



# Forestry Department

Food and Agriculture Organization of the United Nations

## Fire Management Working Papers

### Global Forest Resources Assessment 2005 – Report on fires in the Balkan Region

*by*  
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The purpose of these papers is to provide early information on on-going activities and programmes, and to stimulate discussion.

Comments and feedback are welcome.

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## FOREWORD

Fires impact upon livelihoods, ecosystems and landscapes. Despite incomplete and inconsistent data, it is estimated that 350 million hectares burn each year; however, the nature of fires determines whether their social, cultural, environmental and economic impacts are negative or positive. Up to 90 percent of wildland fires are caused by human activities primarily through uncontrolled use of fire for clearing forest and woodland for agriculture, maintaining grasslands for livestock management, extraction of non-wood forest products, industrial development, resettlement, hunting and arson - thus any proactive fire management needs to adopt integrated, inter-sectoral, multi-stakeholder and holistic approaches. The situation varies markedly in different regions of the world.

As a supplement and complement to the Global Forest Resources Assessment, 2005, this working paper is one of a series of twelve prepared by regional and country contributing authors to provide a greater depth of data and information on fire incidence, impact, and management issues relating to the twelve UN-ISDR Regional Wildland Fire Networks around the world.

The working paper series assesses the fire situation in each wildland fire region, including the area extent, number and types of fires and their causes. The positive and negative social, economic and environmental impacts are outlined. Prediction, preparedness and prevention as key elements in reduction of the negative impacts of fire, rapid response to extinguish fire incidents and restoration following fires are addressed.

The working paper series also addresses institutional capacity and capability in wildland fire management, including the roles and responsibilities of different stakeholder groups for prevention and suppression, particularly the unique role of community-based fire management.

From these working papers, a FAO Forestry Paper on Fire Management will synthesize the highlights from each region, but also provide a global summary of important lessons that can be used in fire management in the future. These papers are a valuable resource in the process to prepare the Fire Management Code, the Global Strategy to Enhance International Cooperation in Implementing the Fire Management Code and associated capacity building.

## **ACKNOWLEDGEMENTS**

This working paper is the product of a global team of dedicated people willingly giving of their time and specialist expertise within each of the twelve UN-ISDR Regional Wildland Fire Networks.

Nikola Nikolov, as the author, obtained key information and data for this working paper from Albania, Bulgaria, Croatia, Greece, the Former Yugoslav Republic of Macedonia, Slovenia, Serbia & Montenegro and Turkey.

We wish to acknowledge the dedicated work of Johann G. Goldammer, Global Fire Monitoring Center (GFMC), for contributing materials and for reviewing this working paper.

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## **1. Background**

Following the release of the Global Forest Resources Assessment 2000 (FRA 2000) report in 2001, the global FRA process has now entered its next reporting cycle. FAO's Committee on Forestry (COFO) 2003 confirmed the directions of global FRA's that the Kotka IV Expert Consultation recommended in July 2002. Recommendations included the preparation of an update of the global FRA-data in year 2005 and to increasingly involve countries directly in the assessment and reporting, in particular to submit national reports on the status and trends of a range of forestry parameters. More information about FRA 2005 is available at [www.fao.org/forestry/fra](http://www.fao.org/forestry/fra).

FRA 2005 also included thematic studies, including e.g. one on forest fire, forests and water, and mangroves. The thematic study on wildland and forest fire in 2005 is built on regional reviews on forest fire management in the United Nations International Strategy for Disaster Reduction (UNISDR) Global Wildland Fire Network (GWFN). The current report is a contribution and makes a review of the UNISDR Balkan Region.

This Working Paper FM/11/E has been written by Mr Nikola Nikolov and does not reflect any official position of FAO.

## **2. Introduction**

According to many sources, there are two most important causes of forest degradation across Europe: air pollution, which is a serious threat to the sustainability of forest resources in Central, Eastern and, to a lesser extent, Northern Europe, and fire, which is a major concern in Southern Europe. The global climatic changes are equally important and connected with both causes. Because of the position of the Balkan Region, the importance of forest fires is obvious.

On the other side, events like wars, economic and political disorders, during the last fifteen years should be taken into consideration in some countries of the Balkan Region. They had in the past a significant role in forest fire occurrence, behavior and extinguishing, but they may still have influence today and in the future.

## **3. Forest fire situation in the Balkan Region**

### ***3.1 Number of fires and burned area***

The number of forest fires per year in the Balkan region from 1988 to 2004 varies a lot. Over the given period, the smallest number of forest fires was recorded in 1991 – 2 765 fires (without data from Croatia), and the largest number of forest fires was recorded in 2000 – 16 922 fires (Table 1). The total number of forest fires over the given period was 115 666. The largest number of forest fires was recorded in Turkey – 39 198 fires, and the smallest in Slovenia – 1 029 fires.

The trend of forest fire occurrence in the period 1988-2004 is provided in Figure 1 and reveals an increase of the annual number of fires during the given period, with one strong peak in the year 2000. The average annual number of forest fires in the period from 1988 to 2004 year is 850 fires.

The total amount of burned forest and other land in the Balkan Region was 826 834 ha (Table 2). The average area of burned forest and other land per year (1988-2004) was 103 354 ha. It must be taken into consideration that there is no data for Greece, and data from some countries like Croatia and Slovenia is incomplete. Otherwise the previous figures would be higher.

The largest area of burned forest and other land was recorded in Croatia - 318 426 ha, even if data existed only for the last five years. The smallest area of burned forest and other land over the given period was recorded in Slovenia – 9 367 ha. The worst year was 2000 with 262 985 ha of burned forest and other land, and the year with smallest burned area was 1995 with 8 861 ha (Figure 3).

Over the given period, the total burned forest area was 1 250 892 ha, without data from Greece which were not available. The annual average area of burned forest was 156 361 ha (Table 3). The largest burned forest area was recorded in Greece – 775 685 ha and the smallest burned area in Serbia and Montenegro (Serbia) – 4 172 ha.

During year 2000, the largest forest area was burned – 271 017 ha, while the smallest area burned in 2004 – 9 300 ha (Figure 5).

According to what is stated above, the countries most threatened by forest fires in the Balkan Region were Greece, Croatia, Turkey, Republic of Macedonia and Bulgaria, but this does not mean that the other countries had no problems with forest fires. The total area and forest cover area have to be kept in mind.

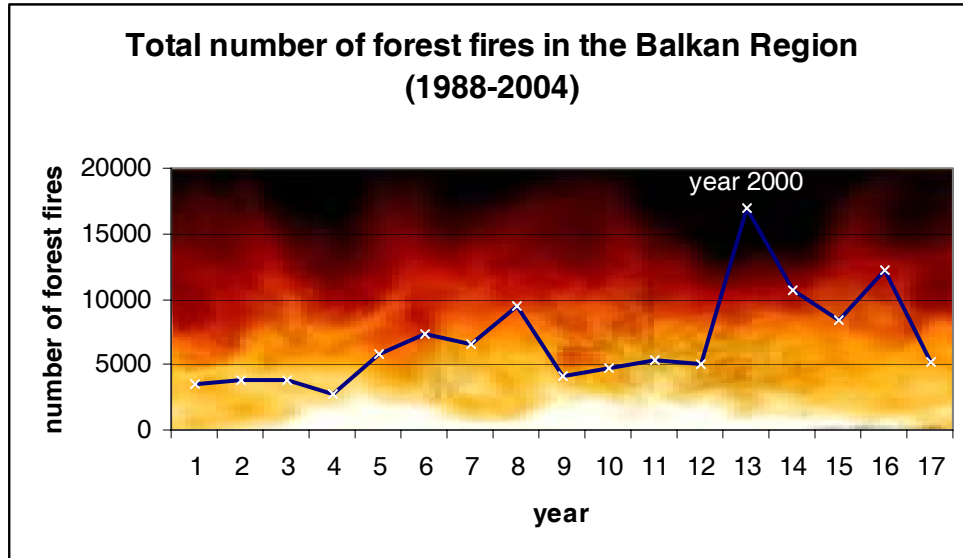
**Table 1.** Number of forest fires in the Balkan Region 1998-2004

Year	Albania	Bulgaria	Croatia	Greece	R. of Macedonia	Slovenia	Serbia and Montenegro -Serbia-	Turkey	Total	Average
1988	121	101	/	1 898	126	/	25	1 372	3 643	455
1989	132	578	/	1 284	95	/	48	1 633	3 770	471
1990	269	208	/	1 322	241	/	98	1 750	3 888	486
1991	147	73	/	941	38	30	55	1 481	2 765	346
1992	659	602	/	2 042	235	40	44	2 117	5 739	717
1993	560	1 196	/	2 406	390	108	157	2 545	7 362	920
1994	585	667	/	1 763	195	66	70	3 239	6 585	823
1995	110	114	/	1 438	24	25	15	7 676	9 402	1 175
1996	490	246	/	1 508	90	50	45	1 645	4 074	509
1997	735	200	/	2 271	174	59	28	1 339	4 806	601
1998	601	578	/	1 842	151	151	78	1 932	5 333	667
1999	628	320	/	1 480	452	53	11	2 075	5 019	627
2000	915	1 710	7 797	2 581	1 187	98	281	2 353	16 922	2 115
2001	327	825	4 024	2 658	165	65	42	2 631	10 737	1 338
2002	140	402	4 692	1 400	59	60	112	1 471	8 336	1 042
2003	771	452	6 924	1 452	96	224	57	2 177	12 153	1 519
2004	143	294	2 855	/	73	/	5	1 762	5 132	642
<b>Total per country</b>	<b>7 333</b>	<b>8 566</b>	<b>26 292</b>	<b>28 286</b>	<b>3 791</b>	<b>1 029</b>	<b>1 171</b>	<b>39 198</b>	<b>115 666</b>	<b>850</b>
<i>Average per country</i>	<i>431</i>	<i>504</i>	<i>1 547</i>	<i>1 664</i>	<i>223</i>	<i>61</i>	<i>69</i>	<i>2 306</i>		

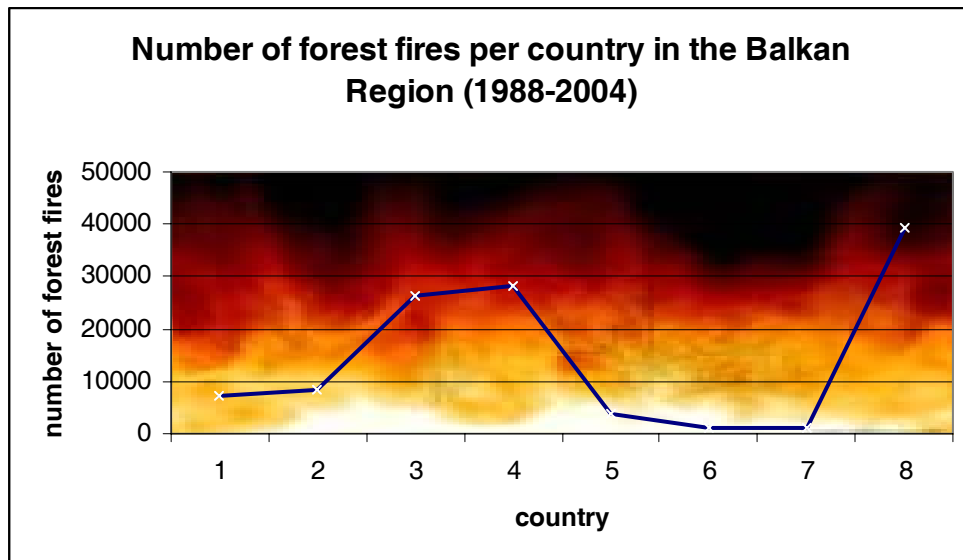
*Remark: no data available from Bosnia and Herzegovina*

Source: National Reports from Regional Balkan Wildland Fire Network/Global Wildland Fire Network International Technical and Scientific Consultation "Forest Fire Management in the Balkan Region", held 4-5 April 2005 in Ohrid, Republic of Macedonia.





**Figure 1.** Total number of forest fires in the Balkan Region 1998-2004



1- Albania    2- Bulgaria    3- Croatia    4- Greece    5- R. of Macedonia  
6- Slovenia    7- Serbia and Montenegro (Serbia)    8- Turkey

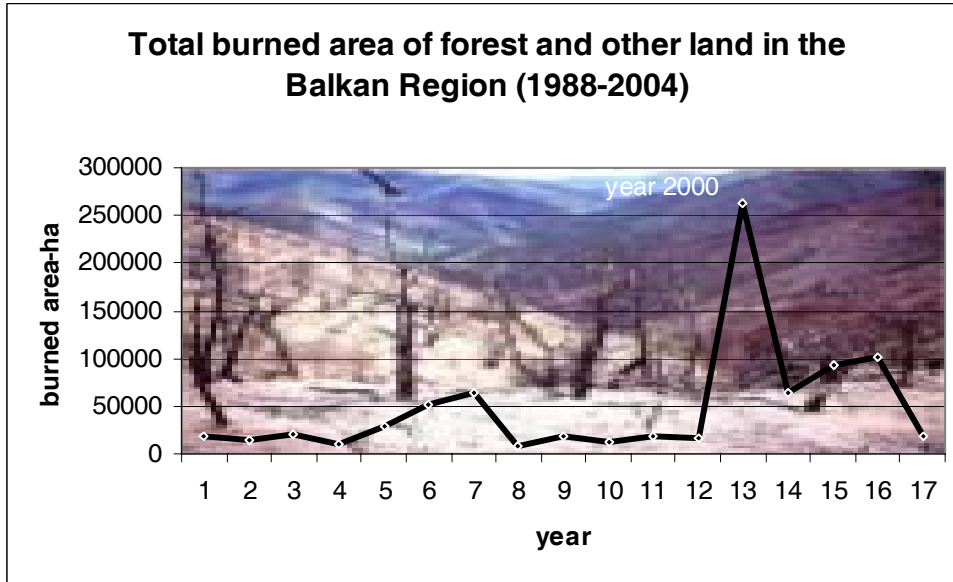
**Figure 2.** Total number of forest fires in the Balkan Region 1998-2004 by country

**Table 2.** Burned area (ha) of forest and other land in the Balkan region 1998-2004

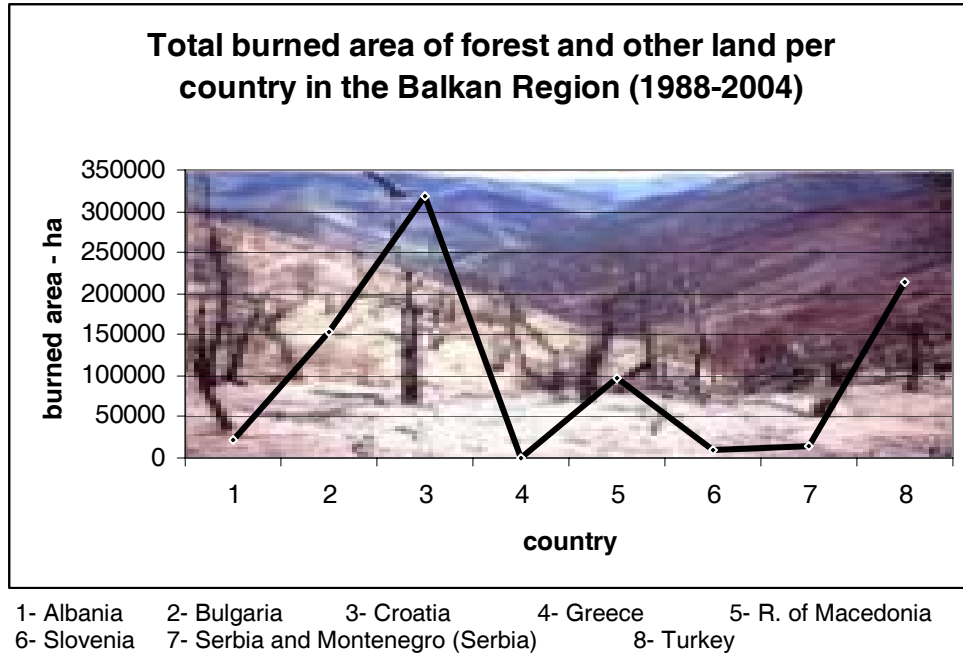
Year	Albania	Bulgaria	Croatia	Greece	R. of Macedonia	Slovenia	Serbia and Montenegro -Serbia-	Turkey	Total	Average
1988	256	462	/	/	/	/	76	18 210	19 004	4 751
1989	320	223	/	/	1 633	/	165	13 099	15 440	3 088
1990	417	1 041	/	/	5 760	/	646	13 742	21 606	4 321
1991	250	511	/	/	444	677	211	8 081	10 174	1 696
1992	1 011	5 243	/	/	9 390	426	215	12 232	28 517	4 753
1993	522	18 164	/	/	14 423	1 660	2 036	15 393	52 198	8 700
1994	705	18 100	/	/	5 802	912	435	38 128	64 082	10 680
1995	153	550	/	/	105	260	117	7 676	8 861	1 477
1996	410	2 150	/	/	986	288	209	14 922	18 965	3 161
1997	1 847	595	/	/	3 574	493	126	6 316	12 951	2 158
1998	680	6 967	/	/	1 889	1 353	919	6 764	18 572	3 095
1999	689	8 291	/	/	1 992	433	36	5 804	17 245	2 874
2000	3 675	57 406	129 883	/	37 928	265	7 476	26 352	262 985	37 569
2001	1 434	20 152	27 251	/	6 667	340	273	7 394	63 511	9 073
2002	690	6 513	74 945	/	659	160	1 373	8 413	92 753	13 250
2003	6 359	5 072	77 359	/	3 936	2 100	430	6 644	101 900	14 557
2004	1 473	1 137	8 988	/	1 584	/	12	4 876	18 070	3 012
<b>Total</b>	<b>20 891</b>	<b>152 577</b>	<b>318 426</b>	<b>/</b>	<b>96 772</b>	<b>9 367</b>	<b>14 755</b>	<b>214 046</b>	<b>826 834</b>	<b>103 354</b>
<i>Average</i>	1 229	8 975	63 685	/	6 048	720	868	12 591		

*Remark: no data available from Bosnia and Herzegovina*

Source: National Reports from Regional Balkan Wildland Fire Network/Global Wildland Fire Network International Technical and Scientific Consultation "Forest Fire Management in the Balkan Region", held 4-5 April 2005 in Ohrid, Republic of Macedonia.



**Figure 3.** Total burned area of forest and other land in the Balkan Region 1998-2004



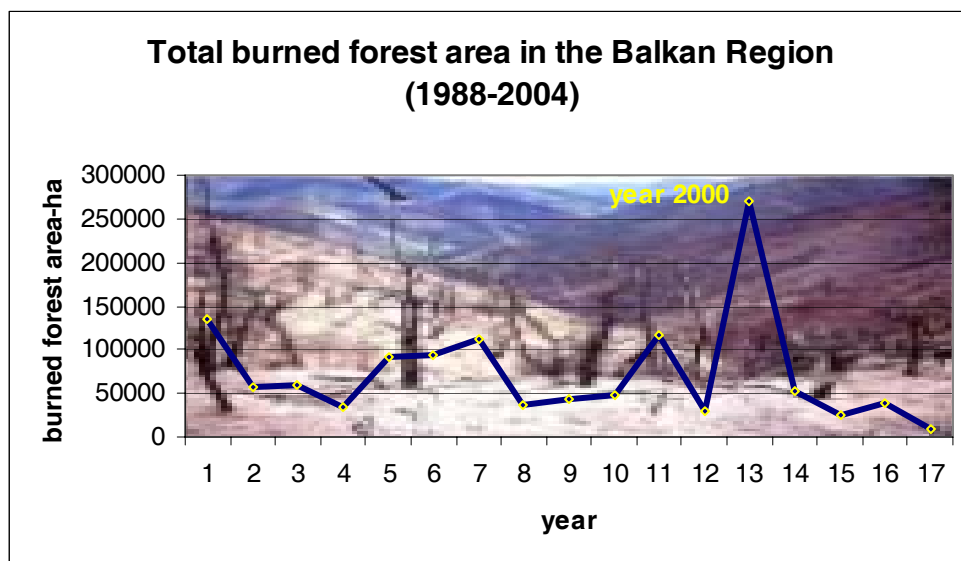
**Figure 4.** Total burned area of forest and other land in the Balkan Region 1998-2004 by country

**Table 3.** Burned forest area (ha) in the Balkan region 1998-2004

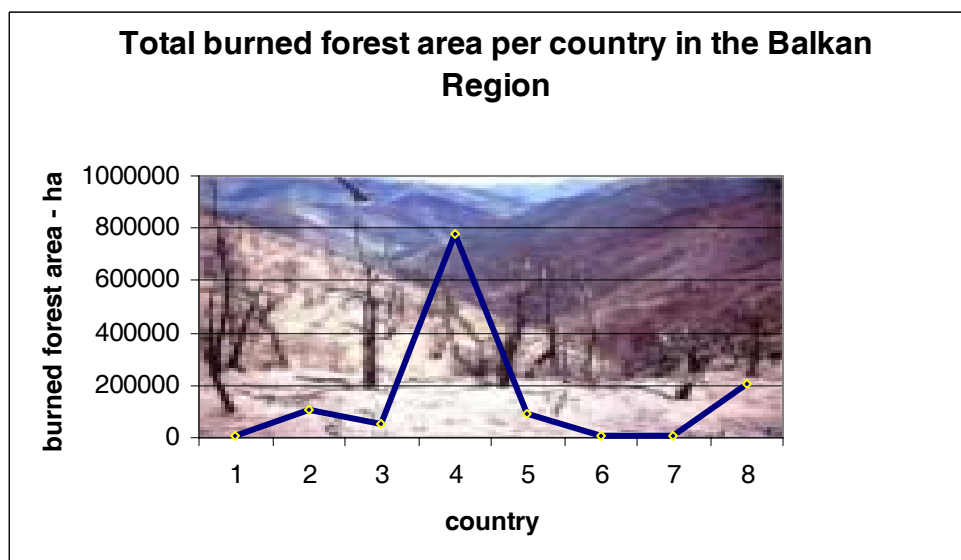
Year	Albania	Bulgaria	Croatia	Greece	R. of Macedonia	Slovenia	Serbia and Montenegro -Serbia-	Turkey	Total	Average
1988	/	462	/	110 501	5 047	/	45	18 210	134 265	16 783
1989	/	223	/	42 364	1 590	/	14	13 099	57 290	7 161
1990	/	1 012	/	38 593	5 338	/	145	13 742	58 830	7 354
1991	/	471	/	23 574	436	625	23	8 081	33 210	4 151
1992	/	4 154	/	66 346	9 105	319	10	12 232	92 166	11 521
1993	/	10 174	/	54 049	12 312	1 261	591	15 393	93 780	11 722
1994	/	9 708	/	57 908	5 656	879	59	38 128	112 338	14 042
1995	/	527	/	27 203	54	149	8	7 676	35 617	4 452
1996	/	1 933	/	25 310	670	244	21	14 922	43 100	5 388
1997	/	472	/	37 777	3 362	383	12	5 803	47 809	5 976
1998	/	6 060	/	101 654	1 621	825	161	5 717	116 038	14 506
1999	/	4 198	/	19 199	1 738	321	2	3 979	29 437	3 680
2000	/	37 431	27 407	145 033	35 189	124	1 253	24 580	271 017	33 877
2001	941	18 463	1 818	18 342	6 443	240	13	5 990	52 250	6 531
2002	650	5 910	5 997	4 336	633	77	1 373	6 100	25 076	3 134
2003	4 419	5 000	14 155	3 496	3 633	1 592	430	6 644	39 369	4 921
2004	491	881	1 466	/	1 574	/	12	4 876	9 300	1 162
<b>Total</b>	<b>6 501</b>	<b>107 079</b>	<b>50 843</b>	<b>775 685</b>	<b>94 401</b>	<b>7 039</b>	<b>4 172</b>	<b>205 172</b>	<b>1 250 892</b>	<b>156 361</b>
<i>Average</i>	<i>1 625</i>	<i>6 299</i>	<i>10 169</i>	<i>45 628</i>	<i>5 585</i>	<i>541</i>	<i>245</i>	<i>12 069</i>		

*Remark: no data from Bosnia and Herzegovina*

Source: National Reports from Regional Balkan Wildland Fire Network/Global Wildland Fire Network International Technical and Scientific Consultation "Forest Fire Management in the Balkan Region", held 4-5 April 2005 in Ohrid, Republic of Macedonia.



**Figure 5.** Total burned forest area in the Balkan Region 1998-2004



1- Albania    2- Bulgaria    3- Croatia    4- Greece    5- R. of Macedonia  
6- Slovenia    7- Serbia and Montenegro (Serbia)    8- Turkey

**Figure 6.** Total burned forest area in the Balkan Region 1998-2004 by country

### 3.2 Causes

**Table 4.** Causes of forest fires in the Balkan region

Country	Causes - %		
	<i>Human</i>	<i>Natural</i>	<i>Unknown</i>
<b>Albania</b>	63.7	0.8	35.5
<b>Bulgaria</b>	30.4	1.7	67.9
<b>Croatia</b>	75.3	0.8	23.9
<b>Greece</b>	55.5	3.0	41.5
<b>Republic of Macedonia</b>	72.5	2.0	25.5
<b>Slovenia</b>	45.9	8.3	45.8
<b>Serbia and Montenegro -Serbia-</b>	66.0	3.0	31.0
<b>Turkey</b>	60.9	6.7	32.4
<b>Average</b>	<b>58.8</b>	<b>3.3</b>	<b>37.9</b>

Source: National Reports from Regional Balkan Wildland Fire Network/Global Wildland Fire Network International Technical and Scientific Consultation "Forest Fire Management in the Balkan Region", held 4-5 April 2005 in Ohrid, Republic of Macedonia.

According to data shown in the Table 4, it can be concluded that, in average, 58.8% from the total number of forest fires have human origin, 3.3% have natural origin and 37.9% have unknown origin. The largest percentage of forest fires with human origin was recorded in Croatia (75.3%) and the smallest percentage in Bulgaria (30.4%). On the other hand, Bulgaria has the largest percentage of unknown causes (67.9%). Generally we should be concerned about the fact that very often the causes of forest fires are unknown.

#### Causes of forest fires in some countries

**Albania:** Human, forest harvesting, agriculture, building activities (mainly in the costal area), etc. have a negative influence on the fire regime. Recreation activities also influence fire regime.

**Bulgaria:** Human activities, especially tourism (arson and accidental ignitions), and burning of stubble fields (crop production practice).

**Greece:** Forest fire causes in Greece are distributed as follows: unknown 41.5%, agricultural activities 18%, rangeland improvement 10.5%, arson 14.5%, negligence 12.5%, and lightning 3%. About half of the 'unknown' fires are attributed to arson, thus increasing the arson fires to 35% approximately - the leading cause of fires in Greece.

**Republic of Macedonia:** Almost 65% of fires occurred due to negligence, 7.5% were ignited intentionally and only 2% were caused by lightning. For 25.5% of fires, the cause is unknown due to difficulties in discovering the cause. Consequently, about 72.5% are of anthropogenic origin.

**Turkey:** Fire regimes are highly affected and change gradually as a result of excessive and increasing human activities. Of human activities, tourism is becoming the most important risk factor to change the fire regimes. Given the status of the socio-economic situation and tourism in the country, it is not very difficult to conclude that the fire risk will steadily increase, resulting in more areas being negatively affected by wildfires.

### 3.3 Damages (social, economic and environmental)

Since there is not yet an international standard in place to define economic and ecological damages caused by fire, it is very difficult to estimate them. However, according to relevant evidences, there is no significant social impact of forest fires. Much more important are economic and environmental damages.

Very good examples (in the negative aspect) regarding economic losses are Albania and the Republic of Macedonia. The total amount of economic losses in Albania (from 1991 to 2003) was US\$5.9 million, and in the Republic of Macedonia, only during the period from 1999 to 2004, the total amount of economic losses was €27.9 million.

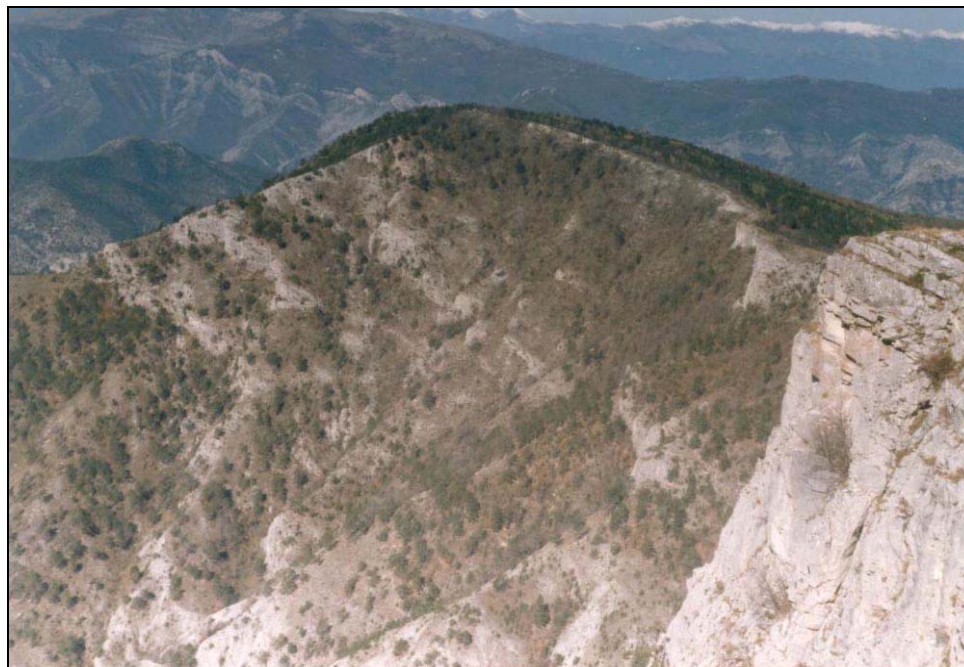
Unfortunately, there are not yet international standards in place to define economic and ecological damages caused by fire. These estimates in each country are based on their own non-unified methods. Certainly the amount would be higher if serious and unified calculations of economic losses caused by forest fires were made.

Ecological damages caused by forest fires are well known: degradation, deforestation, soil erosion, appearance of insects (especially *Ips* spp. bark beetles), emission of greenhouse gases (GHG) to the atmosphere, etc.

The appearance of bark beetle is a very significant problem in the pine forests of the Republic of Macedonia. Soil erosion exists in all countries with large burned areas. Taking the total area of burned forest (1.3 million ha) into consideration, it is clear that the emission of GHGs is very high.

Forest degradation in the Balkan Region due to forest fires is very significant, especially in countries such as Croatia, Greece, Albania, Republic of Macedonia and Turkey.

The influence of forest fires due to tourism in the region should not be forgotten. It is especially important for countries such as: Croatia, Greece, Republic of Macedonia and Turkey.



**Figure 7.** Soil erosion and forest degradation after a forest fire in the Republic of Macedonia. Photo: N. Nikolov.



**Figure 8.** The early phase of the *Ips* bark beetle infestation (note the dead trees) near the burned pine forest in the Republic of Macedonia. Photo: N. Nikolov.

### **3.4 Fire prevention and suppression**

There are many preventive measures which could decrease the number of forest fires.

The first one, of course, is the different legal regulations existing in each country, which present obligations for involved sites in forest management and forest fire protection (Ministry of Forestry, railways, power lines, roads, etc).

Other prevention measures, such as propaganda, informative measures and education, have been used in most countries of the region. Their quantity and quality depend on the economic situation and organizational potential of each country. The most often used preventive forms are billboards along the roads, warning signs in the forests, posters, TV clips, lectures in the schools, forest fire protection journals, etc. These measures are usually taken by Ministries of Interior, Ministries of Forestry, Voluntary protection unions, and some non-governmental organizations (NGOs).

Human intervention is the most important means for extinguishing fires. The number of naturally extinguished forest fires is very low (no more than 3%), usually when the cause of forest fire is lightning accompanied with rainfall.

In order to be more efficient in the suppression of forest fires, few international exercises have been held at the regional level. The first one: "Taming the Dragon - Dalmatia 2002", was a Croatian contribution to the Partnership Work Programme (PWP). The exercise was primarily conducted by the PWP Euro-Atlantic Disaster Response Coordination Centre (EADRCC) and Euro-Atlantic Disaster Response Unit (EADRU). It also involved other existing networks and organizations such as the Disaster Preparedness and Prevention Initiative (DPPI) of the Stability Pact, the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) and the South East Europe Group (SEEGROUP).<sup>1</sup>

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<sup>1</sup> [http://www.fire.uni-freiburg.de/GlobalNetworks/SEEurope/SEEurope\\_4.html](http://www.fire.uni-freiburg.de/GlobalNetworks/SEEurope/SEEurope_4.html)



The scenario for the field exercise was developed on "wild fires", which is one of the risks common to all countries of South East Europe and adjacent countries. Therefore, the exercise was built upon experiences and lessons learnt by Croatia, other countries of the region, and the EADRCC during previous wild fires.

The next one was held on 27 May 2004 in Montenegro, in the town of Budva, and was entitled "Budva 2004" with the slogan "*Together against Fire*". Participants in the exercise were firefighters from Croatia, Montenegro and Bosnia and Herzegovina. Eighty firefighters from three countries participated in the exercise with ten fire trucks, one Bell 212 helicopter owned by the Ministry of Interior of Montenegro, and two Dromader firefighting planes. The exercise scenario dealt with a forest fire in inaccessible terrain near the town of Budva.

The third exercise was the "Eastern European, Near East and Central Asian States Exercise on Wildland Fire Information and Resources Exchange 2005" (EASTEX FIRE 2005) held from 20 to 22 April 2005, in Haskovo, Bulgaria, with the participation of the Fire Services of the Republic of Bulgaria (host country), Albania, Bosnia and Herzegovina, Greece, Republic of Macedonia, Serbia and Montenegro, and Turkey, supported by the Global Fire Monitoring Center (GFMC), the UN-ECE/FAO Team of Specialists on Forest Fire and the UNISDR Regional Southeast Europe Wildland Fire Network.<sup>2</sup>



**Figure 9.** EASTEX FIRE 2005: For the first time in history, fire and forest services from Bulgaria (host country), Albania, Bosnia and Herzegovina, Greece, Republic of Macedonia, Serbia and Montenegro, and Turkey conducted a joint forest fire exercise. In the exercise a large-scale forest fire emergency was simulated and managed with the support of fire suppression resources from neighbouring countries. Photo: Bulgarian Fire Service.

<sup>2</sup> [http://www.fire.uni-freiburg.de/GlobalNetworks/SEEurope/SEEurope\\_4.html](http://www.fire.uni-freiburg.de/GlobalNetworks/SEEurope/SEEurope_4.html)

### **3.5 Stakeholders / actors situation**

The situation with institutional and other capacities (prevention and suppression), responsibilities and roles is different in each country in the region. Otherwise, there are many things which are similar.

**Albania:** The Forest Service is responsible for forest fire management and financing of all operations regarding forest fires. It collaborates with the Directorate of Civil Emergencies, Fire Fighter Service, Military Units and other state agencies. Until now, the collaboration has been limited due to lack of resources. During the last years, the Forest Service has made significant investments to improve the logistical support of forest fire suppression and control, but there is still much to be done to improve planning measures.

The private sector is not involved in fire management. Only private companies that work in forest harvesting are obliged to support fire suppression operations.

There is no NGO involved in this area and the local community is involved only in forest areas which are used on a community basis.

In large fires, the Forest Service calls for help on the Directorate of Civil Emergencies. This is the state agency, which has the authority to involve resources of other institutions inside and outside the country. There is an inter-agency agreement between five institutions, but the Directorate of Civil Emergencies has the duty to coordinate the efforts of all stakeholders. There is no international agreement until now.

**Croatia:** Within the Ministry of Internal Affairs, the Directorate for Prevention and Rescue includes the Fire Department. The Fire Department is responsible for fire prevention and suppression, and the enforcement of:

- supervision of fire prevention and fire-fighting systems;
- coordination of the institutions responsible for the functioning of fire prevention and fire-fighting systems;
- preparation and implementation of legal regulations;
- strategic planning for the acquisition of mechanization and equipment;
- control of air and land fire-fighting forces;
- coordination with other countries in the field of fire prevention.

The Fire Department carries out the integration of tasks connected with those listed above, and is headed by the Fire Chief. In accordance with the law on fire-fighting, the Fire Chief is responsible for the organization, qualification and intervention capability of fire-fighting in the whole country. The Fire Chief is in charge of fire brigades, conducts fire-fighting interventions in two or more counties, and those including aerial fire suppression. The Fire Chief, or his/her deputy, may order every fire brigade to intervene on the territory of the Republic of Croatia with a particular number of firemen and technical equipment, and may require the help of the military forces.

The Pact on Stability for South Europe brought the initiative to form the Regional Disaster Management Center (RDMC) in Split-Dalmatia county. The geographic position of the RDMC is such that its activity covers the whole region of Slovenia, Bosnia and Herzegovina, the Adriatic Sea, Italy, Greece, Albania, Serbia and Montenegro, and the Republic of Macedonia. The aim of establishing the RDMC is to facilitate and enhance co-operation in planning, preparing, preventing, fast reacting, and reducing disaster consequences, including forest fire extinguishing in the area of southeast Europe. At the moment, the Regional Center is in its organization phase.

Agreements on multilateral assistance have been signed with the following countries: Republic of Slovenia, Republic of Hungary, Bosnia and Herzegovina and Republic of Slovakia. Agreements are ready for signature by the following countries: Republic of Poland and Republic of Austria. There are

negotiations for an Agreement with the Russian Federation, Ukraine, Republic of Italy and Republic of France.

**Bulgaria:** Almost all activities for forest fire prevention, monitoring, forecasting, suppression, etc., are financed by the state budget. The National Forestry Board within the Ministry of Agriculture and Forests, in coordination with the National Fire and Emergency Safety Agency within the Ministry of Interior, are the main responsible authorities for combating forest fires. Through their Regional and Local Units and with the help of the Army, Volunteers Formations and other stakeholders, they organize and implement all activities against forest fires.

According to the Regulation for the Conditions and Order of Fire Combating Activities Implementation in the Forest Fund and the Forest Protection from Fire, in case of forest fire the National Fire and Emergency Agency, through its regional and local units, are in charge after they have come to the fire site; and according to the Crisis Management Act (adopted by the Parliament on 1 March 2005), the Governors have the right to declare a crisis situation. The Council of Ministers otherwise can, in case of a very large forest fire, declare a Crisis Situation in few districts. In a certain situation, the Minister for Interior, the Minister for Agriculture and Forest or the Minister for Environment and Waters can ask the Head of the General Staff of the Army for help in suppressing the fire.

In the last years, Bulgaria has received targeted support for improving forest fire management capabilities by the governments of Switzerland, Germany and the United States of America, FAO, the United Nations Development Programme (UNDP) and the World Bank. In 2006 a EU Twinning Project will support the country to harmonize legislation, reporting and prevention measures with EU standards. The Global Fire Monitoring Center (GFMC) has supported the Bulgarian-Swiss Forestry Programme in developing a national fire management strategy and the EU to implement the Twinning Project.

**Republic of Macedonia:** The organization for response to wildfires depends on the size and complexity of the fires.

Within the Public Enterprise (PE) areas of responsibility, the local forest unit will respond and manage the fire as long as it does not go beyond its available limited resources and equipment. If the fire exceeds the local forest's ability to control it, assistance is provided by neighbouring forest regions, local volunteers and personnel and equipment from the Ministry of Interior and Civil Defence units. When this action becomes necessary, a Regional Coordination Committee is assembled. This action is initiated by the Head of the Forest Region. The Head of the Regional Committee is always from the Civil Defence Unit within the Ministry of Defence. PE Macedonian Forests (through the Head of the Forest Region) is represented on the committee, as well as the Ministry of Interior, which operates the local anti-fire brigades.

The Faculty of Forestry in Skopje has a very important role in all aspects of fire management. Until now, the Republic of Macedonia has international agreements with Bulgaria and Greece.

**Serbia and Montenegro (Serbia):** The main institution for fire protection in the country is the Fire Department of the Serbian Ministry of Internal Affairs.

The administrative body responsible for forests in Serbia is the Ministry of Agriculture, Forestry and Water Management, i.e. the Directorate of Forests, which is the Ministerial body, and the Directorate for Forests, as part of this Ministry.

Forest Administration is in charge of the control of prescribed forest protection measures against forest fires in the field. The control in the field is done by the Republican Forest Inspectors, who are authorized to take action against forest users for economic transgression, if the users do not adhere to the prescribed measures of forest protection against forest fires.

When the observers detect a forest fire, they immediately inform the fire warden unit, headed by the Forest Officer. The team goes to the forest fire site and undertakes fire suppression. The fighting against

forest fire is directed by the Chief Forest Officer, who is in permanent contact with the Officer on duty within the local forestry enterprise.

If it is estimated that the unit cannot extinguish the fire on its own, the Fire Department of the Serbian Ministry of Internal Affairs is informed. Then, pursuant to the Fire Protection Law, action of forest fire suppression is undertaken by the Commander of the fire team unit.

If there is a large-scale fire, the responsible officer at the Headquarters of the Public Enterprise is informed, i.e. the Executive Director of the Sector for Forestry and Wildlife Management. The authorized sector of the Headquarters can request the engagement of the Army, and also of other institutions. When several institutions participate in the suppression of forest fires, it is obligatory to form the Fire Suppression Headquarters, consisting of the Presidents of all institutions.

**Turkey:** Fire management in Turkey is a federal responsibility. Duties are carried out by the state forest enterprises functioning under regional directorates. Fire control policies have been developed with a strong emphasis on total fire control as a response to destructive fires. Regardless of the high costs involved, it is the responsibility of the forest service department that all required activities be planned and implemented immediately. However, the beneficial use and ecological role of fire have been incorporated in the fire management planning process. Therefore fire management deals mainly with fire prevention and control activities.

Local people are responsible by law to immediately respond to a fire situation when and if requested. The response of local people and communities to fires has increased considerably in recent years. This has mostly been the result of a change in attitudes towards forest resources and success of the public awareness campaigns.

Academia has a very important role in all aspects of fire management. However, their effectiveness has been fairly limited. Only in recent years, the scientific studies have been increasingly conducted and the results obtained put into practice. The most important step in this regard has been the establishment of a National Fire Danger Rating System.

Since 1997, there have been substantial improvements in handling forest fires. A Fire Command Center (FCC) established in 1997 under the General Directorate of Forestry (GDF) and Forest Protection Unit, is responsible for all fire management issues, ranging from prevention activities to fire suppression and other related issues. As part of FCC activities, a more comprehensive national database on forest fires is being created, containing information on all aspects of forest fires. Information gathered on locations and causes of fires are used to develop fire prevention techniques and prevention planning. Important/large fire situations requiring inter-regional cooperation are handled with the help of FCC. All inter-agency or international agreements/procedures are handled by the Forest Protection Unit of GDF with the help of FCC.

## **4. Analysis and recommendations**

The most appropriate way to come up with analyses and recommendations for this report is to present the final conclusions of the Regional Balkan Wildland Fire Network/Global Wildland Fire Network International Technical and Scientific Consultation "Forest Fire Management in the Balkan Region", held on 4 and 5 April 2005 in Ohrid, Republic of Macedonia. The conclusions from Ohrid have support and approval from all official representatives of Balkan countries.

### **4.1 Conclusions**

On 4 and 5 April 2005, the Republic of Macedonia hosted the International Technical and Scientific Consultation "Forest Fire Management in the Balkan Region". The conference was sponsored by the UNISDR Wildland Fire Advisory Group/Global Wildland Fire Network through its Coordinator and

Secretariat, the Global Fire Monitoring Center (GFMC). Funding for the consultation was provided by the German Foreign Office (represented by the GFMC) and contributions by the participating and contributing countries (Albania, Bulgaria, Croatia, Greece, Hungary, Republic of Macedonia, Serbia and Montenegro, Turkey).

### **The participants in the consultation:**

Recognizing the importance of forests as providers of environmental services and social, economic and ecological benefits to humankind in Southeast Europe;

Expressing concern about the increasing frequency and destructive force of wildfires in Southeast Europe affecting human health and wellbeing, economic assets, property, biodiversity, water resources, soil, atmosphere and climate;

Noting that changing land use and rural exodus in some parts of the region is resulting in increased wildfire hazard and vulnerability of ecosystems, likewise urban encroachment in wildlands resulting in increased vulnerability of human populations to fire, notably at the rural-urban interface;

Noting an increase in vulnerability of humans and ecosystems to secondary disasters following fires, including floods, landslides and soil erosion;

Noting that the effects of climate variability and climate change caused by human activities are already producing periods of extreme drought resulting in an increase in the severity of fires in some ecosystems;

Concluding from the analyses and reports of the countries of the Balkan region presented at this consultation, it is evident that the majority of countries in the region are ready to establish and strengthen a regional dialogue on cooperation and exchange of information, research and wildland fire management as a contribution to forest and environmental protection, stability and peace; bilateral and multilateral agreements should be considered;

Expressing the intention to overcome **current gaps and shortages** in:

- Consistent information and statistics about fires, their causes and their effects;
- Applied research in social sciences and humanities, including finances for research;
- Integration of social, economic, environmental considerations and institutions in developing tangible policies and practices related to wildland fire;
- Integration of fire as a component of land, resource, and forest management;
- Community-based approaches to fire management;
- Training in the appropriate use of fire (for example, prescribed burning for fuel reduction and nature conservation);
- Training in the safe and efficient use of resources for fire suppression (for example, appropriate equipment for fire suppression, wildland fire safety);
- Compatible approaches, e.g., global implementation of the Incident Command System (ICS) and the International Wildland Fire Agreements Template.

Recalling the recommendations of the International Wildland Fire Summit (Sydney, 2003), the UNISDR Wildland Fire Advisory Group/Global Wildland Fire Network (2004), and the FAO Ministerial Meeting on Forests (2005) with respect to the management of wildland fires and the strategy to strengthen international cooperation in wildland fire management;

Endorsing the efforts of the United Nations International Strategy for Disaster Reduction and its Wildland Fire Advisory Group to assist and strengthen the efforts of United Nations bodies, other international organizations, and non-governmental organizations, to reduce the negative impacts of wildland fires;

Supporting the objectives of the UNISDR Global Wildland Fire Network (GWFN) and the Global Fire Monitoring Center (GFMC) to systematically increase the intra- and inter-regional cooperation in wildland fire management for the world;

Expressing gratitude to the Faculty of Forestry of Skopje, represented by Mr. Nikola Nikolov, for the preparation and organization of the consultation;

Recommend to governments, international organizations and non-governmental organizations the following action plan for cooperation on wildland fire research and management in Southeast Europe:

### **Research**

- Secure financing of a regional wildland fire research programme;
- Strengthen wildland fire research cooperation between neighbouring countries;
- Develop standardization of terminology and procedures;
- Develop standardized data collection i.a.w. the further development of global wildland fire data collection;
- Encourage increased involvement of the science community in wildland fire-related research programmes (interdisciplinary research);
- Support the establishment of national or regional (international) wildland fire research centers;
- Establish a regional wildland fire weather network;
- Approach the EU Erasmus/Sokrates programme for developing a dedicated programme for wildland fire exchange.

### **Consolidation of the Regional Network**

- Expand the current focus on the Balkan Region to a “Regional South East European Wildland Fire Network” and invite countries adjoining to the Balkan region to cooperate;
- Establish a network of country Focal Points, preferably with one representative of a government agency and a representative of the academia;
- Support the network co-coordinators that are representing the main stakeholders involved (Mr. Nikola Nikolov, Republic of Macedonia, Research; Mr. Vladimir Konstantinov, Bulgaria, Forest Service; Mr. Dulijano Grum, Croatia, Fire Service) (initially nominated for a 1-year period);
- Seek for widespread membership in the network;
- Maintain a publicly accessible website of the network (communication language: English);
- Produce an initial publication of this regional consultation and the network foundation, to be published in UN-ECE/FAO International Forest Fire News, including a summary of previous activities in international cooperation in the South-East European Region;
- Conduct a first Regional Advanced Wildland Fire Management Training Course not later than 2006, based on experiences in other regions and the FAO courses in Bulgaria; seek support from the German Foreign Office;
- Request an FAO Technical Development Project (TCP) on “Development of a Regional South-East European Strategy for International Cooperation in Wildland Fire Management”, preferably to be conducted before 2007;
- Improve access and reliability of regional and country/ecosystem specific early warning information, including automatic distribution;
- Participate in the 4<sup>th</sup> International Wildland Fire Conference, Madrid, Spain (May 2007);
- Convene the next network meeting not later than 2006.

Finally, the participants of the regional consultation emphasized the need of supplying proper equipment for forest fire suppression in all countries of the Balkan Region.

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Website of the Regional Southeast Europe Wildland Fire Network:  
<http://www.fire.uni-freiburg.de/GlobalNetworks/SEEurope/SEEurope.html>

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Working Paper FM/3	<i>Legal Frameworks for Forest Fire Management: International Agreements and National Legislation.</i> Fernando Fernández Arriaga, Frédéric St-Martin, Tom Frey, Ricardo Vélez Muñoz. March 2004.
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