

Forest Fire Country Studies

Bosnia and Herzegovina



FOREST FIRES COUNTRY STUDY

BOSNIA AND HERZEGOVINA

2015

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Abbreviations

BiH	Bosnia and Herzegovina
PE	Public enterprise
NFI	National forest inventory
RS	Republika Srpska
FBiH	Federation of Bosnia and Herzegovina
BD	Brcko District
MOFTER	Ministry of Foreign Trade and Economic Relations of BiH
MAWMF	Ministry of Agriculture, Water Management and Forestry of FBiH
FFO	Federal Forest Office
FFI	Federal Forest Inspection
FMP	Forest management plan
CFO	Cantonal Forest Office
CFMC	Cantonal forest management companies
CFI	Cantonal Forest Inspection
FHI	Forest and Hunting Inspection
NGO	Non-governmental organisation
JRC	Joint Research Center
PFERS	Public Forest Enterprise of Republika Srpska
TFPU	Territorial Fire Protection Unit
EFFIS	European Forest Fire Information System

Bosnia and Herzegovina (BiH) has a unique political structure that influences the functioning of public institutions and all areas of life, including forestry and forest fire protection. A brief explanation of the political structure of BiH is therefore provided below, in order to contribute to an understanding of the country's forestry and forest protection.

According to the Dayton Agreement, BiH has a multi-level political structure. The most important level is the division of the country into two entities: Republika Srpska and the Federation of Bosnia and Herzegovina. The Federation of Bosnia and Herzegovina covers 51 percent of Bosnia and Herzegovina's total area, while Republika Srpska covers 49%. Brcko District, in the north of the country, was created in 2000 out of land from both entities. It belongs officially to both but is governed by neither, but instead functions under a decentralised system of local government. For election purposes, Brcko District voters can choose to participate in either the Federation or Republika Srpska. The seat of government of Bosnia and Herzegovina is in Sarajevo, and the Presidency building is in the centre of the city.

On the third level, FBiH is subdivided into 10 cantons. Each has its own cantonal government, which is under the law of FBiH as a whole.

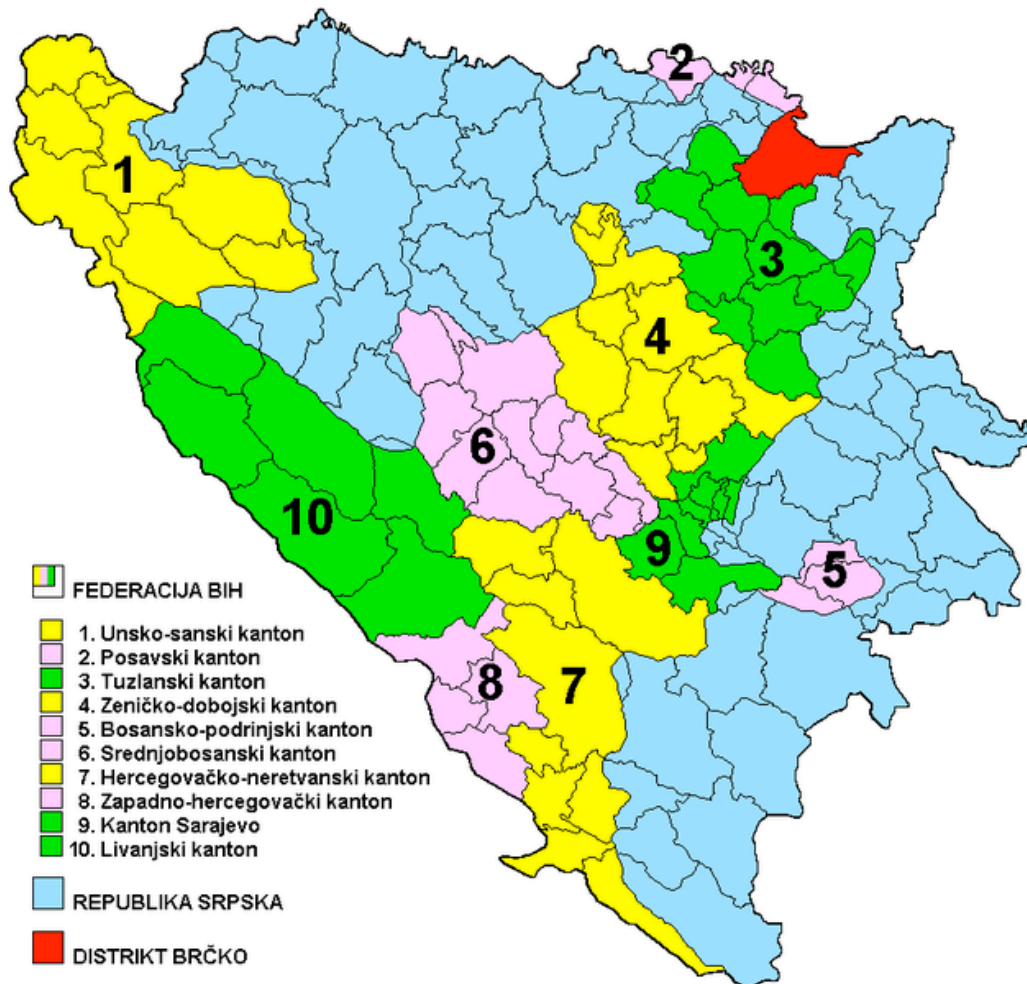
The fourth level of political division are the municipalities. There are 74 municipalities in FBiH and 63 in Republika Srpska. The municipalities also have their own local government, typically based in the most significant city in their territory. Many municipalities have a long tradition and history within their present boundaries. Others, however, were only created following the recent war after the traditional municipalities were split by the Inter-Entity Boundary Line. Each canton in FBiH consists of several municipalities, which are divided into local communities.

Besides entities, cantons and municipalities, Bosnia and Herzegovina also has eight "official" cities: Banja Luka, Mostar, Sarajevo, Zenica, Tuzla, Bihac, Siroki Brijeg and East Sarajevo. The territory and government of the cities of Bihac, Zenica, Siroki Brijeg, Tuzla, Banja Luka and Mostar correspond to the municipalities of the same name, while the cities of Sarajevo and East Sarajevo officially consist of several municipalities. Cities have their own city government whose power is between that of the municipalities and cantons (or entity, in the case of Republika Srpska).

The main implementing body of the civilian part of the Dayton Agreement is the High Representative, whose responsibilities are clarified by the Peace Implementation Council. The High Representative has many governmental and legislative powers, including the power to dismiss elected and non-elected officials. More recently, several central institutions have been established (such as the Defence Ministry, the Security Ministry, the state court and the indirect

taxation service) in the process of transferring part of the jurisdiction from the entities to the state. [1]

Map 1. Bosnia and Herzegovina



Source [3]

I. The forestry sector, forests and forest fires

1. Overview of the forestry sector

There is no Law on Forests at state level in BiH, although the terms "forest" and "forest land" are defined by separate laws and regulations in FBiH and RS. The Law on Forests in FBiH was quashed by the Constitutional Court in 2009, but the definitions of "forest" and "forest land" contained in this law are still in use in FBiH.

According to Article 2 of the law, forest is "land covered with forest trees or forest shrubs, whose area exceeds 500 m² and with a width of at least 10 m. Forests are considered as ecosystems. Their status in the land cadastre does not have any implication in terms of this act." Forest land, "in addition to land overgrown with forest, includes uncultivated, unused or barren land outside the forest to the extent that provides, or supports, the function of the adjacent forest. Forest land also consists of areas with reduced forest cover, rocks, clearings and meadows inside forests." [14]

According to Article 7 of the Law on Forests of RS (Official Gazette of RS No. 66/03, 75/08, 30/10), forests in RS are defined as "surfaces covered by forest species trees, with an area larger than 0.16 ha, a minimum width of 20 m, and with a degree of land coverage by tree crowns of at least 20 percent, regardless of whether it comes from regeneration or adult trees either from seeds or shoots from stumps or roots."

According to Article 3 of the Law on Forests of Brcko District (Official Gazette of Brcko District BiH No. 14/10), forests are defined as:

"(1) a) land overgrown with forest trees or forest shrubs as a forest ecosystem built of biotope and biocenosis, whose area exceeds 500 m² and with at least 10 m width;

b) forest nurseries and plantations of forest trees;

c) forest roads and other forest transport and fire protection infrastructure;

d) lakes, rivers, streams and other surface water and wetlands within the forest."

Forest land is defined as:

"(2) a) land that is not permanently appropriate for a different type of culture, except for growing forest, in accordance with the location, configuration, physical and chemical composition of the soil;

b) land that is designated for forest production by the spatial or urban plan;

c) uncultivated, unused or barren land outside the forest to the extent that it provides or supports the functions of neighbouring forests; and

d) areas with reduced forest cover, meadows and clearings in forests."

1.1. Forest characteristics

According to the Second National Forest Inventory (NFI), carried out between 2006 and 2009, forests and other forest land in BiH cover 3,231,500 ha, of which 1,652,400 ha are high forests while 1,252,200 ha are coppice forests. The rest of the area is characterised as “other wooded land” and comprises shrubs, barren forest land and other forest areas. This suggests that about 63 percent of the total territory of BiH is covered with forest and other wooded land, which is one of the highest values in Europe.

Table 1. Structure of forest area and forest land by vegetation form, purpose and availability in BiH

Vegetation form	Available surface				Protective forest	Total
	Economic forests	Non-economic forests	Protected forests	Special purpose forests		
	ha	ha	ha	ha	ha	Ha
1. High forest	1 329 500	46 300	5 200	8 800	262 600	1 652 400
2. Coppice forest	843 200	158 700	1 600	2 400	246 300	1 252 200
1+2. All forests	2 172 700	205 000	6 800	11 200	508 900	2 904 600
3. Shrubbery	52 700	41 100	0	100	36 700	130 600
4. Barren land	55 700	88 400	800	3 400	38 900	187 200
3+4. Shrubbery and barren	108 400	129 500	800	3 500	75 600	317 800
5. Other forest areas	3 300	3 100		100	2 600	9 100
FAO forest (1+2+3+5)	2 228 700	241 600	6 800	11 400	548 200	3 035 700
6. All forest and forest land	2 284 400	337 600	7 600	14 800	587 100	3 231 500

Note: “Available surface” means surface not contaminated with landmines.

Source [2]

The distribution of high forests and coppice forests and their availability for economic production is shown in Table 2.

Table 2. High forests and coppice forests available for economic production in RS and FBiH

Silviculture form of forest	Available economic productive forests	
	in RS ha	in FBiH ha
1. High forest	647 300	673 300
2. Coppice forest	485 300	355 400
Total	1 132 600	1 028 700

Source [2]

In terms of ownership share of the two major forest forms, the ratios of high forests and coppice forests in public and private ownership are diametrically opposed. While the state owns 72 percent of high forests, coppice forests are predominantly in private ownership (434,000 ha or 62 percent of the total economic coppice forests).

Table 3. Ownership of economic high and coppice forests in BiH

Economic forests	Area				Total in BiH
	State owned		Private owned		
	ha	percent	Ha	percent	ha
High forest	1 063 400	72	266 100	38	1 329 500
Coppice forest	408 700	28	434 500	62	843 200
All forests	1 472 100	100	700 600	100	2 172 700

Source [2]

Timber and fuel wood are the primary products of the forestry sector in BiH. Growing stock is estimated at 435 million m³ (201 m³ per ha).

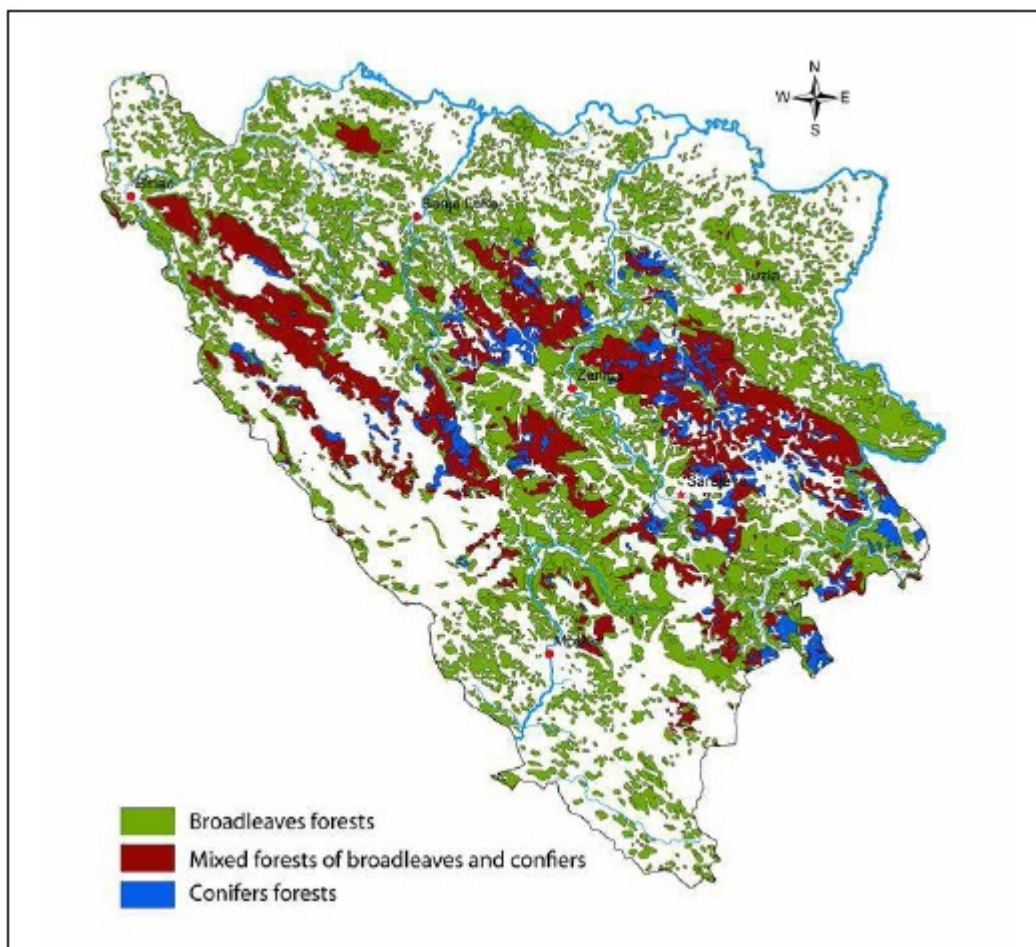
Table 4. Growing stock of accessible economic high and coppice forests by ownership in BiH

Economic forests	Growing stock - wood volume				
	Public owned		Private owned		Total in BiH
	in 1000 m ³	m ³ per ha	in 1000 m ³	m ³ per ha	m ³ per ha
High forest	299 630	282	53 968	202	266
Coppice forest	35 710	87	46 412	107	97
All forests	335 340	228	100 380	143	201

Source [2]

Forests in BiH comprise a huge diversity of forest types, ranging from coastal Mediterranean forests to mountain forests in central BiH. Map 2 shows the distribution of forests in BiH and the spatial patterns of coniferous forests in the highlands, mixed forests at medium altitudes and broadleaved forests on low-level terrains and floodplains.

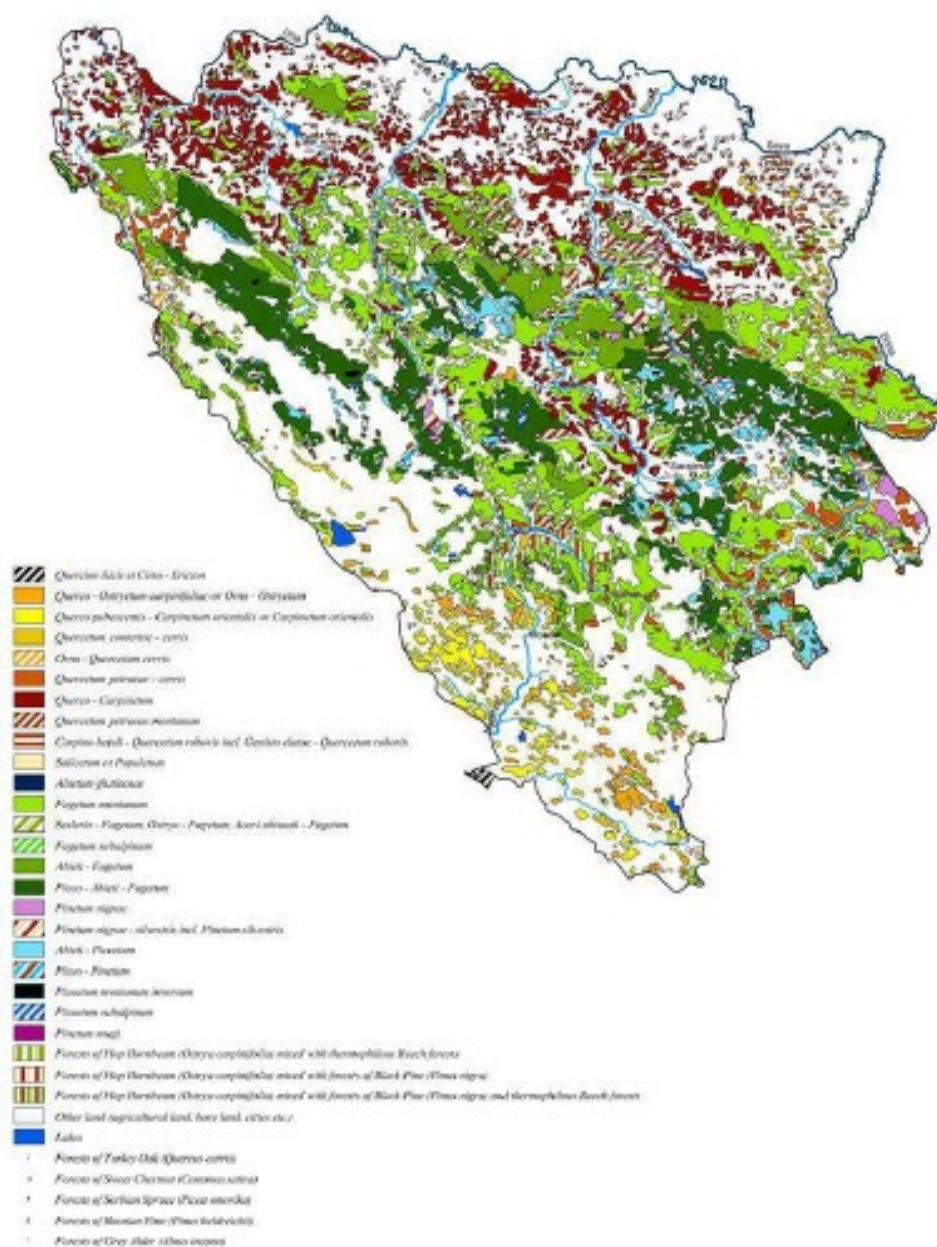
Map 2. Forest distribution in BiH



Source [2]

According to the 2006 categorisation used by the European Environment Agency (EEA), the following categories of forests can be found in BiH: Category 4 – Acidophilous oak forests; Category 5 – Mesophytic deciduous forests; Category 6 – Beech forests; Category 7 – Mountainous beech forest; Category 8 – Thermophilous deciduous forests; Category 9 – Broadleaved evergreen forest; Category 10 – Coniferous forests of the Mediterranean, Anatolian and Macaronesian regions; Category 11 – Mire and swamp forests; and Category 12 – Floodplain forests.

Map 3. Forests in BiH by phytocenosis



Source [2]

1.2. Major forestry stakeholders

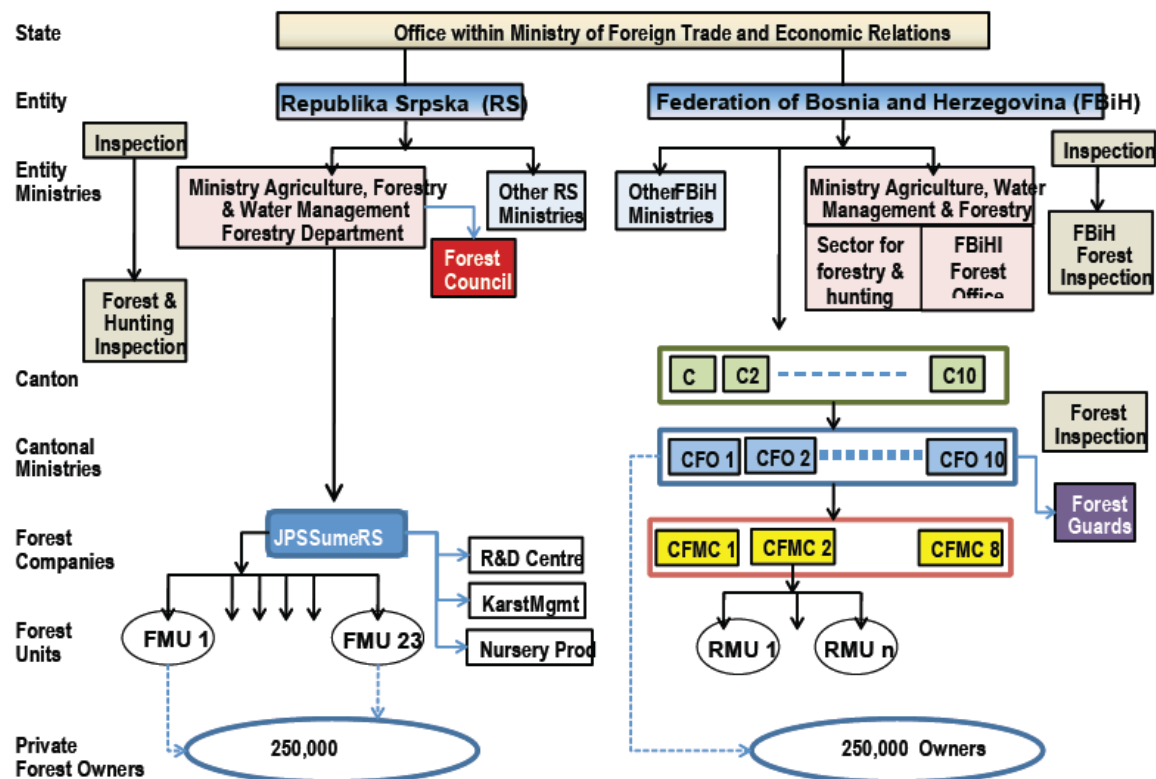
For a better understanding of the organisation and main stakeholders in the forestry sector in BiH, a brief explanation of the legal regulations is provided below.

The forestry sector in BiH is organised at entity level. Forest legislation comprises the following legal acts:

- The RS Law on Forests (2008) provides the overall framework and is supported by a series of 32 regulations adopted in 2009 and 2010 related to timber sales and the technical norms of forest management. The Law on Forests clarified the entity's ownership and administration responsibilities. Further elements of forest planning and the principles of sustainable forest management are included in the RS Spatial Plan for 2008–2015, which provides for the development of planning documentation, including the Strategy for Forestry Development for the period 2011–2021 (published in 2012), as well as for the revision of laws and regulations, including the Law on Forests.
- Based on the Decision of the Constitutional Court of FBiH of April 14, 2009 (Official Gazette of FBiH No. 36/09), the Law on Forests (Official Gazette of FBiH No. 20/02, 29/03 and 37/04) is no longer in force as of November 27, 2009. As a preliminary solution pending the adoption of a new law on forests, the Government of FBiH adopted the Regulation on Forests (Official Gazette of FBiH No. 83/09, 26/10, 33/10 and 38/10). According to the Decision of the Constitutional Court of FBiH No. U-28/10 of March 23, 2011 (Official Gazette of FBiH No. 34/11), the Regulation on Forests should have been in force by December 6, 2011. However, since the Regulation on Forests was not yet in force as of December 6, 2011, and as the Law on Forests has not yet been adopted, the forestry sector is unregulated at the level of FBiH.
- Brcko District adopted its own Forest Law in 2010. Based on the provisions of this law there are forest management plans for public forests (owned by BD) and for private forests (both for the period 2007–2016). Following the legal obligations, annual management plans are prepared and adopted by the Government of BD, which include necessary measures related to harvesting, silviculture, forest protection and forest guarding. Brcko District comprises mainly lowland and agriculture areas, thus forestry plays a subordinated role due to the small area covered by forests and the small scope of harvesting operations.

The organisational set-up and institutional arrangements in the forest sector are shown in Figure 1.

Figure 1. Organisation of the forestry sector in BiH



Source [2]

As already mentioned, direct competences in the forestry sector are held at entity level (FBiH and RS) and at the level of Brcko District. The institutions at these levels are responsible for the development of forest policy as well as for the development and implementation of forest legislation. Among its competencies, the Ministry of Foreign Trade and Economic Relations (MOFTER) is responsible for tasks and duties falling within the jurisdiction of the state of BiH, including the definition of policies and basic principles, the coordination of activities and the consolidation of entity plans with those of international institutions in the areas of agriculture, energy, environmental protection, the use of natural resources and tourism. The Sector for Agriculture, Food, Forestry and Rural Development operates within MOFTER, and in terms of forestry issues deals mainly with coordination activities.

1.2.1. Federation of Bosnia and Herzegovina

In FBiH, forest management competencies are devolved to the cantonal governments. Each canton is responsible for the forest resources within its administrative boundaries.

At FBiH level, there is a Forestry Department within the Ministry of Agriculture, Water Management and Forestry (MAWMF). The main bodies within the MAWMF are:

- the FBiH Forest Office (FFO), which is responsible for forest silviculture and protection, forest utilisation, subsidies and support payments for forestry, as well as the development and monitoring of processes in forestry, including an overall monitoring role in relation to activities within the forest sector; and
- the FBiH Forest Inspection (FFI), which performs overall inspection services safeguarding the implementation of all actions relating to the Law on Forests within FBiH. In the absence of an adopted law, the FFI also operates under the Law on Inspection.

At cantonal level, responsibility lies with the MAWMF of FBiH, with the exception of Sarajevo Canton, Zapadno-Hercegovački Canton and Bosansko-Podrinjski Canton, which fall under the responsibility of different ministries. In this respect, further important bodies are:

- the Cantonal Forest Office (CFO), which controls the activities of the cantonal forest management companies (CFMC) and provides advice and support to private forest owners. The CFO prepares forest management plans (FMP) for all private owners and plays a major role in guarding and protecting forest resources, including from illegal activities; and
- the Cantonal Forest Inspection (CFI), which forms part of the Cantonal Inspection Service. Their role is essentially the same as that of the FBiH Forest Inspection.

1.2.2. Republika Srpska

The Forestry Department within the MAWMF is responsible for forests and forestry in this entity. The main implementing bodies are:

- the Forestry Council, which is a forum for high-level discussion on forestry and forestry-related issues and developments, established under the Forest Law in 2008. Its nine members are representatives of the ministry, other state bodies, institutions and organisations that are related with the forest sector, local communities, NGOs, forest owners and others;
- the Forest and Hunting Inspection (FHI), which was transferred from the MAWMF in 2005 to the general Inspection Service, which has a total of 12 inspectorates. The FHI has six territorial divisions with a total of 17 inspectors. It carries out forest control

measures for both public and privately owned forests based on 10-year and annual forest management plans;

- the “Šume RS” public enterprise, which has a traditional organisational structure for a public forest company comprising a headquarters, 23 forest management units (FMUs), the Research Development and Design Centre that undertakes forest management planning, the Centre for Seedling Production and the Karst Management Centre; and
- FMUs, which report to the headquarters and are managed on a territorial basis that comprises a number of forest districts, which in turn comprise a number of management sub-units.

1.2.3. National parks

There are three national parks in BiH: Sutjeska (established in 1962); Kozara (1967) and Una (2008).

Table 5. Area of the national parks

Name	Entity	Area in ha
National parks		
Sutjeska	Republic of Srpska	17,250.00
Kozara	Republic of Srpska	3,494.00
Una	Federation of Bosnia and Herzegovina	19,800.00

Source [2]

Substantial proportions of the total area of the national parks are covered by forest:

- Kozara – 92 percent;
- Sutjeska – 66 percent; and
- Una – 64 percent.

1.3. Fire history

Although forest fires are a significant negative ecological factor in BiH, in the last decade it has been almost impossible to carry out a good-quality analysis, mainly because statistical data on fires and burned areas are not collected in the same way in FBiH, RS and BD. Data from RS, for example, which are the most systematic, comprise precise figures for the number of fires and burned areas in larger locations. However, data are only available for 2010, 2011 and 2012, and the sites are not well defined. Data submitted on fires in FBiH cover the fire seasons from 2008 to 2012. However, there is no precise information on the distribution of fires on the territory of FBiH, thus the data cannot be used to analyse the occurrence of fires. The least accurate data are those from BD, thus in Table 6 the summary data for BiH are calculated without data from BD. [4]

According to Table 6, the total area of forest and forest land burned by forest fires in the period 2010 to 2012 is around 85,906.47 ha, and the number of fires is around 10,091. There are no official data about the economic losses caused by forest fires, although unofficially they are estimated at between EUR 2 and 10 million per year.

Table 6. Forest fires in BiH (2010–2012)

ENTITY/YEAR	BURNED AREA (ha)	NUMBER OF FIRES	AVERAGE BURNED AREA PER FIRE (ha/fire)
2010			
FBiH	390.35	1,038	0.37
RS	1,523.06	79	19.28
BD	-	18	-
Average in 2010	1,913.41	1,117	1.71
2011			
FBiH	1,796.29	2,806	0.64
RS	14,970.25	298	50.24
BD	-	199	-
Average in 2011	16,766.54	3,104	5.40
2012			
FBiH	41,717.81	5,324	7.84
RS	25,508.71	546	46.72
BD	-	299	-
Average in 2012	67,226.52	5,870	11.45
Average for 2010–2012	85,906.47	10,091	8.51

Source [4]

Table 7. Distribution of burned area (ha) in BiH by land cover type in 2013

<i>Land cover</i>	<i>Area burned</i>	<i>% of total</i>
Forest /Other Wooded Land	2559.7	74.02%
Other Natural Land	608.27	17.59%
Agriculture	289.95	8.38%
Artificial Surfaces	0.07	0%
Total:	3457.99	100%

Source [5]

According to the Joint Research Centre (JRC) annual report for 2013, the 2013 fire season in BiH was not severe, with the total burned area estimated at around 2,560 ha of forest and forest land.

There are no valid and official data for the main causes of forest fires in BiH, although unofficially the main cause is the human factor (in about 98 percent of all forest fires). [4]

According to some unofficial sources, the main reasons for forest fires in BiH are agricultural burning (field clearing in spring and stubble burning in summer) and negligence when lighting fires in or near forests. There are some cases of arson, but these are not proved as there is no official investigation or court verdict. Lightning is a minor cause of forest fires (fewer than 2 percent of cases).

II Legal framework and institutional set-up in the field of forest fire management

Due to its unique political structure, BiH has a large number of legislative acts regulating forest fire issues:

- Law on the Protection and Rescue of People and Material Goods from Natural and Other Disasters (Official Gazette of FBiH No. 39/03, 22/06 and 43/10)
- Law on Fire Protection and Firefighting in FBiH (Official Gazette of FBiH No. 65/09)
- Law on Protection and Rescue in Emergency Situations (Official Gazette of RS No. 121/12)
- Law on Fire Protection in Republika Srpska (Official Gazette of RS No. 71/12)
- Law on Forests of Republika Srpska (Official Gazette of RS No. 66/03, 75/08, 30/10)
- Law on Forests of Brcko District BiH (Official Gazette of BD BiH No. 14/10)
- Law on Forests of Una-Sana Canton (Official Gazette of Una-Sana Canton No. 22/12)
- Law on Forests of Sarajevo Canton (Official Gazette of Sarajevo Canton No. 05/13)
- Law on Forests of Tuzla Canton (Official Gazette of Tuzla Canton No. 09/12 and 17/13)
- Law on Forests of Zenica-Doboj Canton (Official Gazette of Zenica-Doboj Canton No. 08/13)
- Law on Forests of Bosnian-Podrinje Canton (Official Gazette of Bosnian-Podrinje Canton No. 04/13 and 05/13)
- Law on the Competences of the Authorities of Sarajevo Canton in the Field of Fire Protection and Firefighting (Official Gazette of Sarajevo Canton No. 23/11)
- Law on Fire Protection and Firefighting in the Area of Tuzla Canton (Official Gazette of Tuzla Canton No. 1/12)
- Law on Fire Protection and Firefighting in the Area of Central Bosnia Canton (Official Gazette of Central Bosnia Canton No. 15/12)
- Law on Fire Protection and Firefighting in the Area of Zenica-Doboj Canton (Official Gazette of Zenica-Doboj Canton No. 5/11)
- Law on Fire Protection and Firefighting in the Area of Una-Sana Canton (Official Gazette of Una-Sana Canton No. 04/13)

In accordance with the above legislative acts and the political structure in BiH, the main institutions responsible for forest fire protection are described below.

1. Ministry of Security of BiH

The Ministry of Security of BiH is responsible for the execution of international obligations, cooperation, coordination and the revision/approval of the entities' protection and rescue programmes and plans. There are 10 sectors within the ministry, one of which is the Sector for Civil Protection.

Under the existing legislation, both the state and the entities have jurisdiction over their own civil protection structures. Entities are both financially and jurisdictionally autonomous from the state. Each level has its own specific mandate, with the state focusing on civil protection strategy while the entities focus on operational matters.

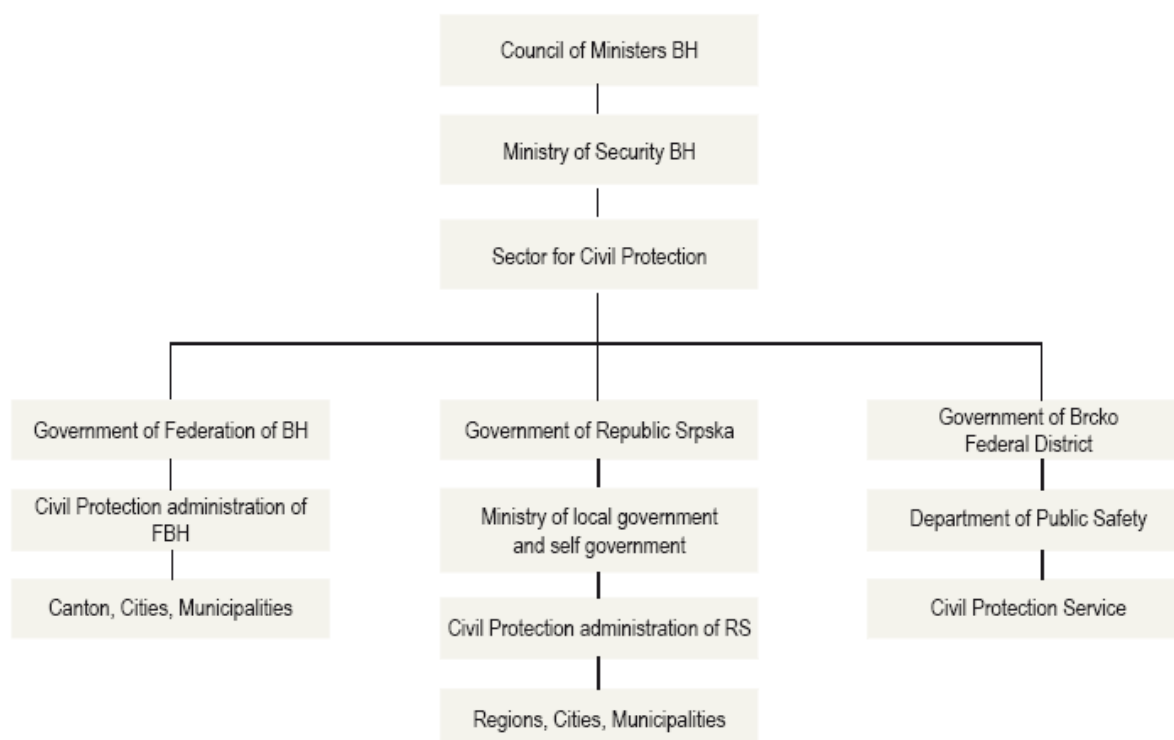
At the state level, the Sector for Civil Protection of the Ministry of Security is the highest-level body with competences and responsibility for international cooperation, internal coordination, the strategic planning of protection and rescue measures, and training programmes.

Three departments have been established within the sector:

- The Department for the Strategic Planning of Protection and Rescue Measures
- The Department for Structures and Training
- The Department for International Cooperation

The Ministry of Security coordinates and manages the planning and exchange of data and information, and reports on risk reduction activities carried out in the entities and Brcko District. The entities and Brcko District, within the framework of their competences in the area of protection and rescue, define, plan, train, organise, finance and execute protection and rescue measures with the aim of reducing risks and removing or mitigating the harmful consequences of disasters caused by natural or other hazards.

Figure 2. Organisation of the Sector for Civil Protection of BiH

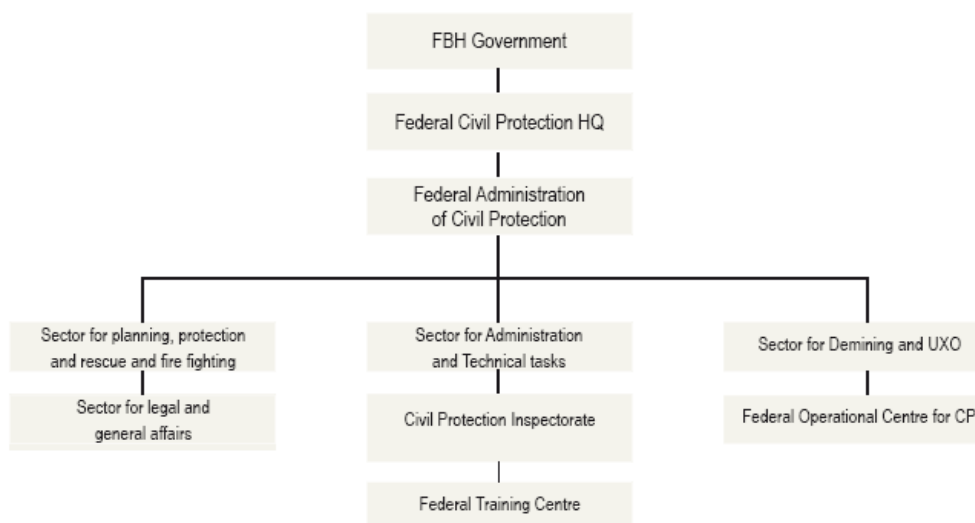


Source [8]

The civil protection structure in FBiH reflects the administrative organisation of the entity, which is particularly complex and decentralised due to its three-tier administrative system of federation, cantons, and municipalities or cities. Each level has the constitutional authority to make regulations and to determine matters in all areas of society, including protection and rescue (Figure 3).

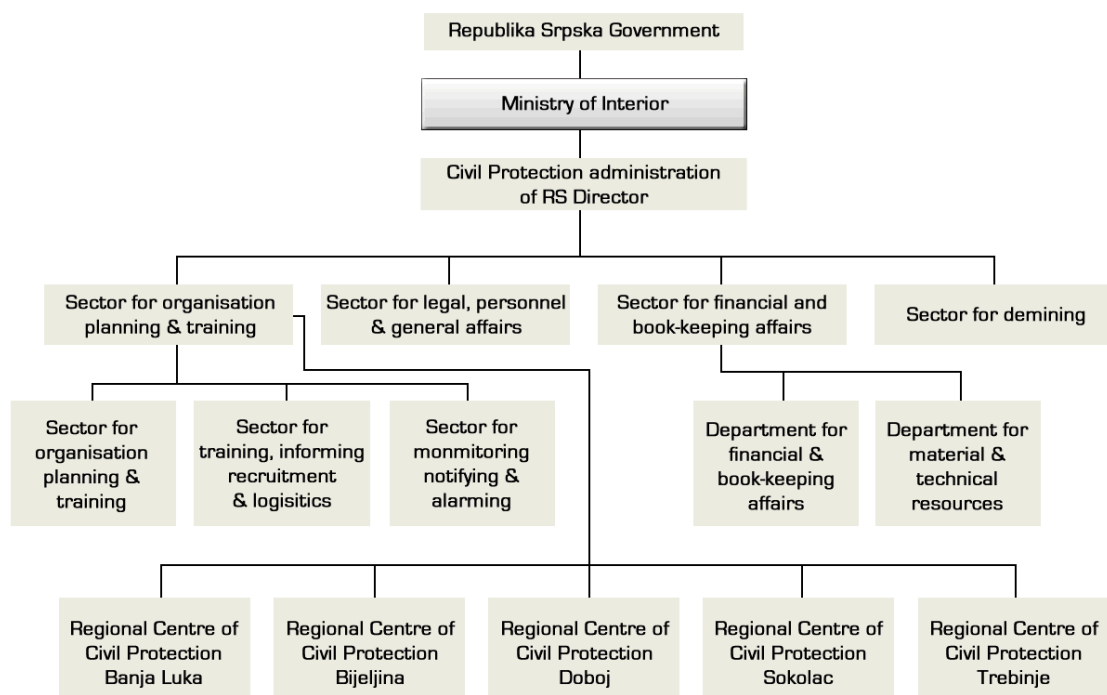
The Civil Protection Administration of RS has competences for planning; the issuing of obligations regarding the lending of material resources for civil protection needs; and damage assessment directives. The director of civil protection is responsible for the administration and organisation of the entire structure, as well as for training programmes for civil protection units (Figure 4).

Figure 3. Organisation of civil protection in FBiH



Source [8]

Figure 4. Organisation of civil protection in Republika Srpska



Source [8]

No specific laws on civil protection have been adopted by Brcko District, and current legislation in this area refers to that of FBiH and RS.

The Brcko District civil protection structure was established under the authority of the Sub-department of Public Safety and encompasses three main sections: the Civil Protection Section, responsible for the de-mining programme; the Fire Department; and the Information Section.

Municipality mayors command operations in the event of emergencies, while the role of head of civil protection belongs to the director of the Department of Public Safety. [8]

2. The forestry sector in BiH

As mentioned above, the forestry sector in BiH is organised at entity level, thus forest fire protection in the framework of the forestry sector is also organised at entity level.

1.1. The Federation of Bosnia and Herzegovina

At the FBiH level, the Forestry Department within the MAWMF has the FFO and FFI as its main bodies. Among other tasks, the FFO is responsible for silviculture and forest protection at entity level. At the cantonal level are 10 cantonal forest management companies (CFMCs), which are public enterprises with forest management units. Each CFMC, in accordance with the existing legal regulations, is obliged to organise forest fire protection (among other activities). For this purpose, the CFMC has to prepare a forest fire protection plan that covers, among other things, measures for forest fire prevention; the means and equipment to put out forest fires; forest roads; water supply sources; early fire detection; and the number and structure of firefighters. All these measures and activities must be in line with the Rulebook for the Content of Forest Fire Protection Plans (Official Gazette of FBiH No. 21/04).

Article 1 of the rulebook describes its main purpose as being to define “technical, preventive, silvicultural and other measures for forest fire protection that are required to be implemented by the CFMC, cantonal administrations for private forests and legal entities managing forests and forest land with a special management regime (hereinafter referred to as holders of rights to manage forests and forest land), in order to reduce the risk of the occurrence and spread of forest fires, ensure early fire detection and alert, and enhance the timely initial response for the localisation and suppression of fires”. [6]

The FFI, at federal and cantonal level, with the inspection of the CFMC, has a role to ensure that all measures for forest fire protection are carried out in accordance with the current legal regulations.

The forest fire protection measures and activities are also regulated by the Law on Fire Protection and Firefighting in FBiH (Official Gazette of FBiH No. 65/09), especially Article 27 and 44.

1.2. Republika Srpska

The FHI, as a part of the MAFWM, ensures the implementation of all legal liabilities and responsibilities of forest management entities (public and private) in terms of forest fire protection.

The Public Forest Enterprise of Republika Srpska, BiH (PFERS) was established by the Government of Republika Srpska, BiH, under Decision No. 03-599 of June 8, 1992 (Official Gazette of the Serb People in BiH, No 9/92). The public enterprise comprises forest management units; the Centre for Nursery Seed Production; the Research and Development and Project Centre; and the Centre for the Management of Rocky Terrain. There are 20 forest management units in the framework of the PFERS. [7]

In accordance with Article 34 of the Law on Forests of RS (Official Gazette of RS No. 66/03, 75/08, 30/10), all forest management units are obliged to carry out activities for forest protection, including forest fire prevention. According to Articles 18 and 28 of the same law, forest management units must prepare a 10-year general management plan and an annual management plan that includes measures for forest fire protection (prevention, pre-suppression and suppression measures). This is also in line with Article 14 of the Law on Fire Protection of RS (Official Gazette of RS No. 71/12) that regulates the content of fire protection plans.

3. National parks in BiH

As mentioned earlier, there are three national parks in BiH: Sutjeska, Kozara and Una. They have almost the same obligations regarding forest fire protection as the forestry sector, and in accordance with the same laws: Sutjeska and Kozara National Parks in accordance with the current legal regulations in RS; and Una National Park in accordance with the regulations in force in FBiH.

4. Local self-governance in BiH

In accordance with Article 40 of the Law on Fire Protection of RS (Official Gazette of RS No. 71/12), local self-governance units are obliged to organise fire protection services (in the form of territorial fire protection units) consisting of professional firefighters. Likewise, local self-governance units in FBiH are obliged to organise similar fire protection services in accordance with Article 16 of the Law on Fire Protection and Firefighting in FBiH (Official Gazette of FBiH No. 65/09).

5. Voluntary fire protection associations of BiH

In accordance with Article 39 of the Law on Fire Protection of RS (Official Gazette of RS No. 71/12) and Article 46 of the Law on Fire Protection and Firefighting of FBiH (Official Gazette of

FBiH No. 65/09), voluntary fire protection associations may be established. Voluntary firefighters can be engaged in fire suppression activities in urban and forest areas.

The following data help to present a clear picture of the capacities of all the above institutions.

Out of the total of 79 municipalities in FBiH, 45 have professional firefighting units with a total of 802 firefighters. There are voluntary fire protection associations in 40 municipalities, with 627 volunteer firefighters. This means that there are 1,429 professional and voluntary firefighters in FBiH.

In RS there are 641 professional firefighters and 608 volunteers (1,249 in total) distributed in five centres: Banja Luka, Bijeljina, Doboj, Sokolac and Trebinje.

In Brcko District there are 91 professional firefighters and no volunteers.

All firefighters (in FBiH, RS and BD) have vehicles and equipment for the suppression of urban fires. [4]

III. The impact of forest fires on the environment, economy and human health

There are no official data about the impacts of forest fires on the environment on the territory of BiH. Some data are available on the economic damage caused by forest fires and burned timber mass, but they are insufficient for a comprehensive analysis. In general, the main environmental consequences of forest fires in BiH, as elsewhere, are:

- Forest degradation
- Deforestation
- Soil erosion
- Outbreaks of pest infestations and diseases
- Loss of biodiversity
- Emissions of GHGs and other gases

In Brcko District, between 2000 and 2012, the total damage from forest fires was estimated at around BAM 2,300,000 [EUR 1,173,000] [4].

Table 8. Forest fires in Brcko District, 2000–2012

Year	Number of fires	Burned area (ha)	Estimated damage (KM)
2000	14	18.26	75,600
2001	7	13.42	21,400
2002	16	81.38	124,350
2003	45	196.24	378,600
2004	4	7.55	19,500
2005	7	16.35	32,400
2006	13	84.26	96,300
2007	42	187.58	218,420
2008	9	14.10	27,800
2009	15	21.60	32,000
2011	4	64.00	289,444
2012	2	55.9	908,390

Source [4]

According to some sources, the direct damage caused by forest fires in FBiH was estimated at EUR 69,992 in 2004; EUR 734,995 in 2005; and EUR 883,120 in 2006. [9]

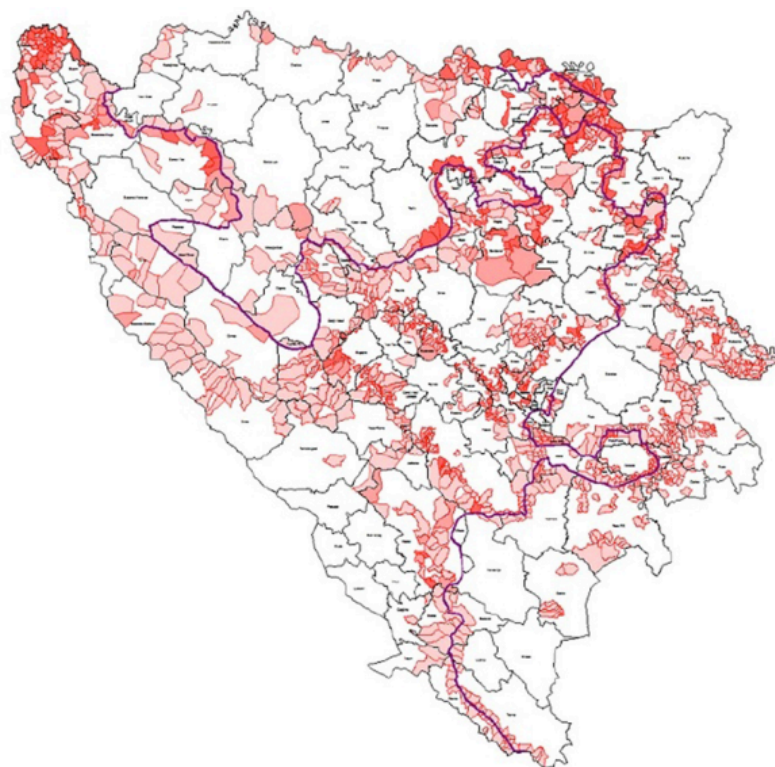
For the period between 2009 and 2013, the damage caused by forest fires in FBiH has been estimated at around BAM 56,250,000 [EUR 28,687,500]. [10]

In the period between 2001 and 2007, around 291,951 m³ of wood mass was burned by forest fires in BiH, with damage estimated at around BAM 38,174,000 [EUR 19,468,740]. [11]

IV. Special issues

One of the main problems in BiH is the existence of areas contaminated by landmines. The current area contaminated by landmines is estimated at around 1,176.5 km² or 2.3 percent of BiH territory, of which 129,774.6 ha or 10.5 percent are forests or forest land.[12] This represents a particular problem for the implementation of the forest fire protection measures prescribed during forest management activities. In addition, it is almost impossible to organise forest fire suppression activities, from either the ground or the air.

Map 4. Distribution of landmines in BiH



Source [2]

Transboundary fires and international cooperation

Forest fires that have spread across the border from Croatia, Montenegro and Serbia had been recorded in the past. The areas most affected by forest fires in BiH are mostly at the border with Croatia and Montenegro, and cooperation agreements have been signed with both countries. In accordance with these agreements, BiH received assistance from Croatia in 2011, 2012 and 2013, totalling 11 days and 11 aeroplanes (CL 415). Assistance was also given by Turkey.

Personnel from BiH regularly cooperate and participate in international exercises and trainings. The most recent international training activity in terms of forest fire protection was the Regional

Fire Management Training for South Caucasus and Western Balkans, held in Antalya, Turkey, on October 15–17, 2014.

V. Needs for improvement in forest fire management

As outlined at the beginning of this study, the unique political structure of BiH has an impact on the functioning of its public institutions and on all areas of public life, including forestry and forest fire protection. As a consequence, a large number of institutions (at state, federal, cantonal and municipal level) are involved in forest fire protection. In order to organise their activities and competences, there are also a large number of legal acts (laws, sub-laws, rulebooks etc.). All this helps to explain why the system of forest fire protection in BiH is not as efficient as it should be. It can be concluded that the number of laws regulating this issue should be dramatically decreased, while the harmonisation of the most important legal acts among entities and institutions should be ensured. This is one of the most important preconditions for the better functioning of the forest fire protection system in BiH.

The existence of a proper early warning system for forest fires may significantly improve preparedness for forest fire protection in BiH. At present there is no early warning system in BiH, with the exception of the possibility to use the European Forest Fire Information System (EFFIS). Taking into consideration the specific local context in BiH, this system can only be seen as a temporary solution and the need for a national early warning system remains.

The problem of ensuring the existence of well-trained firefighters and appropriate vehicles for forest fire suppression also exists in BiH. There is a need for training centres at entity level, but with the same (i.e. harmonised) training programmes. Special vehicles (fire trucks) for forest fire suppression must be procured using the same approach in both entities. All this will ensure that there are well-trained firefighters and proper vehicles, but, more importantly, it will lead to an efficient, harmonised and functional system of forest fire protection.

According to past experience and the 2014 study *Forest Fire Suppression in Bosnia and Herzegovina* [4], there is clearly a need to procure aerial means (aeroplanes and/or helicopters) for forest fire suppression.

The problem of the contamination of forests and forest land with landmines has already been emphasised. There are a couple of urgent issues related to the “solving” of this problem. The first is that all areas contaminated with landmines should be precisely mapped and the data made available to the public. This is necessary not only for the local population and institutions competent for forest fire protection, but also for the equipment (mainly aeroplanes) received as international assistance.

The second is to work towards identifying the most appropriate way to manage these areas in order to reduce the risk of forest fires, and the most appropriate means of fire suppression. The final demining of these territories is, of course, also a requirement.

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