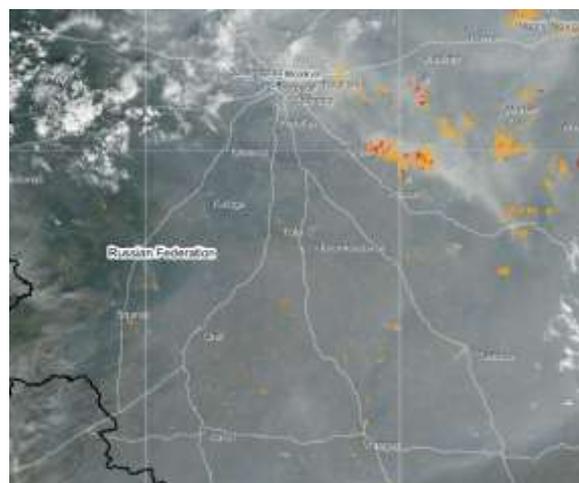


Figure 57. Satellite image showing fires in Russia

*(Source: Aerial Forest Centre, Russia)*

### 2.3.3. Switzerland

#### *Fire danger in the 2010 fire season*

Overall 2010 was just slightly warmer than the mean annual trend (mean 1961-1990). Regionally, Switzerland experienced two dry spells in 2010. The first one in April affected, as usual for the season, the southern Areas (Ticino and Grisons). The second spell was in summer, from mid-June to the end of July. This episode was characterized by very high temperatures often rising over 30°C and leading to increased evapo-transpiration. Overall temperatures in July were about 2.5° to 3°C above the monthly mean trend (mean 1961-1990). This spell affected severely the areas of western Switzerland, roughly from Geneva eastwards to Jura, Basel, Berne and Valais. The June-July spell increased the fire danger in the forests, which became prone to biological infestations (insect pleas). Autumn was also too dry in the same areas, though temperatures were rather low for the season.

#### *Prevention in 2010*

In the harsh mountainous landscapes of Switzerland with steep slopes, even small fires may jeopardise the protective function of the forests. Prevention is therefore the focus of the federal policy. In Switzerland, it is the task of the cantons (regions) to issue warnings or fire bans. The cantons have direct contact with field conditions and the capacity to evaluate the state of fuel (soil moisture, wood, grass, turgidity, etc.) in the forests. The Federal State coordinates and informs over the national territory.

In 2010, many cantons issued warnings during the dry spells; the use of fire was restricted or banned during several weeks in some regions. The population well respected the warnings and bans, which explains the low occurrence of fire events even during these periods.

Communication of fire danger, restrictions, bans and other prevention measures and recommendations occurred mainly by means of radio, television and newspapers or over the Internet, also using the federal platform for meteorological hazards. There was proactive information especially in the cantons of Geneva, Vaud, Neuchâtel, Fribourg, Valais, Jura, Berne, Grisons and Ticino. Some cantons issued bans, special restrictions and/or recommendations on the use of the traditional

great fires and fireworks for the Swiss national day on 1<sup>st</sup> of August.

#### *Fire occurrence and affected surfaces*

For 2010, fires from cantons Ticino, Grisons, Uri, Bern, Basel, Neuchatel and Valais were recorded in the database. A total of 57 forest fires were registered in 2010, burning 26.3 hectares, which correspond to the lowest occurrence since 1980 (Figure 58). Average fire size was 0.5 ha and median fire size 0.1 ha. 46% of the fires happened during the winter season (November to April), when also 42% of the burnt surface occurred.

#### *Injuries and loss of human lives*

No loss of life or major damage to buildings was reported in 2010.

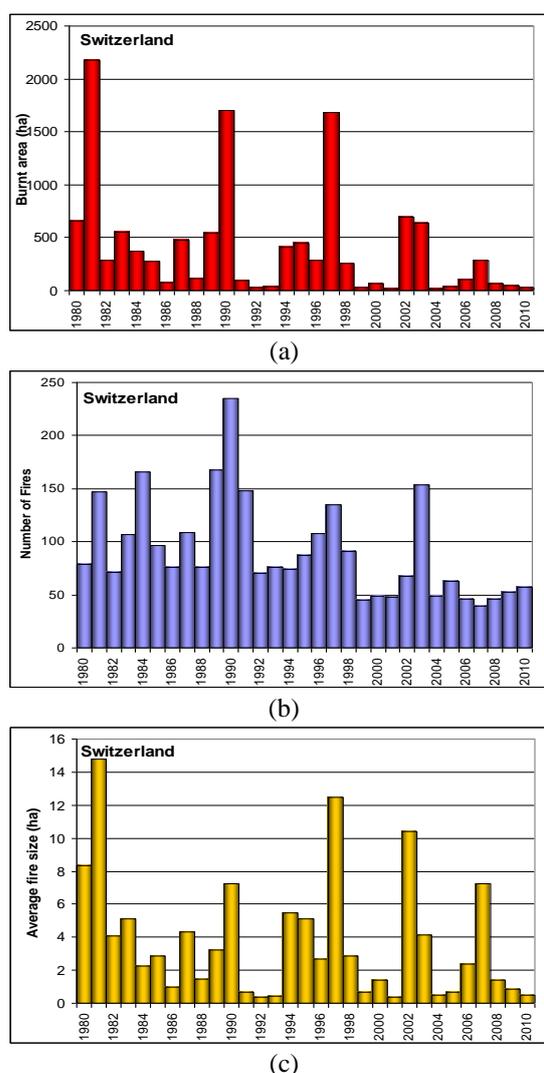


Figure 58. Burnt areas (a), number of fires (b) and average fire size (c) in Switzerland from 1980 to 2010.

(Sources: Federal Office for the Environment, MeteoSwiss, WSL Federal Research Institute, Switzerland)

### 2.3.4. Turkey

#### *Fire danger in the 2010 fire season*

In 2010, the total burnt area was 3 317 hectares, the best figure for the last 5 years and 30% less than that of last year. The number of fires, however, increased reaching 1 861 in the same year.

Basra Low Pressure brought hot air to inner regions of the country, while coastal areas remained colder than inner regions. Evaporation at the sea caused increasing amount of humidity in fuel and air that led to fewer forest fires in coastal areas compared to last year's figures. However, inland parts of the country became more prone to forest fires.

#### *Fire occurrence and affected surfaces*

In Turkey, the coast line, which starts from Hatay and extends over the Mediterranean and Aegean up to İstanbul, has the highest fire risk. In other words, approximately 60% (12 million ha) of Turkey's forest area is located in fire sensitive areas.

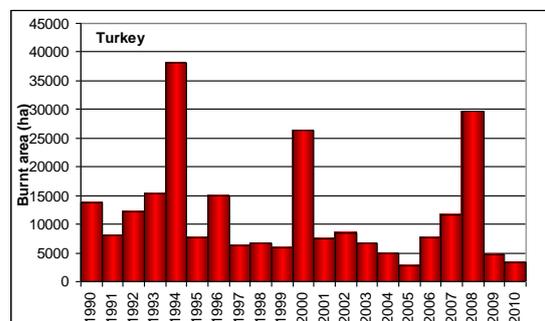
Forest fires mostly occur during the period of May-November, particularly in June, July and August. When we look at the number of forest fires, we see that August ranks the highest with 514 fires damaging 1 773 ha of forest (53 % of the total burnt area: see Table 26). 88 % of the forest fires occurred during the fire season (between May and November) in 2010 damaging 3 046 hectares of forests

Table 26. Monthly distribution of forest fires in Turkey

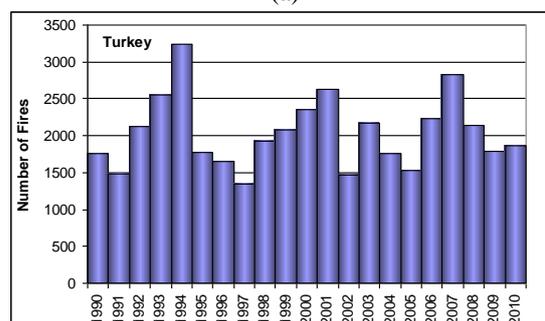
Month	Number of Fires	Burnt Area (ha)		
		Wooded Land	Shrub land	Total
Jan	18	13	7	20
Feb	14	15	5	20
Mar	39	26	5	31
Apr	60	8	13	21
May	116	43	24	67
Jun	168	75	77	152
Jul	297	228	200	428
Aug	514	1,525	248	1773
Sep	339	272	99	371
Oct	87	17	59	76
Nov	132	154	25	179
Dec	77	115	64	179
<b>TOTAL</b>	<b>1861</b>	<b>2,491</b>	<b>827</b>	<b>3317</b>

Fortunately, around 71 % of the fire incidences were controlled before spreading. There were no fires bigger than 500 hectares and there were only three fires that exceeded 100 ha (totaling up to 997 ha): see Table 27.

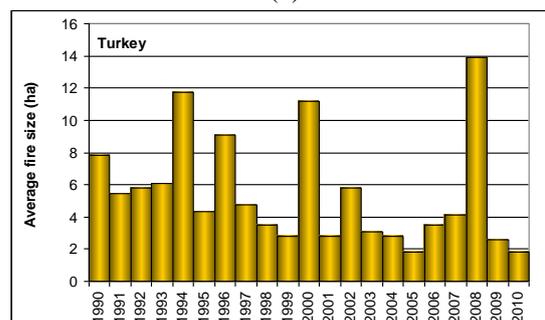
The burnt area, number of fires and average fire size for the period of 1990-2010 are shown in Figure 59.



(a)



(b)



(c)

Figure 59. Burnt areas (a), number of fires (b) and average fire size (c) in Turkey from 1990 to 2010

Table 27. Number of fires and burnt area in 2010 by region and fire size class

Region	Number of fires						Burnt Area		
	< 1 ha	≤1ha	1-100	100-500	≤500	Total	Wooded land	Shrub land	Total
Adana	53	57	27			84	180.130	56.39	236.520
Adapazarı	29	38	16			54	70.790	15.81	86.600
Amasya	53	73	30	1(155 ha)		104	260.382	45.67	306.052
Ankara	44	48	9			57	33.071	9.6	42.671
Antalya	103	111	13	1 (447 ha)		125	489.700	13.123	502.823
Artvin	6	9	8			17	41.720		41.720
Balıkesir	31	35	5			40	28.245	3.12	31.365
Bolu	19	20	10			30	79.950	5.028	84.978
Bursa	42	45	8			53	96.220	12.23	108.450
Çanakkale	10	12	5			17	25.990	6.68	32.670
Denizli	54	55	17			72	77.710	13.76	91.470
Elazığ	2	7	40			47	67.530	167.65	235.180
Erzurum	1	1				1	0.200		0.200
Eskişehir	24	33	11			44	31.040	15.38	46.420
Giresun	26	36	24			60	57.500	48.8	106.300
Isparta	62	65	13			78	45.151	84.912	130.063
İstanbul	38	41	1			42	6.478	1.92	8.398
İzmir	180	192	23	1 (395 ha)		216	444.912	57.105	502.017
Kahraman Maraş	71	88	31			119	120.500	41.7	162.200
Kastamonu	23	26	4			30	20.782	0.32	21.102
Konya	32	34	17			51	40.073	65.44	105.513
Kütahya	30	32	2			34	6.550	4.28	10.830
Mersin	70	73	17			90	60.980	43.55	104.530
Muğla	270	291	18			309	130.600	28.3	158.900
Sinop	12	12	6			18	21.790	5.93	27.720
Trabzon	3	14	11			25	28.501	32.72	61.221
Zonguldak	36	39	5			44	65.283	5.456	70.739
<b>Total</b>	<b>1 324</b>	<b>1 487</b>	<b>371</b>	<b>3</b>		<b>1 861</b>	<b>2 531.778</b>	<b>784.874</b>	<b>3 316.652</b>

### Fire causes

In Turkey, 78% of forest fires take place in forested areas up to 400 metres altitude.

These areas are:

- Densely populated areas
- Areas of high migration
- Areas where there are valuable lands
- Places with Cadastral Problems
- Tourism Areas

Most of the fires were caused by human activities (80% in total). The causes of forest fires in 2010 are shown in Figure 60.

The causes of accident/negligence/carelessness include cigarette stubs, agricultural and forest-related activities (stubble burning, pruning of residues, clearing of fallow and slopes), shepherd fires, long-distance power lines, picnic fires, and hunting.

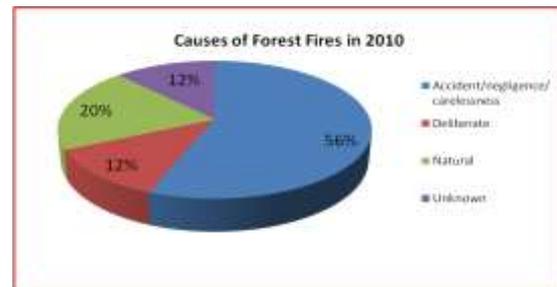


Figure 60. Main causes of forest fires in 2010

### Fire fighting means

In addition to forest fires, General Directorate of Forest has been intervening in agricultural fires for the recent years, which is a high burden with about 5000 non-forest incidences in 2010.

In 2010, 2 500 technical staff, 5 000 forest preservation officers and 11 000 workers were involved in detection, communication and suppression efforts. Ground and air equipment used for firefighting in 2010 are presented in Table 28 and deployment points of planned land means are shown in Figure 61.

Table 28. Land and aerial means in 2010

<i>Land Means</i>		<i>Aerial Means</i>	
Bulldozer	175	Leased Helicopter	20
Grader	138	Leased Aircraft (Dromaders)	14
Trailer	69	Amphibious Aircraft (CL 215 Canadair)	5
Fire Truck	956	Administrative helicopters (owned by forestry organisation)	6
Water Tank	282		
First intervention vehicle	467		
Motorcycle	856		



Figure 61. Deployment points of planned terrestrial means

### *Preventative measures*

#### **In Fire Sensitive Regional Forest Directorates:**

- Planting fire-resistant species in rehabilitating burning areas
- Converting existing forests to fire-resistant forests (YARDOP Project).
- Creating differential elements (roads etc.) in order to stop probable fires in settlements and agricultural lands from spreading towards forest.
- Planting fire-resistant species along roadsides in order to hinder forest fire from turning into crown fire.

#### **Early Fire Warning Systems:**

- So far, a total of 776 fire towers have been built to detect fires and to report to suppression teams.
- The system enables rapid detection of forest fires through visible range optical cameras. (Fire Command Centres can also monitor the progress through these cameras).

### **Construction of Pools and Ponds**

- During 2010, for the purpose of shortening the periods of forest fire attacks in forested areas where water sources are scarce, 197 fire pools and ponds were constructed and will continue to be constructed (1275 pools and ponds in total)

### **Creation of fire risk maps:**

- Weather values such as wind, temperature, humidity are taken from meteorology to create fire risk maps.
- With the aid of fire risk maps, risk points and areas are determined and their coordinates submitted to mobile teams. Thus, in addition to monitoring the forest, teams are mobilized towards fire risk areas and points.

### *Education, Public awareness and information campaigns*

Several education and awareness raising campaigns have been carried out.

**Education: Training of Technical staff**

A Fire Expert Training Program has been put into effect for personnel who will take charge in forest fires. Subjects such as fire-fighting methods, application of fire-use, first aid etc., have been given to technical staff in this training program.

Over the last year the administration has given special attention to professional training of staff. For this reason, the **International Forest Fire Fighting School** was founded in Antalya. The facilities were completed by the end of the 2010. Upon the provision of needed equipment, the school will start training (expected 2011) to forest fighting teams at national and international level.

Training of Technicians

Information has been given to technicians about use and maintenance of tools used to combat forest fires, like GPS, meteorological equipment, electronic hand tools and communication devices.

Training of Workers

Training has been given to Forest Fire Workers about fire-fighting methods, first-aid and other technical subjects.

Public awareness and information campaigns

Public awareness and information campaigns can be aggregated into 2 groups:

a) Awareness-raising activities for target groups

Activities for children and young people:

During 2010, conferences were held, plays were staged by Sincap Children Theatre, and brochures, books and magazines on forest were distributed to schools and other places to raise awareness about environmental, social and economic issues, fire causes and how they can be avoided.

Activities for forest villagers, hunters and shepherds

In our country, there are 17 000 villages located beside or inside forest areas and 7 million people living in these areas. Forest villagers are causing forest fires by going about their agricultural activities. So, messages have been transmitted to them about the importance of human action in preventing fires.

During 2010, 12.55% of fires were caused by burning stubble, shepherd and hunter fires.

Therefore, in fire sensitive areas, common programs were prepared in cooperation with non-governmental organizations to raise awareness about the importance of human action in preventing fires.

b) Awareness-raising activities at national level:

- Activities for specific days and weeks (World Forestry Day );
- Coordination meetings with local authorities;
- Cooperation with radio and television channels;
- Cooperation with media and voluntary organizations;
- Training of personnel working in travel agencies and tourist facilities in fire risk areas about forest fires and the preventative measures needed to be taken;
- Training of soldiers and local fire departments.

*Reforestation*

To make the forests more fire-resistant, effective technical measures have been applied to all our forests.

For the purpose of reforestation, burnt areas have been evaluated in terms of the silvicultural processes and works that are needed within the relevant legislation. Burnt areas will have been afforested by next spring.

In reforestation works, native species have been given priority wherever ecological conditions are appropriate. Forest fires are an inevitable phenomenon in Turkey which is placed in the Mediterranean Climate Zone. In particular, the coastline, which starts from Hatay and extends over the Mediterranean and Aegean up to İstanbul, has the highest fire risk. In other words, approximately 60% (12 million ha) of Turkey's forest area is located in fire sensitive areas.

78% of forest fires occur in these areas, so differential elements are established between agricultural land and forest areas, or between settlements and forest areas. Lines (roads) are established so that the first intervention teams can easily get to forest fires.

For the purpose of hindering probable fires in settlements and agricultural lands from spreading towards forests, and extinguishing forest fires before they become a disaster, protection bands (lines) have been established

between settlements and forest areas or between agricultural areas and forest areas. Furthermore, the following actions will provide quick and effective intervention opportunities for first intervention teams.

- To reduce the amount of fuel at the edge of forested areas
- To protect fire resistant species
- To convert existing forests to fire-resistant forests
- To establish intervention front-line in forest fires
- To plant fire-resistant species

#### **Within the scope of the Project**

##### **A) Fire -Stopping Zone (YDZT)**

In young and fire sensitive forest areas, on large main ridges and situations in which the fire is difficult to get under control, the following actions are carried out:

- Designing differential elements in such a way that fire-fighting vehicles can have easy access;
- Removing fire sensitive species and leaving fire-resistant species on both sides of the facility;
- Planting fire-resistant species on the edge of forested areas. Constructing pool areas to provide a water resource;
- Applying prescribed burning on the third day after rain in forested areas in winter months after facility was finished.

##### **B) Separating forest and agricultural land: (ZOAT)**

- Designing differential elements in such a way that fire-fighting vehicles can easily reach the site;
- Planting fire-resistant species on the edge of forested areas;
- Applying prescribed burning on the third day after rain at the edge of forested area in winter months.

##### **C) Separating Forest Land and Settlement: (YOAT)**

- Designing for ease of access for fire-fighting vehicles;
- Planting fire-resistant species on the edge of the forested area. Constructing a pool in areas where there is a water resource;
- Applying of prescribed burning on the third day after rain on the edge of the forest area in winter months.

As a result we have decided to establish the structures shown in Figure 62 at roadsides and ridges.



#### *Injuries and loss of human lives*

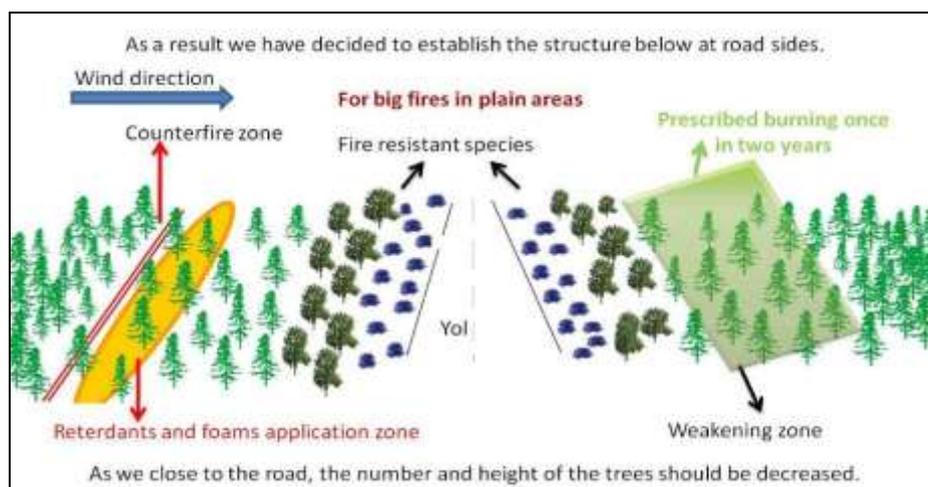
Unfortunately, three staff (1 forest engineer, 1 forest guard and 1 fire fighter) were lost in a car accident during fire suppression operations in 2010. Also, two civilians were found dead in a burnt forest area (suspected to be perpetrators).

#### *Operations of mutual assistance*

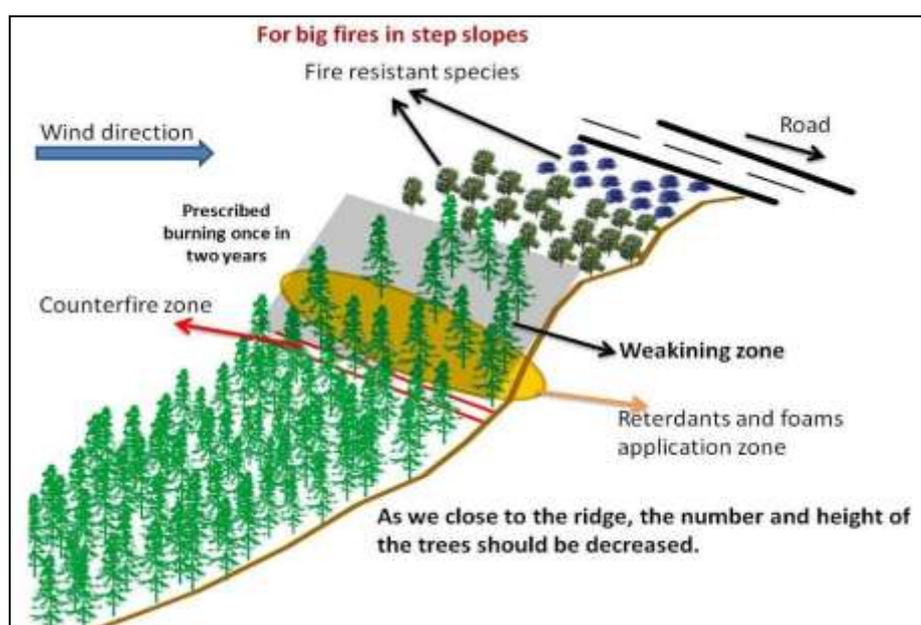
In response to requests for assistance, Turkey sent its aerial means to forest fires in Northern Cyprus, Russia, Israel and Syria. The assistance provided to other countries is summarized in Table 29.

Table 29. Assistance provided to other countries by Turkey during 2010

<i>Country</i>	<i>Aircraft type</i>
Northern Cyprus	3 helicopter
Russia	2 helicopter
Israel	2 Amphibious Aircraft (CL 215 Canadair)
Syria	2 helicopter , 1 Amphibious Aircraft



a)



b)

Figure 62. Planting structure to hinder fires in a) flat and b) sloping areas

### Expenses

In relation to fire expenses, during 2010, 86 084m<sup>3</sup> wood was damaged due to forest fires (total burnt area 3 316.652 ha); this figure includes 7 285 m<sup>3</sup> of total damage and 78 799 partial damage to planted trees. This corresponds to about 3 million \$US in loss. In 2011, 7 660 154 \$US has been allocated for reforestation of burnt areas.

For suppression, in 2010, 72 930 298 \$US were spent for different kinds of firefighting means and 172 610 108 \$US was spent for fire extinction workers. With regard to aerial means, expenses are shown in Table 30.

Table 30. Expenditures made for aerial means

Aerial Means	Flight hours	Expenses (\$US)
21 Helicopter	721	36 752 716
5 Amphibious Aircraft	486.51	13 130 581
14 Turkish Aircraft (Dromaders)		2 210 000
Total		52 093 318

In 2010 about total 343 million \$US were spent for all kinds of forest fire fighting related activities (prevention and suppression).

(Source: General Directorate of Forestry, Forest Fire Fighting Division, Turkey)

### 3. THE EUROPEAN FOREST FIRE INFORMATION SYSTEM (EFFIS)

In 1997 the European Commission set up a research group to work specifically on the development and implementation of advanced methods for the evaluation of forest fire risk and for the estimation of burnt areas in the European Union. This group is currently working as part of the Institute for Environment and Sustainability of the European Commission Joint Research Centre (JRC).

Since 1998, it has been collaborating with the relevant services in the Member States, under the coordination of DG Environment.

These activities led to the development of the European Forest Fire Information System (EFFIS) by the JRC, which started its operation in the year 2000. In 2003, EFFIS was officially established in the context of Regulation (EC) No 2152/2003 (Forest Focus) of the European Council and Parliament on monitoring of forests and environmental interactions.

The purpose of EFFIS is to provide information for the protection of forests against fire in Europe addressing both pre-fire and post-fire conditions. It also centralises the national fire data that the Member States collect through their national forest fire programmes. A web mapping interface has been set up on the EFFIS website (<http://effis.jrc.ec.europa.eu>) that allows users to access EU wide information about forest fires and other related environmental data.

The EFFIS module for the assessment of meteorological forest fire danger is the EFFIS Danger Forecast. This module forecasts forest fire danger in Europe on the basis of the Canadian Fire Weather Index (FWI), allowing a harmonized evaluation of the forest fire danger situation during the year. In 2010, EFFIS Danger Forecast started to evaluate forest fire danger on 1 February and ended on 31 October. Forest fire danger maps were computed and broadcasted to the relevant services in the Member States and the European Commission.

The JRC evaluates the annual damage caused by forest fires in Europe using the EFFIS Rapid Damage Assessment (RDA) module. The evaluation focuses mainly on Southern Europe, where most of the fire damages are concentrated. Since 2000, cartography of all the burnt areas is produced through the processing of satellite imagery. In the year 2003, daily satellite imagery from the MODIS sensor on board of the TERRA

and AQUA satellites, allowed a more frequent updates of the total burnt area in Europe. Currently, the RDA is updated up to two times every day, using MODIS satellite imagery with a ground spatial resolution of about 250 metres. This allows mapping the areas affected by fires of at least 40 ha which correspond, on average, to 75% to 80% of the total area burnt in Europe each year. Further to the mapping of burnt areas, the analysis of which types of land cover classes are affected by fires is performed daily to evaluate the damages, providing weekly statistics at country level, and contributing to newsletters that are published during the fire campaign. This chapter provides the final results of the EFFIS RDA module for 2010.

Other modules, under development within EFFIS, are looking into other aspects of forest fires such as vegetation regeneration after the fires, estimation of forest fire emissions, and the identification of post-fire risk areas that may be subject to further damages such as soil loss and/or landslides. The estimations of atmospheric emissions are already available in the EFFIS web mapping interface (<http://effis.jrc.ec.europa.eu>).

#### 3.1. EFFIS DANGER FORECAST: 2010 RESULTS

In this chapter the fire danger trends assessed by EFFIS in the different countries during the fire season 2010 are presented, comparing them with previous years.

**In the Mediterranean region**, the rainy and cool winter and spring of 2010 provided a soil water reserve in many areas so that the average fire danger level remained relatively low during the initial part of the summer. However in the Iberian Peninsula fire danger started increasing sharply from mid-June, and in Portugal the country average in mid-July had overtaken the previous 4 years records, still keeping on rising with peaks reached at the end of July and mid-August. Corresponding significant fire activity was observed in the country, particularly around mid-August, making this season the worst one for Portugal since 2005 (which had been much worse than the current one). In Spain after the initial sharp increase the trend stopped below an average FWI value of 40.

In Italy a relative peak of fire danger was reached around mid-July and again towards the end of August, though never reaching a remarkable level on average. For the rest of the Mediterranean

countries conditions have been relatively mild throughout the fire season, with some local exceptions (e.g. Southern France at the end of August). Fire danger in Cyprus was quite high throughout the season, though the country managed to maintain the total burnt area below critical levels, probably also thanks to the available water reserve.

**Central and Northern EU regions:** In Scandinavian countries fire danger was around the average or below the average of last years for most of the summer, resulting in a relatively mild season.

A similar trend was observed in central Europe, though with some higher fire danger levels corresponding with the high temperatures recorded during the summer especially during the first half of July

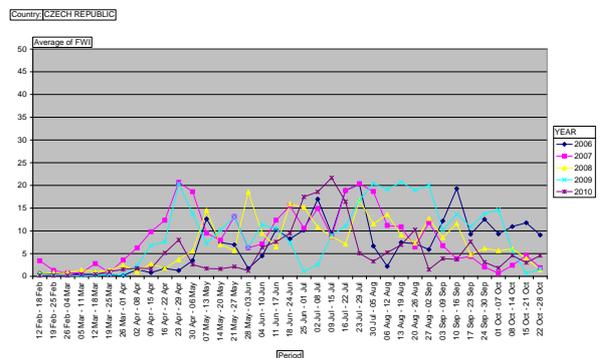
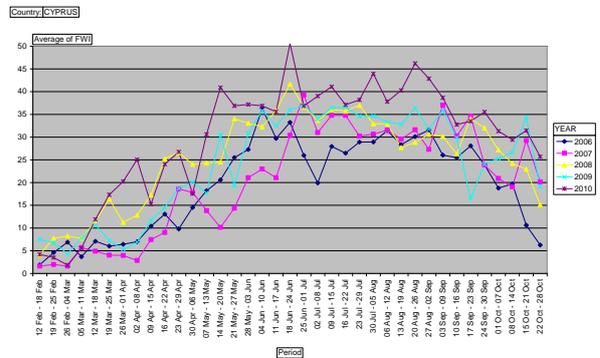
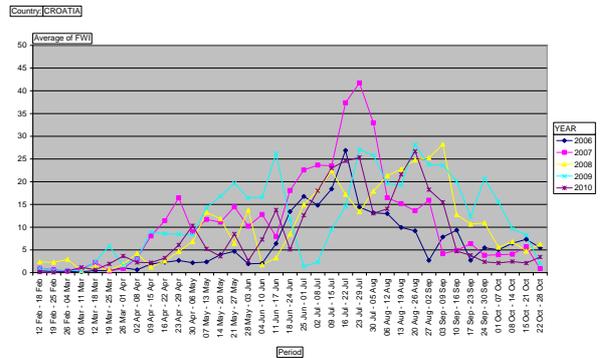
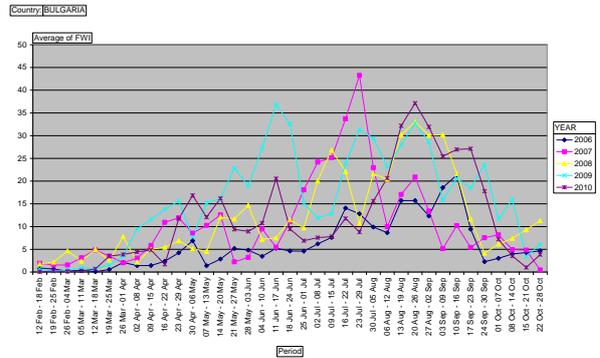
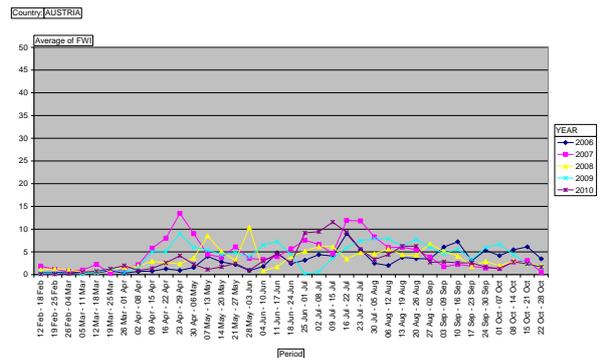
Through the Danger Forecast module of EFFIS the situation has been continuously monitored and the danger level analysed and mapped.

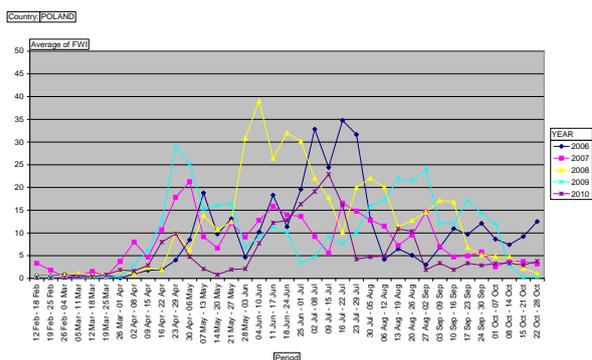
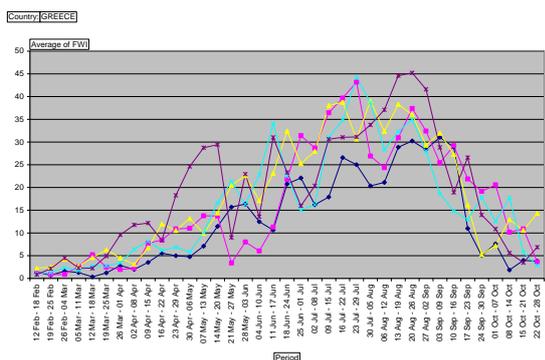
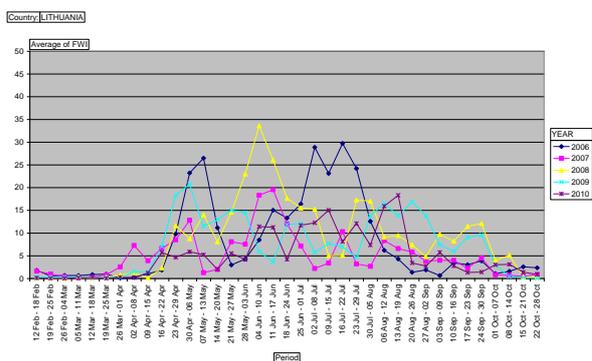
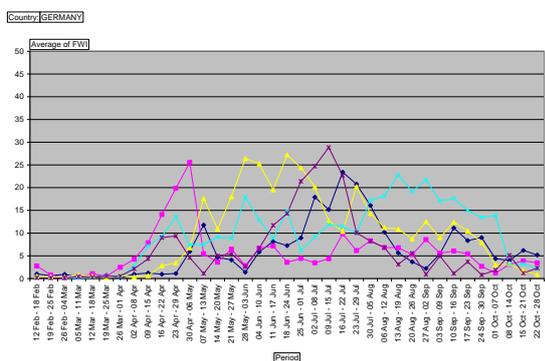
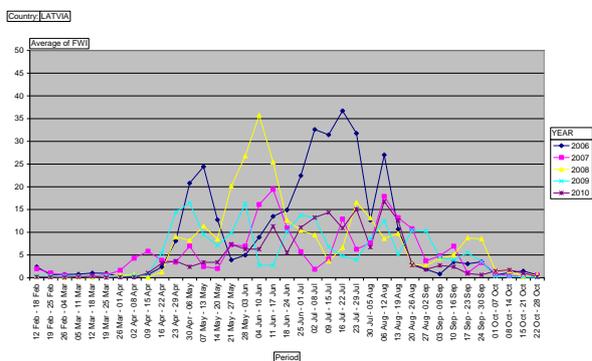
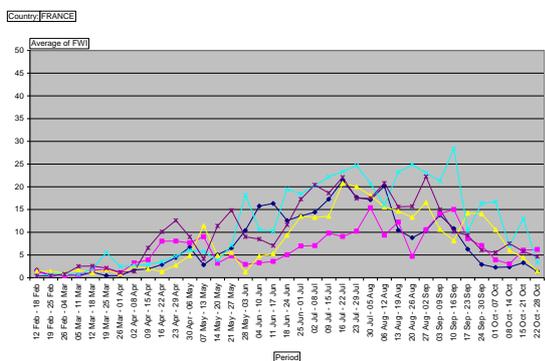
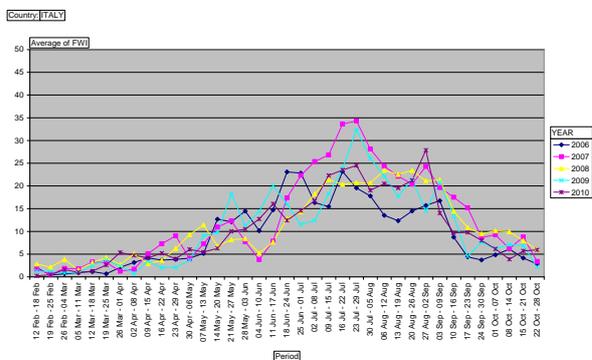
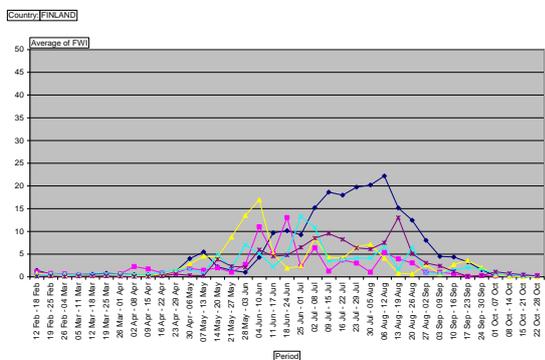
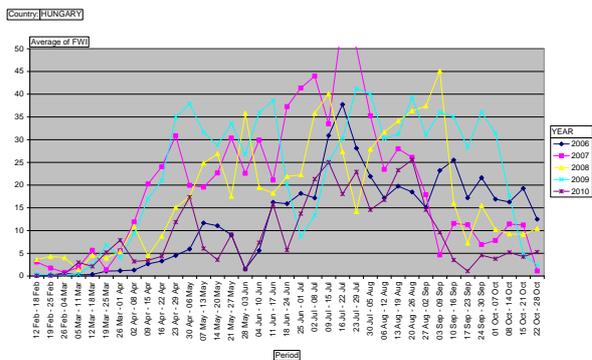
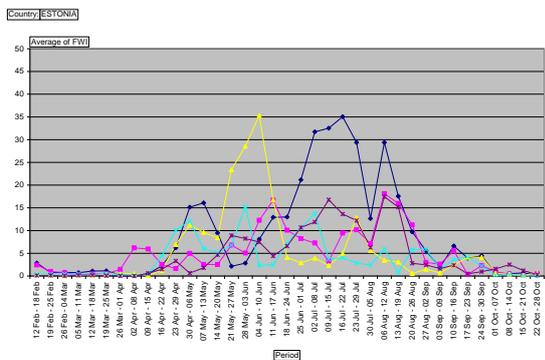
The following figures show fire danger through 2010 as determined by the average FWI values assessed during the fire season in the individual countries.

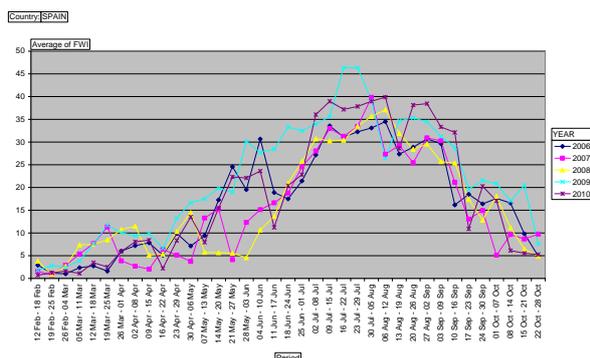
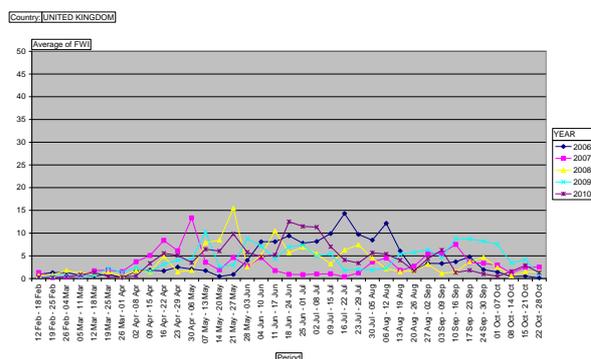
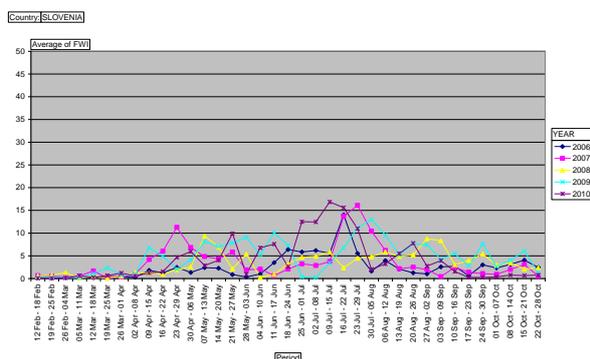
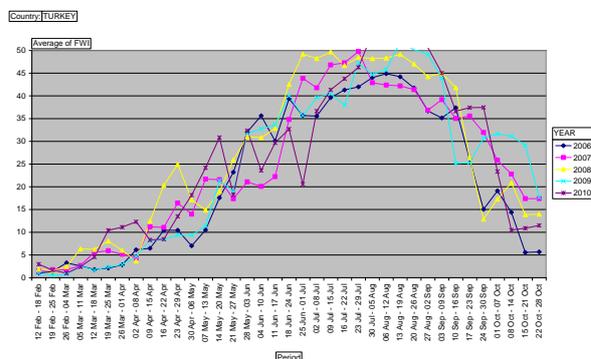
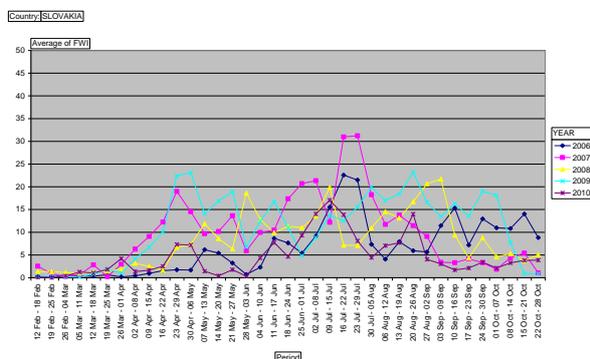
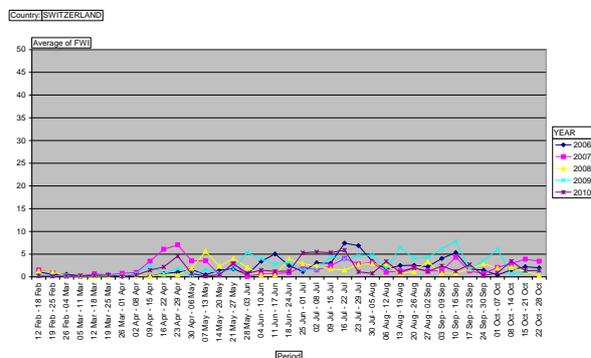
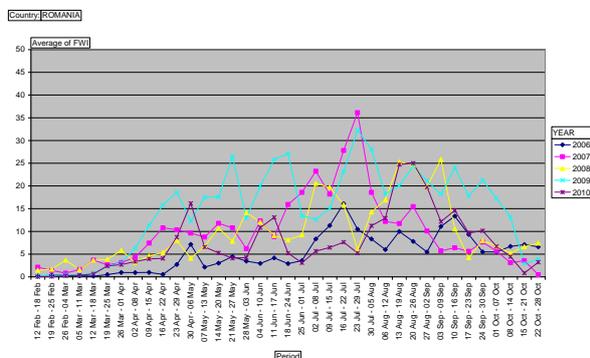
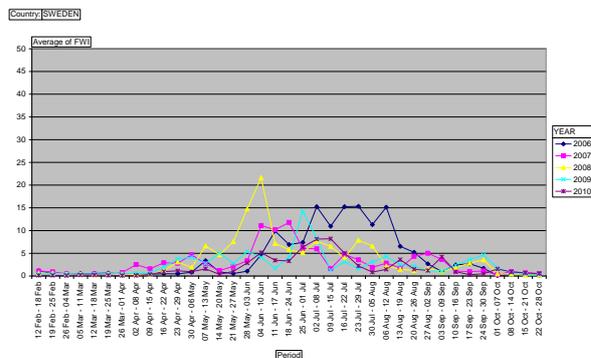
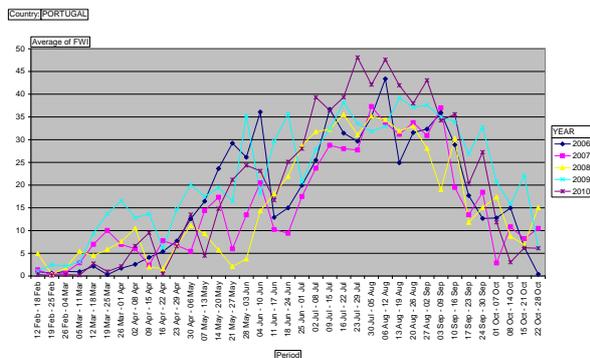
The graphs show the weekly averages of FWI over entire countries; therefore local peaks might have been flattened, especially in those countries such as France or Italy, where there are strong differences in fire danger level with changing latitudes; nevertheless the general trend is depicted providing relevant information about the fire danger level and trends of the year.

To allow a better comparison with past seasons, the curves of 2006 to 2009 are presented in conjunction with 2010 for all countries.

The countries analyzed are those participating in the EFFIS network and are shown in alphabetic order in the graphs that follow.







As mentioned previously, weekly country averages tend to flatten local fire danger peaks, which as a consequence become less evident, especially in those countries such as France or Italy, where there are strong differences in fire danger level with changing latitudes.

Therefore, to show more clearly the seasonal changes in FWI in the larger EU Mediterranean countries, i.e. Portugal, Spain, France, Italy and Greece, their territory has been further divided for fire danger reporting, according to the map shown

in Figure 63. The division criteria are mainly administrative and should be taken as provisional, since other fire risk reporting sub-regions, with a specific focus on environmental criteria, might be proposed in the future.



Figure 63. Sub-country regions identified for fire danger trend reporting in the five Mediterranean most affected Member States.

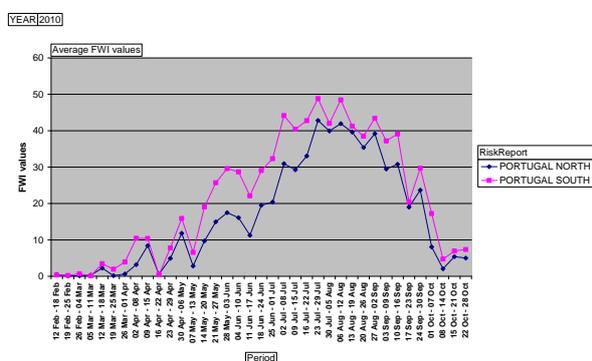


Figure 64. Fire danger trends in 2010 as determined by the Fire Weather Index (FWI) in the regions identified for Portugal

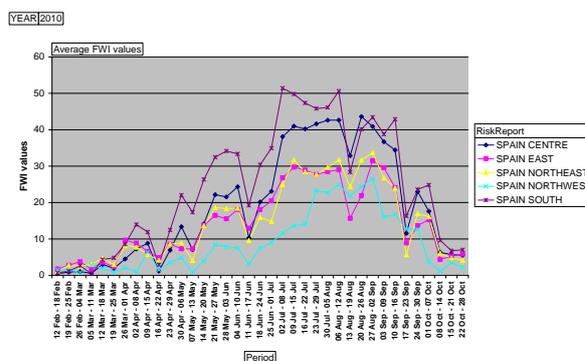


Figure 65. Fire danger trends in 2010 as determined by the Fire Weather Index (FWI) in the regions identified for Spain

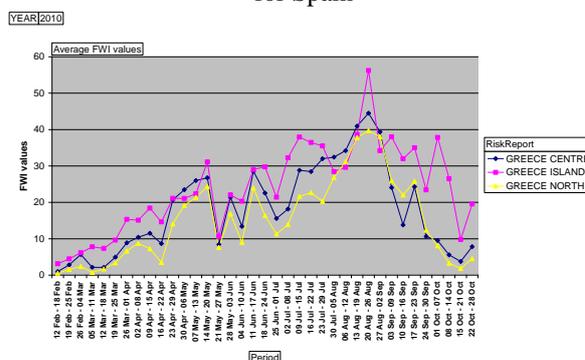


Figure 66. Fire danger trends in 2010 as determined by the Fire Weather Index (FWI) in the regions identified for Greece

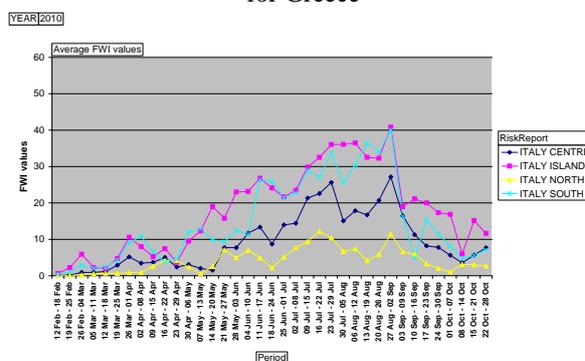


Figure 67. Fire danger trends in 2010 as determined by the Fire Weather Index (FWI) in the regions identified for Italy

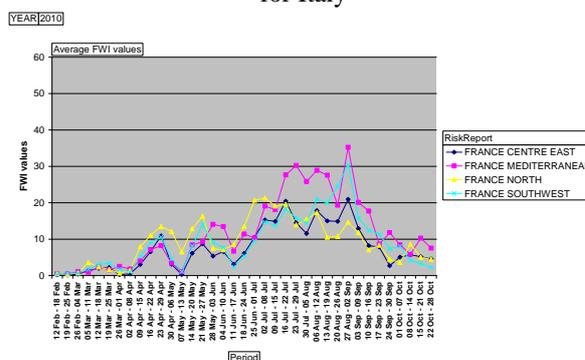


Figure 68. Fire danger trends in 2010 as determined by the Fire Weather Index (FWI) in the regions identified for France.

To facilitate the comparison among the different countries in EU, in the next graphs (Figure 69 to Figure 74), the fire danger trends as determined by FWI are shown for Member States grouped by main bioclimatic type (e.g. Mediterranean, temperate or boreal) and for Candidate countries. Data are given for 2008 to 2010.

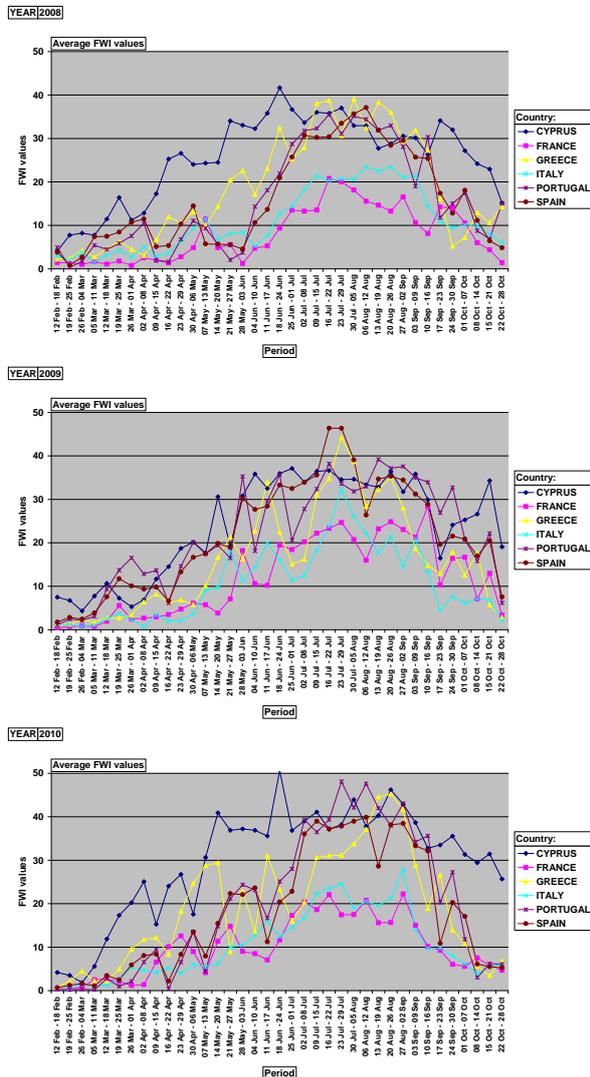


Figure 69. Fire danger trends 2008-2010 in EU Mediterranean countries (CY, FR, GR, IT, PT, ES).

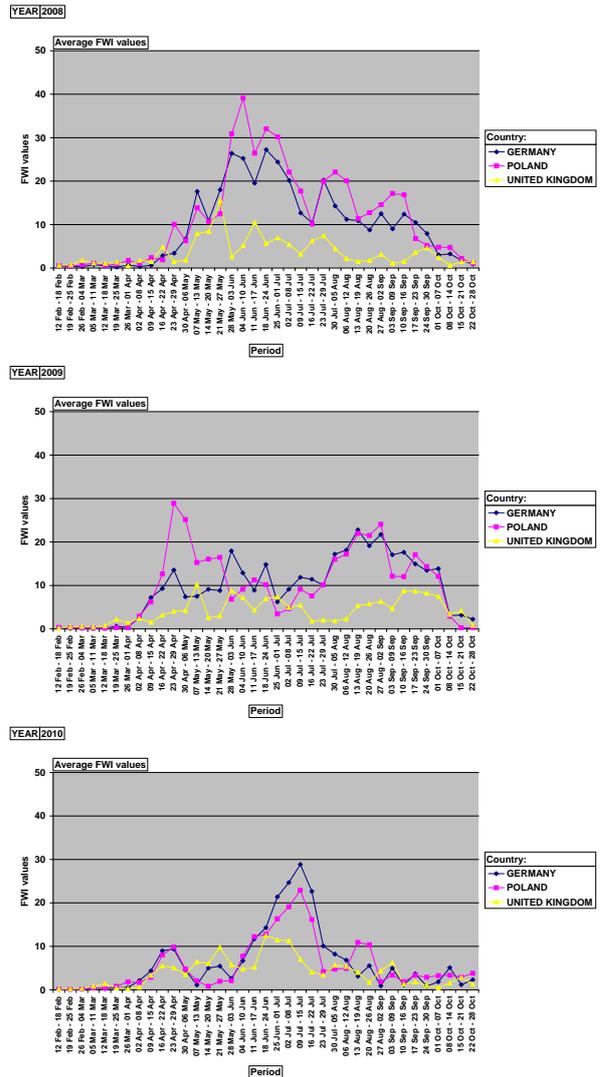


Figure 70. Fire danger trends 2008-2010 in some EU temperate countries (DE, PL, UK).

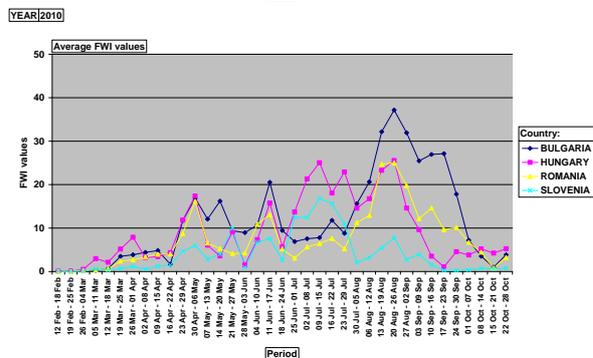
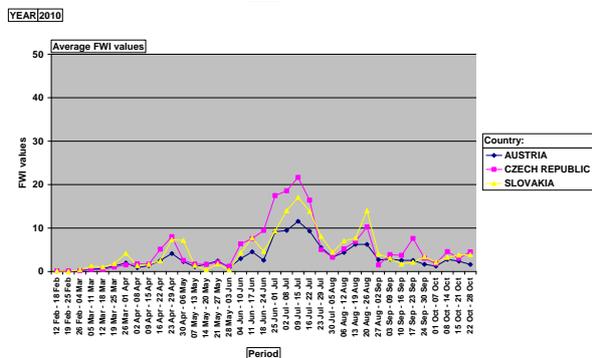
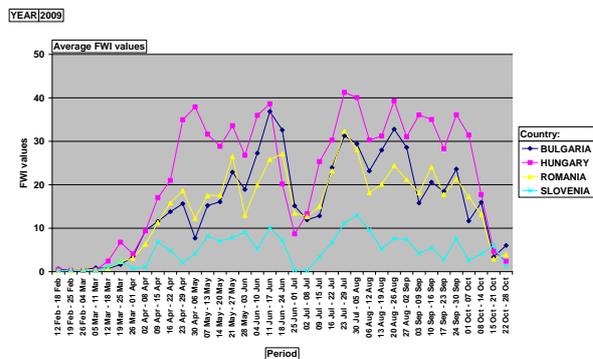
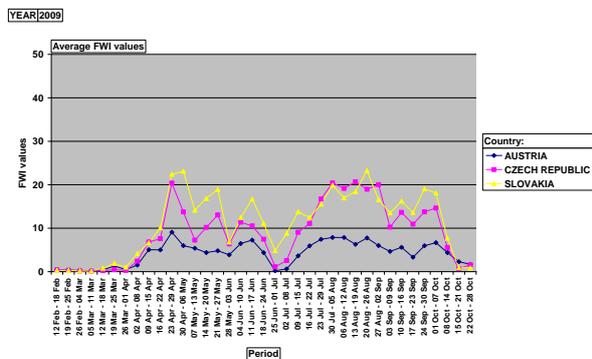
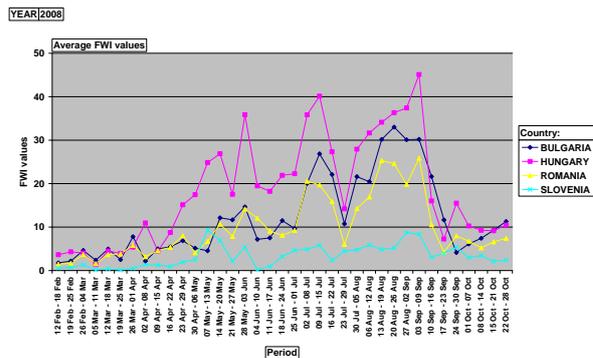
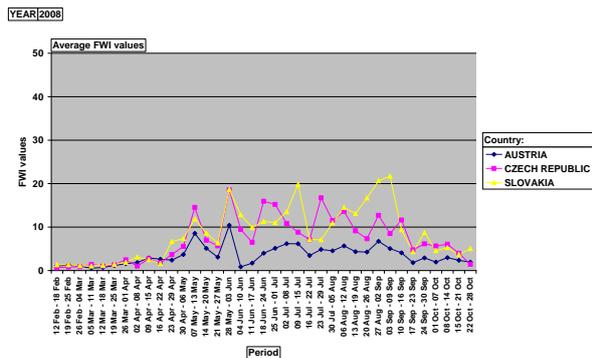


Figure 71. Fire danger trends 2008-2010 in some EU temperate countries (AT, CZ, SK).

Figure 72. Fire danger trends 2008-2010 in some EU temperate countries (BG, HU, RO, SI).

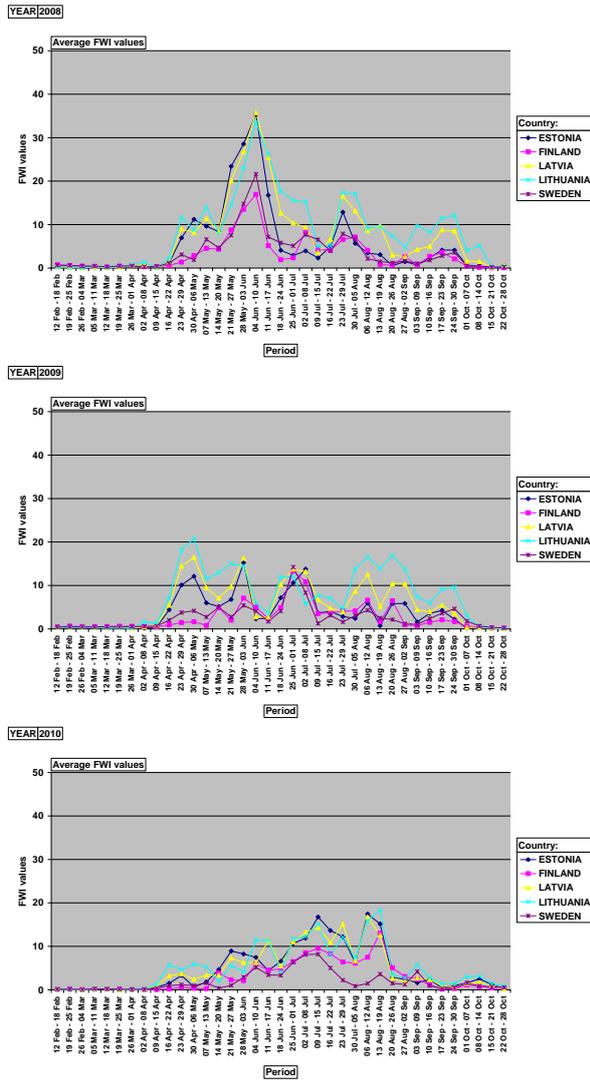


Figure 73. Fire danger trends in the last 3 years (2008-2010) in some EU boreal countries (EE, FI, LV, LT, SE).

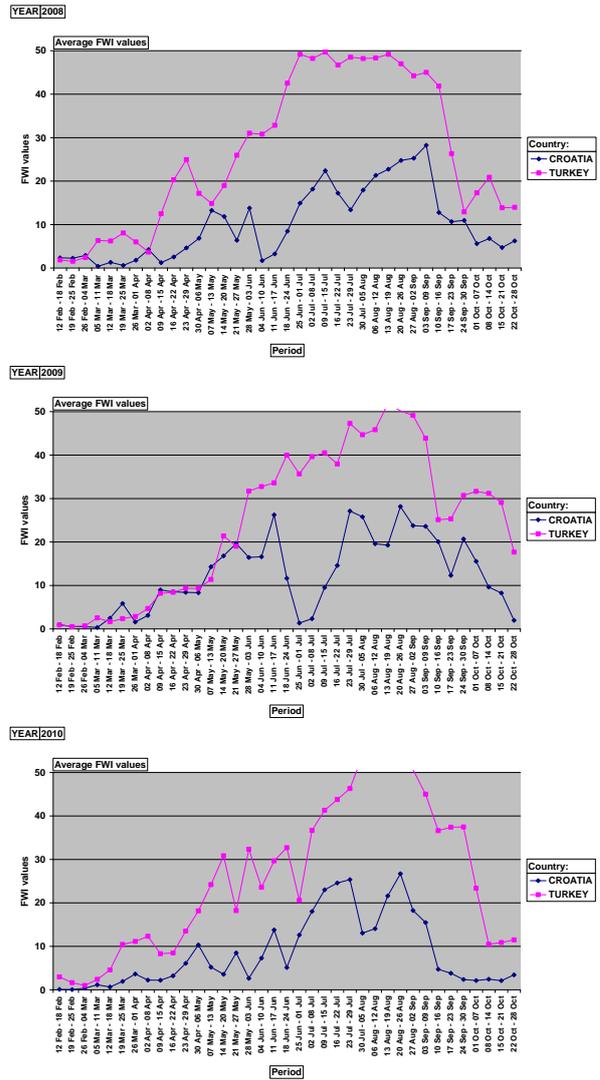


Figure 74. Fire danger trends in the last 3 years (2008-2010) in EU candidate countries (HR, TR).

As in previous years, the Member States gave very positive feedback on the danger assessment activity, urging that the EFFIS Danger Forecast should be continued and improved as part of the European Forest Fire Information System. This dialogue with users and other stakeholders is bound to result in an improved civil protection and forest fire service across Europe, and helps meet the EU's aim of providing environmental information and services that can be combined with other global environmental information products, in support of the Global Monitoring for Environment and Security (GMES) initiative.

### 3.2. EFFIS RAPID DAMAGE ASSESSMENT: 2010 RESULTS

The Rapid Damage Assessment module of EFFIS was set up to provide reliable and harmonised estimates of the areas affected by forest fires during the fire season. The methodology and the spatial resolution of the satellite sensor data used for this purpose allows the mapping of all fires of about 40 ha or larger. In order to obtain the statistics of the burnt area by land cover type the data from the European CORINE Land Cover 2000 (CLC) database were used. Therefore the mapped burnt areas were overlaid to the CLC data, allowing the derivation of damage assessment results comparable for all the EU Countries.

EFFIS Rapid Damage Assessment is based on the analysis of MODIS satellite imagery. The MODIS instrument is on board both the TERRA (morning pass) and AQUA (afternoon pass) satellites. MODIS data has 2 bands with spatial resolution of 250 meters (red and near-infrared bands) and 5 bands with spatial resolution of 500 meters (blue, green, and three short-wave infrared bands). Mapping of burnt areas is based mainly on the 250 meters bands, although the MODIS bands at 500 meters resolution are also used, as they provide complementary information that is used for improved burnt area discrimination. This type of satellite imagery allows detailed mapping of fires of about 50 ha or larger. Although only a fraction of the total number of fires is mapped (fires smaller than 40 ha are not mapped), the analysis of historical fire data has determined that the area burnt by wildfires of this size represents in most cases the large majority of the total area burnt. On average, the area burnt by fires of at least 40 ha accounts for about 75% of the total area burnt every year in the Southern EU.

Since 2008, EFFIS includes Northern African countries in the mapping of burnt area, following the agreement with FAO *Silva Mediterranea*, the FAO statutory body that covers the Mediterranean region. This is intended to be a first step towards the enlargement of EFFIS to the non-European countries of the Mediterranean basin.

The results for each of the EU southern European countries mostly affected by forest fires (Portugal, Spain, France, Italy, Greece, and Cyprus) are given in the following paragraphs. In addition, an analysis for other

countries in the region that had large forest fires is also presented. In 2010, Portugal was by far the hardest-hit country in terms of total burnt area, number of fires and size of the largest fire. Portugal registered over 40% of the entire burnt area mapped in 2010. On the other hand, Algeria and Spain (the two countries with the greatest damage last year) had far fewer large fires in 2010, both registering burnt areas of less than half the 2009 values. The worst month of the year was August, when 58% of the total burnt area of the season occurred. However, in general, compared with 2009 there was around a 30% decrease in burnt area, making 2010 a relatively mild one compared with recent years.

The total area burnt in 2010 by fires larger than 40 ha, as shown by the analysis of satellite imagery, was 297 537 ha (Table 31). These figures may also include agricultural and urban areas that were burnt during the forest fires.

Table 31. Areas burnt by fires of at least 40 ha in 2010 estimated from satellite imagery.

Country	Area (Ha)
Albania	8154.68
Algeria	70747.05
Bosnia	3350.06
Bulgaria	27.62
Croatia	329.74
Cyprus	1121.77
France	4676.69
FYROM	1692.02
Greece	6496.35
Israel	3012.71
Italy	34379.27
Montenegro	2087.84
Morocco	2826.08
Portugal	127891.02
Spain	19914.84
Tunisia	3551.14
Turkey	1277.74
<b>TOTAL</b>	<b>291536.64</b>

Of particular interest is the analysis of the damage caused by fires to the areas protected within the Natura2000 network, as they include habitats of especial interest which are home for endangered plant and animal species. However, the category of Natura2000 areas only exists in the countries of the European Union. Information on other protected areas outside the EU is not available and is thus not presented in this report. The area burnt within the Natura2000 sites is presented in Table 32.

Table 32. Area burnt in 2010 within Natura 2000 sites.

Country	Area (Ha)
Bulgaria	15.41
Cyprus	31.54
France	3770.46
Greece	1512.11
Italy	5216.04
Portugal	47802.02
Spain	7891.18
<i>Total:</i>	<i>66238.76</i>

Figure 75 shows the scars caused by forest fires during the 2010 season. The accumulation of burnt scars in northern Portugal is clearly visible. Other particularly affected regions include Sicily and northern Africa.

Figure 76 below shows the distribution of damage by month throughout the year, showing the peak in August.

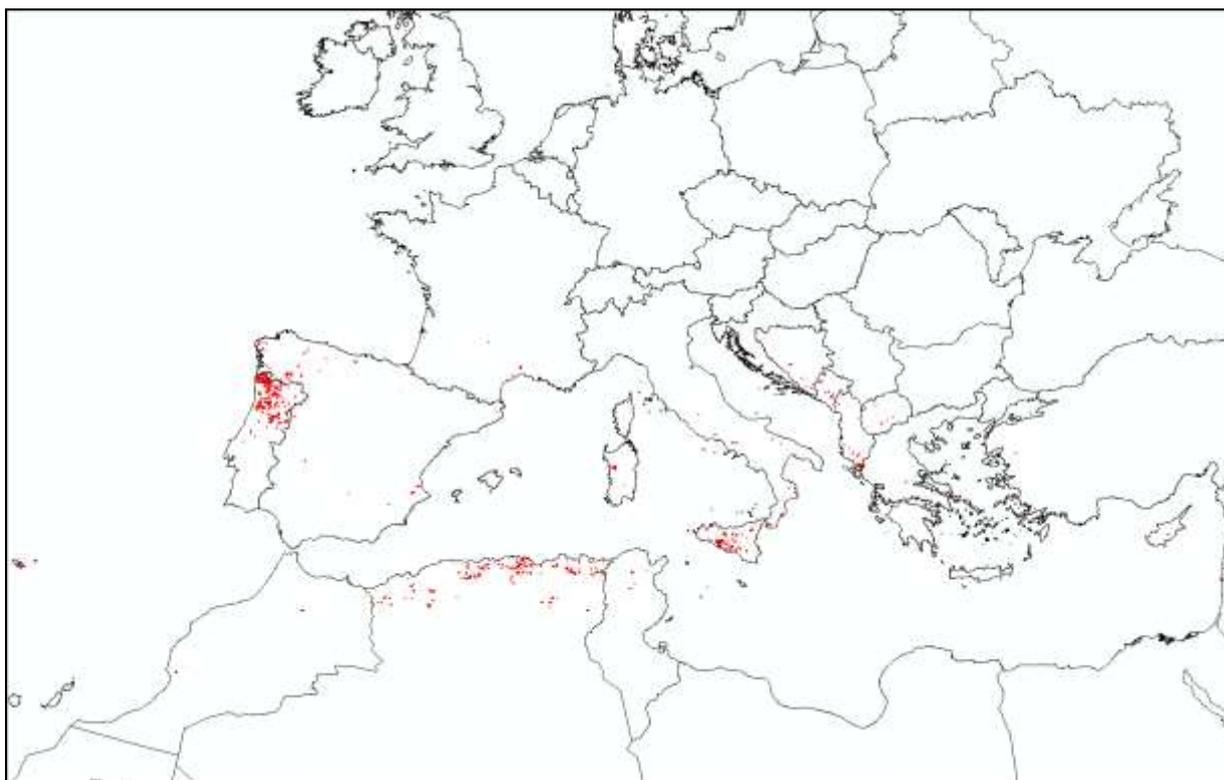


Figure 75. Burnt scars produced by forest fires during the fire season 2010.

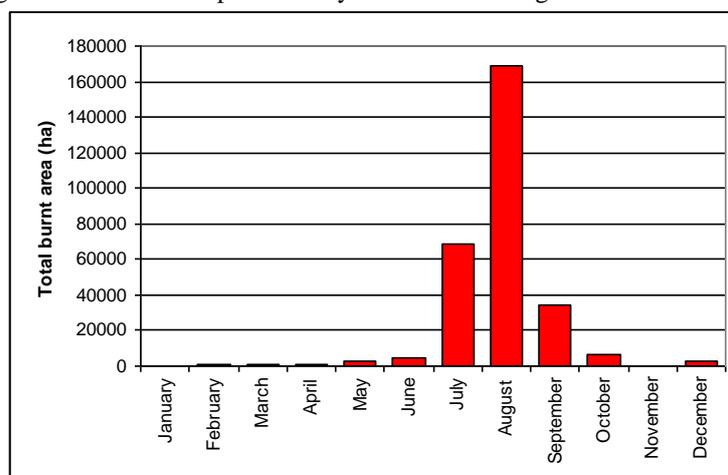


Figure 76. Total burnt area by month



### 3.2.3. France

The total mapped burnt area in France was relatively low in 2010, only half the average value of the last decade. Half the burnt area mapped in 2010 came from a single large fire in August in the Hérault region. The total burnt area mapped in France was 4 676.69 ha. From this area 3 770.46 ha were on Natura2000 sites, corresponding to 80% of the total area burnt, and 0.05% of the total Natura2000 areas in the country. Table 35 presents the distribution of the mapped burnt area by land cover type using the CLC 2000 database. In terms of land cover, from a total of 4 676.69 ha of burnt area mapped, 3 234.58 ha of land were burnt in forest and other wood lands, 1 059.8 ha were on agricultural land, and 330.32 ha were other natural lands. Additionally 51.99 ha of artificial surfaces, including urban, industrial and social areas, were affected by forest fires.

The largest fires, which occurred in the southern part of France, are shown in Figure 79.

Table 35. Distribution of burnt areas (fires of at least 40 ha) by land cover type in France.

<i>Land cover</i>	<i>Area burnt</i>	<i>% of total burnt</i>
Artificial Surfaces	51.99	1.11%
Agricultural Areas	1059.8	22.66%
Forest/Other Wooded	3234.58	69.16%
Other Natural Lands	330.32	7.06%
<b>Total:</b>	<b>4676.69</b>	<b>100%</b>



Figure 79. Burnt areas in southern France.

### 3.2.4. Italy

Italy was the second European country most severely affected by fire in 2010. However, it was a better season than 2009, with only two thirds of the burnt area of last year. The total burnt area in 2010 was close to the 10 year average of 35 701 ha. Sicily was particularly affected in 2010. The total burnt area was 35 379.13 ha, of which 5 216.04 ha were on Natura2000 sites, corresponding to 14.7% of the total area burnt, and 0.09% of the total Natura2000 area in the country. Table 36 presents the distribution of the mapped burnt area by land cover type using the CLC 2000 database. In terms of land cover, from a total of 35 379.13 ha of burnt area mapped, 6 464.93 ha of land were burnt in forests and other wooded lands, 14 130.59 ha were agricultural land, and 13 644.52 ha were other natural lands. 102.57 ha of artificial areas (urban, industrial and social areas) were also affected by fires. Figure 80 shows the distribution of major forest fires in central and southern Italy, showing the concentration of burnt areas in Sicily and some significant damage in Sardinia.



Figure 80. impact of forest fires in Italy.

Table 36. Distribution of burnt areas (fires of at least 40 ha) by land cover type in Italy.

<i>Land cover</i>	<i>Area burnt</i>	<i>% of total burnt</i>
Artificial Surfaces	102.57	0.30%
Agricultural Area	14130.59	41.10%
Forest/Other Wooded	6464.93	18.80%
Other Natural Lands	13644.52	39.69%
Other Land Cover	36.52	0.11%
<b>Total:</b>	<b>34379.13</b>	<b>100%</b>

### 3.2.5. Greece

The 2010 fire season in Greece was relatively mild. The total burnt area of 6 496.35 ha mapped was the lowest since 2005 and well below the average of the last 10 years. The largest fire of the season occurred on 15<sup>th</sup> August in Dimos Kythiron, Attica burning 1 417 ha. Of the total burnt area, 1 512.11 ha were on Natura2000 sites, corresponding to 23% of the total area burnt and to 0.04% of the Natura2000 areas in the country. Table 37 presents the distribution of the mapped burnt area by land cover type using the CLC 2000 map. In terms of land cover, from a total of 6 496.35 ha of burnt area mapped, 3 413.18 ha were forests and other wooded land, 1 807.06 ha were agricultural areas, and 1 275.69 ha were other land cover types. Figure 81 shows the damage caused by forest fires in Greece.

Table 37. Distribution of burnt areas (fires of at least 40 ha) by land cover class in Greece.

<i>Land cover</i>	<i>Area burnt</i>	<i>% of total burnt</i>
Artificial Surfaces	0.42	0.01%
Agricultural Areas	1807.06	27.82%
Forest/Other Wooded	3413.18	52.54%
Other Land Cover	1275.69	19.64%
<b>Total:</b>	<b>6496.35</b>	<b>100%</b>



Figure 81. Satellite image showing impact of forest fires in Greece.

### 3.2.6. Bulgaria

The fire season in Bulgaria was extremely mild. There was only one large fire mapped, of 27.62 ha. 15.41 ha of this occurred in a Natura2000 area. Table 38 presents the distribution of the mapped burnt area by land cover type using the CLC 2000 database.

Table 38. Distribution of burnt area (ha) in Bulgaria by land cover types.

<i>Land cover</i>	<i>Area burnt</i>	<i>% of total burnt</i>
Agricultural Areas	12.32	44.61%
Forest/Other Wooded	0	0.00%
Other Natural Lands	15.3	55.39%
<b>Total:</b>	<b>27.62</b>	<b>100%</b>

### 3.2.7. Cyprus

The 2010 fire season in Cyprus was moderate, with a total burnt area of 1 121.77 ha. 31.54 ha of this occurred on Natura2000 areas, corresponding to 2.8% of the total area burnt, and 0.02% of the total Natura2000 areas in the country. Table 39 presents the distribution of the mapped burnt area by land cover type using the CLC 2000 database. 565.62 ha were burnt in forests and other wooded lands, 216.94 ha in agricultural areas and 339.21 ha were in over land cover types. Figure 82 shows the damage caused by forest fires in Cyprus.

Table 39. Distribution of burnt area (ha) in Cyprus by land cover types.

<i>Land cover</i>	<i>Area burnt</i>	<i>% of total burnt</i>
Agricultural Areas	216.94	19.34%
Forest/Other Wooded	565.62	50.42%
Other Land Cover	339.21	30.24%
<b>Total:</b>	<b>1121.77</b>	<b>100%</b>



Figure 82 Satellite image showing impact of forest fires in Cyprus

### 3.2.8. Albania

The 2010 fire season was comparable with 2009, showing a small increase from the total burnt area mapped last year (8 154.68 ha compared with 7 606.86 ha in 2009). Table 40 presents the distribution of the mapped burnt area by land cover type using the CLC 2000 database. 4 835.11 ha were burnt in forests and other wooded lands, 2 501.28 ha in other natural lands, 740.24 ha in agricultural areas and a small amount in artificial surfaces, i.e. urban, industrial or social areas and other land cover types (75 ha). Figure 83 shows the burnt scars resulting from forest fires in the Albanian territory.

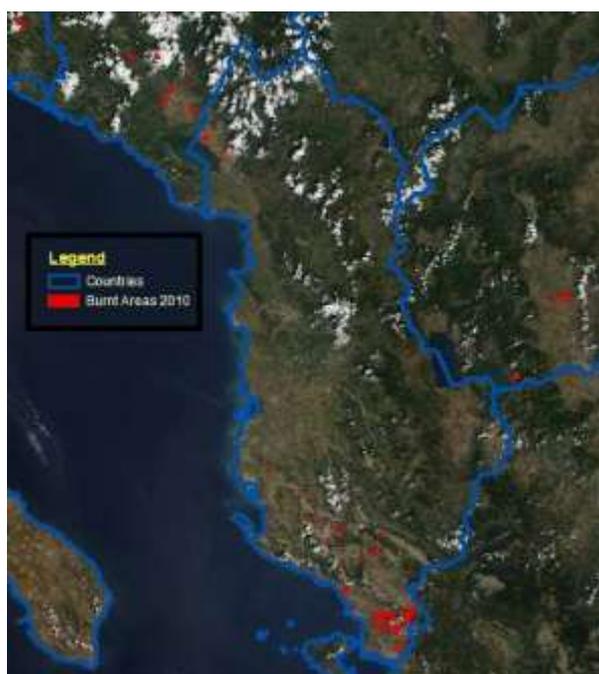


Figure 83. Forest fires in Albania

Table 40. Distribution of burnt area (ha) in Albania by land cover types.

<i>Land cover</i>	<i>Area burnt</i>	<i>% of total burnt</i>
Artificial Surfaces	44.37	0.54%
Agricultural Areas	740.24	9.08%
Forest/Other Wooded	4835.11	59.29%
Other Natural Lands	2501.28	30.67%
Other Land Cover	33.67	0.41%
<b>Total:</b>	<b>8154.68</b>	<b>100%</b>

### 3.2.9. Bosnia-Herzegovina

2010 was a relatively quiet year in Bosnia-Herzegovina, apart from August when 9 fires burnt 3 350.06 ha. The largest of these was 1 400 ha. Table 41 presents the distribution of the mapped burnt area by land cover type using the CLC 2000 database. In terms of land cover, 955.49 ha were burnt in forests and other wooded

lands, 2 218.02 ha occurred in other natural lands, and 176.54 ha were in agricultural areas. Visible fire scars caused by forest fires in Bosnia-Herzegovina can be observed in Figure 84.

Table 41. Distribution of burnt area (ha) in Bosnia-Herzegovina by land cover types.

<i>Land cover</i>	<i>Area burnt</i>	<i>% of total burnt</i>
Agricultural Areas	176.54	5.27%
Forest/Other Wooded	955.49	28.52%
Other Natural Lands	2218.02	66.21%
<b>Total:</b>	<b>3350.06</b>	<b>100%</b>



Figure 84: Impact of forest fires in Bosnia-Herzegovina and Croatia

### 3.2.10. Croatia

The 2010 season was mild in Croatia. The total burnt area mapped in Croatia measured from satellite imagery was 329.74 ha from a single fire in August in the province of Splitsko-Dalmatinska Zupanija. This is less than was recorded in any of the previous 4 years. Table 42 presents the distribution of the mapped burnt area by land cover type using the CLC. Most of the burnt area (263.04 ha) was in forest, with 35.29 ha in other natural lands and 31.41 ha in artificial surfaces; i.e. urban, industrial or social areas. The visible scar left by this fire can be seen in Figure 84 above.

Table 42. Distribution of burnt area (ha) in Croatia by land cover types.

<i>Land cover</i>	<i>Area burnt</i>	<i>% of total burnt</i>
Artificial Surfaces	31.41	9.53%
Agricultural Areas	0	0.00%
Forest/Other Wooded	263.04	79.77%
Other Natural Lands	35.29	10.70%
<b>Total:</b>	<b>329.74</b>	<b>100%</b>

### 3.2.11. Former Yugoslav Republic of Macedonia (FYROM)

In 2010, a total of 1 692.02 ha (caused by 7 fires occurring in August and September) was mapped in FYROM. This was slightly more than in 2009 (901.2 ha) but considerably less than the previous years of 2007 and 2008. The largest fire was recorded at the beginning of September (694 ha). Table 43 presents the distribution of the mapped burnt area by land cover type using the CLC 2000 map. In terms of land cover, from a total of 1 692.02 ha of burnt area mapped, 334.15 ha were burnt in forests and other wooded lands, 393.12 ha were other natural lands, and 964.75 ha were in agricultural areas.

Table 43. Distribution of burnt area (ha) by land cover types in FYROM.

<i>Land cover</i>	<i>Area burnt</i>	<i>% of total burnt</i>
Agricultural Areas	964.75	57.02%
Forest/Other	334.15	19.75%
Other Natural Lands	393.12	23.23%
<b>Total:</b>	<b>1692.02</b>	<b>100%</b>

### 3.2.12. Montenegro

The burnt area mapped in Montenegro in 2010 was 2 087.84 ha from 14 fires, all occurring in August. This was more than the record low of 103.25 ha in 2009, but well below the values of 19 272 ha and 5 772 ha seen in 2007 and 2008.

Table 44 presents the distribution of the mapped burnt area by land cover type using the CLC 2000 map. In terms of land cover, from a total of 2 087.84 ha of burnt area mapped, 1 018.92 ha occurred in forest and other wooded lands, 79.19 ha in agricultural areas, and 989.84 ha occurred in other natural areas.

Table 44. Distribution of burnt area (ha) in Montenegro by land cover types.

<i>Land cover</i>	<i>Area burnt</i>	<i>% of total burnt</i>
Agricultural Areas	79.19	3.79%
Forest/Other Wooded	1018.92	48.80%
Other Natural Lands	989.73	47.40%
<b>Total:</b>	<b>2087.84</b>	<b>100%</b>

### 3.2.13. Turkey

The 2010 fire season in Turkey was a mild one. Five fires of 40 ha or more occurred between June and August burning a total area of 1 277.74 ha, significantly lower than the previous 4 years (average 12 246 ha – ten times higher).

Since the CORINE Land Cover database has not been yet developed in Turkey, it is not possible to provide detailed statistics on the different land cover types that were affected by fires. A view of the fires is given in Figure 85.



Figure 85. View of forest fires in Western Turkey

### 3.2.14. Israel

In December 2010 there was a large fire around Haifa. 41 people were killed in the blaze, which lasted 4 days and burned 3 012 ha, of which 90% was broadleaved deciduous tree cover. This was an unusual event, out of the main fire season and in an area where not many large fires are usually registered. Figure 86 shows the clearly visible scar.



Figure 86. Burnt area in Israel, December 2010

### 3.2.15. North Africa

The fires in Algeria were significantly less than in 2009, although Algeria was still the second most severely affected country in terms of burnt area after Portugal. Both Morocco and Tunisia had a slightly worse season in 2010 than 2009. Total burnt area for these three countries in 2009 and 2010 are presented in Table 45. Since the CORINE Land Cover database has not been yet developed in these countries, it is not possible to provide detailed statistics on the different land cover types that were affected by fires.

Table 45. Distribution of burnt area (ha) in North Africa 2009 and 2010

<i>Country</i>	<i>Area 2009</i>	<i>Area 2010</i>
Algeria	141925.13	70747.05
Morocco	2111.86	2826.08
Tunisia	128.96	3551.14
<b>Total:</b>	<b>144166</b>	<b>77124</b>

Figure 87 show the damage caused by fires in Northern Africa.



Figure 87: Impact of forest fires in North Africa

### 3.3. EUROPEAN FIRE DATABASE

#### *Background*

The European Fire Database is an important component of EFFIS containing forest fire information compiled by EU Member States and the other countries members of the EFFIS network.

The first steps to create a forest fire database were taken under the **Regulation EEC No 2158/92** (now expired), which set up an action framework focussing mainly on measures for the prevention of forest fires. Under the regulation, a first forest fire information system, referred to as the Common Core Database, was established in order to collect information on forest fires, their causes and to improve the understanding of forest fires and their prevention.

Detailed rules for the application of this forest fire information system were given in the subsequent **Regulation EEC No 804/94** which made the systematic collection of a minimum set of data on each fire event a matter of routine for the Member States participating in the system. The Common Core Database covered six Member States of the Union: Germany, Portugal, Spain, France, Italy and Greece. Regulation 2158/92 was renewed for five years in 1997 and expired on 31 December 2002.

The **Forest Focus Regulation (EC) No 2152/2003** was built on the achievements of the two previous Council Regulations on the protection of Community's forests against atmospheric pollution and forest fires. According to the implementing rules of the Regulation, monitoring of forest fires in Europe continued to be recorded in order to collect comparable information on forest fires at Community level.

The forest fire data provided each year by individual EU Member States through the above-mentioned EU regulations, and additional data coming from other European countries have been checked, stored and managed by JRC within EFFIS. The database is now known as the ***European Fire Database***.

#### *Structure and collected information*

The database contains four types of information: about the time, location, size and cause of the fire (Table 46).

Before being accepted into the database, the submitted data pass through a validation phase. The checks include the following:

#### Time of fire

- Is the date valid?
- Does the date given in the file match the year given in the filename?
- Does the date/time of intervention/extinction occur after the initial date/time of alert?
- Is the duration of the fire reasonable given its size?

#### Location of fire

- Do the place names exist and are they correctly spelt?
- Are the commune name/code/NUTS codes consistent with each other?
- Is the correct (up to date) code used?
- If information is missing, is it possible to obtain it from cross-referring other data?
- If North/East values are given, are they plausible?

#### Size of fire

- Are the values plausible (e.g. correct units)?
- Have the categories (Forest, Non-forest, etc.) been assigned correctly?

#### Cause of fire

- Is the mapping between the country cause code and EU code consistent/correct?

#### *Data stored in the database*

In 2011 Slovenia started to send data for the database, bringing the number of countries now contributing to 22 (Bulgaria, Croatia, Cyprus, Czech, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and Turkey). The database currently contains over 2 million individual fire event records (1.66 million forest fires). See Table 47 for a summary.

#### *Access to the information*

Access to summarised information from the database is available through EFFIS web interface

(<http://effis.jrc.ec.europa.eu/fire-history>), which allows the users to retrieve general information such as maps of the number of fires, burnt area and average fire size for a selected year and for the countries for which data are available (Figure 88). The data can be displayed at country,

NUTS1, NUTS2 or NUTS3 level and may be filtered to exclude fires below a certain size, while an interactive graphical facility allows the user to display the same fire statistics over time. Further analysis possibilities are planned for the future.

Table 46. Information collected for each fire event

ID	Unique Fire identifier	FIREID
<b>TIME OF FIRE</b>	Date of first alert [YYYYMMDD]	DATEAL
	Time of first alert [HHMM]	TIMEAL
	Date of first intervention [YYYYMMDD]	DATEIN
	Time of first intervention [HHMM]	TIMEIN
	Date of fire extinction [YYYYMMDD]	DATEEX
	Time of fire extinction [HHMM]	TIMEEX
<b>LOCATION OF FIRE</b>	Province Code (national nomenclature)	PROVCODE
	NUTS3 code	NUTS3
	Commune Code (national nomenclature)	CODECOM
	Commune Name (national nomenclature)	NAMECOM
	Latitude [decimal degrees]	NORTH
	Longitude [decimal degrees]	EAST
<b>SIZE OF FIRE (Ha)</b>	Burnt Area FOREST	BAFOR
	Burnt Area OTHER WOODED LAND	BAOW
	Burnt Area OTHER NON WOODED NATURAL LAND	BAONW
	Burnt Area AGRICULTURE AND OTHER ARTIFICIAL LAND	BAAGR
<b>CAUSE OF FIRE</b>	Presumed Cause (EU categories code)	CAUSE_EU
	Presumed Cause (Country detailed categories code)	CAUSE_CO

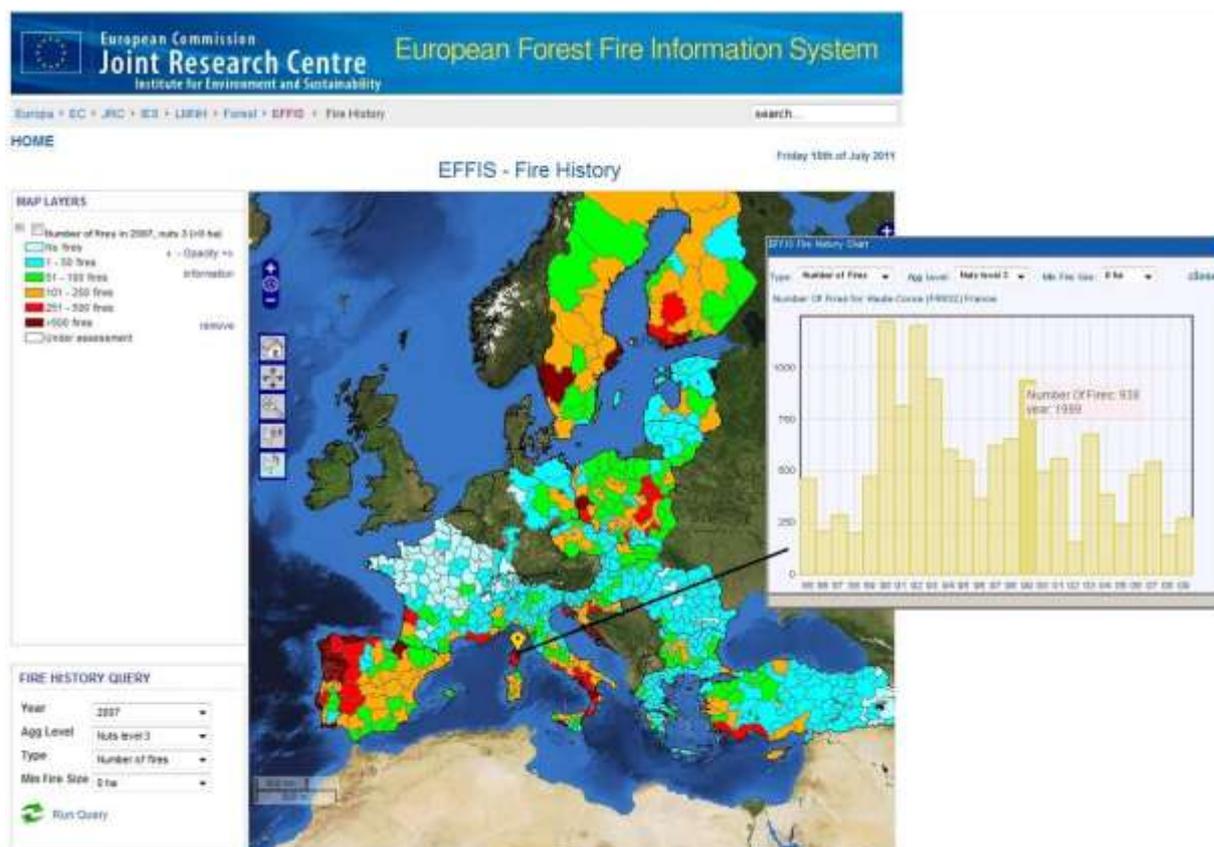


Figure 88. Access to the information stored in the European Fire Database from EFFIS web interface

Table 47. Summary of data records stored in the European Fire Database

COUNTRY	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
Bulgaria																										251	393	1479	582	314	
Croatia																	3147	3795	5485	3856	7897	4045	4713	6937	2859	3372	3581	5176			
Cyprus																						285	299	243	427	221	185	172	111	114	91
Czech rep.																									957	653	697	809	470		
Estonia																										65	248	64	71	47	
Finland																										2285*	2631	6314	2813	3161	2746
France						3732	2657	2116	2240	3321	3297	2372	2708	4766	4728	6539	6401	8001	6289	4881	4343	4259	4097	7023	3767	4698	4608	3382	2781	4808	
Germany															706	525	822	276	592	794	930	373	278	1238	300	299	717	435	560	575	
Greece				945	1184	1417	1088	1234	1798	1203	1283	1036	2008	2707	1955	1494	1527	2271	605	513	1469	1313	572	622	739	718	764	1226	1071	354	
Hungary																							429	373	104	150	97	603	502	608	
Italy						12931	6115	8506	9785	8328	11560	7580	10044	14317	7153	5505	6064	11608	9565	6956	8609	7227	4607	9717	6340	7919	5653	10736	6648	5412	
Latvia																										647	365	1929	426	716	890
Lithuania																										430	267	1444	245	272	471
Poland															24365	23822	23587	25070	21346	32650	31811	24513	38154	79018	36320	46546	35634	31311	35804	30914	
Portugal	2349	6730	3626	4542	7356	8441	5036	7705	6131	21896	10745	14327	14954	16101	19983	34116	28626	23497	34676	25477	34109	26942	26498	26195	21867*	35699	19929	19024	13836	30403	
Romania																										34	64	105	478	91	190
Slovakia																										153	287	238	463	182	347
Slovenia																44	47	55	143	55	100	60	64	227	50	74	106	129	68	122	
Spain						12235	7514	8816	9440	20250	12914	13529	15956	14253	19249	25557	16586	22320	22003	17943	23574	19099	19929	18616	21396	25492	16334	10932	11656	15642	
Sweden																	4854	7057	2503	4707	4708	4831	6490	8282	4955	4573	4618	3787	5420	4180	
Switzerland	79	147	71	107	166	96	76	109	76	168	235	148	70	76	74	87	108	135	91	45	49	48	67	155	49	63	46	65	46	52	
Turkey																											1530	2227	2706	2135	

2010 data are still undergoing validation checks and are not presented

\* Data changed since last year

**NB.** The totals given in this table do not always match the published number of fires for a number of reasons:

1. Purely agricultural fires are stored in the database if submitted by the country, but are excluded from forest fire calculations
2. Some countries do not report detailed records for the whole of their territory and this information is only available in summary form

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**ANNEX I – SUMMARY TABLES OF FIRE STATISTICS**

Table 48. Number of forest fires in five Southern Member States (1980-2010)

Table 49. Burnt area (hectares) in five Southern Member States (1980 – 2010)

Table 50. Number of forest fires in other European countries (1990-2010)

Table 51. Burnt area (hectares) in other European countries (1990 – 2010)

**NOTE**

Every effort is made to ensure that the published figures are correct. However, at the time of printing some data are provisional and may be changed in the future. Where there is a discrepancy between figures published in different reports, the later report should be taken as the definitive version.

**Table 48. Number of forest fires in five Southern Member States (1980-2010)**

<i>Year</i>	<i>PORTUGAL</i>	<i>SPAIN</i>	<i>FRANCE</i>	<i>ITALY</i>	<i>GREECE</i>	<i>TOTAL</i>
1980	2 349	7 190	5 040	11 963	1 207	27 749
1981	6 730	10 878	5 173	14 503	1 159	38 443
1982	3 626	6 545	5 308	9 557	1 045	26 081
1983	4 539	4 791	4 659	7 956	968	22 913
1984	7 356	7 203	5 672	8 482	1 284	29 997
1985	8 441	12 238	6 249	18 664	1 442	47 034
1986	5 036	7 570	4 353	9 398	1 082	27 439
1987	7 705	8 679	3 043	11 972	1 266	32 665
1988	6 131	9 247	2 837	13 588	1 898	33 701
1989	21 896	20 811	6 763	9 669	1 284	60 423
1990	10 745	12 913	5 881	14 477	1 322	45 338
1991	14 327	13 531	3 888	11 965	858	44 569
1992	14 954	15 955	4 002	14 641	2 582	52 134
1993	16 101	14 254	4 769	14 412	2 406	51 942
1994	19 983	19 263	4 618	11 588	1 763	57 215
1995	34 116	25 827	6 563	7 378	1 438	75 322
1996	28 626	16 771	6 401	9 093	1 508	62 399
1997	23 497	22 320	8 005	11 612	2 273	67 707
1998	34 676	22 446	6 289	9 540	1 842	74 793
1999	25 477	18 237	4 960	6 932	1 486	57 092
2000	34 109	24 118	4 603	8 595	2 581	74 006
2001	26 533	19 547	4 309	7 134	2 535	60 058
2002	26 488	19 929	4 097	4 601	1 141	56 256
2003	26 195	18 616	7 023	9 697	1 452	62 983
2004	21 870	21 394	3 775	6 428	1 748	55 215
2005	35 697	25 492	4 698	7 951	1 544	75 382
2006	19 929	16 355	4 608	5 634	1 417	47 943
2007	18 722	10 915	3 364	10 639	1 983	45 623
2008	13 832	11 612	2 781	6 486	1 481	36 192
2009	26 119	15 391	4 800	5 422	1 063*	52 795
2010	22 026	11 722	3 900	4 884	1 052*	43 584
<i>% of total in 2010</i>	51%	27%	9%	11%	2%	100%
<i>Average 1980-1989</i>	7 381	9 515	4 910	11 575	1 264	34 645
<i>Average 1990-1999</i>	22 250	18 152	5 538	11 164	1 748	58 851
<i>Average 2000-2010</i>	24 684	17 736	4 360	7 043	1 636	55 458
<i>Average 1980-2010</i>	18 317	15 218	4 917	9 834	1 552	49 838
<i>TOTAL</i>	567 831	471 760	152 431	304 861	48 110	1 544 993

\* Incomplete data

**Table 49. Burnt area (hectares) in five Southern Member States (1980 – 2010)**

<i>Year</i>	<i>PORTUGAL</i>	<i>SPAIN</i>	<i>FRANCE</i>	<i>ITALY</i>	<i>GREECE</i>	<i>TOTAL</i>
1980	44 251	263 017	22 176	143 919	32 965	506 328
1981	89 798	298 288	27 711	229 850	81 417	727 064
1982	39 556	152 903	55 145	130 456	27 372	405 432
1983	47 811	108 100	53 729	212 678	19 613	441 931
1984	52 710	165 119	27 202	75 272	33 655	353 958
1985	146 254	484 476	57 368	190 640	105 450	984 188
1986	89 522	264 887	51 860	86 420	24 514	517 203
1987	76 269	146 662	14 108	120 697	46 315	404 051
1988	22 434	137 734	6 701	186 405	110 501	463 775
1989	126 237	426 693	75 566	95 161	42 363	766 020
1990	137 252	203 032	72 625	195 319	38 594	646 822
1991	182 486	260 318	10 130	99 860	13 046	565 840
1992	57 011	105 277	16 593	105 692	71 410	355 983
1993	49 963	89 267	16 698	203 749	54 049	413 726
1994	77 323	437 635	24 995	136 334	57 908	734 195
1995	169 612	143 484	18 137	48 884	27 202	407 319
1996	88 867	59 814	11 400	57 988	25 310	243 379
1997	30 535	98 503	21 581	111 230	52 373	314 222
1998	158 369	133 643	19 282	155 553	92 901	559 748
1999	70 613	82 217	15 906	71 117	8 289	248 142
2000	159 605	188 586	24 078	114 648	145 033	631 950
2001	111 850	93 297	20 642	76 427	18 221	320 437
2002	124 411	107 464	30 160	40 791	6 013	308 839
2003	425 726	148 172	73 278	91 805	3 517	742 498
2004	129 539	134 193	13 711	60 176	10 267	347 886
2005	338 262	188 697	22 135	47 575	6 437	603 106
2006	75 510	148 827	7 844	39 946	12 661	284 788
2007	31 450	82 048	8 570	227 729	225 734	575 531
2008	17 244	50 321	6 001	66 329	29 152	158 621
2009	87 416	110 783	17 000	73 355	35 342	323 896
2010	133 090	54 770	10 300	46 537	8 967	253 664
<i>% of total in 2010</i>	52%	22%	4%	19%	4%	100%
<i>Average 1980-1989</i>	73 484	244 788	39 157	147 150	52 417	556 995
<i>Average 1990-1999</i>	102 203	161 319	22 735	118 573	44 108	448 938
<i>Average 2000-2010</i>	148 555	118 833	21 247	80 483	45 577	413 695
<i>Average 1980-2010</i>	109 386	173 169	27 504	114 276	47 309	471 644
<i>TOTAL (1980-2010)</i>	3 390 976	5 368 227	852 632	3 542 542	1 466 591	14 620 968

**Table 50. Number of forest fires in other European countries (1990-2010)**

<i>Country</i>	<i>1990</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
<i>Austria</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	954*	912*	750*	-	218	192
<i>Bulgaria</i>		73	602	1196	667	114	246	200	578	320	1710	825	402	452	294	241	393	1479	582	314	222
<i>Croatia</i>	-	-	-	-	-	-	-	-	-	-	7797	4024	4692	6923	2853	3368	3571	5176	-	-	-
<i>Cyprus</i>	-	-	-	-	-	-	-	-	-	-	285	299	243	427	221	185	172	111	114	91	133
<i>Czech Rep.</i>	-	-	-	-	-	1331	1421	1398	2563	1402	1499	483	604	1754	873	619	697	-	-	-	-
<i>Estonia</i>	-	-	-	-	-	-	-	-	-	-	-	-	356	111	89	65	248	64	71	47	30
<i>Finland</i>	-	-	-	-	-	-	1475	1585	370	1528	826 <sup>†</sup>	822 <sup>†</sup>	2546 <sup>†</sup>	1734 <sup>†</sup>	816 <sup>†</sup>	1069	3046	1204	1456 <sup>†</sup>	1242 <sup>†</sup>	1412
<i>FYROM</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	652	573	80	99
<i>Germany</i>	-	1846	3012	1694	1696	1237	1748	1467	1032	1178	1210	587	513	2524	626	496	930	779	818	858	780
<i>Hungary</i>	-	-	-	-	-	-	-	-	-	229	811	419	382	375	104	150	97	603	502	608	109
<i>Latvia</i>	604	225	1510	965	763	582	1095	768	357	1196	915	272	1720	900	647	365	1929	425	700	823	316
<i>Lithuania</i>	-	-	1180	634	715	472	894	565	258	1022	654	287	1596	885	468	301	1545	251	301	471	104
<i>Poland</i>	575€	3528	11858	8821	10710	7681	7924	6818	6166	9820	12428	4480	10101	17088	7219	12803	11828	8305	9091	9161	4880
<i>Romania</i>	131	42	187	159	121	62	72	37	59	138	688	268	516	203	34	64	105	478	91	190	70
<i>Slovakia</i>	-	-	-	-	366	254	662	535	1056	426	824	311	570	872	153	287	237	463	182	347	127
<i>Slovenia</i>	-	-	-	-	-	-	-	-	-	-	-	-	60	224	51	73	112	140	74	120	32
<i>Sweden</i>	-	-	-	-	-	-	4854	7057	2503	4707	4708	4831	6490	8282	4955	4573	4618	3737	5420	4180	3120
<i>Switzerland</i>	235	148	70	76	74	87	108	135	91	45	49	48	67	154	49	63	46	39	46	52	57
<i>Turkey</i>	1750	1481	2117	2545	3239	1770	1645	1339	1932	2075	2353	2631	1471	2177	1762	1530	2227	2829	2135	1793	1861

\* Database undergoing validation – figures may change in future

† Figures different from those reported last year after database validation

**Table 51. Burnt area (hectares) in other European countries (1990 – 2010)**

<i>Country</i>	<i>1990</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	
<i>Austria</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	74*	75*	48*	-	22	37	
<i>Bulgaria</i>	-	511	5243	18164	18100	550	906	595	6967	8291	57406	20152	6513	5000	1137	1456	3540	42999	5289	2271	6526	
<i>Croatia</i>	-	-	-	-	-	-	-	-	-	-	129883	27251	74945	77359	8988	21407	18782	63719	-	-	-	
<i>Cyprus</i>	-	-	-	-	-	-	-	-	-	-	8034	4830	2196	2349	1218	1838	1160	4483	2392	885	2000	
<i>Czech Rep.</i>	-	-	-	-	-	403	2043	359	1132	336	375	87	178	1236	335	227	53	-	-	-	-	
<i>Estonia</i>	-	-	-	-	-	-	-	-	-	-	-	-	2082	207	379	87	2638	292	1280	59	25	
<i>Finland</i>	-	-	-	-	-	-	433	1146	131	609	266 <sup>†</sup>	187 <sup>†</sup>	590 <sup>†</sup>	666 <sup>†</sup>	358 <sup>†</sup>	495	1617	576	830 <sup>†</sup>	576 <sup>†</sup>	520	
<i>FYROM</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32665	5915	1307	737
<i>Germany</i>	-	920	4908	1493	1114	592	1381	599	397	415	581	122	122	1315	274	183	482	256	538	757	522	
<i>Hungary</i>	-	-	-	-	-	-	-	-	-	756	1595	-	1227	845	247	3531	625	4636	2404	6463	878	
<i>Latvia</i>	258	69	8412	570	326	535	927	448	211	1544	1341	311	2222	559	486	120	3387	272	364	646	92	
<i>Lithuania</i>	-	-	769	274	279	321	478	226	93	494	352	113	746	436	253	51	1199	38	112	287	22	
<i>Poland</i>	7341	2567	4375 <sup>‡</sup>	8290	9171	5306	14120	6598	4019	8307	7013	3429	5593	28554	4338	7387	5912	2844	3028	4400	2126	
<i>Romania</i>	444	277	729	518	312	208	227	68	137	379	3607	1001	3536	762	124	162	946	2529	373	974	206	
<i>Slovakia</i>	-	-	-	-	-	-	-	-	-	557	904	305	595	1567	157	524	280	679	118	510	192	
<i>Slovenia</i>	-	-	-	-	-	-	-	-	-	-	-	-	161	2100	138	280	1420	128	75	177	121	
<i>Sweden</i>	-	-	-	-	-	-	1588	5873	422	1771	1552	1254	2626	4002	1883	1562	5710	1090	4280	860	144	
<i>Switzerland</i>	1705	96	27	34	404	444	286	1685	261	30	68	17	697	640	23	41	108	282	65	43	26	
<i>Turkey</i>	13742	8081	12232	15393	38128	7676	14922	6316	6764	5804	26353	7394	8514 <sup>†</sup>	6644	4876	2821	7762	11664	29749 <sup>†</sup>	4679	3317	

\* Database undergoing validation – figures may change in future

† Figures different from those reported last year after database validation



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**Abstract**

This is the 11<sup>th</sup> “Forest Fires in Europe” report published by the European Commission. The report contains a summary of the 2010 fire season in Europe, with official statistics on number of fires and burnt areas compiled by the contributing countries. In addition to country reports with a summary of the past fire season provided by the countries, the report Forest Fires in Europe informs about the latest developments in terms of forest fire prevention and initiatives of the European Commission to support forest fires fire protection activities in the European Union. Furthermore it provides the results of the European Forest Fire Information System (EFFIS) operating during the fire season, with special emphasis on the EFFIS Danger Forecast, providing daily maps of meteorological fire danger forecast of EU, and the EFFIS Rapid Damage Assessment, performing the daily mapping and assessment of main land cover and Natura2000 areas affected by fires of at least 40 ha during the fire season.

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