

# Forest Fire Country Studies

Republic of Serbia



**FOREST FIRES COUNTRY STUDY**

**REPUBLIC OF SERBIA**

**2015**

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## Abbreviations

PE	Public enterprise
NP	National park
RS	Republic of Serbia
FAS	Firefighting Association of Serbia
MoU	Memorandum of Understanding
EU	European Union
RHMS	Republic Hydrometeorological Service
EFFIS	European Forest Fire Information System
MKFFIS	Macedonian Forest Fire Information System
BiH	Bosnia and Herzegovina

*Kosovo\* This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo declaration of independence.*

## I. The forestry sector, forests and fire history

### 1. Overview of the forestry sector

According to Article 5 of the Law on Forests (Official Gazette of RS Nos. 30/10 and 93/12), forests and forest land in the Republic of Serbia are defined as follows:

*“Forest, in terms of this act, means an area larger than 5 ares [0.05 ha] covered with forest trees.*

*The term forest also includes forest nurseries in the forest complex and seed plantations, as well as protective belts of trees with an area larger than 5 ares [0.05 ha].*

*The term forest does not include separate groups of forest trees on an area less than 5 ares [0.05 hectares], parks in urban areas, as well as trees located under power lines and in the corridor of constructed power lines, regardless of the area covered.*

*Forest land is land on which forest is grown, the land on which, due to its natural characteristics, it is more rational to grow forests, as well as the land on which facilities for forest management, wildlife and exercising the amenities of the forest are located, and which can not be used for other purposes, except in cases and under conditions stipulated herein.”*

According to Article 8 of the same law, “forest management” is defined as follows:

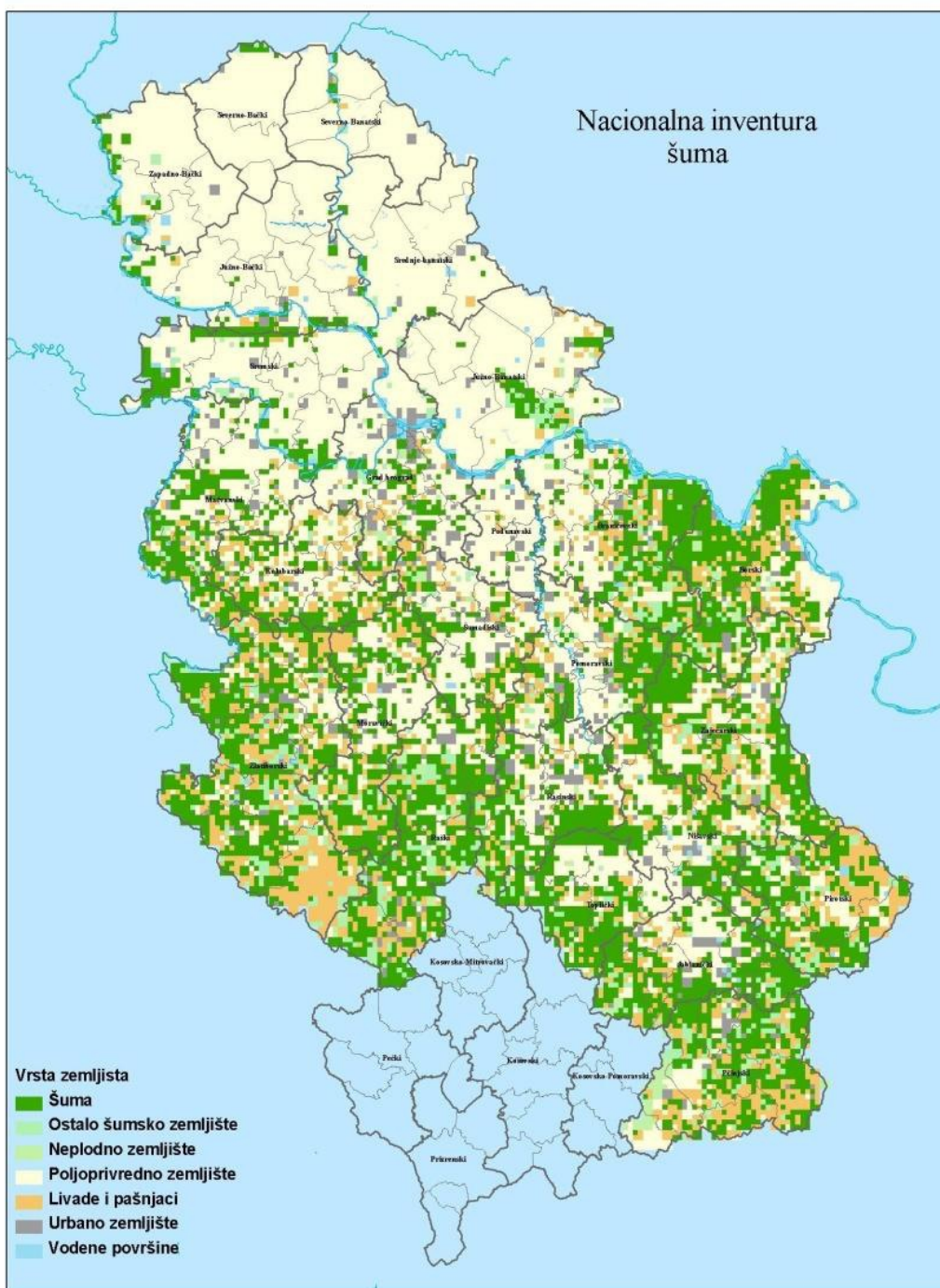
*“Forest management is a set of harmonised professional-scientific, technical- technological, economic, organisational and social activities undertaken in the forest in a particular period for the purposes of its protection, maintenance, enhancement and utilisation.”*

#### 1.1. Forest characteristics

The total forest area in Serbia is 2,252,400 ha, of which 1,194,000 ha (53 percent) are in state ownership, while 1,058,387 ha (47 percent) are privately owned.

Broadleaved trees account for 90.7 percent of the growing stock, conifers for 6 percent, while mixed forests of broadleaved trees and conifers account for 3.3 percent. The average standing volume is 101.7 m<sup>3</sup>/ha, with 153 m<sup>3</sup>/ha in high forests (forests of seed origin) and 70 m<sup>3</sup>/ha in coppice forests. [1]

**Map 1.** Forests and forest land in Serbia



*Note:* This map does not show the territory of Northern Kosovo, which is under the jurisdiction of the Ibar-Leposavic forest company operating in the framework of the Srbijazume public enterprise.

Source: [3]

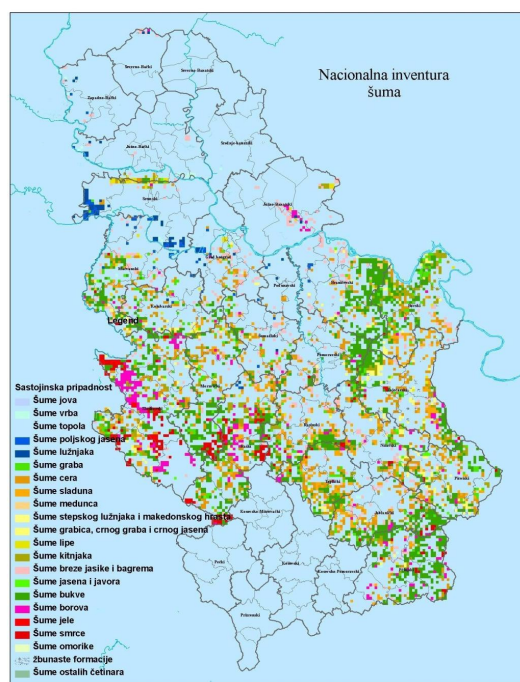


**Table 1.** Forest area by purpose

PURPOSE	AREA (ha)
Forests and forest stands with productive function	1,704,855
Forests and forest stands with productive-protection function	100,400
Forests with priority protection function	27,200
Protected natural areas <sup>1</sup>	412,745
Game parks and reserves	4,400
Forests designated for recreation and with cultural and educational functions	800
Educational base	1,600
Forests designated for country defense	400
<b>TOTAL</b>	<b>2,252,400</b>

Source: [2]

**Map 2.** Forests by tree composition **Table 2.** Area and percentage of forest by tree species



Source: [3]

Categories	Area (ha)	%
Oaks forests	720,800	32.0
Beech forests	660,400	29.3
Others	580,000	25.8
Conifers forests	243,200	10.8
Poplar forests	48,000	2.1
<b>TOTAL</b>	<b>2,252,400</b>	<b>100.0</b>

## 1.2. Major forestry stakeholders

The Government of the Republic of Serbia administers the forests and forest lands in state ownership through the following institutions:

- Ministry of Agriculture and Environmental Protection
- Srbijašume public enterprise
- Vojvodinašume public enterprise
- Borjak public enterprise
- Fruška Gora National Park public enterprise
- Djerdap National Park public enterprise
- Kopaonik National Park public enterprise
- Tara National Park public enterprise

The enterprises listed above are also engaged in professional activities in private forests. Funds for their activities are provided from the budget of the Republic of Serbia.

Educational and research institutions:

- Faculty of Forestry, Belgrade,
- Institute of Forestry, Belgrade
- Institute of Lowland Forestry and Environment, Novi Sad

Private forests are managed by:

- Legal persons who own the forest
- Associations of forest owners
- Individual forest owners

### 1.2.1. Ministry of Agriculture and Environmental Protection

(<http://www.mpzss.gov.rs/>)

The Law on Ministries (Official Gazette of the RS No. 44/2014) defines the authority of the Ministry of Agriculture and Environmental Protection. The competencies of the ministry in the forestry sector are defined primarily through the competencies of the Forest Administration.

The Forest Administration (according to Article 4 of the Law on Ministries) is an administrative body within the Ministry of Agriculture and Environmental Protection that implements public administration tasks and professional tasks related to forest policy; forest conservation; the promotion and utilisation of forests and wildlife; the protection of forests and wildlife; the control



of seeds and seedlings in forestry; inspections in the field of forestry and hunting; as well as other duties prescribed by law.

#### 1.2.2. Srbijašume (Serbian Forests) public enterprise ([www.srbijasume.rs](http://www.srbijasume.rs))

Srbijašume is a state enterprise for forest management founded by the National Assembly of the Republic of Serbia in July 1991.

The public enterprise manages state forests and forest land on an area of 899,612.75 ha and performs professional activities in private forests on an area of 1,058,387.00 ha (data from December 2010). The public enterprise comprises nine sectors: the Sector for Forestry and Environmental Protection; the Sector for Forest Utilisation; the Sector for Commercial Affairs; the Sector for Finances and Accounting; the Sector for Development and International Cooperation; the Sector for Hunting, Fishing and Other Resources; the Sector for Legal Affairs; the Sector for Marketing and Public Relations; and the Sector for Real Estate.

In addition to its headquarters in Belgrade, there are 17 forest estates and 67 forest administrations throughout the territory of central Serbia, as well as the Ibar-Leposavić forest management unit on the territory of Kosovo\*.

#### 1.2.3. Vojvodinašume (Vojvodina forests) public enterprise ([www.vojvodinasume.rs](http://www.vojvodinasume.rs))

Vojvodinašume is a state enterprise for forest management founded by a decision of the Assembly of the Autonomous Province of Vojvodina in May 2002. It operates on the territory of the Autonomous Province of Vojvodina.

The public enterprise has three organisational levels:

- The company directorate
- Company subsidiaries: Sremska Mitrovica; Banat; Pančevo; Sombor; Novi Sad; and the company Vojvodinašume-Lovoturs in Petrovaradin
- Work units – forest administrations and other operational units

**Table 3.** Distribution of forests within Vojvodinašume

No.	Forest estate	Total area (ha)	Forests (ha)	Remaining land (ha)
1	Sremska Mitrovica	42,644.34	38,810.28	3,683.64
2	Pančevo	49,494.60	44,317.50	5,141.64
3	Novi Sad	14,143.93	12,468.49	1,661.51
4	Sombor	23,594.97	18,669.95	4,907.14
	<b>Total</b>	<b>129,877.84</b>	<b>114,266.22</b>	<b>15,393.93</b>

Source: [9]

#### 1.2.4. Borjak public enterprise ([www.borjak.rs](http://www.borjak.rs))

This public enterprise was founded in 2004 by the municipality of Vrnjačka Banja. Its goal is to manage the protective forest covering an area of around 9,500 ha in the region of Vrnjačka Banja.

#### 1.2.5. Kopaonik National Park public enterprise ([www.npkopaonik.com](http://www.npkopaonik.com))

Kopaonik National Park is located in central Serbia. Because of its natural resources, the area was declared a national park in 1981. The park covers an area of 11,810 ha. Considering the high number of endemic species of flora, the park is one of the most important centres of biodiversity in Serbia.

#### 1.2.6. Djerdap National Park public enterprise ([www.npdjerdap.org](http://www.npdjerdap.org))

Djerdap National Park was established in 1974. The Djerdap Gorge and the natural riverbanks, covering over 637.99 km<sup>2</sup>, form an area of outstanding cultural and historical values, important ecosystems with valuable and rare wildlife, indigenous flora and fauna and well-preserved natural forests of remarkable beauty.

#### 1.2.7. Fruška gora National Park public enterprise ([www.npfruskagora.co.rs](http://www.npfruskagora.co.rs))

Fruška Gora National Park was proclaimed in 1960 in order to provide for its permanent protection and to improve its natural resources and beauty. The area under active protection covers 25,525 ha.

### 1.2.8. Tara National Park public enterprise ([www.npfruskagora.co.rs](http://www.npfruskagora.co.rs))

Tara National Park was established in 1981. It is located in western Serbia and covers an area of 19,175 ha. Together with some of the surrounding areas (Zaovine and Mokra Gora), the national park has been nominated by the national Man and the Biosphere Committee (MAB) as a potential biosphere reserve.

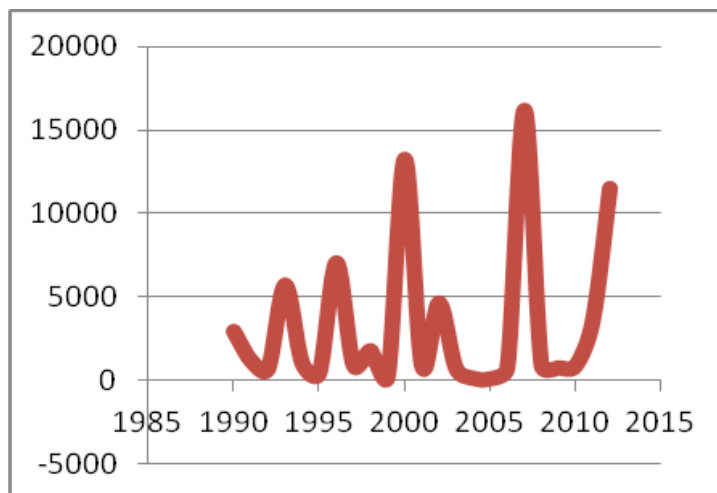
## 1.3. Fire history

In the period between 2004 and 2013, an annual average of 3,828 ha were burned in Serbia, of which 2,252.400 ha were forests. In terms of wildfires and forest fires, the most severe years were 2007 and 2012.

In 2007 there were 5,268 wildfires that destroyed 47,868 ha; 2,021 forest fires that destroyed 32,136 ha; and 3,247 low vegetation fires that destroyed 15,732 ha.

In 2012 there were 22,154 wildfires and 1,249 forest fires that destroyed 219,000 ha. Twenty-six members of the fire rescue units were injured. [4]

**Figure 1.** Burned area of forest and forest land (ha) and number of forest fires (2004–2012)



Source: Forest Administration

**Table 4.** Burned area of forests and forest land

Year	Number of fires	Area (ha)
2004	22	98
2005	15	63
2006	43	715
<b>2007</b>	<b>258</b>	<b>16,144</b>
2008	45	824
2009	84	728
2010	72	855
2011	343	3,567
<b>2012</b>	<b>328</b>	<b>11,462</b>

Source: Forest Administration

**Table 5. Number of fires in open spaces**

Number of fires in open space Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of forest fires	385	643	595	264	259	837	1,627	17,720	408	254	734	1,321
Number of fires in crops	189	221	175	213	62	62	147	552	286	98	721	416
Number of fires in meadows and grass fires	1,877	2,919	3,820	2,311	1,936	2,831	10,273	200	4,159	2,789	9,814	11,665
Number of fires in orchards	51	91	90	55	32	92	299	6,339	129	70	332	349
Number of fires at waste dumps	811	1,273	2,031	1,797	2,215	3,073	4,060	140	1,212	755	1,671	1,663
Number of other fires in open spaces	2,837	3,756	4,034	3,486	3,810	4,721	6,178	4,554	5,947	4,349	8,659	10,041
TOTAL	5,961	8,903	10,745	8,126	8,314	7,749	22,584	5,935	12,141	8,315	21,931	25,455

Source: Ministry of the Interior of the Republic of Serbia, Emergency Management Sector

In the last 10 years, 66 percent of the total number of forest fires in Serbia have been started by human activities, 3 percent have had a natural origin, and 31 percent have been of unknown origin. Even in those cases where the cause of the fire is recorded as unknown, unofficially the reason behind the fire is human activity. One of the most important causes of forest fires in Serbia is agricultural burning. [19]

## II. Legal framework and institutional set-up in the field of forest fire/wildfire management

The most important legislative acts regulating the issue of forest fires in Serbia are:

- Strategy for Fire Protection for 2012–2017 (Official Gazette of RS No. 21/2012)
- National Strategy for Protection and Rescue in Emergency Situations (Official Gazette of RS No. 86/2011)
- National Programme for Environmental Protection (Official Gazette of RS No. 12/2010)
- Forestry Development Strategy of the Republic of Serbia (Official Gazette of RS No. 59/06)

The main laws regulating the issue of forest fires and wildfires are:

- Law on Fire Protection (Official Gazette of RS No. 111/09)
- Law on Emergency Situations (Official Gazette of RS No. 111/09)
- Law on Forests (Official Gazette of RS Nos. 30/10 and 93/12)

According to the current laws, entities that manage forests (public enterprises) must prepare plans for forest fire protection for all categories of forest ownership within their territory. Such plans are obligatory for forests that come within the first and second categories of fire risk according to the forest management plans and should include:

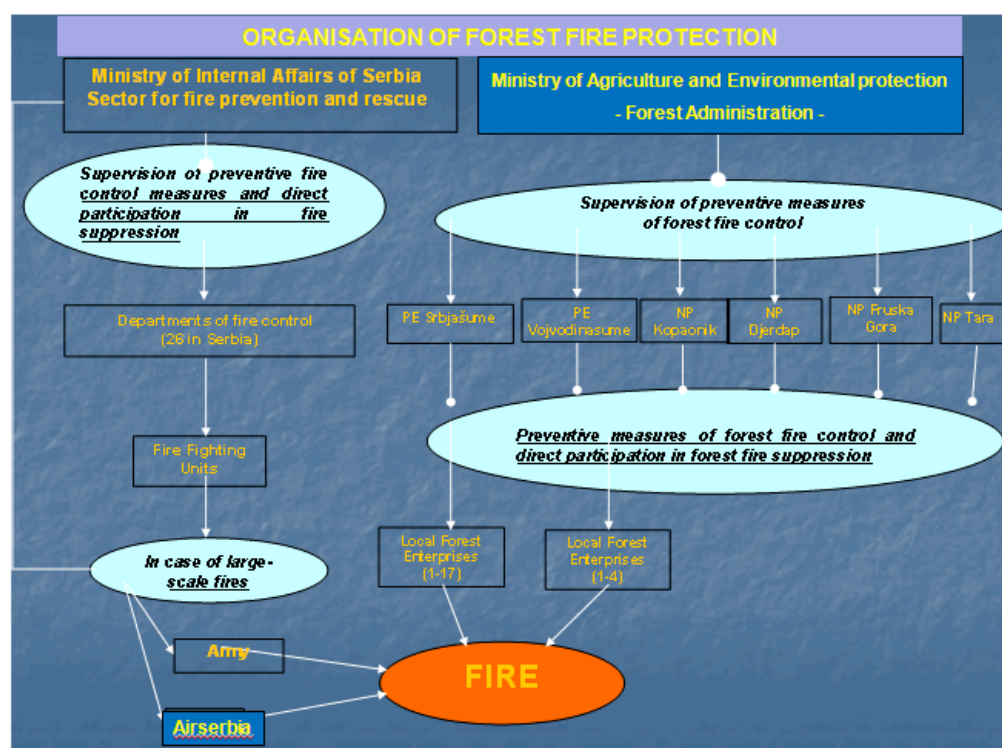
- a review of the current state of fire protection;
- an assessment of the fire risk;
- the organisation of fire protection;
- prescribed technical and organisational measures to eliminate weaknesses and strengthen capacities for fire protection; and
- a calculation of the necessary financial resources for this purpose.

In the form of an annex, the fire protection plan must also provide data on the number of fire fighters, the equipment and technical training of the fire teams, the organisation of preventive measures, the teams' shifts, and the number of qualified personnel for the implementation of fire protection activities.

The plan must be approved by the Ministry of the Interior and the Ministry of Agriculture and Environmental Protection. Forest fire risks and the vulnerability of the forests are defined in the planning documents for forest management. In order to reduce these risks, decrease the

vulnerability of the forests and protect forests from fires, the management team must define appropriate management activities for the forest.

**Figure 2.** Organisation of forest fire protection in Serbia



Source: [17]

## 1. Ministry of Agriculture and Environmental Protection (<http://www.mpzss.gov.rs/>)

In terms of forest fire protection, the Ministry of Agriculture and Environmental Protection (Forest Administration) has the role of coordinating and inspecting all entities that manage forests and forest land.

## 2. Srbijašume public enterprise

Srbijašume is a state enterprise for forest management founded by the National Assembly of the Republic of Serbia in July 1991.

The public enterprise manages state forests and forest land on an area of 899,612.75 ha and performs professional activities in private forests on an area of 1,058,387.00 ha (data from December 2010). The public enterprise comprises nine sectors: the Sector for Forestry and Environmental Protection; the Sector for Forest Utilisation; the Sector for Commercial Affairs; the Sector for Finances and Accounting; the Sector for Development and International



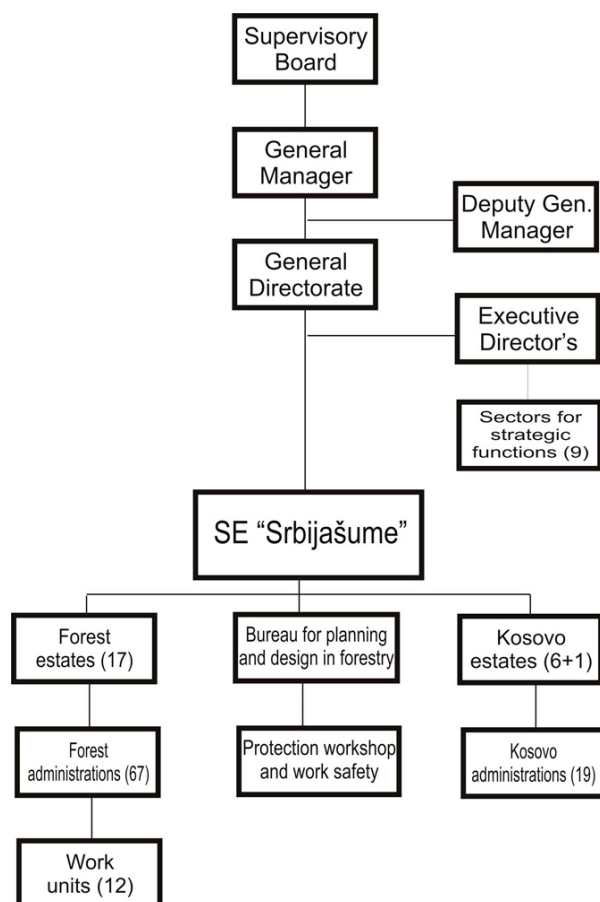
Cooperation; the Sector for Hunting, Fishing and Other Resources; the Sector for Legal Affairs; the Sector for Marketing and Public Relations; and the Sector for Real Estate.

In addition to its headquarters in Belgrade, there are 17 forest estates and 67 forest administrations throughout the territory of central Serbia, as well as the Ibar-Leposavić forest management unit on the territory of Kosovo\*.

In accordance with the Forest Law, the public enterprise carries out measures and activities with the aim of preventing, suppressing and eliminating the consequences and harmful impacts of plant diseases, insects, rodents, wild game, human activities, fire, natural disasters and other biotic and abiotic factors.

Forest fire protection measures are carried out in all 17 forest estates and 67 forest administrations in accordance with their current management plans and plans for forest fire protection (as explained above). This means that they must organise appropriate measures for prevention, pre-suppression and suppression.

**Figure 3.** Organisational structure of Srbijašume public enterprise



Source: [8]

### *3. Vojvodinašume public enterprise*

Forest fire protection is of great significance for this public enterprise, as fire represents a serious threat to forests and forest ecosystems on the territory that it manages, and especially to the forests of Deliblato Sands and Subotica Sands.

In order to prevent outbreaks of fire and to be able to suppress forest fires, the public enterprise prepares a forest fire protection plan that foresees the following activities and measures:

- the assessment of fire danger categories for certain types of forests;
- the monitoring of climate conditions and fuel quantity in order to estimate the existing fire hazard;
- early warning and the detection of forest fires;
- the organisation of teams for first response;
- the construction of firebreaks and water tanks;
- the implementation of silvicultural measures for reducing the risk of fire outbreaks and the speed at which fires spread;
- the maintenance of picnic sites;
- the printing and distribution of information materials; and
- awareness raising among the local population.

### *4. Borjak public enterprise and national parks*

Borjak public enterprise, along with four national park public enterprises, have organised their forest fire protection according to the same principles and rules as Srbijašume and Vojvodinašume public enterprises (carrying out the same set of preventive, pre-suppressive and suppressive measures for forest fire protection, in line with local conditions).

### *5. Ministry of the Interior ([www.mup.gov.rs](http://www.mup.gov.rs))*

The operations of the Ministry of the Interior are based on a unique organisational structure throughout the territory of the Republic of Serbia, comprising territorial, linear and object principles of operation. In addition to the seat of the ministry in Belgrade, and in line with the territorial division into districts, the tasks and duties fall within the competence of the ministry are also performed by regional units — the regional police directorates of Belgrade, Kragujevac, Jagodina, Niš, Piroć, Prokuplje, Leskovac, Vranje, Zaječar, Bor, Smederevo, Požarevac, Valjevo, Šabac, Kraljevo, Kruševac, Čačak, Novi Pazar, Užice, Prijepolje, Novi Sad, Sombor, Subotica, Zrenjanin, Kikinda, Pančevó and Sremska Mitrovica, as well as a coordination directorate for Kosovo\* and Metohija. There are four sectors within the ministry: the Sector for

Analytics, Telecommunications and Information Technology; the Sector for Finance, Human Resources and Common Affairs; the Internal Affairs Sector; and the Sector for Emergency Management.

### **Sector for Emergency Management**

The Sector for Emergency Management seeks to build, maintain and improve the ability of the entire country to help prevent the risks, respond to the challenges, and mitigate the consequences of various disasters that may affect the region. It combines all existing resources in terms of protection, rescue and emergency response.

The operational division comprises the core members of the operational fire rescue units. At any time, 3,000 rescuers are ready to give their best to protect and rescue citizens in the Republic of Serbia. Accidents of various kinds — fires, floods, earthquakes, landslides and chemical accidents — can happen anywhere, at any time and without warning, thus priority is given to a high level of professionalism and the ability to respond in a timely manner. In addition to the basic fire rescue units, the sector has specialist rescue teams in the event of earthquakes, floods and other accidents, or in the event of technological accidents and accidents involving hazardous substances.

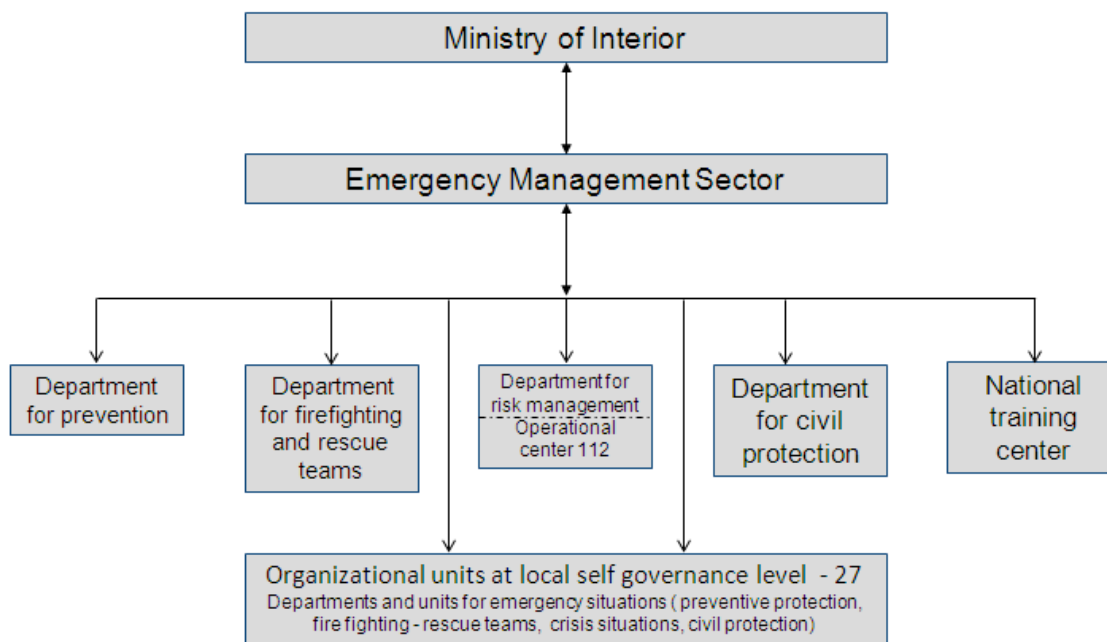
The headquarters of the sector comprises the Department for Prevention; the Department for Firefighting and Rescue Teams; the Department for Risk Management; the Department for Civil Protection; and the National Training Centre. At local level, the sector has 27 organisational units: four emergency situation boards in Belgrade, Kragujevac, Niš and Novi Sad; and 23 departments of emergency situations in Bor, Valjevo, Jagodina, Kikinda, Pančevo, Sremska Mitrovica, Užice, Šabac, Kraljevo, Novi Pazar, Pirot, Požarevac, Prokuplje, Čačak, Prijepolje, Smederevo, Subotica, Sombor, Zaječar and Zrenjanin.

The Department for Firefighting and Rescue Teams exercises timely legal supervision over the work of the fire and rescue units and industrial and voluntary fire brigades, as well as their coordinated action in the event of major emergencies. It has a direct influence over the work of the regional organisational units of fire at rescue operations in order to improve their work. It comprises three units: the Unit for Technical Equipment for Fire Fighting and Rescue Teams; the Unit for the Control of Firefighting and Rescue Teams; and the Unit for the Coordination of Operational Activities.

The Unit for Technical Equipment for Firefighting and Rescue Teams actively participates in the organisation and supervision of the work of firefighting and rescue units; analyses the state of the technical equipment used by the fire and rescue units; undertakes the planning of material and technical resources and the procurement of the necessary resources to improve the technical equipment of the fire and rescue units; plans measures to ensure adequate conditions for the accommodation of the fire and rescue units; monitors and studies the development of

modern devices, equipment and protective systems; and cooperates with the manufacturers of such devices and equipment and with other organisations in the field of protection.

**Figure 4.** Organisational structure of the Ministry of the Interior

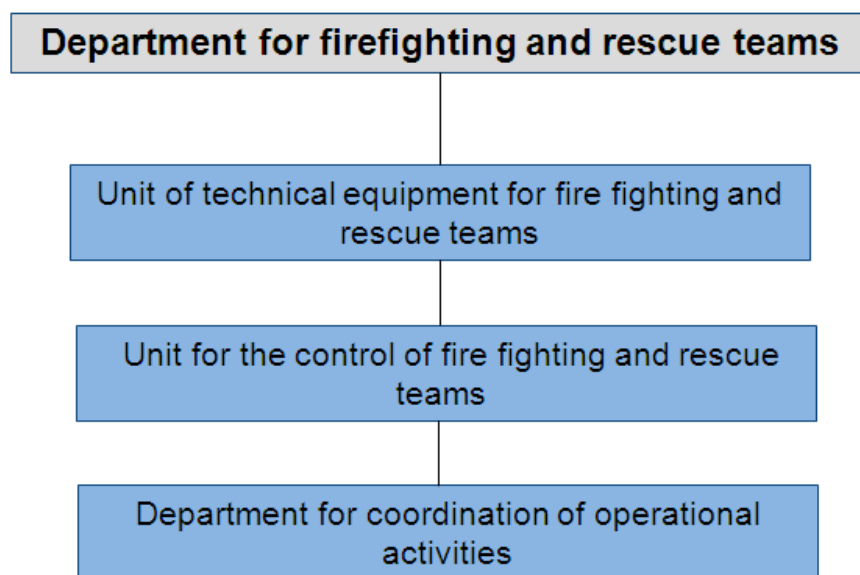


Source: [18]

The Unit for the Control of Firefighting and Rescue Teams is responsible for the fire and rescue units and for industrial and volunteer fire brigades. It controls their work and proposes appropriate measures for the improvement of fire brigades.

The Unit for the Coordination of Operational Activities is responsible for assessing the vulnerability of the territory in order to define the formation of new fire and rescue units, as well as the required number of staff. It is also responsible for coordinating the work of all the departments that are involved in emergency situations. It proposes and participates in the development and harmonisation of protection plans and operational plans with the state, regional, city and local authorities. It maintains direct contact with other services operating in emergency situations.

**Figure 5.** Organisational structure of the Department for Firefighting and Rescue Teams



Source: [15]

### *6. The Firefighting Association of Serbia (FAS) ([www.vss.org.rs](http://www.vss.org.rs))*

The Firefighting Association of Serbia brings together volunteer fire associations and unions on the territory of the Republic of Serbia in the framework of programmes in the field of fire protection and prevention activities and professional training. Through the activities of its municipal, county, city and provincial unions, the FAS coordinates and jointly implements activities together with professional firefighting units that are organised within the Ministry of the Interior and units that are located within the enterprise or institution, aimed at improving fire protection.

The establishment of volunteer fire societies and unions is regulated by the Law on Associations. The FAS conducts measures of prevention, preparedness and suppression.

There are about 3,500 volunteer firefighters with firefighting equipment, most of them in eastern Serbia. Members of the volunteer brigades have rights, obligations and responsibilities under the Law on Fire Protection. The volunteer qualification standards are compatible with those of professional firefighters and they are protected by the same legal safeguards. Local authorities provide some money for the work of volunteer firefighters.

The inter-agency mechanisms for fire protection and rescue in emergency situations are defined by the Law on Fire Protection, the Law on Emergency Situations and the Law on Forests as the responsibility of the Emergency Management Sector (Ministry of the Interior of Serbia).

Regulations governing the use of fire in forestry, agriculture, conservation areas and other lands can be found in the Law on Fire Protection, the Law on Forests, the Law on Agricultural Land and the Law on National Parks.

According to the Law on Fire Protection it is forbidden to burn stubble, crop residues or waste in the open air.

Cross-border activities include:

- Agreements on cooperation in the field of emergency and disaster management signed with Slovakia, Azerbaijan, Bosnia and Herzegovina, Montenegro, the Russian Federation and Ukraine, Bulgaria, Croatia, the former Yugoslav Republic of Macedonia, Greece and Hungary, and in process with Romania.
- A memorandum of understanding on cooperation in the field of emergency situations with Italy.
- A letter of intent for cooperation in the field of emergency situations signed with France.
- A memorandum of understanding signed with the Danish Emergency Management Agency.

In forests, agricultural lands, protected areas and military areas or national border terrain, the responsibility for fire management lies with the Emergency Management Sector of the Ministry of the Interior, the Ministry of Agriculture and Environment, public enterprises and the public enterprises of national parks, subjects that manage hunting, private land owners and the users of state land. Changes are not planned because the current regulations are harmonised with EU regulations.

Prescribed fires are commonly used in agricultural lands, pastures, abandoned agricultural and pasture lands, and waste disposal sites, although they are banned by law. There are also benefits in relation to firefighting, when fire is used as counter fire. Some uses of prescribed fire are permitted by law under certain conditions in natural forests, intensively managed forests, forest plantations and agricultural lands.

### III. The impact of wildfires on the environment, economy and human health

There are no data for related hospital admissions and premature deaths during heat and fire episodes in Serbia.

According to the Law on Air Protection, air quality is monitored in cases where there is a reasonable suspicion that poor air quality is harming human health or the environment. In crisis situations, the relevant entities (Ministry of Environment, Mining and Spatial Planning, and other local units) must be informed immediately. Statistics are available regarding the impact of forest fires on the economy in 2007, 2012 and 2014:

- In 2007, the total burned area (forests, other woodland and other land) was 34,001 ha and the total damage caused was EUR 31,530,831.
- In 2012, the total burned area (forests, other woodland and other land) was 12,125 ha and the total damage caused was EUR 112,929,525.
- In 2014, significant areas were affected by floods, causing total damage of RSD 1,074,722,891.49 [EUR 8,956,024].



## IV. Special issues

The use of bombs containing depleted uranium during the 1999 conflict is a specific problem that may have considerable environmental consequences. The Kingdom of Norway financed a project to identify contaminated areas in the municipalities of Bujanovac, Preševo and Kuršumlja. There are still areas contaminated with unexploded ordnance, but no data are available. There are large areas of unexploded ordnance in the area of Dobrosin, in the municipality of Vranje.

Land contaminated by radioactivity poses two main problems:

- It is dangerous for firefighters to remain in these areas during fire suppression because of the harmful radioactive radiation (although the level of radiation is not known).
- The gas emissions caused by forest fires in these areas will also be radioactive and, if further transported by the wind, contaminants can be deposited over long distances and in urban areas.

Terrain contaminated with unexploded ordnance is dangerous for firefighters during forest fire suppression activities, but also for foresters and members of the local population.

A significant number of areas have been decontaminated since the bombing in 1999 but are still considered as potentially dangerous sites.

A forest fire that had spread from Montenegro was recorded in the municipality of Prijepolje in July 2012. A forest fire that had started in Bosnia and Herzegovina was recorded in September 2012 in Tara Mountain area, and a fire that had started in Bulgaria was also recorded in 2012 in Bosilegrad municipality. Serbia exchanges fire management personnel with other countries. Assistance was provided in July 2012 to Montenegro; in August 2012 to Greece (Athos); and in August and September 2012 to Bosnia and Herzegovina. Assistance to Serbia has been provided by the Russian Federation.

The country has specially trained and equipped wildfire fighters. The National Training Centre for Emergency Management is responsible for training. Serbia has participated in shared fire management training through terrain simulation exercises in Croatia in 2012, in Slovenia in 2011, in Moldova in 2011, in Turkey in 2010, in Serbia in 2010 and in Croatia in 2007. Fire management materials are very similar in these neighbouring countries. Agreements on joint training, exercises and response have been signed with Slovakia, Azerbaijan, Bosnia and Herzegovina, Montenegro, the Russian Federation, Ukraine and Hungary. Agreements are currently in process with Bulgaria, Croatia, the former Yugoslav Republic of Macedonia, Greece and Romania.

Women actively participate in the professional rescue services.

Serbia has a negative population growth rate and rural depopulation is very intensive. There is a clear increase in the average age of the rural population and a reduction in the workforce, thus the availability of capable rural farmers and volunteers is reduced.

## V. Needs for improvement in forest fire management

In general, the legal regulations and institutional set-up with respect to forest fire protection in Serbia are at a satisfactory level, but some improvements still need to be made.

### **Early warning system**

The Emergency Management Sector of the Ministry of the Interior of Serbia has compiled a risk map of natural disasters in the country. Since 2008, the State Hydrometeorological Service of Serbia (RHMS) has forecast the risk of forest fires in using the Canadian Fire Weather Index method. The RHMS also has a unique hydrometeorological early warning system, integrated into the National Protection and Rescue System, as well as European and global hydrometeorological systems and programmes, which provides timely and accurate information, forecasts and warnings.

However, there is still a need for an early warning system for forest fires. This could be designed on the model of the European Forest Fire Information System (EFFIS) or the Macedonian Forest Fire Information System (MKFFIS). This kind of early warning system would serve as a basic tool for use by all institutions and organisations involved in forest fire protection in Serbia for planning and creating their activities and resources.

### **Special vehicles and equipment**

Although all institutions involved in forest fire protection have certain resources in the form of special vehicles and equipment, they are not sufficient. Most of the vehicles are obsolete, and the newly procured vehicles are almost all designed for urban fires. Other forest fire suppression equipment (hand tools, water supply systems, personal protective equipment etc.) is either obsolete or lacking.

### **Trained personnel**

As mentioned earlier, Serbia has specially trained and equipped wildfire firefighters, and the National Training Centre for Emergency Management is responsible for their training. However, they are not sufficient, taking into consideration the fact that the forestry sector (public enterprises, national parks etc.) is responsible for forest fire protection, including fire suppression. The forestry sector is obliged to organise the initial response and to participate in fire suppression. The personnel need appropriate training for forest fire suppression.

### **Revision and improvement of forest fire protection plans**

Although such plans exist, some are not of suitable quality. Their content is more formal than operational. The plans need to be more accurate in terms of prescribed measures and duties in accordance with the competences of the institutions. All plans must be harmonised in terms of content, quality and prescribed measures and activities.

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