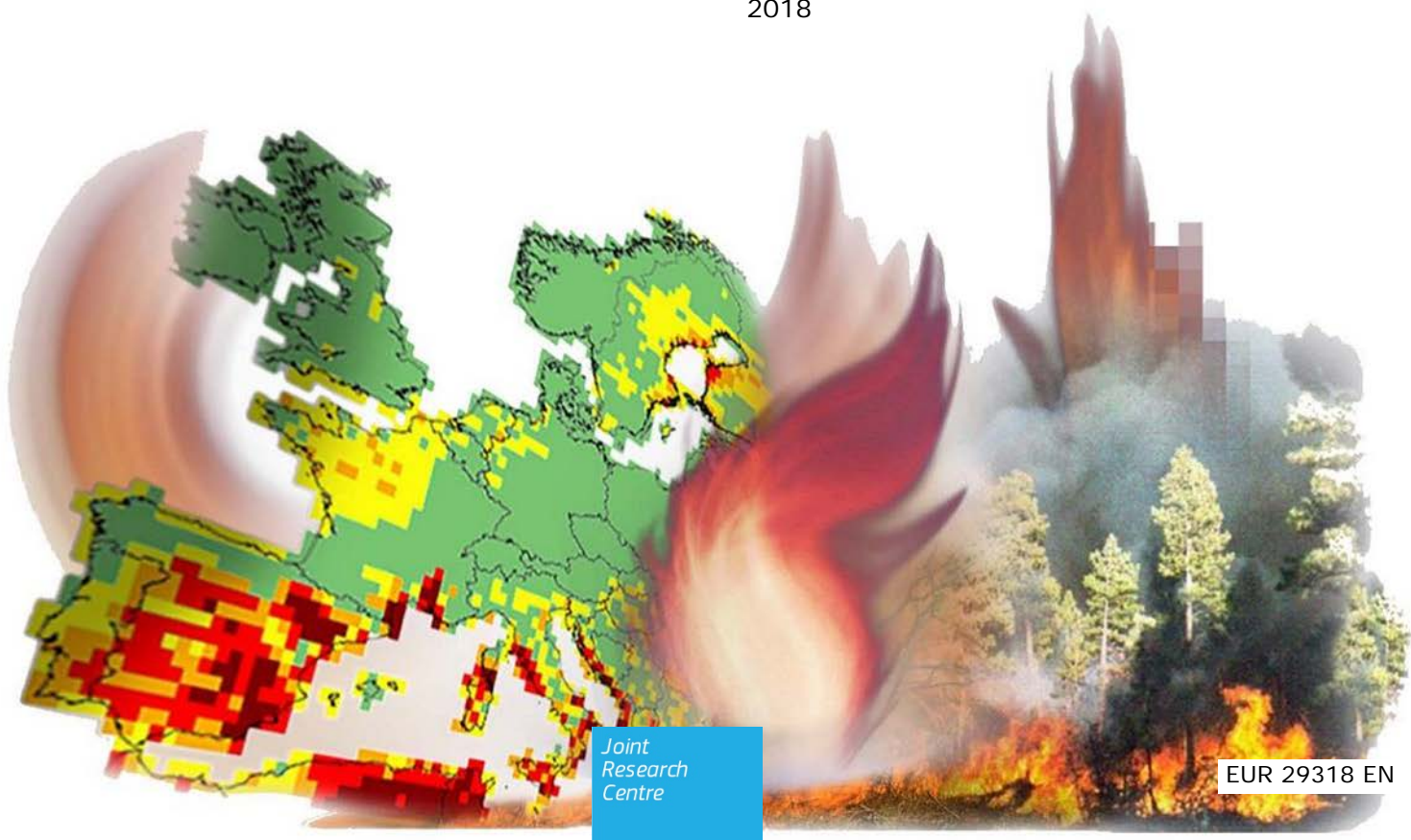


## JRC TECHNICAL REPORTS

# Forest Fires in Europe, Middle East and North Africa 2017

2018





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**Title** Forest Fires in Europe, Middle East and North Africa 2017

## Abstract

This report contains the annual summary of the fire season of 2017 with official figures provided by 33 contributing countries for the number of fires, burnt areas and fire prevention efforts, and the analysis of fire danger and areas mapped in the European Forest Fire Information System (EFFIS).

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## Foreword

At the time of preparing this 2017 report, wildfires have shown again in 2018 that they can be very deadly, even when countries are aware of the fire danger conditions and prepared for firefighting, such as the dramatic fires in Greece this July. Simultaneously, we are observing how extreme weather conditions can affect all the territories of the European Union, not only the Mediterranean region. In 2018, wildfires have heavily affected Sweden, UK, Ireland, Finland, and Latvia; countries in which wildfires have not been a concern in past years. This shows the importance and the urgency to seriously invest in the prevention of forest fires.

This report presents the dramatic effects of wildfires in the year 2017. Despite the efforts by national and regional wildfire administrations and the support of the European Commission to prevent and fight wildfires in the European Union (EU), in 2017 wildfires burnt over 1.2 million ha of natural lands in the EU and killed 127 people among fire fighters and civilians. Over 25% of the total burnt area was in the Natura2000 network, destroying much of the efforts of the EU countries in preserving key biodiversity and natural habitats for future generations. The European Forest Fire Information System estimated losses of around 10 billion euros caused by these fires.

I would like to stress again that the extreme conditions by themselves are not the cause of wildfires. In the vast majority of the cases, it is human intervention that ignites fires, which, under extreme weather conditions spread uncontrollably, causing enormous destruction and significant losses of human lives and assets. Fire prevention is thus key in tackling wildfires. More efforts should be channelled to increasing population and decision makers' awareness on the risk of wildfires. Member States and the EU Institutions must work hand in hand in providing guidelines on how to act in case of wildfires and how to increase our resilience, building on individual national experiences and capacities and sharing best practices.

Furthermore, unsustainable forest management practices, degradation of ecosystems and their services, as well as the continuity of fuels of very flammable forest tree species facilitate fire ignition and favours fire propagation. Awareness raising and training of local communities, policy makers and stakeholders should be combined with investing in sustainable land-use practices that ensure the multifunctional role of forests beyond their economic function. Forest ecosystem services such as the regulation of the water cycle, soil protection, habitats provision for biodiversity, air cleaning, are under pressure due to climate change and intensified management and more investments are needed in ensuring forest resilience and supporting the ecosystem services that forests provide to the economy and the wider society.

The EU is actively supporting wildfire prevention and fighting, the restoration of burnt lands, as well as education and awareness raising measures through its Regional Development Fund (ERDF) and Rural Development Fund (EAFRD). The European Commission is working with its Expert Group on Forest Fires (EGFF), made of 41 national wildfire administrations from the EU and the Mediterranean neighbouring countries, in developing guidelines for better wildfire prevention and common basic criteria to assess wildfire risk at the pan-European level. These basic criteria will be ready by the end of 2018 and will help in assessing wildfire risk and developing better prevention and preparedness measures to tackle wildfires in the pan-European area. The EGFF is also working on a guidance, due in 2019, on forest fire prevention to support Member States in their prevention processes.

These activities are conducted with the support of the European Forest Fire Information System (EFFIS), which constitutes the backbone of wildfire information, provides near-real time information on wildfires and support to firefighting operations coordinated by the Emergency Response Coordination Centre (ERCC). Moreover, with the recent RescEU proposal<sup>1</sup> the Commission aims at strengthening the European civil protection focusing on two complementary strands of action: creating a stronger collective response at the European level, and improved prevention and preparedness capacities.

The Commission intends to keep on working together with the national administrations to be better prepared for wildfire conditions that may worsen in the future by the effects of climate change. Wildfires can be a real concern to any of the EU countries, as shown by the ongoing 2018 wildfire season. It is thus essential that coordinated actions are taken at European level to increase the resilience of our forest, to learn from each other through the exchange of good practices and to increase preparedness for firefighting operations. We need to show the EU solidarity in action and through effective EU initiatives strengthen the EU capacity to defend the lives of our citizens and protect our natural capital for future generations.



A handwritten signature in dark ink, appearing to read 'D. Calleja', with a horizontal line underneath it.

Daniel CALLEJA CRESPO  
Director-General for Environment

European Commission  
Directorate General for Environment

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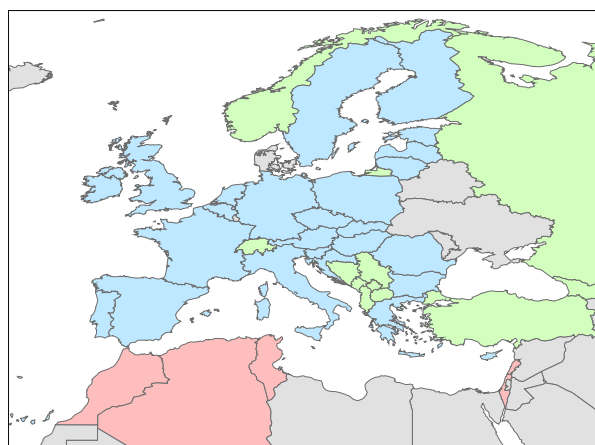
<sup>1</sup> COM(2017) 772 [1] and COM(2017) 773 [2]

## Executive summary

This is the 18th issue of the EFFIS annual report on forest fires for the year 2017. This report is consolidated as highly appreciated documentation of the previous year's forest fires in Europe, Middle East and North Africa. In its different sections, the report includes information on the evolution of fire danger in the European and Mediterranean regions, the damage caused by fires and detailed description of the fire conditions during the 2017 fire campaign in the majority of countries in the EFFIS network. The chapter on national reporting gives an overview of the efforts undertaken at national and regional levels, and provides inspiration for countries exposed to forest fire risk.

The preparation and publication of the report aims also at improving cooperation with the members of the Expert Group on Forest Fires (EGFF) especially with regard to fire prevention actions. Our common aim is to maintain and protect our landscapes and natural heritage, to avoid loss of human lives and to minimise the damage caused to property by uncontrolled forest fires.

The aim of the European Forest Fire Information System (EFFIS) is to provide harmonised information on forest fires and assessment of their effects in the pan-European region. For this purpose, collaboration with EU Member States and neighbouring countries has been on-going since 1998. EFFIS started as a pilot project of collaboration between the European Countries and the European Commission in the area of fire information and fire prevention.



On the Commission side, EFFIS was initiated by the Joint Research Centre in collaboration with the DG Environment. Due to the high support from the Expert Group on Forest Fires, which constitutes the network of experts from the countries contributing to EFFIS, the system was developed to an operational level supporting national and European policies and providing the information basis for the discussion of issues related to forest fires in the European Parliament<sup>2</sup>. Currently, EFFIS provides operational support to DG ECHO in the area of civil protection, DG GROW in the implementation of the Copernicus Regulation [3] as well as to DG REGIO regarding the implementation of the EU Solidarity Fund Regulation [4] for critical fires. In 2015, EFFIS was adopted as one of the components of the EU Copernicus Program, which provides a legal and financial basis for its operation under this framework.

EFFIS provides an ideal platform for countries to exchange good practices on fire prevention, firefighting, restoration practices and other activities related to fire management, and for the European Commission to update the forest fire services in the countries on relevant initiatives at the European level.

Since its first operation in the year 2000, the number of countries contributing to the information on forest fires in EFFIS and receiving data from it has increased steadily.

Currently, the EFFIS network constitutes 41 countries, including 25 EU Member States (Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, the Netherlands and the United Kingdom), 11 European non-EU countries (Albania, Bosnia & Herzegovina, former Yugoslavian Republic of Macedonia, Georgia, Kosovo, Montenegro, Norway, Russia, Serbia, Switzerland and Turkey), and 5 MENA countries (Algeria, Israel, Lebanon, Morocco and Tunisia).

<sup>2</sup>

<http://www.europarl.europa.eu/plenary/en/parliamentary-questions.htm>

## 1.1 Forest fires and climate change

Forest fires are complex phenomena caused by a combination of land management, human activities, cultural traditions, and climate and weather conditions. Climate change affects forest fires both directly through the weather conditions that affect fire ignition and propagation, and indirectly through its effects on vegetation and fuels. The fire weather danger is expected to increase in Europe due to climate change, and will be increasingly characterised by extreme fires destroying vast areas with long-term impacts. Analyses of European wildfires occurring in the last 30 years show an increase in the length of the wildfire season, and the fire regime is projected to change almost everywhere in Europe (see Figure 1). While countries in southern Europe concentrate most of the annual burned area, northern areas such as Scandinavia have recently suffered from unprecedented forest fires.

Climate change poses serious threats to current fire management due to the more severe fire danger season, and its expansion during the year. To safeguard the Union's citizens from climate-related pressures and risks such as forest fires, the EU has developed the EU Strategy on adaptation to Climate Change.<sup>3</sup> The strategy aims to enhance the preparedness and capacity to respond to the impacts of climate change by promoting action by Member States, enabling better informed decision-making, and climate-proof EU action in key vulnerable sectors such as forests.

To date, most EU Member States have identified the forestry sector as a key sector vulnerable to climate change. Adapting forest management practices to climate change is key to reduce fire risk. There is a need to better balance fire suppression with prevention and investment efforts, and integrate longer-term preventative measures to take into account climate change (e.g. forest thinning, grazing, climate resilient species, natural and diversified forests).

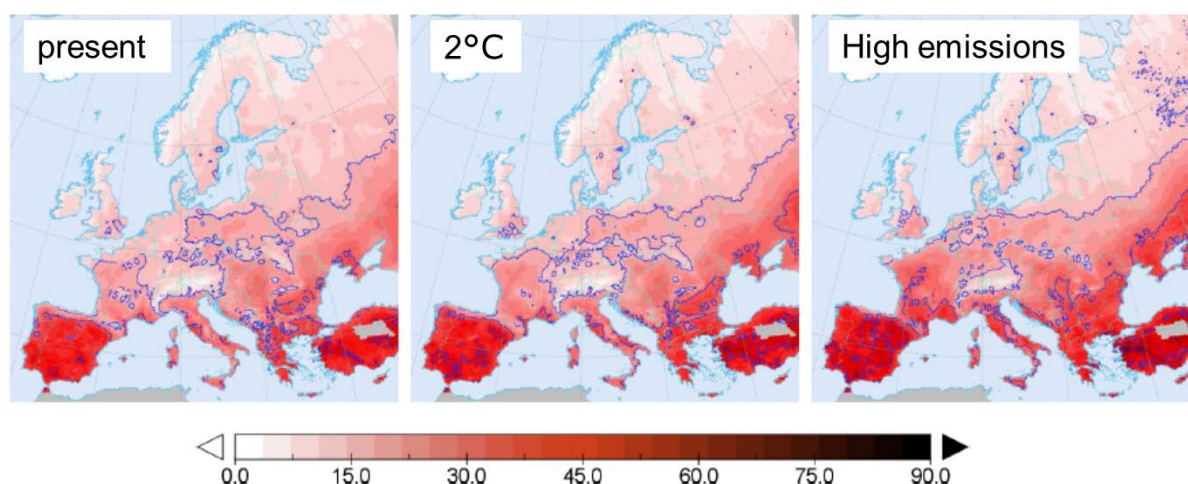


Figure 1. Overall weather-driven forest fire danger (score from 0 to 90) in present, 2°C and high emissions scenario (JRC PESETA III, 2018 [5])

<sup>3</sup> Communication from the Commission to the European Parliament, the Council, the European Economic and

Social Committee and the Committee of the Regions, COM(2013) 216 final [6].

## 2 Forest Fires in 2017

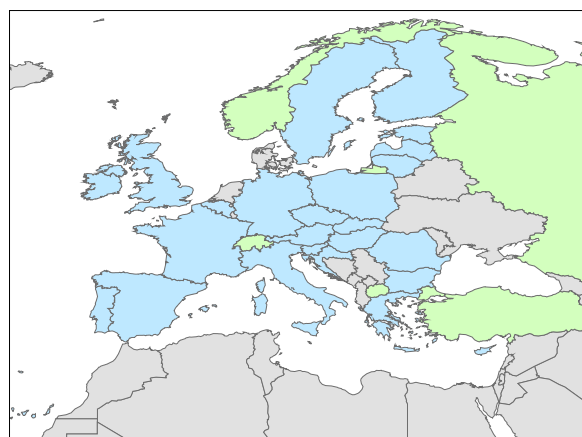
### 2.1 Introduction to the 2017 fire season in Europe, Middle East and North Africa

Table 1. Overview of the number of fires and burnt areas reported by the contributing countries in 2017.

Country	Number of fires			Burnt area (ha)			Notes
	2017	2007-16 average	2017 as % of average	2017	2007-16 average	2017 as % of average	
Austria	265	357	74	30	142	21	Change in method of recording fires
Bulgaria	513	568	90	4569	9158	50	
Switzerland	110	93	118	118	132	89	
Cyprus	92	102	90	428	2125	20	
Czech Rep.	966	958	101	170	287	59	
Germany	424	735	58	395	319	124	
Algeria	2992	3367	89	53975	33426	161	Average 2011-16
Estonia	61	50	122	33	204	16	
Spain	13793	12501	110	178234	91432	195	
Finland	881	1174	75	460	496	93	
France	4403	3687	119	26378	10143	260	
FYROM	301	282	107	5619	7407	76	
Greece	1083	1145	95	13393	49442	27	
Croatia	329	229	144	48543	9064	536	
Hungary	1454	982	148	4933	4853	102	
Italy	7855	6132	128	161987	78898	205	Provisional data in 2017
Lebanon	92	184	50	264	1312	20	Only 2 previous years to compare
Lithuania	80	197	41	53	106	50	
Latvia	423	525	81	265	347	76	
Morocco	433	455	95	2414	2859	84	
Norway	264	103	257	525	842	62	Change in method of recording fires 2016
Poland	3592	7634	47	1023	3325	31	
Portugal	21002	18257	115	540630	85189	635	
Romania	447	270	165	2459	1588	155	
Russian Fed.	10051	17404	58	1459099	2326529	63	Average 2010-2016
Sweden	5276	3961	133	1433	2876	50	
Slovenia	108	94	115	441	247	179	
Slovakia	162	270	60	295	457	64	
Turkey	2411	2426	99	11993	9042	133	

### 2.2 European countries

The following chapters contain the reports from the contributing European countries. The reports are arranged in alphabetical order and comprise reports from 24 Member States and 5 other non-EU members of the EFFIS network.





## 2.2.1 Austria

### *General information*

The area of Austria is 83 858 sq. km and is divided into 9 provinces, 15 towns with separate charter, 94 administration districts, and 2 100 municipalities. There are 4 490 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. The response time for action is between 10 and 15 minutes.

### *Fire danger in the 2017 fire season*

In the last year in Austria it was a long season with a high level of forest fire danger and a lot of small fires, in particular in the southern / south-west part of Austria.

### *Fire occurrence and affected surfaces*

Table 2 shows the number of fires and burnt area in Austria in 2017.

12 of the fires were more than 1 ha. Most of the fires were ground fires. Only 7 were fires in the treetops.

Table 2. Number of fires and burned area in Austria in 2017.

Fire type	No. of Fires	Burned area(ha)
Non forest fires	372	41
Forest fires	265	30.3

### *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.

We have special courses for forest fire, in particular for actions in the mountains; some are specialist courses for working with helicopters and airplanes all over Austria. The education will be done in nine fire service colleges (provinces). All the courses are only for firefighters in cooperation with the army. We also organize meetings for team-leaders to share their experience (lessons learned).

### *Fire prevention activities*

Because of a lot of wildland and forest fires in 2017 we had some special campaigns. The risks for forest fires in Austria is now a sensitized topic for the Austrian inhabitants.

- The governments and the communities write more regulations on forest fire danger than they did in the past. They have also for example forbidden cultural fires (midsummer).
- TV and radio reports on current forest fire hazard in Austria. (for example based on the EFFIS database)
- A working group of ÖBFV (Österreichischer Bundesfeuerwehrverband) worked intensively with the issue of forest fire danger. A special regulation for fire services was created.
- ÖBFV has installed an EU module for forest fire fighting with helicopter support and two for forest fire ground fire fighting. Some special training courses have been held.

### *Fire causes*

66 fires were triggered by lightning. The rest were triggered directly or indirectly by humans.

### *Injuries and loss of human lives*

In 2017 there were no deaths (either firefighters or civilians) during forest fires.

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

## 2.2.2 Belgium

### *Fire occurrence and affected surfaces*

At the time of writing this report, 78 forest fires or wildfires had been added to the national fire intervention database for the year 2017, as opposed to only 50 in 2016.

The final number of forest fires in Belgium in 2017 will probably be slightly higher because the reports from some of the provinces are not yet complete. Still, at this point it is already clear that forest fires in 2017 were distributed heterogeneously across the country, with only one occurrence in the province of West Flanders, while there were more than 20 events in the provinces of Flemish Brabant and Namur. The majority of the fires in 2017 (44/78) occurred in those two provinces.

Since most of the registered fires affected only a limited surface area and no human lives were lost, affected surfaces were not measured in 2017. Moreover, this is still not done in a systematic way in the case of forest fire interventions.

### *Firefighting means and intervention campaigns*

In Belgium, the Crisis Centre of the Ministry of Internal Affairs is responsible for fighting forest and wildfires that surpass the means of local fire brigades. The Crisis Centre coordinates the field actions of fire brigades, civil protection, police and other emergency services in the case of such fires.

Given the fact that the communities are responsible for managing public forests and parks, and hence taking adequate fire prevention measures, these field actions are coordinated in consultation with the involved agencies (Flanders: *Natuur en Bos*, Wallonia: *Département de la Nature et Forêts*) and departments at the level of the communities.

Until July 2017 there was a significant shortage of rainfall, which led to quite severe drought conditions in most parts of the country. In June the situation had become so critical that the entrance to several public forests and nature reserves was forbidden, and likewise the extraction of ground water in several provinces.

Besides, the watch towers in some of the most vulnerable nature reserves were manned (e.g. Kalmthoutse Heide, Mechelse Heide,...).

### *Fire causes*

Given the relatively small size of the forest fires and wildfires that occurred in 2017, typically no means were spent to retrieve their cause, though it may be assumed that most were directly or indirectly caused by human activities.

*(Source: Ghent University Department of Data Analysis and Mathematical Modelling, Belgium).*

### 2.2.3 Bulgaria

Activities for forest fire prevention are the priority of the Ministry of Agriculture, Foods and Forests and the Executive Forest Agency (EFA). Annually before the active fire season, all regional authorities develop an annual plan for forest fire protection of the forest areas and an action plan for forest fire fighting. Those documents are to be submitted annually to the committee of representatives from EFA and to the Directorate General for Fire Safety and Protection of the Population.

#### *Fire occurrence and affected areas*

According to the Executive Forest Agency database in 2017 the number of forest fires in Bulgaria was 513 and the burnt area is estimated to be 4 569.4 ha. The average size per forest fire in 2017 decreased to 8.9 ha. The biggest forest fire affected 1 392.1 ha of forest territories, of which 685.9 ha was burnt by crown fire.

The largest number and area burnt by forest fires were reported in Regional Forest Directorate (RFD) Blagoevgrad with 70 fires and 1 694.1 ha, RFD Berkovitca with 40 and 612.3 ha, RFD Burgas – 32 and 538.2 ha and RFD Sofia – 54 and 286.6 ha.

Distribution of the burnt areas in 2017 according to ownership is:

- State forest - 70%,
- Municipal forest – 13%
- Private forest – 15%
- Other forests – 2%.

The main causes for the forest fires during 2017 are as follows:

- Carelessness – 401 in number (78%);
- Arson - 32 in number (6%);
- Natural - 14 in number (3%);
- Unknown - 66 in number (13%).

The total number of fires, burnt area and average fire size from 1991 to 2017 is presented in Figure 1 and forest fire statistics including causes for the last 10 years are in Table 1.

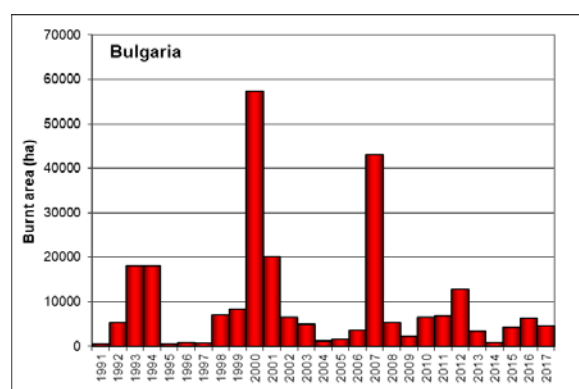
The direct losses by forest fires in 2017 are estimated to be more than 2 000 000 Euro, although the average damages for the last 10 years is about 2 500 000 Euro.

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

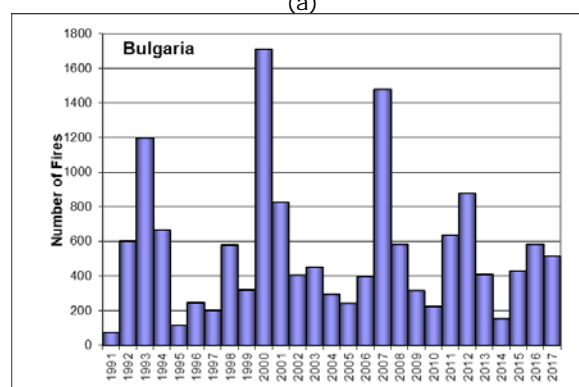
During 2017 there were no reported losses of human lives or injuries from forest fires.

Table 3. Forest fire statistics for Bulgaria 2008-2017.

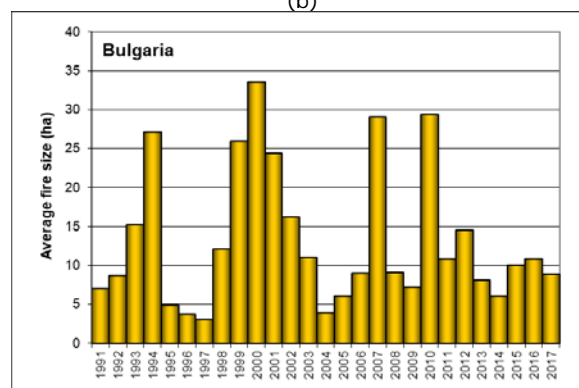
Year	Burnt area (ha)		Fire causes (number)			Total number of fires
	Total	Forest lands	Human activities	Natural	Unknown	
2008	5289	5289	484	8	90	582
2009	2276	2276	231	5	76	314
2010	6526	6526	191	1	30	222
2011	6883	6883	418	7	210	635
2012	12730	12730	669	42	165	876
2013	3314	3314	334	12	62	408
2014	916	916	128	3	20	151
2015	4313	4313	335	12	82	429
2016	6340	6340	472	22	90	584
2017	4569	4569	433	14	66	513
<b>Mean</b>	<b>5316</b>	<b>5316</b>	<b>369</b>	<b>13</b>	<b>89</b>	<b>471</b>



(a)



(b)



(c)

Figure 2. Burnt areas (a), number of fires (b) and average fire size (c) in Bulgaria from 1991 to 2017.

(Source: Executive Forest Agency, Bulgaria).

## 2.2.4 Croatia

### *Fire danger in the 2017 fire season*

**June:** The analysis of the median monthly rating for June (Figure 3) indicates that the danger was moderate in the northern Adriatic and in the mountainous region of Croatia. In the rest of the coastal area it was high, with the highest values being recorded in inland Dalmatia, especially in the area of Ploče and the island of Mljet, where the median rating was very high.

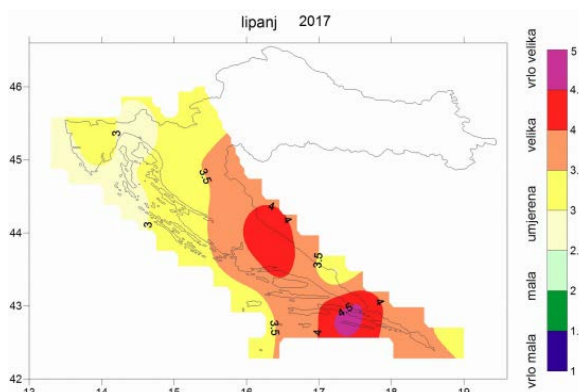


Figure 3. Median monthly danger rating for the occurrence and spread of vegetation fires according to the Canadian method (MIOP) for June 2017.

During the firefighting season, a simple verification of the predicted danger ratings is performed. Comparison of the total number of predicted and actual cases indicates that the forecasts were relatively well tuned, i.e. the number of the predicted and identified cases is approximately equal for all ratings. In June in the Adriatic, especially in Dalmatia, the dry period continued, so there were vegetation fires. Due to adverse weather conditions, there were problems with extinguishing them. As far as synoptic conditions are concerned, during most of the month the weather was affected by a field of high or medium air pressure, and occasional penetration of humid and unstable air brought precipitation mainly in the continental part of the country, often in the form of thunderstorms. These penetrations rarely reached the Adriatic, especially Dalmatia. Between 19 and 25 June 2017, our country was hit by the first heat wave of the year, which happened when very hot air came from the south of the continent. There was also occasionally strong and stormy wind in the Adriatic, which was associated with the passing of atmospheric systems and strengthening of the anticyclone ridge. Strong bora hindered the firefighting attempts on 17 and 18 June.

**July:** The analysis of the median monthly rating for July (Figure 2) indicates that the danger was moderate in the northern Adriatic (Istria and Kvarner). In Dalmatia, however, the median rating was high and very high, with the highest being on the islands of Lastovo and Mljet (Govedari), where a very high rating was recorded every day in July!

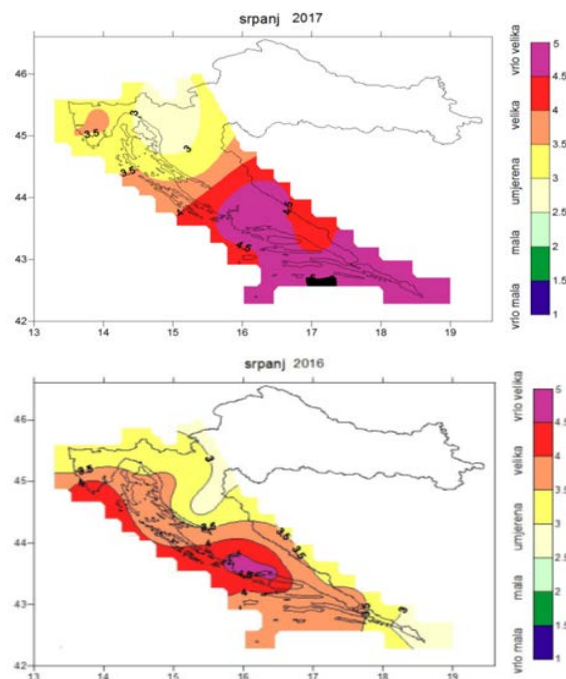


Figure 4. Danger rating difference between the month of July 2017 (top) and July 2016.

In July in the Adriatic; i.e. the inland of Istria and Dalmatia, as well as in the mountainous part of Croatia, the dry season continued. Therefore, for the most days the danger ratings were high and very high. High fire risk is the consequence of extreme heat. Positive deviations of the average monthly air temperature from the multi-year average were mainly 2 to 3.5 °C. The weather was mostly affected by a field of moderate even and elevated air pressure, which is common for summer months. However, due to the altitude situation; i.e. the inflow of very hot air from the south and the southwest, the minimum and maximum air temperature was high. Two heat waves were recorded, and the third began in late July. Cold fronts which still brought local rain and heavy thunderstorms in the inlands barely reached Dalmatia. Therefore, in that part of the country there was the greatest danger of extreme forest fire occurrences. With a moderate and strong bora, as well as dry vegetation, the fire which arose on 17 July spread rapidly, and increased turbulence and instability in the dry air additionally hampered the fire localization and extinguishing for the firefighters.

**August:** The analysis of the median monthly rating for August (Figure 3) indicates that the danger was moderate only in the part of Gorski Kotar, high in a small part of the northern Adriatic and Lika, and very high in the remainder of the area – i.e. most of the area. At the same time, in the part of Dalmatia, throughout all days of August, a very high rating was recorded (black area), which has not yet been recorded for such a large area.

August was an extremely hot month, and the lack of precipitation was particularly prominent in Dalmatia. Early August 2017 was characterized by the most prominent and the most enduring heat wave that peaked on 5 and 6 August when the absolute air temperature maximums were recorded in inland Dalmatia, as well as in parts of the mountainous region. Very hot air also flowed into the mountainous regions.

Although in August the weather was mostly influenced by a field of moderate even or slightly elevated air pressure, there were occasional penetrations of humid and unstable ocean air. However, those penetrations mostly did not reach the region of Dalmatia. After passing of the cold fronts and strengthening of the branch of the field of high air pressure, the Adriatic was relatively windy with an occasionally moderate and strong bora and northwest wind.

As it is well-known, the weather without precipitation and relatively windy weather is extremely unfavourable if a vegetation fire occurs. Such weather conditions were especially present in the third ten-day period. In August, there were also periods with unstable weather conditions and dry atmosphere lasting for several days, which, in addition to local effects (orography and slope winds or zmorac), adversely affected the fire behaviour. The fire at Kistanje on 1 August was just one of many others.

**September:** The analysis of the median monthly rating for September indicates that the danger was low in most of the area and moderate exceptionally in a small part of Dalmatia (Mljet). In the far north (the west coast and inland Istria, as well as part of Gorski Kotar), it was very low. In September, there were frequent penetrations of humid and unstable and fresh air with extreme precipitation. The most prominent precipitation in the Adriatic and the coastal area was from 10 to 12 September, when the prominent cyclone shifted. Several days before that, humid air flowed into the west and southwest current, thus causing rain and thunderstorms. On 11 September in Zadar area and the islands of northern Dalmatia, extreme rainfall of more than 300 mm occurred, thus ending this year's firefighting season. The weather did not stabilize after that. Danger ratings decreased to low and very low.

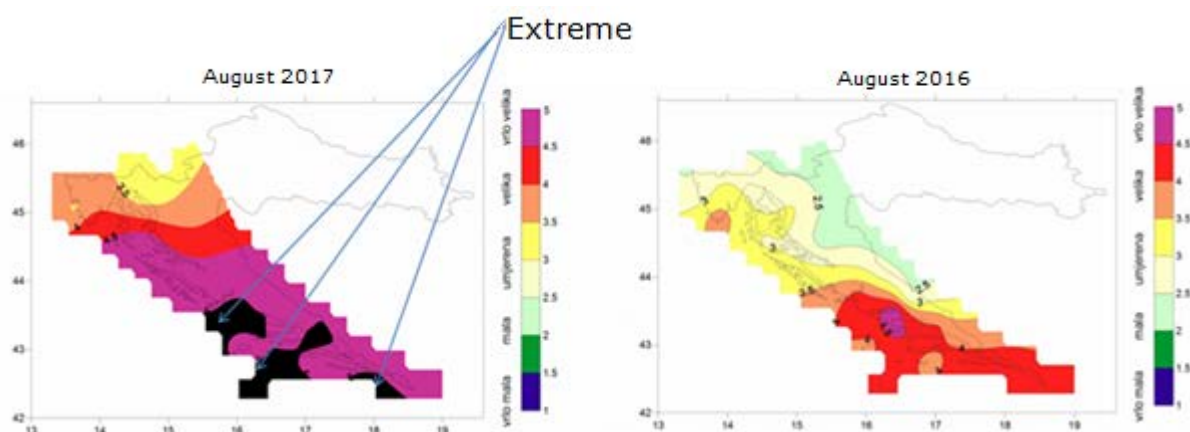


Figure 5. Danger rating difference between the month of August 2017 (left) and August 2016.

### Fire occurrence and affected surfaces

During 2017, 329 forest fires affected 48 543 hectares of land. Most fires (218) occurred in Split area (66% of the number of fires and 85% of the affected surfaces). The trend of number of fires, burnt area and average fire size can be seen in Figure 6.

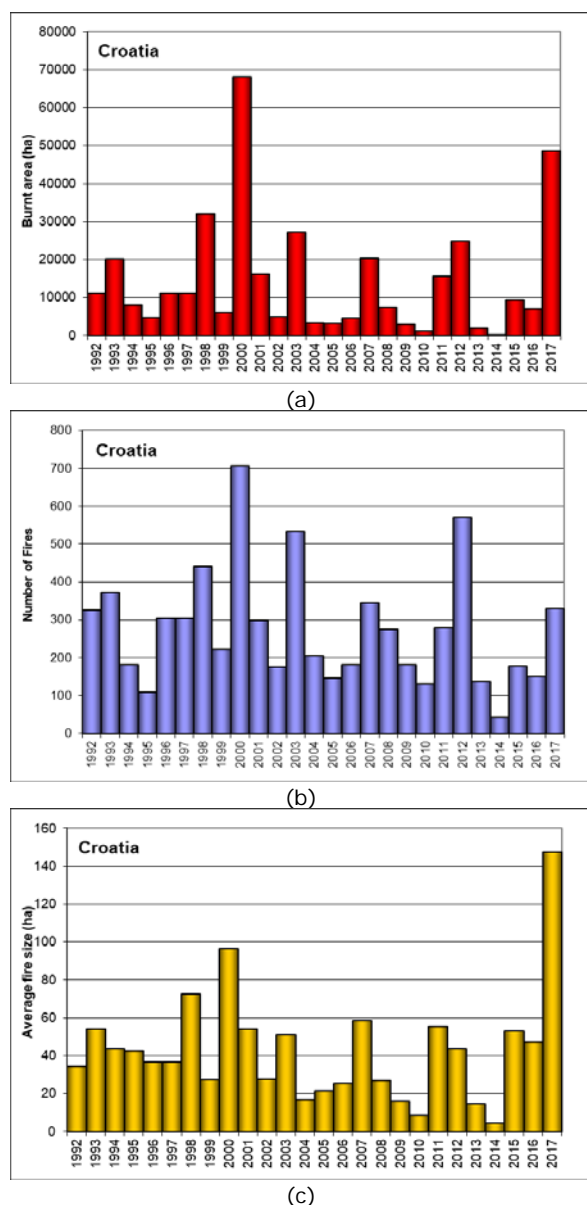


Figure 6. Burnt areas (a), number of fires (b) and average fire size (c) in Croatia from 1992 to 2017.

Of the total affected surfaces, 3 256 hectares or 6.7% of high forests were affected, 28 675 ha or 59.1% of other forests (medium forest, coppice, bushes and shrubbery, macquis, garigue) and 16 612 ha or 34.2% of unwooded forest and agricultural land.

As far as the ownership structure of the affected surfaces is concerned, it can be noted that 41 098 ha or 84.7% of the state owned surfaces were affected and 7 445 ha or 15.3% of the private surfaces (forest and agricultural land).

Year	Area burned in forest fires (ha)			Total
	Forest	Non-forest	Other/ Agricultural	
2008	4119	2868	356	7343
2009	2316	446	138	2900
2010	753	267	101	1121
2011	6937	3106	5512	15555
2012	15515	6201	3106	24804
2013	942	628	429	1999
2014	120	45	23	188
2015	6569	1462	1385	9416
2016	4288	2698	114	7100
2017	31931	12560	4052	48543

### Fire prevention activities

Prevention measures regarding fire protection and operational functioning of the firefighting system are defined by the Fire Protection Act, the Firefighting Act and accompanying by-laws. In addition to the aforementioned Acts, the Government of the Republic of Croatia stipulates additional fire protection activities each year (Program of activities in the implementation of special fire protection measures of interest to the Republic of Croatia). The program is implemented by state administration bodies, public institutions and fire brigades, and the Program grants additional funding for the operational functioning of the firefighting system. The National Protection and Rescue Directorate is responsible for coordinating and monitoring the implementation of fire protection measures.

An integral part of the Program is the State Plan for the Engagement of Firefighters. The State Plan defines fire commands, standard operational procedures and instructions according to which the firefighting system takes action. The standard operating procedures also determine the operation of aircrafts during the extinguishing of forest fires. Prior to the start of the fire season, estimates were prepared and Fire Protection Plans for the following especially endangered areas were developed: islands of Lastovo, Brač, Hvar, Vis and Dugi otok.

Firefighters and firefighting equipment from the continental part of the country were dislocated during the summer months to a total of 11 endangered coastal locations. In one shift, 69 firefighters and 17 firefighting vehicles were dislocated to the coastal part of the Republic of Croatia.



In addition to the local firefighters, during the summer in the coastal area there were an additional 1110 seasonal firefighters deployed in professional and voluntary firefighting units and 45 local professional firefighters deployed in the State Fire Department and the Seasonal Emergency Fire Department on the islands of Mljet, Korčula, Brač and the Pelješac peninsula.

#### *Firefighting means and information campaigns*

During the fire season in 2017, the National Protection and Rescue Directorate - Fire Operations Center carried out the coordination of ground and air firefighting forces across the coastal area and communication with the Air Force Command operating within the Ministry of Defence. The National Protection and Rescue Directorate - Firefighting Sector together with the representatives of the National Hydrometeorological Institute reported once a week on the situation to the Emergency Response Coordination Centre (ERCC) in Bruxelles, while presenting weekly events in the Republic of Croatia through a video conference.

The National Hydrometeorological Institute prepared a fire weather index on a daily basis. Prior to the start of the fire season, additional firefighter training in extinguishing forest fires (desanting and joint action with aircrafts) was conducted.

The air forces consist of 6 "Canadair" CL-415 type aircrafts, 6 Air Tractor AT-802 A/F type aircraft and one Mi-8 MTV1 type helicopter. During the fire season, the air forces realized a total of 17 606 flights, 2773:30 hours of flight time, with 81 951 tons of water discharged, 1 754 111 litres of fuel consumed, 283 people and 188 tons of equipment transported, which is multiple times higher than in 2016, when 6 364 flights were realized, with 937:05 hours of flight time, 34 228 tons of water discharged, 618 852 litres of fuel consumed, as well as 442 people and 72 tons of equipment transported. From the total number of flights in the year 2017, there were 65 firefighting reconnaissance flights recorded, with 111:15 hours of flight time, whereby in some situations the planes detected the initial fires and joined the firefighting efforts.

The Ministry of the Interior performed additional inspections of areas, forests, tourist destinations, hotels, camps and national parks endangered by fires. Information campaigns were also held with the aim of

informing the population and tourists of fire hazards through printed flyers and placing billboards. Other competent inspection departments conducted supervision of all other fire endangered areas. The supervision covered the firefighting forest roads and belts, railway lines, public roads of state importance and facilities on those roads, as well as those areas where fires that hindered the flow of road traffic occurred in previous years. Supervision was performed of roads of local significance that were under increased traffic load during the tourist season (access roads to resort hotels, auto camps, public garages, cultural and historic sites and other facilities where a large number of tourists or guests are staying). Furthermore, supervision was performed and measures were taken in national parks, nature parks and other protected forest areas, municipal waste landfills, where municipal waste is disposed of under controlled conditions, especially in the coastal area.

#### *Loss of human lives*

During fire extinguishing in the coastal and karst areas in 2017, 97 firefighters (minor injuries) and 4 civilians (no tourists) were injured, while one person died (heart attack).

#### *Operations of mutual assistance*

In accordance with the concluded inter-state Agreements on mutual assistance in major accidents, further contacts with Bosnia and Herzegovina, Montenegro and Slovenia are ongoing. There is a standard operating procedure signed with Bosnia and Herzegovina, Montenegro and Slovenia with regard to unhindered crossing of state borders by land and air forces in large-scale fires in the border area.

In 2017, three requests were received for the provision of humanitarian assistance in firefighting from abroad (Montenegro on 20 July 2017, Bosnia and Herzegovina on 3 August 2017 and the Italian Republic from 29 October to 2 November 2017), which were also realized.

*(Source: Directorate for Forestry, Hunting & Wood Industry, Ministry of Agriculture, Croatia; National Protection and Rescue Directorate, Croatia).*

## 2.2.5 Cyprus

### *Fire danger in the 2017 fire season*

In January 2017, the weather in Cyprus was relatively dry. Unstable weather conditions prevailed during certain periods of the month, giving rain, local thunderstorms, hail and snow. The mean air temperature was 1.1° C below normal and the average precipitation was 75% of normal.

In February the weather was extremely dry. The mean air temperature was 0.1° C above normal, while the average precipitation was 14% of normal.

In March the weather was mild. Unstable weather conditions prevailed during certain periods of the month giving rain, local thunderstorms and slight snowfall over the mountains. The mean air temperature was 0.9° C above normal and the area average precipitation was 93% of normal.

In April the weather was relatively dry. The mean air temperature was 0.5° C above normal and the area average precipitation was 63% of normal.

In May the weather was mild. Unstable weather conditions occurred during certain periods of the month, giving local rain and isolated thundery showers. The mean air temperature was 0.3° C above normal and the area average precipitation was 87% of normal.

In June the weather was relatively dry. The mean temperature was 0.5° C above normal. Relatively high temperatures were recorded during the last week of the month, when maximum temperatures were about 3 to 5° C above normal, with temperatures above 30° C in the mountainous areas of the island.

In July the weather was extremely hot and dry. The mean temperature in July was 1.8° C above normal and the area average precipitation 4% of normal. A daily maximum temperature of 44.6° C was recorded in Athalassa area at Nicosia city on the 2nd of July 2017, which was the highest for the specific station and for the specific month since 1983. Extremely high temperatures were recorded during certain periods of the month with maximum daily temperatures above 40° C.

In August the weather was mild. Unstable weather conditions prevailed during certain periods of the month giving local showers and isolated thunderstorms over some areas, mainly over mountains, inland and over west-northwest coasts. The mean air temperature was about 0.5° C above normal and the area average precipitation was 86% of normal. No abnormal weather conditions were recorded or reported during the month.

In September the weather was extremely dry and relatively hot. The mean air temperature was about 1.5° C above normal and the area average precipitation was 7% of normal. Relatively high temperatures were recorded during certain periods of the month, when daily maximum temperatures were up to 8° C above normal.

In October, both the mean air temperature and the area average precipitation, were around normal.

The weather in November was relatively wet with unstable weather conditions during most periods of the month giving local showers and isolated thunderstorms. The mean air temperature was approximately 0.5° C above normal and the area average precipitation was 115% of normal.

In December the weather was dry and relatively warm. The mean air temperature was about 2.0° C above normal and the area average precipitation was 33% of normal.

### *Fire occurrence and affected surfaces*

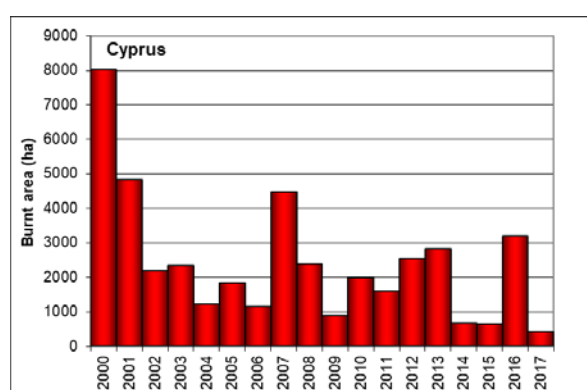
The 2017 fire season had been a mild one compared to the severe and particularly damaging 2016 fire season. The total area that was burned during 2017 will go down in history, as the lowest ever recorded in Cyprus since the year 2000. During 2017, Cyprus experienced 92 forest fires that burned 428 hectares, mostly forest and other wooded land. There was only one fire with burnt area greater than 50 ha, that affected an area of 159 ha.



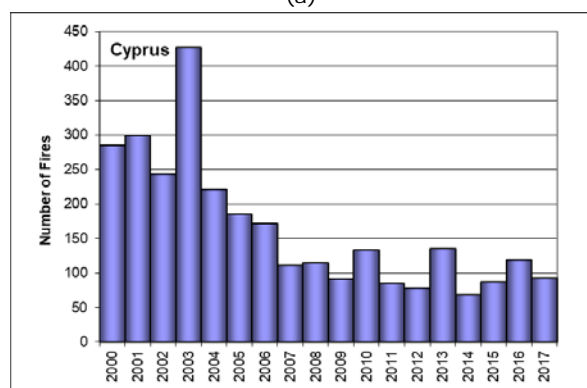
Table 4. Number of forest fires and burnt areas in Cyprus from 2013 to 2017.

Year	Number of fires	Burned area (ha)		
		Total	Forest and other wooded land	Agriculture and other artificial land
2013	135	2 835	1 681	1 154
2014	68	669	496	173
2015	87	652	350	302
2016	119	3205	2946	259
2017	92	428	270	158

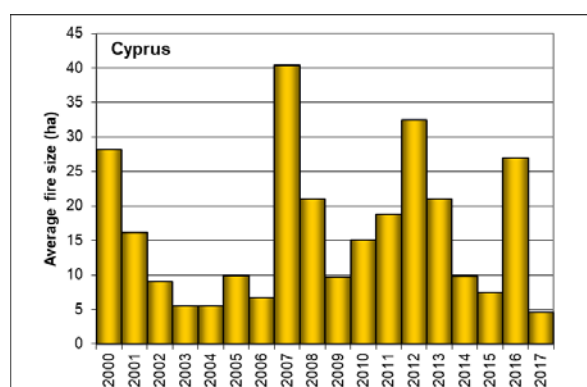
The trends regarding both the number of fires and burnt areas over the last 18 years (2000-2017) are shown in Figure 7.



(a)



(b)



(c)

Figure 7. Burnt areas (a), number of fires (b) and average fire size (c) in Cyprus from 2000 to 2017.

### Major fires in 2017

During the afternoon of the 19th of July 2017, a fire broke out near Ora village, Larnaca District. The firefighting effort was hindered by issues of accessibility due to the rough terrain as well as weather conditions, particularly the strong winds prevalent in the area. The blaze burned 1.6 km<sup>2</sup> (159 ha) of pine forest, other wooded land and agricultural crops.

### Loss of human lives

There were no casualties during the fire suppression operations.

### Fire prevention activities and fighting means

The 2017 fire prevention program consisted of multiple activities, including:

- fire break construction and maintenance
- vegetation management
- law enforcement
- education and information campaigns.

All fire fighting means, including fire fighting aircrafts and fire engines, were subjected to their annual inspection and maintenance, before the fire season. During 2017, the Department of Forests recruited 437 forest fire fighters to form the fire-fighting task force and operated 38 lookout stations for fire detection purposes.

### Operations of mutual assistance

There were no operations of mutual assistance during 2017.

(Source: Ministry of Agriculture, Rural Development and Environment, Department of Forests, Cyprus).

## 2.2.6 Czech Republic

### *Fire occurrence and affected surfaces*

Forest fires fighting and prevention is covered by the Fire and Rescue Service of the Czech Republic and by a high number of voluntary fire brigades.

In 2017 a total number of 966 forest fires were recorded, and about 170 ha of forest areas were burned. The total number of fires was slightly under the 5 year average when compared to the 2012-2016 average of 1 144. The burned area was well under the 5 year average of 250 ha. The worst fire seasons when considering last 5 years were the years 2012 and 2015. The locations of the fires are mostly concentrated according to level of fire risk over the country (Figure 9).

Table 5. Number of fires, burnt area, economic losses and casualties in Czech Republic since 2005.

Year	No. of fires	Burnt area (ha)	Damage caused (mil. EUR)	Saved values (mil. EUR)*	People killed	People injured
2005	626	227	0.8	4.9	0	12
2006	693	405	0.3	4.0	0	16
2007	805	316	0.7	13.3	0	20
2008	470	86	0.1	4.5	3	10
2009	514	178	0.3	6.2	0	20
2010	732	205	0.2	5.0	1	12
2011	1337	337	0.3	6.5	1	27
2012	1549	634	1.8	26.2	2	30
2013	666	92	0.2	3.0	0	7
2014	865	536	0.3	3.3	2	10
2015	1748	344	0.7	24.7	1	33
2016	892	141	0.2	7.8	0	6
2017	966	170	0.3	3.4	2	9

\*refers to the amount that would have been lost without intervention.

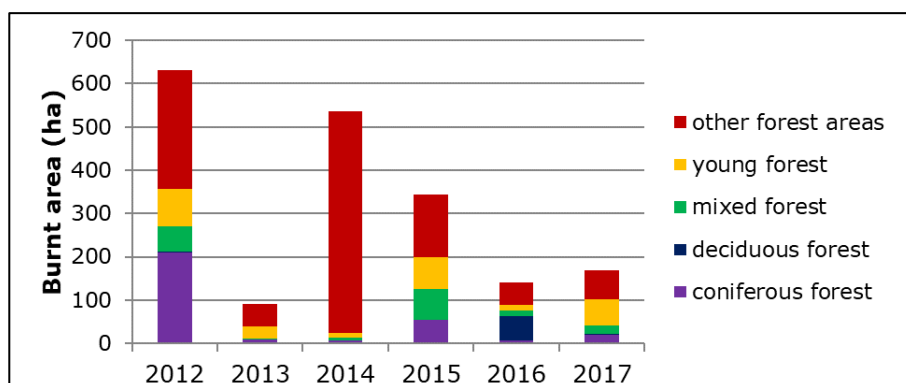


Figure 8. Total burnt area (ha) by forest type.

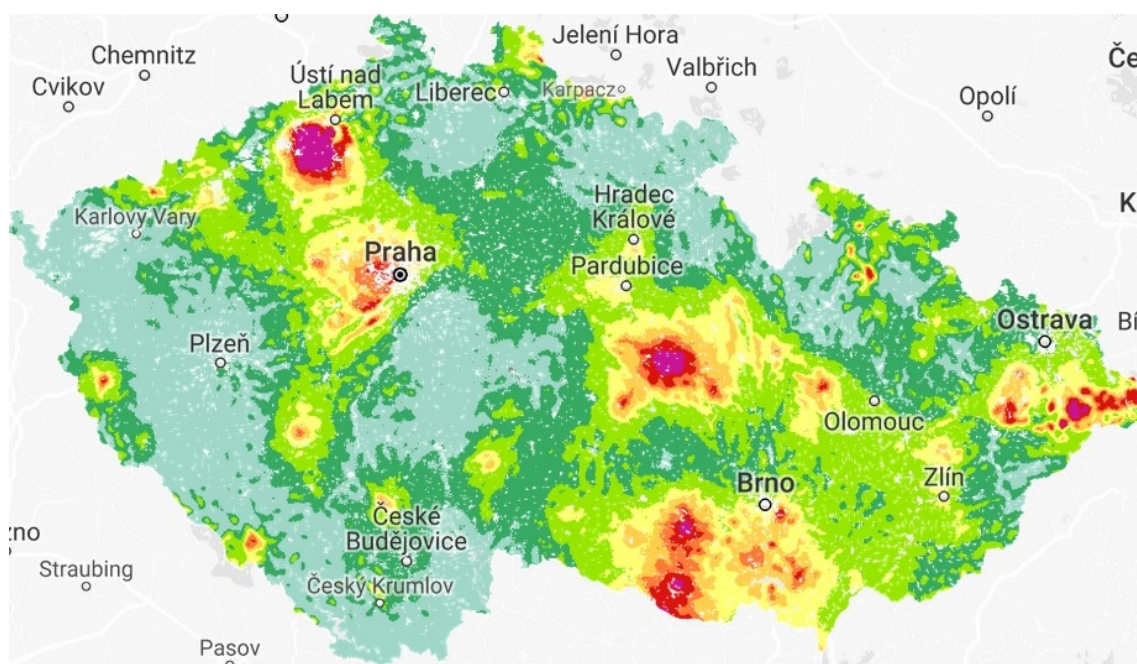


Figure 9. Forests with high risk level, usual situation (Source: Czech Academy of Sciences, project CzechAdapt).

The trends regarding the number of fires and burnt areas from 1995 to 2017 are shown in Figure 10.

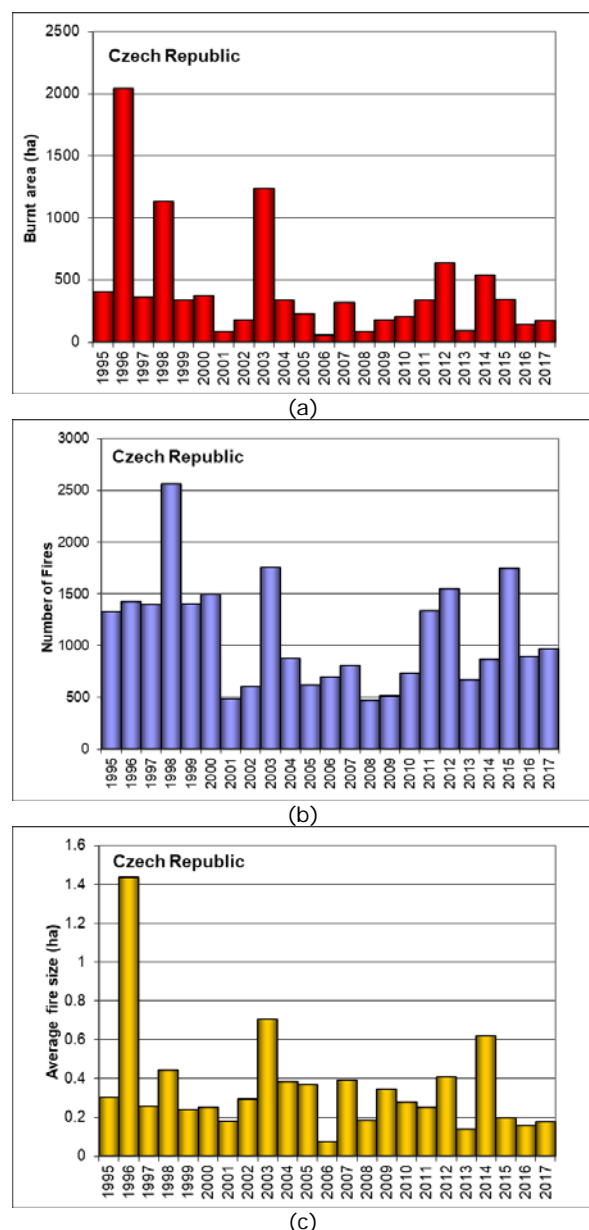


Figure 10. Burnt areas (a), number of fires (b) and average fire size (c) in Czech Republic 1995-2017.

### Firefighting means

It is very common, for bigger fires, to use the support of police helicopters, for tactical exploration and also for aerial firefighting, using water buckets with up to 1 000 litres of water. If needed, it is also possible to ask for army helicopters or private planes in a case of emergency.

### Fire causes

The main causes for the forest fires during 2017 are :

- Negligence 44 %
- Human caused, unknown motivation 35%

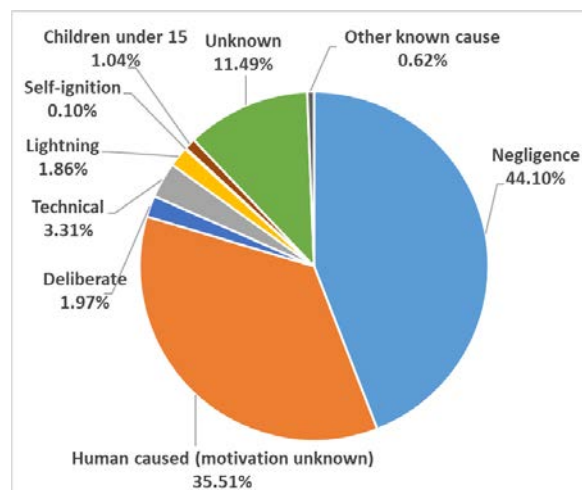


Figure 11. Causes of forest fires in 2017.

The causes of forest fires in the last 4 years are given in Table 6.

Table 6. Causes of forest fires in Czech Republic 2014-2017.

Year	2014	2015	2016	2017
Negligence	123	630	337	426
Motivation unknown	1	665	371	343
Technical	5	32	16	32
Lightning	7	38	4	18
Intention	26	67	25	19
Unknown	24	253	119	111
self-ignition	1	2	5	1
Children < 15	4	17	4	10
Other	2	7	6	6

### Injuries and loss of human lives

There were 2 people killed and 10 people injured due to forest fires in 2017. In total, 155 people have been injured and 12 people killed in the last 10 years due to forest fires.

(Source: Fire and Rescue Service, General Directorate, Czech Republic).

## 2.2.7 Estonia

### *Fire occurrence and affected surfaces*

In 2017 a total number of 340 forest fires and wildfires were recorded; 61 of these were classified as forest fires. The biggest fire threat was in the spring and more than a half of the forest fires (33) occurred in May.

Table 7. Forest fires in Estonia 2000-2017

Year	Number	Area (ha)			
		Forest	Non-forest	Total	Average
2000	158	487.5	196.4	683.9	4.3
2001	91	54.6	7.2	61.8	0.7
2002	356	1055.1	1026.6	2081.7	5.9
2003	111	129.5	77.1	206.6	1.9
2004	89	297.2	81.7	378.9	4.3
2005	65	76.2	10.3	86.5	1.3
2006	250	2467.0	628.6	3095.6	12.4
2007	64	61.3	231.1	292.4	4.6
2008	71	340.4	939.4	1279.8	18.0
2009	47	41.4	17.9	59.3	1.3
2010	30	20.6	4.1	24.7	0.8
2011	24	15.5	3.8	19.3	0.6
2012	5	2.5	-	2.5	0.5
2013	15	33.4	45.1	78.5	5.2
2014	91	68.0	9.8	77.8	0.9
2015	67	77.7	5.4	83.1	1.2
2016	84	117.7	5.2	122.9	1.5
2017	61	24.6	8.4	33.0	0.5

Forest fires in 2017 were recorded in 12 counties, and three counties which remained untouched by forest fires were Järva, Saare and Viljandi. The first forest fire in 2017 was recorded in April, the last one in August. The largest forest fire of 2017 occurred in May in Harju county Kallavere with area of 4.65 ha.

Forest fires were small in size – only in 12 cases the burnt area was equal or bigger than 1 ha.

The burnt area, number of fires and average fire size for the years 2000-2015 are shown in Figure 12.

### *Fire fighting means and intervention campaigns*

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 Defence 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.

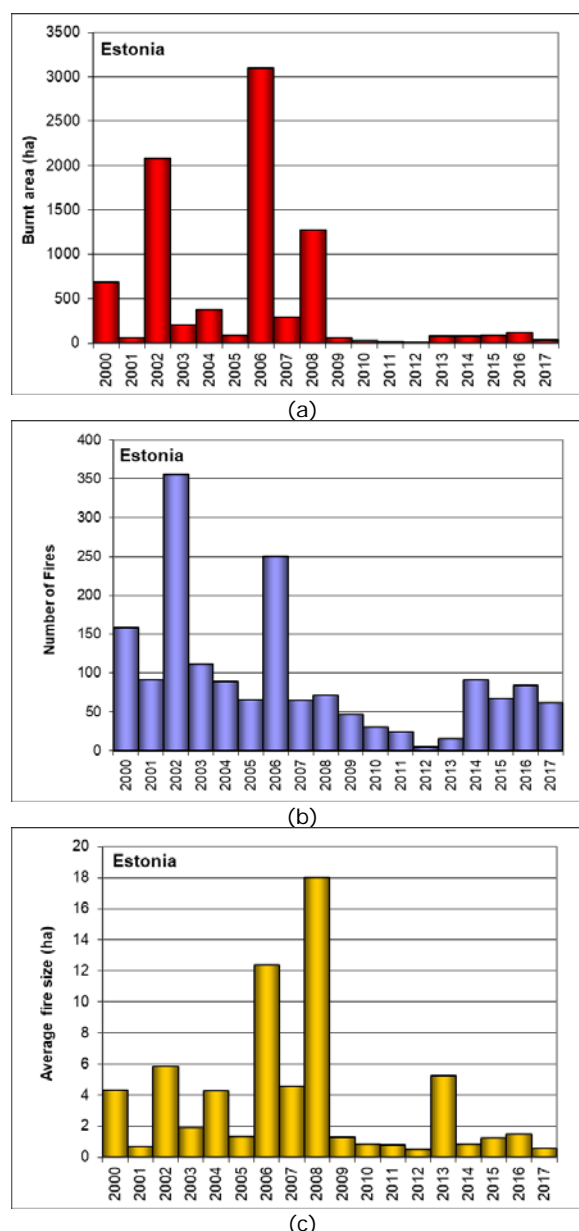


Figure 12. Burnt areas (a), number of fires (b) and average fire size (c) in Estonia from 2000 to 2017

### *Fire causes*

In 2017, despite the fact that in more than half of the cases the exact cause remained unknown, most forest fires were of human direct or indirect origin.

### *Loss of human lives and other damage*

This year there were no casualties and no dwellings were destroyed in forest fires.

(Source: The Estonian Environment Agency, Estonia).

## 2.2.8 Finland

### *Fire danger in the 2017 fire season*

Based on information from the Finnish Meteorological institute, the overview from summer 2017 was quite cold and quite wet in Finland. However, May was warm and dry in the southern part of Finland. Fire danger days for 2017 are presented below in Figure 13.

### *Fire occurrence and affected surfaces*

The number of forest fires in 2017 in Finland was slightly lower than the normal average level. There were 2 181 wildfires in Finland last year and 881 of them were reported as forest fires. The total burned area was around 769 ha, of which 460 ha was forest land. The average burned forest area per fire was 0.52 ha.

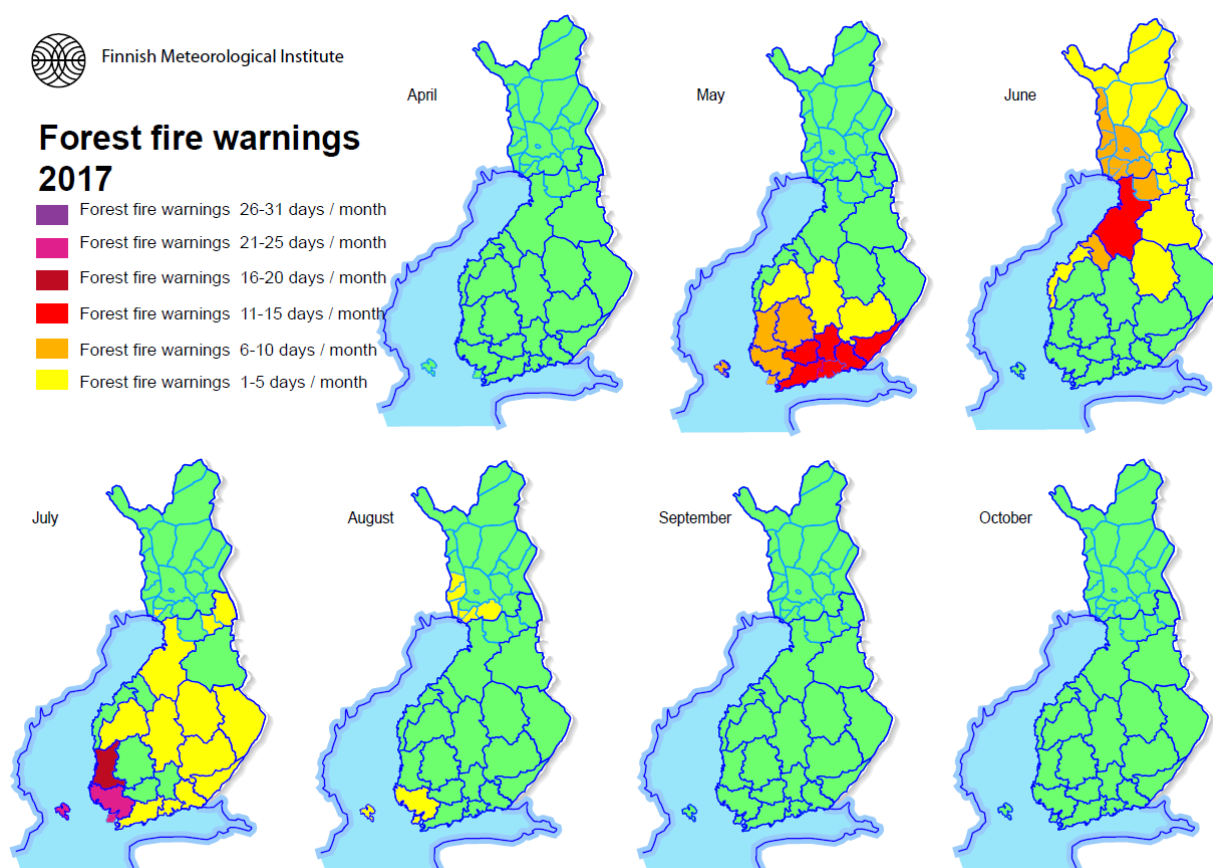


Figure 13. Fire danger days in Finland 2017.



The yearly trends in terms of number of fires and burnt area from 1996-2017 in Finland are shown in Figure 14 and Figure 15.

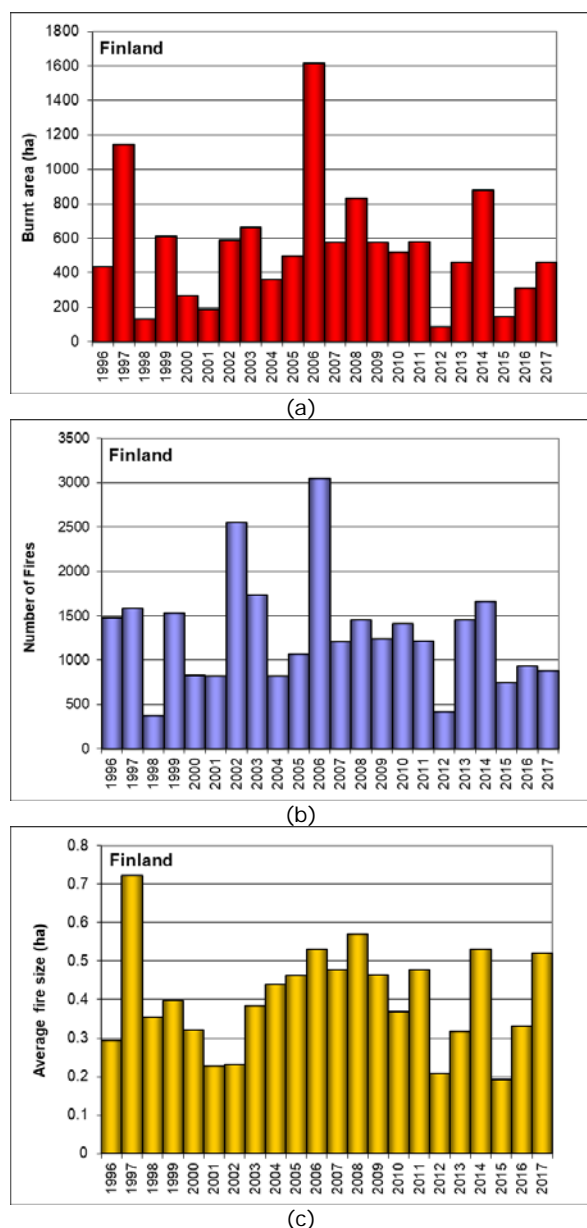


Figure 14. Burnt areas (a), number of fires (b) and average fire size (c) in Finland from 1996 to 2017.

#### Fire causes

The most common cause of wildfires in Finland was human actions. These caused more than 70%, mainly from accidents. The second biggest reason was natural (less than 10% of fires). The reason for the fire could not be found in over 10% of the cases.

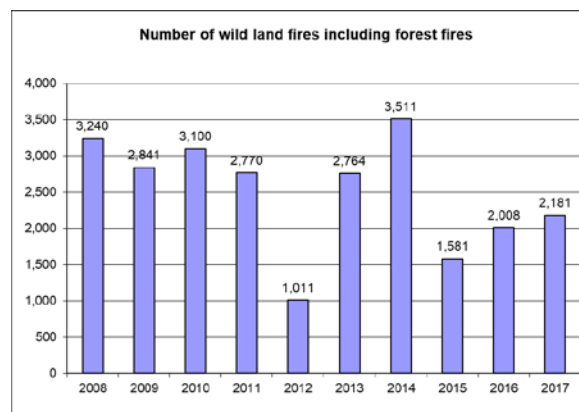


Figure 15. Total number of wildfires including forest fires from 2008-2017.

#### Fire prevention activities

There was more cooperation with institutes such as the Finnish meteorological institute, for example projects for improving situation awareness and satellite monitoring.

#### Fire fighting means and information campaigns

- Finnish military forces NH 90 helicopters are available to extinguish forest fires.
- More co-operation between other authorities such as the border guard.
- Continuation of forest fire aerial officer education for fire officers.
- Development of the forest fire index system. The new system will be ready for the 2018 season.

#### Loss of human lives

One person died in Finland forest fires in 2017. Four people were injured in different wildfires, suffering from burns. Some of the wildfires caused damage to buildings; and conversely some of the wildfires were caused by fires in buildings or vehicles.

#### Operations of mutual assistance

Finland sent one CP expert to support the ERCC, 2017 Forest and Wild Fire Season, June-September 2017. There has also been information sharing between neighbourhood countries and the EU.

(Source: Ministry of the Interior, Finland).

## 2.2.9 France

### *Fire danger in the 2017 fire season*

2017 was again marked by a large number of fires, particularly in south-eastern France and Corsica. The 2017 season was particularly intense on the fire front, affecting a wider area and lasting longer than in 2016.

Following a relatively mild autumn and winter with very low rainfall on the continent during the winter, spring rains occurred more in the continental areas whereas they were rare in Corsica. Spring in the southern zone was hot: after 2007 and 2011 it ranks as the third hottest spring since 1900.

The measurements made by the National Forest Office show that the vegetation was very weakened by this situation, which favoured the outbreak and spread of fires.

Outside the Mediterranean region, the spring drought was offset and the summer danger level remained limited.

The burnt area is up compared to 2016 but remains very far from the 73 000 ha affected in our territory in 2003 or the areas destroyed at the European level (350 000 ha in Portugal).

This gross figure can be explained by several factors:

- a greater number of fire starts related to hot weather and drought.
- an increased number of days with strong winds that promote fire spread and make it even more difficult for air and ground forces to intervene;
- vegetation with a high level of water deficiency, which increased the intensity of the fires after they become established.

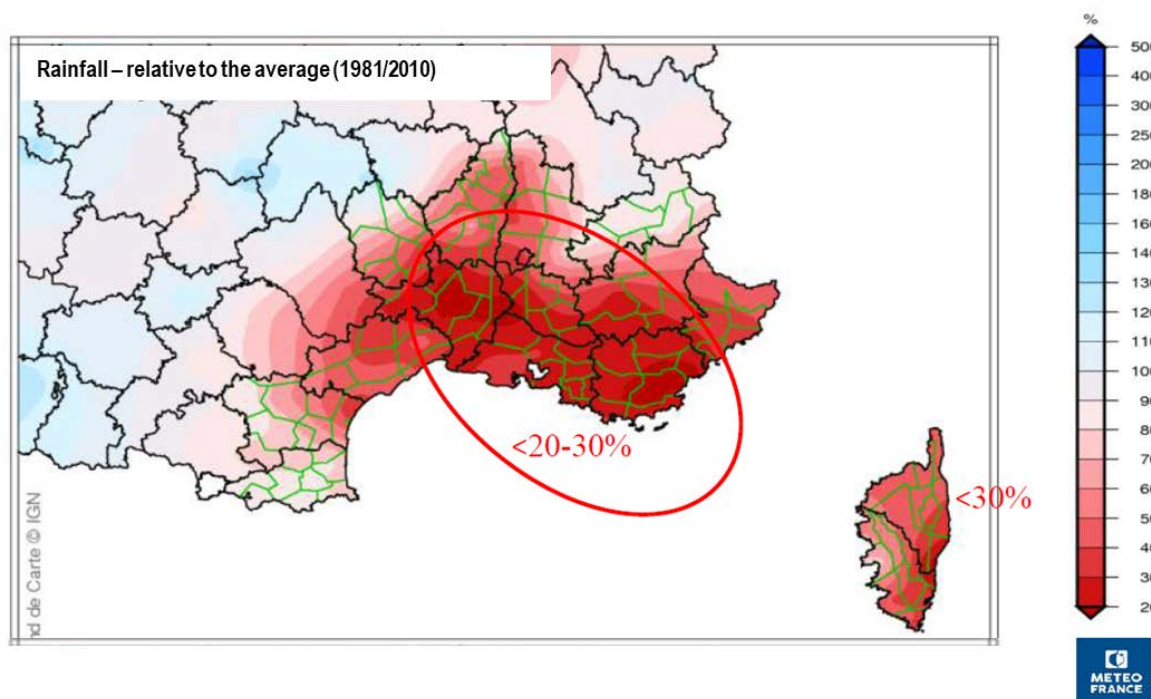


Figure 16. The deficit is strong, with only 30% of the normal rainfall over the period, from the east of Languedoc to the south of the PACA as well as in the east of Corsica, and extreme with less than 20% of normal rainfall in the Gard, the Var and towards Solenzara. This global map over 4 months, shows the extreme deficit present in Corsica and the Cote d'Azur during the 3 months of summer (June-July-August).

### *Fire occurrence and affected surfaces*

In 2017, there were 4 403 fires in mainland France affecting 26 378 ha (which is in line with the 10-year average):

- 19 691 ha were burnt in the Mediterranean departments (the 10-year average is 7 084 ha<sup>4</sup>), of which 14 601 ha occurred during the summer (1 117 fires),
- 5 913 ha were in the south-west quarter (average 1 621 ha), including 3 207 ha in the Landes massif (compared to an average of 1 230 ha), and 1 700 ha in the Pyrenean mountain range,
- 774 ha were in the other metropolitan departments.

This distribution is in line with what is usually observed with about three-quarters of the fires in France in 2017 located in the Mediterranean departments. Two thirds of the areas affected were during the summer period.

#### Fires in the Mediterranean region:

With an area burned close to 20 000 ha, the areas affected by wildfires have not reached a comparable level since 1994 (when 22 600 ha were burnt).

This total is mainly because of the fires that occurred in late July and then, more unexpectedly, in October.

During these fires the interveners had to make significant efforts to protect the population and infrastructure. Despite this, some buildings were affected by these fires (in La-Londe-des-Maures in the Var, in particular).

In total, eight fires burned more than 1 000 ha during the summer, and another twenty-three fires affected over 100 ha:

Location	Number
Alpes-de-Haute-Provence	2
Alpes-Maritimes	1
Aude	1
Bouches-du-Rhône	4
Corse-du-Sud	5
Haute-Corse	3
Hérault	3
Pyrenees-Orientales	1
Var	2
Landes	1

The most serious fires occurred in the Var and in Haute-Corse. In these regions, six fires burned more than 1 000 ha:

- Haute-Corse
  - Olmeta di Tuda (2 260 ha, 24 July)
  - Nonza (1 617 ha, 11 August)
  - Ville-di-Paraso (1 316 ha, 20 October)
- Var
  - Artigues (1 780 ha, 24 July)
  - La Londe-des-Maures (1 423 ha, 25 July)
- Vaucluse
  - La Bastidonne (1 140 ha, 24 July)

In the southwestern quarter, forest fire activity was intense in the spring with two large fires (Captieux, 1 293 ha on March 30 and Cissac-Médoc, 1 075 ha on April 20). These two fires alone represent three-quarters of the area burned in the Landes massif.

There are still large areas in the Pyrenees (1 700 ha) linked to the practice of agricultural burning.

In the Landes massif alone, 3 207 ha were affected by fire, which is three times higher than the 10-year average.

#### Forest fires in Réunion Island

The *Direction Générale de la Sécurité Civile et de la Gestion des Crises* (DGSCGC) also mobilized reinforcement means in Réunion. Having sent air and ground reinforcements to this department for large fires in 2010 and 2011, in 2017 it pre-positioned a Dash water bomber aircraft during the sensitive period, as it has done since 2012.

The areas affected during the sensitive period in Reunion were limited, and in total less than 80 ha of various vegetation burned against 580 ha on average over the period 2007-2016.

#### New Caledonia

The territory is regularly confronted with wildfires traversing large areas that could threaten sensitive areas. In the past 20 years, tens of thousands of hectares have been affected from November to January (48 000 ha in 2002, 20 000 ha in 2004, 17 000 ha in 2005). At the end of 2017, a detachment of some thirty ForMiSC rescue engineers was hired in view of the strong operational activity in this area. This detachment intervened on a dozen fires that burned 1 500 ha.

<sup>4</sup> Prior to the implementation of the strategy to deal with incipient fires in the late 80s, the average was 34 000 ha.



The yearly trends in terms of numbers of fires and burnt areas in France since 1980 are shown in Figure 17.

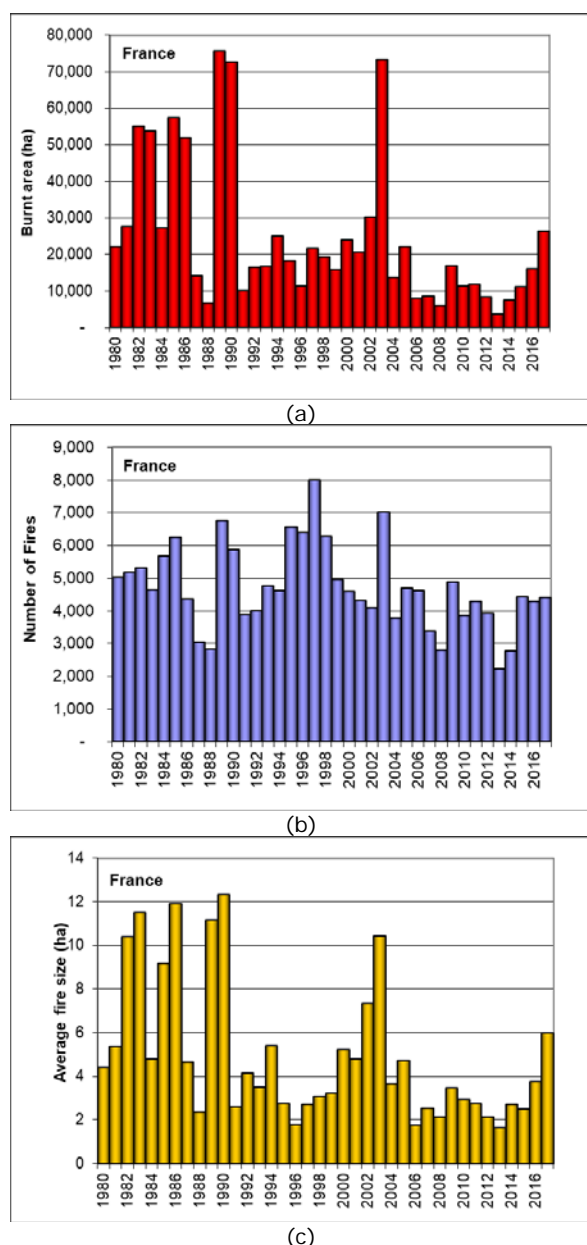


Figure 17. Burnt areas (a), number of fires (b) and average fire size (c) in France from 1980 to 2017.

### Fire prevention activities

The modernization of the technical instructions relating to legal requirements for clearing, forest fire protection plans and the forest fire database in France were pursued in accordance with the guidelines of the April 2016 inspection report on the defense of forests against fire.



Figure 18. Example of state of vegetation monitoring September 2017.

Most of the preventive actions were in the Mediterranean region:

- the 116 meteorological zones are equipped with a network of stations, of which 73 are dedicated to forecasting forest fire danger;
- these forecasts were supplemented by monitoring the dryness of the vegetation at 30 sites (Figure 18);
- during the summer, a thousand foresters participated in surveillance and alert (lookouts, surveillance, deterrence and first response patrols) for a total of approximately 36 000 man-days funded by the state and communities;
- investment in field equipment continued, representing an investment of around €10 million of work, which benefited from the financial support of the European Union (around €1.4 million from EAFRD: the European Agricultural Fund for Rural Development) for the maintenance of existing amenities (tracks, water points etc.);
- information campaigns were conducted at departmental level (NUTS3) and across the entire region (NUTS1), to publicize preventive regulations (limitation or prohibition of use of fire, traffic in the massifs, clearing obligations, etc.) and dissemination of safety recommendations;
- interdisciplinary units (foresters, firefighters, policemen) worked together in most departments to investigate the causes of fires, in order to guide preventive actions and improve the criminal justice response.
- In terms of communication, the *Délégation à la Protection de la Forêt Méditerranéenne* (DPFM) has a website ([www.dpfm.fr](http://www.dpfm.fr)) which provides information on regulations and relays the main events and articles related to the DFCI in French.



Figure 19. Fire-fighting means deployed in 2017.

### Fire fighting means

To support firefighters funded by local authorities (numbering 37 000 in the Mediterranean departments and 7 700 in the Landes massif), the Ministry of the Interior deployed reinforcements that included:

- 700 military personnel of investigation and intervention units of the civil protection (UIISC);
- 23 water bombers (12 Canadair, 9 Tracker, 2 Dash);
- 3 reconnaissance and coordination aircraft and 35 rescue and command helicopters.

Under a protocol signed with the Ministry of Defence, with funding from the Ministry of Interior, 45 men, 15 vehicles and three helicopters were assigned to the work of protecting forests.

Finally, around ten reserve firefighters from departmental fire and rescue services outside the Mediterranean area (strictly respecting the required qualifications) coming from different areas of defence were positioned. At the request of the *Centre Opérationnel de Gestion Interministérielle des Crises* (COGIC) of the Directorate General of Civil Security and crisis management, they were thus able to supplement local arrangements on demand.

The effectiveness of the intervention mechanism depends on its ability to act without delay by applying a strategy of fast attack for incipient fires based on the forecast mobilization of resources to combat during periods of high risk. Ongoing cooperation with *Météo France* and the *Office National des Forêts* (ONF) makes it possible to have specifics on the level of foreseeable danger to anticipate the danger and to be more reactive in operational response in the case of incipient fires.

Thus, in periods of high risk, both national and local resources are mobilized proactively

according to the danger level to act promptly while the fire is still manageable: the UIISC elements are deployed in the most sensitive forests alongside local fire brigades, water bombers provide armed air surveillance missions, and the military provide patrols alongside local actors (foresters, firefighters, members of community committees for forest fires).

Due to the meteorological and operational conditions, activity of the national resources was greater than in recent years.

The water bomber planes of the Civil Defense intervened several times.

The air assets were engaged this year in intervention activities on fires and during missions of armed air watch, during very severe risk situations.

The military formations of the civil security were engaged on the fires and also carried out ground surveillance missions in Corsica.

The mobilization of forest fire reinforcement columns made up of firefighters from all over France to strengthen the Mediterranean system has been important. These reinforcements were deployed on a curative or provisional basis, depending on the notified risks to reinforce the local arrangements by decision of COGIC.

### Impacts on human lives

The measures taken to prevent and fight against forest fires were effective in protecting the population but the damage to infrastructure (housing, buildings) was significant, in particular from the fire in La Londe-des-Maures.

(Source: Ministère de l'Intérieur – DGSCGC / SDPGC / BAGER; Ministère de l'Agriculture et de l'Alimentation : DGPE / SDFE / SDFCB / BGED, France).

### 2.2.10 The former Yugoslav Republic of Macedonia

The Republic of Macedonia covers 2 543 200 ha of land. According to the latest data of the Special plans of woods management, total forest area in Republic of Macedonia amounts to 1 091 857.59 ha, of which 835 055.82 ha are totally forest covered area and 256 801.77 ha of the forest is non-covered forest area.

The total forest reserve according to the same database amounts to 75 939 573 m<sup>3</sup>: that is 91 m<sup>3</sup>/ha. Total annual growth amounts to 1 616 782 m<sup>3</sup> (1.93 m<sup>3</sup>/ha).

The total anticipated growth for 10 years amounts to 10 948 149 m<sup>3</sup>, or annually 1 094 815 m<sup>3</sup>. Its utilisation is 75%.

The natural conditions of Republic of Macedonia, conditioned by location, climate, relief, geologic structure of terrain, hydrologic features and similar, enable the existence and growth of a great number of plant and animal species. Because of that, forests are characterised by rich biodiversity. A great number of plant and animal species are relics and endemics.

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 2450 hours per year.

The Protection and Rescue Directorate within the regular duties of the Sector for prevention, planning and development organizes, plans and implements the measures and activities for protection and rescue against natural disasters and other accidents, in particular forest fires. In coordination with the protection and rescue units, data are collected about the current situation and the necessary intervention through assessment of the risks from the dangers that are current. All situations are visualized on a geographical map and recorded. At the end of the day a daily overview of the situation of the fires is submitted.

The data in the form of examinations come to the Sector for Prevention, planning and development, which are processed in the Department for analytics and research, with the note that after the completion of all activities, an official Analysis is made with verified data on the number of fires, engaged subjects, engaged resources for protection and rescue, weaknesses, omissions and lessons learned.

#### *Fire danger in the 2017 fire season*

The fire danger in 2017 season in Macedonia was relatively severe, the worst year since 2012. The majority of fires occurred during the summer months. July was dry, warm and hot in the southern part of the country. The weather in August was most commonly affected by a field of high or medium even air pressure.

#### *Fire occurrence and affected surfaces*

During the year 2017 there were 1 787 fires of which 301 were forest fires, affecting a total area of 5618.9 ha. The affected agricultural area was 2 348.3 ha and the total affected area was 8 018.2 ha. 16.84 % of the total number of fires were forest fires.

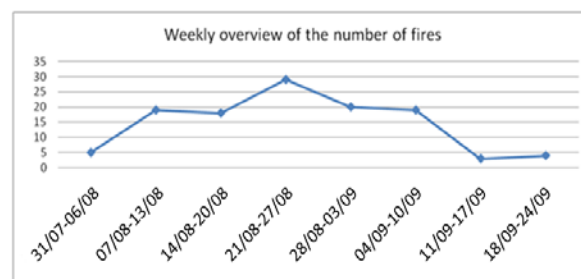


Figure 20. Weekly distribution of the number of fires through the summer.

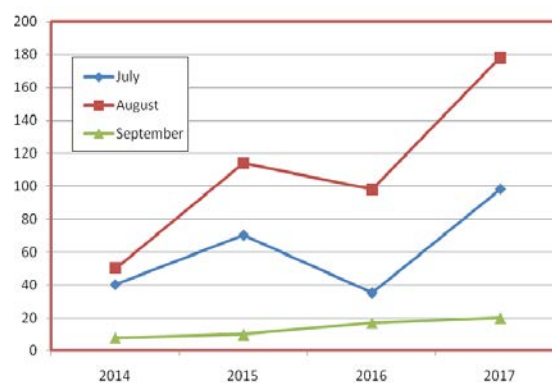


Figure 21. Monthly summer fires from 2014-2017.

The analysis of the preconditions, reasons and factors and factor leads to the conclusion that Macedonia is a region with a high risk of fires on its territory. The damage was not only economical but on a much bigger scale-inestimable damage for plant conditions.

The comparative charts for burnt area, number of fires and average fire size for the years 2007-2017 as well as the number of fires and burnt area according to types of fires for the year 2017 are shown in Figure 22 and Figure 24.

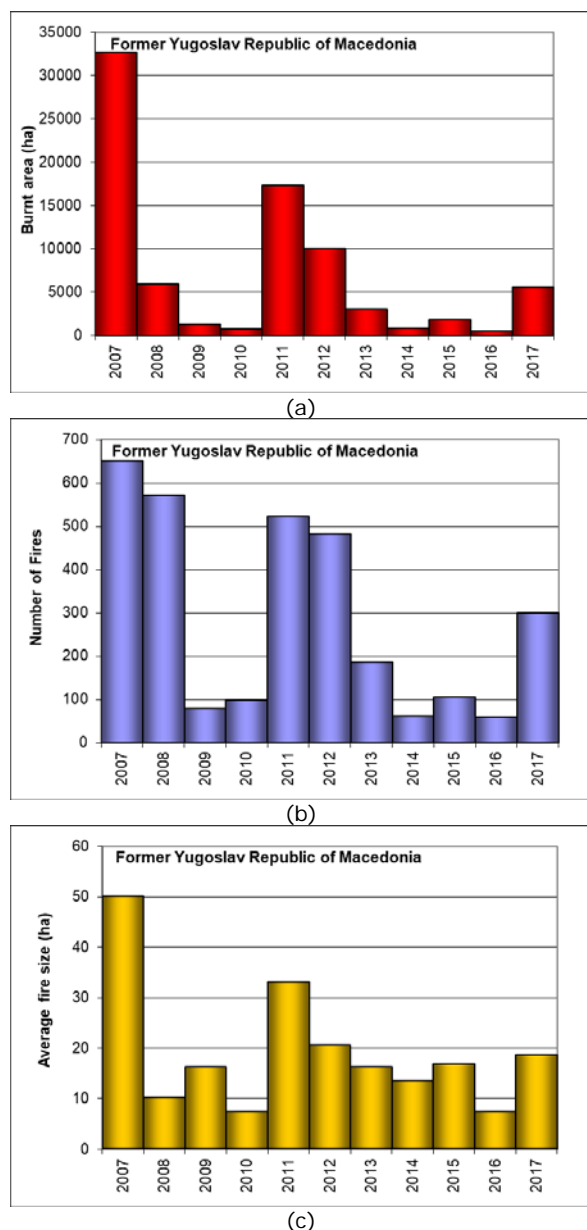


Figure 22. Burnt areas (a), number of fires (b) and average fire size (c) in the former Yugoslav Republic of Macedonia from 2007 to 2017.

### Fire causes

The most common causes of forest fires during 2017 are shown in Figure 23. The majority (59%) are caused mainly from negligence. The second biggest known reason was deliberate or arson (15 % of fires). The reason for the fire could not be found in around 25 % of the cases.

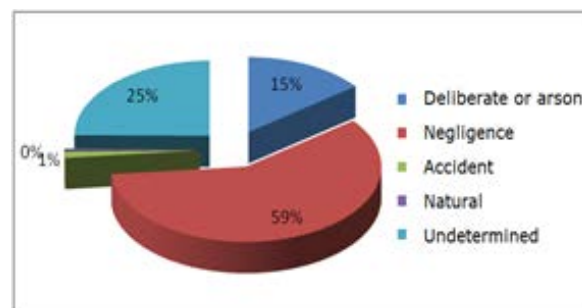


Figure 23. Causes of forest fires in 2017.

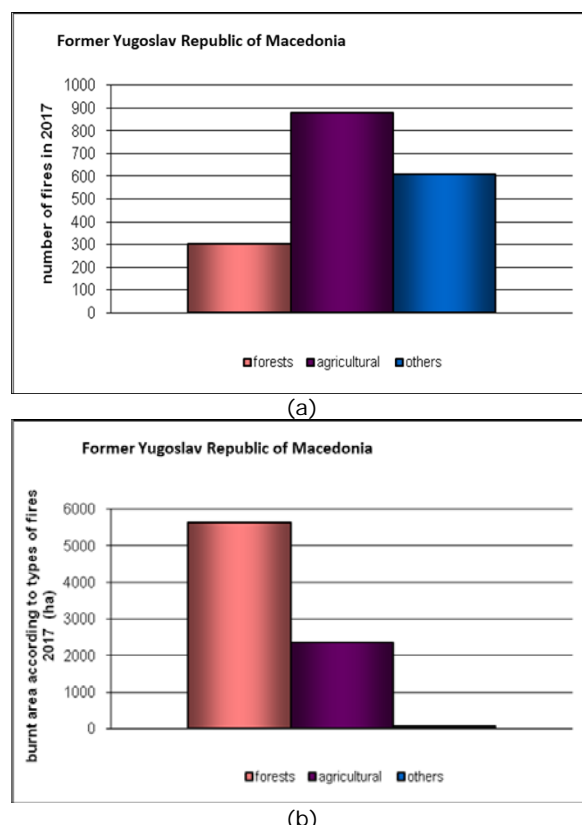


Figure 24. Number of fires (a) and burnt area (b) according to the type of fires in 2017.

### *Economic damage*

The economic damage caused by forest fires in 2017 is estimated to be around 1 911 308 151 Macedonian denar. (data provided by P.E. Macedonian forest).

### *Fire prevention activities*

The Protection and Rescue Directorate in accordance with its legal competence and function, and taking into consideration a number of factors (working program, possible heat wave for the 2017 summer period, staffing and capacities, equipment levels and the increased danger of occurrence of fires in open spaces), prevents a number of activities.

In accordance with article 5 paragraph 1 item 3 of the Law on Protection and Rescue and article 54 of the Law on Forests (which require all entities, including citizens, to fulfil the obligation for fire protection in forests), the regional units for protection and rescue organized working meetings in the period May-June 2017 with all competent entities including fire brigades, forestry companies, local self-government, public enterprises, institutions and services in connection with undertaking preventive and operational measures for protection against forest fires. Within the Protection and Rescue Directorate, a Mobile Fire Protection Unit of 20 members has been established from its permanent composition. It has been trained and equipped with 4 WV Amoroc vehicles with a built-in pump and a 300-litre tank and other equipment.

The three Firefighting Aircraft Air Tractor AT-802 A of the Protection and Rescue Directorate have been prepared and put into operation, the airline has been reorganized and consolidated considering the reduced number of pilots and other personnel, and the simplified and clarified protocols and the manner of interventional action of the pilots on the field.

In addition, in order to improve the work and strengthen the Operational and Logistics Department, a Coordinative Body for protection against forest fires has been established in order to coordinate the resources for easier handling of the fires.

In the work of this body, the principles of staff work that have given good effect have been applied (including management, information, assessment, guidance, coordination, use of the resources of the Protection and Rescue Directorate and monitoring of the effects of operational actions).

The Plan for protection and rescue defines fire commands, standard operational procedures and instructions according to which the firefighting system takes action. The standard operating procedures also determine the operations of aircraft during the extinguishing of forest fires. Prior to the start of the fire season, estimates were prepared and Fire Protection Plans were developed.

There was more cooperation with stakeholders, especially with the Macedonian Hydro meteorological Service. In the organization of the General Staff of the Army of RM and in anticipation of the period of increased fire resistance, the Protection and Rescue Directorate participated in reconnaissance from the air (with Helicopter MI 17) to potential high risk areas for forest fires.

### *Fire fighting means and information campaigns*

During the fire season in 2017, the Protection and Rescue Directorate carried out the coordination of ground and air firefighting forces across the whole territory.

The Hydro meteorological service prepared a fire weather index on a daily basis. Prior to the start of the fire season, additional training in extinguishing forest fires was conducted.

The Protection and Rescue Directorate forces consist of three "Air Tractor AT-802 A" which are available to extinguish forest fires. The aircraft at the Protection and Rescue Directorate were engaged for 163 hours and 15 minutes until 15/08/2017, and 48 520 litres of fuel were spent.

Macedonian military forces MI 17 helicopters are available to extinguish forest fires. There is co-operation between other authorities such as the Ministry of the Interior forest police, who performed additional inspections of areas, forests, tourist destinations and national parks endangered by fires.

From the Protection and Rescue Directorate, a total of 22 decisions were taken on the fires for the Unit members engaged in fires, and a total of 449 people were involved with transport and food.

The total number of vehicles engaged from Protection and Rescue Directorate are a Volkswagen Amarok with installed pumps of 300 l capacity and water pressure unit and 3 mobile teams of PRD Units from the Skopje region, as well as other vehicles that are on the schedule.

The mobilization decisions were made with a duration of 1 day, 2 days, and 3 days depending on the assessment of the terrain for the fire, and the number of mobilized members of the protection and rescue forces is different. The mobilization decision for the Airborne Department was open-ended for their daily engagement.

Fire prevention and fire fighting activities were undertaken along with a public information campaign. For the purpose of awareness raising, media events such as press conferences, short reports and announcements on the TV and radio were organized.

In addition, the Public relations department of the Protection and Rescue Directorate regularly informs the public about the state of the fires. There were 4 press conferences organized for informing the public about the engagement in this period. A press release was prepared by employees. Information campaigns were also held with the aim of informing the population of fire hazards through printed flyers.

#### Campaign for raising awareness:

There was distribution of leaflets and brochures made by the Public company "Macedonian Forests" and the Firefighting Union of Macedonia. At the stand raised for this purpose, there were publicity materials to be distributed to passersby, emphasizing the need and importance of protecting forests from fires.

#### *Operations of mutual assistance*

From August 2 to 6, 2017, the Protection and Rescue Directorate through the Ministry of Foreign Affairs of the Republic of Macedonia and the Embassy of the Republic of Bulgaria, contacted the National Operational Centre of Bulgaria, and assistance was provided with one M 17 helicopter and 12 crew members.

The Protection and Rescue Directorate in coordination with the Steering Committee on Crisis Management established a contact with the Turkish Agency for Emergency Response and Disaster Relief (AFAD) on August 1 2017, in order to provide 1 helicopter for extinguishing fires. On August 3 at about ten o'clock a Turkish team of 10 members arrived by helicopter Mi-17, whose payload is 3t. They acted on the field until August 7.

Meanwhile, due to an increase in the intensity of fires in most of the territory of the country, on August 5, contact was established with the Honorary Consul of the State of Israel in Macedonia, and a request was made for aircraft to extinguish fires. On August 7, a B-200 King Air aircraft with a seven-member team arrived to assess the situation on the ground. On August 8, the type C130J with equipment and 15-member team arrived in Macedonia with 2 Air tractor aircraft for fire fighting. The mission of the Israeli team (2 teams with a total of 22 members and 2 Air tractor aircraft) lasted until August 11 and was realized in coordination with the Protection and rescue directorate.

#### *Loss of human lives*

No person died in Macedonia forest fires in 2017. Four people were injured in different forest fires, suffering from burns. Some of the wildfires caused damage to buildings.

*(Source: Protection and rescue Directorate, Department for analysis and research, the former Yugoslav Republic of Macedonia).*



## 2.2.11 Germany

### Fire occurrence and affected surfaces

In 2017 a total of 424 forest fires were reported in Germany, corresponding to a burnt area of 395 ha (318 ha in deciduous forests and 77 ha in coniferous forests). This is around two-thirds the number of fires recorded in 2016, but a slightly higher burnt area.

As usual the most affected province (Land) in 2017 was Brandenburg whose burnt area was accounted for 72 % of the total burnt area recorded in the country (Table 8, Figure 25). 3 Länder (Bremen, Hamburg and Schleswig-Holstein) did not record any fires.

Table 8. Burnt area in total and by forest type, and total number of fires, Federal Republic of Germany, 2017.

	Burnt area (ha)			Number of fires
	Coniferous forest	Broadleaved forest	Total	
Baden-Württemberg	1.20	3.91	5.11	17
Bayern	24.46	18.08	42.54	44
Berlin	0.40	0.00	0.40	1
Brandenburg	29.46	255.94	285.40	141
Bremen	0.00	0.00	0.00	0
Hamburg	0.00	0.00	0.00	0
Hessen	1.57	4.51	6.08	58
Mecklenburg-Vorpommern	0.06	0.00	0.06	4
Niedersachsen	8.15	1.05	9.20	12
Nordrhein-Westfalen	2.92	21.97	24.89	38
Rheinland-Pfalz	1.91	6.91	8.82	23
Saarland	0.10	0.98	1.08	4
Sachsen	4.42	0.49	4.91	42
Sachsen-Anhalt	1.55	3.57	5.12	23
Schleswig-Holstein	0.00	0.00	0.00	0
Thüringen	1.00	0.17	1.17	17
<b>Germany</b>	<b>77.20</b>	<b>317.58</b>	<b>394.78</b>	<b>424</b>

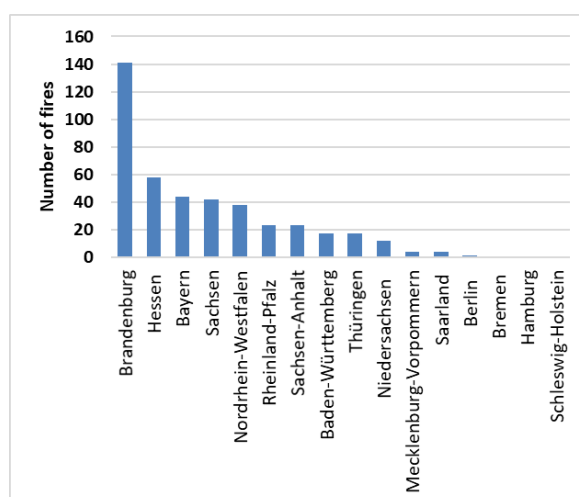
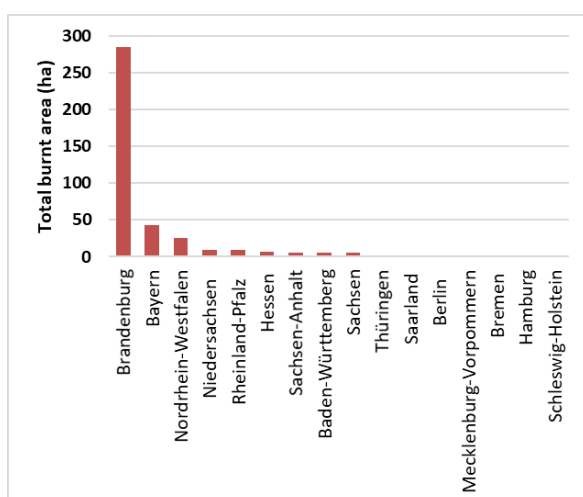


Figure 25. Burnt area (left) and number of fires (right) in Germany in 2017 by Land, ordered by size.

In 2017 the most affected month by a large margin was May, when 70% of the annual total burnt area occurred (Figure 26).

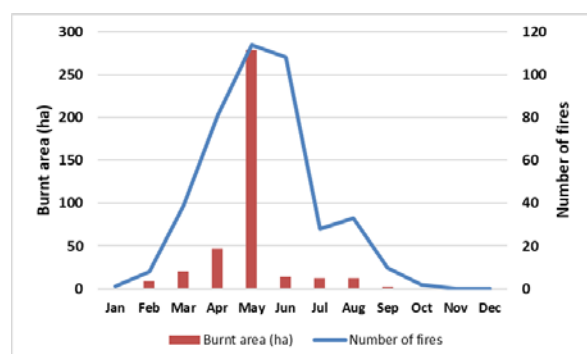


Figure 26. Number of fires and burnt area by month in Germany in 2017

The trend of the burnt areas, number of fires and average fire size in Germany for the years 1991-2017 are shown in Figure 28.

#### Fire causes and impacts

The main causes of forest fires during 2017 are shown in Figure 27. Within the category of negligence fires, the majority (59) were caused by the general public (campers, visitors, children etc.).

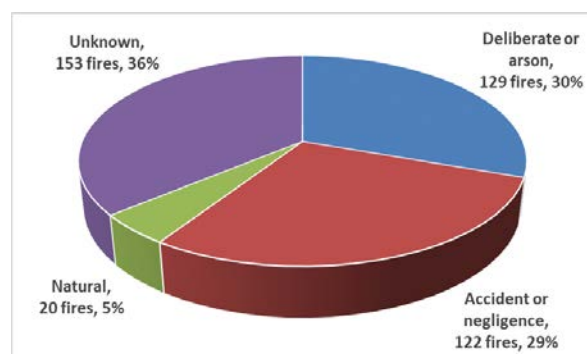


Figure 27. Causes of forest fires in 2017.

The economic damage caused by forest fires in 2017 is estimated to be around 0.29 million Euro, lower than the long term average from 1991 to 2017, which is 1.3 million Euro. The cost per hectare burnt was estimated at just over 735 Euro/hectare. In 2017, approximately 2.2 million Euro were spent on prevention and control measures.

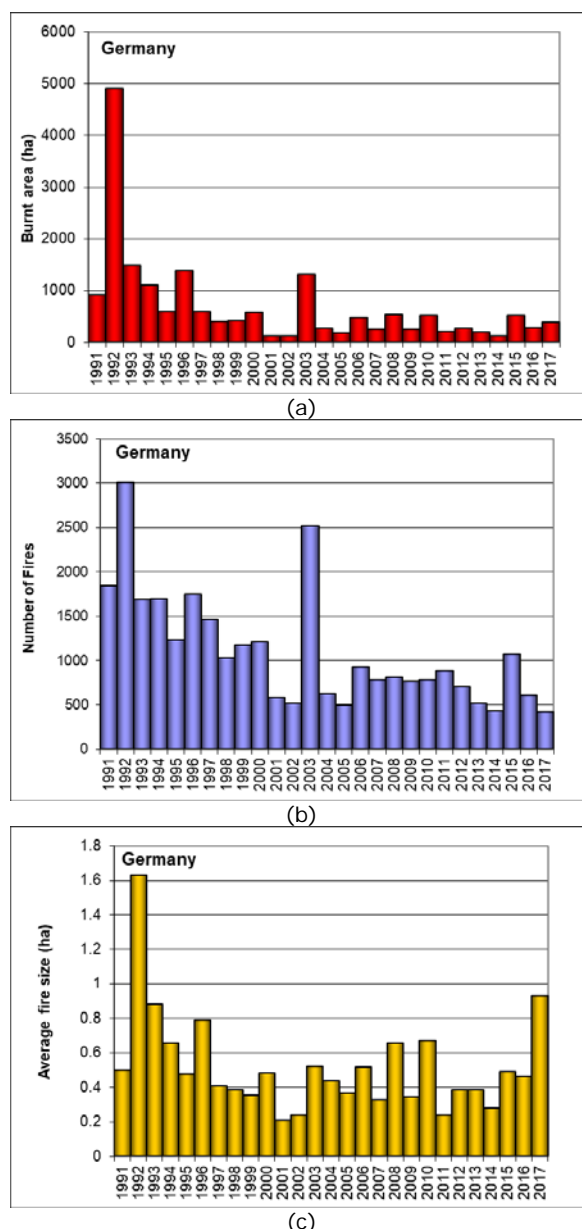


Figure 28. Burnt areas (a), number of fires (b) and average fire size (c) in Germany from 1991 to 2017.

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



## 2.2.12 Greece

### *Fire danger in the 2017 fire season*

Fire danger during the fire season 2017 was characterized by high temperatures and low precipitation levels except for a short period in June and in July. At the beginning of the fire season (specifically the first fifteen days) many temperatures were recorded in central and southern regions of Greece that were high, extreme and unusual for the season.

Moreover, extremely warm weather conditions influenced the eastern parts of mainland at the end of June (30/06-03/07) with maximum air temperatures above 40° C in most parts of the country, but no record was recorded.

On the 25th of September a fierce storm struck the island of Samothrace causing floods. At the end of the fire season (24-25/10) strong rain and hail was the cause of disasters in Marathon, Fthiotida and Skyros.

### *Fire occurrence and affected surfaces*

Greece experienced increased levels of fire activity during the 2017 fire season. Five major fires occurred on Kythira, Zakynthos, Messinia (twice) and Achaia, but the largest fire was in the area of Attica and burned approximately 2 050 hectares.

During the 2017 fire season, a total number of 1 083 fires were recorded with an affected burnt area of 13 393.06 hectares, 11 735.33 of which were on wooded forest land and 1 657.97 on non-wooded forest land. The majority of fires (673) resulted in less than 1.00 hectare of burnt area.

It is worth mentioning that the fire season 2017, in comparison with the last fire seasons and specifically 2016, exhibited a significant rise in the number of fires (1 083 compared to 777 forest fires), but the total burnt area of forest land was reduced to about half (13 393.06 hectares compared to 26 539.50 hectares).

The compiled data below have been provided by the local Forest Services.

These numbers are still provisional and are likely to rise when compilation of fires is complete. However, the number of the recorded forest fires refers to the majority of the fire incidents for 2017 and there is no large deviation expected. The number of fires and the burnt areas are shown in the following Table 9.

Table 9. Number of fires and burned area in 2017 by regional forest administration

FOREST ADMINISTRATION AUTHORITIES	Number of fires						Burned area (ha)		
	Total	<1 ha	1-5 ha	5-100 ha	100-500 ha	>500 ha	Total	Wooded	Non wooded
Macedonia-Thrace	216	128	58	26	4	0	1268.11	1191.75	76.36
Epirus & Western Macedonia	142	76	32	31	3	0	1222.00	844.30	377.70
Thessaly and Central Greece	177	96	55	26	0	0	618.37	508.68	109.69
Peloponnese, Western Greece & Ionian	336	222	61	40	9	4	5163.72	4276.80	887.17
Attica	69	47	12	5	3	2	4294.00	4262.49	31.50
Crete	84	58	16	9	1	0	555.48	466.23	89.25
Aegean	59	46	6	7	0	0	271.38	185.08	86.30
<b>TOTAL</b>	<b>1083</b>	<b>673</b>	<b>240</b>	<b>144</b>	<b>20</b>	<b>6</b>	<b>13393.06</b>	<b>11735.33</b>	<b>1657.97</b>

### *Fire fighting means and information campaigns*

In 2017 the Fire Brigade personnel consisted of 14 043 people, 8 853 of whom were permanent personnel of the Fire Brigade dealing also with structural fires, 3 910 were personnel employed with a five years contract and 1 280 were seasonal personnel, hired for forest fire suppression activities. A further 1 750 volunteer fire fighters were also involved.

The Fire Brigade of Greece has a total of 3294 vehicles of various types. These vehicles are distinguished as follows:

Firefighting vehicles	1868
Helping vehicles	952
Special vehicles	309
Motor cycles	165
<b>Total</b>	<b>3294</b>

The aerial means used during the 2017 campaign are indicated in Table 10.

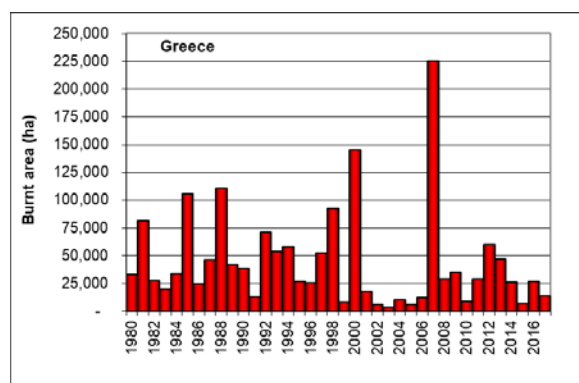
Table 10. Aerial means participating in the 2017 campaign

<b>National fleet</b>		
Type	Number	Availability 2017 (max)
Aircraft CL-415	7	3
Aircraft CL-215	13	6
Aircraft PEZETEL	19	19
Aircraft C-130	1	1
Helicopter SUPER PUMA AS 332 L1	2	2
Helicopter BK 117 CL	3	3
Helicopter CHINOOK	3	3
<b>Total</b>	<b>48</b>	<b>37</b>
<b>Leased air means</b>		
Type	Availability 2017	
Medium Press Helicopters	7	
Heavy Duty Helicopters	3	
<b>Total</b>	<b>10</b>	

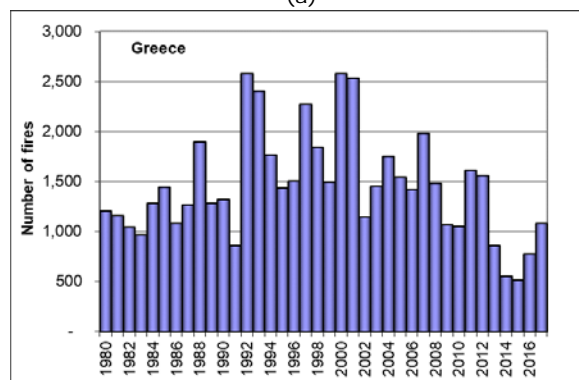
The yearly trends in terms of numbers of fires and burnt areas in Greece since 1980 are shown in Figure 29.

### *Fire causes*

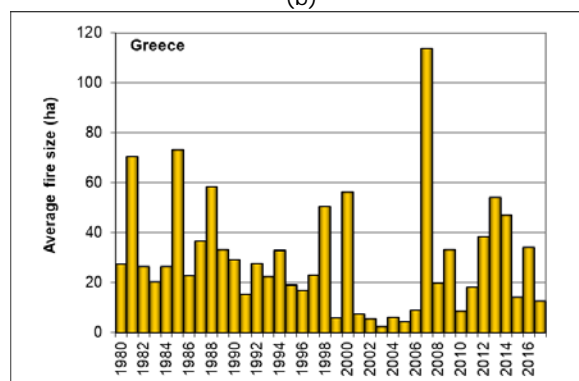
In many cases, the ignition source for fires is associated with traditional agricultural burning practices, although the fire causes for the majority of fire incidents remained unknown.



(a)



(b)



(c)

Figure 29. Burnt areas (a), number of fires (b) and average fire size (c) in Greece from 1980 to 2017.

### *Injuries and loss of human lives*

During the fire-fighting period of 2017, one (1) Firefighter and one (1) citizen were killed and seventeen (17) Firemen and eleven (11) citizens were injured.

(Source: Ministry of Environment and Energy; Directorate General For The Forests And The Forest Environment, Greece).

## 2.2.13 Hungary

### *Fire danger in the 2017 fire season*

FWI derived data and values were reported throughout the whole fire season by the Forestry Directorate (FD). FD has been using JRC's data service to monitor the daily fire danger situation.

Fire danger was high at beginning of the 2017 fire season. Compared to previous years precipitation was less than usual. The number of fire events show the tendencies experienced in latest years that one of most dangerous forest fire periods starts in March every year (Figure 30).

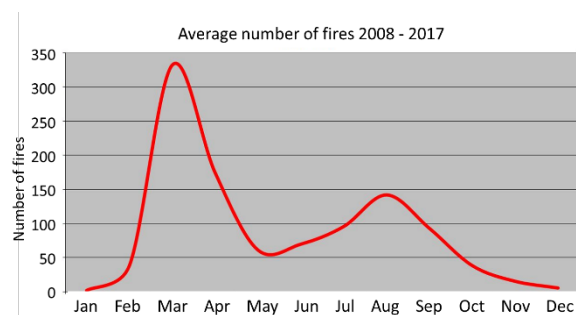


Figure 30. Average number of fires by month.

Due to uneven distribution of precipitation over the summer months there was a longer period when the FWI values reached the "extreme" level in summer. A total fire ban was ordered two times during the year (March and summer months) and they were in place for 131 days in total.

### *Fire occurrence and affected surfaces*

Forest fire data are collected in close cooperation with the disaster management authority. Data collected on the spot by fire fighters are uploaded to the database weekly, and if needed it can be done day-to-day. Forest fire data are prepared and analysed with an automated GIS method and checked on the spot by the forest authority.

The gathered fire data are processed and evaluated by size, date, cause, duration of fires, and they are then compared with traditions in forest management processes and the behaviour of visitors and hikers in the forest land area.

Data from 2011-2017 are shown in Table 11.

Table 11. Number of fires and burnt areas.

Year	Total number of wildfires	Forest fires		Other land types
		Number	Burned area (ha)	Number
<b>2011</b>	8436	2021	8055	6415
<b>2012</b>	21581	2657	13978	18924
<b>2013</b>	4602	761	1955	3841
<b>2014</b>	5783	1042	4454	4741
<b>2015</b>	5318	1069	4730	4249
<b>2016</b>	2677	452	974	2225
<b>2017</b>	<b>7122</b>	<b>1454</b>	<b>4933</b>	<b>5668</b>

4 933 hectares were affected by 1 454 forest fires in Hungary in 2017. Compared with previous years fire events in 2017 show the same trend over several years. Figure 30 represents the tendencies experienced in the last 10 years that there are two most dangerous forest fire periods during the year.

"Traditional" grassland use includes burning methods in early spring, which can accidentally spread to nearby forest. These fires usually burn between March and April. Spring vegetation fires usually burn with low or medium intensity in broadleaf forests, juvenile growths, shrubs and grasslands. Fire totally or partially consumes forests and causes serious harm. 40 % of spring fires burn in northern areas (Borsod-Abaúj-Zemplén County, Heves County, Nógrád County) which indicates these areas as high forest fire danger zones. In these areas not only traditional grassland management methods, but other social-economic factors add to forest fire danger. Unlike spring fires, summer fires usually burn in the Great Hungarian Plain. Figure 31 shows the locations of forest fires in Hungary in these two high-danger periods of the year.

98% of forest fires were surface fires in the 2017 fire season, when surface litter and other dead vegetal parts and smaller shrubs burnt down. The average rate of fires smaller than 1 hectare is almost 63 %. The average total burnt area was 3.3 hectares in 2017. There were 15 fire events when more than 50 hectares were burnt.

Analysing the statistics we can see that a total of 1 236 hectares of forest were burned or affected by fire during 2017. In addition, more than 2 672 hectares of grass vegetation and 1 026 hectares of other wooded land were destroyed in forest fires (Table 12).

Table 12. Fires by forest type

Forest type	Total burnt area (ha)
Forested land	1236
Other wooded land	1026
Other land	2672
Total	1454

The yearly trends in terms of number of fires and burnt area during the last 18 years in Hungary are shown in Figure 32 below.

#### *Fire Causes*

99 % of forest fires are human induced (negligence or arson). Most fires are induced by negligence (adults and infants) and only a small proportion of fires are caused by arsonists. Typical forest fire causes are the incorrectly extinguished fires of hikers, illicit agricultural fires, discarded cigarette butts and sometimes slash burning.

#### *Fire fighting means*

Fires were usually extinguished in less than an hour after the alarm. The fire service arrived at the fire in 30 minutes on average. Small fires are extinguished within half an hour.

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

There were no casualties among fire fighters and civilian people during firefighting in 2017. Fire service equipment was not heavily damaged. No death or personal injury occurred during firefighting last year.

#### *Operations of mutual assistance*

Neither Fire Service nor Forest Authority served mutual assistance last year.

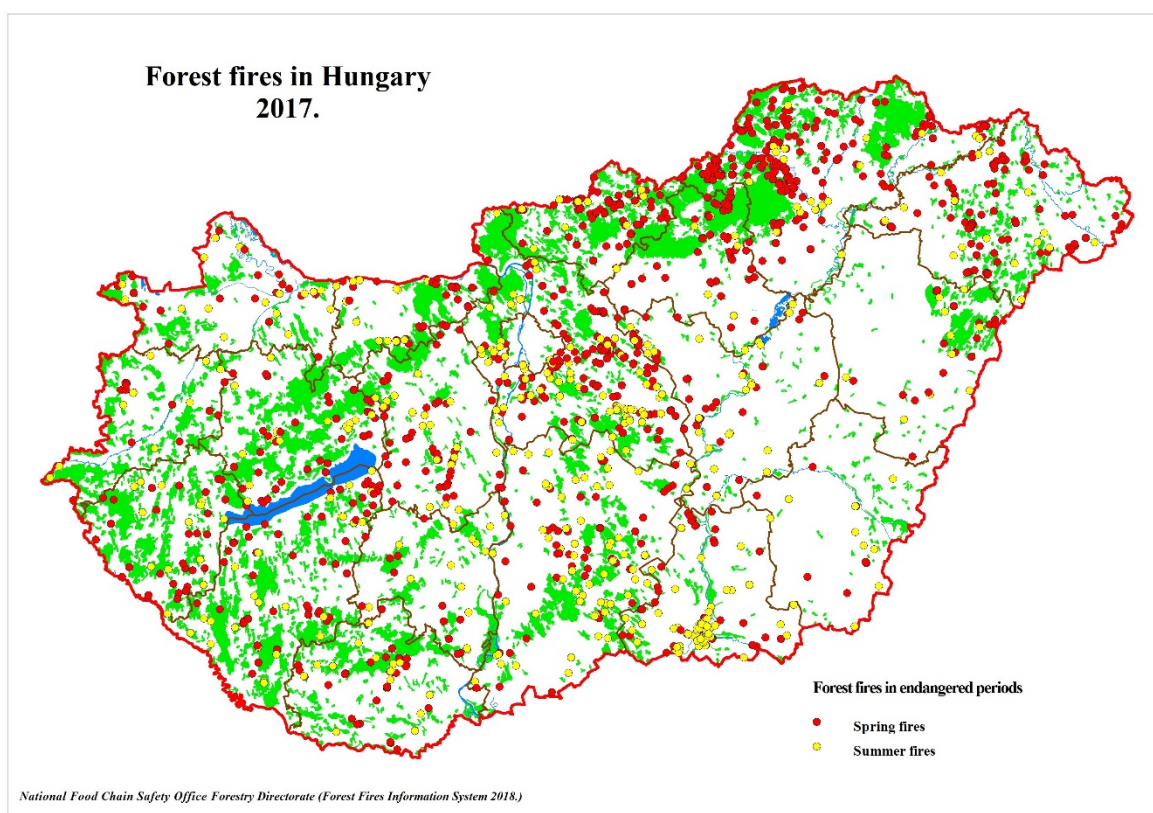


Figure 31. Locations of forest fires in Hungary in 2017.

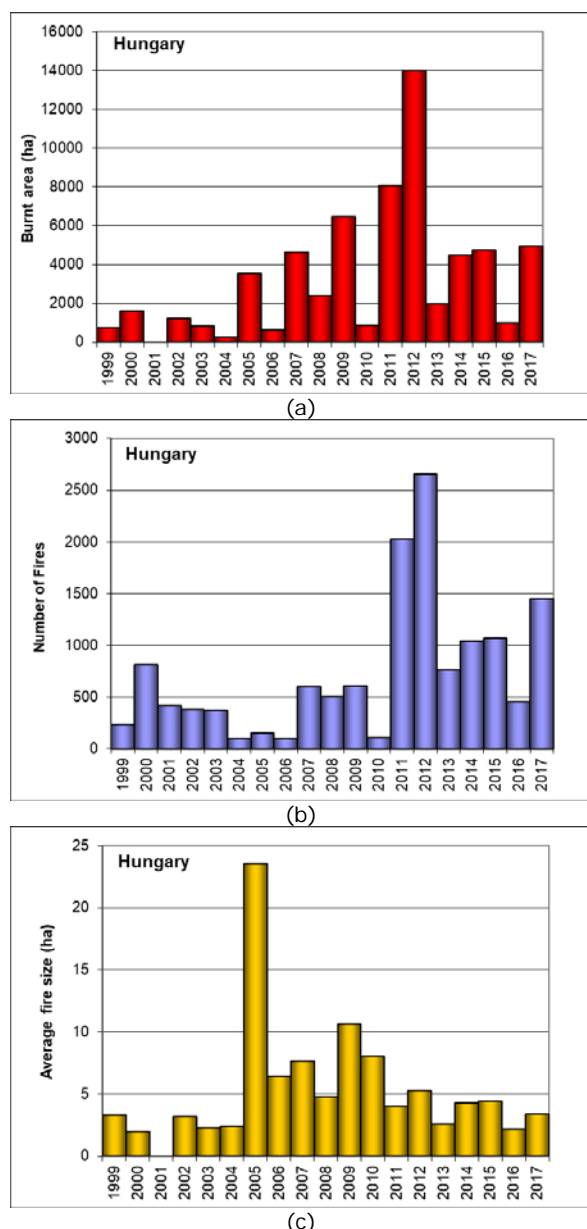


Figure 32. Burnt areas (a), number of fires (b) and average fire size (c) in Hungary from 1999 to 2017.

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

There is a cooperation agreement between the Fire Service and the Forest Authority. The National Fire Prevention Committee established by the government has been monitoring all fire prevention activities.

Forest fire prevention activities are implemented by the forest authority in the frame of a FIRELIFE project.

The aim of the project is to enhance effective, proactive and continuous forest fire prevention activity in Hungary. As 99% of forest fires are human caused in our country, targeted and timely communication can effectively cut the number of forest fires.

The active communication on forest fires attracts greater media attention, which can significantly help to reach the aims of the project.

The key goal of the project is to disseminate useful and adequate information to the public on forest fire prevention. Our strategy includes two main fields: communication campaigns using PR and marketing tools and training.

Every one of the communication campaigns helped to reach our goals through 2017:

- Our participation in countrywide and regional information events with a FIRELIFE adventure course, reaching the target groups of children, wider public, farmers, hobby gardeners and smokers – 17 days;
- Contact with the media through workshops, press releases, with the help of publishing articles in the relevant offline media in order to reach the people in the country and also at a regional level – 41 online appearances;
- Direct communication with those target groups which can be involved more deeply through personal contact, for example farmstead owners and hikers – 40 days;
- Online information transfer and campaigns with the help of our website, our FB profile and our NÉBIH Facebook profile;
- Two publications were made for the target group of children; 15 000 storybooks and 11 500 sticker booklets, which were sent for students and kindergarten children;
- Building professional and mutually beneficial cooperation with professional organizations and enterprises, through which we can reach our target group: Forestry and Hunting Associations, National Directorate General for Disaster Management, Educational Research Institute, Decathlon Hungary, STIHL Group, Hungarian Scout Association.

FIRELIFE project website: [www.erdotuz.hu](http://www.erdotuz.hu).

(Source: National Food Chain Safety Office; Forestry Directorate).



## 2.2.14 Ireland

The Department of Agriculture, Food and Marine (DAFM) is the agency responsible for forest Protection in Ireland.

2017 saw a major increase in levels of fire activity relative to preceding years. The bulk of fire activity occurred between April and May 2017 and corresponded with prolonged high fire risk in upland areas typically associated with fire activity. A number of very large fires on open land types occurred in between late April and May, mainly in western regions. Several of these incidents required a Major Emergency response and activation of additional military resources by local fire services to achieve suppression.

### *Fire occurrence and affected surfaces*

During 2017, the area of open land affected by fire is thought to be in the region of 10,400ha based on DAFM analysis of NASA MODIS/VIIRS detections and Copernicus Sentinel 2 imagery of the burned sites. In addition, up to 1 500 ha of forest lands are known to have been affected by fire, mainly commercial forest holdings adjacent to fire prone upland areas.

Table 13. Estimated total losses in 2017.

Forest	Non-Forest
1 500 ha	10 400 ha

### *Fire danger during the 2017 season*

Fire risk in Ireland remained at a high level from March through to June 2017.

The DAFM fire danger notification system was operational by early March 2017 in advance of fire activity. This system uses outputs from EFFIS and local weather forecasting to provide an indication of fire risk. A baseline Condition Yellow Fire Danger Rating Notice was issued in March and six additional Condition Orange warnings were issued between April 19th and May 25th in response to high risk weather patterns.

A Condition Red Notice was issued on May 2nd, in response to Extreme risk weather patterns, which were largely associated with low-humidity Continental (Easterly) airflows. This is the first time such a notice has been issued in Ireland. This warning preceded a very large scale fire incident at Cloosh, in Co. Galway in Western Ireland. These warnings are available at:

[www.agriculture.gov.ie/forests-service/firemanagement](http://www.agriculture.gov.ie/forests-service/firemanagement)

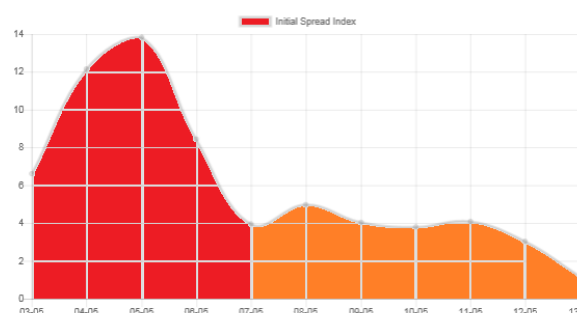
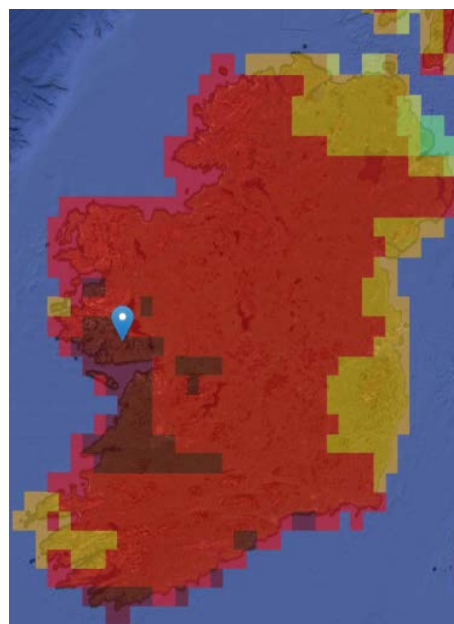


Figure 33. Initial Spread Index conditions on May 05, 2017 (Source EFFIS).

### *Fire prevention activities*

Following from previous years, Forest Fire prevention activities by DAFM and partner agencies continued throughout 2017.

Prior to the onset of fire activity, further development of locally led fire management approaches took place in SW Ireland via the West Cork Wildfire Cooperative in an area subject to high levels of fire activity. Activities included demonstration prescribed burns, promoting best practice, and a number of public seminars and media activities. A Ministerial press statement highlighted fire prevention requirements for landowners in March 2017.

A number of Locally-Led RDP funded projects supported through DAFM have been approved during late 2017, several of which are focussed on high fire risk upland regions and contain specific fire management measures.

A legislative process, aimed at increasing the available legal prescribed burning timeframe on a pilot basis was resumed by the Oireachtas (Irish Parliament). Once fully enacted, these amendments will permit the use of prescribed fire during March, on a pilot basis. The current legal period for burning opens between September 1st and February 28th. Restrictions to prescribed burning and other fuel management activities since 2000 are thought to have contributed to large increases in fuel loads that are now influencing fire outcomes in Ireland.

### Fire detection

The majority of fire detection and reporting took place through existing Fire Service reporting centres. Evaluation and testing of satellite detection under Irish conditions continues using EFFIS and other applications. VIIRS (Visible Infra-Red Radiometer Suite) fire detections during 2017 on a month by month basis are illustrated in Figure 34.

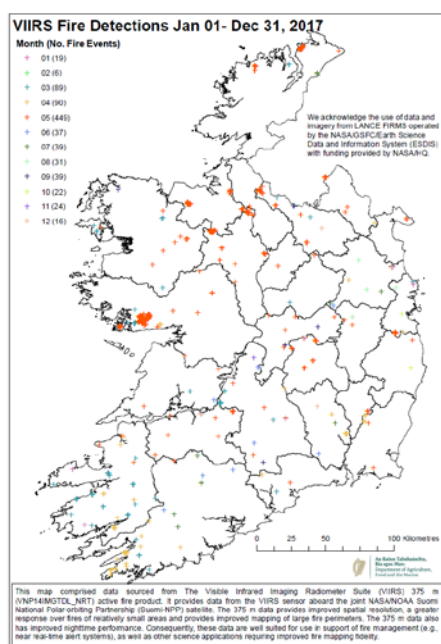


Figure 34. VIIRS fire detections in Ireland 2017.

### Fire suppression

Most fire suppression activities were conducted by Local Authority Fire and Rescue services. On state owned forest lands, these services were frequently augmented by firefighting personnel from Coillte Teoranta (State Forestry Board) and the Irish Defence Forces.

Ground operations were augmented by 2 Helicopters (EC120, B205) hired from private sector providers and additional medium lift helicopter support (AW 139) from the Irish Defence Forces.

### Post fire investigations

#### Burned area detection

DAFM actively investigated incidents of illegal burning using the most up to date technology, including aerial surveys and satellite imagery as well as ground inspections.

Weather conditions and low cloud cover from late March to May, and the scale and duration of many fires meant that fires were readily visible using satellite means. In addition to satellite images some aerial multispectral imagery of fire sites was collected and evaluated during April. Following cessation of fire activity in May, available satellite imagery, mainly SENTINEL 2 and LANDSAT 7 were utilised to define a burned area with a high degree of confidence. Sentinel 1 surface differential data was also utilised.

Total detected area	10456 ha
Total polygons	335
Total Natura area	4932 ha
%Natura	47.16

### Spatial analysis

2017 fire season yielded a lot of satellite based spatial information that is useful in defining fire regime issues in Ireland. It is generally accepted that most ignitions in Ireland are human caused. Spatial analysis and land use patterns on affected lands are useful in identifying groups of land users who may influence ignition patterns, towards focussing fire prevention measures on these groups and general locations.

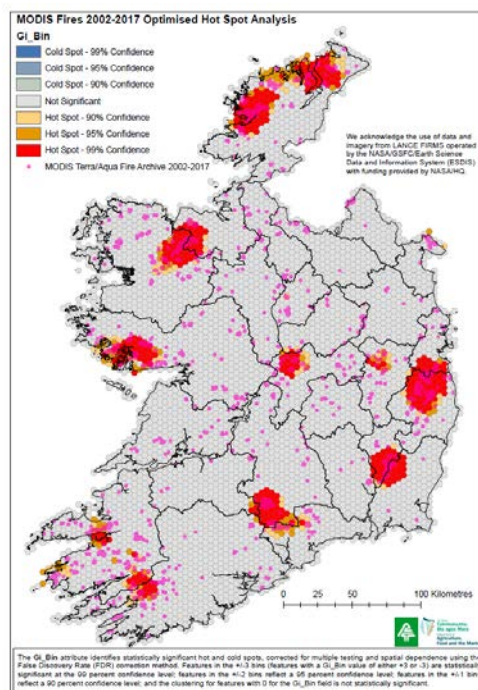


Figure 35. Fire Activity Hotspot analysis, based on MODIS data 2002-2017.

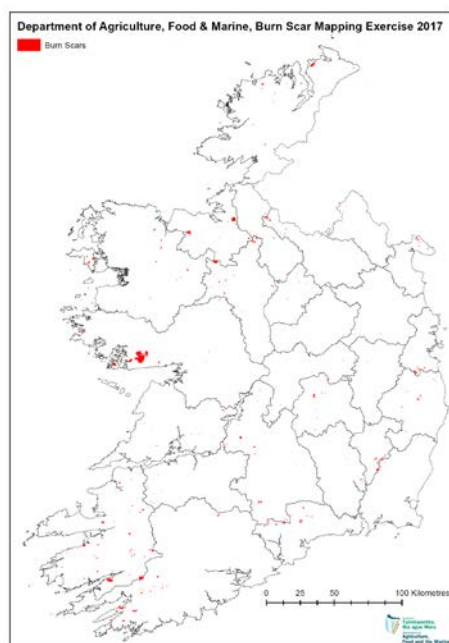


Figure 36. 2017 burn scars in Ireland.

### Fire investigations

DAFM actively investigated incidents of illegal burning using a variety of means, including aerial surveys and satellite imagery as well as field visits. It was apparent that there was widespread unlawful burning of vegetation during the closed season for burning in 2017. The Department of Agriculture, Food and the Marine is not responsible for criminal investigation of illegal burning; however the Department is responsible for determining the eligibility of land under the Basic Payments and other area related schemes.

Accordingly, DAFM confirmed via Press release on 17th May 2017 that it was investigating the illegal burning of land. It was also publicised that such land is not eligible for payment under the Basic Payment Scheme

(BPS) and other area-based schemes. The main issue is that the lands are considered ineligible for the purpose of BPS irrespective of how the fires started as the lands were burned outside of the permitted timeframes. The Department as an accredited paying agency is required to ensure that the EU regulations governing the BPS are implemented fully.

### Outcomes of investigations

57 parcels of privately owned land were identified as having been burned between 1 March and 31 August 2017. The majority of these fires took place on commonage land and therefore a significant number of farmers were affected. 179 farmers were written to outlining that the burned land parcel(s) are ineligible for the purpose of BPS and have given rise to payment over-claims. The letters explained the options open to them including the right to a review and also requesting them to submit any relevant documentation.

The over claim and administrative penalties applied to the 179 cases amount to €243 145.

There was significant public discussion and campaigning by farm organisations in response to these measures, which has appeared to have resulted in a greater awareness of regulations and compliance by landowners during the same period in 2018.

### *Injuries and loss of human lives*

There were no injuries or deaths reported as a consequence of wildfire in 2017. One dwelling house was destroyed in Co. Mayo in the West of the country.

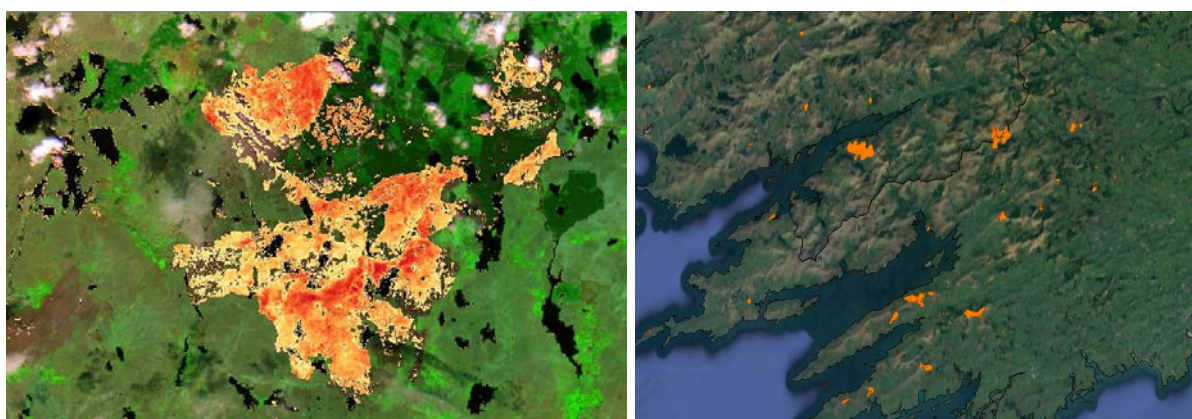


Figure 37. Burn Scar Image processing (Source DAFM)

(Source: Forest Service, Department of Agriculture, Food and the Marine, Ireland).



## 2.2.15 Italy

### Fire occurrence and affected surfaces

According to information received from the Italian authorities, there were a total of 7855 fires in Italy, which burned a total of 161 987 ha. The greatest number of fires occurred in Calabria, but the largest burnt area was in Sicily (Figure 38). The annual total is the highest since 2007 (Figure 39).

Table 14. Number of fires and burnt area in Italy by region in 2017.

Year 2017	Num. fires	Burnt area (ha)			Av. fire size
		Forest	Non-forest	Total	
North	1208	14648	5924	20573	17
Centre	1697	25212	8678	33890	20
South + Islands	4950	73707	33818	107524	22
<b>TOTAL</b>	<b>7855</b>	<b>113567</b>	<b>48420</b>	<b>161987</b>	<b>21</b>

Year 2017	Num. fires	Burnt area (ha)			Av. fire size
		Forest	Non-forest	Total	
Piemonte	266	8685	2266	10952	41
Valle D'aosta	14	11	18	29	2
Lombardia	220	2288	2004	4292	20
Trentino A.Adige	78	53	6	59	1
Veneto	57	15	31	46	1
Friuli V.Giulia	99	43	60	103	1
Liguria	338	3135	1423	4558	13
Emilia Romagna	136	418	116	534	4
Toscana	769	2061	1352	3413	4
Umbria	98	647	284	931	10
Marche	45	388	66	454	10
Lazio	548	15601	3717	19318	35
Abruzzo	138	5651	2564	8215	60
Molise	99	864	695	1559	16
Campania	1199	17694	2791	20485	17
Puglia	454	4035	2576	6611	15
Basilicata	288	4072	2233	6305	22
Calabria	1488	26656	5404	32060	22
Sicilia	1113	15785	18436	34221	31
Sardegna	408	5465	2378	7842	19
<b>TOTAL</b>	<b>7855</b>	<b>113567</b>	<b>48420</b>	<b>161987</b>	<b>21</b>

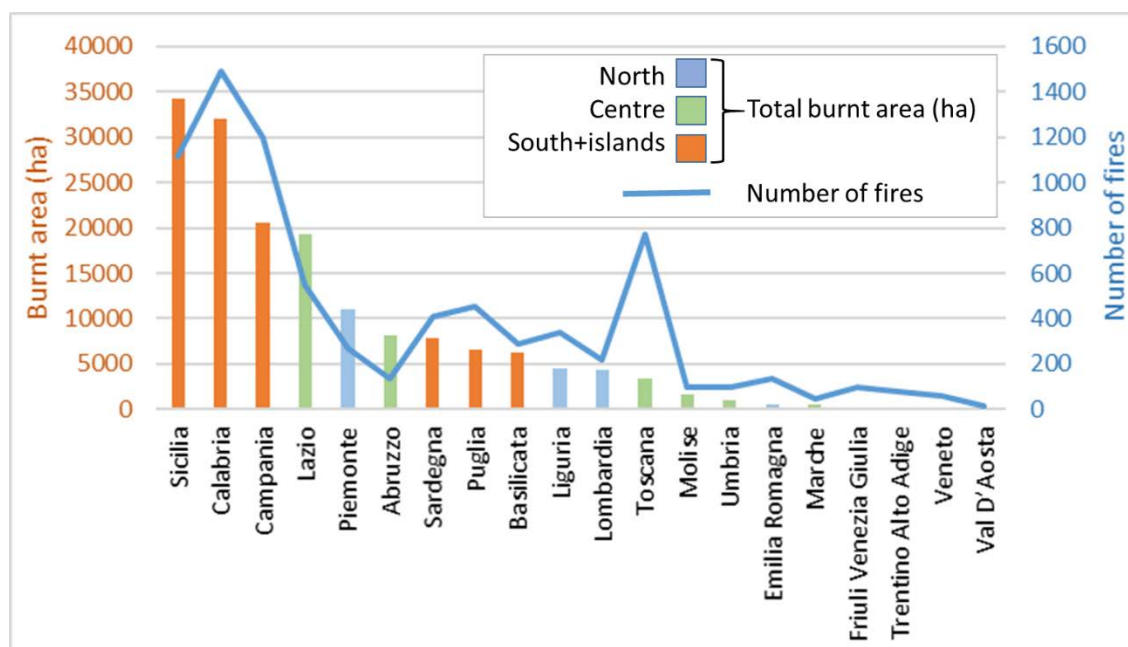


Figure 38. Number of fires and burnt area by region in 2017.

The yearly trends in terms of numbers of fires and burnt areas in Italy since 1980 are shown in Figure 39.

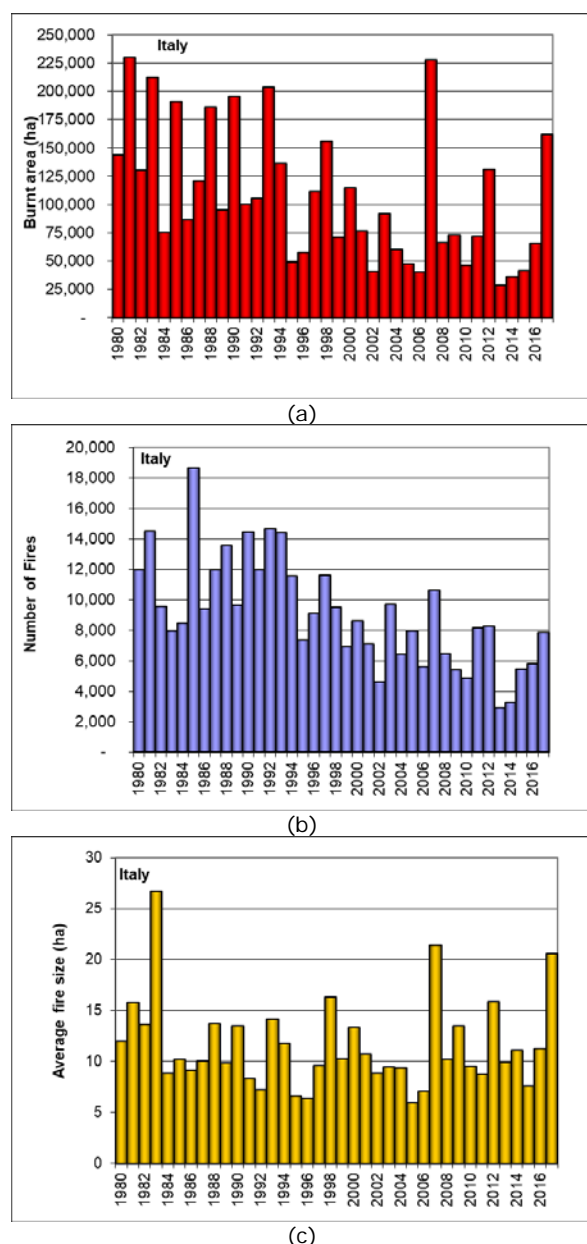


Figure 39. Burnt areas (a), number of fires (b) and average fire size (c) in Italy from 1980 to 2017.

### Fire prevention activities

For the prevention activities, the Carabinieri forestali have carried out the activity of monitoring the areas affected by fire through targeted campaigns aimed at verifying:

- the state of implementation of the cadastre of forested stands burnt by fire in the Municipalities which, in 2012, were totally non-compliant or had not updated it annually;
- the improper use of wooded areas burnt by fire after the events (prohibition of grazing and hunting, construction works), also by acquiring the lists of wild boar hunting teams in the Municipalities, where present;
- the regularity of self-certifications and / or documentation attesting the ownership and / or the lease and / or loan for use of land for which applications for social security contributions related to "conditional" or "trusting pasture" practices are paying utmost attention so that in the request for contributions there is a declaration that the land used has not been affected by forest fires.

### The control of the territory with enforcement services.

As at 30 September 2017, the fire-fighting controls carried out by the Carabinieri Forestry departments alone amounted to 25 290. In the same period of 2016, there were 12 091 inspections carried out by the State Forestry Corps.

In terms of law enforcement, as of September 30th, all the Arma Departments carried out 53 arrests of people caught in the act of starting a forest fire, and reported a further 724 people. In the analogous reference period of 2016, the Arma and the State Forestry Corps deferred 410 people, 27 of whom were arrested.

In Italy, anyone who causes a fire in forests, woodlands or forest nurseries destined for reforestation (either their own or others'), is punished with imprisonment from four to ten years.

If the fire is caused by negligence, the penalty is imprisonment from one to five years.

The penalties are increased if fire causes danger to buildings or damage to protected areas.

The aforementioned penalties are increased by half, if serious, extensive and persistent damage to the environment derives from the fire. *Penal Code Art. 423-bis. - (Forest fire)*

In fact, the main preventive action is based on the prohibitions written in Law 353 of 2000 article 10:

1. The wooded areas and the pastures whose stands have been burnt can not have a function different from the one before the fire for at least fifteen years. However, the construction of public works necessary for the protection of public safety and the environment is permitted.

In all the deeds of sale and purchase of areas and properties located in the aforementioned areas, stipulated within fifteen years of the events provided for in this paragraph, the aforesaid legal constraint must be expressly referred to, under penalty of nullity of the deed. In these stands it is also forbidden for ten years to construct buildings as well as structures and infrastructures aimed at civil settlements and production activities, except in cases where for this construction the relative authorization or concession has already been issued prior to the fire and on the basis of the planning instruments in force at that date.

For five years, on the aforementioned stands, reforestation and environmental engineering activities supported with public financial resources are forbidden, unless specifically authorized by the Minister of the Environment (for state protected natural areas) or by the competent region (in other cases), for documented situations of hydrogeological instability and in situations where an intervention is urgently needed to protect particular environmental and landscape values. Grazing and hunting are also prohibited for ten years in stands affected by fire.

2. The municipalities shall, within ninety days from the date of approval of the regional plan referred to in paragraph 1 of Article 3, register, through appropriate land registry, stands already affected by fire in the last five years, also making use of the findings made by the State Forest service. The land registry is updated annually. The list of the aforementioned stands must be displayed for thirty days in the municipal praetory register, for any observations. After this deadline, the municipalities evaluate the observations submitted and approve, within the next sixty days, the final lists and the relative perimeters. Revision of the lists is allowed with the cancellation of the provisions relating

to the prohibitions referred to in paragraph 1 only after the periods indicated in the same paragraph for each prohibition have elapsed.

3. In the case of violations of the ban on grazing in wooded areas burnt by fire pursuant to paragraph 1, an administrative sanction shall be applied, for each head, of not less than 60,000 lire and not more than 120,000 lire; and in the event of breach of the ban on hunting on the same stands an administrative penalty of not less than 400,000 lire and not more than 800,000 lire applies.

4. In the case of transgressions to the prohibition of construction of buildings as well as structures and infrastructures aimed at civil settlements and production activities on stands affected by fire, paragraph 1, Article 20, first paragraph, letter c) of the law 28 February 1985, n. 47 applies. The judge, in sentencing, arranges the demolition of the work and the restoration of the state of the locations at the expense of those responsible.

5. In areas and periods at risk of forest fire, all actions (identified in accordance with article 3, paragraph 3, letter f), which may even potentially trigger fire, are prohibited.

6. For transgressions to the prohibitions referred to in paragraph 5, the administrative sanction of the payment of an amount not lower than 2,000,000 lire and not more than 20,000,000 lire applies. These penalties are doubled if the person responsible belongs to one of the categories described in article 7, paragraphs 3 and 6.

7. In the event of violations of the prohibitions referred to in paragraph 5 by tourist activities, in addition to the sanction referred to in paragraph 6, the revocation of the license, authorization or administrative provision that allows the exercise of the activity is ordered.

8. In any case, the provisions of Article 18 of the Law of July 8, 1986, n. 349 apply, on the right to compensation for environmental damage, the determination of which includes the expenses incurred for the active fire-fighting and the estimate of damage to the stand and to the soil.

#### *Loss of human life*

The number of casualties due to forest fires in 2017 is 9.

*(Source: Comando Carabinieri per la Tutela Forestale, ambientale e agroalimentare, Italy).*

## 2.2.16 Latvia

### *Fire danger in the 2017 fire season*

In 2017 the forest flammable period was set from the first of May and continued until September 11.

### *Fire occurrence and affected surfaces*

In total, 423 forest fires were discovered and extinguished in 2017 during which 265 hectares were burnt. Of these, 173 hectares of forest, 87 hectares of young stands and 6 hectares of other wooded land were affected. Table 15 and Figure 40 show the distribution of numbers of fires and burnt areas by month during the fire season, and Figure 41 shows the locations of the fires in 2017.

The highest number of forest fires in 2017 was still in the vicinity of two of Latvia's biggest cities, Riga and Daugavpils (191 fires, 166.1 hectares affected area, and 67 fires, 7.1 hectares).

Table 15. Number of fires and burnt areas by month.

Month	Number of forest fires	Burnt area (ha)
January	1	0.01
February	0	0
March	14	3.4313
April	43	49.9874
May	204	162.1504
June	55	16.177
July	49	20.3912
August	48	11.9796
September	7	0.0106
October	2	1.001
November	0	0
December	0	0
<b>Total</b>	<b>423</b>	<b>265.14</b>

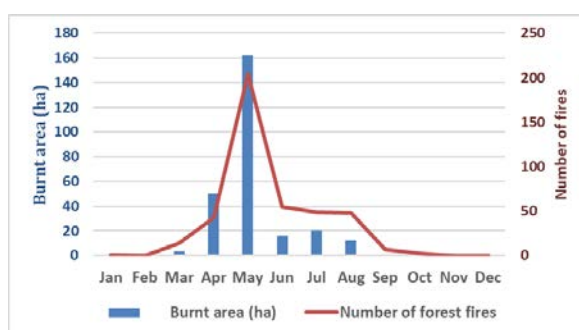


Figure 40. Number of fires and burnt areas by month.

## WILDFIRES IN LATVIA 2017

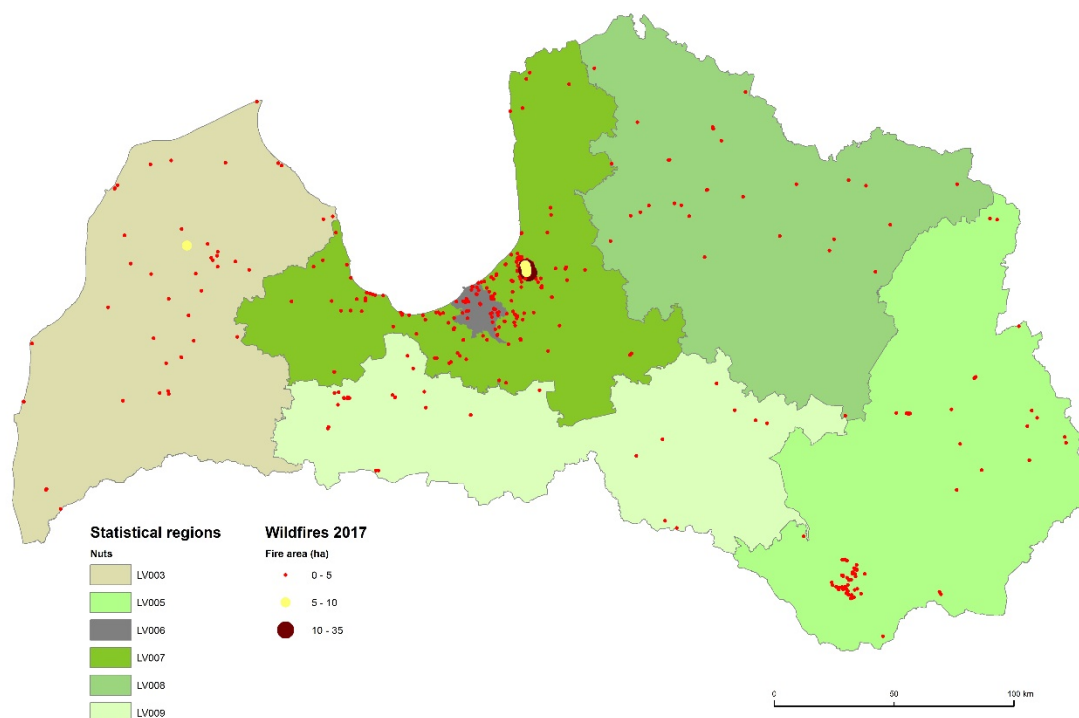


Figure 41. Map of forest fire locations in Latvia in 2017.

The yearly trends in terms of number of fires and burnt area during the last 25 years in Latvia are shown in Figure 42.

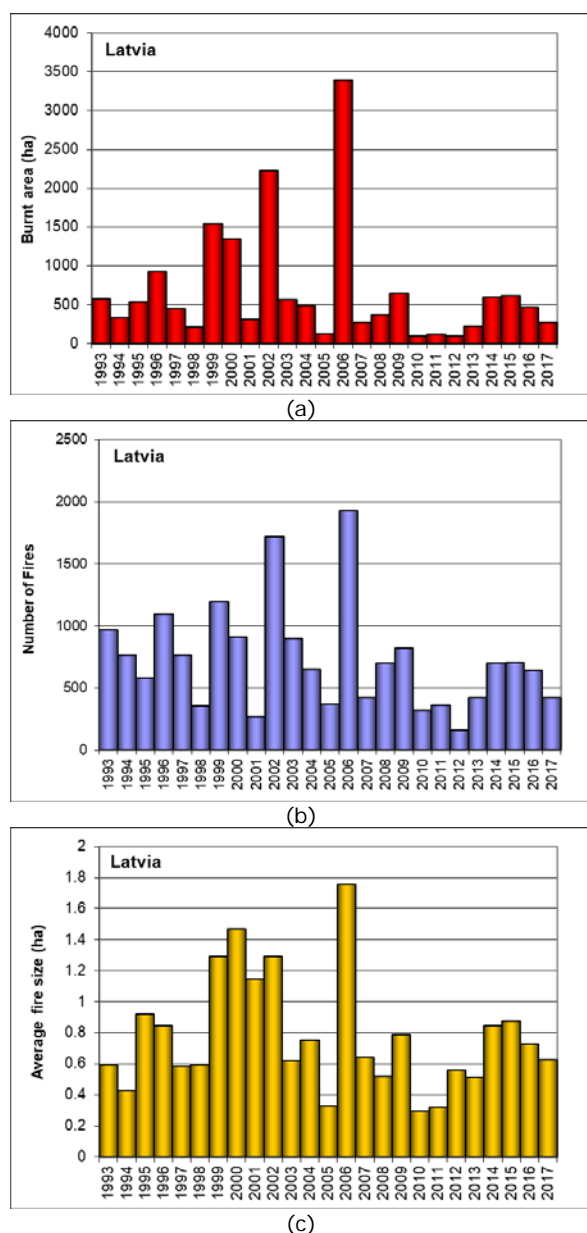


Figure 42. Burnt areas (a), number of fires (b) and average fire size (c) in Latvia from 1993 to 2017.

### Preventive measures

Under the acts of law, fire prevention measures are imposed on forest owners (managers). In 2017 joint stock Company "Latvian state forests" spent 77 144 Euro on fire preventive measures. (Table 16).

Table 16: Expenditure on fire prevention measures in Latvia in 2017

Title	Costs, EUR
<i>Latvian State forest</i>	
Creating new fire breaks, 2 km	62
Existing fire break cultivation, 3393km	71078
Water point, warning sign renovation	6004
<b>Total</b>	<b>77144</b>
<i>Riga City Forest</i>	
Creating new fire breaks, 0 km	
Existing fire break cultivation, 548km	

### New equipment

In 2015 the State forest service bought 1 new Mercedes Benz Unimog U4000 forest fire truck. The fire trucks were equipped in Lithuania, by company JSC "Iskada", and Latvian company LLC "Unimotors Latvia". At the moment each of the State Forest service heads of forestry (10) have 17 new Mercedes Benz Unimog U4000 fire trucks, and 34 new Toyota Hilux forest fire pick-ups. In general State Forest Service are permanently upgrading the forest firefighting vehicle park (for effective forest firefighting).



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



## 2.2.17 Lithuania

### *Fire danger in the 2017 fire season*

Forest fires during the year 2017 in Lithuania settled at a low level. The amount of wildfires and the total burnt area was low. The first fire in 2017 was recorded in March, the last one in September. A heat wave in Lithuania occurred in August. The number of fires was influenced substantially by the weather conditions in spring and summer.

### *Fire occurrence and affected surfaces*

In 2017, according to the data of the Directorate General of State Forests, 80 forest fires occurred and damaged 52.87 ha of forest. Only 5 forest fires were bigger than 1 ha. The highest number of forest fires occurred in May (57.5% of fires and 89% of burnt area). The total damage was estimated to be 10 031 million euro. The yearly trends in terms of number of fires and burnt area during the last 27 years in Lithuania are shown in Figure 43 below.

### *Fire prevention activities*

The Directorate General of State Forests under the Ministry of Environment organizes the establishment of the uniform system of state fire prevention protection measures. Annual contracts between the Lithuanian Hydro meteorological Service and Directorate General of State Forests are signed concerning calculations of complex forest fire figures and pronouncements of classes of fire rates in each territory of the state forest enterprise. A Forest Fire Danger Map is updated daily (at 12 a.m.) from April to September and can be found at the site <http://www.meteo.lt/lt/web/guest/misku-gaisringumo-klases-prognozes>.

Every year state forest enterprises, together with the Fire and Rescue Services and Armed Forces, organize educational training in the forest in order to check how organizations are able to organize forest fire extinction, manage difficult situations, control the actions, collaborate with each other and keep the connection. In order to sustain the system of general state fire protection measures, state forest enterprises budgeted 1 639 thousand EUR from their own funds in 2017, and 13 242 km of firebreaks were mineralized. 4 new fire-extinguishing cars have been purchased.

Automatic early warning systems for forest fire prevention "FireWatch" are used in 25 state forest enterprises having forests with high fire risk (total 24 central stands and 84

detectors). Forest fire detection systems help to detect forest fire focus coordinates with better precision, so that fire brigades can arrive at the fire faster, and extinguish the fire more efficiently.

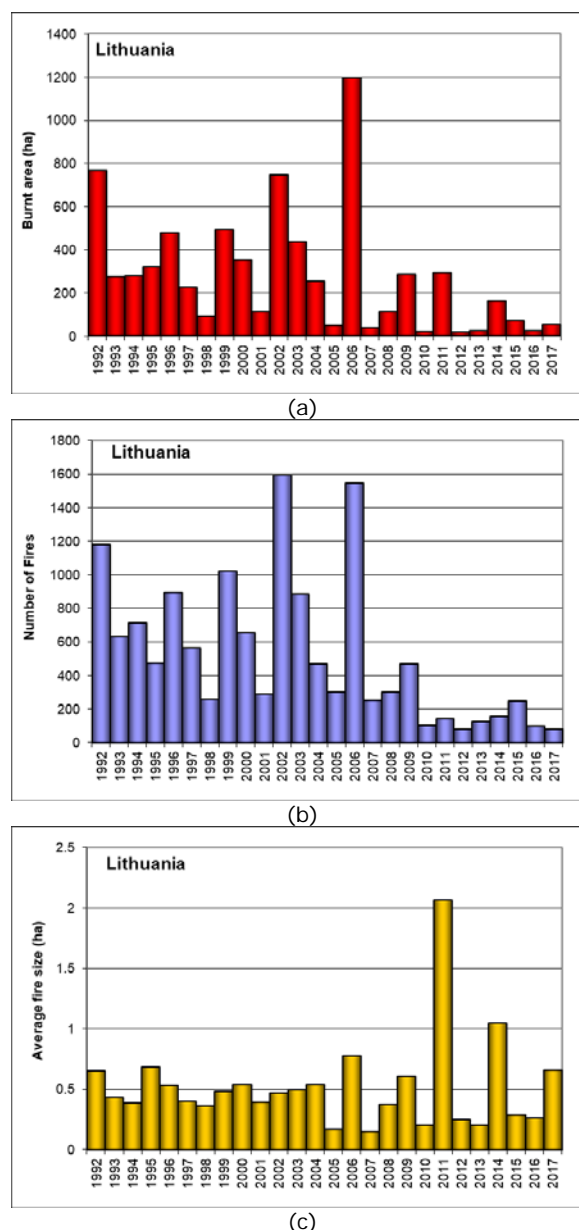


Figure 43. Burnt areas (a), number of fires (b) and average fire size (c) in Lithuania from 1992 to 2017.

### *Operations of mutual assistance and loss of human lives*

No operations of mutual assistance were taken and no casualties were reported in Lithuania during the fire season of 2017.

(Source: Directorate General of State Forests of Lithuania, Department of Nature Protection and Forest, Ministry of Environment of Lithuania).

## 2.2.18 Norway

### *Fire danger in the 2017 fire season*

In Norway we are using the fire index WBKZ. The fire season is normally from March to September. The fire danger in Norway varies from north to south since the country is 1750 km long and there may be a high forest fire index in one area and little or no fire risk in other areas in the same time.

Normally the fire season starts in the south-west in March-April. In the western part it is mainly brush-fires. In the southern part it is pines on poor soil that dries up quickly which is most common. The largest areas with forest are in the eastern part of Norway.

The average temperature for the whole country in 2017 was 1.1°C above the normal and precipitation was 120% above normal. There were dry periods in April, May, June and July. There are large variations depending where the measurements are made.

### *Fire prevention activities*

The municipalities are responsible for the Fire Services in Norway and the Fire Service is responsible for prevention and action regarded to the forest fires. Some activities are assigned to Governmental Authorities.

The Fire Services are responsible for following activities:

- Monitoring the forest by air (plane).
- Information campaigns
- Prohibit fire dangerous activity in periods with high Fire Index.

The Governmental Authorities are responsible for the following activities:

- Provide information on the forest fire index through the internet (The Norwegian Meteorological Institute).
- Provide information through television (Forecast) when the forest fire index is high (The Norwegian Meteorological Institute).
- General prohibition on lighting fires in the forest or wildland in the period from 15. April to 15. September, regulated by law. (The Directorate for Civil Protection).

### *Fire occurrence and affected surfaces*

In 2017 there were 264 forest fires recorded in Norway; 406 ha of productive forest and 119 ha of other wooded land. There were 773 fires recorded in brushes and grass (non-forest).

The last two years are an increase from previous years. The reason for this is mainly a new reporting system where we have reported too low values in previous years. The trends regarding both the number of fires and burnt areas from 2000-2017 are shown in Figure 7.

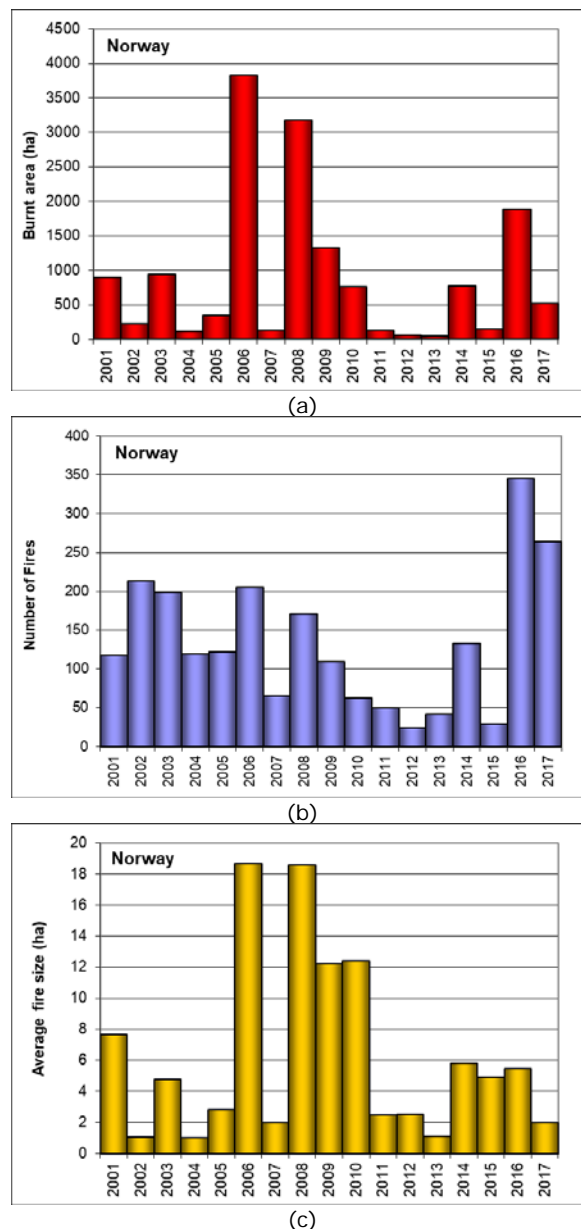


Figure 44. Burnt areas (a), number of fires (b) and average fire size (c) in Norway from 2001 to 2017.



(Photo credit: Dag Botnen, Norway)



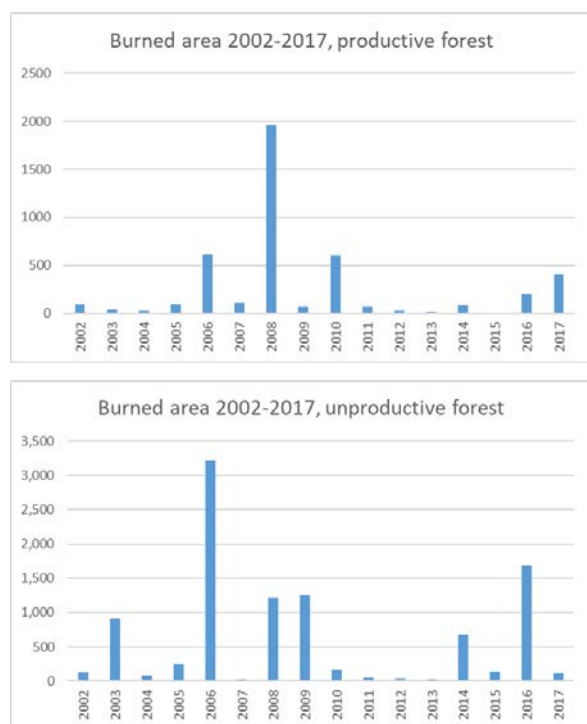


Figure 45. Burnt area of productive/unproductive forest in Norway 2002-2017.

#### *Loss of human lives*

No human lives were lost in fires related to Forest Fires in 2017.

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

The Directorate for Civil Protection and Emergency Planning has an agreement with a private helicopter company. The helicopter is a Bell 214 with a 3000 litres bucket, and the company can provide more helicopters if needed. This helicopter is available for Fire Services in the period from 15 April to 15 September (24/7).

In 2017, the helicopter(s) were used in 18 fires with around 24 hours in the air. The total use of helicopters came to 82 hours flying time (including exercises, etc.).

The Directorate for Civil Protection has established an expert team that supports the local fire chief officer when they have large forest fires and when the helicopter is used.

The Norwegian fire service consists of 4 000 full-time and 8 000 part-time firefighters where the fire department is an all-risk service. For those municipalities that have significant forest fire risk, there are groups established only for fighting forest fires. These groups are managed by the fire services.

#### *Operations of mutual assistance*

None.



(Photo credit: Dag Botnen, Norway)

(Source: Directorate for Civil Protection (DSB), Norway)

## 2.2.19 Poland

### Fire danger in the 2017 season

The weather conditions had an influence on the forest fire danger risk trend and the occurrence of fires in 2017. They were the least favourable to the occurrence of fires not only in comparison to the last years 2011-2016, but also to all years after the year 2001. The diagrams (Figure 46 - Figure 50) show the variations of air temperatures, precipitation, pine (*Pinus sylvestris* L.) litter moisture, relative air humidity and the national degree of forest fire danger risk (NDFFDR) in the 2017 fire season (April-September). They also present the number of fire outbreaks.

The mean monthly air temperature was 15.3°C at 9 a.m. and 19.5°C at 1 p.m. The average monthly air temperatures were lower by about 1.4°C at 9 a.m. and 2.1°C at 1 p.m. in comparison to the year 2016. For comparison the average from years 2001-2010 were 16.0°C at 9 a.m. and 21.0°C at 1 p.m. April was the coolest month after the year 2001, when the mean monthly air temperature reached 7.3°C at 9 a.m. and 11.2°C at 1 p.m. In May the average air temperature clearly increased and reached 15.1°C in the morning and 19.3°C in the afternoon. In following months (June-August) the air temperature was aligned, within the range 19-19.1°C at 9 a.m. and 23-23.7°C at 1 p.m. In September the air temperature decidedly decreased, and reached 12.7°C at 9 a.m. and 17.0°C at 1 p.m.

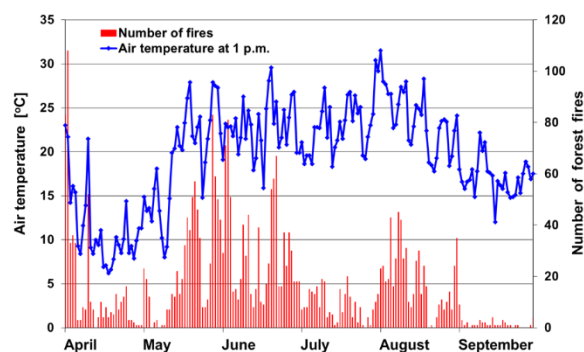


Figure 46. Air temperatures and numbers of forest fires in fire season 2017.

The average precipitation level in the fire season was 2.9 mm, and it was the highest in the years 2001-2016. It was almost twice as high as the most "flammable" year 2015. September was characterised with the greatest rainfall, when the average daily precipitation reached 4.2 mm, and maximum daily reached 17.4 mm, which was simultaneously the highest in the 2017 fire season.

The average daily precipitation in July was almost close to rainfall in September and reached 3.8 mm. In April, June and August the average daily precipitation oscillated from 2.3 to 2.4 mm. May turned out to be the month with the least rainfall, when the average daily precipitation reached 1.7 mm.

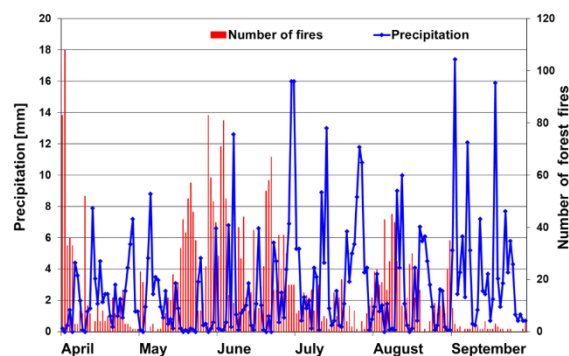


Figure 47. Precipitation and numbers of forest fires in fire season 2017.

Mean pine (*Pinus sylvestris* L.) litter moisture values (the reference fuel type in Poland's condition) were the highest which appeared in years 2001-2016. They reached 35.2% at 9 a.m. and 29.8% at 1 p.m. For comparison the average from years 2001-2010 amounted to 31.0% and 26.0% respectively. The highest mean litter moisture values were in September. They reached 46.2% at 9 a.m. and 41.9% at 1 p.m., while a security level in respect of fire for dead pine litter is 30%. Below this limiting value the mean litter moisture values were noted in both of the observation terms only in May (at 9.00 29.2%, and at 1 p.m. 24.0%) and June (properly: 29.2 and 23.7%). In remaining months mean litter moisture values were above the security level in respect of fire (the exception: August at 1 p.m., when the litter moisture reached 26.7%) and oscillated within the range: 32.3-37.1% at 9 a.m. and 30.7-32.0% at 1 p.m.

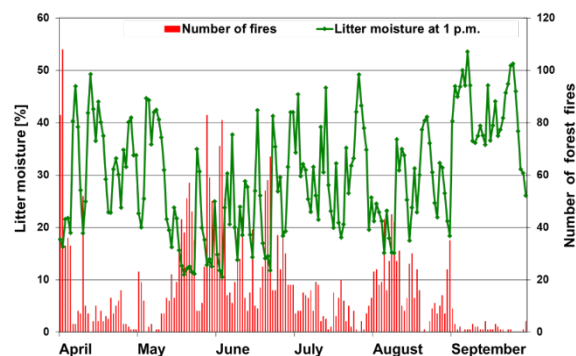


Figure 48. Litter moisture and numbers of forest fires in fire season 2017.

The mean relative air humidity for the fire season 2017 reached 78.8% at 9 a.m. and 61.5% at 1 p.m. They were a few percent higher in comparison to the years 2001-2016. In the years 2001-2010 they were 76% and 58% respectively.

The highest mean relative air humidity values were observed in September, by reason of large amounts of rainfall. They reached 92.6% at 9 a.m. and 74.8% at 1 p.m. The lowest mean relative air humidity values were in May and June. They reached 71.0% and 69.8% respectively at 9 a.m., and 55.5% and 55.1% at 1 p.m.

In April, July and August the mean relative air humidity was similar, because in the morning it oscillated from 77.9 % to 81.4%, and in the afternoon it was within the range 60.5-61.9%.

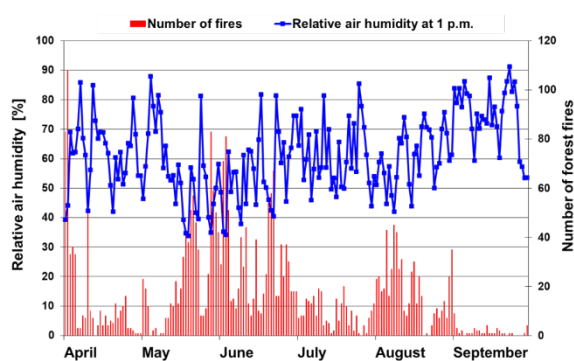


Figure 49. Relative air humidity and numbers of forest fires in fire season 2017.

The average national degree of forest fire danger (NDFFDR) in the four-degree scale (0, 1, 2, 3) reached 0.8 at 9 a.m. and 0.9 at 1 p.m. This means that the fire danger in the whole analysed period was low.

Fire danger was a little greater in May, when NDFFDR reached 1.1 in the morning, and 1.4 in the afternoon, and in June, when it reached respectively 1.3 and 1.2. The forest fire danger was minimal in September, because values of NDFFDR reached 0.1 at 9 a.m., and 0.3 at 1 p.m.. In the remaining months NDFFDR reached values within the range: 0.6-0.8 at 9 a.m. and 0.7-1.1 at 1 p.m.

The high forest fire risk, expressed with share of occurrence in the third level of forest fire danger, appeared sporadically and only in some days of April, May and June.

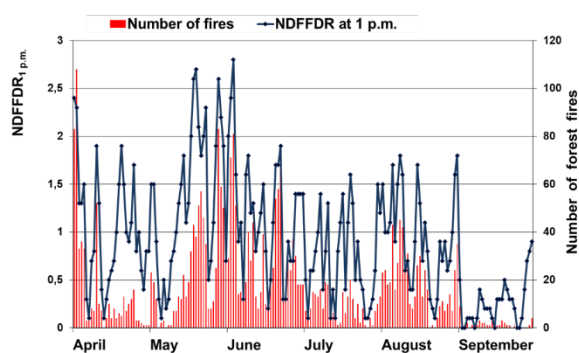


Figure 50. The National Degree of Forest Fire Danger Risk and numbers of forest fires in fire season 2017.

### Fire occurrence and affected surfaces

In 2017 in Poland, a total of 3 592 fires broke out (2 334 forest and 1 258 other non-wooded natural land), over 1 694 less than in 2016 (5 286 fires), with a surface area of 1 023 ha (693 forest and 330 ha other non-wooded natural land), over 428 ha less than in the last year (1 451 ha) - Table 17 and Figure 53.

The greatest proportion of fires occurred in June (25.4%; i.e. 914) - Figure 46. This was followed by May (20.7%), August (16.1%) and April (13.7%). The lowest number of fires in the fire season (April-September) occurred in September (1.3%) and July (7.5%).

84.7% of fires occurred in the fire season.

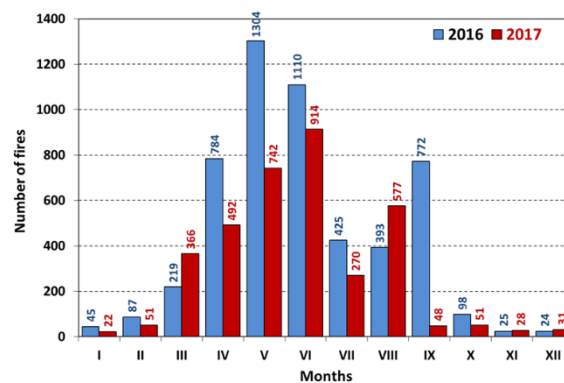


Figure 51. Distribution of number of forest fires by months in 2016 and 2017 in Poland.

The largest number of fires in 2017, similar to last year, occurred in Mazowieckie Province (1 016 - 28.3%).

The lowest number of forest fires occurred in Podlaskie Province (63), Zachodniopomorskie Province (67), and Opolskie Province (88).



The largest burnt forest areas were recorded in:

- Mazowieckie Province (277 ha),
- Świętokrzyskie Province (160 ha),
- Podkarpackie Province (122 ha).

The smallest area was in Podlaskie Province (4 ha) and Pomorskie Province (8 ha). These data are illustrated in Figure 54 - Figure 56.

Small forest fires; i.e. with a surface area of less than 1 ha, represented 94.85% of all the forest fires in 2017 (Figure 7), with the burnt area amounting to 47.02%.

Fires with a surface area of between 1 ha and 10 ha represented 48.46% of the burnt area, with their number representing only 5.07%.

In addition there were 3 large fires (10-100 ha) representing 4.52% of the burnt area, and no very large fires (> 100 ha).

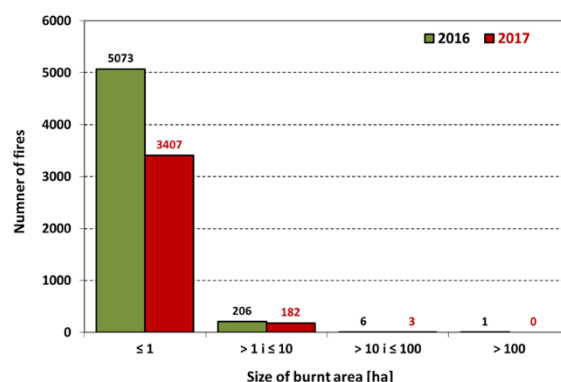


Figure 52. Distribution of the number of forest fires by size of burnt area in the years 2016 and 2017 in Poland.

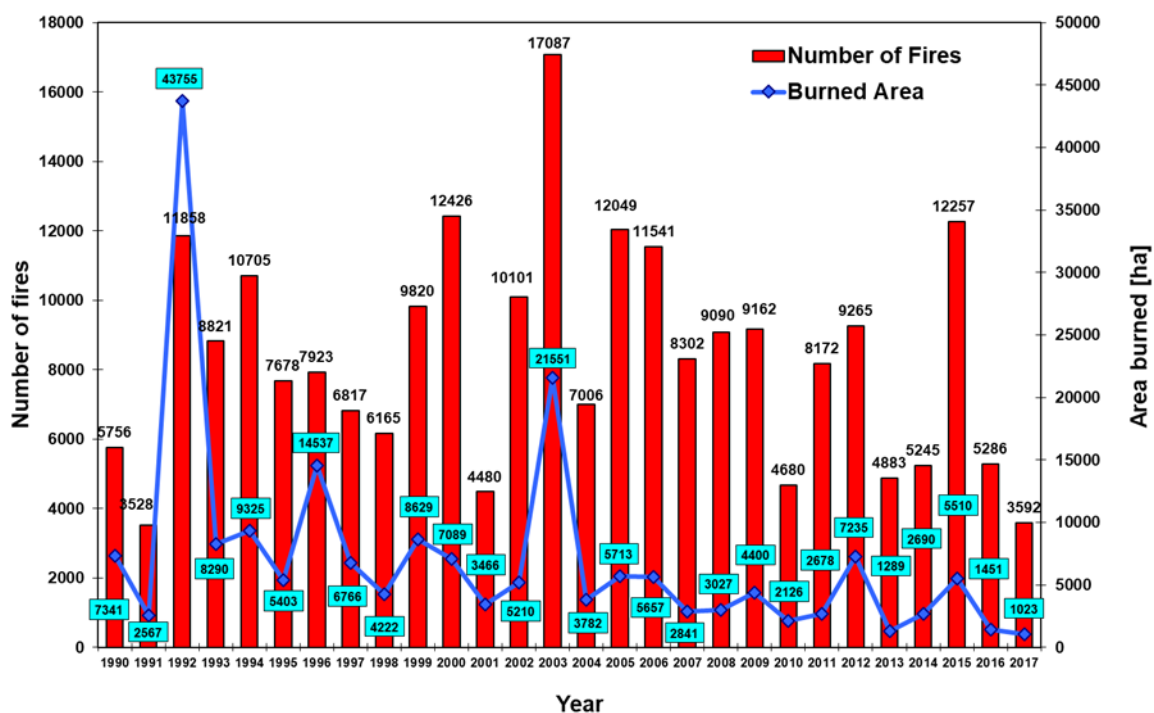


Figure 53. Total number of fires on high forest and area burned in Poland in the period 1990-2017.

Table 17. Forest fires in Poland in the period 2007-2017.

Year	Number of fires			Burnt area (ha)		
	Forest	Non wooded	Total	Forest	Non wooded	Total
2007	5 086	3 216	8 302	1 642.64	1 198.24	2 840.88
2008	5 568	3 522	9 090	1 810.74	1 216.39	3 027.13
2009	5 633	3 529	9 162	2 524.58	1 875.90	4 400.48
2010	2 975	1 705	4 680	1 358.26	767.98	2 126.24
2011	5 126	3 046	8 172	1 526.11	1 151.66	2 677.77
2012	5 752	3 513	9 265	4 781.65	2 453.62	7 235.27
2013	3 168	1 715	4 883	810.42	478.12	1 288.54
2014	3 603	1 642	5 245	1 956.90	733.55	2 690.45
2015	8 292	3 965	12 257	3 765.87	1 744.03	5 509.90
2016	3 545	1 741	5 286	862.37	588.68	1 451.05
2017	2 334	1 258	3 592	692.73	329.80	1 022.53

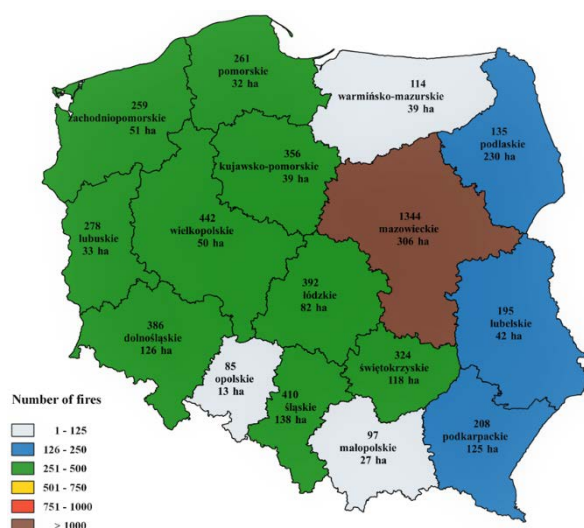


Figure 54. Number of forest fires and burned areas by provinces (NUTS2) in 2016.

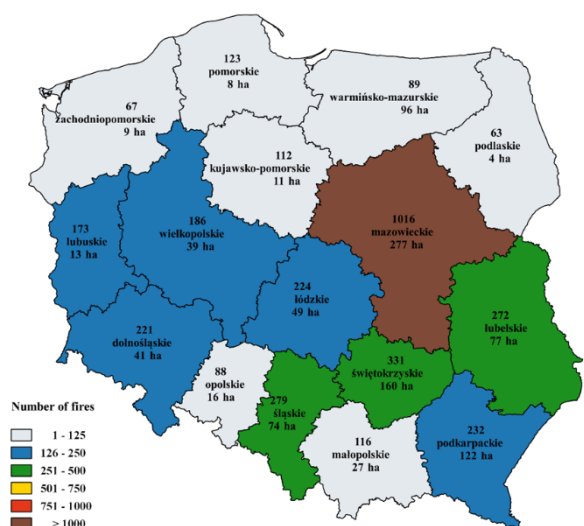


Figure 55. Number of forest fires and burned areas by provinces (NUTS2) in 2017.

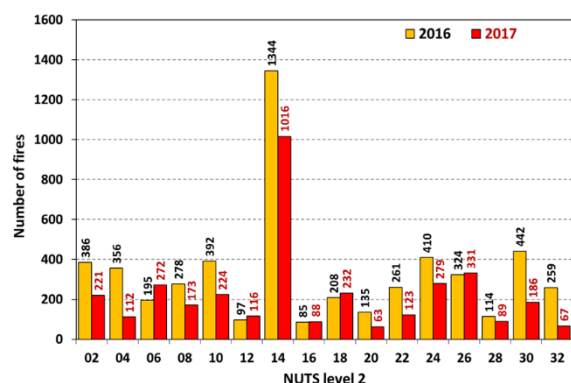


Figure 56. Distribution of the number of forest fires by province (NUTS2) in 2016 and 2017 in Poland.

The burnt area, number of fires and average fire size for the years 1990-2017 are shown in Figure 57.

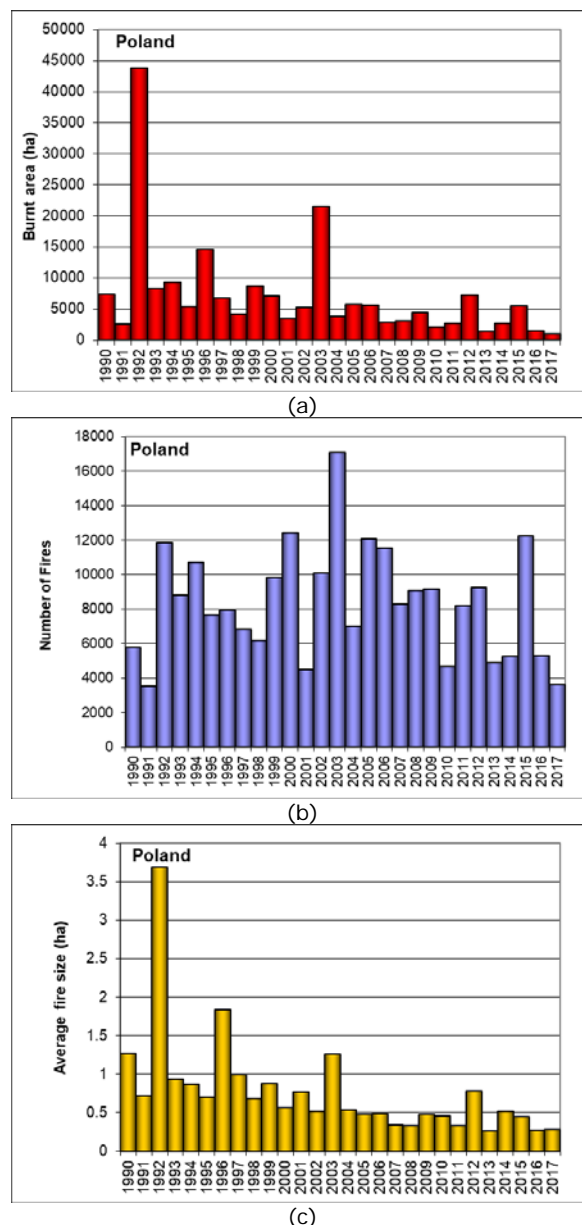


Figure 57. Burnt areas (a), number of fires (b) and average fire size (c) in Poland from 1990 to 2017.

### Fire causes

Human activity was the main cause of forest fires; specifically arson represented almost half of the fires (44.88%), followed by negligence (27.73%) and accident (3.62%), whereas unknown causes accounted for 22.83% (Figure 58).

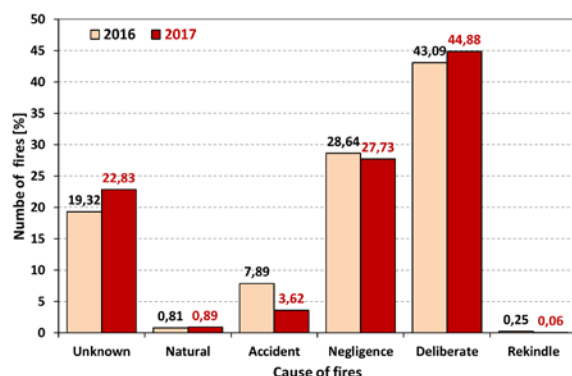


Figure 58. Distribution of the number of forest fires by causes in 2016 and 2017 in Poland.

### Fire fighting means and information campaigns

The "State Forests" National Forest Holding (State Forests NFH) had at its disposal equipment consisting of:

- 34 fire suppression airplanes and 1 helicopter,
- 354 patrol and fire suppression vehicles,
- 8 medium and heavy vehicles,
- 247 portable pumps.

These means were used to extinguish 3% of all the fires in the areas managed by the State Forests NFH, whereas the other fires were suppressed by units of the State Fire Service and voluntary fire brigades.

In 2017, as part of information and promotion activities, the following measures in the State Forests NFH were taken:

- more than 10 thousand lectures in schools and youth camps, and about 600 at country-meetings,
- more than 700 interviews were provided on the radio and the television,
- more than 107 thousand posters, information leaflets and calendars related to forest fires were disseminated,
- more than 250 articles were published in the press and about 100 on the Internet,
- more than 4 thousand information boards were erected.

### Fire prevention activities

In forest areas managed by the State Forests NFH, works were carried out to prevent the conditions for fire outbreaks and to reduce their spread, by repairing 4 337 km of fuel breaks and building 104 km of new fuel breaks; in addition, forests were cleaned over a surface area of 20.7 thousand ha, by reducing the quantity of inflammable biomass.

The observation system of the State Forests NFH consisted of:

- 665 fire protection lookout points, including 256 (38.5%) equipped with a system of TV cameras;
- 7 patrol airplanes, 34 fire suppression airplanes and 1 helicopter;
- 354 ground patrols.

The effectiveness rate of fire detection by fire protection lookout points was 29%, airplanes detected 2% of fires and civilians notified of 62%. The other 7% of fires were detected by fire protection patrols.

The communication and alarm network in the State Forests NFH consisted of: 6 576 radio-telephones, including 1 164 base sets, 2 390 mobile sets and 3 022 hand held sets, as well as 101 converters to the frequency band used by the State Fire Service.

Water supply for fire suppression purposes was provided by 11 797 water supply points, including about 4.5 thousand natural points and over 2.5 thousand artificial ones. Moreover, water was supplied by more than 4.8 thousand hydrants located in the vicinity of forests.

In 2017, the fire protection costs incurred by the State Forests NFH amounted to 85.1 million PLN.

Information on Poland's National Forest Fire Information System can be found on:

[http://bazapozarow.ibles.pl/ibl\\_ppoz/faces/index.jsp](http://bazapozarow.ibles.pl/ibl_ppoz/faces/index.jsp).

Poland's Forest Fire Danger Map, which is updated daily from March to October (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).

## 2.2.20 Portugal

### Fire danger in the 2017 fire season

In 2017 the burnt area was 539 921 ha. The burnt area represents 498% of the average of the previous decennium which was 90 269 ha. Regarding rural fires, there was in 2017 a total of 21 006 fires which represents a decrease of 6% when compared to the average of fires in the last decennium and an increase of 30.4% compared with 2016.

In Região Autónoma da Madeira, there was a total of 94 forest fires responsible for the burning of 1 569.6 hectares (658.3 ha wooded land and 911.3 ha shrub land).

According to the information provided by the Portuguese Sea and Atmosphere Institute (IPMA), the meteorological daily severity index (DSR), derived from the Fire Weather Index, shows the evolution of the fire risk in an operation perspective for the year 2017 (Figure 59).



Figure 59. DSR variation in 2017.

### Fire occurrence and affected surfaces

In 2017 Portugal registered a total of 21 006 rural fires, responsible for the burning of 539 921 ha (Figure 60). *Pinus pinaster* and *Eucalyptus globulus* plantations were the forest cover most affected by fires.

About 36.6% of the occurrences (7 682) were reported between January and June, which burned about 72 007 ha (13.3% total burned area), as seen in Table 18.

In summer period (July-September) about 8 946 rural fires occurred (42.6% total rural fires), which consumed approximately 177 847 ha (33% total burnt area).

In 2017, the most critical month was October, with 3 234 rural fires (15.4% total rural fires) and 289 124 ha (53.5% total burnt area).

Fire occurrence prevailed mostly in the urban districts, such as Porto (Northern region), Braga (Northern region), Viseu (Central region), Aveiro (Central region) and Vila Real (Northern region) which registered 55.6% of the total number of fires. The Northern and Central regions of Portugal were the most affected by rural fires (518 269 ha – 96% total), Table 19. In these regions are concentrated the main area of Eucalyptus and Pine stands and mountainous areas.

Portugal registered 273 large fires ( $\geq 100$  ha), which corresponded to 94% of the total burned area. There were 95 fires larger than 500 ha, which burned 468 055 ha. The largest fire of 2017 occurred in Coimbra district, with 53 618 ha, on 15 October.

Table 18. Rural fires in Portugal (monthly distribution).

Month	Number of fires	Burnt area (ha)			
		Wooded land	Shrub land	agricultural land	Total
January	795	222	1467	49	1738
February	318	90	374	12	476
March	1270	1012	3108	107	4227
April	2498	3083	4514	72	7669
May	930	381	321	356	1058
June	1871	42198	12864	1777	56839
July	2457	32455	33374	8674	74503
August	4227	48080	34984	6912	89976
September	2262	7264	5190	914	13368
October	3234	194471	73776	20877	289124
November	822	238	482	43	763
December	322	20	131	29	180
<b>TOTAL</b>	<b>21006</b>	<b>329514</b>	<b>170585</b>	<b>39822</b>	<b>539921</b>



Table 19. Number of fires and burnt areas in Portugal (NUTS2).

NUTS 2 region	Number of fires	Burnt area (ha)			
		Wooded land	Shrub land	Agricultural land	Total
Norte	11755	27536	61431	4342	93309
Centro	6016	291226	103177	30557	424960
Lisboa	1234	368	882	84	1334
Alentejo	1607	10242	4981	4795	20018
Algarve	394	142	114	44	300
<b>TOTAL</b>	<b>21006</b>	<b>329514</b>	<b>170585</b>	<b>39822</b>	<b>539921</b>
Região Autónoma da Madeira	94	658.3	911.3	-	1569.6

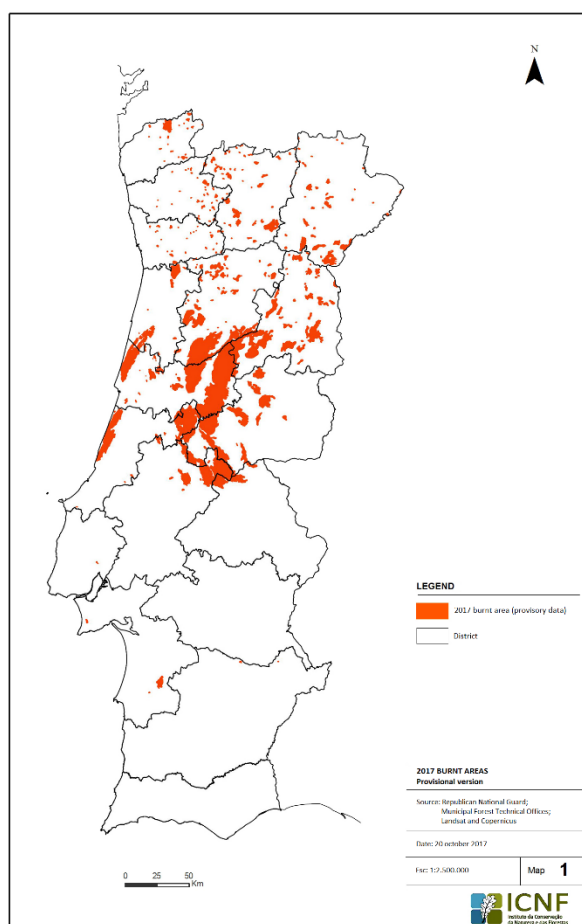


Figure 60. Burnt areas in 2017, provisory data (Portugal).

The analysis of the yearly trends in the number of fires and burnt areas in Portugal is shown in Figure 61.

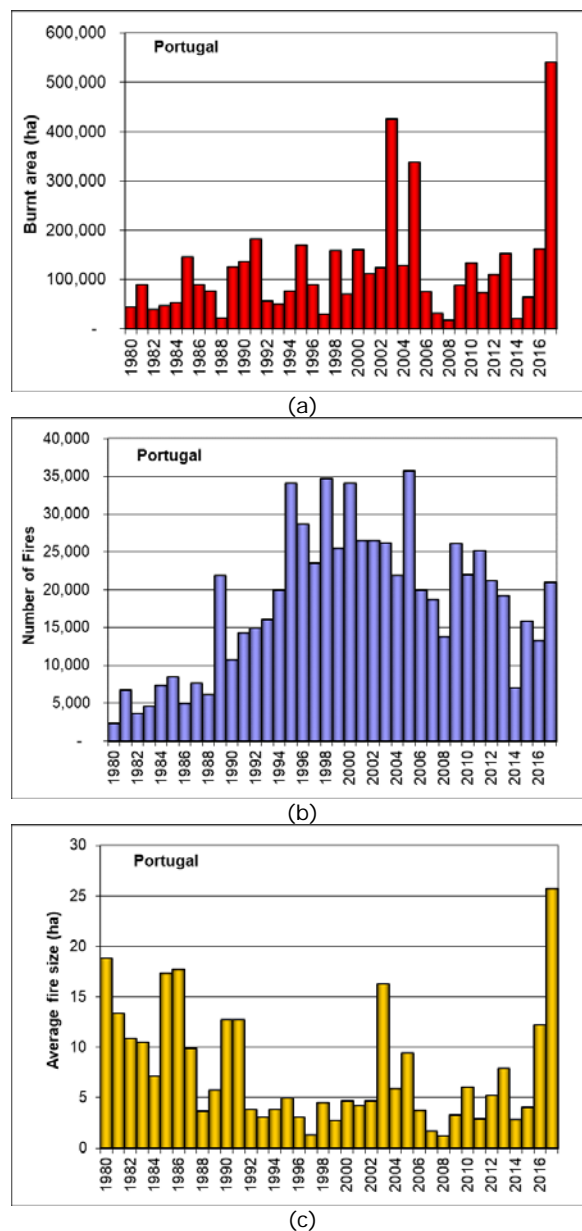


Figure 61. Burnt areas (a), number of fires (b) and average fire size (c) in Portugal 1980-2017.

### Fire causes

Of 21 006 occurrences registered in 2017, the National Guard proceeded with the investigation of causes for 17 271 forest fires (82%), of which 6 661 were of unknown origin (Figure 62).

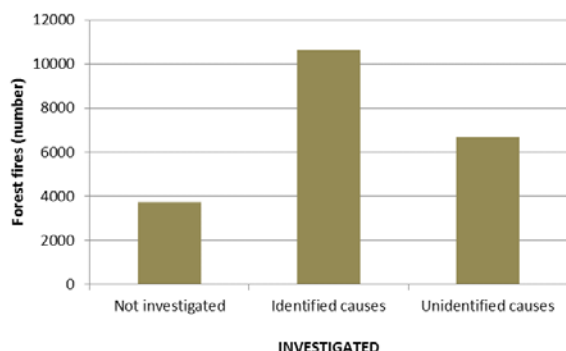


Figure 62. Criminal rural fires 2017 investigation

Amongst those fires with determined cause, intentional acts corresponded to 32.4% and accidents or negligence were present in the ignition of 49.7% of the total number of fires (Figure 63). The use of fire for renewal of shrub pastures in mountain grazing areas still has a strong impact on the burnt areas.

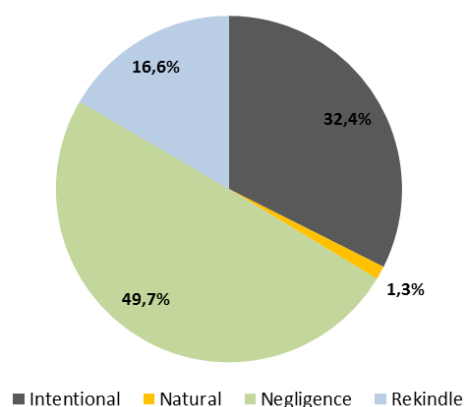


Figure 63. Main causes of rural fires 2017.

### Policy measures

In 2017, the Ministerial Order n.º 195/2017, established the period between 22 June and 30th September, as the critical fire season, when preventive measures are implemented.

This period was extended until 23 of November by the next Ministerial Order :

Despacho 8640-B/2017: until 15 October;

Despacho 9081-E/2017: until 30 October;

Despacho 9599-A/2017: until 15 November;

Despacho 9973-B/2017: until 23 November.

### Fire prevention activities

#### Forest fire planning

The Institute for Nature Conservation and Forests (ICNF) kept its efforts in the forest fire planning at the local, municipal and regional (district) levels.

The municipal planning objective is pursued by the municipal forest technical offices, based on the municipal plans for forest fire prevention (5 years planning) and the municipal operational plans, which are part of the previous plans and were updated on an yearly basis.

The municipal forest technical offices provided technical support to the municipal commission for forest protection. By the end of 2017 there were 267 municipal forest technical offices established and 217 municipal plans for forest fire prevention approved.

The regional level planning (for the entire Mainland) is assured by 18 Regional Forest Plans updated before each summer in cooperation with municipalities and district commands for relief operations, at the district level.

#### Forest fuels management

Forest fuels management is one of the key-actions in the forest fire prevention domain. A total area of 14 781.4 ha was managed, of which 694 ha with prescribed burning.

#### Water points

During 2017, 252 water points (reservoirs) were renovated.

#### Forest roads

In 2017, 5 301 kilometres of forest roads were managed.

## Fire-fighting Strategy

Wildfire fighting continues to be one of the main areas that require the permanent involvement of the National Civil Protection Authority and all the civil protection agents involved in its suppression. As in previous years, the ANPC continued the operational training program, including a set of training and preparation actions, especially directed to the fire brigades and in addition to its training program, in a total of 246 actions that involved 5 325 trained personnel in areas identified after the 2016 campaign as priorities, such as the implementation of the operations management system, combat techniques with manual and mechanical tools, combat techniques using track machines, ICS and control of air operations.

Table 20. Fire-fighting means available per phase.

Phases	Elements	Vehicles	Aerial Means
Alfa (< 15MAY)	Means available on demand		2 - 5
Bravo (15MAY-30JUN)	6 607	1 514	32
Charlie (1JUL-30SEP)	9 740	2 065	48
Delta (1OCT-31OCT)	5 518	1 307	22
Echo (> 31OCT)	Means available on demand		2 - 5

During the most critical phase of 2017 [July-September period], the Special Firefighting Devices (DECIF) expressed in the National Operational Directive (DON) No. 2/2015 integrated a total of 9 740 operational staff, 2 065 vehicles and 48 aerial means (Table 20). There were also operatives from the National Guard Protection and Relief Group (GIPS), with intervention in 11 districts, with a total of 594 elements, supported by 73 vehicles and by the Firefighters Special Force (FEB), which integrated a staff of 261 operational supported by 56 vehicles, distributed by 7 districts. Of the forest firefighting device, 1 442 elements of the Institute for Nature Conservation and Forestry (ICNF) were also included, including 255 teams of forestry workers, 240 operational from the Pulp Industries Association (AFOCELCA) and 948 elements of the Nature Protection Service and GNR environment responsible for detection and surveillance.

Table 21. Aerial resources used.

Year	Flight Hours	Number of Missions	Number Aerial Resources
2015	5 233	5 456	49
2016	6 809	6 229	47
<b>2017</b>	<b>9 153</b>	<b>7 457</b>	<b>48</b>

Although the aerial resources are not responsible for the suppression of forest fires, as these fires are fought on the ground through the use of land resources, their use in wildfire firefighting is essential for the area of rising fires and for reducing the intensity of the fronts of fire, making possible a faster and safer intervention of terrestrial resources. The level of commitment of air resources was very high in 2017, with a total of 7 457 missions and more than nine thousand flight hours spent, much higher than in previous years, due to the increase in the number of fires and the intensity with which they have developed (Table 21).

### Loss of human life

As a result of a winter and a spring with little precipitation and a very severe summer in terms of meteorological conditions favourable to the spread of fires, in 2017 there were 21 006 forest fires, which contributed to 539 921 ha of burned forest and agricultural area. As a result of the severity of many of the fires recorded and the high continuity of fuel present in the Portuguese forest, the year is tragically marked by two tragic episodes that resulted in a high number of fatalities.

The first episode, which occurred in a fire that began in the municipality of Pedrógão Grande and which extended to the neighboring municipalities of Castanheira de Pera, Figueiró dos Vinhos, on June 17, caused a total of 66 deaths (65 civilians and 1 firefighter) and caused high losses in terms of buildings and forest areas. The second episode took place on 15 October, where more than 500 ignitions in one day resulted in a large number of simultaneous fires, resulting in a total of 46 fatalities and losses of high value in the building, industry and in agriculture, in addition to more than 200 thousand ha of burned area. It should also be noted that the year 2017 is marked by the existence of two more deadly casualties among operatives involved in firefighting - 1 helicopter pilot and 1 bulldozer operator, and a high number of civilian and operational injuries involved in wildfire fighting.

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

## 2.2.21 Romania

### *Meteorological characteristics during 2017*

In 2017, the mean annual national temperature (9.9°C) was +0.7°C higher than the standard climate normal (1981–2010). Positive deviations of the mean monthly temperature against the normal standard climate of each month, were recorded in 9 months, ranging between 0.1°C (October) to 3.4°C (March).

The annual precipitation amount in Romania (673.5 mm) was 6% higher than the standard climate normal (1981–2010). Deviations were positive in 8 months, ranking from 2% in February, to 73% in October. The maximum annual precipitation amount was recorded at the meteorological station Stâna de Vale (1 737 mm).

### *Fire occurrence and affected surfaces*

In 2017, 447 forest vegetation fires were recorded at national level, affecting 2 459.27 ha, of which 442 fires occurred on 2 445.94 ha in the national forest, and 5 fires occurred on 13.3 ha in forest vegetation, located on land outside the forest.

As a result of the fires, an estimated damage of 133 thousand Euro occurred, burning 207 thousand seedlings of plantations and natural regenerations plus 267 cubic metres of standing or under operation timber.

The burnt area, number of fires and average fire size for the years 1986–2017 are shown in Figure 64.

Table 22. Causes of forest fires.

Cause of fire	EFFIS code	Number of fires	Burnt area (ha)
Unknown	100	76	250
Electrical power	310	2	7.7
Weapons	350	1	14
Self-ignition	360	3	36.1
Vegetation management	411	288	1756
Agricultural burning	412	70	389.5
Waste management	413	1	1.5
Cigarettes	422	6	4.45

Table 23. Nature of the affected property.

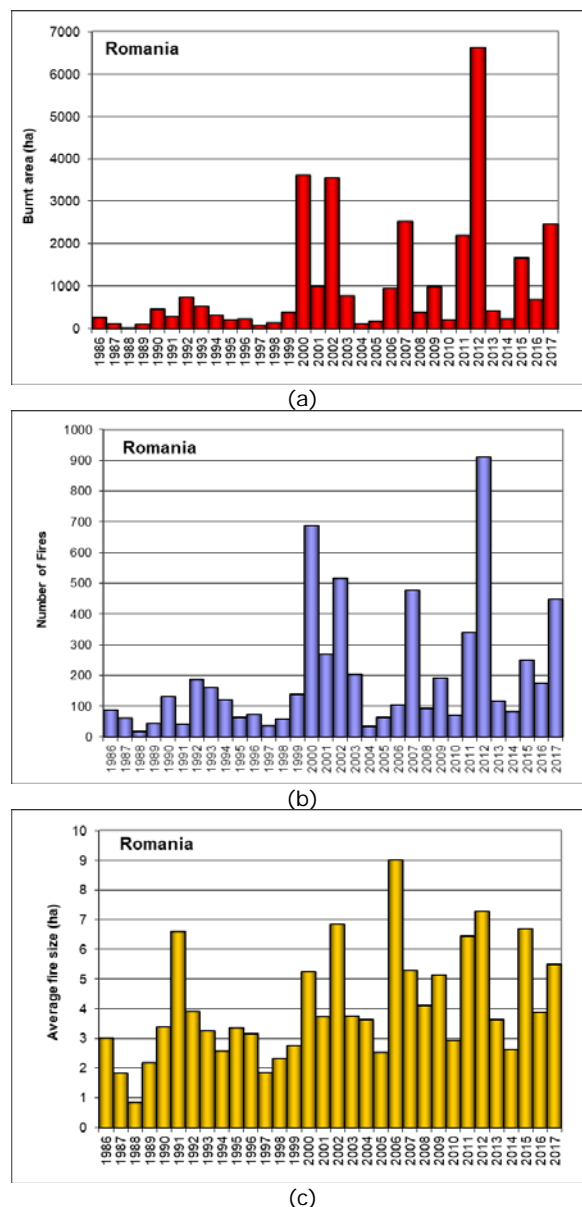
Property type	Number of fires	Burnt area (ha)
State public property	316	1621.36
Communities public property	37	130.04
Private property	116	690.91

(22 fires common on State and private property)

Table 24. Type of fire.

Fire type	Number of fires	Burnt area (ha)
Litter fires	426	2405.54
Mixed fires (litter, canopy)	21	53.73

The periods with a high number of fires occurred in spring: in the period between March 3 – April 3 were 269 fires on 1 628.4 ha, of which 28 fires burned 278.8 ha on April 3, and the principal cause was the fire propagation from pastures and farming land, in warm and windy weather (Table 22).



### *Fire fighting means*

Firefighting actions involved a total of 9 470 people, of which:

- Forest rangers – 2 329 people;
- Military and civilian fire-fighters – 2 940 people;
- Policemen and gendarmes - 615 people
- Citizens – 3 586 persons.

(Source: National Meteorological Institute, Ministry of Waters and Forests, Romania).

## 2.2.22 Russian Federation

### *Fire danger in 2017*

The forest fire season in the Russian Federation started on April in 46 regions, and the Emergency situation was declared throughout the Trans-Baikal Territory.

### *Fire occurrence and affected surfaces*

In total there were 10 051 forest fires and area burned is 1 459 099 ha.

Including:

- 9 201 forest fires on the lands of the Federal Forest Fund, area burned 1 350 310 ha, including 952 417 ha covered by forest;
- National parks and special protected territories: 159 forest fires, area burned 50 335 ha;
- Other categories: 691 forest fires, area burned 58 454 ha;

The most critical forest fire situations during the fire season were noted in:

- Republic of Sakha (Yakutia) - 345 fires, area burned 161.4 thousand ha;
- Irkutsk Region – 1 119 fires, area burned 305.4 thousand ha;
- Krasnoyarsk krai - 1481 fires, area burned 177.5 thousand ha;
- Zabaikalski krai - 793 fires, area burned 152.5 thousand ha;
- Republic of Buryatia - 734 fires, area burned 63.1 thousand ha;

There were organized 61 interregional operations to deliver 2 235 firefighters to 11 regions of the Russian Federation with the most complex forest fire situation. They have managed 163 forest fires, area burned 283.5 thousand ha.

There were operations on artificial precipitation to extinguish forest fires. There were conducted 147 impacts on certain clouds for rain seeding to 102 forest fires, the total area burned 267 287 ha.

There were organized blasting operations to build up firelines with the use of detonating cord in the extended territories of Siberia.

### *Fire prevention activities*

Regional forestry special brigades managed the following fire prevention activities:

- Construction of roads for forest protection needs: over 4.0 thousand km.
- Reconstruction and maintenance of forest roads for fire-prevention operations: over 6.4 thousand km.
- Construction of the fire-prevention mineralized lines, barriers: over 177.3 thousand km.
- Care of the fire-prevention mineralized lines, barriers: over 601.5 thousand km.
- Prescribed burning : 741.3 thousand ha.
- There were public events on Federal and Regional level with the rural population on forest fire prevention activities.

### *Loss of life*

According to the results of the season, there were no human casualties and the transition of forest fires to human settlements and economic objects.

*(Source: Aerial Forest Fire Centre, Russian Federation).*



### 2.2.23 Slovakia

#### *Fire danger in the 2017 fire season*

The 2017 fire season was not critical from the point of view of fire hazard. The number of wildfires and the average size was similar to 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*

A total number of 162 forest fires was reported in Slovakia in 2017, corresponding to a total burnt area of 294.66 ha. The average burned forest area per fire was 1.83 ha. The burnt areas, number of fires and average fire size for the years 1999-2017 can be seen in Figure 67 and the monthly distribution is shown in Figure 68.

The biggest fire occurred on 11 February 2017 in the Spišská Nová Ves district and damaged 56 hectares of coniferous forest. The cause of the fire was negligence (Figure 66).

#### *Fire causes*

Forest fire causes in 2017 are shown in Figure 65, and causes for the years 2006–2017 are presented in Table 25.

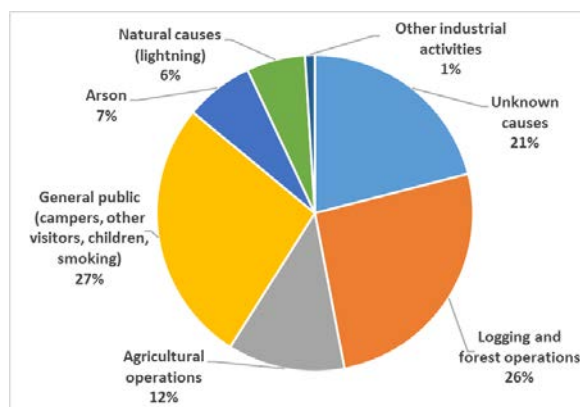


Figure 65. Causes of forest fires in 2017.

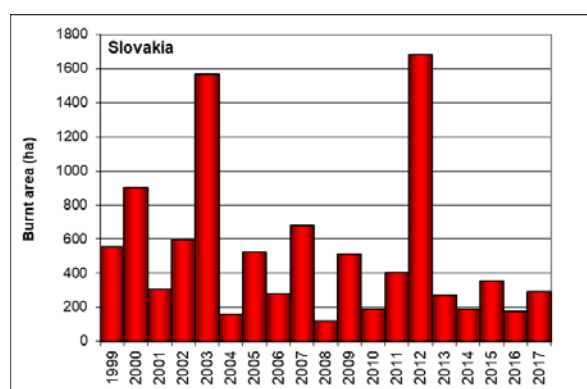
The burnt area, number of fires and average fire size for the years 1999-2017 are shown in Figure 67.



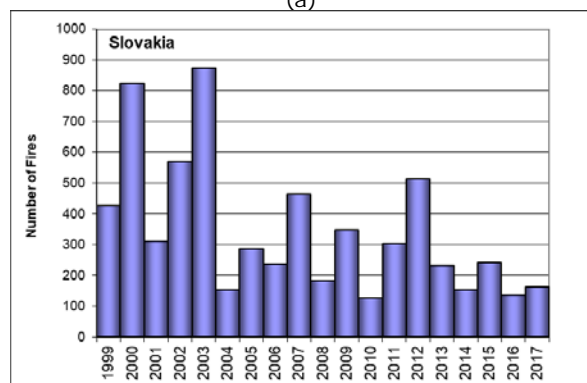
Figure 66. Forest fire in Láb, damage 51.14 ha (Photo M. Herz)

Table 25. Forest fire causes for the years 2007-2017 (number of fires).

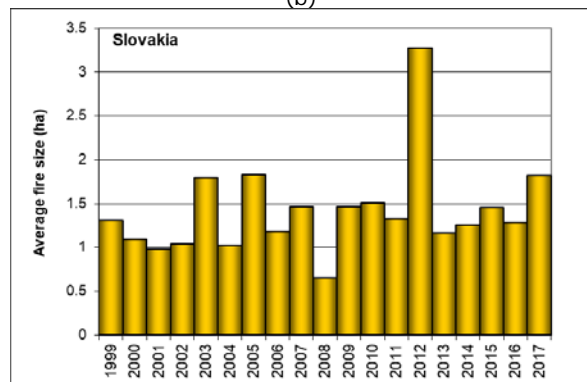
	<i>Year</i>	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<i>Basic information</i>	Total fires	<b>463</b>	<b>182</b>	<b>347</b>	<b>123</b>	<b>303</b>	<b>517</b>	<b>233</b>	<b>153</b>	<b>242</b>	<b>136</b>	<b>162</b>
<i>Known causes (Human)</i>	Arson	11	7	18	6	8	42	33	26	23	12	11
	Negligence (see also B below)	416	154	286	94	244	409	177	112	167	98	108
<i>Known causes (Natural)</i>	Lightning	6	1	3	2	1	8	4	2	12	0	10
<i>Unknown</i>	Unknown	26	20	40	21	50	58	19	13	40	26	33
<i>B: Supplementary information: Total negligence</i>	Agricultural operations	110	25	51	25	59	135	26	24	26	21	20
	Logging/forest operations	23	19	52	25	21	56	15	18	21	14	21
	Other industrial activities	2	20	12	5	0	1	7	1	5	0	0
	Communications (railways, electricity lines, etc.)	3	3	7	2	1	7	3	1	2	1	2
	General public (campers, other visitors, children)	278	81	161	66	222	208	125	67	110	62	65
	Other (military, etc.)	0	6	3	0	0	2	1	1	3	0	0



(a)



(b)



(c)

Figure 67. Burnt areas (a), number of fires (b) and average fire size (c) in Slovakia from 1999 to 2017.

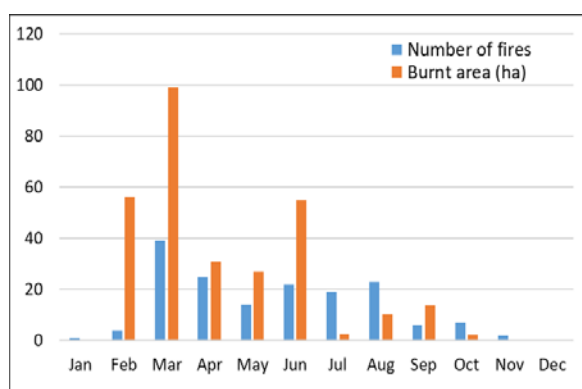


Figure 68. Number of fires and burnt area by month in Slovakia 2017.

### Fire prevention activities

- Provide information on the forest fire index through the internet page of the Slovak Hydrometeorological institute;
- Provide information through television when the forest fire index is high;
- Information campaigns;
- Prohibit fire dangerous activities in periods with high Fire index;
- Use of a stationary camera system for the early detection of forest fires.

### Injuries and loss of human lives

One injury was reported in Slovakia during the fire season of 2017.

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



## 2.2.24 Slovenia

In 2017, according to the data of the Forest Service, 108 forest fires were reported, with a total burnt area of 440.99 ha, of which 175.77 ha were in forest land (Table 26). The number of fires is a little higher than that reported in 2016, and the burnt area is a little lower. There were 24 fires over 1 ha during the year as well as two over 100 ha, and the average fire size was 5.8 ha. Figure 69 shows the trends in terms of number of fires and burnt area during the last 14 years in Slovenia.

Table 26. Number of fires and burnt area in Slovenia in 2017.

Number of fires	< 1 ha	82
	≥ 1 ha	24
	≥ 100 ha	2
	≥ 500 ha	0
	<b>Total</b>	<b>108</b>
Burnt area	Woodland	175.77
	Bushes	0.70
	Non woodland	264.52
	<b>Total</b>	<b>440.99</b>

As was the case in previous years, the worst affected region was Sežana, in which 44% of the fires (89% of burnt area) occurred (Table 27).

In 2017, nearly half of the fires (47) were of unknown origin. Of the rest, 1 was caused by lightning, 2 were deliberately started and the remaining 51 were reported as accidental or negligent.

(Source: Ministry of Agriculture and the Environment, Slovenia)

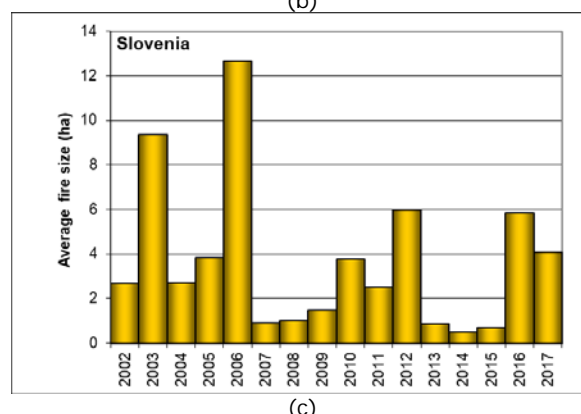
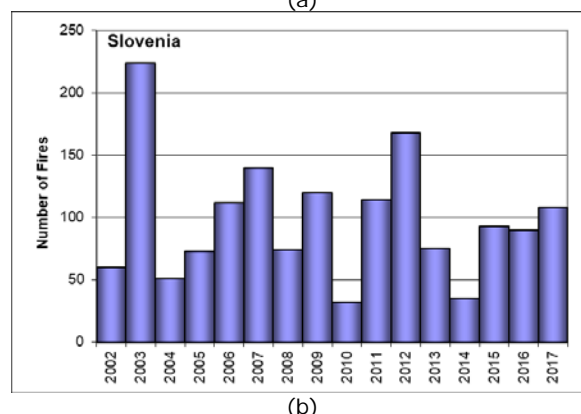
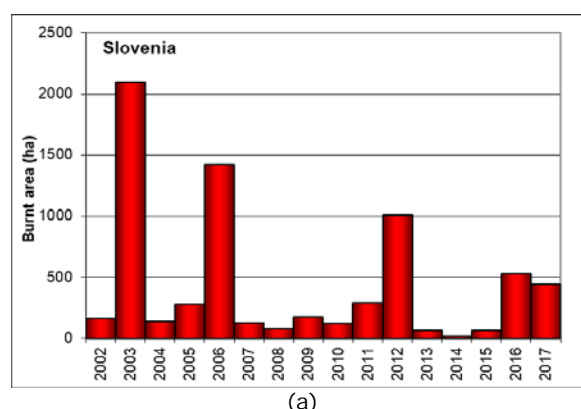


Figure 69. Burnt areas (a), number of fires (b) and average fire size (c) in Slovenia from 2002 to 2017.

Table 27. Number of fires and burnt area by forest management unit in Slovenia in 2017.

Region	Number of fires				Burnt area (ha)			
	<1 ha	≥1 ha	≥100 ha	Total	Forest	Scrub	Non wooded	Total
Tolmin	3	1	0	4	2.30	0.02	0.41	2.73
Bled	2	0	0	2	0.21	0.28	0.00	0.49
Kranj	10	0	0	10	2.10	0.00	0.47	2.57
Ljubljana	13	4	0	17	21.87	0.00	0.32	22.19
Postojna	0	1	0	1	1.37	0.00	0.93	2.30
Kočevje	2	1	0	3	1.93	0.00	0.00	1.93
Novo mesto	9	3	0	12	2.17	0.39	4.00	6.56
Brežice	0	0	0	0	0.00	0.00	0.00	0.00
Celje	3	0	0	3	0.41	0.00	0.48	0.89
Nazarje	0	1	0	1	4.62	0.00	0.04	4.66
Slovenj Gradec	3	0	0	3	0.15	0.00	0.00	0.15
Maribor	3	0	0	3	1.31	0.00	0.41	1.72
Murska Sobota	1	0	0	1	0.20	0.00	0.00	0.20
Sežana	33	13	2	48	137.13	0.01	257.46	394.60
<b>Total</b>	<b>82</b>	<b>24</b>	<b>2</b>	<b>108</b>	<b>175.77</b>	<b>0.70</b>	<b>264.52</b>	<b>440.99</b>

## 2.2.25 Spain

### Number of fires and affected surfaces

The provisional statistics for 2017 are compiled with the information sent by the autonomous regions on a weekly basis during the summer campaign and monthly for the rest of the year.

The total number of fires increased by 11.57% compared with the average of the last decade, with an increase of 5.80% in the number of small fires (area  $\leq 1$  ha) and 23.05% in larger fires (area  $> 1$  ha) respectively. This year was the third highest in terms of number of fires in the last decade. The number of fires for 2017 is below the worst years in the decade, which were 2009, 2011 and 2012.

Table 28. Number of fires in 2017 compared with 10 year average

	Average 2007-2016	2017
Number of fires $< 1$ ha	8228	<b>8705</b>
Number of fires $\geq 1$ ha	4135	<b>5088</b>
Total	12363	<b>13793</b>

Regarding the affected areas, there was an increase with respect to the average of 145% in the wooded areas and 94% in forest areas. The year 2017 ranks second in the decade in affected area.

Table 29. Burnt area in 2017 compared with the 10 year average

	Average 2007-2016	2017
Burnt area other wooded land (ha)	27 226.41	<b>66 839.02</b>
Burnt area forest (ha)	91 846.74	<b>178 233.93</b>

### Large fires

According to the provisional statistics compiled by the relevant departments in the autonomous regions, during 2017 there were 56 large forest fires (GIF) in 2017, a category which includes fires in excess of 500 hectares affected.

In total, the GIFs recorded represented 54.96% of the burnt area and 0.41% of the total number of fires that occurred (Table 30).

The Northwest geographical region was the most affected by the GIF: 73.21% of the number and 74.54% of the surface burned by them occurred in this region. In the month of October alone there were 31 GIF (55% of the annual total), all of them in the Northwest region.

Table 30. Large fires in 2017

Province	Municipality of origin	Start date	Burnt area (ha)
Salamanca	Candelario	25/01	516.60
León	Ponferrada	19/04	1251.04
León	Benuza	20/04	798.34
Asturias	Allande	20/04	746.46
Asturias	Ibias	20/04	647.79
Asturias	Grandas de Salime	20/04	590.49
Huelva	Moguer	24/06	7517.88
Cáceres	Calzadilla	24/06	606.81
Valencia	Gátova	28/06	1181.41
Huelva	Minas de Riotinto	03/07	739.72
Albacete	Yeste	27/07	3074.43
Zamora	Pino del Oro	29/07	2355.69
Cuenca	Campillo de Altobuey	31/07	1057.00
Ourense	Verín	03/08	1372.18
Jaén	Segura de la Sierra	03/08	682.65
Ávila *	Navarredonda de Gredos	07/08	541.22
León	Encinedo	21/08	9820.66
Salamanca/Ávila	Puente del Congosto/Medinilla	24/08	1719.95
Ávila	Hoyocasero	26/08	924.04
Zamora	Fermoselle	26/08	1632.44
Huelva/Sevilla	La Granada de Riotinto	08/09	2956.07
Sevilla	Almadén de la Plata	08/09	977.14
Zamora	Vegalatrave	09/09	527.26
Las Palmas	Tejeda (Gran Canaria)	20/09	1937.00
Ourense	Lobios	09/10	670.00
Asturias	Ibias	09/10	2700.00
Asturias *	Degaña	11/10	1950.00
León	Palacios de Sil	12/10	573.50
León	Villablino	13/10	719.44
Lugo	Cervantes	12/10	864.00
Lugo	Cervantes	13/10	1785.00
Asturias	Allande	14/10	661.06
Asturias	Ibias	14/10	3379.00
Ourense	Lobios	14/10	3425.48
Pontevedra	Tui	15/10	865.37
Ourense	Chandrexa de Queixa	15/10	741.03
Ourense	Baños de Molgas	15/10	1599.97
Ourense	Melón	15/10	5965.86
Ourense	San Cristovo de Cea	15/10	1520.34
Asturias	Cangas de Narcea	15/10	962.90
Asturias	Allande	15/10	553.80
Ourense	A Gudiña	15/10	1809.14
Ourense	Esgos	15/10	573.03
Ourense	Maceda	15/10	526.36
Ourense	Parada de Sil	15/10	1275.62
Pontevedra	Salvaterra do Miño	15/10	770.14
Pontevedra	Caldas de Reis	15/10	1067.87
Pontevedra	Gondomar	15/10	1384.92
Pontevedra	Nigrán	15/10	1483.25
Pontevedra	As Neves	15/10	2818.49
Pontevedra	Ponteareas	15/10	8877.79
Pontevedra	Ponteareas	15/10	645.18
Pontevedra	Mondariz	15/10	568.32
León	Benuza	15/10	1521.76
Lugo	Negueira de Muñiz	16/10	1104.00
Castellón	Culla	29/12	535.20
<b>Total burnt area</b>			<b>98072</b>

\* Images shown in Figure 72 and Figure 74 below.

The yearly trends in terms of numbers of fires and burnt areas during the last 38 years in Spain are shown in Figure 70.

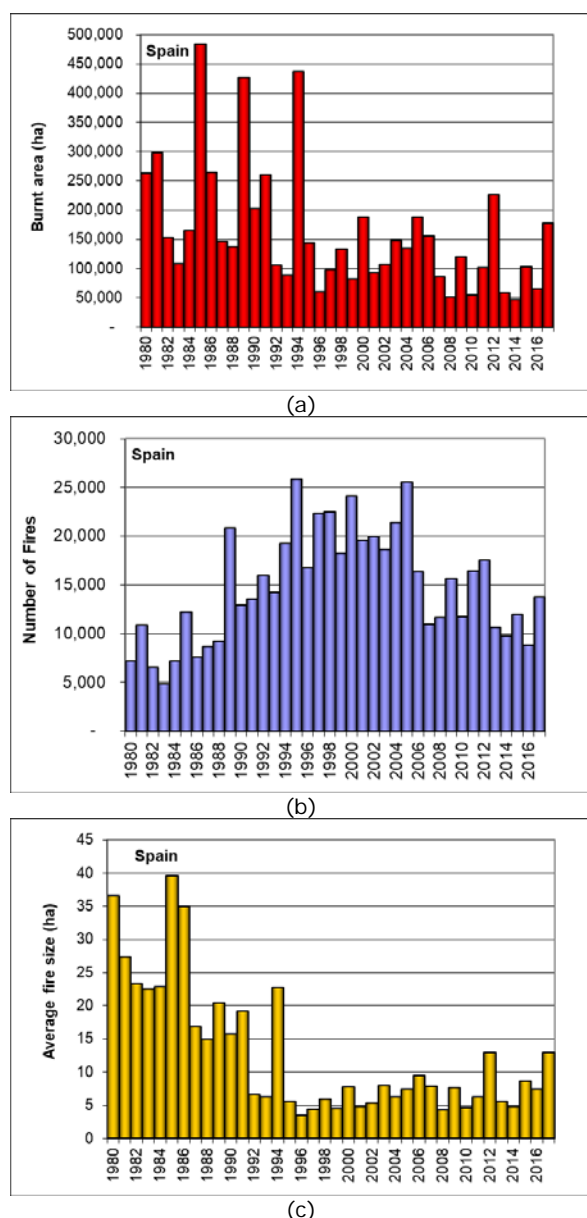


Figure 70. Burnt areas (a), number of fires (b) and average fire size (c) in Spain for the last 38 years.

The distribution of the total number of fires by geographical area is shown in Figure 71. It shows that the Northwest region suffered the greatest number of fires, with 51.57% of the annual total. It is followed by the Interior Communities with 32.05%, the Mediterranean area and finally the Canary Islands. Regarding burnt forest area the Northwest region represents 73.84% of the total, followed by the Interior Communities, the Mediterranean region and, with much lower values, the Canary Islands.

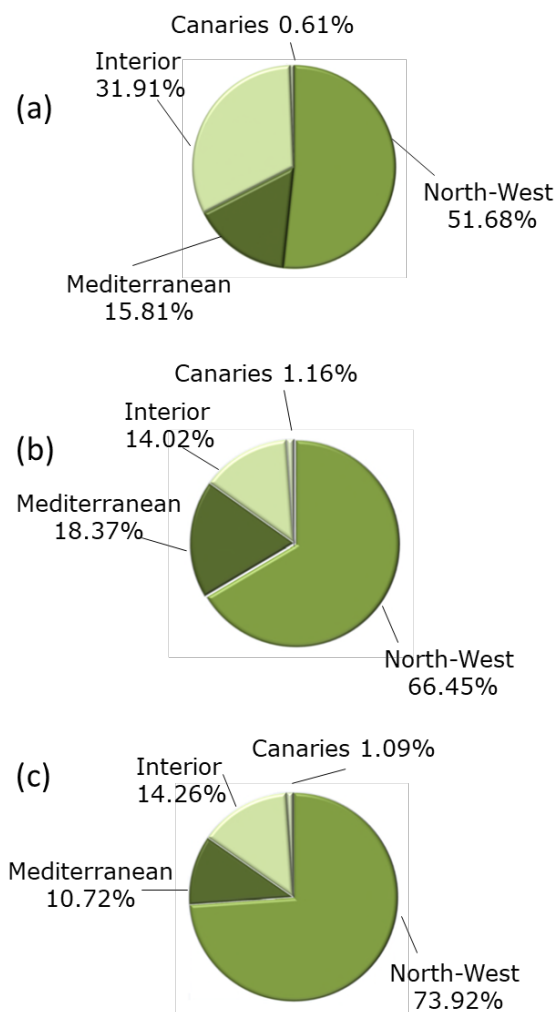


Figure 71. (a) Number of fires; (b) burnt area of other wooded land (ha); (c) burnt area of forests (ha) in 2017 by geographic region.

#### Prevention measures

##### Training in fire management

During 2017 MAPAMA carried out the following training courses for professionals working in defence against forest fires:

- Drone course and its use in forest fires.
- Advanced Course on Security and Investigation of Forest Fire Accidents.
- Incident Command System Course ICS.

##### Integral Prevention Teams (*Equipos de Prevención Integral: EPRIF*)

In 2017, the EPRIFs were operational from January 18 until May 30 and resumed work from November 2 to December 23, completing a maximum of 6 months of work at the end of the year.

During this period, the EPRIFs worked mainly on training activities and meetings with various groups, including ranchers, farmers, hunters and local administrations, in order to reconcile interests and raise awareness of forest fire prevention.

Among the actions carried out during the first part of 2017 was the treatment of 1 147 hectares with 198 controlled burns. This helps to reduce the risk of forest fires by reducing forest fuel and creating discontinuities in the vegetation, while also achieving other objectives such as improving pastures, favouring the habitat of various species or improving accessibility in the forest. A total of 679 plots were prepared for burning, although the weather conditions did not allow all of the work to be completed.

For performing controlled burns, the EPRIFs located in Huesca, Tabuyo (León), Cangas del Narcea (Asturias), Pola de Lena (Asturias) and Gredos (Ávila) received occasional support from the MAPAMA Preventive Work Brigades with bases close to the area of action.

#### Preventive Work Brigades (*Brigadas de Labores Preventivas*)

The MAPAMA Preventive Work Brigades acted, in collaboration with the autonomous administrations, from the beginning of the year until the beginning of the summer campaign. Once the summer campaign was over, preventive work was resumed, which ended in the middle of December, extending the work period to about 11 months.

During these two work periods, they carried out fire prevention work on more than 1 475 hectares of forest land, which included thinning, pruning and shrub removal.

In total, more than 400 workers distributed in the 10 Preventive Work Brigades carried out preventive forestry work in forests close to the surroundings of the BRIF bases. As noted, the BLPs also work from time to time in support of EPRIFs in the execution of prescribed burnings.

#### Human resources: Reinforcement Brigades against Forest Fire (*Brigadas de Refuerzo contra Incendios Forestales: BRIF*)

MAPAMA deploys five BRIF-i during the winter-spring campaign in the north and west of the Peninsula, and ten BRIFs during the summer campaign distributed throughout the national territory.

In the summer campaign the BRIFs are composed of three teams each comprising 2 supervisors and 14 specialists under the command of 1 technician. For transport and support for fire extinction they have two helicopters with 1 500 litres of capacity. In the Puerto del Pico (Ávila) aerial base a BRIF-B type brigade is available, which is smaller in size and similar to the brigades of the BRIF-i winter campaign, consisting of 7 specialists, 1 foreman and 1 technical staff equipped with a single 1 500 litre capacity helicopter.



Figure 72. BRIF Puerto el Pico in the fire of Navarredonda de Gredos 07/08/2017 (Ávila).



These highly specialized helicopter transport personnel units can operate anywhere in the country where needed. BRIF personnel receive continuous education and training that allows them to act in the most demanding situations and the most complicated fires. The mastery of all techniques of extinction, including backburning, is essential in its performance.

In the 2017 campaign, the BRIF worked for 5 617 hours in 455 fire interventions and extinguished a total front length of 420 272 metres. The BRIF with the highest activity during this campaign was that of Laza (Ourense) with a total of 84 interventions combining the summer and winter campaigns.

#### Aerial means

The MAPAMA has an aerial means deployment managed from the Forest Fire Spanish Service, which covers the national forest area throughout the year. During the two periods of greatest occurrence of forest fires, winter and summer campaigns, the number of available means is strengthened.

During 2017, the MAPAMA air forces carried out a total of 1 944 interventions in forest fire suppression, in support of the means of the respective autonomous communities. In total they flew for 6 641 hours, making 30 401 discharges.

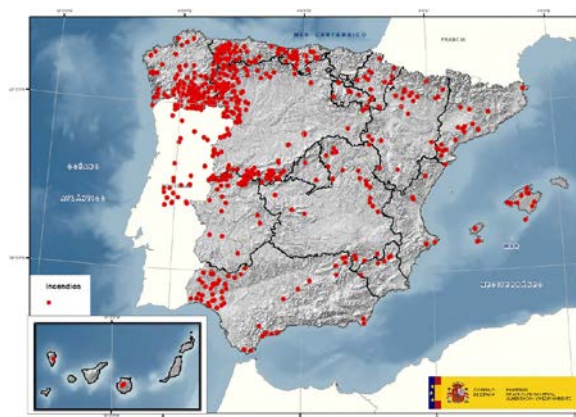


Figure 73. Location of air intervention actions made in 2017.

#### *Loss of human life*

Deaths and injuries are shown in Table 31. All fatalities were civilian personnel not included in the fire suppression services.

Table 31. Injuries and fatalities in Spain in 2017.

	<i>Fires &gt; 500 ha</i>	<i>Fires &lt; 500 ha</i>	<i>Total</i>
Number of deaths	3	4	7
Number of injuries	7	33	40



Figure 74. Performance of the Brif-Tineo Helicopter in the Degaña fire 11/10/2017 (Asturias).

*(Source: Ministry of Agriculture and Fisheries, Food and Environment, Forest Fire Spanish Service, Spain).*

## 2.2.26 Sweden

### Fire danger in the 2017 fire season

The forest fire risk was low in general but at the end of May there were some days with high danger, and under those days some of the largest forest fires this season occurred. At the end of the summer there was lower fire danger and more rainfall. Most of the major forest fires of 2017 took place rather early in the season, in May.

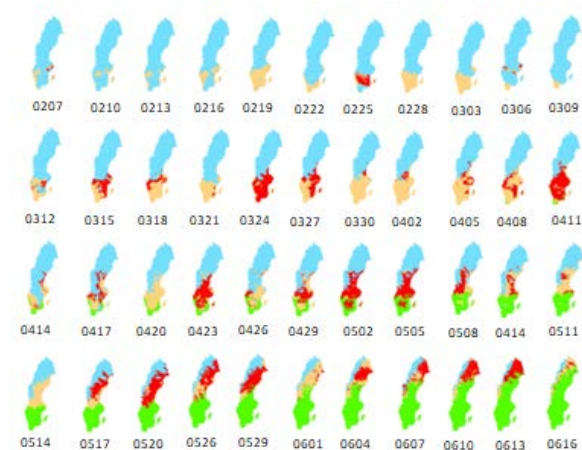
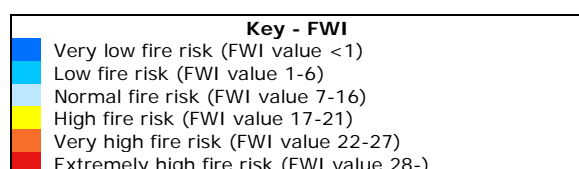
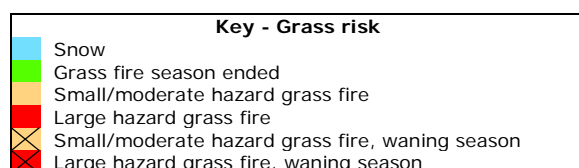


Figure 75. Maps of grass fire risk season 2017 shows periods of risk in combination with snow.



### Fire occurrence and affected surfaces

During 2017 the number of fires recorded was 5 276, burning 443 ha of forest land, 174 ha of other wooded land and 816 ha of other land.

The two largest fires occurred and started on the same day 28<sup>th</sup> of May. In the largest fire, where about 450 ha of other land burned, the fire started in a peat bog area and was spread rather quickly from the open area to the forest around. The second largest fire affected about 160 ha of forest land, with most of high stand pine forest.

The monthly pattern of fire numbers and burnt areas in 2017 are shown in Figure 76.

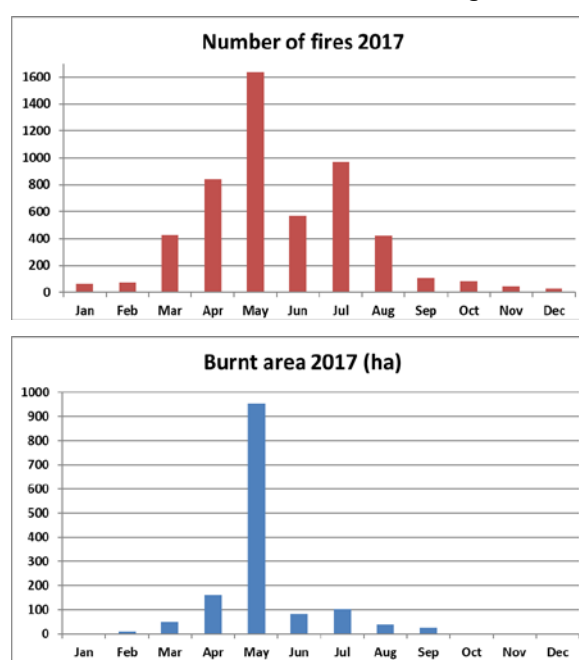


Figure 76. Total number of fires and burnt area (ha) by month in 2017.

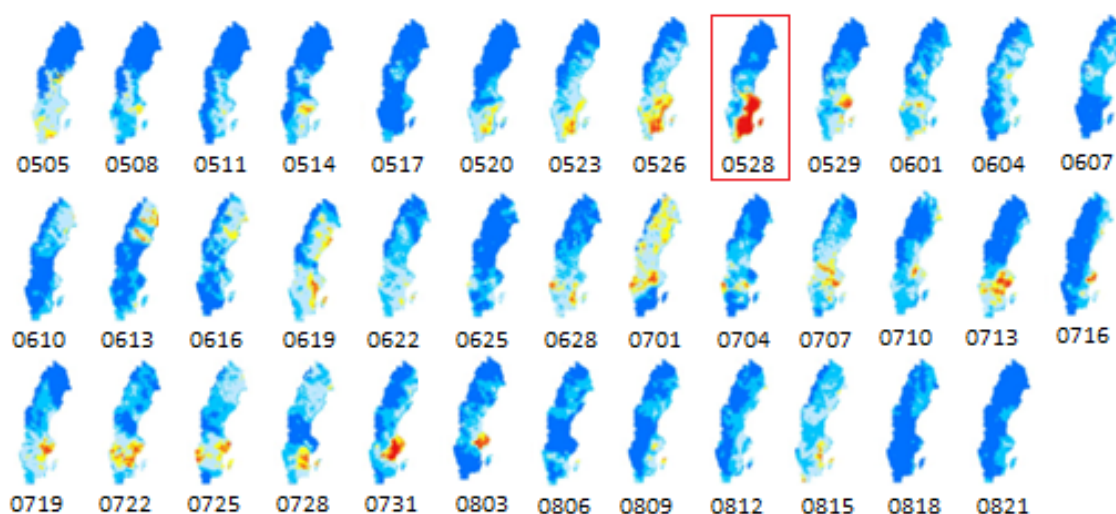


Figure 77. Maps of forest fire risk shows the low fire risk season 2017 from the FWI-index (Swedish normalised index). On 28<sup>th</sup> of May the two largest fires occurred and it was extreme high fire danger.



The burnt area, number of fires and average fire size for the years 1998-2017 are shown in Figure 78.

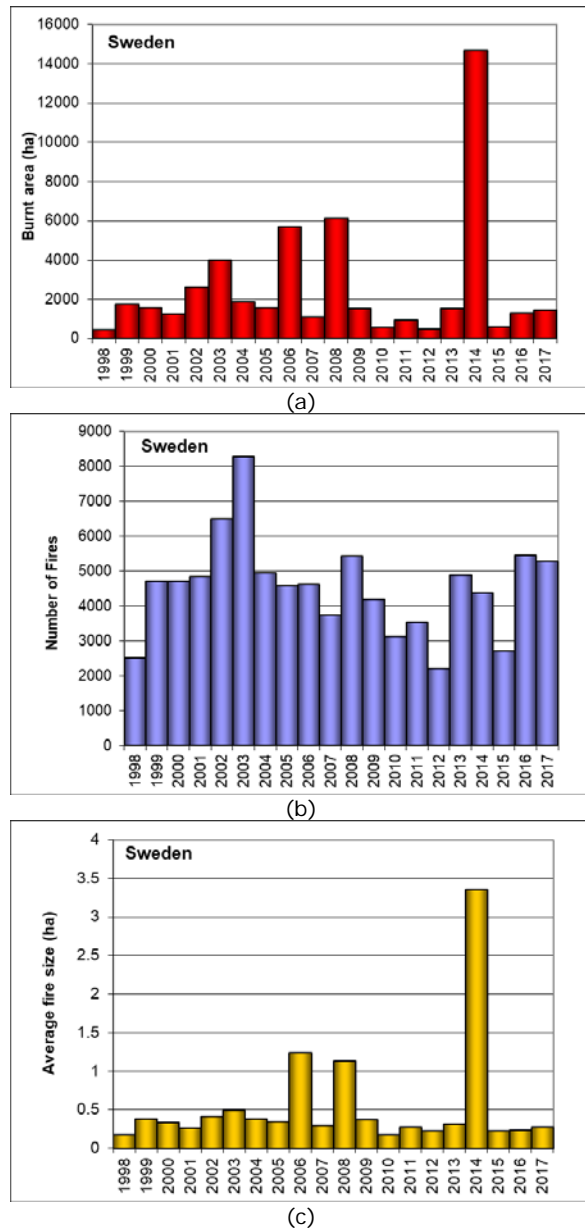


Figure 78. Burnt areas (a), number of fires (b) and average fire size (c) in Sweden from 1998 to 2017.

The following images show the largest fire of the season. The fire started on the 28th of May at a peat bog area and spread over the open area to the forest around and to other peat areas with dry and burnable vegetation. Fires in the forest around the peat bog were smouldering in the ground. The fire affected about 450 ha.



(Photo credits: Leif Sandahl, Sweden).





(Photo credits: Leif Sandahl, Sweden).

The other fire on 28th of May occurred in mostly high standing forest with pine. Most of the trees have been harvested after the fire. The fire affected about 160 ha.

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

## 2.2.27 Switzerland

### *Weather conditions and state of the forests 2017*

On average, 2017 was 0.8°C warmer than the mean average 1981 to 2010. This corresponds to the 6th warmest year since the beginning of measurements in 1864. Intra-annual variations were a mark of 2017.

January 2017 was very rigorous. Under the fog in the North of the Alps, January 2017 was the coldest month of January of the past 30 years. During January, constant high-pressure systems led to a lack of precipitation for that month. February on the contrary was warmer than the mean average temperature. In the last third of February, Switzerland experienced temperatures of 17° to 20°C in the Midlands, which is very high for the season. February was also particularly dry with the exception of southern areas. A lack of snow was perceptible at higher elevation. Overall, March was also mild. Locally, the average temperatures were up to 4°C higher than the mean March temperatures. March was very sunny, dryer than usual in many areas.

April was mild and sunny too, despite changing conditions at the beginning of the month. Vegetation responded consequently and started sprouting very early. At the end of the month however, cold northerly air masses arrived in Switzerland so that the forests experienced late frost events even at low elevation. On northern alpine slopes, snowfall built up a fresh snow layer of about 20-35cm, locally even 40-15cm. As from the middle of May warm summer temperatures were recorded. On May 24th, the first day reaching 30°C was recorded leading to subsequent strong thunderstorm events.

June was overall very warm and a "little heatwave" with temperatures around 33°C was recorded roughly during the last 10 days of the month. Southerly thunderstorms generated heavy precipitation at the very end of June leading to landslides and flooding. Stable summer weather conditions ended with July. Despite some warm and sunny spells, weather conditions were variable, with heavy thunderstorms leading locally to new flooding and landslides. On August 1st, a strong thunderstorm event with hail and gust of wind of about 90-135km/h occurred in northeast Switzerland. Gusts up to 190km/h were measured locally. Consequently, significant wind throws occurred in those areas.

On average, temperatures in June, July and August were above the mean annual summer temperatures in Switzerland. Summer 2017 was the 3rd warmest summer since the beginning of measurements, after 2003 and 2015. Due to active thunderstorms, precipitation sums varied drastically between the regions, though Switzerland experienced drier conditions in northern areas in June and in July in southern areas.

With the exception of two sunny autumn spells, September was overall cool and variable. The snowfall limit dropped twice between 1100m and 1300m asl in the mountains, which is very early. Also the beginning of October was variable and cool. As from October 10th an "Indian Summer" spell installed due to a high pressure system over central Europe, contrasting with variable and unstable conditions in November. Subsequent high-pressure systems led to thick fog events in the Midlands by the middle of November and around Christmastime. Snowfall occurred several times in November at lower elevations in northern areas, whereas Foehn winds occurred in southern alpine areas, drying out the understories.

In December, significant amounts of snow occurred even at low elevation in southern Switzerland so that snow was present all over Switzerland at Christmastime. (*Source: MeteoSwiss 2017*).

### *Fire occurrence and affected surfaces*

In 2017, Switzerland recorded fires and fire starts in the Cantons of Berne, Jura, Grisons, Lucerne, Neuchâtel, Sankt-Gallen, Schaffhausen, Schwyz, Ticino, Uri and Zurich in the SwissFire database.

A total of 110 forest fires were registered in 2017 (as reported by May 2018), burning 118 hectares, which corresponds to mean occurrences in term of frequency, and low average loss of forest surfaces compared to the yearly average since 1980. Average fire size was 1.1 ha (Figure 79).

55% of the fires happened during the winter season (November to April), when 89% of the burned surface occurred (Figure 80).

### *Fire Causes*

The main cause of fires in Switzerland remains neglect. No loss of life or major damage to buildings were reported in 2017. (*Source: WSL Federal Research Institute*).



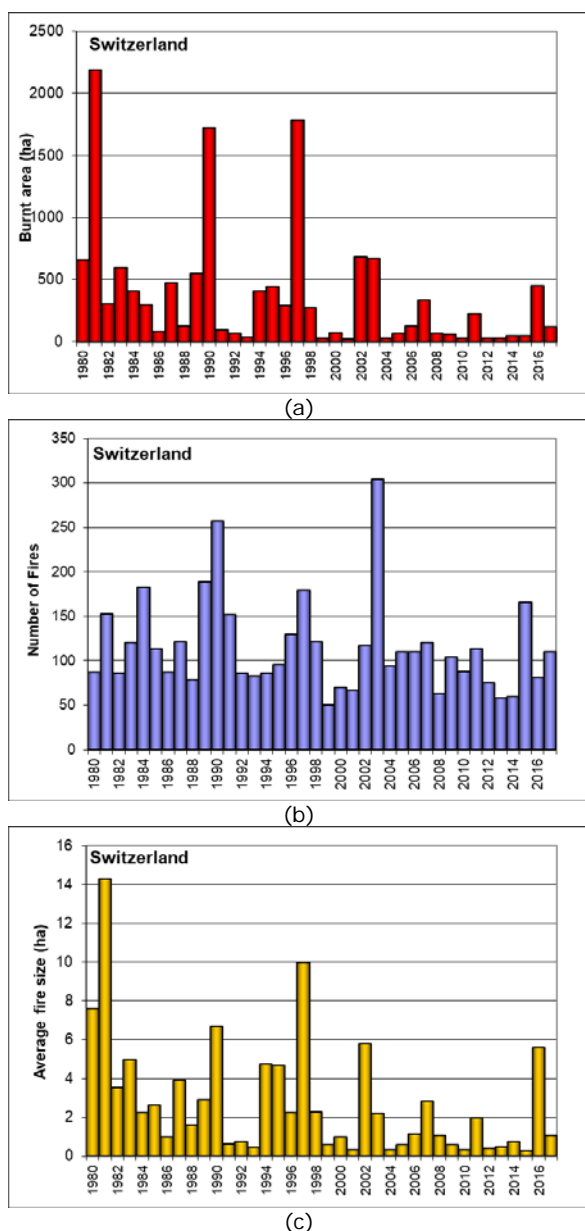


Figure 79. Burnt areas (a), number of fires (b) and average fire size (c) in Switzerland from 1980-2017.

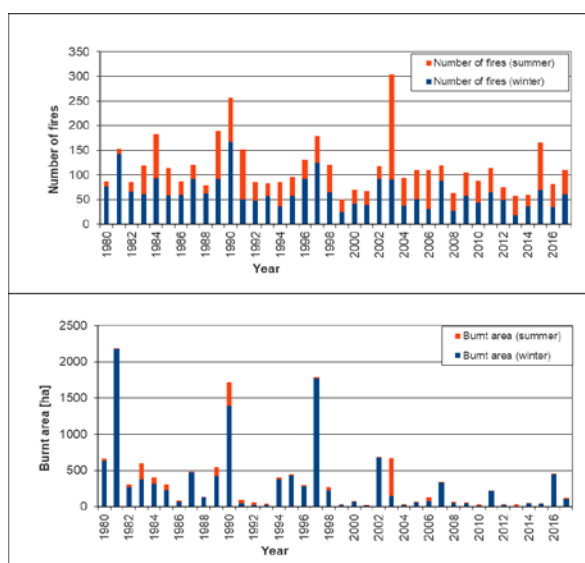


Figure 80. Summer vs winter fires in Switzerland.

### Fire prevention activities

Prevention and information are in the focus of the federal forest fire prevention strategy in Switzerland. It relies on the close collaboration of the Cantons (States) with the Confederation (Federal state). In accordance with the alternating wet weather conditions, 2017 was overall a “quiet” year for fire prevention, with the exception of southern Switzerland. After a dry beginning, Switzerland did experience as usual a danger peak by the end of winter and the beginning of spring in southern Switzerland. The critical situation in autumn (October-November) was unusual.

Because of the dry winter conditions at the end of 2016, 2017 started with calls that care should be taken when lighting fires in the forests and in the proximity of the forests in many regions. In southern Switzerland (Grisons and Ticino), fire bans were decreed at the very beginning of January, lasting up to February. At the end of February a new ban was decreed for a week again, when rainfall and winter temperature made it possible to deactivate the measure. However, the dry conditions that followed led to new fire bans in these areas for a new week. This dynamic situation was exceptional, since bans are usually decreed only for long-lasting periods.

Grisons and Ticino decreed absolute fire bans in southern Switzerland in April. During the same period and due to the weather-conditions, forest authorities in northern alpine areas issued many calls that care should be taken when lighting fires in the forest and in the proximity of the forest. Local authorities throughout the country issued the same calls during the “little” heat wave at the end of June. The unusual dry spell that occurred in autumn with the “Indian Summer” forced the forest authorities in Southern Switzerland to decree absolute fire bans for three weeks, lasting up to the beginning of November. This was a particularly tricky period since trees had shed their leaves and a significant amount of easily flammable litter was available on the forest grounds.

Media reported much information about forest fires around the world in 2017 again. The presence of this topic helps awareness raising within the population. The national website ([www.forest-fire-danger.ch](http://www.forest-fire-danger.ch)) has again registered a high number of visits, indicating the need for such platforms for the population and the media. (Source: FOEN, Federal office for the environment).

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

## 2.2.28 Turkey

### *Fire occurrence and affected surfaces*

According to data derived from the General Directorate of Forestry, Department of Forest Fire Combating, in 2017 the total burnt area was 11 992.76 hectares. The number of fires was 2 411 in the same year.

In Turkey, the coast-line, which starts from Hatay and extends through the Mediterranean and Aegean up to Istanbul, has the highest fire risk. In another words, approximately 57% (12.5 million ha) of Turkey's forest area is located in fire sensitive areas.

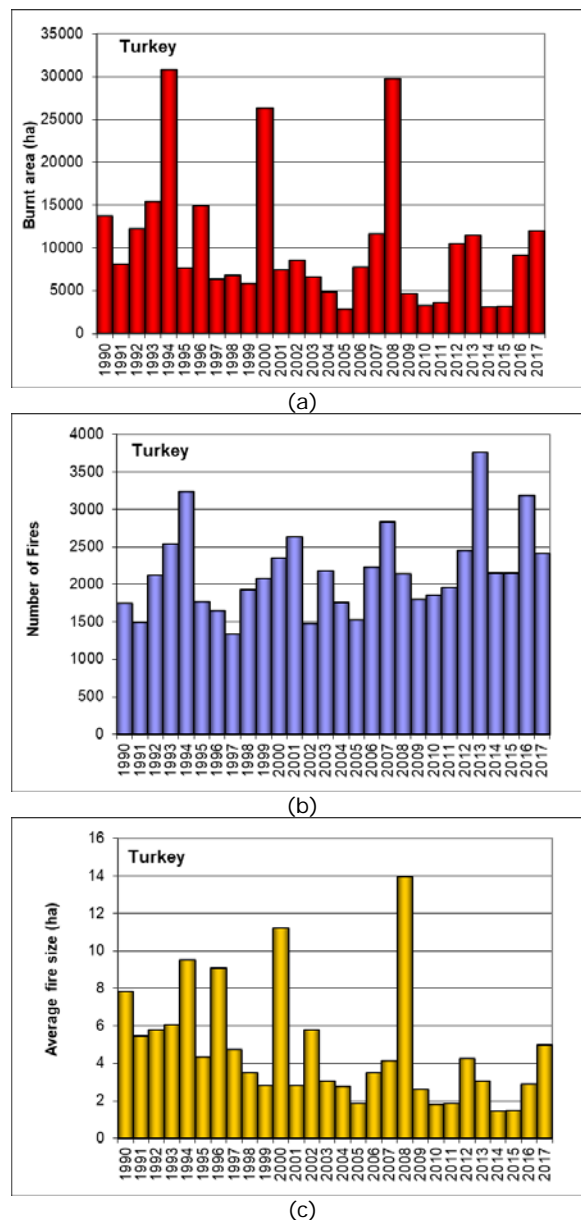
Forest fires mostly occurred during the period of April-November, particularly in June, July, August and September. When we look at the number of forest fires, we see that September ranked the highest with 572 fires, but in terms of burnt area, July was the highest with 4487.2 ha. (See Table 33). 92% of the forest fires occurred in four months (between June to September) and 11 063 hectares of forest area were damaged in this period.

Table 32 gives the forest fire statistics for Turkey 1990-2017.

Table 32. Forest fires in Turkey 1990-2017.

Year	Fire Number	Burnt Area (ha)
1990	1750	13742
1991	1481	8081
1992	2117	12232
1993	2545	15393
1994	3239	30828
1995	1770	7676
1996	1645	14922
1997	1339	6317
1998	1932	6764
1999	2075	5804
2000	2353	26353
2001	2631	7394
2002	1471	8514
2003	2177	6644
2004	1762	4876
2005	1530	2821
2006	2227	7762
2007	2829	11664
2008	2135	29749
2009	1793	4679
2010	1861	3317
2011	1954	3612
2012	2450	10455
2013	3755	11456
2014	2149	3117
2015	2150	3219
2016	3188	9156
<b>2017</b>	<b>2411</b>	<b>11992</b>

The yearly trends in terms of numbers of fires and burnt areas in Turkey since 1990 are shown in Figure 81.



Fortunately, around 93.7% of the fire incidents were controlled before spreading. There were only four fires bigger than 500 hectares (totalling 4 495 ha), there were 9 fires between 200-500 ha (totalling 2 796 ha) and there were 18 fires between 500-2000 hectares (totalling 1 586 hectares) as shown in Table 35.

Table 33. Monthly distribution of forest fires in Turkey 2017.

Month	Number Of Fires	Burnt Area (Ha)
Jan	32	37.9
Feb	105	70.4
Mar	142	97.8
Apr	134	240.8
May	123	68.6
Jun	150	2209.6
Jul	442	4487.3
Aug	429	1070.9
Sep	572	3295.4
Oct	182	176.0
Nov	52	158.4
Dec	48	79.2
<b>TOTAL</b>	<b>2411</b>	<b>11992.7</b>

### *Firefighting means and information campaigns*

#### Fire Management

Fire management in Turkey is carried out under the responsibility of the General Directorate of Forestry (GDF). Duties are carried out by state forest enterprises functioning under regional directorates. Regardless of the high costs involved, all required activities are planned and implemented immediately. Fire management deals mainly with activities concerning early detection, prevention and control.

#### *Fire Causes*

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

These areas are:

- High populated areas
- Areas of high migration
- Areas where there are valuable lands
- Places with cadastral problems
- Tourism areas

Most of the fires in Turkey were caused by human activities (89% in total) The causes of forest fires in 2017 are shown in Figure 82.

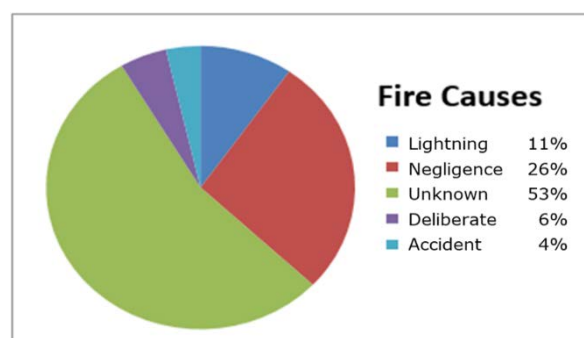


Figure 82. Fire causes in Turkey in 2017.

### Firefighting Means

In addition to forest fires, the General Directorate of Forest has been intervening in agriculture fires for recent years, which is about 4 786 non-forest incidents in 2017.

In 2017, 3 000 technical staff, 5 000 forest preservation officers and 12 000 workers were involved in detection, communication and suppression efforts. Ground and air equipment used for firefighting in 2017 are presented in Table 34.

Table 34. Firefighting forces in Turkey in 2017.

<b>Land Means</b>		<b>Aerial Means</b>	
Bulldozer	186	Leased Helicopter	24
Grader	179	Amphibious Aircraft	5
Fire Truck	1010	Administrative helicopter	6
Water Tank	281		
First intervention vehicle	559		
Motorcycle	856		

### Education, Public awareness and information campaigns.

Several education/training and awareness raising campaigns have been carried out.

#### Training of Technicians

Information has been given to technicians about the use and maintenance of tools used to combat forest fires, such as 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.

#### 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.

In 2012 the International Forest Fire Fighting School was opened in Antalya. The facilities provided training to forest fighting teams at national and international level with a forest fire simulator (Figure 83).





Figure 83. Forest Fire Fighting Simulator in Antalya International Training Centre.

### 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 2017, conferences were held, plays were staged by Sincap Children's 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.

#### 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.

### Construction of Pools and Ponds

During 2017, for the purpose of shortening the periods of forest fire attack in forested areas where water sources are scarce, 3 041 fire pools and ponds were constructed and will continue to be constructed (Figure 84).



Figure 84. Fire pool.

### Forest Fires Early Fire Warning System

So far, a total of 776 fire towers have been built to detect fire and report to firefighting teams. With 230 cameras at 115 points, the fires detected in our forests in the fire sensitive zone are reported to the fire management centres and the teams are sent. The system enables rapid detection of forest fire to visible range optical cameras (Fire management centres can also monitor the progress through these cameras).

With the fire watch towers, our forests are monitored 24 hours a day. The automatic early warning system analyses the smoke and reports it to the centre within 15 seconds. There are also 15 unmanned smart towers in our forests.

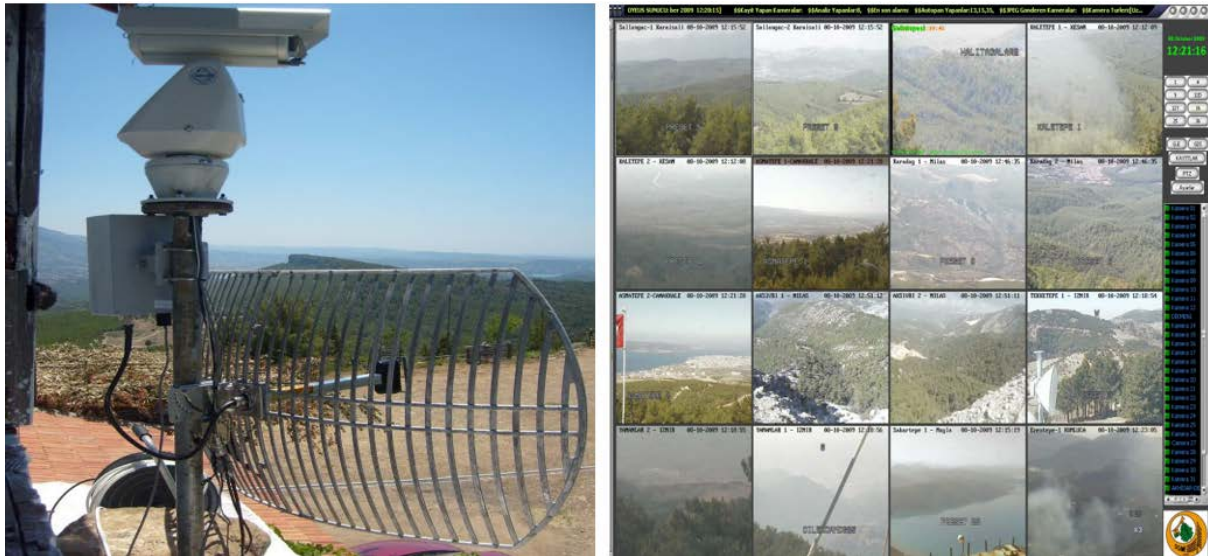


Figure 85. The early warning system for detecting forest fires and automatic fire-finding systems established and put into service via a joint project among GDF, Bilkent University and Scientific and Technological Research Council of Türkiye(TÜBİTAK) for a decade.

230 units cameras in 115 Fire Lookout Towers are being used for fire detection.

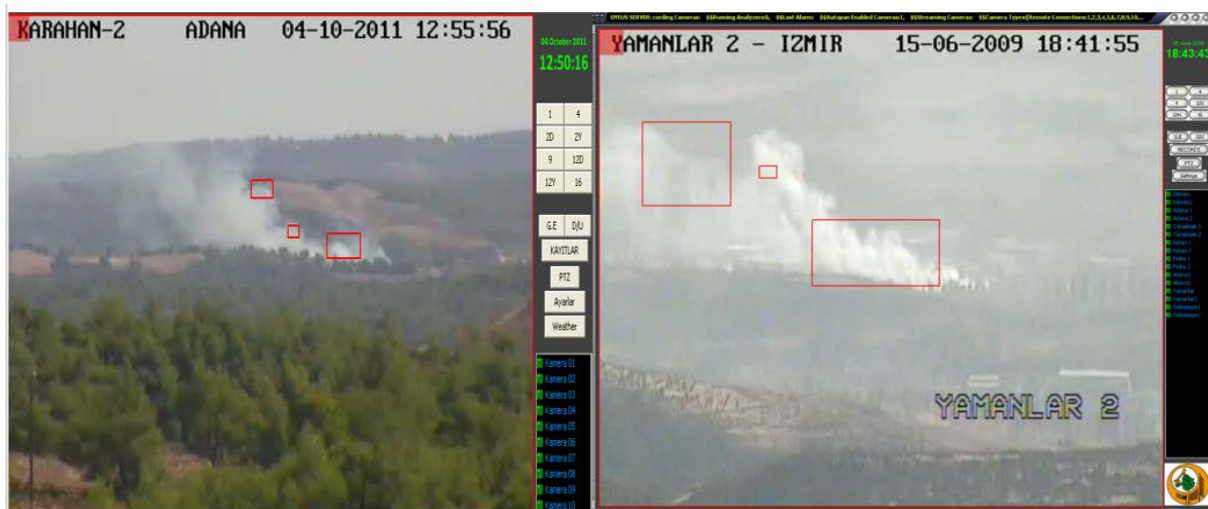


Figure 86. As soon as a fire is detected by RSS, 28 Fire Management Centres have been reported in 15 seconds.

### Forest Fire Risk Maps

#### Monthly

We have just started using our monthly fire risk maps. These maps are not based only long-term statistics, but also include trend analysis for the last 10 years (Figure 87).

#### Daily (3-days)

We have been using MEUS (meteorological early warning system) with wind, wind direction, temperature and humidity to create our 3-days daily fire risk maps (Figure 88).





Figure 87. Monthly risk map for May 2018.

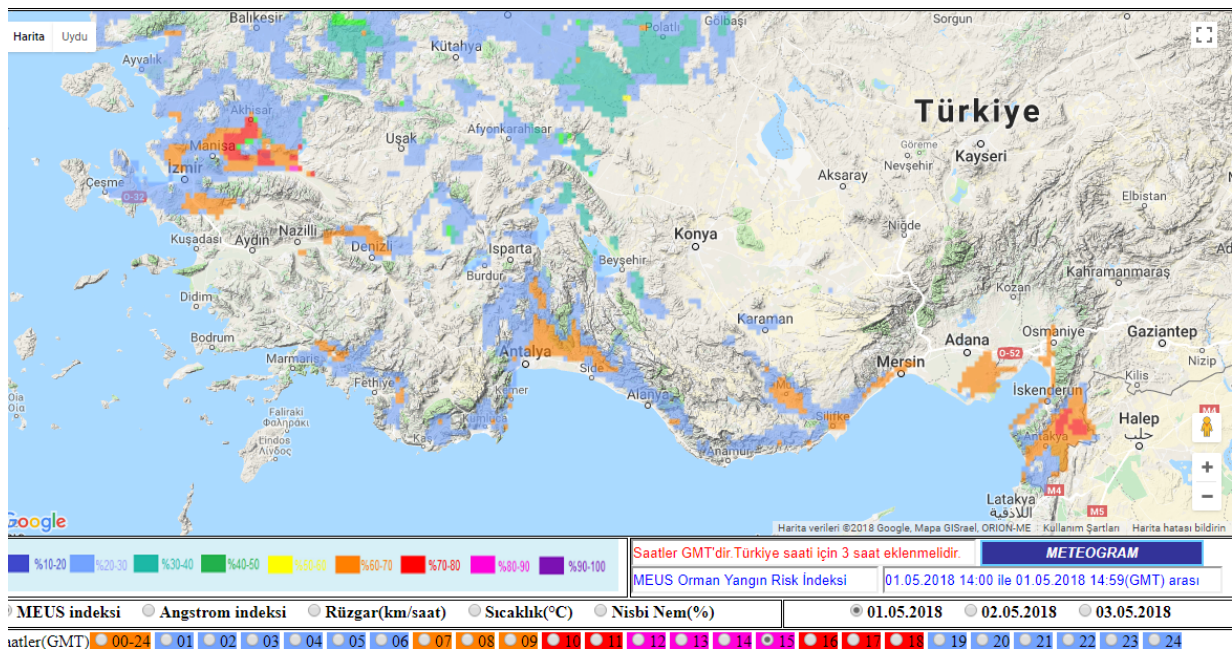


Figure 88. Daily forest fire risk for 01/05/2018.

### National Forest Fire Risk Estimations in Turkey

We use yearly, monthly and 3-days Forest fire risk estimations and risk maps (Figure 89).

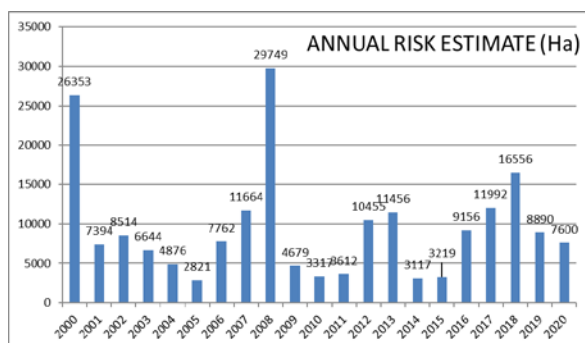


Figure 89. Yearly forest fire risk estimate.

Our yearly risk estimation is based on a strong relationship between solar activity cycle and yearly burnt areas (Figure 90).

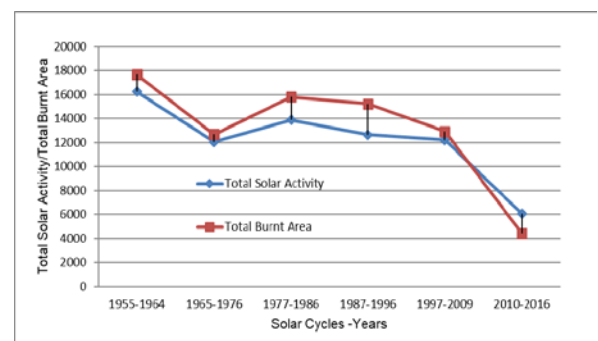


Figure 90. Relationship between solar activity and burnt area.

## Preventive measures

### Fire sensitive Regional Forest Directorates

- Planting fire resistant species when rehabilitating burnt areas.
- Converting existing forest to fire resistant forest. (YARDOP Project: Rehabilitation of Burned Areas and the Establishment of Forest with Fire Resistant Species Projects).
- Creating differential elements (roads etc.) in order to stop probable fires from settlements and agriculture lands going towards forest.
- Planting fire-resistant species along roadsides in order to hinder forest fires from turning into crown fire.

Table 35. Number of fires and burnt area in 2017 by forestry regions and fire size class.

Region	<1.0 Ha		1.1 - 5.0 Ha		5.1 - 20.0 Ha		20.1 - 50.0 Ha		50.1 - 200.0 Ha		200.1 - 500.0 Ha		> 500. Ha		TOTAL	
	Nr Fire	Brt Area	Nr Fire	Brt Area	Nr Fire	Brt Area	Nr Fire	Brt Area	Nr Fire	Brt Area	Nr Fire	Brt Area	Nr Fire	Brt Area	Nr Fire	Brt Area
ADANA	134	22.5	11	23.1	5	55.5			1	60.0					151	161.1
AMASYA	50	22.3	24	57.0	4	33.2	1	25.0							79	137.5
ANKARA	82	22.7	14	38.7	2	31.0									98	92.4
ANTALYA	240	45.2	22	46.1	7	61.3	1	45.0	1	147.5	1	335.1	1	2069.9	273	2750.1
ARTVİN	9	2.7	2	2.7											11	5.4
BALIKESİR	43	9.3	7	15.6	5	50.5			1	92.3					56	167.7
BOLU	23	8.4	5	11.5	1	9.2					1	250.0			30	279.1
BURSA	52	12.1	9	21.6					2	220.0					63	253.7
ÇANAKKALE	35	87	7	15.4	1	5.6					1	290.1			44	319.9
DENİZLİ	35	15.2	9	20.8							1	408.0			45	444.0
ELAZIĞ	36	13.9	6	12.5											42	26.4
ERZURUM	36	20.0	22	69.4	11	131.2	6	206.5	3	233.0	1	241.2			79	901.3
ESKİŞEHİR	26	7.2	5	14.2	1	9.0	1	45.0							33	75.4
GİRESUN	25	11.3	8	20.4	3	28.9									36	60.7
ISPARTA	49	8.0	2	3.0	2	20.7			1	71.6					54	103.3
İSTANBUL	165	20.5	8	18.3											173	38.8
İZMİR	202	43.1	21	51.5	5	36.8			2	158.6	1	202.0	2	1530.0	233	2022.0
K.MARAŞ	150	42.3	23	56.3	8	75.5	2	75.0							183	249.1
KASTAMONU	87	28.2	18	41.7	3	33.6									108	103.5
KAYSERİ	19	10.8	16	50.5	3	43.0									38	104.3
KONYA	9	2.4	4	9.1											13	11.5
KÜTAHYA	43	7.8	3	7.3							2	845.0			48	860.1
MERSİN	48	12.9	4	11.6	1	8.2							1	895.0	54	927.7
MUĞLA	212	44.0	16	47.4	1	6.0	2	46.0	1	73.6	1	225.0			233	441.9
SAKARYA	46	13.9	3	7.2					1	61.0					50	82.1
Ş.URFA	9	5.5	32	90.7	23	237.0	11	332.0	5	468.2					80	1133.4
TRABZON	12	6.7	18	47.7	6	57.3	2	55.0							38	166.7
ZONGULDAK	59	14.8	4	9.6	2	29.0	1	20.1							66	73.5
<b>TOTAL</b>	1936	482	323	821	94	963	27	850	18	1586	9	2796	4	4495	2411	11992.4
<b>%</b>	80.3	4.0	13.4	6.8	3.9	8.0	1.1	7.1	0.7	13.2	0.4	23.3	0.1	37.5	100	100

### Operations of mutual assistance

In 2017 in response to requests for assistance, Turkey sent three amphibious aircraft for forest fires in other countries.

(Source: Regional Forestry Directorate of Antalya, Turkey).

## 2.2.29 United Kingdom

### *Introduction*

Further to the changes in governance for managing fire and rescue services (FRS) announced in last year's report, it is still not yet possible to gain access to wildfire statistics from Incident Recording System data for Great Britain, gathered at the time of firefighting by FRS staff. The UK report for 2017 is therefore based on qualitative information submitted by representatives from the four devolved UK countries.

In the UK, wildfires are often most prevalent in spring when there are dry fine fuels from dead vegetation after winter freezing and drying, and during hot summers. Increased rainfall before warm, dry periods can also cause rapid vegetation growth that can increase the risk of wildfires when the vegetation later dries. These conditions provide the ideal environment for the development and spread of large and destructive wildfires.

### *Fire danger in the 2017 season*

According to the UK Met Office, 2017 as a whole was rather warmer than average for the UK. The months from February to June were all warmer than average, whereas the second half of the year saw temperatures nearer to average apart from a warm October. UK-average anomalies in February, March, May, June and October were all well above +1 °C, and mid-June saw a significant hot spell with the highest temperatures in that month for over 40 years. Unusually, this brought temperatures above 30 °C somewhere in the UK for five days in a row. Most places were within 10% of the yearly average for rainfall; it was rather drier across central and northern Scotland and many central and southern parts of England, but somewhat wetter in west Wales and north-west England.

As a consequence of the 2017 weather conditions, there were many more wildfire events across UK as a whole compared to 2016, and some were categorised as major incidents. Wildfires were recorded from most parts of the UK, and many started in natural or semi-natural vegetation, often in areas designated as nature reserves or National Parks, rather than woodland or forest.

In Northern Ireland, following the driest April since 1980, similar conditions continued into early May, with a series of fires which commenced around 6th May and continued until 12th May, primarily in the county of (East) Fermanagh. There were other incidents in Antrim, Tyrone, Armagh and West Fermanagh. The Northern Ireland Fire & Rescue Service reported that 983 gorse fires were extinguished in May, with over 90% considered to be started deliberately. Over 1 100 hectares of the forest estate were affected by fire with the majority in open moorland on the Slieve Beagh SPA which borders counties Fermanagh, Tyrone & Monaghan. There were five fires which damaged plantations resulting in approximately 45 hectares being destroyed, mainly in East Fermanagh.

In Wales, grass and bracken fires occurred as early as March 2017, with some extending into neighbouring forest. A large fire of some 800 hectares took place in Brecon Beacons National Park in April.

In Scotland, there were a number of significant incidents, including wildfire on moor and grassland south of Inverness, and another large heather wildfire in Spittal in the Highlands. It is not clear whether forests were destroyed in these or other Scottish fires. Similarly, information for England is patchy though significant wildfires were recorded in southern England, especially at Easter, and noteworthy fires occurred as late as December.

### *Fire prevention activities and information campaigns*

Following a very large number of arson-induced wildfires in Wales in 2015, the Wales Strategic Arson Reduction Board (WSARB) developed a new strategy that broadened the responsibility for arson reduction activity in Wales to a range of multi-agency partners. A consequence of this approach has been a reported reduction in deliberate fire setting incidents - overall, 44% fewer fires were reported in 2017 compared to 2015. The WSARB has suggested that engaging with young people has been key to reducing numbers, and it also worked with landowners and farmers to try to reduce the number of illegal controlled burns or ones which accidentally got out of hand.

However, the size of the fires has increased owing to changes in land management, and this has led to the purchase of specialised equipment and training in order to undertake more prescribed and operational burning.

In Northern Ireland, too, there has been a new initiative, Operation WildFire, launched in 2017, to bring together experts from the Northern Ireland Environment Agency (NIEA) the Police Service and the Northern Ireland Fire & Rescue Service (NIFRS) to investigate in more depth a number of the recent wildfires. They will be assisted by a team of international wildfire investigators from the European Forest Institute and European Forest Risk Facility (FRISK).

### *Training events*

Wildfire training has become an important part of managing wildfire risk. In 2017, there were a number of national events, and international events with UK participation. These included:

- (a) "Operation Kingwater" at RAF Spadeadam, Cumbria on 28th February 2017,
- (b) "Planning for Wildfire" event in Northumberland in October 2017" which provided advice and guidance to farmers, land managers, gamekeepers and local agencies on how to prepare and plan for wildfires",
- (c) Wildfire Prevention Workshop, Thursley Common, Surrey, 17th May 2017,
- (d) an international wildfire simulation training exercise held in Northumberland, 12th to 16th June 2017,
- (e) "Operation Corsican Pine", Ashdown Forest, East Sussex on 11th October 2017, and
- (f) participation in a number of European training events in Barcelona, Spain.

Further to guidance on wildfires described in last year's report, the National Operational Guidance Programme for the UK fire and rescue service (<https://www.ukfrs.com/>) issued several new online resources during 2017. These include: emergency response plans, provision of supervision, public health protection, wildfire prediction, and protection of ecological and heritage assets. All are updated online as necessary.

In November 2017, more than 130 delegates from 10 countries participated in a successful National Conference in Bournemouth entitled "Wildfire Resilience in a UK Context". The event focused on how to make UK homes, communities and the landscape more wildfire resilient in the future. Climate change predictions suggest that the UK will see more extreme wildfire weather and the conference sought to make the UK better prepared should these predictions come true.

Further information can be found at:

<https://www.dorsetforyou.gov.uk/countryside-coast-parks/dorset-heaths/pdfs/uk-wildfire-resilience-2017.pdf>

(Source: Forest Research, UK).



## 2.3 Comparison of Southern EU countries with longer time series (1980-2017)



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

Figure 91a shows the total burnt area per year in the five large 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.

The total burnt area in 2017 was 920 622 ha (Figure 91a), the highest amount recorded since 1985. Much of this increase came from Portugal, whose burnt area total was over half a million hectares. Spain, Italy and France also had worse than average years, and only Greece recorded a relatively low burnt area.

Figure 91b 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 decade a decrease was observed to a low point in 2014. The last 3 years have seen numbers rising slightly again, and it remains to be seen if this is a short term aberration or a new trend. The numbers of fires in 2017 were higher than 2016 for all countries but still below long term averages. (see Table 36 and Annex 1 for details).

Figure 91c 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). However, it is also largely due to the improvements of the fire protection services of the countries.

In 2017 the average fire size was significantly higher than the long term average, and the third highest ever recorded (comparable with figures recorded in the early 1980s), mostly as a result of the extremely large fires in Portugal.

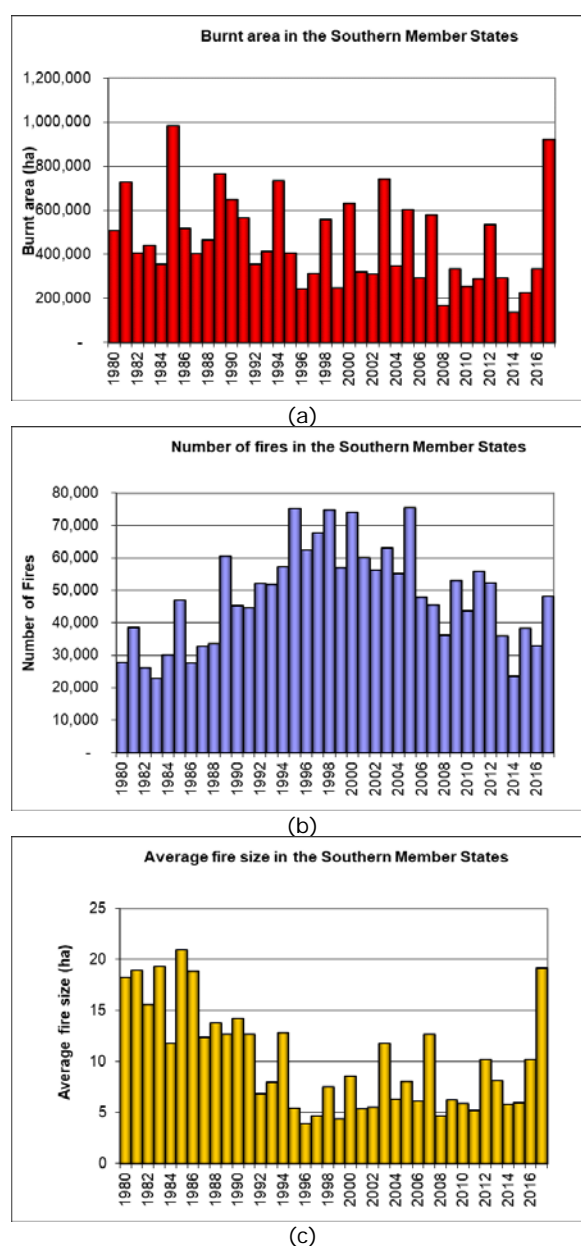


Figure 91. Burnt area (a) number of fires (b) and average fire size (c) in the five Southern Member States for the last 38 years.

Figure 92 compares the yearly averages of burnt areas, number of fires and average fire size for the periods 1980-89; 1990-1999, 2000-9 and 2010-2017 with the figures for 2017. It shows each of the 5 countries separately and also their total.

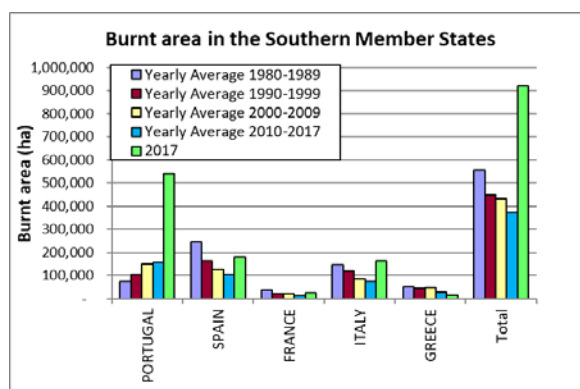
Table 36 gives a summary of the burnt areas and number of fires for the last 38 years, the average for the 1980s, the 1990s and the 2000s, and the average for the last 7 years, together with the figures for 2017 alone.

The total number of fires was higher than the average of the last decade, although not by much. However, the burnt area in 2017 was significantly above the average of the last decades, mostly as a result of the fire season in Portugal, which was substantially worse than that experienced by the other four countries (Figure 92b). This also had an effect on the average fire size, which is higher than in previous decades.

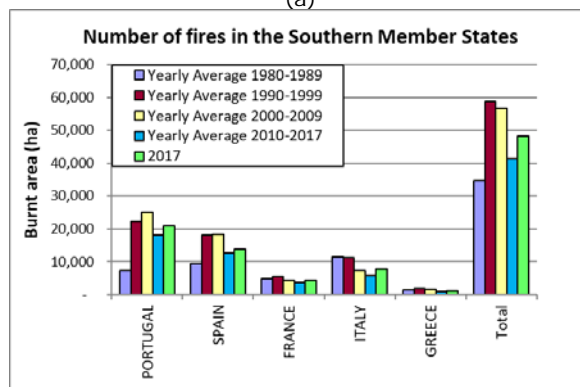
Figure 93 shows the contribution of each of the five Member States in terms of burnt areas and number of fires to the overall figures for all five countries in 2017.

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 provisional and are likely to be an under-representation of the true figure, which also affects the figures for average fire size and leads to an inflated figure for average fire size in Greece.

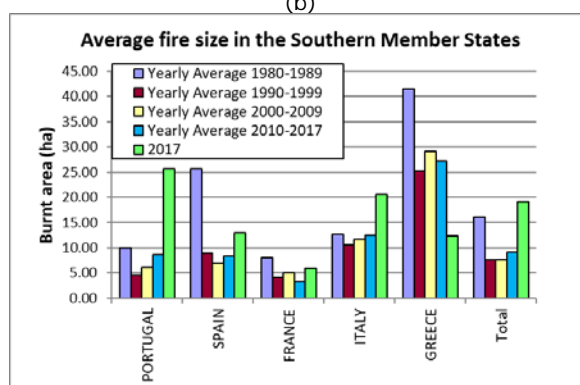
In 2017 the relative proportions of the numbers of fires in the 5 countries was quite similar to previous years, but Portugal had a much greater share of the burnt area: 59% the total (compared with 28% in 2015 and 50% in 2016).



(a)

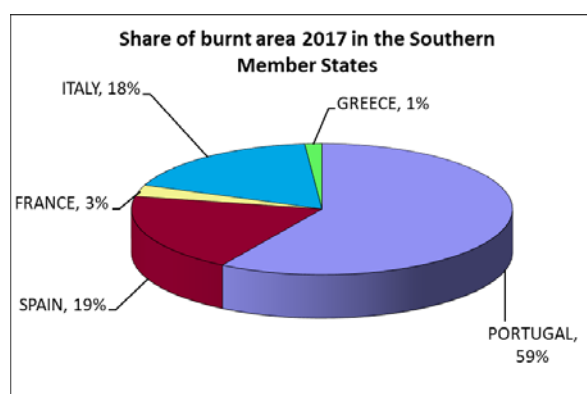


(b)

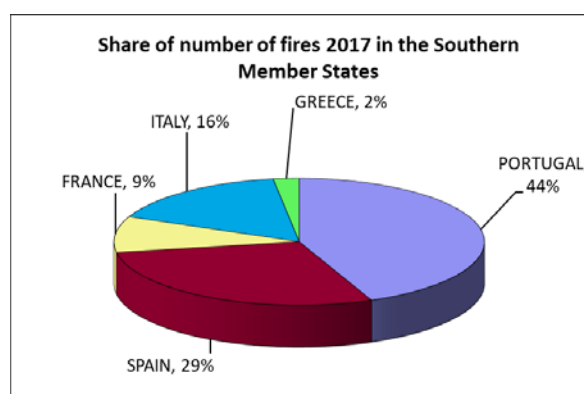


(c)

Figure 92. Burnt areas (a), number of fires (b) and average fire size (c) in the five Southern Member States in the year 2017 as compared with average values for previous decades.



(a)



(b)

Figure 93. Share of the total burnt area (a) and the total number of fires (b) in each of the Southern Member States for 2017.

Table 36. Number of fires and burnt area in the five Southern Member States in the last 37 years.

<i>Number of fires</i>	PORTUGAL	SPAIN	FRANCE	ITALY <sup>(*)</sup>	GREECE <sup>(*)</sup>	TOTAL
<b>2017</b>	<b>21 002</b>	<b>13 793</b>	<b>4 403</b>	<b>7 855</b>	<b>1 083</b>	<b>48 136</b>
% of total in 2017	44%	29%	9%	16%	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 2000-2009	24 949	18 369	4 418	7 259	1 695	56 690
Average 2010-2017	18 112	12 572	3 776	5 828	1 001	41 289
Average 1980-2017	18 176	14 761	4 707	9 121	1 449	48 215
<b>TOTAL (1980-2017)</b>	<b>690 700</b>	<b>560 928</b>	<b>178 865</b>	<b>346 602</b>	<b>55 066</b>	<b>1 832 161</b>

<i>Burnt areas (ha)</i>	PORTUGAL	SPAIN	FRANCE	ITALY <sup>(*)</sup>	GREECE	TOTAL
<b>2017</b>	<b>540 630</b>	<b>178 234</b>	<b>26 378</b>	<b>137 103</b>	<b>13 393</b>	<b>895 738</b>
% of total in 2017	59%	19%	3%	18%	1%	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 2000-2009	150 101	127 229	22 362	83 878	49 238	432 809
Average 2010-2017	157 052	104 502	12 019	72 945	27 198	373 715
Average 1980-2017	118 797	162 352	24 702	107 357	44 084	457 293
<b>TOTAL (1980-2017)</b>	<b>4 514 300</b>	<b>5 991 140</b>	<b>938 687</b>	<b>4 079 562</b>	<b>1 675 209</b>	<b>17 377 132</b>

(\*)Provisional figures.

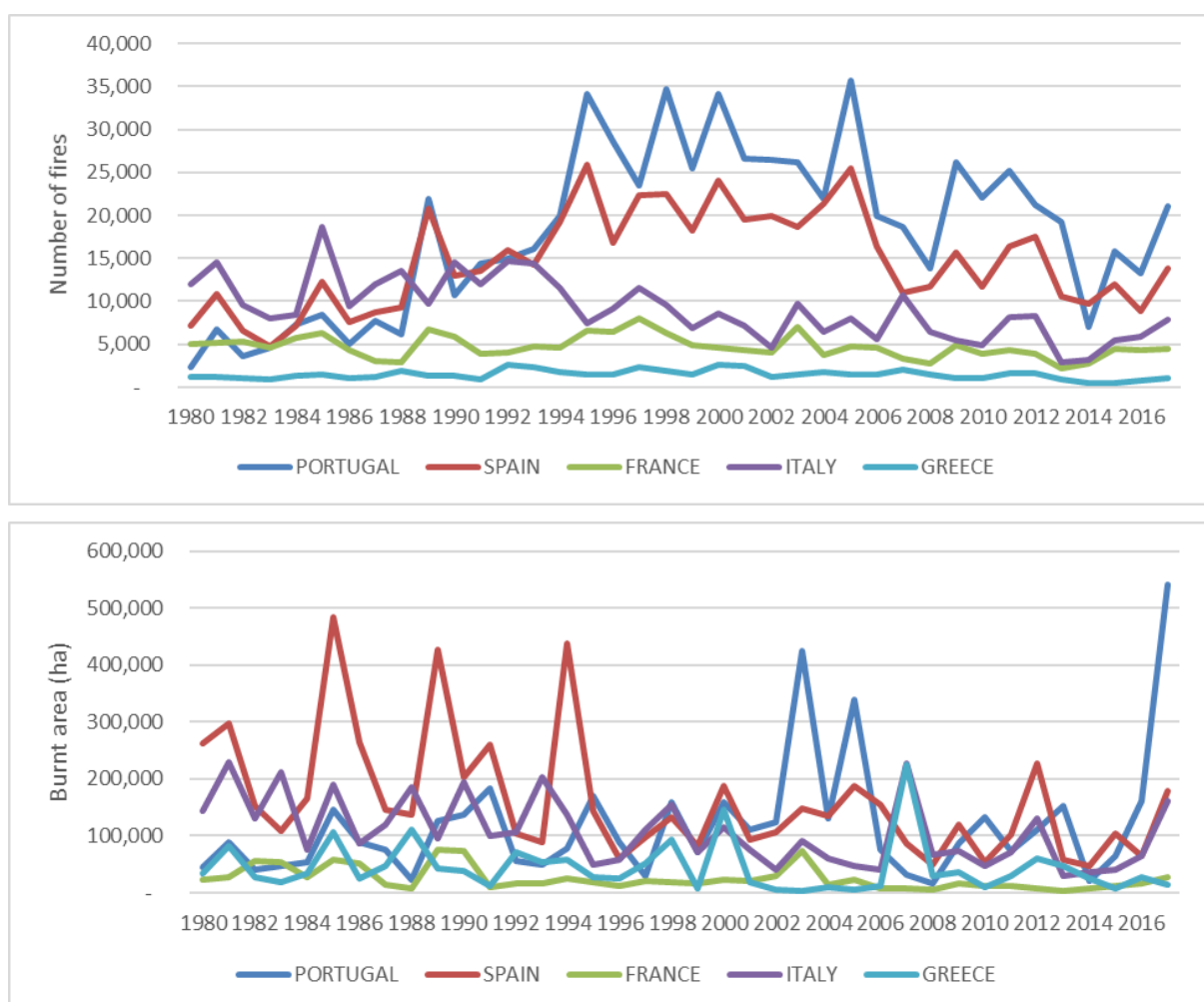
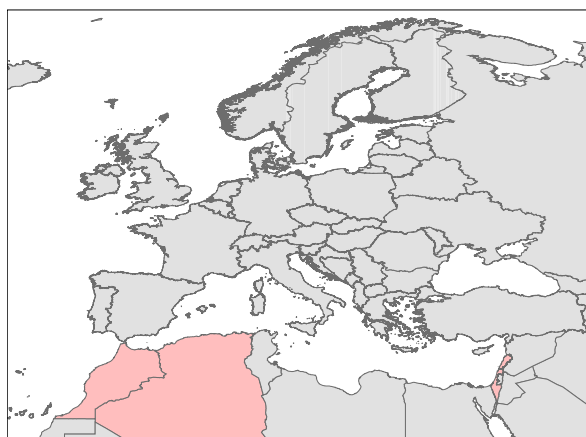


Figure 94. Time series showing the comparative number of fires and burnt area in the 5 large EU-Med countries.

## 2.4 Middle East and North Africa Countries



### 2.4.1 Algeria

#### Introduction

The forest estate in Algeria represents about 4.1 million hectares, and the area at the north of the country has an afforestation rate is 11%. The forests are composed mainly of Aleppo pine, which is a highly combustible species, distributed along two large mountain ranges crossing the north of the country from east to west.

Every summer fires devour thousands of hectares of forests and maquis in Algeria. This fire risk is further amplified by the lack of preventive forest management and the difficulty of accessing some of the fires, making the task of intervention difficult.

In addition, the risk of fire during the summer does not spare other types of vegetation, including crops, plantations and palm groves representing significant economic value. These economic assets are in the private domain, where fires are due mainly to the owners' ignorance of the preventive measures against fire, in particular, during cleaning-burning, crop storage and harvesting.

In this context, great efforts are being made by the authorities to inculcate a fire prevention culture in rural society, involving different categories of the population, such as farmers, schoolchildren and citizens in general.

#### Fire danger in the 2017 fire season

The 2017 fire season was characterized by an intense period of heat from mid-July to mid-August.

Successions of Sirocco heat waves crossed the regions of the East and the Centre during this period and the temperature peaked at 44° in certain localities. These heat waves brought together favourable conditions for the onset and spread of devastating fires in these areas.

The average area burned per fire during the 2017 season is in the order of 18 ha / fire. This is very high compared to that of the previous year. Below is a representative diagram of the average areas burned by fires since 2012 (Figure 95).

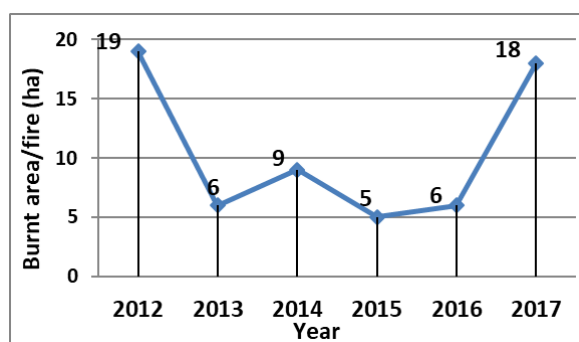


Figure 95. Average burnt area per fire for the last 6 years (ha/fire).

#### Fire occurrence and affected surfaces

The total area of forests, maquis and scrub affected by fire during the 2017 season is estimated at 53 975 hectares, from a total of 2 992 fires, making 2017 the most disastrous since that of 2012, in terms of burnt area.

The distribution of the total burnt area by type of vegetation (Figure 96), shows that forests were the land type most affected by fire: in fact more than half (54%) of the total area burned is within forest massifs.

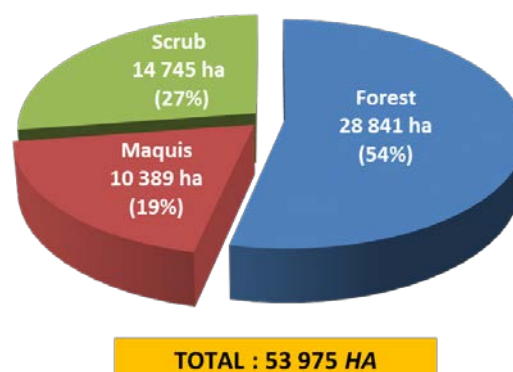


Figure 96. Burnt area classified by vegetation type.

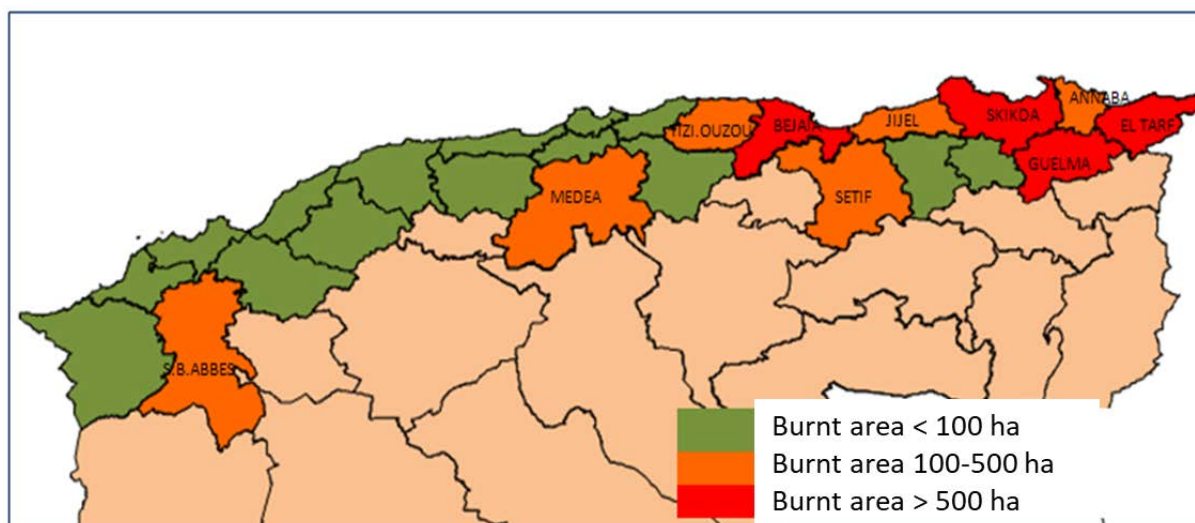


Figure 97. The ten Wilayas most affected by forest fires in 2017.

The other half of the overall area affected by fire is scrub and maquis with 27% and 19% respectively, slightly lower than recorded in the previous season.

The wilayas (departments) most affected by forest, maquis and scrub fires during the 2017 season are those in the Northeast of the country (Figure 97). In fact, four wilayas (El Taref, Skikda, Guelma and Bejaia) accounted for 72% of the total burnt area, with more than 500 ha burned in each. Also, it should be noted that the total area affected by fire in ten wilayas, located mainly in the East and the Centre regions, represents 91% of the total area burned in the whole country.

The monthly distribution of the burnt area (Figure 98), shows that August is the period when the largest area burned was recorded, although the number of fires during this month was not significantly high. This is due to the disastrous nature of the fires recorded during this period, which caused considerable damage.

The other months of the season experienced less damage and the areas affected by fire were around the seasonal average.

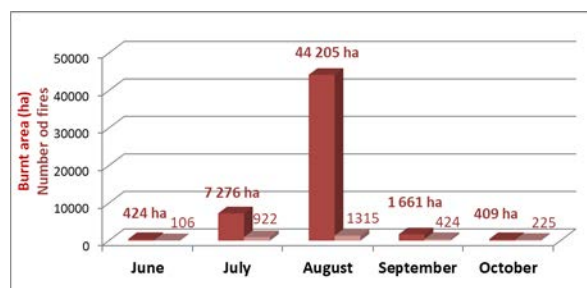


Figure 98. Number of fires and burnt area by month in 2017.

The distribution of the total number of fires and the overall area burned (Figure 99) in increments shows that despite the reduced number of fires with burnt areas greater than 50 ha per fire (with only 186 over 50 ha were recorded, which represents 6% of the total number of outbreaks) these fires caused significant damage: about 73% of the total area was burned by these fires. It should also be noted that these devastating fires were all recorded during the period from mid-July to mid-August which saw a succession of heat waves. However, the majority of other fires (94%) caused burned areas of less than 50 ha per fire, and the area burned by these outbreaks represents only 27% of the total.

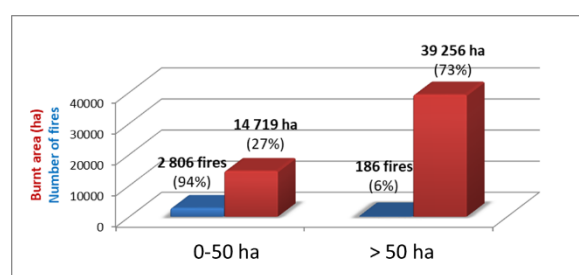


Figure 99. Number of fires and burnt area by fire size in 2017.

Comparing the area burned by region (East-Mid-West) during the 2017 campaign (Figure 100), shows that the East region of the country is the most affected by fires, with total burnt area of 44 339 ha, including all plant species, forests, maquis and scrub, followed by the Centre region of the country with 7 386 ha and the West region with only 2 250 ha of area burned.

This is mainly due to the scorching periods that particularly affected the East and Centre regions of the country during the 2017 season.



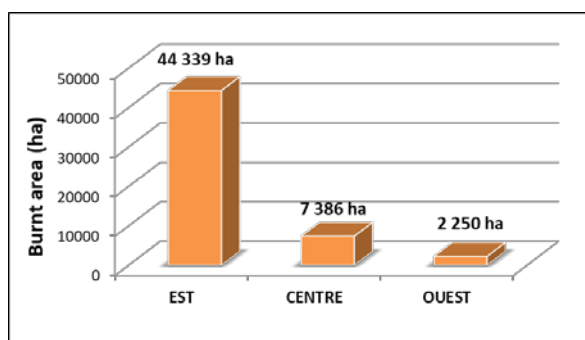


Figure 100. Burnt area of forests by region in 2017.

### *Forest fire prevention in 2017*

As every year, considerable efforts have been made by the various sectors concerned to prepare the campaign against forest fires in 2017, including the implementation of numerous actions to improve the management of forest fires. These preparatory actions can be grouped into the following main components:

#### 1. Awareness actions:

- Organization of information and awareness tours for farmers and the rural population on the risk of forest fire and harvests.
- Dissemination on several occasions of leaflets and leaflets containing preventive fire safety instructions for the benefit of citizens.
- Organization of conferences and debates with the sectors concerned, in order to improve the management of the 2017 forest fire campaign
- Sensitization of the general public on the risks related to forest fires, through information flashes and programmes on local radios.

#### 2. Preventive actions:

- Construction of new fire protection trenches in a number of forests as well as the maintenance of existing trenches.
- Maintenance of road laybys, railways and spaces under high tension lines crossing forests.
- Opening of some new forest tracks and the maintenance of existing tracks.
- Realization of new water points in the forests.

#### 3. Organizational Actions:

- Organization of refresher courses on the forest fire simulator, for the benefit of the new Civil Protection officers who are in charge of "forest fire" intervention operations.

- Update of the forest fire plans, for the 40 wilayas affected by this risk.
- Strengthening civil protection intervention units located near forest areas with appropriate human and material resources.
- Operation of "CANCER ALERT" weather bulletins as well as forecast data on the forest fire risk and the distribution of warning bulletins to the local services concerned.

#### 4. Intersectoral Coordination Actions:

- Organization of "active fight" simulation exercises in coordination with the different sectors involved in operations against forest fires.
- Establishment of operational committees for the coordination of control operations at national, Wilaya, Daira and Commune levels.
- Installation of community committees composed of farmers and citizens, who play an important role in prevention and first intervention in isolated and remote localities.

### *Monitor, alert, and response reinforcement*

The general organization of the forest and maquis fire fighting system deployed during the 2017 campaign has not changed much. Surveillance, warning and first intervention were provided by forest conservation services, through lookout posts and small mobile brigades within the forest massifs. However, the actual interventions in case of major fires were ensured by the means of the units of the civil protection.

However, the civil protection has also reinforced the local units, composed of appropriate firefighting means, which are mobilized close to crop fields adjoining forests during the harrowing-harvesting season, and also near recreational forests.

Additional means, intended to reinforce operations during large-scale forest fires, have been set up by civil protection. This is composed of 22 mobile columns, with considerable human and material resources and distributed judiciously in order to be able to cover the three regions of the north of the country "EAST-CENTRE-WEST" with the minimum of delay.



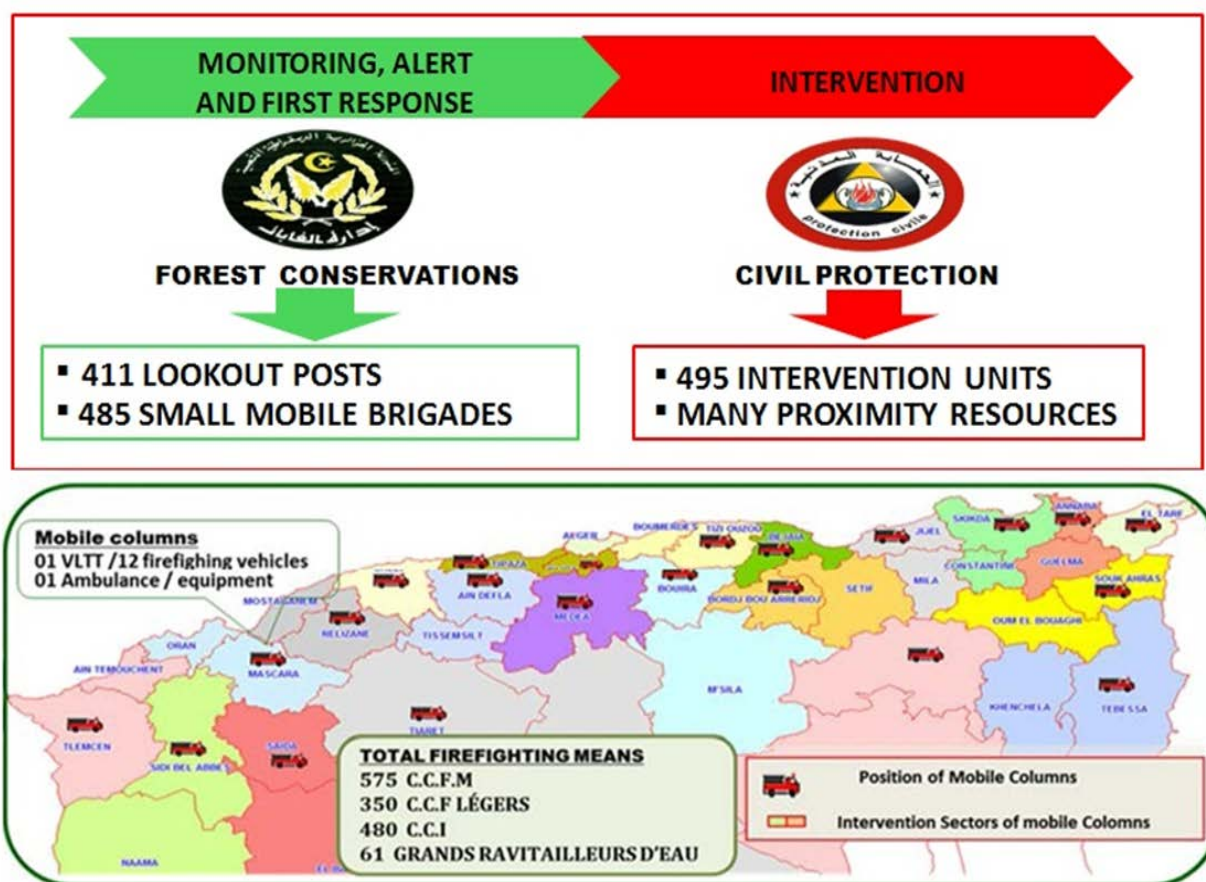


Figure 101. Resources used in the 2017 season in Algeria.

Figure 101 presents a representative diagram of the global national scheme deployed by the different sectors concerned, to support the 2017 campaign against forest fires.

(Source: Direction Générale de la Protection Civile; Direction Générale des Forêts, Algeria).

#### Loss of human life

During the 2017 wildfire season, the deaths of four citizens were recorded during the devastating fires that occurred in the East and Centre regions of the country. Twenty other people were also victims of various injuries and burns or were inconvenienced by smoke.

It should also be noted that an accident occurred at a Civil Protection intervention team during a fire-extinguishing operation where one officer lost his life and two others were seriously injured.

#### Mutual assistance operations between states

Algeria did not request any international assistance in the fight against forest fires of the 2017 season, and the intervention means of the Directorate General of Civil Protection did not participate in any intervention operation outside Algerian territory.

## 2.4.2 Israel

### *Israel forest fire season 2017 campaign*

The 2017 fire season was characterized by average meteorological conditions. No high indexes of fire hazards were recorded. This is an exceptional statistic for Israel's 10-15-day period of extreme fire danger.

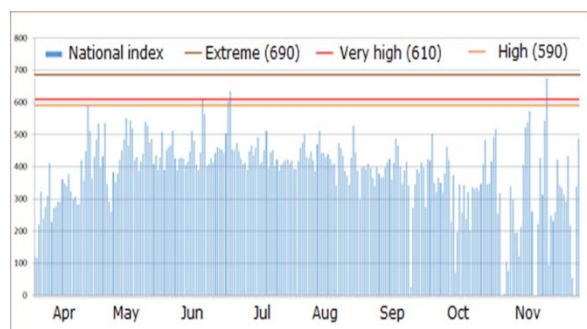


Figure 102. Fire danger in 2017 (Source: Mr. Yiftah Ziv Israel Meteorological Service).

### *Fire occurrence and affected surfaces*

The amount of area burned in 2017 is significantly lower than in 2016 due to the reasonable meteorological conditions during this season.

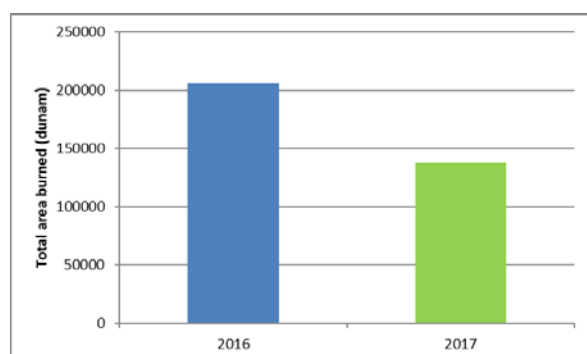


Figure 103. Burnt area in 2016 and 2017 (Source: Israel Nature and Park's Authority)



### *Aerial means used during the 2017 campaign*

The Israeli firefighting squadron has 14 AT-802. In 2017 the squadron took part in 102 forest fire incidents.

### *Operations of mutual assistance*

In this year the firefighting squadron participated in the extinguishing efforts in Macedonia and Montenegro.

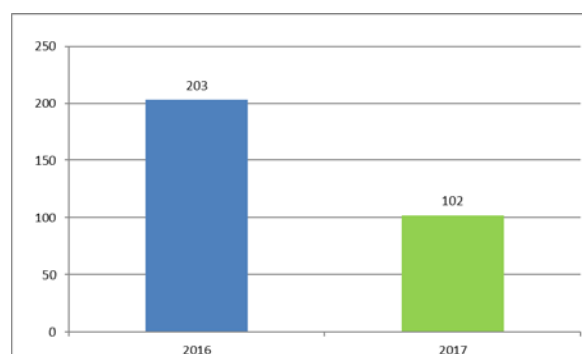


Figure 104. Number of operational incidents involving the firefighting squadron.

### *Injuries and loss of human lives*

In 2017 there were no fatalities or injuries among fire fighters or civilians as a result of forest fires.

### *International drills*

The special drill, named MEFF (Middle East Forest Fire), took place on 22 and 26 October under the auspices of the European Union to improve international cooperation and assistance between Israel, Jordan and the Palestinian Authority. The exercise was attended by three EU countries (France, Italy and Spain) as well as forces from other countries. It reviewed joint efforts in emergency fire and rescue situations, including major forest fires and rescue from the rubble.



(Source: Fire and Rescue Commission, Ministry of Public Security, Israel).

### 2.4.3 Lebanon

#### Fire danger in 2017

Lebanon's annual forest fire reports are completed within the framework of a collaborative work between the Ministry of Environment (MOE) and the Land and Natural Resources Program, Institute of the Environment, University of Balamand (LNR-IOE-UOB). The present information is mostly based on the 2017 fire report (MOE/UOB, 2018). Reported fires were based on field inspections only. Many other fires may have not been initially visited in the field, therefore remaining un-reported.

#### Fire season

In 2017, relatively large fires affected the northern district of Akkar, the Mount Lebanon town of Rashmaya – where the same area of forested land has been devastated by fire three times in the last decade – and the biologically diverse Chouwen and Jabal Moussa regions of Kesrouan, where 100 Civil Defense firefighters and the Lebanese Army battled a blaze for 10 days.

The calculated start date of the fire season for 2017 was 27 February, and the calculated end date was 15 November. The peak month (in number of fires) was September (a total of 22 fires damaging a minimum area of 94 ha of vegetated land). A total of 92 fires were reported, affecting a total area of 264 ha (Figure 105).

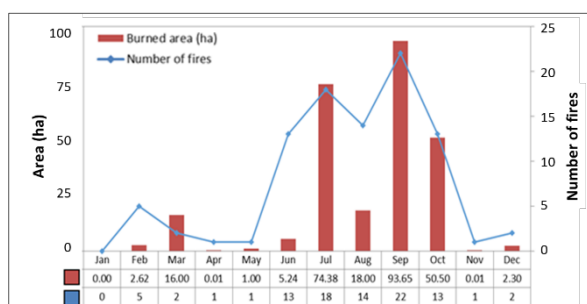


Figure 105. Monthly distribution of fire occurrence and fire affected areas in 2017 (source: MOE/UOB, 2018).

#### Land use type

Land-use of fire affected areas (Figure 106) comprised forests/woodlands (64.97%), agricultural land (13.05%), and grassland (12.84%).

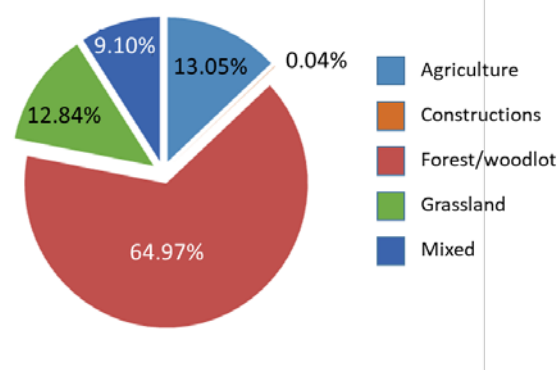


Figure 106. Land-use of fire affected areas (source: MOE/UOB, 2018).

#### Affected fuel type

A total of 38.2% of affected fuel types (Figure 107) was mixed forests, followed by mixed agriculture/forest (21.84%) and grassland (13%).

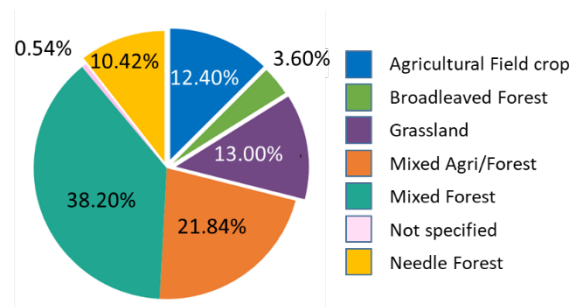


Figure 107. Distribution of fuel type affected by fires (source: MOE/UOB, 2018).

#### Causes of fire

The main fire causes were unknown (79.65%). Negligence was reported as the main cause of fires for 13% of the reported fire events. Human activities in nature represented 6% of the total fire causes (Figure 108).

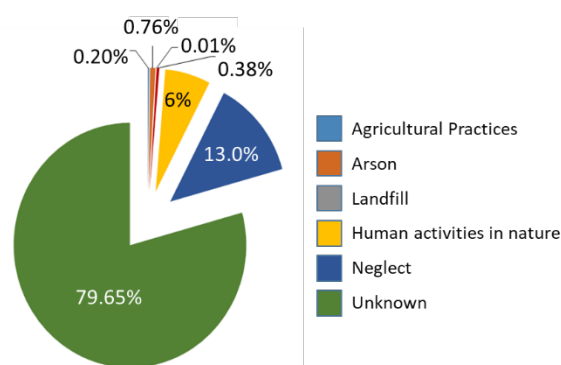


Figure 108. Distribution of main fire causes (source: MOE/UOB, 2018).

### Intervention time

It was observed that 53.2% of first interventions in fire suppressions occurred within the first 20 minutes after the reporting time, while 39.1% of interventions happened after 20 minutes and before 1 hour from the reporting time (Figure 109).

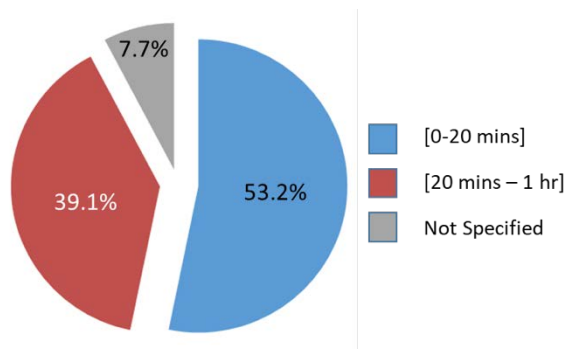


Figure 109. Times for intervention after reporting fires (source: MOE/UOB, 2018)

### Fire duration

The largest number of fires lasted between 1 and 2 hours (48.3). A total of 24.18% of fires lasted between 2 and 5 hours, and 10.99% of fires lasted between 5 and 12 hours. It was also observed that 4.44% of fires lasted between 12 and 24 hours. However, 7.69% of fires lasted more than 24 hours (Figure 110).

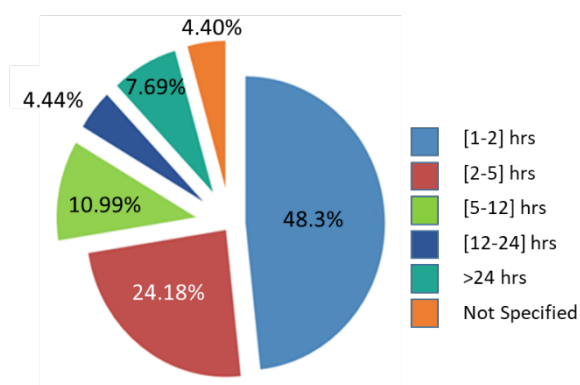


Figure 110. Fire duration (source: MOE/UOB, 2018).

### Resources employed in fire suppression

The following human and technical resources were involved in fire suppression of reported fires (Table 37):

Table 37. Human and technical resources involved in fire control throughout 2017 (source: MOE/UOB, 2018).

	Number				Lebanese Army helicopters used
	Small Cars	Water Tanks	Other Cars	Human Resources	
Civil Defense	50	165	0	410	
Army	38	6	2	381	14
Internal Security	40	6	4	209	
Ministry of Agriculture	7	0	0	6	
NGO	14	14	8	42	
Local Resident	0	0	0	329	
<b>Total</b>	<b>149</b>	<b>191</b>	<b>14</b>	<b>1377</b>	<b>14</b>

### Forest fire initiatives and campaigns

The parliamentary National Defense and Interior and municipalities committee report on forest fires was published in April, 2017 setting out a long list of recommendations for improved fire risk management. This report reiterated the need for an efficient fire management including joint operations room for fire control. Also, the report recommended that Cabinet allow the General Directorate of Civil Defense to hire more permanent staff and raise pay for employees.

### Reference:

MOE/UOB, 2018. State of Lebanon's wildfires in 2017. Beirut, Lebanon.

(Source: Land and Natural Resources Program, Institute of the Environment, University of Balamand, Lebanon).



## 2.4.4 Morocco

### Background

In over 9 million hectares of forest domain representing more than 20% of the national area, forest formations in Morocco cover an area of 5 814 000 ha (broadleaves, conifers...) and 3 318 260 ha of *stipa tenacissima* (Figure 111), and are distributed among the different bioclimatic zones, from semi-arid to humid.

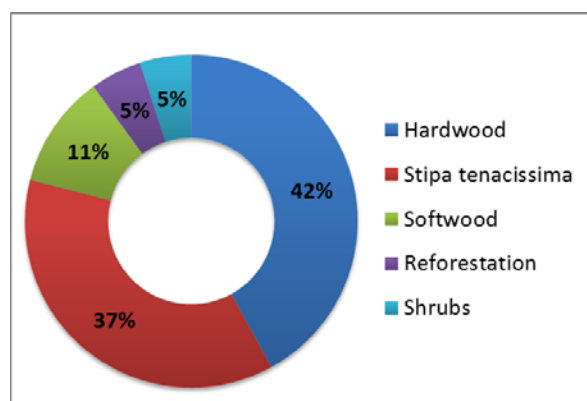


Figure 111. Composition of forest land in Morocco

As in Mediterranean countries, forested areas in Morocco are subject to a recurrent risk of fires that is favoured by the extreme flammability of forest species during the summer. The consequences of this risk are prejudicial in terms of social, economic and environmental components. Indeed, the forest land is an open space where access (except rare situations) is free. Riparian forest populations live in a subsistence economy (using forests for their needs of construction wood and firewood, various non-timber forest products, and pasture). Consequently, forests are under a very strong human pressure.

Through the analysis of annual reports of forest fires during the years 1960 to 2016, an average of 288 fires per year is calculated for an annual average area affected of 3 023 ha (HCEFLCD, 2016).

Although limited compared to the average area burned in other countries with similar conditions, especially the Mediterranean, this area is important in view of the major roles played by forests and the difficulties of their reconstruction and regeneration with regard to the national socio economic and environmental context.

To face the recurring and imponderable phenomenon of fire, a **National Plan of Prevention and Fight against forest fires** (in French: *Plan Directeur de Prévention et de Lutte Contre les Incendies "PDCI"*) was adopted with the participation of all institutional partners concerned by this issue: Ministry of the Interior (MI), High Commission of Forests, Water and combating Desertification (HCEFLCD), Ministry of Equipment and Transport (MET), Royal Gendarmerie (GR), Civil Protection (PC), Agency for Economic and Social Development for Northern Provinces and Prefectures (ADPN) and the Administration of Land Conservation, Cadastre and Mapping (ACFCC). The plan focuses on the actions of equipment and forest management for fire prevention, risk prediction, monitoring and warning and also on the coordinated operations to fight against forest fires.

Despite the efforts made at different levels by all institutions involved in forest fire management in Morocco, **the system calls for continuous improvements**, not only in terms of prevention and prediction, but also in terms of operational and organizational interventions.

### Fire occurrence and affected surfaces

#### From 1960 to 2016

Through the analysis of the available data on forest fires in Morocco during the period 1960 to 2016, a total of 16 402 outbreaks of fire (Figure 112) and a total area damaged (but not lost) of 172 290 ha are reported, giving an average of 288 fires per year for an annual average area of 3 023 ha affected, with maxima of 11 000 ha in 1983 and 8 660 ha in 2004. The absolute minimum is recorded in 2002 with 593 ha.

It should also be noted that, globally and since 1960, the trend of fire numbers and area affected by forest fires has never stopped increasing; but the shapes of the increases are not similar. Indeed, the increase in fire number has been continuous from an average of 242 between 1990-1994, to 455 forest fires in the last decade (2007-2016).

We note that the area affected per fire which, reached a value of 6.27 ha during the period 2007-2016, has decreased by 41% compared to the national average recorded since 1960, which is 12 ha per fire (Figure 114 below).



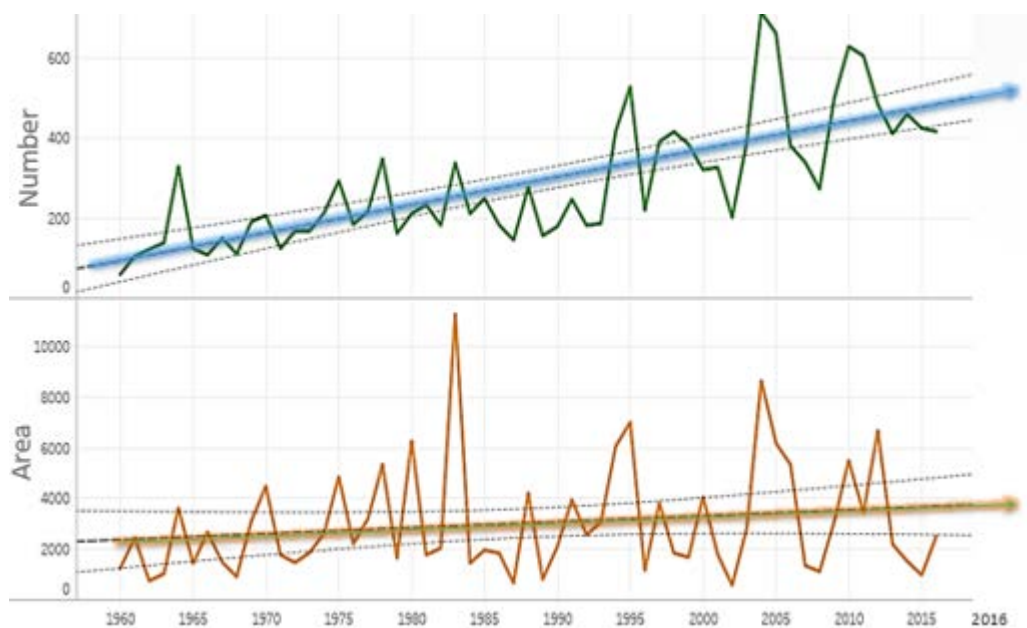


Figure 112. Evolution of forest fire number and area from 1960 to 2016 (HCEFLCD, 2016)

Over the past decade, the years 2004, 2005, 2010, 2011, 2012 and 2014 were exceptional both in forest fire numbers declared and in affected areas. Indeed, it is mainly the Rif and Pre-Rif provinces which were most affected because of the high sensitivity to fire of pine, cork oak and shrub formations and the strong pressure on land resulting from the use of fire as a cleaning land practice for cultivation.

#### 2017 fire season

During 2017, there was recorded a total of 433 fires affecting an area of 2 414 ha, an average of 5.5 ha per fire.

Both the number of fires and the total burnt area have decreased in comparison to the average for the last decade 2007-2016, by 5% and 16% respectively (Figure 113).

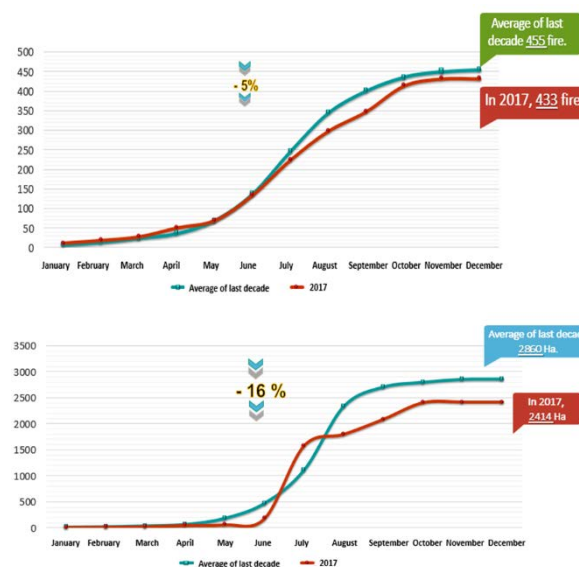


Figure 113. Evolution of number of fires (top) and burned area (bottom) in 2017 compared to the last decade.

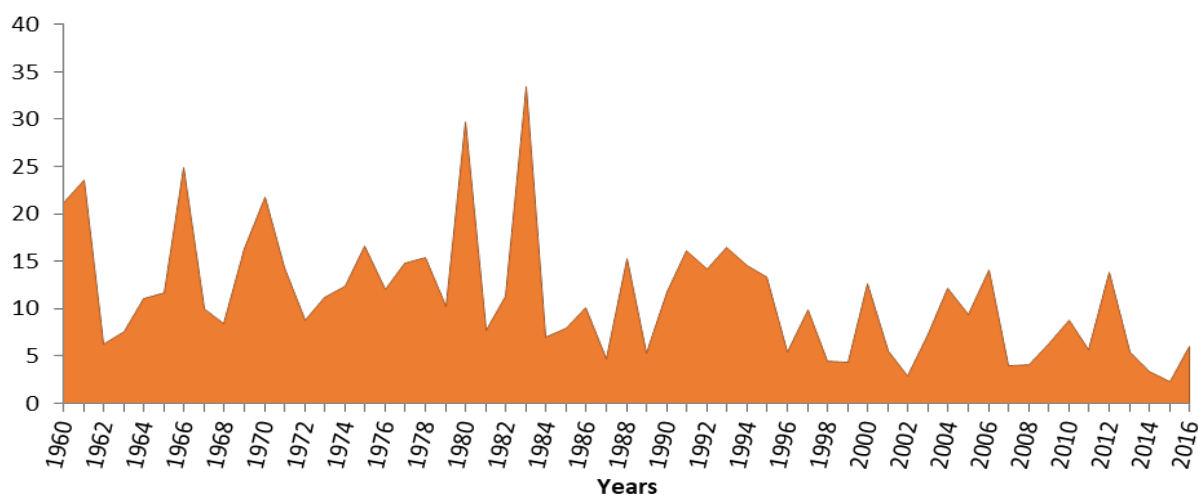


Figure 114. Evolution of area affected per fire from 1960-2016.

The distribution of fires recorded in 2017 (Table 38), based on the type of vegetation affected, is as follows:

- For wooded land, an area of 845 ha (35% of the total area burned) was affected by 160 fires (37% of the total number of fires);

- The shrub and herbaceous covers were affected by 272 fires that covered an area of 1568 ha, equivalent to 63% respectively of the total number of reported fires and 65% of the total area burned.
- For wooded stands, oak species are in first place with an area of 362 ha affected, equivalent to 15% of the total area burned in this category, followed by pines with an area of 283 ha affected (12%).

Table 38. Distribution of fires, based on the type of vegetation affected in 2017.

Category		Species	Burnt Area (ha)	% Area	Number of fires	% Number
Wooded land	broadleaves	cork oak	155.99	6.46	35	8.08
		<i>Quercus</i> sp.	115.33	4.78	3	0.69
		holm oak	91.09	3.77	22	5.08
		Eucalyptus	85.48	3.54	11	2.54
		Acacia mollissima	0.02	0.00	1	0.23
	Total broadleaves		447.91	18.56	73	16.86
	Coniferous	Pines	283.74	11.76	45	10.39
		<i>Thuja</i>	44.64	1.85	13	3.00
		Atlas cedar	34.62	1.43	16	3.70
		<i>Oxycedrus</i>	15.81	0.66	6	1.39
		Moroccan fir	10.00	0.41	1	0.23
		Red cedar	8.37	0.35	5	1.15
		Arizona cypress	0,25	0.01	1	0.23
	Total conifers		397.42	16.47	87	20.09
Total wooded		845.34	35.02	160	36.95	
Non wooded land	Alfa		687.25	28.47	22	5.08
	Shrubs		742.28	30.75	106	24.48
	Grass cover		138.78	5.75	144	33.26
Total non wooded		1568.23	64.98	272	62.82	
Total		2413.57	100.00	433	100.00	

The data relating to the distribution of fires according to size classes of affected areas are represented in Table 39. Indeed, 90% of reported fires were under control with the speed and efficiency required, since the area affected did not exceed 5 ha for each fire. It is also noted that only 5 fires (1.16% of the total number of fires) affected an area of over 100 hectares, representing over 57.71% of the total area burned.

Table 39. Distribution of fires according to classes of affected areas.

Size Class (ha)	Number		Area (ha)	
	Count	%	Area	%
0-5 ha	390	90.05	263.36	10.91
5-10 ha	15	3.47	113.04	4.68
10-20 h	13	3.01	181.35	7.51
20-50 ha	6	1.39	222.50	9.22
50-100 ha	4	0.93	240.31	9.96
>100 ha	5	1.16	1393.00	57.71
Total	433	100	2413.57	100

### Distribution of fires

The data showing the distribution of fires by forest region are shown in Figure 116 below. The Oriental region (Taourirt, Nador, Oujda, Driouch...) ranks first in terms of area affected with 951 ha (40% of the total area recorded nationally) and the Rif region ranks first in terms of the number of fires with 129 fires (30% of the total number) (Figure 115).

The occurrence of fires is concentrated in the provinces of Rif and Pre-Rif (including Tangier and Tetouan); this situation is favoured by the terrain, the high sensitivity of forest stand types (pine, cork oak matorral...) and the intense human pressure on land resulting from the use of fire as a practice of cleaning land for their cultivation.

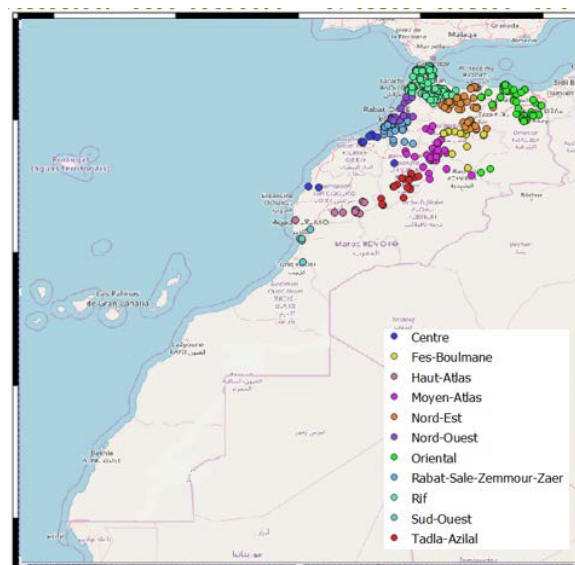


Figure 115. Location of the forest fires recorded in 2017 in Morocco.

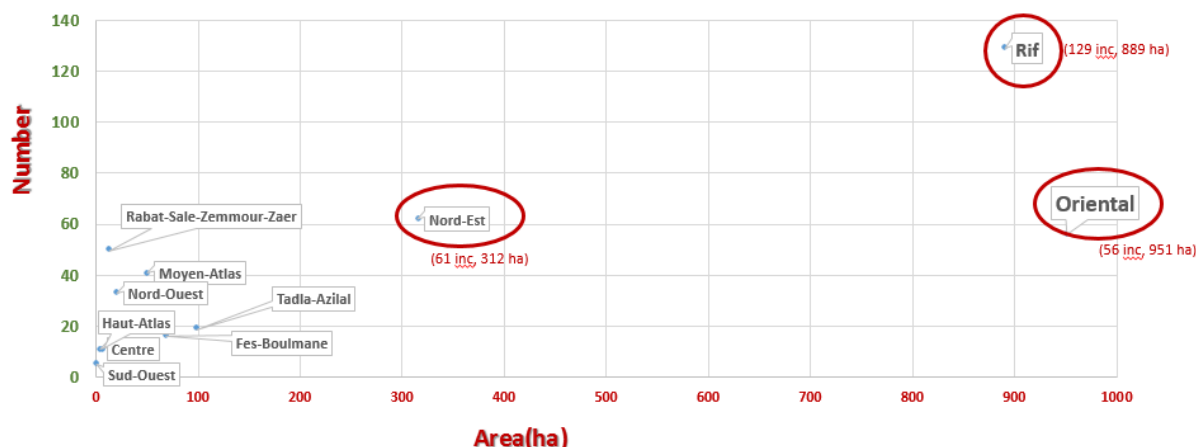


Figure 116. : Fire number and area affected by forest region.

### Firefighting means

The means mobilized by the different departments in 2017 in Morocco for the operations against forest fires, are shown in Table 40:

### Loss of human lives

No lives were lost in the 2017 season.

Table 40. Firefighting means

Activities	Department	Quantity
<b>Monitoring and alerts</b>	High Commission of Forests, Water and combating Desertification	1200 watchers
	Ministry of the Interior	1000 watchers
<b>Ground intervention</b>	High Commission of Forests, Water and combating Desertification	332 forest fighters with 95 vehicles for the first intervention
	Civil Protection	-
	Auxiliary Forces	[Estimated at 300 persons]
	Royal Armed Forces	[Estimated at 300 persons]
<b>Aerial control</b>	Royal Gendarmerie	18 Turbo Trush aircraft
	Royal Air Forces	5 Canadairs CL415

(Source: Service de la Protection des Forêts, Haut-Commissariat aux Eaux et Forêts et à la Lutte Contre la Désertification, Morocco).

### 3 The European Forest Fire Information System (EFFIS)

The European Forest Fire Information System (EFFIS) has been established jointly by the European Commission services (DG ENV and JRC) and the relevant fire services in the EU Member States and European countries (Forest Services and Civil Protection services). Research activities for the development of the system initiated at JRC in 1998 and the first EFFIS operations were in the year 2000.

In 2003, EFFIS was embedded in the new Regulation (EC) No 2152/2003 (Forest Focus) [7] of the European Council and Parliament on monitoring of forests and environmental interactions until it expired in 2006. Since then EFFIS operated as a voluntary system of information on wildfires until 2015, when it became part of the EU Copernicus program, under the Emergency Management Services [3].

Acting as the focal point of information on forest fires, EFFIS supports the national services in charge wildfire management. Currently, the EFFIS network is made of 40 countries in Europe, Middle East and North Africa. EFFIS provides specific support to the Emergency Response Centre (ERCC) (formerly Monitoring and Information Centre (MIC)) of Civil Protection as regards near-real time information on wildfires during the fire campaigns and assists other DGs through the provision both pre-fire and post-fire information on wildfire regimes and impacts. It provides information that supports the needs of the European Parliament with regards to wildfire management, impact in natural protected areas and harmonized information on forest fires in the EU.

EFFIS also centralises the national fire data that the countries collect through their national forest fire programmes in the so-called EFFIS Fire Database. The EFFIS web services<sup>5</sup> allow users to access near-real time and historical information on wildfires in Europe, Middle East and North Africa.

EFFIS provides a continuous monitoring of the fire situation in Europe and the Mediterranean area, and regularly sends updates to EC services during the main fire season. The information about the on-going fire season is continuously updated on the EFFIS web site (up to 3 times, daily), which can be interactively queried<sup>6</sup>. EFFIS provides daily meteorological fire danger maps and forecasts of fire danger up to 10 days in advance, updated maps of the latest active fires, wildfire perimeters and post-fire evaluation of damage.

The EFFIS module for the assessment of meteorological forest fire danger is the EFFIS Danger Forecast. This module forecasts forest fire danger in Europe, part of North Africa and the Middle East, on the basis of the Canadian Fire Weather Index (FWI) [8], allowing a harmonized evaluation to be made of the forest fire danger situation throughout Europe and neighbouring countries.

The damage caused by forest fires in Europe and neighbouring countries is estimated using the EFFIS Rapid Damage Assessment module. Since 2000, cartography of the burned areas is produced every year through the processing of satellite imagery. In the year 2003, due to the availability of daily satellite imagery from the MODIS sensor on board the TERRA and AQUA satellites, the RDA provided frequent updates of the total burnt area in Europe. In 2007, the RDA was updated twice a day and currently, since 2016, it is updated 3 times a day. Further to the mapping of burnt areas, the analysis of which types of land cover classes are affected by fires is performed. This module uses MODIS satellite imagery with a ground spatial resolution of about 250 metres, which permits the mapping of fires of around 30 ha or larger. The burned area mapped by EFFIS corresponds, on average, to around 75% to 80% of the total area burnt in Europe each year.

<sup>5</sup> <http://effis.jrc.ec.europa.eu>

<sup>6</sup> see <http://effis.jrc.ec.europa.eu/current-situation>

### 3.1 EFFIS Danger Forecast: 2017 results

The EFFIS Danger Forecast was developed to support the Commission's Directorate-General for the Environment and the forest fire-fighting services in the EU Member States. From 2002, at the request of the Member States, operation of the EFFIS Danger Forecast was extended to six months starting on 1 May and ending on 31 October, and in 2006 to nine months, from 1 February to 31 October. From 2008 the EFFIS Danger Forecast system has run continuously throughout the year without interruption.

The geographic extent has been enlarged over the years from the initial extent that covered only the Mediterranean region. Now the system covers the whole of Europe and MENA (Middle East & North Africa) countries.

The meteorological data used to run the model has also changed during the years. At the beginning the system started using forecasted data provided by MeteoFrance with a spatial resolution of around 50 km. Then over time other providers were included, such as DWD (Deutscher Wetterdienst) and ECMWF (European Centre for Medium-Range Weather Forecast) and the resolution has improved. Now the system runs with three different data sets from three providers: ECMWF (the primary), Meteo France and DWD; with a spatial resolution in a range from around 10 km to 25 km.

In this chapter the fire danger trends assessed by EFFIS in the different countries during the 2017 fire season are presented, comparing them with previous years.

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

The following figures show fire danger through 2017 as determined by the average FWI values assessed during the fire season in the individual countries.

In 2017 the northern countries experienced relatively high FWI early in the year, as is usual. High values were seen across much of Europe during summer, and there was a noticeable extra peak late in the year in October for several countries.

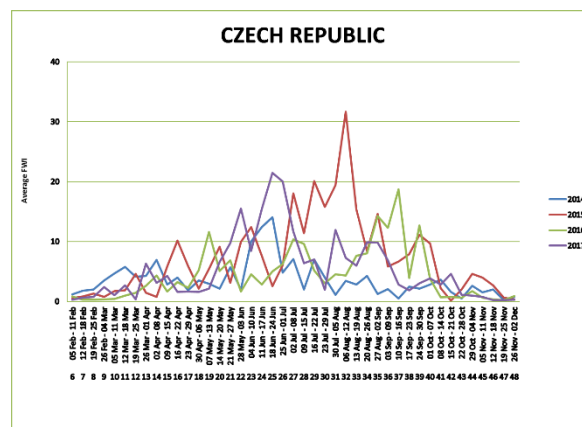
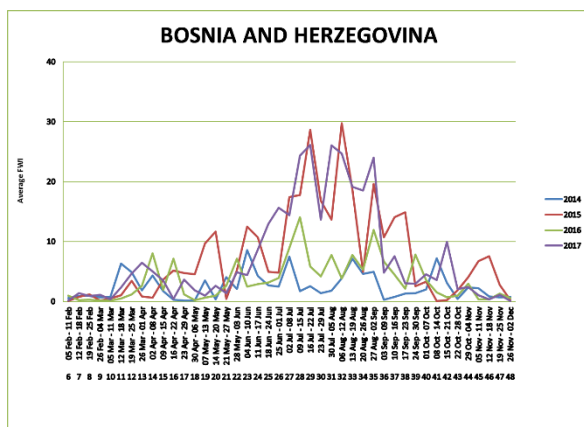
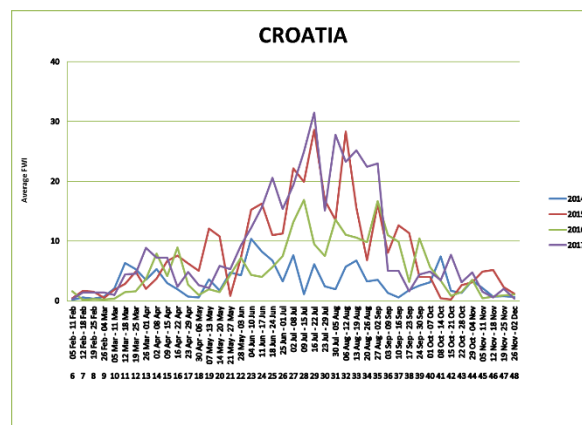
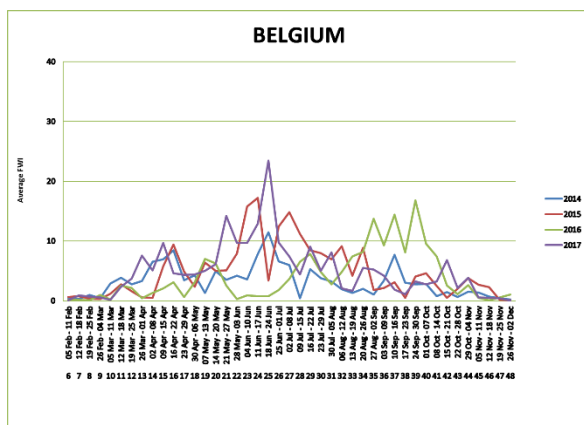
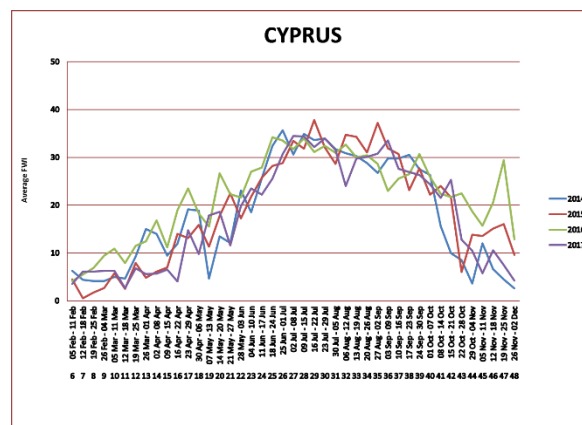
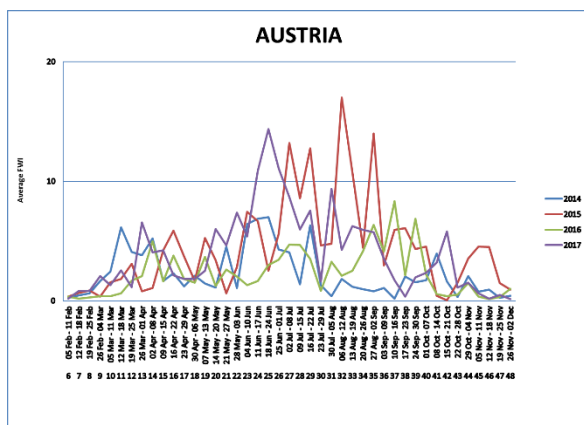
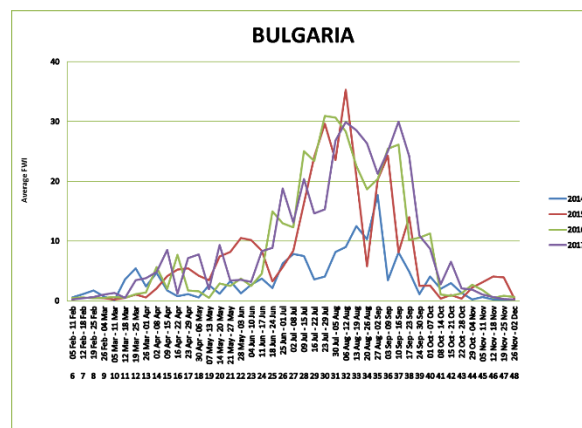
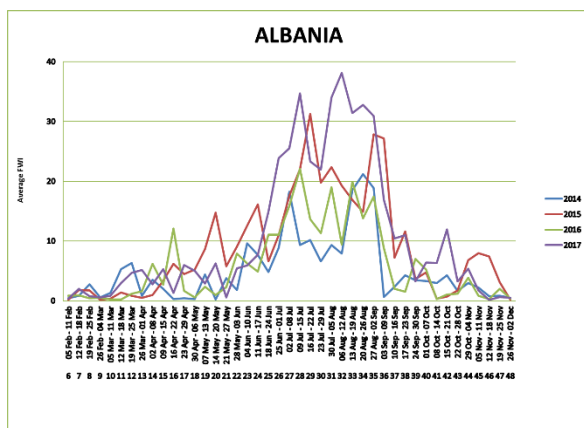
The graphs show the weekly averages of FWI over entire countries; therefore local peaks might have been flattened, especially in those countries such as France or Italy, where there are strong differences in fire danger level with changing latitudes; nevertheless the general trend is depicted providing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

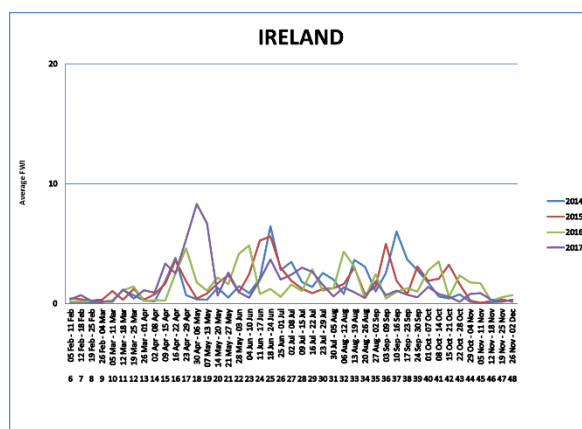
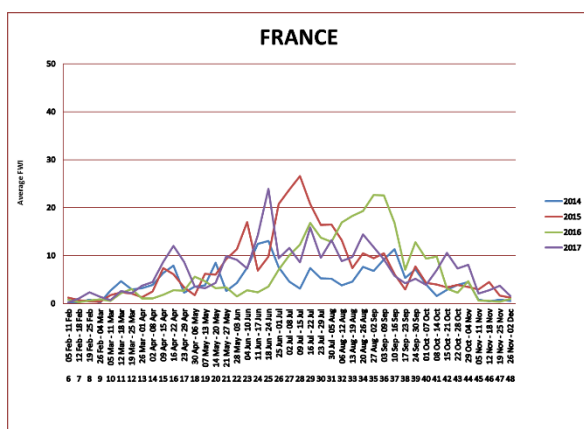
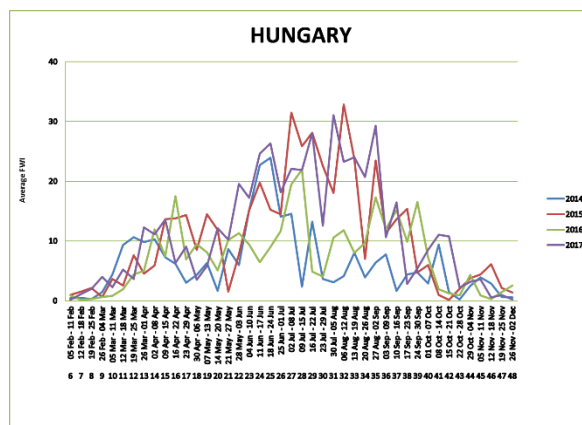
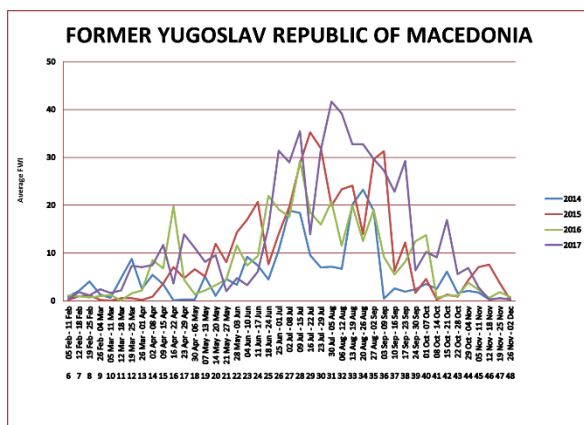
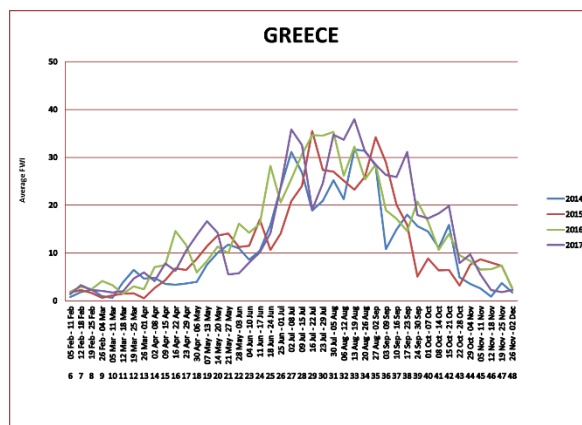
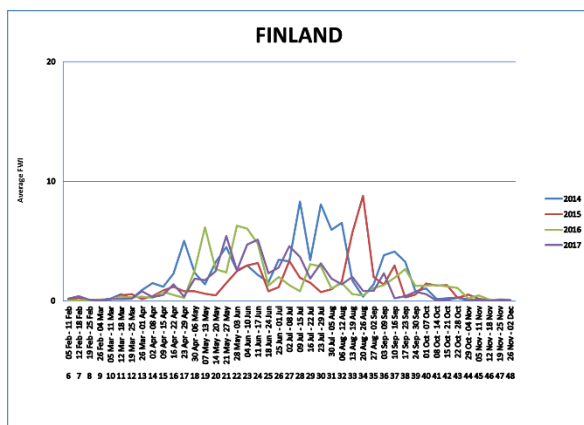
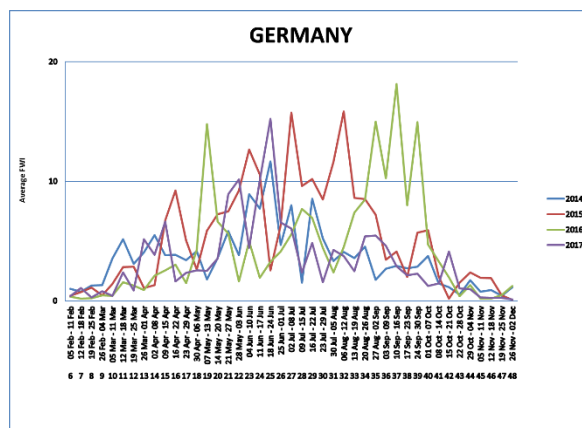
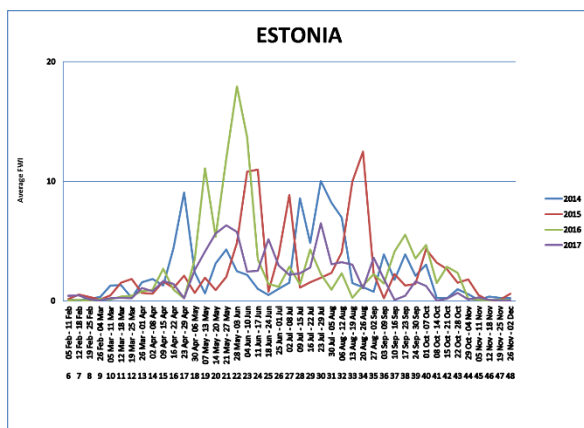
To allow a better comparison with past seasons, the curves of 2014-2016 are presented in conjunction with 2017 for all countries.

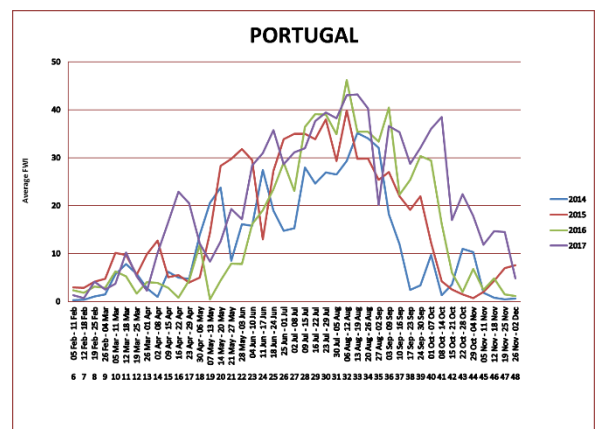
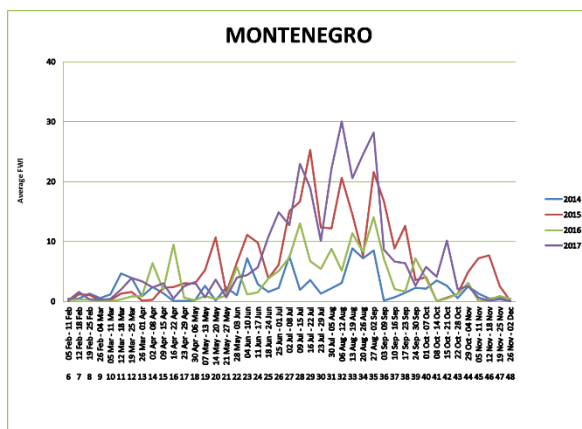
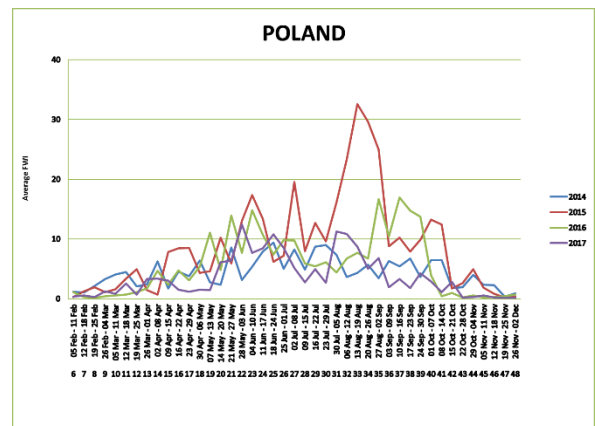
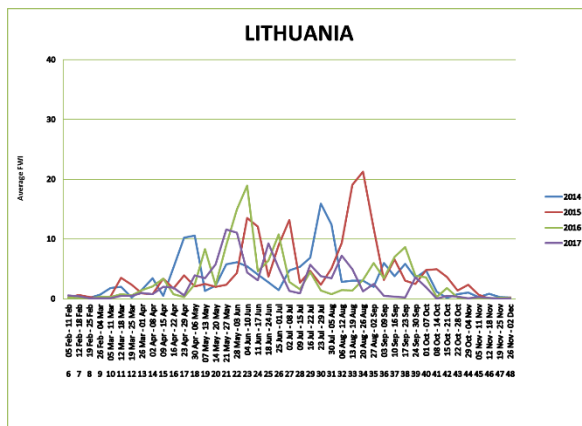
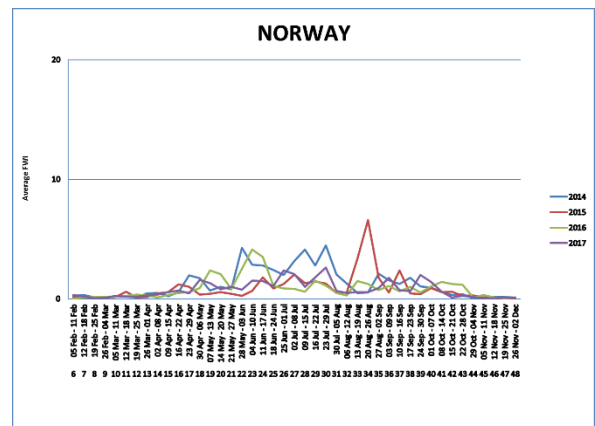
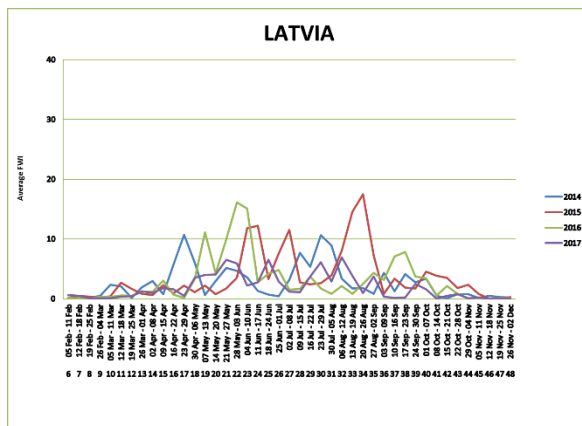
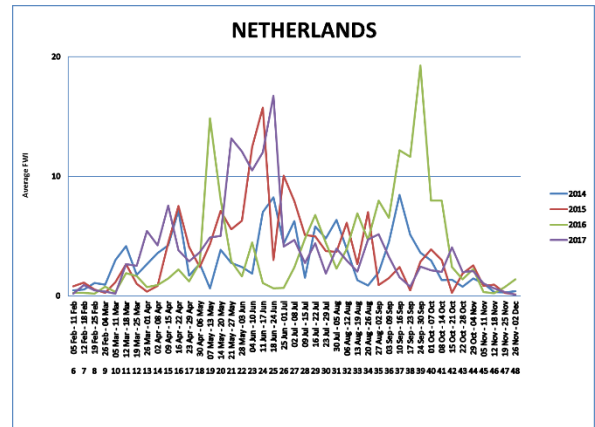
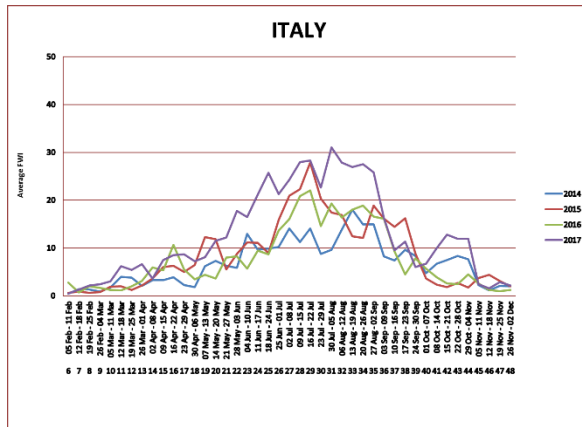
The countries analysed are those participating in the EFFIS network for which data are available, and are presented in alphabetic order within the two groups (European countries and MENA countries) in the graphs that follow.

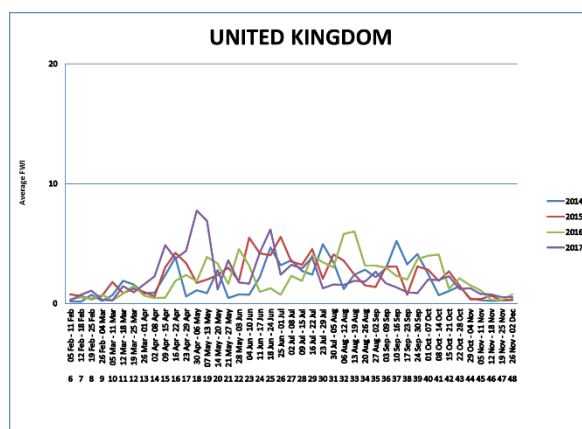
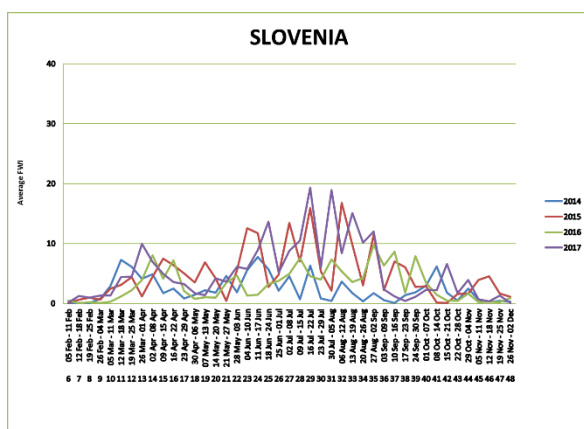
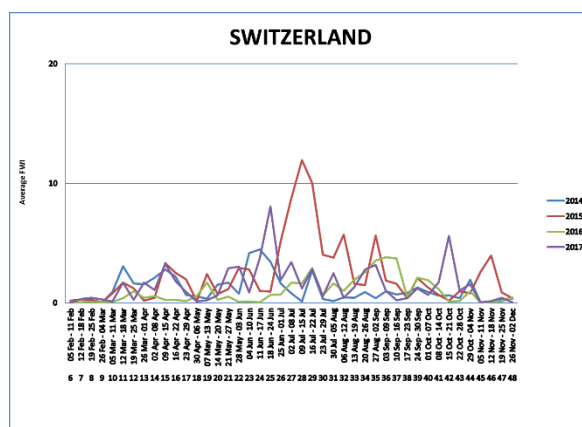
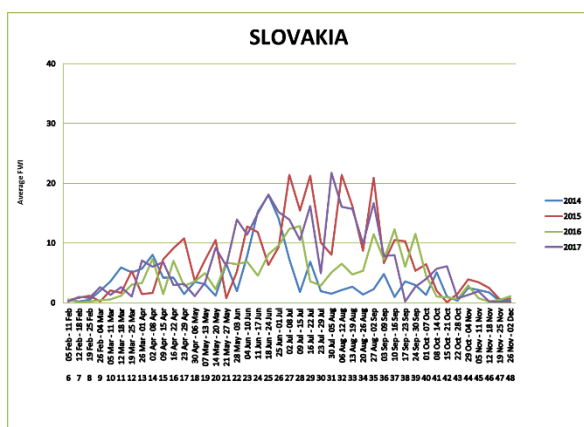
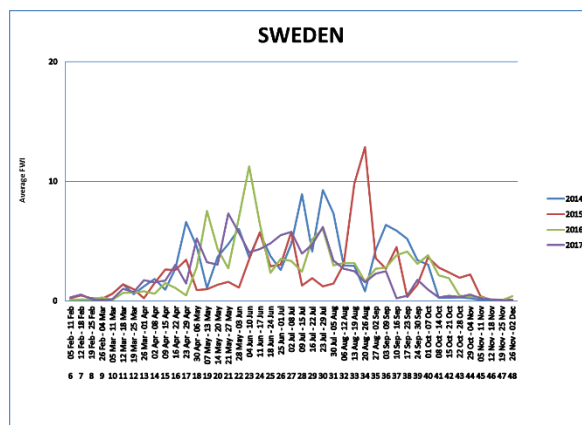
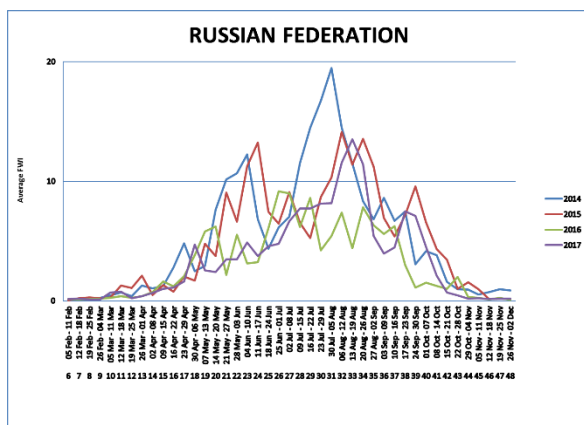
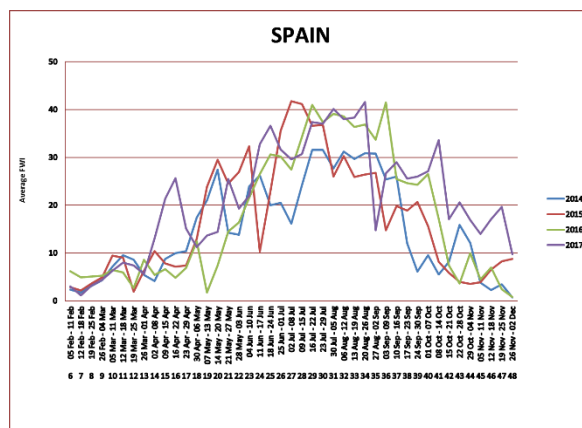
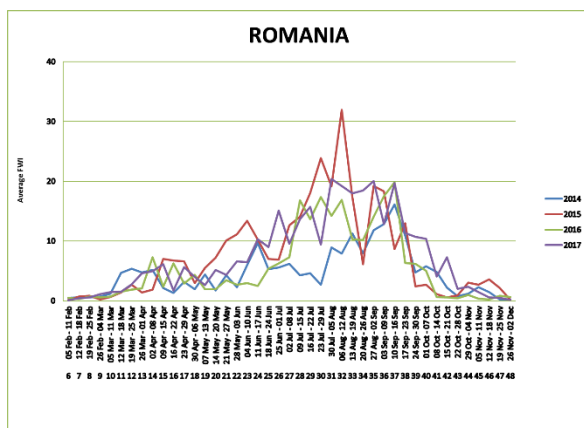
**NOTE:** In order to make the graphs more readable, 4 colour-coded scales have been used to present the FWI: **0-20** for the most northern countries where fire danger rarely reaches high levels; **0-40** for central countries, **0-50** for the Mediterranean and Turkey, and **0-60** for the MENA countries.

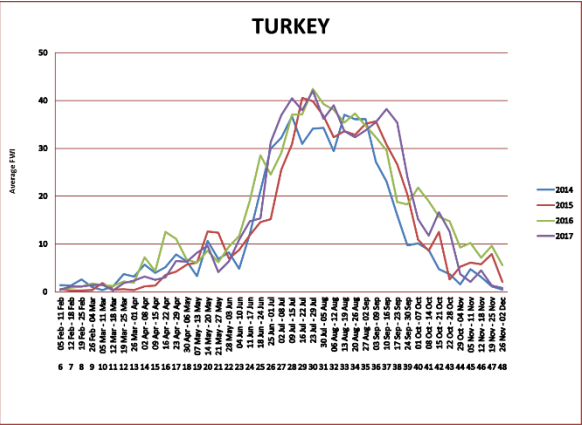




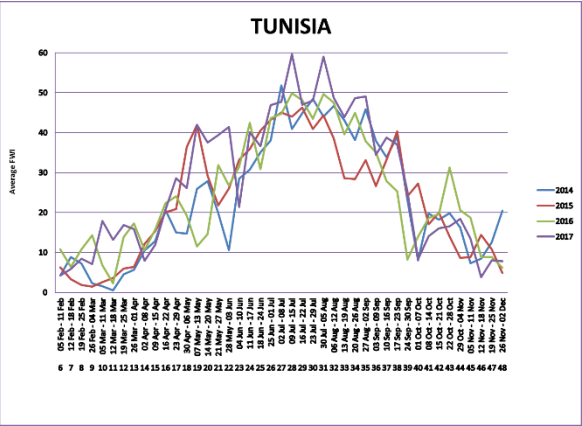
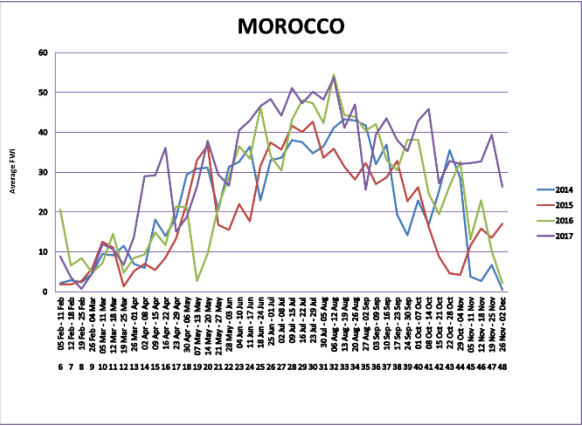
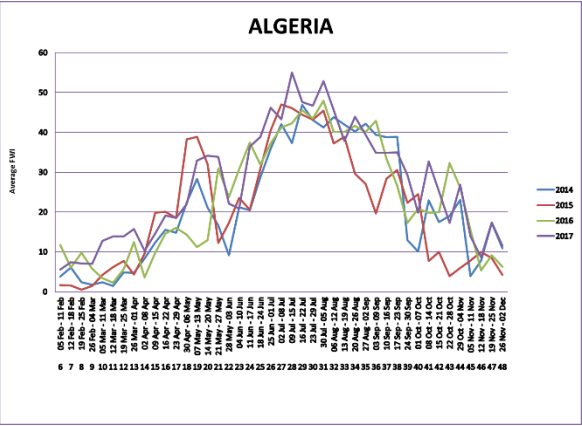








**MENA Countries**





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 117. 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.

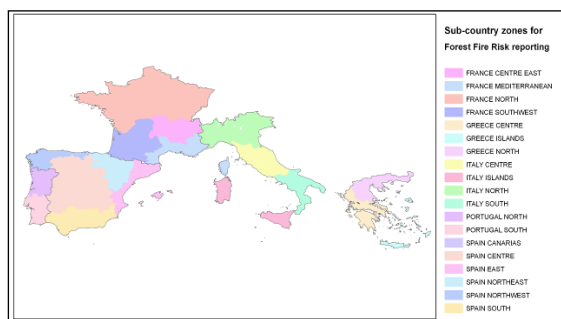


Figure 117. Sub-country regions identified for fire danger trend reporting in the five largest Mediterranean Member States.

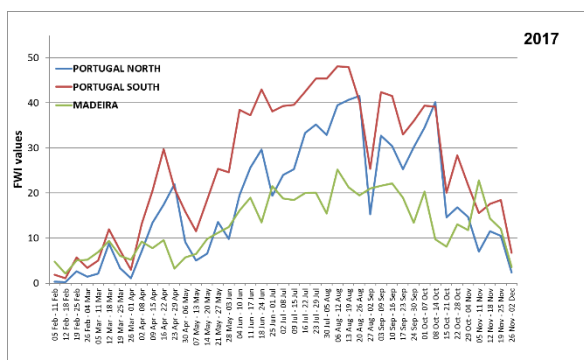


Figure 118. Fire danger trends in 2017 as determined by the Fire Weather Index (FWI) in the regions identified for Portugal.

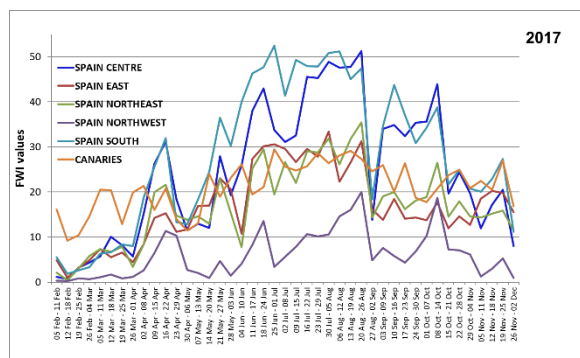


Figure 119. Fire danger trends in 2017 as determined by the Fire Weather Index (FWI) in the regions identified for Spain.

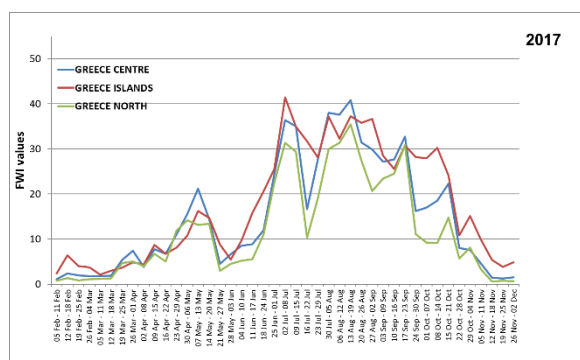


Figure 120. Fire danger trends in 2017 as determined by the Fire Weather Index (FWI) in the regions identified for Greece.

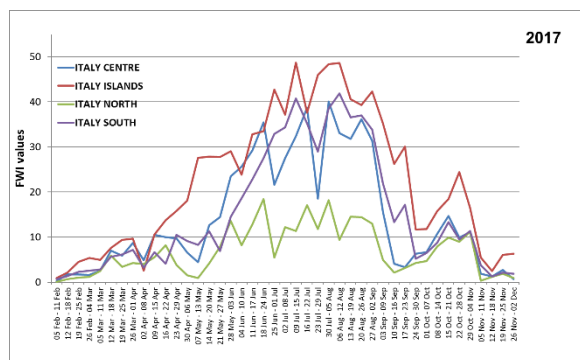


Figure 121. Fire danger trends in 2017 as determined by the Fire Weather Index (FWI) in the regions identified for Italy.

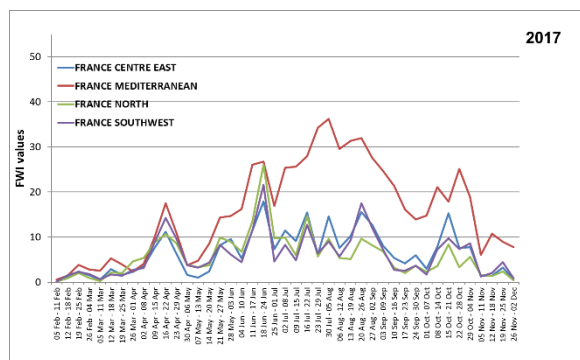


Figure 122. Fire danger trends in 2017 as determined by the Fire Weather Index (FWI) in the regions identified for France.

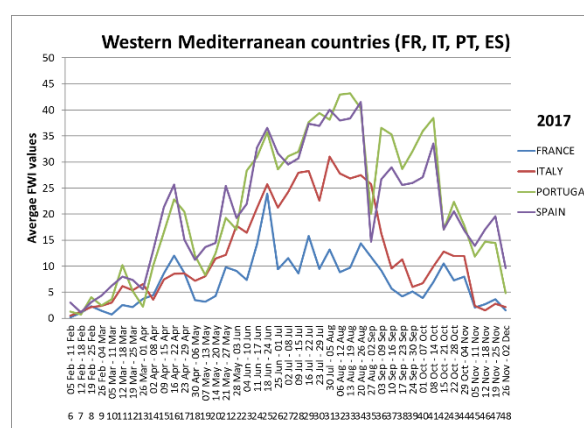
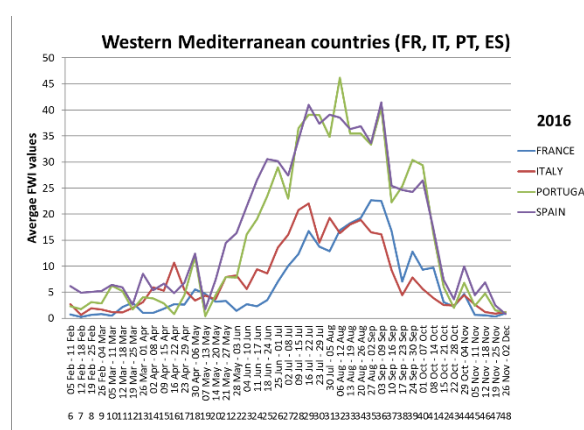
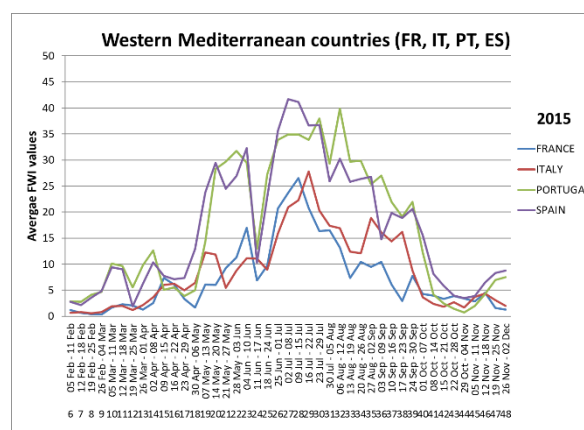


Figure 124. Fire danger trends 2015-2017 in western EU Mediterranean countries (FR, IT, PT, ES).

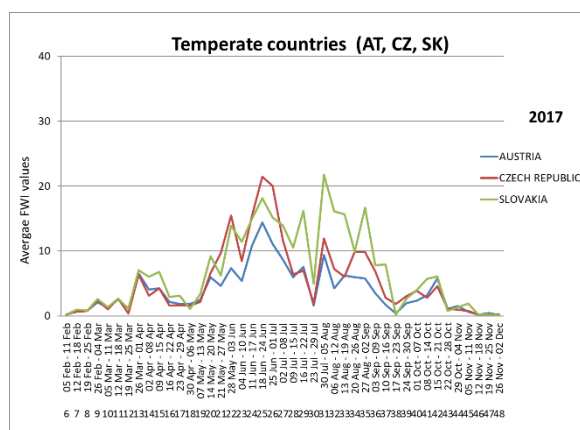
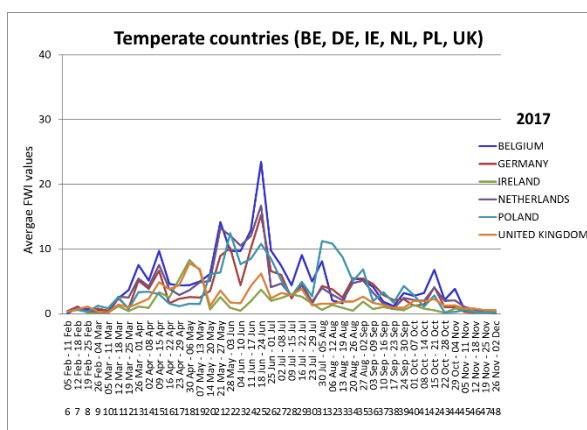
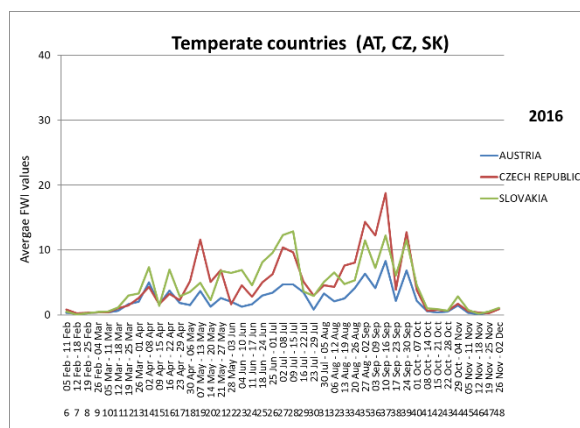
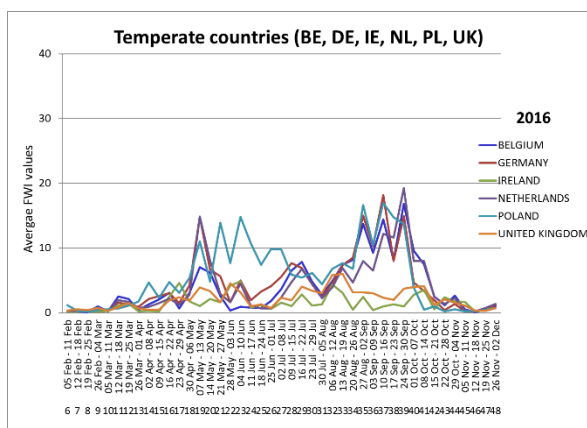
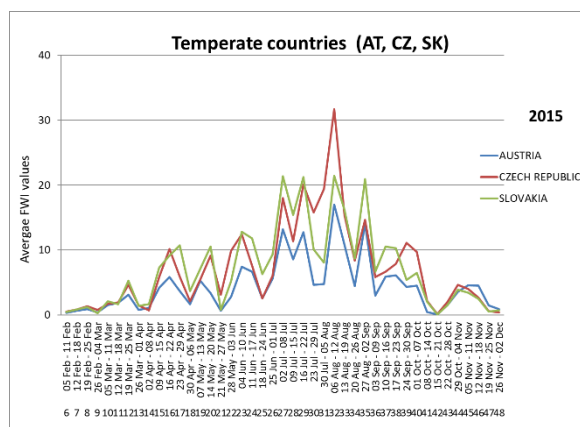
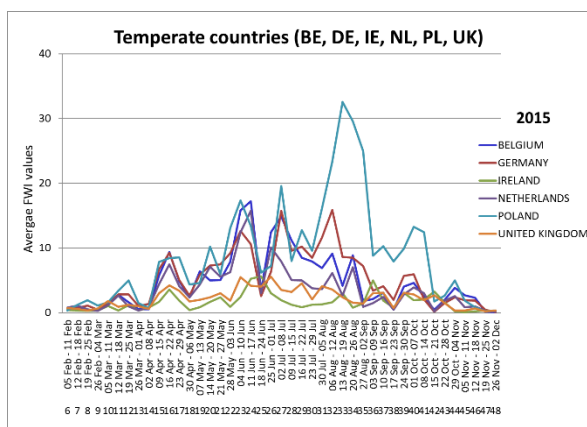


Figure 125. Fire danger trends 2015-2017 in some northern EU temperate countries (BE, DE, IE, NL, PL, UK).

Figure 126. Fire danger trends 2015-2017 in some central EU temperate countries (AT, CZ, SK).

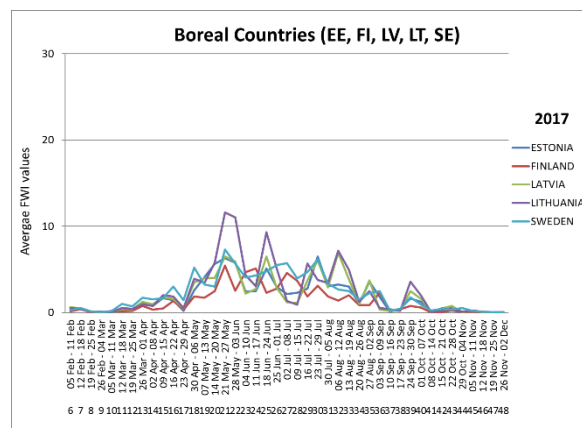
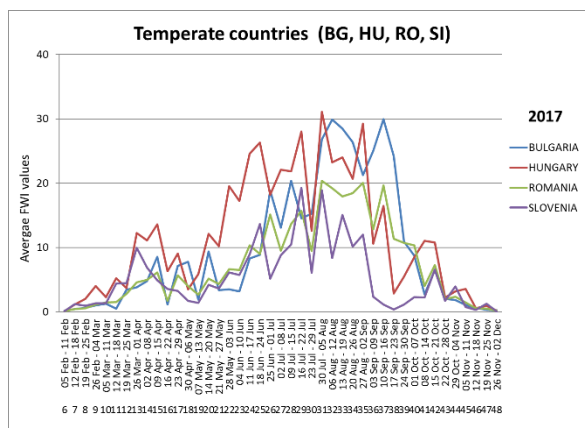
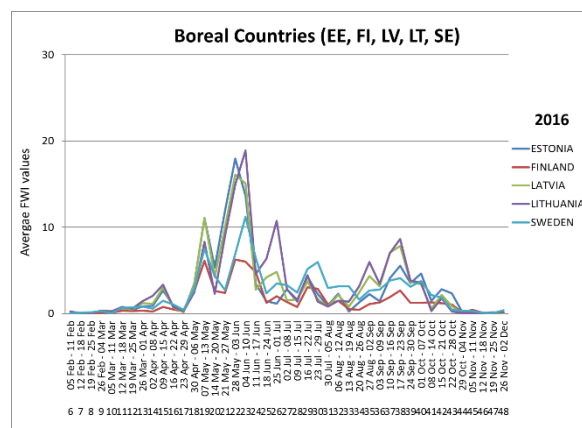
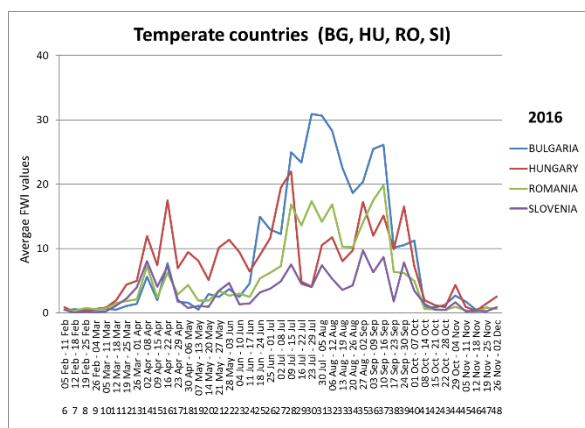
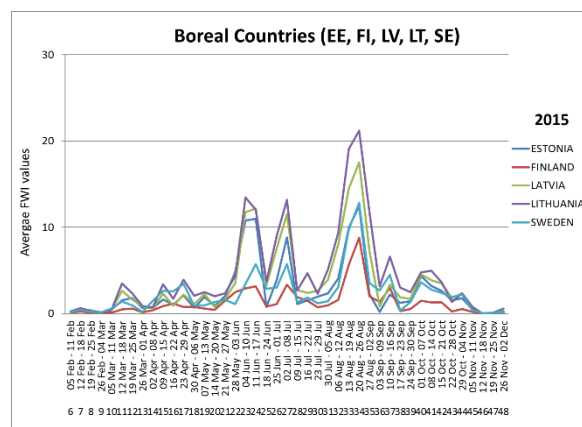
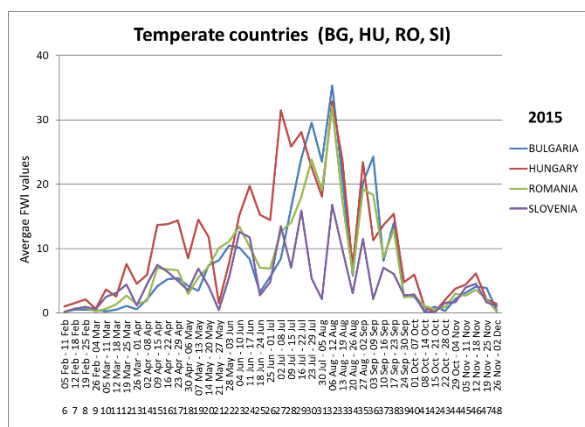
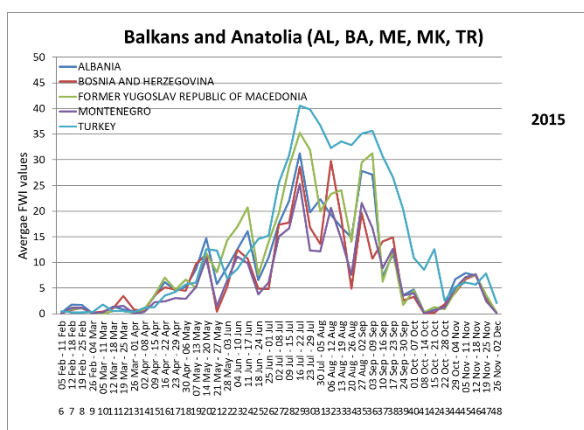


Figure 127. Fire danger trends 2015-2017 in some eastern EU temperate countries (BG, HU, RO, SI).

Figure 128. Fire danger trends 2015-2017 in some EU boreal countries (EE, FI, LV, LT, SE).







### 3.2 The EFFIS Rapid Damage Assessment: 2017 results

The Rapid Damage Assessment module of EFFIS was set up to provide reliable and harmonized 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 all fires of about 30 ha or larger to be mapped. In order to obtain the statistics of the burnt area by land cover type the data from the European CORINE Land Cover 2006 (CLC) database [9,10] were used. Therefore the mapped burned areas were overlaid with the CLC data, making it possible to derive 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 metres (red and near-infrared bands) and 5 bands with spatial resolution of 500 metres (blue, green, and three short-wave infrared bands). Mapping of burnt areas is based mainly on the 250 metre bands, although the MODIS bands at 500 metres 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 around 30 ha or larger. Although only a fraction of the total number of fires is mapped (fires smaller than 30 ha are not mapped), the analysis of historical fire data has determined that the area burned by wildfires of this size represents in most cases the large majority of the total area burned. On average, the area burned by fires of at least 30 ha accounts for about 75% of the total area burnt every year in the Southern EU.

Since 2008, EFFIS has included Northern African countries in the mapping of burned area, following the agreement with FAO *Silva Mediterranea*, the FAO statutory body that covers the Mediterranean region.

The results for each of the countries affected by forest fires of over 30 ha are given in the following paragraphs in alphabetical order, followed by a section on the MENA countries.

The total area burned in 2017, as shown by the analysis of satellite imagery, is shown in Table 41. These figures may also include agricultural and urban areas that were burned during the forest fires. Figure 131 shows the scars caused by forest fires during the 2017 season.

In 2017 fires of greater than 30 ha were observed in 34 countries and a total burnt area of 1 376 090 ha was mapped. This is more than double the previous year, and the highest amount ever recorded by EFFIS. Only a few countries in the south-east were less affected than in 2016. Values were higher than average from early in the year, becoming significantly higher by July. Huge fires in October, affecting Portugal and Spain, added a further 400 000 ha – more than the annual total of 2013, 2014 or 2015 - at a time when the fire season is usually relatively quiet (Figure 137 below).

Table 41. Areas burned by fires of at least 30 ha in 2017 estimated from satellite imagery.

<b>Country</b>	<b>Area (Ha)</b>	<b>Number of Fires</b>
Albania	42168.08	223
Algeria	89759.43	283
Bosnia & Herzegovina	83134.1	146
Bulgaria	5213.22	17
Croatia	67342.45	104
Cyprus	652.61	4
Czech republic	144.91	1
Denmark	130.39	2
Finland	233.96	4
France	20659.13	92
Georgia	853.97	1
Germany	56.67	1
Greece	19736.44	56
Hungary	458.28	3
Ireland	7241.12	18
Italy	140404.9	788
Kosovo under UNSCR 1244	4059.09	34
Latvia	34.52	1
Lebanon	45.36	1
Libya	233.96	3
Montenegro	51661.17	124
Morocco	4644.18	25
Norway	260.33	2
Portugal	563674.4	414
Romania	30480.05	65
Serbia	8170.02	37
Slovenia	187.65	2
Spain	131047.5	322
Sweden	732.85	8
Syria	5742.58	18
Former Yugoslav Republic of Macedonia	24969.34	87
Tunisia	19065.02	51
Turkey	47765.55	158
United Kingdom	5126.67	19
<b>TOTAL</b>	<b>1376090</b>	<b>3114</b>



Figure 131. Burnt scars produced by forest fires during the 2017 fire season.

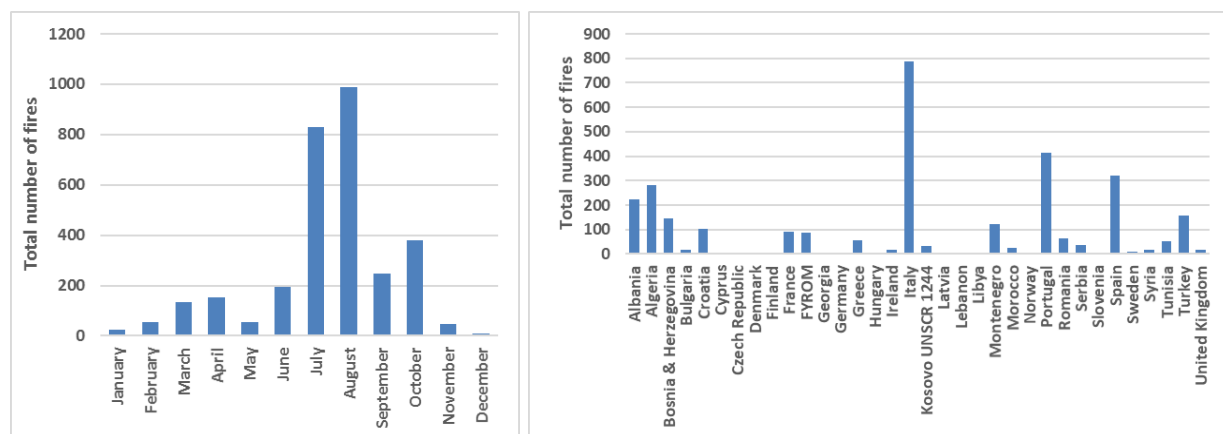


Figure 132. Total number of fires >30 ha by month and country in 2017.

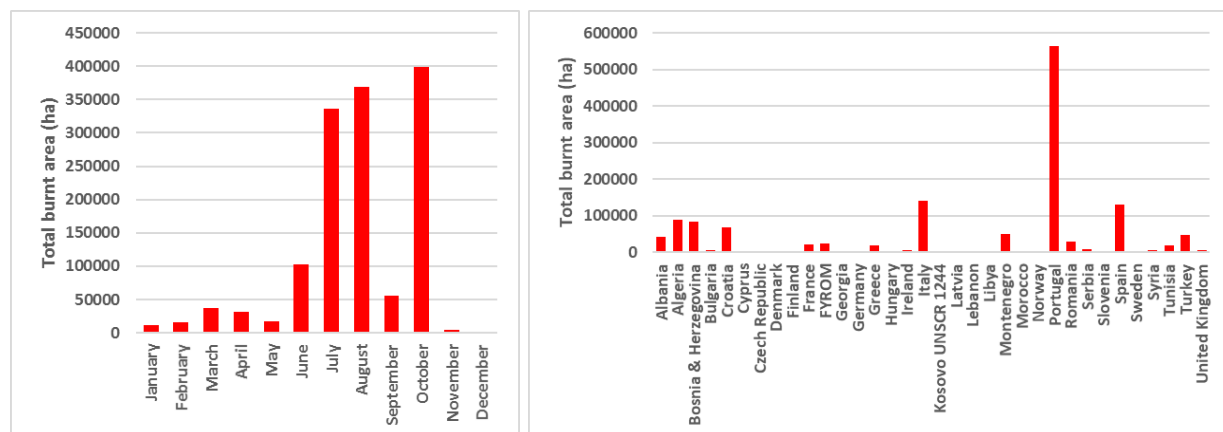


Figure 133. Total burnt area of fires >30 ha by month and country in 2017.

## Damage to Natura2000 sites

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.

The category of Natura2000 areas only exists in the countries of the European Union. Information on other protected areas outside the EU is presented for those countries for which the information is available. The area burnt within the Natura2000 and other protected sites is presented below.

Country	Area (Ha)	% of Natura2000 Area	Number of Fires
Bulgaria	4403.46	0.117	13
Cyprus	2.69	0.002	1
Czech Republic	144.91	0.013	1
Denmark	130.39	0.034	2
Finland	0.04	0	1
France	7115.47	0.104	48
Germany	56.67	0.001	1
Greece	4163.15	0.116	16
Hungary	458.28	0.023	3
Ireland	3442.37	0.378	7
Italy	52007.86	0.901	340
Latvia	34.52	0.005	1
Portugal	81490.46	4.265	124
Romania	29639.12	0.696	60
Slovenia	187.65	0.026	2
Spain	44742.81	0.326	144
Sweden	206.55	0.004	2
UK	799.59	0.045	7
<b>EU28 total</b>	<b>229026</b>		<b>773</b>
Albania	35.53	3.657	2
Algeria	12418.73	7.461	27
Morocco	341.74	0.045	3
<b>MENA total</b>	<b>12796</b>		<b>32</b>
<b>TOTAL</b>	<b>241822</b>		<b>805</b>

The total burnt in protected areas in 2017 was 241 822 ha, more than twice that recorded in 2016. Portugal was the most affected country in 2017, accounting for one third of the total Natura2000 burnt area, followed by Italy and Spain with around 20% each.

Summary	Total Area (Ha)
<b>EU28</b>	<b>993557.7</b>
<b>Other European countries</b>	<b>263041.7</b>
<b>Middle East and North Africa</b>	<b>119490.5</b>
<b>Natura2000 and protected sites</b>	<b>241821.99</b>

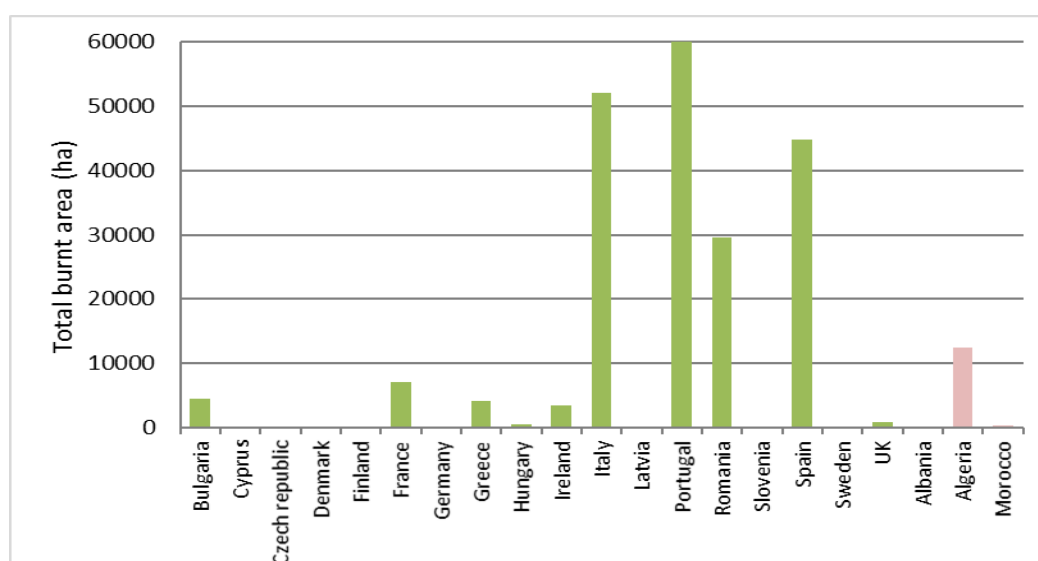
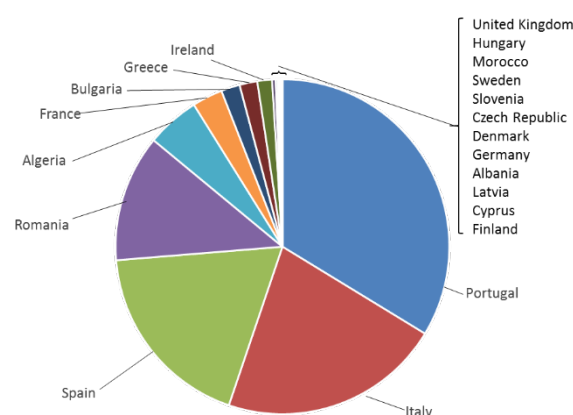
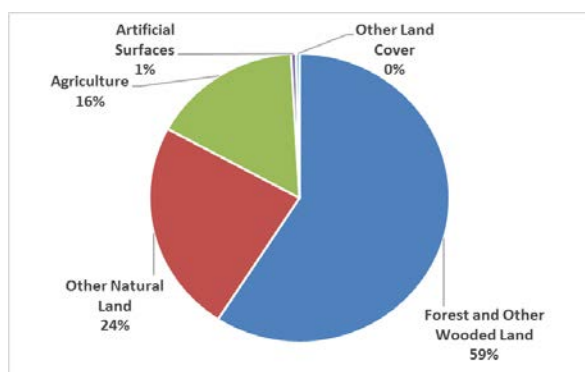


Figure 134. Burnt area in Natura2000 sites and other protected areas in 2017.

## Affected land cover types

59% of the burnt area in 2017 was in Forest and Other Wooded Land, as identified by the CORINE Land Cover Type classification system (Figure 135).



This is somewhat higher than the previous 6 years, when the proportion burnt in Forest and Other Wooded Land was around 45% on average.

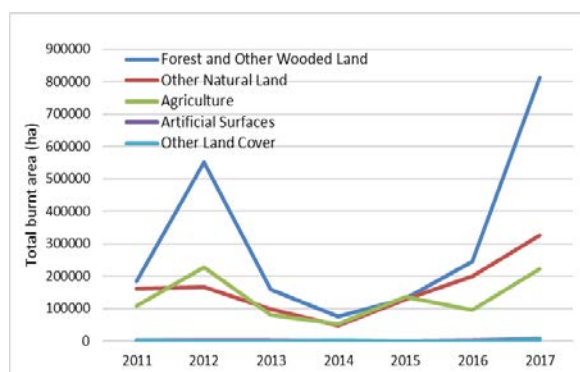


Figure 135. a) Proportions of land cover types affected in 2017 (all countries); b) Total burnt area by land cover type 2011-2017 (all countries).

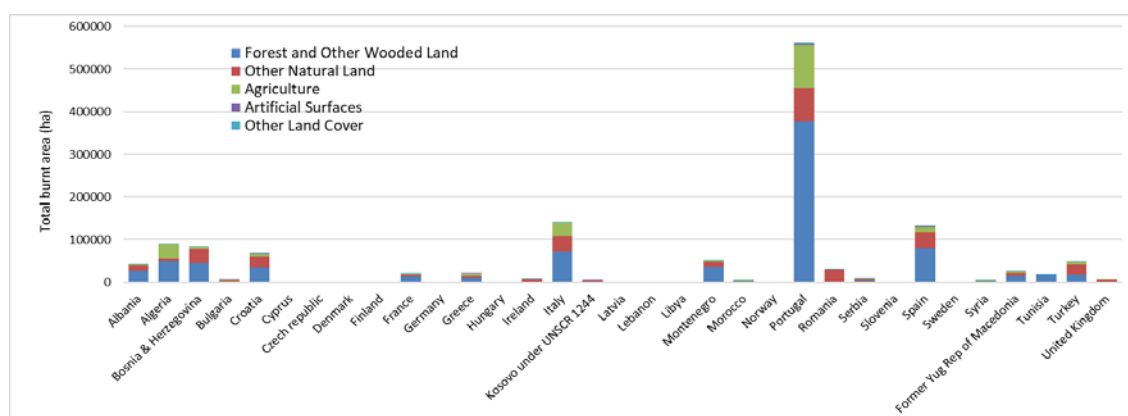


Figure 136. Burnt area in each country by CORINE land class

## European countries

In 2017, 19 of the EU28 countries were affected by fires of over 30 ha: (Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Portugal, Romania, Slovenia, Spain, Sweden, United Kingdom), burning 993 558 ha in total (three times the amount that was recorded in 2016, and the highest since EFFIS started mapping burnt areas). Of this total, 229 026 ha (23%) were on Natura2000 sites.

Although Portugal was by far the country with the highest burnt area, Italy recorded more fires over 30 ha than any other country, as shown by Figure 132 and Figure 133 above. Unusually, October was the worst month for burnt area; this is almost all from the extremely large fires in Portugal.

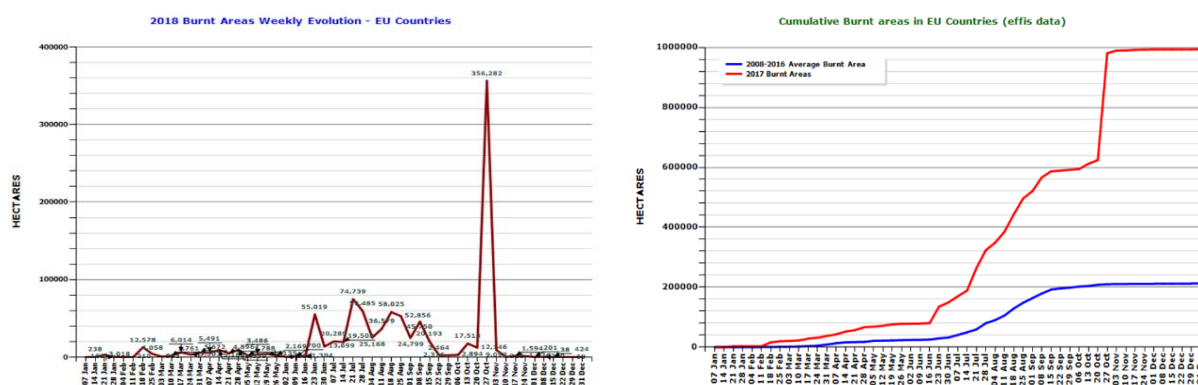


Figure 137. Burnt area weekly evolution and cumulative burnt area (European Union countries).



Burnt areas are split into different land cover types using the CLC 2006 database unless otherwise specified.

### 3.2.1 Albania

The total burnt area of 42 168 ha recorded in Albania was higher than the previous four years combined, although still below the amounts recorded in 2011 and 2012 (both over 50 000 ha). There were 223 fires of over 30 ha in 2017, ten times the number recorded in 2016. Most of them occurred in July and August. The largest fire of the year burnt 5 609 ha in Gjirokastrës Province in the south of the country, and 17 other fires over 500 ha were also recorded. The burnt area scars left by the 2017 fires in Albania can be seen in Figure 138.

Table 42. Distribution of burnt area (ha) in Albania by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	27082.18	64.22
Other Natural Land	13297.04	31.53
Agriculture	1639.16	3.89
Artificial Surfaces	141.09	0.33
Other Land Cover	8.57	0.02
<b>TOTAL</b>	<b>42168.04</b>	<b>100</b>

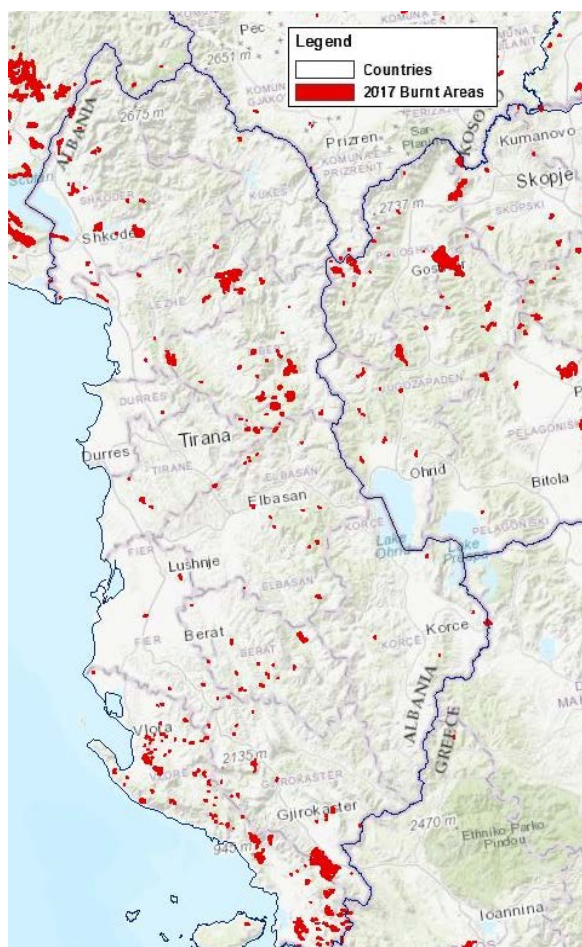


Figure 138. Visible fire scars in Albania 2017.

### 3.2.2 Bosnia and Herzegovina

In Bosnia-Herzegovina, similar to Albania, the 2017 total burnt area of 83 134 ha was more than the previous 4 years combined, making it the second worst season of the decade (after 2012), and among the worst affected countries of those covered by EFFIS. Three-quarters of the damage was recorded in July and August, but there was also significant damage in March. There were 40 fires with more than 500 ha mapped, including two of over 7 000 ha. Visible fire scars caused by forest fires in Bosnia-Herzegovina can be seen in Figure 140 below.

Table 43. Distribution of burnt area (ha) in Bosnia-Herzegovina by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	45055.22	54.2
Other Natural Land	31692.81	38.12
Agriculture	5709.75	6.87
Artificial Surfaces	16.62	0.02
Other Land Cover	659.68	0.79
<b>TOTAL</b>	<b>83134.09</b>	<b>100</b>

### 3.2.3 Bulgaria

Bulgaria had a somewhat better season in 2017, with only half the burnt area recorded compared with 2016. A total of 17 fires of over 30 ha were recorded, the majority in August. Four fires burnt more than 500 ha, with the largest occurring in Blagoevgrad burning 1 646 ha at the end of August. Of the annual total, 4 403 ha occurred on Natura2000 sites, amounting to 84% of the total and 0.117% of Natura2000 land. The scars caused by these fires can be seen in Figure 139 below.

Table 44. Distribution of burnt area (ha) in Bulgaria by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	1567.89	30.08
Other Natural Land	2218.92	42.56
Agriculture	1411.04	27.07
Artificial Surfaces	15.37	0.29
<b>TOTAL</b>	<b>5213.22</b>	<b>100</b>

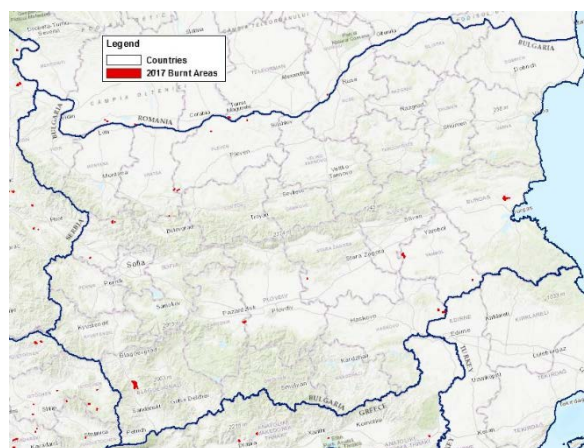


Figure 139. Fire scars in Bulgaria in 2017.



### 3.2.4 Croatia

It was the worst season by far in Croatia for more than a decade, and more than 7 times the average burnt area of the previous 10 years was recorded from 104 fires of over 30 ha. The season started early in March, when 31 large fires burnt over 10 000 ha, but most of the damage occurred in July and August. The largest fire of the season occurred in Splitsko-Dalmatinska Zupanija province in July and covered 5 122 ha, and there were 33 other fires over 500 ha.

The scars caused by these fires can be seen in Figure 140. Table 45 presents the distribution of the mapped burnt area by land cover type.

Table 45. Distribution of burnt area (ha) in Croatia by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	35052.66	52.05
Other Natural Land	24581.73	36.5
Agriculture	7063.98	10.49
Artificial Surfaces	598.42	0.89
Other Land Cover	45.65	0.07
<b>TOTAL</b>	<b>67342.44</b>	<b>100</b>

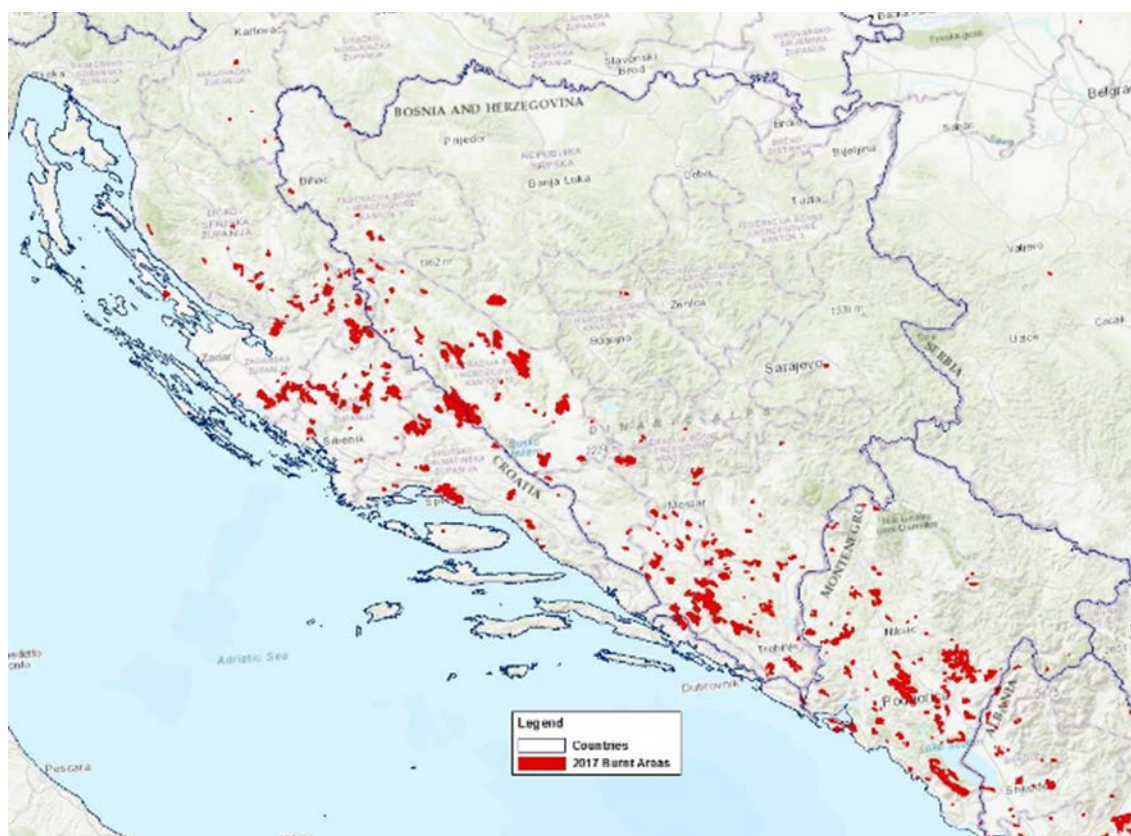


Figure 140. Burnt area scars in Croatia, Bosnia and Montenegro in 2017.

### 3.2.1 Cyprus

Cyprus had a relatively good year with just four fires over 30 ha. Almost all of the damage occurred in July. Of the total, less than 3 ha occurred on Natura2000 sites. Table 46 presents the distribution of the mapped burned area by land cover type.

Table 46. Distribution of burnt area (ha) in Cyprus by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	454.92	69.71
Other Natural Land	74.49	11.41
Agriculture	121.5	18.62
Artificial Surfaces	1.72	0.26
<b>TOTAL</b>	<b>652.61</b>	<b>100</b>

### 3.2.2 Czech Republic

The Czech Republic does not often experience large fires. In March 2017 a fire of 145 ha occurred on a Natura2000 site, mostly on Other Natural Land.

Table 47. Distribution of burnt area (ha) in Czech Republic by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	19.94	13.76
Other Natural Land	124.97	86.24
<b>TOTAL</b>	<b>144.91</b>	<b>100</b>

### 3.2.3 Denmark

Denmark is another Northern country with unusual fire activity in 2017. 2 fires occurred in May and June, burning a total of 130 ha, all on Natura2000 sites.

Table 48. Distribution of burnt area (ha) in Denmark by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	0.54	0.41
Other Natural Land	129.85	99.59
<b>TOTAL</b>	<b>130.39</b>	<b>100</b>

### 3.2.4 Finland

In Finland 4 fires burned a total of 234 ha between May and July. Natura2000 land was not affected.

Table 49. Distribution of burnt area (ha) in Finland by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	155.48	66.45
Other Natural Land	78.48	33.55
<b>TOTAL</b>	<b>233.96</b>	<b>100</b>

### 3.2.5 The former Yugoslav Republic of Macedonia

2017 was the worst year in the former Yugoslav Republic of Macedonia since 2012. 87 large fires burnt a total of 24 969 ha. Most of the damage was in July and August, but large fires occurred from February to November. The largest fire was in the Southwestern region and burnt over 5000 ha, and there were 9 other fires of over 500 ha. Visible scars from these fires can be seen in Figure 141.

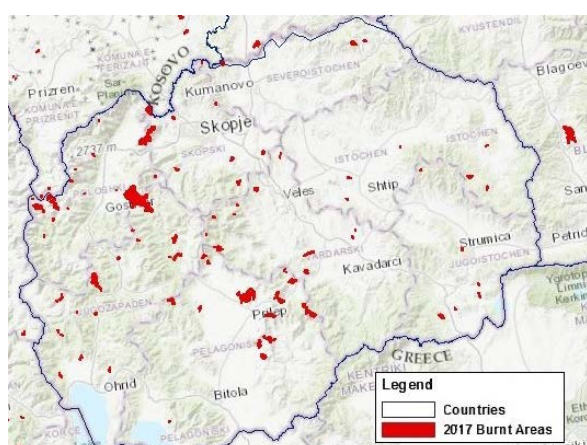


Figure 141. Fire scars in the former Yugoslav Republic of Macedonia 2017.

Table 50. Distribution of burnt area (ha) in the former Yugoslav Republic of Macedonia by land cover types in 2017.

<i>Land cover</i>	<i>Area</i>	<i>% of total</i>
Forest/Other Wooded Land	14653.05	58.68
Other Natural Land	7171.06	28.72
Agricultural Areas	3141.85	12.58
Artificial Surfaces	2.21	0.01
Other Land Cover	1.16	0
<b>TOTAL</b>	<b>24969.33</b>	<b>99.99</b>

### 3.2.6 France

France had a severe fire season. Twice the burnt area was recorded than occurred in 2016, which was itself the worst for more than a decade. Fires of over 30 ha were mapped in every month of the year, but nearly half of the damage occurred in July. In this month a total area of around 5000 ha was burnt in 3 very large fires on Corsica. In total 20 659 ha were affected by 92 fires of over 30 ha. Of this, 7 115 ha were on Natura2000 sites, corresponding to 34% of the total area burned, and 0.104% of the total Natura2000 areas in the country. Table 51 presents the distribution of the mapped burnt area by land cover type. The burnt scars left by the fires occurring in the southern region of the country and in northern Corsica are shown in Figure 142.

Table 51. Distribution of burnt area (ha) in France by land cover types in 2017.

<i>Land cover</i>	<i>Area</i>	<i>% of total</i>
Forest/Other Wooded Land	13171.05	63.75
Other Natural Land	5900.97	28.56
Agriculture	1334.87	6.46
Artificial Surfaces	216.08	1.05
Other Land Cover	36.16	0.18
<b>TOTAL</b>	<b>20659.12</b>	<b>100</b>



Figure 142. Visible burnt area scars in the South of France and Corsica in 2017.

### 3.2.7 Georgia

A fire of 854 ha was recorded in August at Borjomi, Samtskhe-Javakheti province.

### 3.2.8 Germany

A fire in a Natura site March caused 57 ha of damage in Germany, amounting to 0.001% of the Natura2000 area in the country.

Table 52. Distribution of burnt area (ha) in Germany by land cover types in 2017.

<i>Land cover</i>	<i>Area</i>	<i>% of total</i>
Forest/Other Wooded Land	33.67	59.42
Other Natural Land	22.99	40.58
<b>TOTAL</b>	<b>56.67</b>	<b>100</b>

### 3.2.9 Greece

Greece was one of the few countries that had a better season in 2017 than 2016, with a burnt area of around two-thirds of the previous year's total. 19 736 ha was mapped of which 4 163 ha occurred on Natura2000 sites, amounting to 21% of the total and 0.116% of the total Natura2000 area of Greece. Practically all of the damage occurred between July and September, including two fires of over 2 000 ha in Attiki province in August. Table 53 presents the distribution of the mapped burnt area by land cover type. Figure 143 shows the damage caused by forest fires in Greece.



Figure 143. Burnt area scars in Greece in 2017.

Table 53. Distribution of burnt area (ha) in Greece by land cover types in 2017.

<i>Land cover</i>	<i>Area</i>	<i>% of total</i>
Forest/Other Wooded Land	10111.52	51.23
Other Natural Land	4398.58	22.29
Agriculture	5170.06	26.2
Artificial Surfaces	56.26	0.29
<b>TOTAL</b>	<b>19736.43</b>	<b>100</b>

### 3.2.10 Hungary

In Hungary three fires of over 30 ha were mapped. All of the burnt area occurred on Natura2000 sites, representing 0.023% of the Natura2000 area in the country. Most of the damage came from one fire in August that covered 364 ha.

Table 54. Distribution of burnt area (ha) in Hungary by land cover types in 2017.

<i>Land cover</i>	<i>Area</i>	<i>% of total</i>
Other Natural Land	448.63	97.89
Agriculture	5.42	1.18
Other Land Cover	4.23	0.92
<b>TOTAL</b>	<b>458.28</b>	<b>100</b>

### 3.2.11 Ireland

Ireland's fire season was significantly worse than 2016, and comparable with 2015. Eighteen fires of over 30 ha burnt a total of 7241 ha, all but three of them occurring in May. More than half of the damage came from a single fire in the West province in early May that covered 3 865 ha (visible in Figure 144). 47% of the burnt area (3 442 ha) was recorded in Natura2000 sites, corresponding to 0.378% of the total Natura2000 land in the country. The most affected land type was Other Natural Land, as shown in Table 55.

Table 55. Distribution of burnt area (ha) in Ireland by land cover types in 2017.

<i>Land cover</i>	<i>Area</i>	<i>% of total</i>
Forest/Other Wooded Land	1315.41	18.17
Other Natural Land	5704.22	78.78
Agriculture	26.8	0.37
Other Land Cover	194.68	2.69
<b>TOTAL</b>	<b>7241.12</b>	<b>100</b>

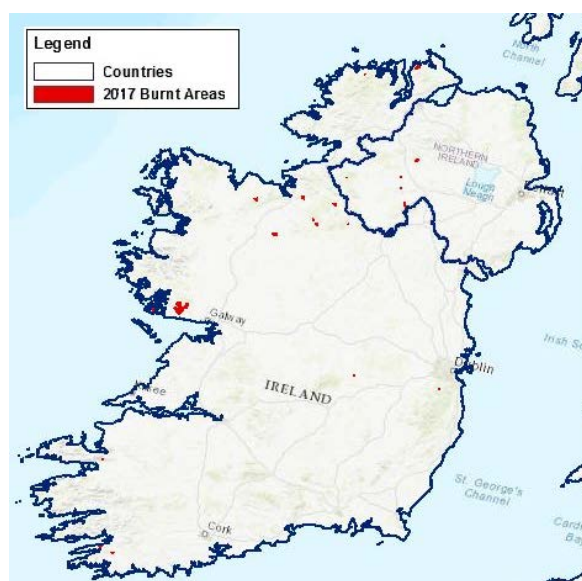


Figure 144. Burnt area scars in Ireland in 2017.



### 3.2.12 Italy

It was the worst fire season in Italy for a decade, with a burnt area of 140 405 ha. The most notable feature of the year, however, was the total number of fires, which was the highest recorded in any country in 2017 by a significant margin. 788 fires over 30 ha represents one quarter of all the fires mapped in 2017 and more than were observed in Portugal and Spain combined.



Figure 145. Monthly evolution of number of fires in Italy in 2017 compared with 10-year average.

The first major fire of the season was in January, when over 1 600 ha burnt in Imperia province, but large fires were also mapped in every other month from March to November. The largest fire of the year occurred in Torino province in late October and covered 3 533 ha (Figure 146).



Figure 146. Burnt area scars in Northern Italy showing the damage from early (January, Imperia) and late in the season (October, Torino).

Much of the damage occurred in July and August when over 300 fires were mapped in each of these months. Of the year's total, 52 008 ha of damage occurred on Natura2000 sites, corresponding to 37% of the total area burned, and 0.9% of the total Natura2000 area in the country. Notable fires include several affecting the Vesuvius National Park area (Figure 147).

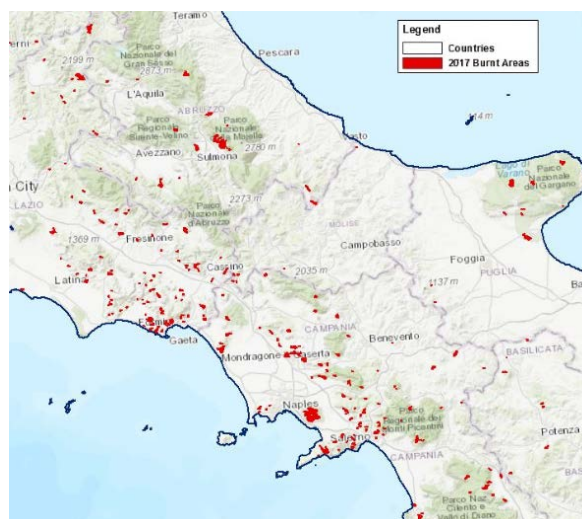


Figure 147. Burnt area scars in central and southern Italy, showing the significant damage around Vesuvius National Park.

The southern regions, Sicily and Sardinia were also heavily affected. Of the 41 fires over 500 ha mapped in 2017, 17 were in Sicily. Two fires around 3 000 ha were mapped in Trapani and Enna (Sicily) in July-August.



Figure 148. Visible fire scars in southern regions, Sicily and Sardinia in 2017.

Over half of the burnt area affected Forest and Other Wooded Land. Table 56 presents the distribution of the mapped burnt area by land cover type.

Table 56. Distribution of burnt area (ha) in Italy by land cover types in 2017.

Land cover	Area	% of total
Forest/Other Wooded Land	72118.7	51.36
Other Natural Land	36208.69	25.79
Agriculture	30813.82	21.95
Artificial Surfaces	1214.59	0.87
Other Land Cover	48.9	0.03
<b>TOTAL</b>	<b>140404.6</b>	<b>100</b>

### 3.2.13 Kosovo under UNSCR 1244

The fire season in Kosovo was the worst since 2012. 34 fires of over 30 ha burned a total of 4059 ha, mostly between August and September, but fires were also mapped from April to October. The largest fire of the season occurred in Kosovska Mitrovica province in August and covered 842 ha. Table 57 shows the classification of the burnt area by land type. The burnt area scars left by these fires can be seen in Figure 149.

Table 57. Distribution of burnt area (ha) in Kosovo by land cover types in 2017.

<i>Land cover</i>	<i>Area</i>	<i>% of total</i>
Forest/Other Wooded Land	2222.11	54.74
Other Natural Land	1091.93	26.9
Agriculture	707.84	17.44
Artificial Surfaces	37.21	0.92
<b>TOTAL</b>	<b>4059.08</b>	<b>100</b>

### 3.2.14 Latvia

In Latvia a fire of 35 ha was recorded in May, affecting a Natura2000 site on Forest and Other Wooded Land and representing 0.005% of the Natura2000 area of the country.

### 3.2.15 Montenegro

Montenegro's fire season was the worst for a decade. There were 124 fires of over 30 ha affecting a total of 51 661 ha, six times the area mapped in 2016. Fires were recorded through the year from February to November, although the worst of the damage occurred in July and August. The largest fire of the year burned 5 687 ha in Danilovgrad in July, but there were also 28 other fires larger than 500 ha. The scars from these fires can be seen in Figure 149, and Table 58 shows the classification of the burnt area by land type.

Table 58. Distribution of burnt area (ha) in Montenegro by land cover types in 2017.

<i>Land cover</i>	<i>Area</i>	<i>% of total</i>
Forest/Other Wooded Land	35968.59	69.62
Other Natural Land	12276.02	23.76
Agriculture	3219.96	6.23
Artificial Surfaces	47.84	0.09
Other Land Cover	148.74	0.29
<b>TOTAL</b>	<b>51661.15</b>	<b>100</b>

### 3.2.16 Norway

In Norway there were two fires in May that burned a total of 260 ha, mostly on Other Natural Land.

<i>Land cover</i>	<i>Area</i>	<i>% of total</i>
Forest/Other Wooded Land	43.3	16.63
Other Natural Land	217.03	83.37
<b>TOTAL</b>	<b>260.33</b>	<b>100</b>

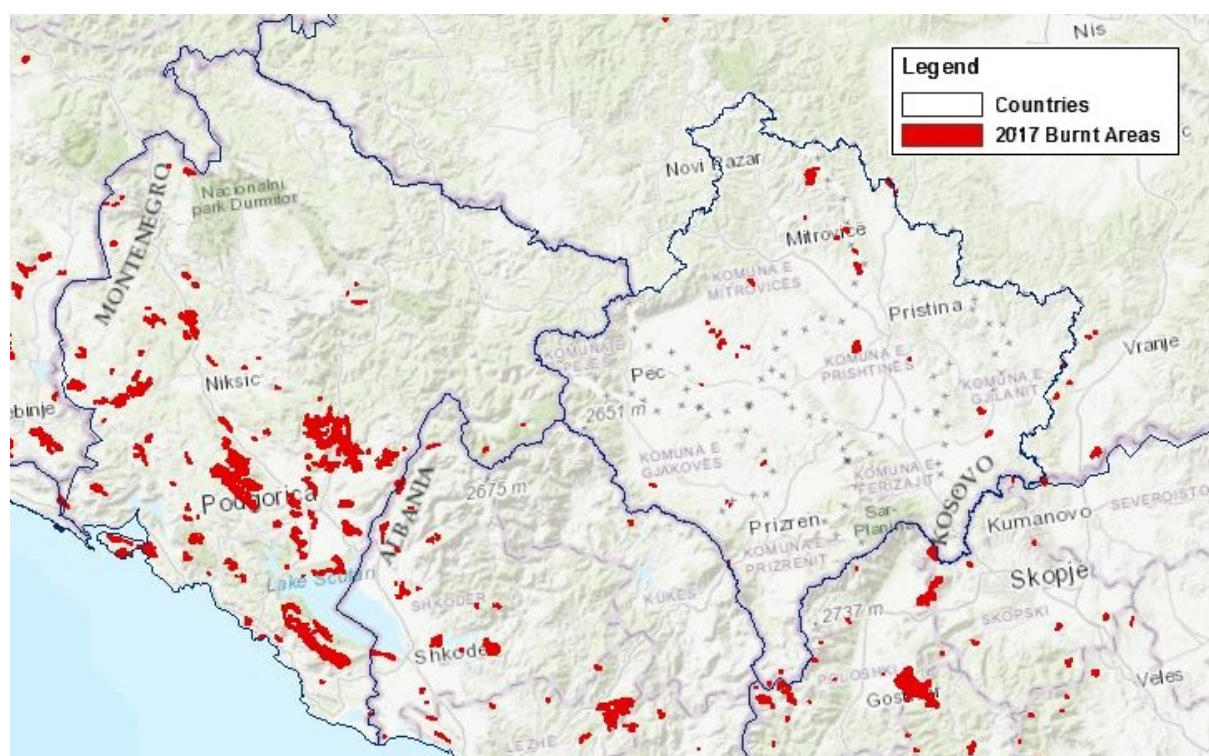


Figure 149. Visible fire scars in Montenegro and Kosovo in 2017.



### 3.2.17 Portugal

Portugal was by a huge margin the country most affected by forest fires, accounting for 41% of the entire burnt area mapped in 2017. There were fires of over 30 ha in every month of the year, and 2016's total (itself the worst for some years) was already surpassed in August.

The fire in Pedrógão Grande in mid-June was among the most deadly in history in terms of fatalities, but it was also remarkable for occurring relatively early in the season.

In October, the remnants of Hurricane Ophelia passed over the country, bringing strong dry southerly winds to a land already in drought conditions. Over a few days the annual burnt area total more than doubled. The damage in Portugal during one week in October exceeded the annual total of any other country mapped in the last decade.

While the number of large fires was greater than the 10-year average (Figure 150), the average size of these fires was significantly higher than usual, leading to unprecedented levels of damage (Figure 151). The fires were so large and so numerous that many merged together, making it problematic to classify the exact numbers and delimitations. 59 areas over 1 000 ha were mapped, and the largest burnt area (in Pinhal Interior Norte province in October, and probably comprising more than one fire) was mapped at over 67 000 ha.

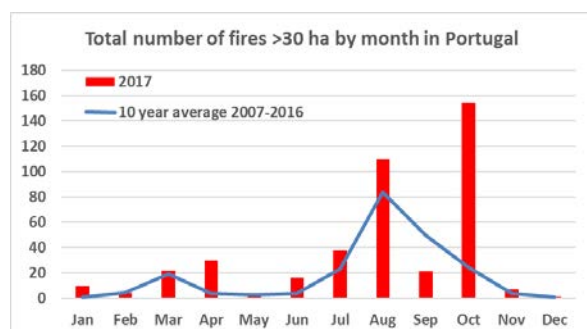


Figure 150. Monthly evolution of number of fires in Portugal in 2017 compared with 10-year average.

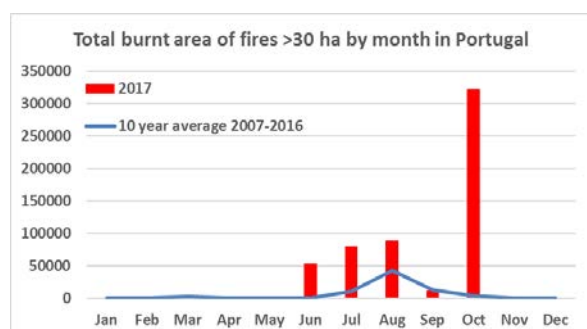


Figure 151. Monthly evolution of burnt area in Portugal in 2017 compared with 10-year average.

By the end of the year, 563 674 ha of burnt area had been recorded in Portugal, more than the previous 6 years put together and surpassing the total mapped over the whole of Europe, Middle East and North Africa in all but two of the last 10 years. The mapped burnt areas can be seen in Figure 155.

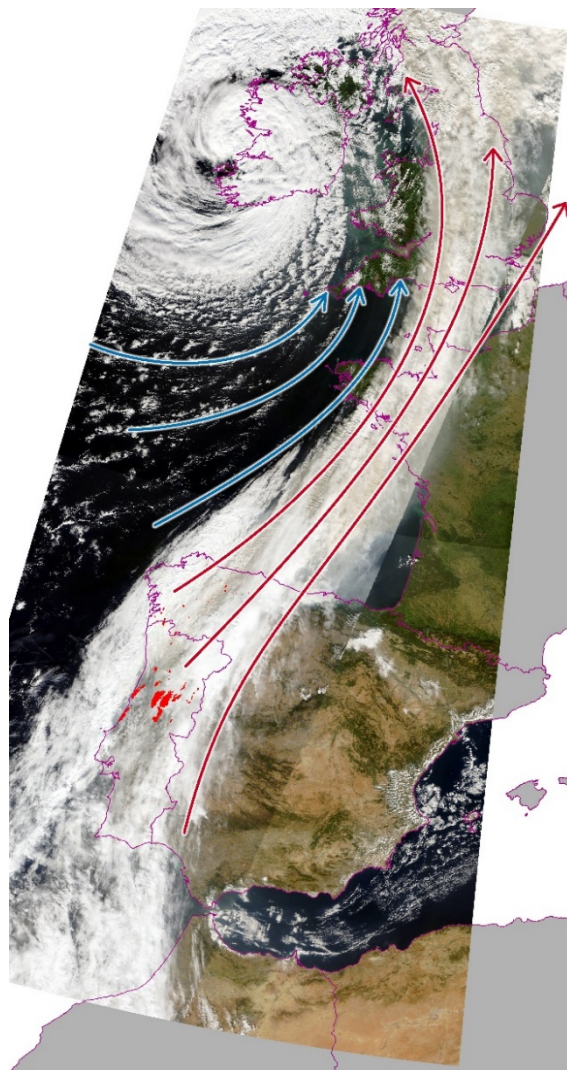


Figure 152. Path of Ophelia hurricane in October 2017 with fire scars superimposed showing south-north elongation caused by the strong winds.

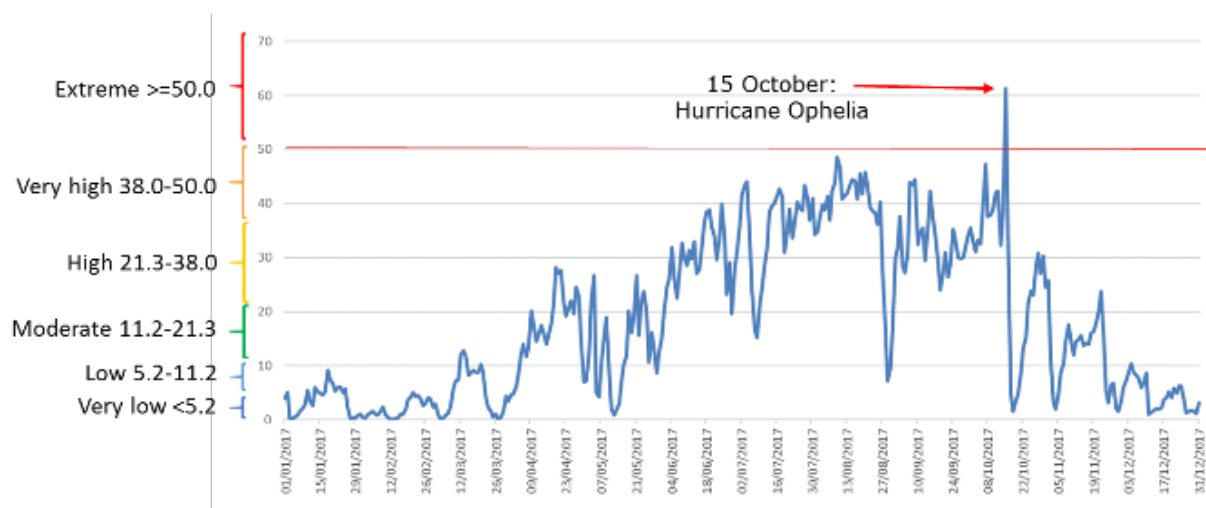


Figure 153. Daily average Fire weather Index over Portugal in 2017.

81 490 ha of the burnt area mapped in 2017 occurred on Natura2000 sites, corresponding to 14.4% of the total area burnt, and 4.3 % of the total Natura2000 areas in Portugal.

The distribution of the mapped burnt area by land cover type is shown in Table 59. Forest and Other Wooded Land was heavily affected, accounting for around two-thirds of the mapped burnt area (Figure 154).

Table 59. Distribution of burnt area (ha) in Portugal by land cover types in 2017.

Land cover	Area burned	% of total
Forest/Other Wooded Land	377967.8	67.05
Other Natural Land	78341.47	13.9
Agriculture	99168.29	17.59
Artificial Surfaces	4481.07	0.79
Other Land Cover	3715.67	0.66
<b>TOTAL</b>	<b>563674.29</b>	<b>100</b>

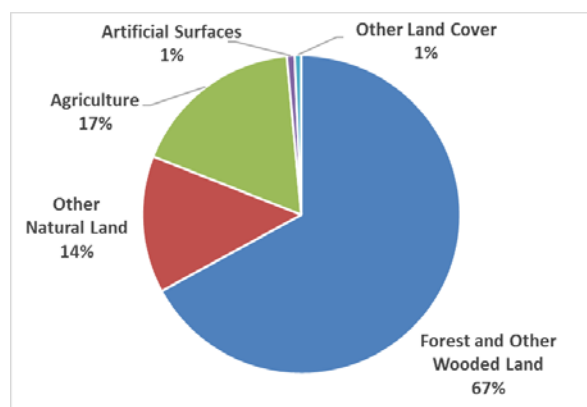


Figure 154. Distribution of burnt area (ha) in Portugal by land cover types in 2017.

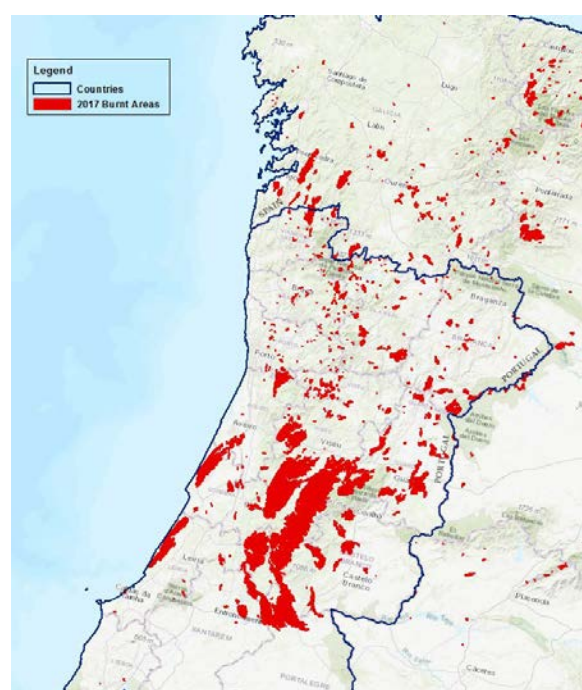


Figure 155. Burnt area scars in central and northern Portugal in 2017.

### 3.2.18 Romania

Romania's fire season was also the worst seen for several years, with a total burnt area larger than the previous 6 years combined. The fire season was long, with fires over 30 ha occurring from January to November. Two-thirds of the damage occurred between January and March, and much of the rest of the damage occurred in October. There were 12 fires of over 500 ha, all in Tulcea province, the largest of which covered over 4000 ha (Figure 156). As in previous years, almost all (97%) of the mapped burnt area was on Natura2000 sites. This represents 0.696% of the total Natura2000 area of Romania. Table 60 presents the distribution of the mapped burnt area by land cover type.

Table 60. Distribution of burnt area (ha) in Romania by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	1009.59	3.31
Other Natural Land	28365.19	93.06
Agriculture	990.55	3.25
Artificial Surfaces	6.62	0.02
Other Land Cover	108.1	0.35
<b>TOTAL</b>	<b>30480.05</b>	<b>100</b>

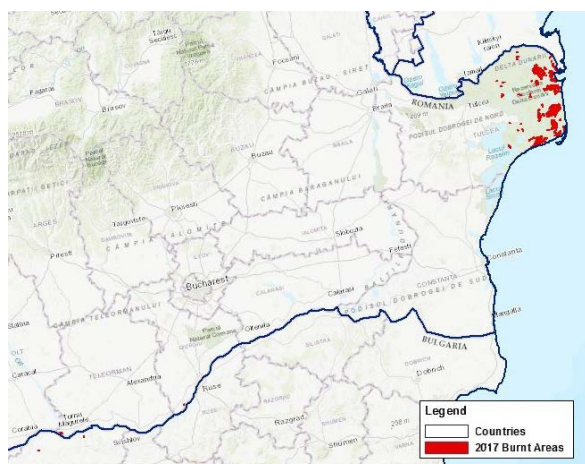


Figure 156. Burnt area scars in the eastern part of Romania in 2017.

### 3.2.19 Serbia

The fire season in Serbia was the worst since 2012, with 37 fires of over 30 ha burning a total of 8 170 ha. There were two peaks in the season; one in March when around 25% of the damage occurred, and the second around August, when the largest fire of the season also occurred (1 058 ha in Severno-Banatski province). Table 61 presents the breakdown of burnt area by land cover type. Figure 157 shows the location of these fires.

Table 61. Distribution of burnt area (ha) in Serbia by land cover type in 2017.

<i>Land cover</i>	<i>Area</i>	<i>% of total</i>
Forest/Other Wooded Land	3005.37	36.79
Other Natural Land	3339.83	40.88
Agriculture	1794.61	21.97
Artificial Surfaces	8.01	0.1
Other Land Cover	22.21	0.27
<b>TOTAL</b>	<b>8170.02</b>	<b>100.01</b>

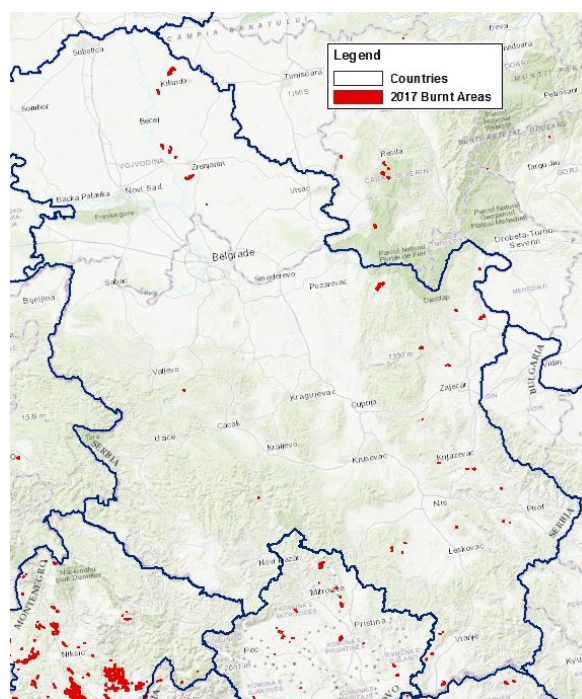


Figure 157. Burnt area scars in Serbia in 2017.

### 3.2.20 Slovenia

Slovenia was one of relatively few countries having a less severe fire season in 2017 than 2016. 2 fires of just over 90 ha each occurred in March and August, all on Natura2000 land, accounting for 0.026% of the Natura2000 area of the country. Table 62 presents the distribution of the mapped burned area by land cover type.

Table 62. Distribution of burnt area (ha) in Slovenia by land cover types in 2017.

<i>Land cover</i>	<i>Area</i>	<i>% of total</i>
Forest/Other Wooded	70.74	37.7
Other Natural Land	87.07	46.4
Agriculture	29.84	15.9
<b>TOTAL</b>	<b>187.65</b>	<b>100</b>



### 3.2.21 Spain

Spain was the third most affected country in terms of both numbers of fires and burnt area in 2017, after Portugal and Italy. 322 fires burned a total of 131 048 ha, the highest total since 2012 and as much as the last three years combined. There were fires over 30 ha in every month of the year, but over 40% of the damage occurred in October (Figure 158), much of it as a consequence of the hurricane Ophelia that also affected Portugal (Figure 152 above). 52 fires were mapped over 500 ha, two of them over 10 000 ha (in Leon and Huelva provinces).

Of the total burnt area mapped in 2017, 44 743 ha were on Natura2000 sites, corresponding to 34% of the total area burned, and 0.326% of the Natura2000 areas in Spain. Table 63 presents the distribution of the mapped burnt area by land cover type. The most noticeable fires in Spain during 2017 are shown in Figure 159.

Table 63. Distribution of burnt area (ha) in Spain by land cover type in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	79955.92	61.01
Other Natural Land	36434.81	27.8
Agriculture	14248.43	10.87
Artificial Surfaces	323.4	0.25
Other Land Cover	84.95	0.06
<b>TOTAL</b>	<b>131047.51</b>	<b>99.99</b>

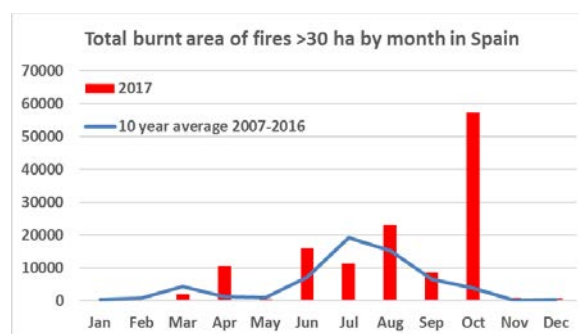


Figure 158. Monthly evolution of burnt area in Spain in 2017 compared with 10-year average.

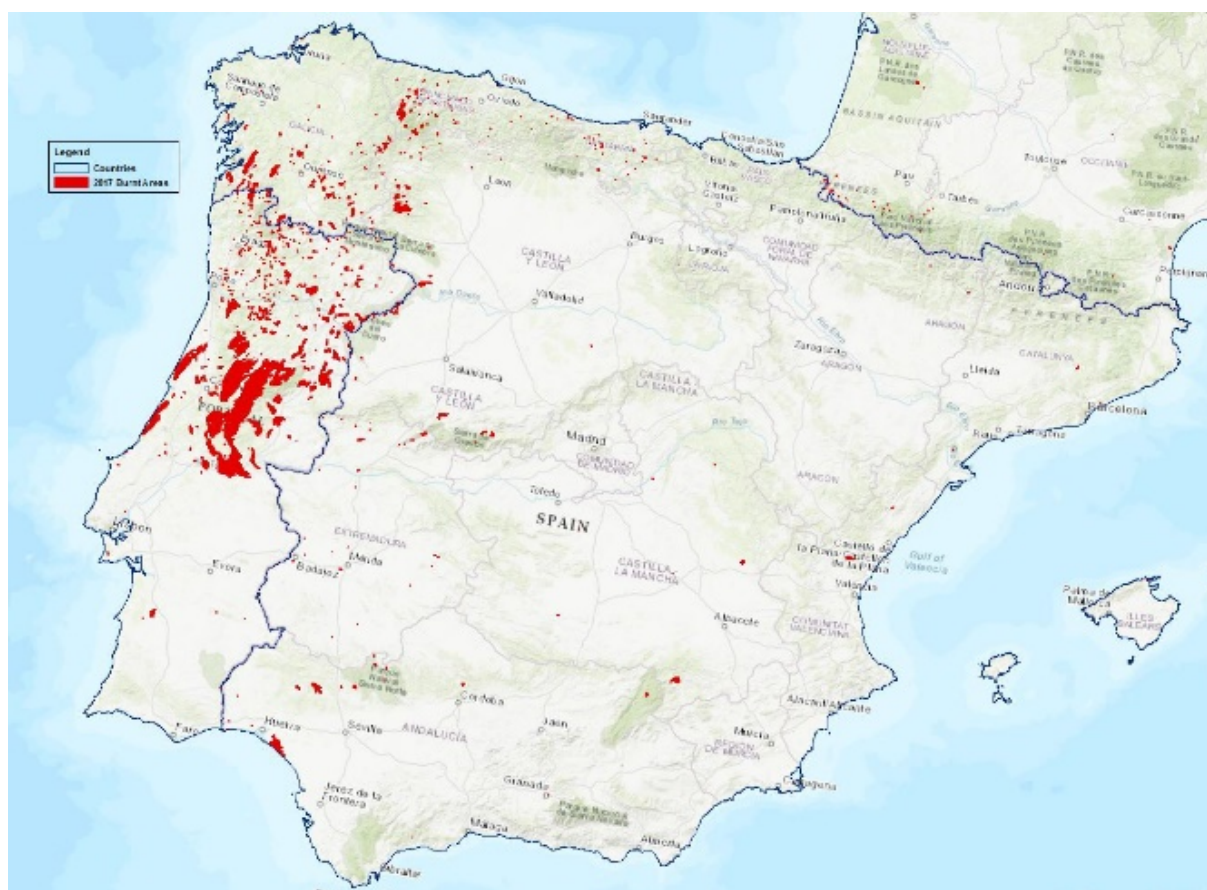


Figure 159. Burnt area scars in the Iberian Peninsula in 2017.

### 3.2.22 Sweden

In Sweden there were eight fires over 30 ha mapped in 2017. This is significantly more than the amount recorded in the last two years (although still far from the 2014 total, which included one of the largest fires ever seen in Sweden). Of the total burnt area mapped, 207 ha occurred on Natura2000 sites, amounting to 28% of the total and 0.004% of the Natura2000 area of the country.

Table 64. Distribution of burnt area (ha) in Sweden by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	400.99	54.72
Other Natural Land	331.86	45.28
<b>TOTAL</b>	<b>732.85</b>	<b>100</b>

### 3.2.23 Turkey

Turkey's fire season was significantly better than 2016, with less than 40% the burnt area of that year. 158 fires burned a total of 47 766 ha, mostly between July and September. The south-east of the country was the worst affected but some very large fires were also mapped in the west. There were 24 fires of more than 500 ha, and the largest of the year in Mardin province covered over 2500 ha. As in previous years, Other Natural Land including transitional woodland/shrubland was the most affected land type. Table 65 presents the distribution of the mapped burned area by land cover type. The visible scars from forest fires in the south-east of the country are shown in Figure 160.

Table 65. Distribution of burnt area (ha) in Turkey by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	18192.16	38.09
Other Natural Land	22676.72	47.48
Agriculture	6839.53	14.32
Artificial Surfaces	34.25	0.07
Other Land Cover	22.86	0.05
<b>TOTAL</b>	<b>47765.53</b>	<b>100.01</b>

### 3.2.24 United Kingdom

In the UK there were 19 fires of over 30 ha, which burned a total of 5 126 ha, more than the last three years and comparable with 2013. Most of the damage occurred in May, including one fire of over 1 550 ha in Caithness & Sutherland and Ross & Cromarty province. There were three other fires of more than 500 ha, affecting Scotland, Wales and Northern Ireland. 800 ha of this occurred on Natura2000 land, amounting to 15.5% of the total burnt area and 0.045% of the Natura2000 land in the UK. Table 66 presents the distribution of the mapped burnt area by land cover type.

Table 66. Distribution of burnt area (ha) in the UK by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	255.49	4.98
Other Natural Land	4854.71	94.7
Agriculture	16.39	0.32
Other Land Cover	0.08	0
<b>TOTAL</b>	<b>5126.67</b>	<b>100</b>



Figure 160. Burnt area scars in Turkey in 2017.



### 3.3 Middle East and North Africa

The 2017 fire season in North Africa and the Middle East was somewhat worse than average, with a total burnt area recorded over the region of 119 491 ha, around three times the amount recorded in 2016. The most affected MENA countries were Algeria and Tunisia, amounting to around 75% and 16% of the total respectively.

#### 3.3.1 Algeria

Algeria was the most affected of the MENA countries and the fourth most affected of all the countries covered by EFFIS. Almost all the fires occurred in July and August. The mapped burnt area of 89 759 ha was the highest since 2012, although well below the amount that burned then (over 200 000 ha). 283 fires of over 30 ha were recorded, of which 35 were over 500 ha. The largest covered 4 717 ha and occurred at the end of July in Et-Tarf province in the north-east of the country. In 2017, 12 419 ha of Protected Areas were burnt, amounting to 36% of the total burnt and 0.084% of the protected area in Algeria. The burnt scars left by these fires can be seen in Figure 161 below. The Globcover land cover map from ESA was used to split the burnt area into different land type categories, harmonised with CLC terminology, and the distribution of burnt area by these land cover types is given in Table 67.

Table 67. Distribution of burnt area (ha) in Algeria by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	48897.4	54.48
Other Natural Land	6895.31	7.68
Agriculture	33924.73	37.8
Other Land Cover	41.95	0.05
<b>TOTAL</b>	<b>89759.39</b>	<b>100.01</b>

#### 3.3.2 Lebanon

In Lebanon a fire in September burned 45 ha, mostly in Forest/Other Wooded Land. Table 68 presents the distribution of the mapped burnt area by land cover type using the Globcover land cover map, harmonised with CLC.

Table 68. Distribution of burnt area (ha) in Lebanon by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	38.33	84.49
Agriculture	7.03	15.51
<b>TOTAL</b>	<b>45.36</b>	<b>100</b>

#### 3.3.3 Libya

There were three fires over 30 in Libya between June and November, covering a total of 234 ha. Three-quarters of the damage (168 ha) came from one fire in September. Table 69 presents the distribution of the mapped burnt area by land cover type using the Globcover land cover map, harmonised with CLC.

Table 69. Distribution of burnt area (ha) in Lebanon by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	94.69	40.47
Other Natural Land	14.41	6.16
Agriculture	124.86	53.37
<b>TOTAL</b>	<b>233.96</b>	<b>100</b>

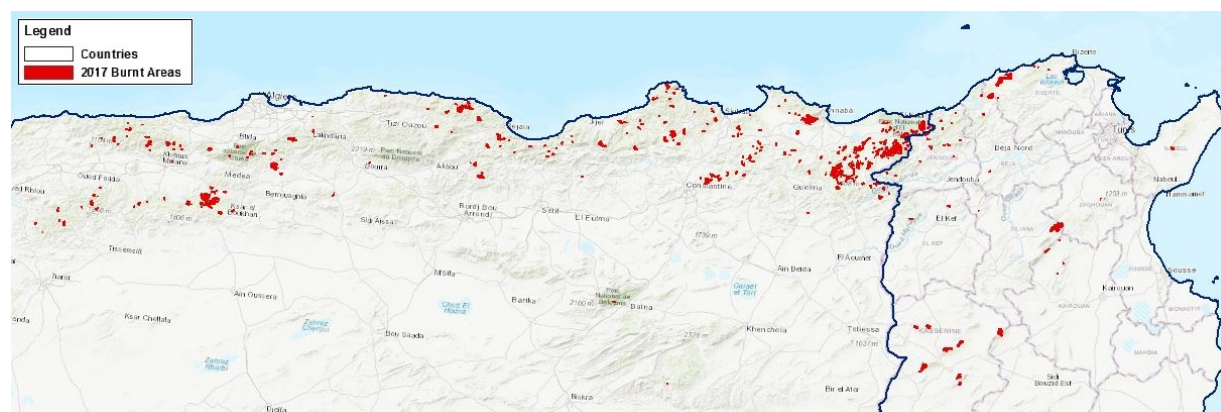


Figure 161. Burnt area scars in Algeria and Tunisia in 2017.

### 3.3.4 Morocco

Morocco's fire season was a little worse than that of 2016. 25 fires burned a total of 4 644 ha between April and December, two-thirds of the damage occurring in July. Much of this came from the largest fire of the year in Jerada province at the end of July (1 470 ha). Of the annual total, 342 ha occurred in Protected Areas, amounting to 7% of the total burnt in the year and 0.045% of the total protected areas of the country. The distribution of burnt area by land cover types, using Morocco's own land cover map but with terminology harmonised with CLC, is given in Table 70 and the burnt area scars left by the fires are shown in Figure 162.

Table 70. Distribution of burnt area (ha) in Morocco by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	2957.08	63.7
Other Natural Land	62.95	1.36
Agriculture	1622.43	34.95
<b>TOTAL</b>	<b>4642.46</b>	<b>100</b>

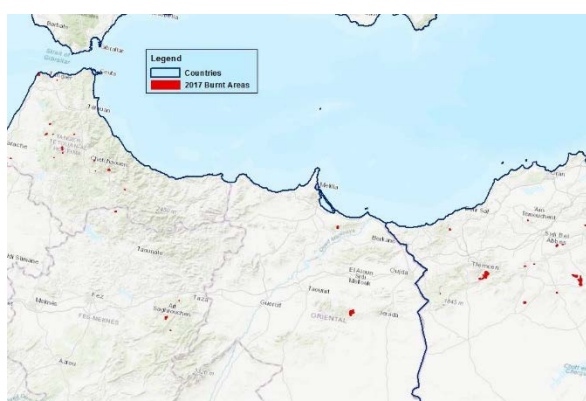


Figure 162. Burnt area scars in Morocco and western Algeria in 2017.

### 3.3.5 Syria

Although three times as much area was burnt in 2017 compared with 2016, it was still significantly less than the amount recorded in 2015, when over 90 000 ha was burnt. There were 18 fires of over 30 ha recorded between May and November, mostly near the start of the season, resulting in a total burnt area of 5 743 ha. The largest fire occurred in Dar'a province at the end of May and covered 2 512 ha, and there were two other fires of over 500 ha. The Globcover land cover map, harmonised with CLC, was used to split the burnt area into different land type categories.

Table 71 shows the distribution of burnt area in Syria by land type and the burnt area scars left by the fires can be seen in Figure 163.

Table 71. Distribution of burnt area (ha) in Syria by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	3705.15	64.52
Other Natural Land	69.23	1.21
Agriculture	1968.2	34.27
<b>TOTAL</b>	<b>5742.58</b>	<b>100</b>

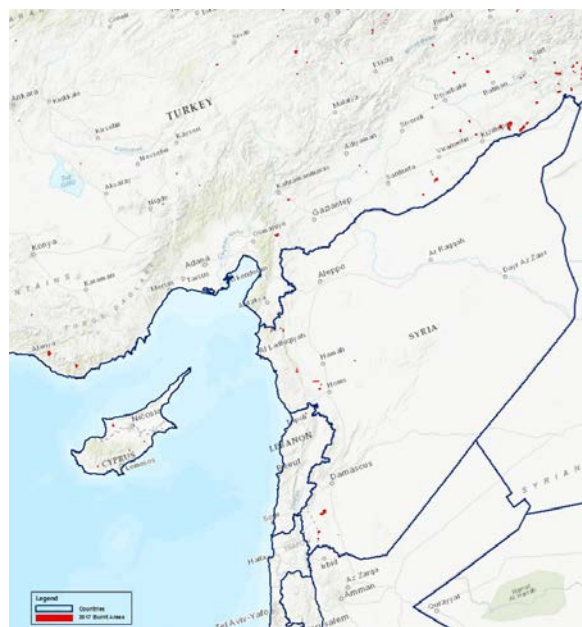


Figure 163. Burnt area scars in Syria in 2017.

### 3.3.6 Tunisia

In Tunisia it was the worst year for forest fires for nearly a decade. There were 51 fires greater than 30 ha recorded between June and September, burning a total of 19 065 ha. 60% of the damage occurred in August, including two fires over 3000 ha in Jendouba and Siliana provinces. Figure 161 on page 123 shows the burnt scars left by these fires. The distribution of burnt area by land cover types using Tunisia's own land cover map but with terminology harmonised with CLC, is given in Table 72.

Table 72. Distribution of burnt area (ha) in Tunisia by land cover types in 2017.

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest/Other Wooded Land	17709.22	92.89
Other Natural Land	93.52	0.49
Agriculture	1221.6	6.41
	3.54	0.02
	37.12	0.19
<b>TOTAL</b>	<b>19065</b>	<b>100</b>

## Summary overview

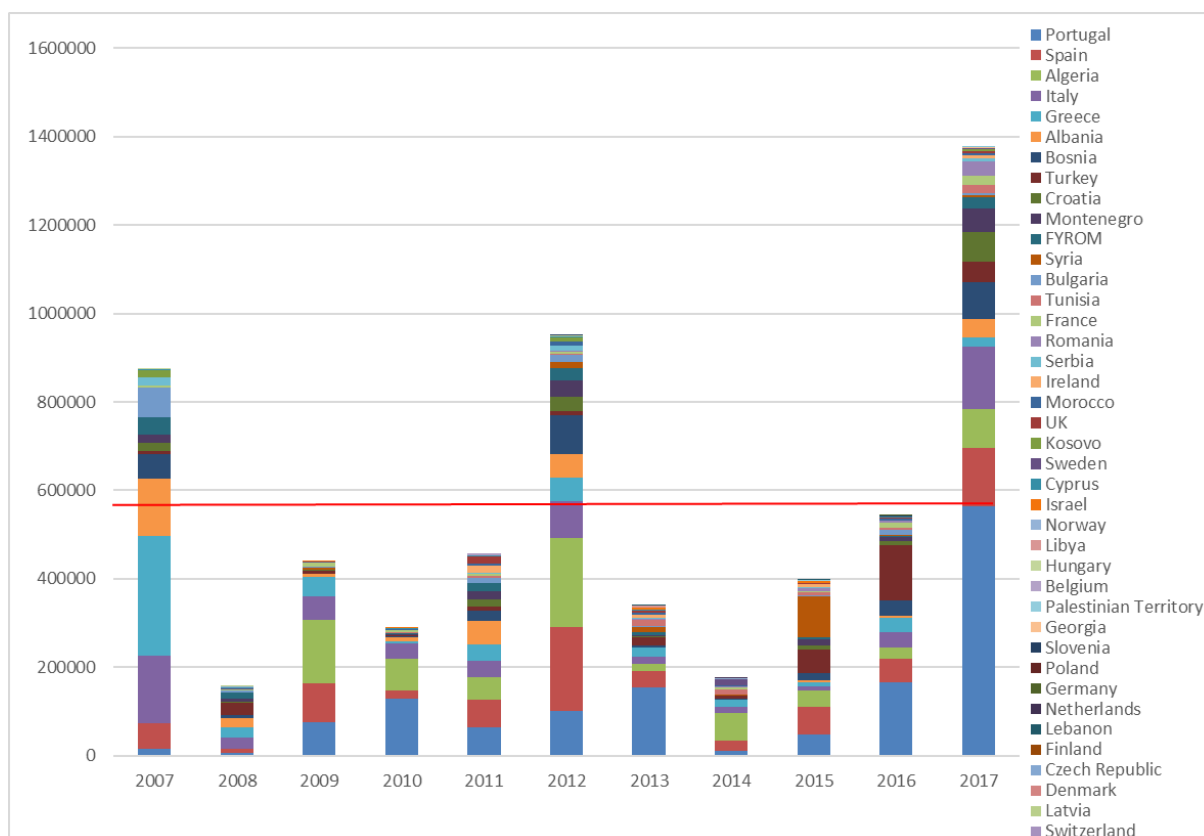


Figure 164. Overview of total burnt area across Europe and the Middle East for the last 11 years. Countries are ordered by size of total burnt area over this period. Note that the burnt area mapped for Portugal in 2017 exceeds the combined total for all countries in all except 2 of the previous 10 years.

## 3.4 EFFIS Applications

### 3.4.1 The Current Situation Application

The current situation allows the user to view and query map layers, giving an indication of the fire situation across Europe for the current date and surrounding short term time frame.

The application is normally updated between March and October.

In the Fire Danger Forecast section ① two different sources and 8 different indices can be displayed, for the current day and up to 8 days in the future.

The Rapid Damage Assessment ② allows the user to display active fire information and burnt area information from two sources.

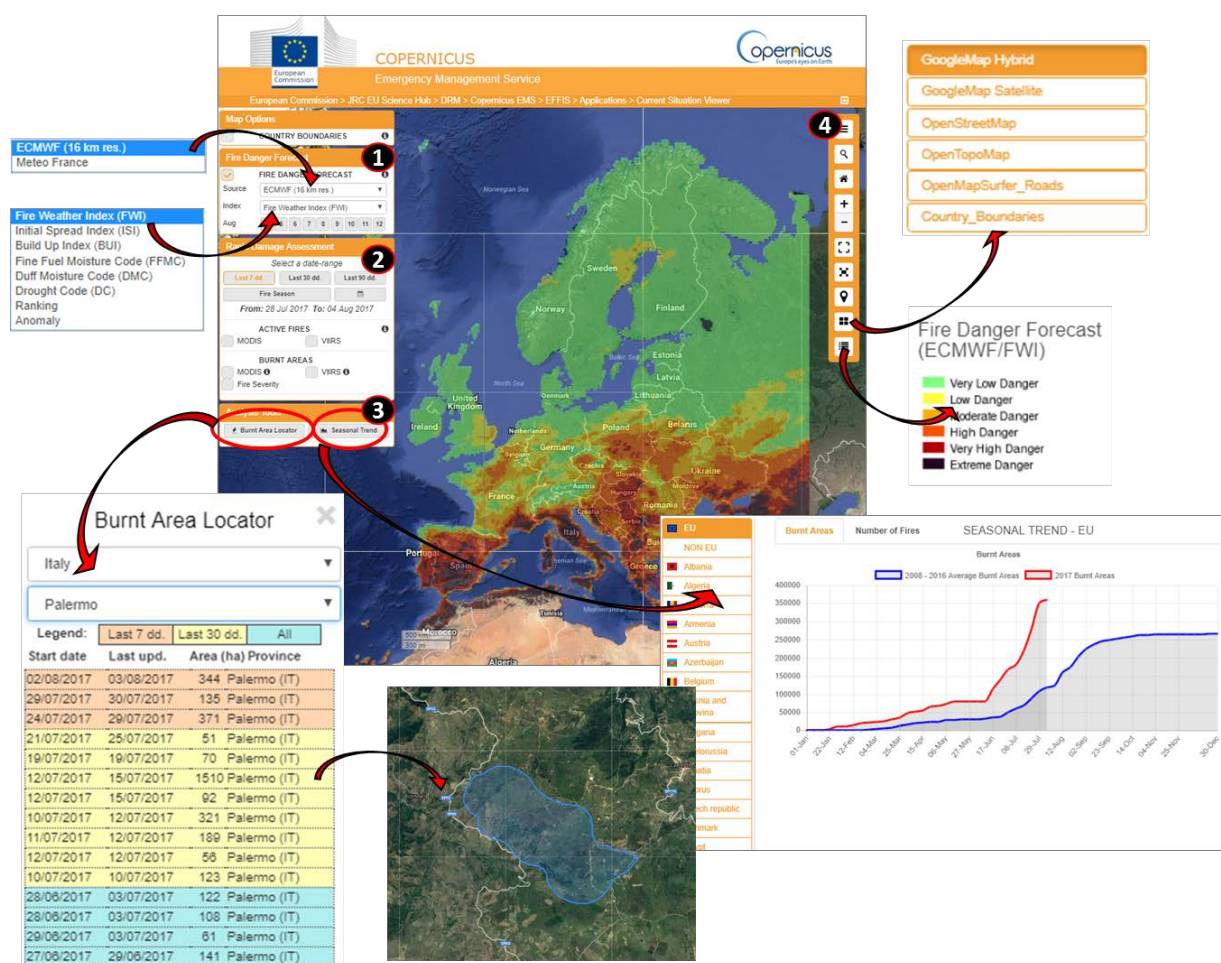
In the Analysis Tools section ③ there is a Burnt area locator, where the burnt area for the whole area or for a given country/region can be displayed. A close-up view of the individual fire perimeter is shown if the user clicks on a specific fire.

The Seasonal Trend button displays the current cumulative burnt area or number of fires mapped in EFFIS, alongside the long term average.

A tool bar ④ has a number of controls for changing the view and displaying the legend.

This application can be accessed at

[http://effis.jrc.ec.europa.eu/static/effis\\_current\\_situation/public/index.html](http://effis.jrc.ec.europa.eu/static/effis_current_situation/public/index.html)





### 3.4.2 The Fire News Application

The purpose of this application is to display geo-located news items about forest fires from a number of sources. News items are added to the map daily by team members during the fire season. The resulting list can be sorted by any of the displayed variables and filtered by date, size class or country.

[N.B. It is important to note that not all fires are displayed here: only those reported in the media with an identifiable location. Fires are not always reported individually (or at all) in the press, and the space devoted to them depends on other current world events].

This application can be accessed at <http://effis.jrc.ec.europa.eu/applications/fire-news/>

Clicking on a point on the map gives a link to the original news item associated with that point.

Clicking on the name in the list gives a table with details of the fire and a close-up of the map.

By default the display shows fires occurring in the last week, but the **From** and **To** boxes can be used to select other time periods – even for past years. The Search box allows the user to narrow down the display from among the total selected in the date filters.

The screenshot displays the Fire News Application interface. At the top, the Copernicus Emergency Management Service logo is visible. The main map shows Europe with red dots indicating fire locations. A sidebar on the left contains navigation links for EFFIS, About EFFIS, Reports and Publications, Applications, Partners, Current Situation, Long-term fire weather forecast, Fire History, Firenews, Data and Services, Global Wildfire Information System (beta viewer), and EFFIS Member Area.

The Firenews section includes a search bar and filters for 'From' (28/04/2017) and 'To' (05/05/2017). Below the map is a table of fire details:

Country	Place	Size	Update	Critical	News
Belgium	Sart-Tilman	20	May 3, 2017	False	1 News linked
France	Mondon	5	May 2, 2017	False	1 News linked
France	Saint-Amand-les-Eaux	5	May 2, 2017	False	1 News linked
Greece	Maries, Zakynthos	80	May 2, 2017	False	2 News linked
Greece	Nea Roumta, Chania	10	May 2, 2017	False	1 News linked
Greece	Vourkoti, Andros	8	May 4, 2017	False	1 News linked
Italy	Sciaccia	8	May 2, 2017	False	1 News linked
Italy	Torrebianca		May 3, 2017	False	1 News linked
Italy	Vallesudana/Monticelli		May 4, 2017	False	1 News linked
Turkey	Samandag Hatay	5	May 2, 2017	False	1 News linked

Below the table, it states '10 fires selected (with 11 related news). Get the KML'. The 'Size Class' is set to 'N.A.' and the 'Country' filter is set to 'France - Greece - Italy - Portugal - Spain - Turkey'.

A detailed view of a fire in Sicily, Italy, is shown on the right. It includes the following details:

- Place: Sciaccia
- Simple Place: Sciaccia
- Country: Italy
- Size: 8.0 (ha)
- Size Class: Small
- Last update by EFFIS: May 2, 2017, 10:49 a.m.
- Update: May 2, 2017
- Start Date: May 2, 2017
- End Date: May 2, 2017
- Critical: False
- Notes:

The detailed view also includes a close-up map of the fire location in Sicily.



### 3.4.3 The EFFIS Fire Database

The Fire Database is an important component of EFFIS, containing the forest fire information compiled by countries in Europe, Middle East and North Africa.

The Regulation EEC No 804/94 [11] (now expired) established a Community system of information on forest fires for which a systematic collection of a minimum set of data on each fire occurring, the so called "Common Core", had to be carried out by the Member States participating in the system. This regulation was replaced by the Forest Focus regulation in 2003.

Following the Forest Focus regulation (EC) No 2152/2003 [7], concerning monitoring of forests and environment interactions in the Community, the forest fire common core data was continued to be recorded in order to collect comparable information on forest fires at Community level.

Since 2000 the forest fire data provided each year by individual EU Member States and other countries in Europe, Middle East and North Africa are checked, stored and managed by JRC within EFFIS. In 2012 the 4 MENA countries submitted data for entry into

the database, bringing the number of countries now contributing to 26 (Algeria, Bulgaria, Croatia, Cyprus, Czech, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Lebanon, Morocco, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tunisia and Turkey). The database currently contains 2.75 million individual fire event records (2.05 million forest fires).

#### Access to the information

The individual records are not made available; however users can request custom annual or monthly summaries of burnt area or number of fires by country, NUTS2 or NUTS3 region from the point of contact.

More detailed information about the database can be found in the technical report "*The European Fire Database: Technical specifications and data submission*" EUR26546 EN [12], which can be downloaded from:

<http://effis.jrc.ec.europa.eu/reports-and-publications/effis-related-publications/>

Table 73. . Information requested for each fire event.

ID	Unique Fire identifier	FIREID
TIME OF FIRE	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
LOCATION OF FIRE	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
SIZE OF FIRE (Ha)	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
CAUSE OF FIRE	Certainty of knowledge of Presumed Cause (New EU code)	CAUSE_KNOWN
	Presumed Cause (New EU categories code)	CAUSE_EU
	Presumed Cause (Country detailed categories code)	CAUSE_CO

Table 74. Summary of data records stored in the Fire Database.

	BG	CH	CY	CZ	DE	EE	ES	FI	FR	GR	HR	HU	IT	LT	LV	PL	PT	RO	SE	SI	SK	TR	DZ	LB	MA	TN
1980		86															2349									
1981		151															6730									
1982		82															3626									
1983		117								945							4542									
1984		178								1184							7356									
1985		114					12235		3732	1417			12931				8441									75
1986		86					7514		2657	1088			6115				5036									89
1987		121					8816		2116	1234			8506				7705									207
1988		78					9440		2240	1798			9785				6131									158
1989		189					20250		3321	1203			8328				21896									70
1990		249					12914		3297	1283			11560				10745									118
1991		151					13529		2372	1036			7580				14327									97
1992		84					15956		2708	2008			10044				14954									182
1993		83					14253		4766	2707			14317				16101									183
1994		86			706		19249		4728	1955			7153			24361	19983									131
1995		94			525		25557		6539	1494			5505			23816	34116			44						13
1996		126			822		16586		6401	1527	3147		6064			23582	28626		4854	47						13
1997		177			276		22320		8001	2271	3795		11608			25068	23497		7057	55						98
1998		117			592		22003		6289	605	5485		9565			21342	34676		2503	143						-
1999		50			794		17943		4881	513	3856		6956			32646	25477		4707	55						-
2000		66	285		930		23574		4343	1469	7897		8609			31809	34109		4708	100						-
2001		64	299		373		19099		4259	1313	4048		7227			24511	27982		4831	60						-
2002		105	243		278		19929		4097	572	4713	429	4607			38154	28738		6490	64						-
2003		262	427		1238		18616		7023	622	6937	373	9716			79013	26941		8282	227						-
2004		71	221	957	300		21396		3767	739	2859	104	6341	430	647	36315	26945	34	4955	50	153					-
2005	251	81	185	653	299	65	25492	2631	4698	718	3372	150	7918	267	365	46542	40965	64	4573	74	287	1530				-
2006	393	78	172	697	717	248	16334	6314	4608	764	3580	97	5651	1444	1929	35630	23647	105	4618	106	238	2227			347	216
2007	1479	79	111	809	435	64	10932	2813	3382	1226	5177	603	10736	245	426	31303	23956	478	3787	129	463	2706			304	292
2008	582	57	114	470	560	71	11656	3161	2781	1071	228	502	6648	272	716	35786	18619	91	5420	68	182	2135			267	259
2009	314	83	91	520	575	47	15642	2746	4808	354	181	608	5423	471	890	30912	29218	190	4180	122	347	-			487	199
2010	222	73	133	731	525	30	11722	3100	3828	540	131	109	4884	106	319	24443	25013	70	3120	33	123	1861			597	264
2011	635	102	85	1341	515	24	16417	2871	4283	953	279	2021	8181	137	373	39011	38118	340	3534	114	303	-			568	262
2012	876	71	78	1555	451	5	15978	1050	3713	-	570	2657	10345	81	162	53907	30740	911	2213	168	517	2449	5036	99	484	493
2013	408	58	135	671	355	15	10797	2864	2061	-	137	761	2077	119	420	25652	27372	118	4907	75	-	3755	-	-	411	-
2014	151	57	68	870	251	91	9806	3637	1729	-	43	1042	1821	155	695	38115	11387	83	4374	35	-	-	-	-	460	-
2015	439	-	87	1738	594	67	11810	1644	2891	-	176	1069	5424	247	704	60176	23175	250	2700	93	-	-	-	-	425	-
2016	584	63	119	899	407	84	-	2101	2761	-	148	452	-	98	641	25791	-	174	5454	90	-	-	-	-	422	-

**General notes on Table 74:**

- 2017 data are still undergoing validation checks and are not presented.
- 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 the information is only available in summary form.

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All reports from past years can be found in

<http://effis.jrc.ec.europa.eu/reports-and-publications/annual-fire-reports/>

## **Annex – Summary Tables of Fire Statistics**

**Table 75. Number of forest fires in five Southern Member States (1980-2017)**

**Table 76. Burnt area (hectares) in five Southern Member States (1980 – 2017)**

**Table 77. Number of forest fires in other countries (1990-2017)**

**Table 78. Burnt area (hectares) in other countries (1990 – 2017)**

Statistics on burnt area divided into forest and non-forest area are supplied in the individual country reports, where available.

### **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 75. Number of forest fires in five Southern Member States (1980-2017)**

<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	21 396	3 775	6 428	1 748	55 217
2005	35 697	25 492	4 698	7 951	1 544	75 382
2006	19 929	16 354	4 608	5 634	1 417	47 942
2007	18 722	10 936	3 364	10 639	1 983	45 644
2008	13 832	11 655	2 781	6 486	1 481	36 235
2009	26 119	15 643	4 800	5 422	1 063*	53 047
2010	22 026	11 721	3 900	4 884	1 052*	43 583
2011	25 221	16 414	4 500	8 181	1 653*	55 929
2012	21 176	17 503	4 105	8 252	1 559*	52 595
2013	19 291	10 626	2 223	2 936	862*	35 938
2014	7 067	9 771	2 778	3 257	552*	23 425
2015	15 851	11 928	4 440	5 442	510*	38 171
2016	13 261	8 817	4 285	5 818	777*	31 933
<b>2017</b>	<b>21 002</b>	<b>13 793</b>	<b>4 403</b>	<b>7 855*</b>	<b>1 083*</b>	<b>48 136</b>
<b>% of total in 2017</b>	<b>44%</b>	<b>29%</b>	<b>9%</b>	<b>16%</b>	<b>2%</b>	<b>100%</b>
<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 2000-2009</i>	24 949	18 369	4 418	7 259	1 695	56 690
<i>Average 2010-2017</i>	18 112	12 572	3 776	5 828	1 001	41 289
<i>Average 1980-2017</i>	18 176	14 761	4 707	9 121	1 449	48 215
<b>TOTAL (1980-2017)</b>	<b>690 700</b>	<b>560 928</b>	<b>178 865</b>	<b>346 602</b>	<b>55 066</b>	<b>1 832 161</b>

\* Provisional data.

**Table 76. Burnt area (hectares) in five Southern Member States (1980 – 2017)**

<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	155 345	7 844	39 946	12 661	291 306
2007	31 450	86 122	8 570	227 729	225 734	579 605
2008	17 244	50 322	6 001	66 329	29 152	169 048
2009	87 416	120 094	17 000	73 355	35 342	333 207
2010	133 090	54 770	10 300	46 537	8 967	253 664
2011	73 813	102 161	9 400	72 004	29 144	286 522
2012	110 231	226 125	8 600	130 814	59 924	535 694
2013	152 756	58 985	3 608	29 076	46 676	291 101
2014	19 929	46 721	7 493	36 125	25 846	136 114
2015	64 443	103 200	11 160	41 511	7 096	227 410
2016	161 522	65 817	16 093	47 926	26 540	317 898
<b>2017</b>	<b>540 630</b>	<b>178 234</b>	<b>26 378</b>	<b>137 103*</b>	<b>13 393</b>	<b>895 738</b>
<b>% of total in 2017</b>	<b>59%</b>	<b>19%</b>	<b>3%</b>	<b>18%</b>	<b>1%</b>	<b>100%</b>
<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 2000-2009</i>	150 101	127 229	22 362	83 878	49 238	432 809
<i>Average 2010-2017</i>	157 052	104 502	12 019	72 945	27 198	373 715
<i>Average 1980-2017</i>	118 797	162 352	24 702	107 357	44 084	457 293
<b>TOTAL (1980-2017)</b>	<b>4 514 300</b>	<b>6 169 374</b>	<b>938 687</b>	<b>4 079 562</b>	<b>1 675 209</b>	<b>17 377 132</b>

Table 77. Number of forest fires in other countries (1990-2017)

Country	Algeria	Austria	Bulgaria	Croatia	Cyprus	Czech Rep.	Estonia	Finland	former Yugoslav Republic of Macedonia	Germany	Hungary	Latvia	Lebanon	Lithuania	Morocco	Poland	Norway	Romania	Russian Federation	Slovakia	Slovenia	Sweden	Switzerland	Turkey
Year																								
1990	-	-	-	-	-	-	-	-	-	-	-	604	-	-	179	5756	-	131	-	-	-	-	257	1750
1991	-	-	73	-	-	-	-	-	-	1846	-	225	-	-	247	3528	-	42	-	-	-	-	152	1481
1992	-	-	602	325	-	-	-	-	-	3012	-	1510	-	1180	182	11858	-	187	-	-	-	-	86	2117
1993	-	-	1196	372	-	-	-	-	-	1694	-	965	-	634	187	8821	-	159	-	-	-	-	83	2545
1994	-	-	667	181	-	-	-	-	-	1696	-	763	-	715	417	10705	-	121	-	366	-	-	86	3239
1995	-	-	114	109	-	1331	-	-	-	1237	-	582	-	472	528	7678	-	62	-	254	-	-	96	1770
1996	-	-	246	305	-	1421	-	1475	-	1748	-	1095	-	894	220	7923	-	72	-	662	-	-	130	1645
1997	-	-	200	305	-	1398	-	1585	-	1467	-	768	-	565	391	6817	-	37	-	535	-	-	179	1339
1998	-	-	578	441	-	2563	-	370	-	1032	-	357	-	258	416	6165	-	59	-	1056	-	2503	121	1932
1999	-	-	320	223	-	1402	-	1528	-	1178	229	1196	-	1022	385	9820	-	138	-	426	-	4707	50	2075
2000	-	-	1710	706	285	1499	158	826	-	1210	811	915	-	654	321	12426	-	688	-	824	-	4708	70	2353
2001	-	-	825	299	299	483	91	822	-	587	419	272	-	287	327	4480	117	268	-	311	-	4831	67	2631
2002	-	-	402	176	243	604	356	2546	-	513	382	1720	-	1596	202	10101	213	516	-	570	60	6490	117	1471
2003	-	-	452	532	427	1754	111	1734	-	2524	375	900	-	885	392	17087	198	203	-	872	224	8282	304	2177
2004	-	-	294	204	221	873	89	816	-	626	104	647	-	468	714	7006	119	34	-	153	51	4955	94	1762
2005	-	954	241	147	185	619	65	1069	-	496	150	365	-	301	662	12049	122	64	-	287	73	4573	110	1530
2006	-	912	393	181	172	697	250	3046	-	930	97	1929	-	1545	381	11541	205	105	-	237	112	4618	110	2227
2007	-	750	1479	345	111	805	64	1204	652	779	603	425	-	251	340	8302	65	478	-	463	140	3737	120	2829
2008	-	-	582	275	114	470	71	1456	573	818	502	700	-	301	273	9090	171	91	-	182	74	5420	63	2135
2009	-	218	314	181	91	514	47	1242	80	763	608	823	-	471	501	9162	109	190	-	347	120	4180	104	1793
2010	-	192	222	131	133	732	30	1412	99	780	109	316	-	104	629	4680	62	70	32300	127	32	3120	88	1861
2011	2487	356	635	280	85	1337	24	1215	523	888	2021	360	-	142	606	8172	49	340	20851	303	114	3534	114	1954
2012	5110	312	876	569	78	1549	5	417	483	701	2657	162	-	81	484	9265	24	911	19535	517	168	2213	75	2450
2013	2443	357	408	137	135	666	15	1452	186	515	761	422	-	123	411	4883	42	116	9754	233	75	4878	58	3755
2014	4629	369	151	43	68	865	91	1660	62	429	1042	698	-	155	460	5245	133	83	17058	153	35	4374	60	2149
2015	2383	345	429	177	87	1748	67	745	106	1071	1069	704	107	247	425	12257	29	250	12238	242	93	2700	166	2150
2016	3150	317	584	151	119	892	84	933	60	608	452	641	260	98	422	5286	345	174	10089	136	90	5454	81	3188
2017	2992	265	513	329	92	966	61	881	301	424	1454	423	92	80	433	3592	264	447	10051	162	108	5276	110	2411



Table 78. Burnt area (hectares) in other countries (1990 – 2017)

Country	Algeria	Austria	Bulgaria	Croatia	Cyprus	Czech Rep.	Estonia	Finland	former Yugoslav Republic of Macedonia	Germany	Hungary	Latvia	Lebanon	Lithuania	Morocco	Poland	Norway	Romania	Russian Federation	Slovakia	Slovenia	Sweden	Switzerland	Turkey
Year																								
1990	-	-	-	-	-	-	-	-	-	-	-	258	-	-	2188	7341	-	444	-	-	-	-	1723	13742
1991	-	-	511	-	-	-	-	-	-	920	-	69	-	-	3965	2567	-	277	-	-	-	-	96	8081
1992	-	-	5243	11131	-	-	-	-	-	4908	-	8412	-	769	2579	43755	-	729	-	-	-	-	65	12232
1993	-	-	18164	20157	-	-	-	-	-	1493	-	570	-	274	3078	8290	-	518	-	-	-	-	37	15393
1994	-	-	18100	7936	-	-	-	-	-	1114	-	326	-	279	6072	9325	-	312	-	-	-	-	408	38128
1995	-	-	550	4651	-	403	-	-	-	592	-	535	-	321	7018	5403	-	208	-	-	-	-	446	7676
1996	-	-	906	11214	-	2043	-	433	-	1381	-	927	-	478	1185	14537	-	227	-	-	-	-	293	14922
1997	-	-	595	11122	-	359	-	1146	-	599	-	448	-	226	3845	6766	-	68	-	-	-	-	1785	6316
1998	-	-	6967	32056	-	1132	-	131	-	397	-	211	-	93	1855	4222	-	137	-	-	-	422	274	6764
1999	-	-	8291	6053	-	336	-	609	-	415	756	1544	-	494	1688	8629	-	379	-	557	-	1771	30	5804
2000	-	-	57406	68171	8034	375	684	266	-	581	1595	1341	-	352	4064	7089	-	3607	-	904	-	1552	70	26353
2001	-	-	20152	16169	4830	87	62	187	-	122	-	311	-	113	1806	3466	895	1001	-	305	-	1254	21	7394
2002	-	-	6513	4853	2196	178	2082	590	-	122	1227	2222	-	746	593	5210	221	3536	-	595	161	2626	681	8514
2003	-	-	5000	27091	2349	1236	207	666	-	1315	845	559	-	436	2858	21551	942	762	-	1567	2100	4002	673	6644
2004	-	-	1137	3378	1218	335	379	358	-	274	247	486	-	253	8660	3782	117	123.7	-	157	138	1883	31	4876
2005	-	71	1456	3135	1838	227	87	495	-	183	3531	120	-	51	6198	5713	346	162	-	524	280	1562	67	2821
2006	-	75	3540	4575	1160	53	3096	1617	-	482	625	3387	-	1199	5360	5657	3829	946	-	280	1420	5710	127	7762
2007	-	48	42999	20209	4483	316	292	576	32665	256	4636	272	-	38	1367	2841	128	2529	-	679	128	1090	337	11664
2008	-	-	5289	7343	2392	86	1280	830	5915	538	2404	364	-	112	1127	3027	3174	373	-	118	75	6113	68	29749
2009	-	22	2271	2900	885	178	59	576	1307	262	6463	646	-	287	3108	4400	1329	974	-	510	177	1537	60	4679
2010	-	37	6526	1121	2000	205	25	520	737	522	878	92.2	-	21.5	5511	2126	769	206	2300000	192	121	540	27	3317
2011	13593	78	6883	15555	1599	337	19	580	17308	214	8055	115	-	293	3460	2678	121	2195	1636232	403	288	945	225	3612
2012	99061	69	12730	24804	2531	634	3	86	10021	269	13978	90	-	20	6695	7235	60	6624	1900000	1683	1006	483	30	10455
2013	13396	165	3314	1999	2835	92	79	461	3027	199	1955	217	-	25	2207	1289	47	421	1416659	270	66	1508	29	11456
2014	43125	192	916	188	669	536	78	881	846	120	4454	591	-	162	1540	2690	770	217	3738207	192	18	14666	46	3117
2015	13010	268	4313	9416	652	344	83	143	1798	526	4730	615	753	71	992	5510	143	1671	2875350	353	65	594	47	3219
2016	18370	398	6340	7100	3205	141	123	310	450	283	974	467	1871	26	2585	1451	1884	675	2419254	175	526	1288	454	9156
2017	53975	30	4569	48543	428	170	33	460	5619	395	4933	265	264	53	2414	1023	525	2459	1459099	295	441	1433	118	11993



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