Forest Fires in South Eastern Europe

Regional Report







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FOREST FIRES IN SOUTH EASTERN EUROPE

REGIONAL REPORT

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(Key expert: Nikola Nikolov)

Editor: Aniko Nemeth
Regional Environmental Center for Central and Eastern Europe

Abbreviations

AIA	Administration for Inspection Affairs, Montenegro
BD	Brčko District, BiH
BiH	Bosnia and Herzegovina
CCFS	Climate Change Framework Strategy, Kosovo*
CFI	Cantonal Forest Inspectorate
CFO	Cantonal forest office, BiH
CFMC	Cantonal forest management company (BiH)
CFP	Communal forests and pasture
CMC	Crisis Management Centre, Former Yugoslav Republic of Macedonia
dbh	Diameter at breast height
DCEPR	Department of Civil Emergency Planning and Response, Albania
DES	Directorate for Emergency Situations, Montenegro
DFFRO	Directorate of Firefighting and Rescue Operations, Albania
DFHWPI	Directorate for Forestry, Hunting and Wood Processing Industry, Montenegro
DIF	Department for the Inspection of Forestry, Montenegro
DPR	Directorate for Protection and Rescue, Former Yugoslav Republic of Macedonia
DRR	Disaster risk reduction
DTFP	Directorate for Forest Protection and Treatment, Albania
EFFIS	European Forest Fire Information System
EMA	Emergency Management Agency, Kosovo*
ENVSEC	Environment and Security Initiative
ERCC	Emergency Response Coordination Centre
EU	European Union
FA	Forest Administration
FAS	Firefighting Association of Serbia
FAO	Food and Agriculture Organization
FBiH	Federation of Bosnia and Herzegovina
FFI	Federal Forest Inspectorate, FBiH
FHI	Forest and Hunting Inspectorate, Republika Srpska
FFO	Federal Forest Office, FBiH
FMP	Forest management plan
FPU	Fire Protection Union, Former Yugoslav Republic of Macedonia
GFMC	Global Fire Monitoring Center
GHG	Greenhouse gas
IUCN	International Union for Conservation of Nature
JICA	Japan International Cooperation Agency
JRC	Joint Research Centre
KFA	Kosovo Forestry Agency
KEPA	Kosovo Environmental Protection Agency

LGU	Local-government unit
LULUCF	Land use, land-use change and forestry
MAEP	Ministry of Agriculture and Environmental Protection, Serbia
MAF	Ministry of Agriculture and Food, Albania
MAFRD	Ministry of Agriculture, Forestry and Rural Development, Kosovo*
MAFWE	Ministry of Agriculture, Forestry and Water Economy, Former Yugoslav Republic of Macedonia
MARD	Ministry of Agriculture and Rural Development, Montenegro
MAWMF	Ministry of Agriculture, Water Management and Forestry of FBiH
MCPFE	Ministerial Conference on the Protection of Forests in Europe
MEFWA	Ministry of Environment, Forests and Water Administration, Albania
MEPP	Ministry of Environment and Physical Planning, Former Yugoslav Republic of Macedonia
MESP	Ministry of Environment and Spatial Planning, Kosovo*
MIA	Ministry of Internal Affairs, Kosovo*
MKFFIS	Macedonian Forest Fire Information System
MOFTER	Ministry of Foreign Trade and Economic Relations of BiH
MoU	Memorandum of understanding
NFI	National forest inventory
NGO	Non-governmental organisation
OSCE	Organization for Security and Co-operation in Europe
PE	Public enterprise
PFERS	Public Forest Enterprise of Republika Srpska, BiH
RFMC	Regional Fire Monitoring Center
RFPU	Regional fire protection unions
RFSD	Regional Forestry Services Directorate, Albania
RHMS	Republic Hydrometeorological Service, Serbia
RS	Republika Srpska
SIEFW	State Inspectorate of Environment, Forests and Waters, Albania
TCP	Technical cooperation programme
TFPU	Territorial fire protection unit
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UXO	Unexploded ordnance

* ***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.***

Foreword

Forests represent a common heritage and have ecological, economic, social, aesthetic and cultural values that are impossible to quantify. Forest fires are one of the main threats to our forest resources and give rise to a wide range of devastating economic, social and ecological problems. Although the issue is receiving increased attention, and although forest fire prevention is being tackled in the framework of climate change adaptation measures both regionally and internationally, the necessary political drive is still lacking and policy and legal mechanisms still need to be put in place at national and regional level.

The political, social and economic changes that have taken place in the last two decades have generally had a negative impact in terms of forest fire prevention in the countries of the region. Many of the relevant institutions have been restructured or annulled, and new institutions have been established. Some competencies have been transferred to other institutions, giving rise to a number of regional obstacles. Common to most of the countries is the overall lack of coordination, and even the inconsistencies, between the various institutional and administrative frameworks.

Institutional capacities need further strengthening. There is an overall lack of well-established bilateral processes with neighbouring countries in the field of forest fire protection, and especially fire suppression (with respect to both sending and receiving assistance). Not enough joint actions are being implemented for the suppression of cross-border and internal forest fires.

Under the Environment and Security Initiative (ENVSEC), the Regional Environmental Center for Central and Eastern Europe (REC), with the support of Austrian Development Cooperation, is implementing a project aimed at identifying potential actions to combat this form of forest devastation in South Eastern Europe (SEE), as well as at enhancing dialogue and cooperation among SEE countries. One of the goals of the project is to identify concrete activities by which key actors can close the existing gaps in legislation, policy, implementation and enforcement in order to reduce or eliminate forest fires in SEE. The core project team comprised Aniko Nemeth, project manager; experts Bruno Mesquita and Danko Aleksic; and Gordana Kozhuharova, project director and ENVSEC regional desk officer for SEE.

The present report, covering SEE countries exclusively and financed by Austrian Development Cooperation, is the first step towards the ultimate objective of reinforcing bilateral processes with neighbouring countries in forest fire protection, especially fire suppression, and strengthening regional contacts among experts, academics, decision makers and other stakeholders with the aim of combating and preventing forest fires in SEE.

The REC has a solid track record in this field, with 25 years of experience in building capacities towards environmental management in SEE countries. The REC is committed to the security aspects implicit in addressing environmental challenges. It participates in and manages a number of important projects implemented under the ENVSEC Initiative, strengthening key decision makers in SEE to ensure peace and stability while safeguarding the environment.

Marta Szigeti Bonifert
Executive Director
Regional Environmental Center for Central and Eastern Europe

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The present study was compiled in the context of the project “Addressing the risks of forest fires in South Eastern Europe”, financed by the Austrian Development Cooperation and implemented under the ENVSEC Initiative. It covers Albania, Bosnia and Herzegovina, Kosovo*, the former Yugoslav Republic of Macedonia, Montenegro and the Republic of Serbia.

The study was prepared mainly by the Regional Fire Monitoring Center (RFMC), together with Aniko Nemeth, Bruno Mesquita and Cecile Monnier, and with the contribution of Danko Aleksic. It is based on national reports prepared by the Regional Fire Monitoring Center’s key expert, Nikola Nikolov.

In 2010, the Regional Southeast Europe/Caucasus Wildland Fire Network, in cooperation with the Global Fire Monitoring Center (GFMC) and a team of forest fire specialists from the United Nations Economic Commission for Europe (UNECE)/United Nations Food and Agriculture Organization (FAO), with the financial support of the Council of Europe (European and Mediterranean Major Hazards Agreement, EUR-OPA), decided to establish the Regional Fire Monitoring Center (RFMC). The RFMC is hosted by the Faculty of Forestry in the Macedonian capital, Skope.

The aims of the RFMC are to:

- conduct and coordinate wildland fire research;
- implement research results in fire management policies and practice, supporting relevant ministries and specialised agencies in SEE/Caucasus;
- facilitate the exchange of information about wildland fires;
- provide information about the latest technological advances in fire management;
- provide capacity building (training) and advisory services to support the development of fire management policies and to enhance local and national fire management capabilities; and
- initiate, support and participate in bilateral and multilateral collaboration between countries in the region and beyond in the field of wildland fire prevention.

Disclaimer

The information contained in this report is based mainly on the findings of the national reports compiled by the Regional Fire Monitoring Center. Some gaps in information have been filled through additional research. It is important to bear in mind the general lack of hard statistical data in the forestry sector. This problem is particularly pronounced in some of the countries concerned. In addition, statistical data are often not updated, or are underestimated. The main objective of the report is not to provide completely accurate figures and data on all aspects of forest management and forest fire risk prevention and control, but rather to present general observations and trends with a view to drawing overall conclusions and recommendations for improvements. It remains the task of the national governments and relevant international organisations to develop more reliable and uniform data collection mechanisms and methodologies.

Given the above, the authors (REC) do not assume any responsibility for any mistakes and misinterpretations that may occur in the text. However, the REC welcomes any comments and suggestions that could be discussed at national, regional and international level and taken into account in future related policy and strategy papers.

Executive Summary

The status quo

In South Eastern Europe (SEE), the forestry sector has significant untapped potential and could contribute to the social and economic development of a large stratum of the population. It is therefore vital to identify those elements — such as forest fires — that are preventing the realisation of the full potential of forestry in the region.

In addition to forestry, forests play a significant role in other sectors, such as tourism, and are a valuable environmental resource in general.

Certain general patterns can be discerned in the SEE region covered by the present study (Albania, Bosnia and Herzegovina, Kosovo*, the former Yugoslav Republic of Macedonia, Montenegro and Serbia):

- the types of forests particularly prone to forest fires (in the Mediterranean and sub-Mediterranean parts of the region);
- the types of forests that are particularly vulnerable to forest fires, such as beech forests and large territories afforested with coniferous trees (especially *Pinus* spp.);
- national systems for forest fire protection involving large numbers of institutions and organisations;
- the large number of laws regulating forest fire protection;
- the lack of reliable and aggregated data on forest fires (forest fire statistics);
- the lack of national early warning systems; and
- the lack of proper tools, equipment and vehicles for forest fire suppression.

On the whole, forest fire prevention has been compromised by the political, social and economic changes that have taken place over the last two decades. Many of the institutions involved in forest fire protection (including ministries, directorates and agencies) have been restructured or annulled, new institutions have been established, and in some cases competencies have been transferred between institutions. As a result, one of the most pressing regional obstacles, and one that is common to most of the countries, is the overall lack of coordination, and even inconsistencies, between the various institutional and administrative frameworks.

Institutional capacities need further strengthening. There is an overall lack of well-established bilateral processes with neighbouring countries in the field of forest fire protection, especially fire suppression (in the case of either sending or receiving assistance). Not enough is being done in terms of the suppression of cross-border and internal forest fires.

In all countries of the region there is a clear lack of specialist equipment such as off-road vehicles, specialised fire trucks, aeroplanes and helicopters.

In addition, the impacts of climate change (lengthy dry periods, heat waves and decreased precipitation) are among the main factors behind the large number of forest fires and the large expanses of burned area.

The main causes of forest fires in the region are:

- agricultural burning;
- pastureland burning;
- negligence (along highways, railways etc.); and
- arson.

The rise in the incidence of arson as a reason for forest fires in the SEE region over the past decade is a cause for concern. The main motive for arson is economic, as arson attacks are generally connected to illegal logging.

Recommendations

The current international and regional legal, policy and institutional frameworks contain all the essential components for dealing with forest fires. However, they still need to be developed and improved in order to achieve greater efficiency in forest fire protection. In this context, efficiency does not refer only to efficient forest fire suppression, but also to efficient forest fire prevention.

The activities required to achieve efficiency can be implemented at both national and international level. The authors of the present report recommend that the countries concerned, in cooperation with international donors, first work on consolidating and strengthening their national institutions and capacities. Attention can then be given to regional and wider international networking. These two different processes should, in fact, be carried out in parallel.

The recommendations presented in this report can be implemented by:

- providing capacity-building trainings for relevant professional personnel (command personnel, forest firefighters etc.);
- promoting bilateral and regional cooperation;
- encouraging public participation and raising awareness;
- establishing national forest fire early warning systems;
- ensuring sufficient funds for forest fire protection;
- improving legal regulations;
- strengthening preparedness measures;
- strengthening prevention measures;
- developing fire management research programmes;
- replicating good fire management practices from other countries and regions; and
- using the capacities and resources of international organisations (ENVSEC, REC, UNEP, UNDP, OSCE, Council of Europe, GFMC, RFMC etc.).

I. Introduction

Global and regional context

Fire is a natural and beneficial part of many forest ecosystems, but the number and intensity of fires today is challenging fire managers and forest communities throughout the world. Each year wildfires destroy between 6 and 14 million hectares of fire-sensitive forests worldwide, a rate of loss and degradation comparable to that of destructive logging and agricultural conversion. At the same time, many fire-adapted forest ecosystems are fire starved.

The immediate impacts of fires are devastating to human communities and forest ecosystems. In the longer term, they adversely affect the supply of environmental services necessary for the well-being of local communities, threaten the survival of endangered species, damage the structural and compositional complexity of biologically important forests, and create suitable conditions for invasive species.

However, it is also important to understand that the role of fires varies according to the type of forest. In tropical, dry forests, boreal forests and some types of coniferous forests, for example, a certain amount of fire is essential in the maintenance of forest structure and function, and in the composition of the forest flora and fauna. In tropical, moist forests, however, fires are usually detrimental.

Forest fires may be started for many reasons. Some are practical and beneficial, some are accidental, and others are deliberately started in order to cause damage. All fires are potentially harmful to forest ecosystems or human communities, depending on both the condition of the forest at the time and how they are managed once they are burning.

According to the study "Forest Fires: Causes and contributing factors in Europe", prepared at the request of the European Parliament's Committee on the Environment, Public Health and Food Safety (2008), forest fires are the most important threat to forests and wooded areas in Southern Europe. Around 50,000 fires sweep through 700,000 to 1 million hectares of Mediterranean forest, other wooded land and other land each year, causing enormous economic and ecological damage as well as loss of human life.

The Balkan region, which includes parts of Southern and Eastern Europe, is no exception. In the area covered by the present report (comprising Albania, Bosnia and Herzegovina, Kosovo*, the former Yugoslav Republic of Macedonia, Montenegro and Serbia), over 220,000 hectares of forest were burned in the years 2007 and 2012 alone. The impacts of fires in this region vary — from economic losses related to fire suppression and burned timber mass to degradation, deforestation, soil erosion, pest infestations (especially bark beetles) and greenhouse gas emissions.

The aim and scope of the present report

The project “Addressing the risks of forest fires in South Eastern Europe” is financed by the Austrian Development Cooperation and implemented by the Regional Environmental Center (REC) under the Environment and Security (ENVSEC) Initiative. It covers Albania, Bosnia and Herzegovina, Kosovo*, the former Yugoslav Republic of Macedonia, Montenegro and Serbia. The present regional report provides an overview of the state of play in the forestry sector in SEE in terms of the general framework for forest protection; identifies gaps and practices; and analyses the occurrence and management of forest fires as well as measures implemented by the relevant national authorities for their prevention and mitigation.

The overall aim is to map the forest fire context in the individual countries and, from a regional perspective, to identify concrete regional priorities and actions to be taken by key stakeholders in order to close the gaps in laws, policy, implementation and enforcement.

Methodology and structure

This regional report is based predominantly on information obtained from experienced, nationally recognised forestry experts from the Regional Fire Monitoring Center (RFMC), based in Skopje. The RFMC was contracted in 2014 to undertake national fact-finding studies, using a questionnaire. The structure of these reports is presented in Annex I. The reports focused mainly on the forestry sector at national level; the organisation of forest management; forest fire prevention and control, including authorities and control mechanisms; the legal and policy regimes for regulating forestry activities; the main causes of forest fires; and the main prevention and mitigation activities. The individual country reports contained only very limited recommendations. Most of the recommendations presented in this regional report are made by the REC on the basis of the information received in the individual reports, but also in relation to the broader regional and international context.

The regional report is divided into the following sections:

1. The forestry sector, forests and fire history
2. The legal framework and institutional set-up in the field of forest fire management
3. The impact of forest fires on the environment, economy and human health

Regarding the methodological approach, the regional report is structured in such a way as to highlight the general trends in SEE countries and some of the common denominators, as well as the most noteworthy differences. It does not examine every single aspect of forest fires and the precise extent of activities, as this would require more reliable and comparable data and statistics. The report focuses on forest fires mainly from the perspective of causes, drivers, short- and long-term impacts and possible solutions.

The forestry sector, forests and fire history

1. Geography, topography and climate conditions (with relevance to forest fires)

Introduction

South Eastern Europe (SEE) is a sub-region comprising Albania, Bosnia and Herzegovina, Croatia, Kosovo*, the former Yugoslav Republic of Macedonia, Montenegro and Serbia. With the exception of Albania, the SEE countries were formerly constituent republics of the Federal Republic of Yugoslavia. The 1990s were a turbulent decade in the region, with the break-up of the Federal Republic of Yugoslavia and the creation of new countries. Ethnic and civil wars affected all the countries of the region, either directly or indirectly, exacting a high price.

From a geographical point of view, SEE countries are either landlocked (Serbia, Kosovo* and the former Yugoslav Republic of Macedonia) or have access to either the Adriatic or the Ionian Sea. Although the 20 km coastline of Bosnia and Herzegovina is surrounded by Croatian peninsulas, according to United Nations law the country has a right of passage to the open sea.

The topography of the region is characterised by vast mountainous areas that cover up to 70 percent, or even 80 percent, of the territory. The last Ice Age caused massive erosion in several parts of the mountain ranges. The rugged peaks of the Dinaric and Rodope mountains reach heights of well over 2,000 metres, making it difficult to access certain areas. The region is crossed by a number of rivers, including the Sava, Drina and Vardar, creating terrain ideal for agriculture. The Pannonian basin, from the northern part of Bosnia and Herzegovina and Serbia, as well as some of the areas with a Mediterranean climate lying southeast of the Dinaric Mountains and bordering the Adriatic Sea, are also suitable for agriculture.

A variety of unique fauna and flora can be found in the region, increasing its natural value. Large parts of the territory are covered by forests, ranging from 27 percent in Serbia to 39 percent in Kosovo* and up to 50 percent in Bosnia and Herzegovina.

Climate

Although the studied countries do not cover a large geographical area, their climatic conditions vary. From the west, there is a strong Adriatic and Mediterranean influence that fades as it meets the Dinaric Alps and other mountain ranges, as well as the large continental air mass coming down through the Pannonian and Wallachian plains. The coastal regions have a typically Mediterranean climate, with hot and dry summers and mild, wet winters. In the mountainous areas the air is cooler and the average annual rainfall is far higher, although in the valleys there is a mild continental climate with occasionally extremely high summer temperatures and relatively cold winters. The northern parts of Serbia and Bosnia and Herzegovina enjoy a typically continental climate with very hot summers and it is common for temperatures to fall below -15ºC or even -20ºC during the winter season. Despite its small size, Albania has a high number of climatic regions and includes the area with the highest precipitation in Europe due to the convergence of the prevailing airflow from the Mediterranean Sea and the continental air mass. Although the former Yugoslav Republic of Macedonia is small in area, it shows great diversity in terms of geological formations, climate, relief forms, soils and flora. As a result of the heterogeneity of natural conditions, the territory of the country can be

distributed in eight climate–soil–vegetation zones. About 56 percent of the territory belongs to two zones (continental sub-Mediterranean and warm continental).

Demography

The demographic shifts and lack of censuses in most of the countries covered by this report mean that the total population of the region can only be estimated. A figure slightly exceeding 20 million is likely, with a tendency to decrease due to significantly ageing populations and the high level of emigration resulting from the wars and ethnic/religious conflicts in the region. The Albanian populations in Kosovo* and Albania are very young (the average age in Albania is 28.9), but although the birth rate until the 1990s was relatively high (over four children per woman), it has now fallen to replacement level or even lower. None of the countries, with the exception of Albania, are ethnically homogenous. Minorities can constitute as much as 31 percent or even 33 percent of the total population (in Bosnia and Herzegovina and the former Yugoslav Republic of Macedonia respectively). The remarkably low fertility rate in Serbia, along with the emigration of approximately 500,000 people, has created one of the oldest populations in the world, although it is currently home to the largest European refugee population (7 percent of the total population). In Bosnia and Herzegovina, severe tensions between the three nationalities/religious groups (Bosniaks, Serbs and Croats; or Muslims, Serbian Orthodox and Roman Catholics) have created a longstanding conflict that has also resulted in strong migration towards Western Europe and led to the loss of over half a million of its 4.3 million population. Albania experienced strong internal migration starting in the 1990s, which led to a reduction in the population of the northern districts and a significant increase in the south, in particular in the cities of Tirana and Durres.

General socioeconomic conditions

The 1990s was an extremely difficult decade in the history of the SEE region, when constant hostilities led to the emergence of a number of new nation states. The effects of the war and the legacy of the former centrally planned economy created obstacles to the adoption of effective reforms and hindered socioeconomic progress. Delayed and often unimplemented reform programmes made it impossible to establish fully functioning market economies, which led to inferior economic performance, declining living standards, rising unemployment and greater poverty.

Nevertheless, the region has growth potential. In the past decade it has outperformed other European economies as a result of efforts towards macroeconomic stability and reform. However, the recent global crisis has also struck the region, and a number of significant factors continue to hold back the economy. These include underdeveloped infrastructure networks, low levels of foreign direct investment and weak administrative structures and project promoters. The year 2009 saw a sharp drop in external trade and industrial production and a significant slowdown in economic growth. In addition, unemployment rates, which had been decreasing from very high levels, are predicted to rise sharply again and the level of public debt also remains very high across the region. [G1]

Studies indicate that, after the outstanding performance of most of the SEE countries, all the economies, with the exception of Albania, are declining due to the economic crises and the decrease in foreign direct investment (FDI) in the region. High dependency on FDI makes the region more susceptible to external shocks and high export–import trade deficits, which are most apparent in the case of Montenegro. Although Albania was the only country to have

recorded economic growth in 2009, its gross domestic product, calculated on the basis of purchasing power parity (GDP PPP), stands at 25 percent of the EU average and it is still a region that attracts little interest among investors due to power shortages, lack of water supplies and illegal activities.[G2] With its damaged economy, ethnic conflicts, international sanctions and poor external commerce, Kosovo* has the highest poverty level in the region (still considered a developing country according to the World Bank) with USD 2,100 GDP PPP per capita.[G8] The other four countries have a relatively higher GDP PPP per capita, with Bosnia and Herzegovina the lowest at 30 percent and Montenegro the highest, reaching 46 percent.[G3] Although the financial crisis has cut back the economic expansion of the so-called Balkan Tiger, Serbia, it is the fastest growing economy of the region, with significant FDI.[G4]

In SEE, as in more developed regions of the world, the service sector employs the largest proportion of the labour force and has the highest share of GDP, with the exception of Albania, where agriculture is still the most significant sector taking a 58 percent share of the labour market. Although the unemployment rate has been decreasing, it is still extremely high, ranging from 14 percent in Serbia to as high as 29 percent in the former Yugoslav Republic of Macedonia and even 50 percent in Kosovo*. In spite of its high unemployment rate, the former Yugoslav Republic of Macedonia was recently ranked by the World Bank as the "fourth best reformatory state" out of 178 countries, having undergone considerable reform and having created an open economy. Nevertheless, the poverty rate still stands at 22 percent, which shows that, despite significant progress, there are still a large number of issues to be addressed.[G5] All the countries covered are progressing with the necessary economic and institutional reforms as a step in the EU integration process.

Forests cover on average 40 percent of the SEE countries, while the EU average is 42 percent.[G6] Wood is used extensively in several countries of the region, but rather inefficiently. One of the main goals is to increase the efficient use of wood energy by the introduction of new technologies. To achieve this, commitment is needed at the political level, both nationally and locally, as well as closer cooperation between the various public and private bodies with an interest in forest management and energy. Forests are an important resource for survival, especially in terms of the provision of firewood. Per capita GDP and total nominal GDP are low in many areas, especially since the war, thus increasing the pressure on forestry resources.

The forestry sector contributes to poverty alleviation among rural populations. In some countries, including Albania, the distribution of the rural population and the distribution of forest resources do not correspond, resulting in a significant impact on forests. The rural plains, for example, which are home to 65.4 percent of the rural population, include only 40 percent of the country's forested area, 39 percent of its pastures and 73 percent of its agricultural land. The mountainous areas, which are home to 34.5 percent of the population, include 60 percent of the country's forests, 61 percent of its pastures and 27 percent of its agricultural land.[G7]

In Albania, forage and grazing for livestock are also important forestry products but are not included in official statistics, nor is their value reflected in GDP. Similarly, the environment services provided by the forests are not reflected in the (real) contribution of the forestry sector to the national economy. Such services include the protection of soil and water resources; the conservation of biodiversity; the protection of agricultural crops from climatic hazards; carbon sequestration and the slowing of climate change; the provision of shade, amenity and recreation; and the protection of coastal areas and fishing.

In summary, agriculture and forestry are significant in the region, although in some countries show a decreasing trend. In many SEE countries current migration patterns are characterised by young people moving from rural to urban areas. As a consequence, fewer young people are involved in forestry. In addition, people that have moved to more populated

areas may be living at a distance from forests they still own. As these forests are more vulnerable to theft, owners are often forced to sell them below their market value and to non-local proprietors, increasing the danger of abuse and overexploitation of the forestry resources.

The area and state of the forests

Total forest coverage

The countries covered in the present report do not take a consistent methodological approach to the classification of forest land, which should be taken into account when comparing statistics and aggregate data. In Kosovo*, most of the forest area is classified as forest land by means of the interpretation of aerial photographs and field surveys. Another way of classifying forest land is through photo interpretation without a field survey — which is particularly convenient for inaccessible areas.

Recent figures (mainly from 2008) show that the proportion of forest coverage ranges from 29 percent in Serbia to 54 percent in Montenegro. The average coverage is about 40 percent, compared to the EU average of 42 percent. A steady decline in forest land due to urbanisation and land-intensive activities such as agriculture, mining and heavy industry, is common to most countries. Increasing efforts are being made towards the afforestation of degraded land, often as an integral part of overall strategies towards sustainable forestry.

2. Overview of the forestry sector

The definition of what is considered forest and forest land inevitably has an influence on the forestry sector and its activities and competencies (including forest fire protection). In terms of forest fire protection activities, the definition is important not only for the forestry sector but also for the other institutions and organisations responsible for and involved in forest fire protection. The terms “forest” and “forest land” are defined in each country’s forest-related laws.

Albania – According to Article 2 of the Law on Forests and Forestry Services (No. 9385 of April 5, 2005), forest and forest land in the Republic of Albania are defined as follows:

“Forest is land with a dense array of forest trees in stable form or other forest vegetation with a low density, with an area greater than a tenth of a hectare with coverage of not less than 30 percent, that produces a timber mass and an impact on the surrounding environment, and that provides the functions of a forest.

Forest land (open forest) means land surface with forest vegetation and other non-forest vegetation, with coverage from 5 to 30 percent, bare surfaces, rocky places, eroded and non-productive land, nurseries, forest roads, lands not registered as having another use in the land-use cadastre, and similar agricultural lands ecologically functional in the national forest fund, which, all together, provide the functions of a forest.” [AL 2]

Bosnia and Herzegovina – According to Article 2 of the Law on Forests, forest and forest land in the Federation of Bosnia and Herzegovina are defined as follows:

"Forest, in terms of this law, means the land covered with forest trees or forest shrubs, whose area exceeds 500 m^2 and with a width of at least 10 metres. 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." [BiH 14]

Article 7 of the Law on Forests of Republika Srpska (Official Gazette of Republika Srpska Nos. 66/03, 75/08, 30/10) contains the following definition:

"Forests, within the meaning of this law, are surfaces covered by forest tree species over an area larger than 0.16 ha, with a minimum width of 20 metres and with 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 Brčko District (Official Gazette of Brčko District, No 14/10), forest and forest land are defined as follows:

> *"(1) A forest, in the sense of this law, is:*
> *a) land overgrown with forest trees or forest shrubs forming a forest ecosystem comprising a biotope and biocenosis, with an area exceeding 500 m^2 and with a width of at least 10 metres;*
> *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.*
> *(2) Forest land, in terms of this law, is:*
> *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 in a spatial or urban plan;*
> *c) land beside overgrown forest, including uncultivated, unused or barren land outside the forest to the extent that it provides or supports the functions of the neighbouring forest; or*
> *d) land with reduced forest cover, meadows and clearings in forests."*

Kosovo* – According to Article 2 of the Law on Forests (2003/3), forests and forest land are defined in the following way:

> *" 'Forest' is land registered as such in the cadastral records.*
>
> *'Forest land' is land that is being managed for the production of wood or other forest products or whose best use, given its natural characteristics and economic conditions, involves the growing of trees."*

Former Yugoslav Republic of Macedonia – Article 6 of the Law on Forests (Official Gazette of RM, No. 64, of May 22, 2009) defines forests as:

> "*Forest ecosystems that exist on forest land covered with forest tree and shrub species, bare land close to the forest, as well as other bare land and pastures inside the forest, forest nurseries, forest roads, seedling plantations, forest fire cleanings, wind protection belts with an area larger than 2 ares [0.02 ha], as well as forests in protected areas. Forests also consist of young stands and forest plantations with an area larger than 2 ares, as well as areas that are currently uncovered as a result of human activities or natural hazards, where natural regeneration has begun.*
>
> *Separate groups of trees on areas smaller than 2 ares, border trees in agricultural land, plantations from fast-growing tree species as well as river bank vegetation, alleys and parks in inhabited places are not considered as forest."* [MK 6]

Montenegro – According to Article 3 of the Law on Forests (Official Gazette of Montenegro, 74/10), forests and forest land in Montenegro are defined in the following way:

> *"Within the meaning of this law, forests shall be considered as land spanning more than 50 ares [0.5 ha], covered with forest trees having canopy cover above 10 percent of the land area and dominant trees higher than 5 metres (i.e. trees able to reach that height in their physiological maturity phase).*
>
> *Within the meaning of this law, forest land shall be considered as land spanning more than 50 ares [0.5 ha], covered by forest trees:*
>
> - *higher than 5 metres (i.e. trees able to reach that height in their physiological maturity phase) and whose canopy cover is 5 to 10 percent of the land area;*
> - *not able to reach a height of above 5 metres (i.e. covered by a combination of trees and low forest vegetation if coverage is higher than 10 percent of the land area).*
>
> *Forest and forest land shall also be deemed temporarily barren areas where the natural regeneration of forest trees has started, fire protection lanes, areas covered with non-*

forest vegetation spanning less than 50 ares [0.5 ha] if it is within the forest or forest land complexes, forest tree protection belts spanning more than 50 ares and wider than 20 metres, and forest roads." [MNE 5]

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

" 'Forest', in terms of this law, 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.

The term forest does not include separate groups of forest trees on an area less than 5 ares, 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 land on which facilities for forest management, wildlife and the exercising of the amenities of the forest are located, and which cannot be used for other purposes, except in cases and under conditions stipulated herein."

It is clear that, according to the current national laws in the region, the definitions of "forest" and "forest land" differ (even within the same country, in the case of Bosnia and Herzegovina). This has implications for the competencies of the relevant institutions in terms of territorial coverage and liabilities for forest fire protection. Although the terms are clearly defined in the laws, there are many problems in practice, especially in abandoned agricultural regions. Many abandoned agricultural fields are now covered with native vegetation (forest or shrubs), although according to the cadastre they are still agricultural lands. Thus, according to the definition in the law on forests, they are to be regarded as forest, but according to the cadastre they are agricultural land. This results in confusion within the competent institutions, and especially in institutions that belong outside the forestry sector.

1.1. Characteristics of forests

According to current legal regulations and official statistics, the condition of the forest fund in the countries of the region is described below.

1.1.1 Forest area

Albania – The forest area in Albania covers 1,498,957 ha, of which high forest occupies 294,957 ha, coppice forest 405,016 ha, shrubs 241,724 ha, and open forest 557,260 ha.

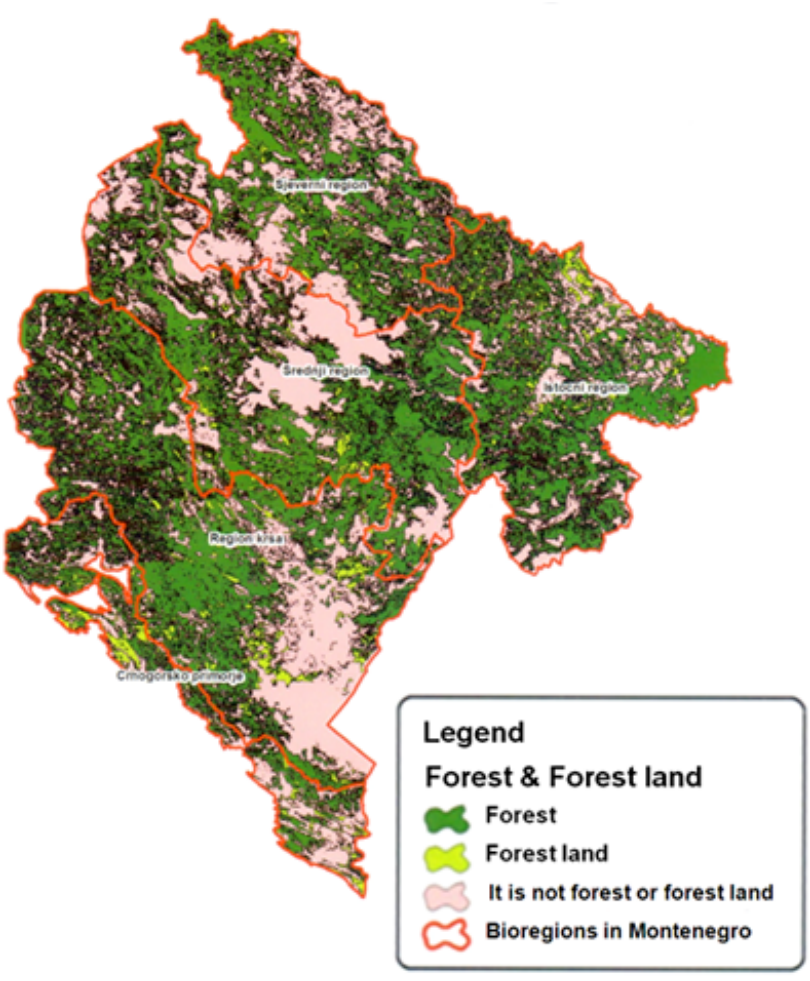
Bosnia and Herzegovina – According to the second national forest inventory, carried out between 2006 and 2009, forests and other forest land in Bosnia and Herzegovina cover 3,231,500 ha. This suggests that about 63 percent of the total territory of the country is covered with forest and other wooded land, which is one of the highest values in Europe.

Kosovo* – According to the national forest inventory, compiled in 2012, the total forest area in Kosovo* is 481,000 ha.

Former Yugoslav Republic of Macedonia – The total area of forest land in the country is 1,159,600 ha, of which forests cover 947,653 ha. [FYRM 3]

Montenegro – Forests and forest land cover 54 percent (743,609 ha) of the total area of Montenegro. The country has substantial forest coverage, among the highest in Europe, with 0.9 ha per capita. Forests cover 620,872 ha, while forest land covers 122,737 ha. [MNE 1]

Map 1. Forest and forest land in Montenegro



Source [MNE 2]

Serbia – Forests and other wooded land in the Republic of Serbia occupy 2,252,400 ha, which is about one-third of the territory of the republic. [SRB 2]

Map 2. 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 Srbijasume public enterprise.* Source: [SRB 3]

As shown in Table 1, the total area of forest and forest land in all six countries is 9,367,066 ha, and the average coverage with forest and forest land is 48 percent of their territory.

Table 1 Forest cover per country

Country	Forest and forest land cover (ha)	Forest and forest land cover out of the total country area (%)
Albania	1,498,957	52.0
Bosnia and Herzegovina	3,231,500	63.0
Kosovo*	481,000	44.7
FYR Macedonia	1,159,600	45.5
Montenegro	743,609	54.0
Serbia	2,252,400	29.0
	Total: 9,367,066	**Average: 48.0**

1.1.2 Ownership structure

Albania – According to Article 15 of the Law on Forests and the Forestry Service, national forests in Albania may be either publicly or privately owned.

> *" 3. Public forests are divided into:*
> *a) forests and forest land owned by the state (state forests); and*
> *b) forests and forest land used or owned by local governments (communal forests).*
>
> *4. The private forest fund (private forests) consists of:*
> *a) forests and forest land in private ownership;*
> *b) trees and groups of trees that are located within the boundaries of land in private ownership, new forests that are planted in these lands, and parts of privately owned forests."* [AL 2]

State forests are owned by the state. Communal forests are forests owned by the state but given over for communal use to a village or to several villages or communes. According to criteria developed by the Ministry of Agriculture and Food (MAF), parcels of communal forest of between 0.4 and 1 ha per family may be given for use to households of permanent residence in the village, subject to agreement between the local government and the forest authority. The specific rules and criteria for the definition and administration of these forests are subject to a special regulation of the MAF.

Private forests are any stands of trees and any forests created within the boundaries of land recognised as private property.[AL 5] Up until 1945, private forests in Albania covered 63,000 ha out of the 1,379,000 ha of the total forest area, according to the available data. The mass nationalisation of private property began in 1945, and a few years later the concept of private ownership vanished. The restitution of private forests to their former owners began after 1996. A total of 19,000 ha, or less than 30 percent of private forest areas, had been restored to their former owners by December 2007. The restitution process is very slow and the former owners face various problems in relation to the management of their forests. [AL 4]

According to data from the Ministerial Conference on the Protection of Forests in Europe (MCPFE), 15.8 percent of the forests in Albania are protected forest areas. The respective European average is about 12 percent. [AL 6]

Bosnia and Herzegovina – There is a sharp contrast in the proportions of high forest and coppice forest in public and private ownership. 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 area of coppice forests).

Table 2. Ownership of economic high and coppice forests in Bosnia and Herzegovina

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 [BiH 2]

Kosovo* – Around 180,800 ha (38 percent) of forests in Kosovo* are classified as privately owned, while 295,200 ha (62 percent) are classified as public forests.

Former Yugoslav Republic of Macedonia – Out of the total forest area, the share of state-owned forests is 90.14 percent, comprising 92.2 percent of the total standing volume. Privately owned forests cover 9.86 percent (94,146 ha) of the total forest area, comprising 7.8 percent of the total standing volume. [FYRM 3]

There are more than 200,000 parcels of forest (with an average size of 0.6 ha), in the hands of around 65,000 owners.

Montenegro – Around 500,041 ha (67.25 percent) of the total forest area are in state ownership, and around 243,568 ha (32.75 percent) are privately owned. [MNE 1]

Serbia – About 1,194,000 ha (53 percent) of the total forest area are in state ownership, while 1,058,387 ha (47 percent) are privately owned.

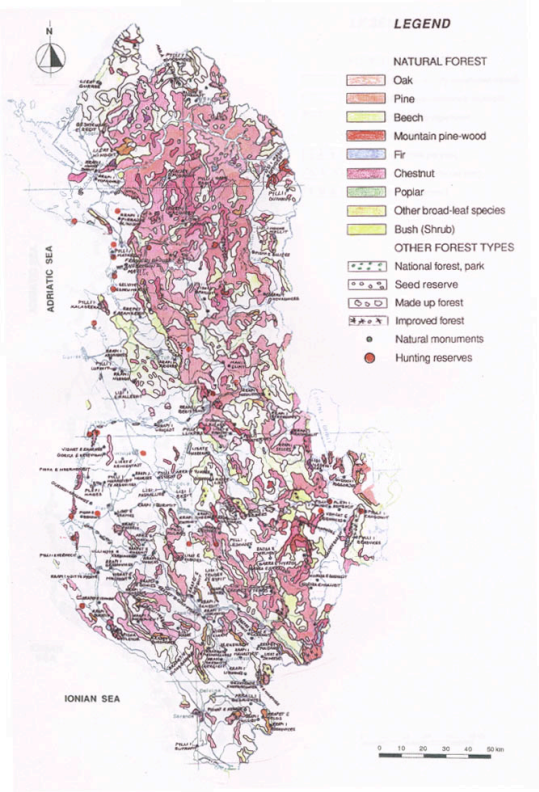
1.1.3 Forest types

Albania – The composition of Albania's abundant forest fund is shown in Table 3.

Table 3: Forest composition in Albania

No	Item	Area, Ha	Percentage
1	Forests[3]	1,498,957	100.00%
2	High Forest	294,957	19.68%
2a	*From which: - Conifers*	84,461	
2b	*- Broadleaves*	210,496	
3	Coppice Forests	405,016	27.02%
4	Shrubs	241,724	16.13%
5	Open forest land[4]	557,260	37.17%

Map 3. Forest types and forests by purpose in Albania



Source: [AL 3]

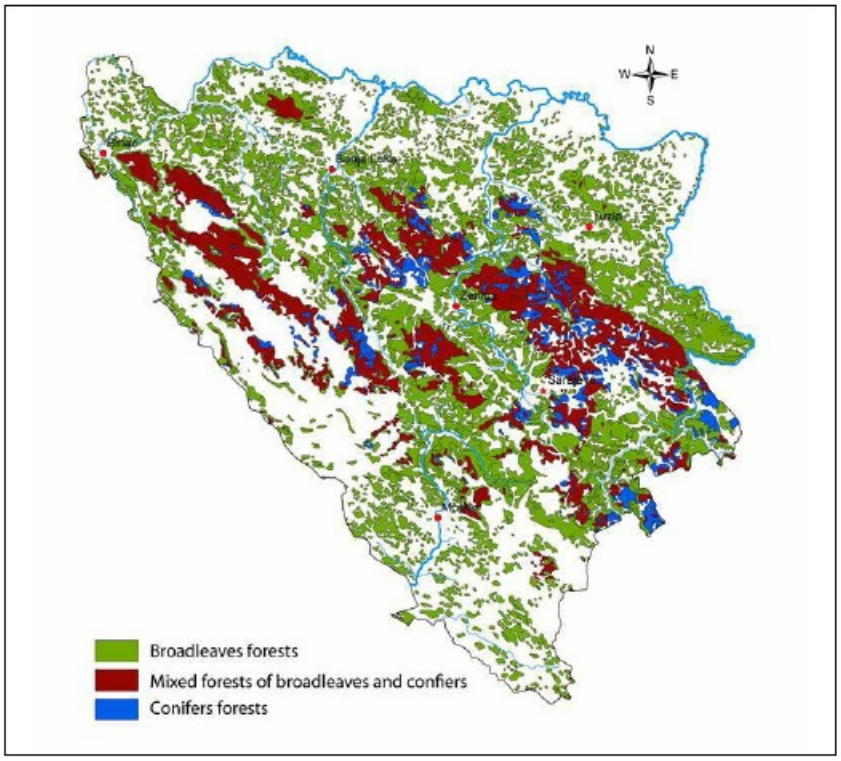
Bosnia and Herzegovina – About 1,652,400 ha of the total area of forest comprise high forest, while 1,252,200 ha are coppice forests. The rest of the area is characterised as "other wooded land" and comprises shrubs, barren forest land and other forest areas.

Table 4. Structure of forest area and forest land by vegetation form, purpose and availability in Bosnia and Herzegovina

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 by landmines. Source [BiH 2]

Map 4. Forest distribution in Bosnia and Herzegovina



Source [BiH 2]

Kosovo* – Forests in Kosovo* are dominated by broadleaved tree species, covering 93 percent of the forest area (449,400 ha; see Table 5). Coniferous forests cover almost 5 percent of the forest area (23,800 ha). [KOS 1]

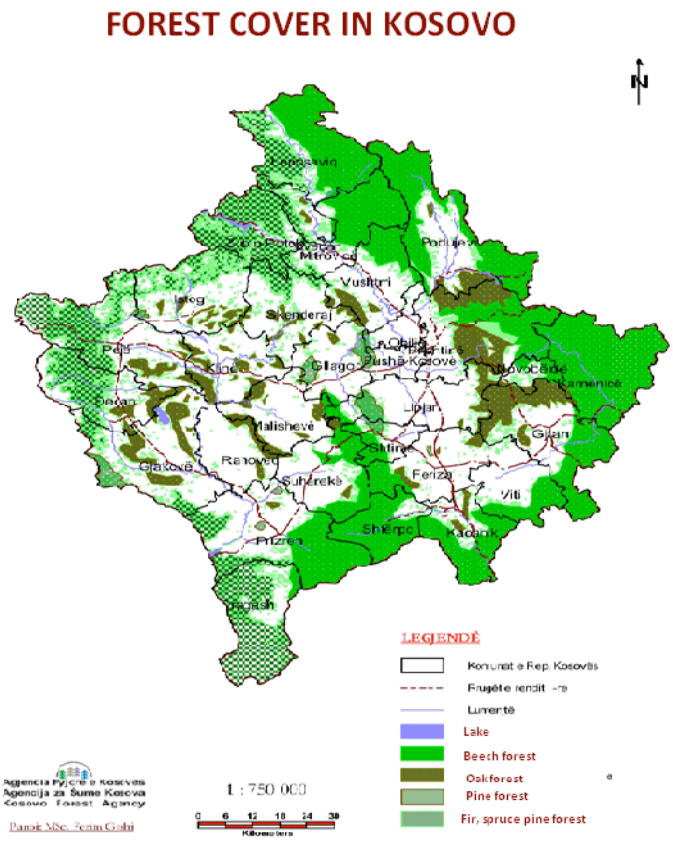
Coppice forests cover 84 percent of the total forest area. This is the result of extensive harvesting, in particular of short rotation coppice forestry for firewood production. Forests that regenerate naturally are mostly beech (*Fagus* spp.), mixed beech and conifers, and pure coniferous forests located at higher elevations. [KOS 1]

Table 5. Forest area in Kosovo* by forest composition and age class (ha)

Forest composition	Age class (years)						Total
	0-20	21-40	41-80	81-120	121-160	161-200	
Coniferous	4 600	3 600	11 400	3 400	800	0	23 800
Mixed	200	1 000	4 600	1 200	600	200	7 800
Broadleaved	139 600	157 200	127 800	21 800	2 800	200	449 400
Total	144 400	161 800	143 800	26 400	4 200	400	481 000

Source [KOS 1]

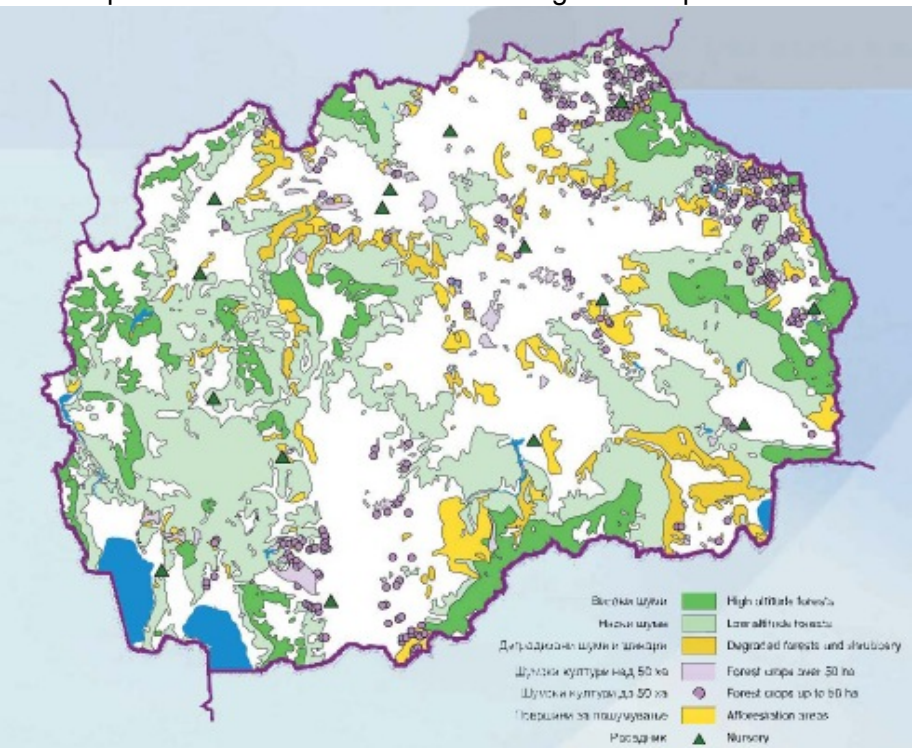
Map 5. Forest cover in Kosovo*



Source [KOS 1]

Former Yugoslav Republic of Macedonia – The most dominant species are beech (*Fagus moesiaca*) and various oak species (*Quercus* spp.), which make up 90 percent of the total area of native forest types.

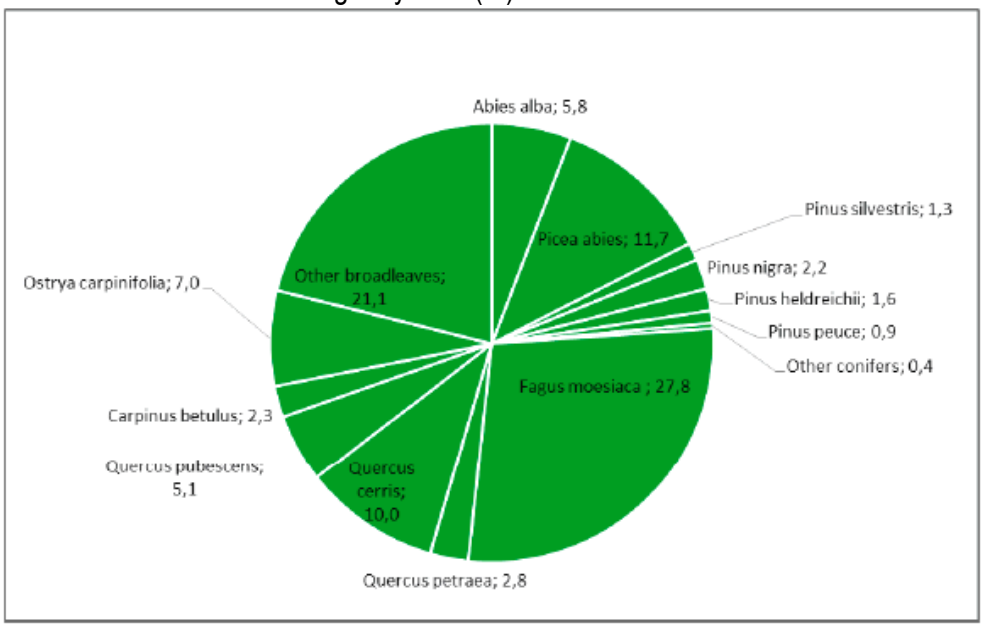
Map 6. Forest cover in the former Yugoslav Republic of Macedonia



Source [FYRM 3]

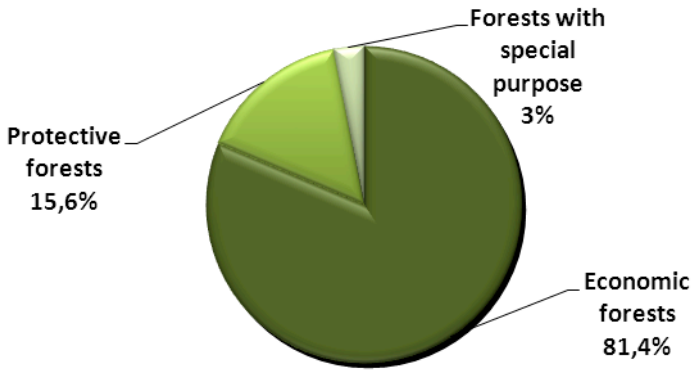
Montenegro – In terms of forest composition, the dominant trees in Montenegro's forests are beech, oak, spruce, fir and willow. There are 12 registered coniferous species and 59 registered broadleaved tree species in Montenegro. [MNE 3]

Figure 1 Distribution of trees in Montenegro by area (%)



Source [MNE 3]

Figure 2: Structure of forests in Montenegro by purpose



Source [MNE 2]

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

Forests in Serbia by composition

Map 7

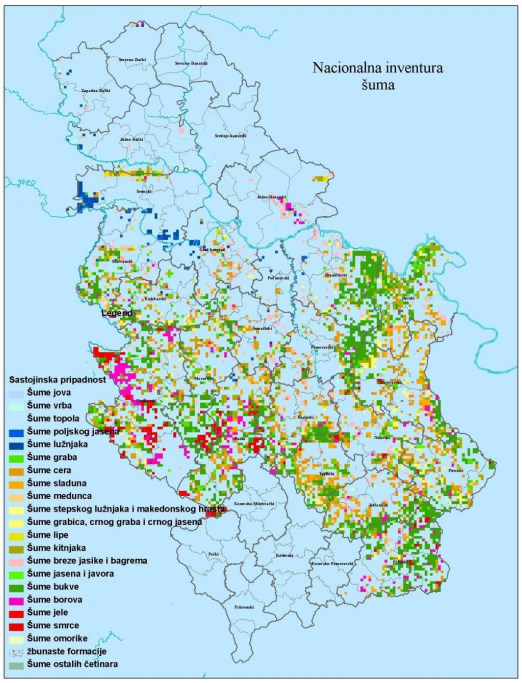


Table 6

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
TOTAL	2,252,400	100.0

Source: [SRB 3]

Table 7. Forest area in Serbia 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[1]	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
TOTAL	**2,252,400**

Source: [SRB 2]

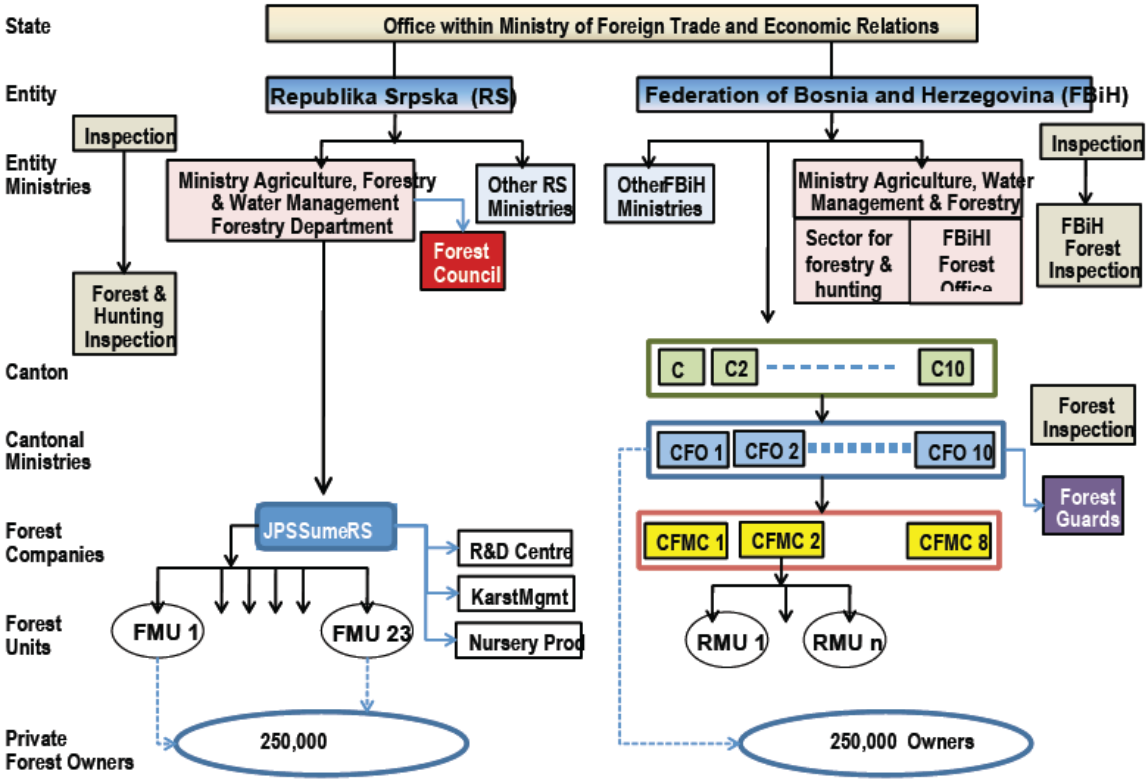
1.2. Major forestry stakeholders

Due to the region's historical, social, economic and political circumstances, the number and competencies of stakeholders in terms of forest management differ from country to country. The main stakeholders by country are presented in Table 8 (and in Figure 3 for Bosnia and Herzegovina).

The first conclusion is that there are a large number of forestry stakeholders in each country, including ministries, public enterprises, faculties, institutes and private owners.

The second conclusion is that there is no separate ministry for forestry in any country in the region. Instead, the forestry sector is part of other sectoral ministries, generally agriculture, environment or rural development, or the ministry of environment (Albania). This typically has negative implications for the forestry sector in terms of capacities (human and resources) and organisational structure. Taking into consideration the financial circumstances in the individual countries, this means that the forestry sector, in the framework of these institutions, must share the human and other resources of the ministry with other sectors, and very often they are not sufficient.

Figure 3. Organisation of the forestry sector in Bosnia and Herzegovina



Source [BiH 2]

Table 8. Major forestry stakeholders

Albania	Bosnia and Herzegovina	Kosovo*	Macedonia FYR	Montenegro	Serbia
1. Ministry of Environment: - Directorate for the Protection and Treatment of Forests (Forestry Service) - State Inspectorate of Environment, Forests and Waters - Protected areas and national parks 2. Communal forests: Forest users, forest user associations, local governments and communal forest federations 3. Faculty of Forest Sciences 4. Private forest owners	Because of the large number of stakeholders in Bosnia and Herzegovina, and their organisation at entity level, they are shown separately (Figure 3).	1. Ministry of Agriculture, Forestry and Rural Development (MAFRD) - Department of Forestry - Kosovo Forestry Agency (KFA) 2. Municipalities 3. Ministry of Environment and Spatial Planning (MESP) - Kosovo Environmental Protection Agency (KEPA)	1. Ministry of Agriculture, Forestry and Water Economy (MAFWE) 2. Macedonian Forests public enterprise 3. Saints Cyril and Methodius University in Skopje - Faculty of Forestry, Skopje 4. Ministry of Environment and Physical Planning (MEPP) - National parks and protected areas 5. Private forest owners	1. Ministry of Agriculture and Rural Development (MARD) 2. Directorate for Forestry, Hunting and the Wood Processing Industry (DFHWPI) 3. Administration for Inspection Affairs (AIA) 4. Forest Administration 5. Forestry Institute 6, Private forest owners 7. National Parks public enterprise	1. Ministry of Agriculture and Environmental Protection (MAEP) *2.* Srbijašume (Serbian Forests) public enterprise *3.* Vojvodinašume (Vojvodina Forests) public enterprise *4.* Borjak public enterprise *5.* National parks 6.Faculty of Forestry, Belgrade, 7.Institute of Forestry, Belgrade 8.Institute of Lowland Forestry and Environment, Novi Sad 9. Private forest owners

1.3. Fire history

Over the last two decades, forest fires have been one of the main causes of damage to forests and other natural resources in SEE countries. The extent of the damage caused does of course vary, depending on the year and the individual country.

Albania – Between 2004 and 2013, the annual average burned area was 2,731 ha of forests; 50 ha of (non-forest) protected areas; and 2,000 ha of other vegetation (e.g. wetlands). Damage included 15 houses burned; four high-voltage pylons damaged; and 23 people injured. Each year around 200 ha of olive trees and other agricultural crops are also burned.

Table 9. Forest fires in Albania (2005, 2006, 2008 and 2010)

Year	2005	2006	2008	2010
Nr. Of Cases	174	176	348	246
Forest surface (he)	3241	1081	-	1133
Burned surfaces (he)	300	108	1483	1133
Burned pastures (he)	1740	303	2716	1741
Value of damage in /000 Lekë(Albanian Money)	31682	81317	139131	63733

Source: General Directorate of Forests and Pastures

The most severe forest fires in recent years occurred in 2007 and 2012.

2007

- 1,190 fires in forests and pastures
- 2,700 ha of state forests burned
- 2,860 ha of communal forests burned
- 310 ha of private forests burned
- 6,263 ha of pastures burned
- Estimated damage of around EUR 20 million

2012

- 440 cases of fires in forests and 47 cases of fires in pastures
- 3,300 ha of forest area burned
- 1,300 ha of pasture burned

Studies have shown that 29 percent of these forest fires were caused by carelessness and negligence; 61 percent by unknown factors; 9 percent by arson; and only 1 percent by unusual events and lightning. However, it should be recognised that even those forest fires classified as "caused by unknown factors" can be considered to have been started as a result of human activity. They are classified under "unknown factors" as the precise cause is not known, but it can still be concluded that a large proportion of forest fires in Albania are started by human activities. [AL 9]

Bosnia and Herzegovina – Although forest fires are a significant ecological threat in Bosnia and Herzegovina, 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 the Federation of Bosnia and Herzegovina (FBiH), Republika Srpska (RS) and Brčko District (BD). Data from RS, for example, which are the most systematic, comprise precise figures for the number of fires and total burned area 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. [BiH 4]

According to Table 11, 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 10. Distribution of burned area (ha) in Bosnia and Herzegovina by land cover type in 2013

Land cover	*Area burned*	*% of total*
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 [BiH 5]

Table 11. Forest fires in Bosnia and Herzegovina (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 [BiH 4]

According to the Joint Research Centre (JRC) annual report for 2013, the 2013 fire season in Bosnia and Herzegovina 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 Bosnia and Herzegovina, although unofficially the main cause is human activity (in about 98 percent of all cases). [BiH 4]

According to some unofficial sources, the main reasons for forest fires in Bosnia and Herzegovina 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 was no official investigation or court verdict. Lightning is a minor cause of forest fires (fewer than 2 percent of cases).

Kosovo* – According to the national forest inventory, one of the most negative and detrimental factors affecting forests and forestry is forest fires. Up until 2012, forest fires had affected around 12,200 ha of forest, or 2.5 percent of the total forest area (Table 12). It should be noted that areas where more than 25 percent of small trees were affected, or where more than 25 percent of the growing stock of measurable trees was affected, are taken into consideration and included in this table.

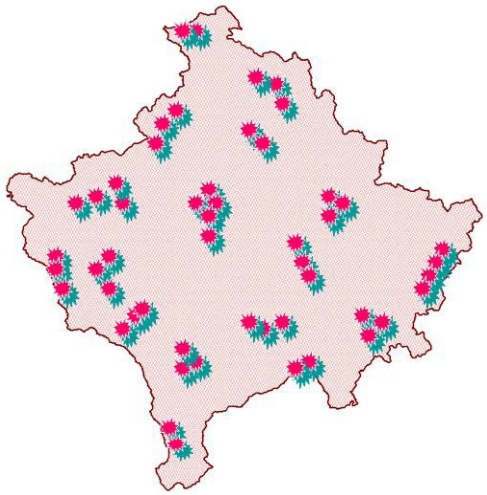
Table 12. Area of significant stand-level damage in Kosovo*, by forest composition and cause of damage (ha)

Forest composition	Cause of damage								Total
	Insects	Disease/ fungi	Fire	Animal	Weather	Human impact	Suppres-sion	Misc.	
Coniferous	200	200	2 200	0	400	800	0	800	4 600
Mixed	600	400	0	0	400	200	0	200	1 800
Broadleaved	3 000	10 200	10 000	1 800	2 400	7 800	5 200	11 400	51 800
Total	**3 800**	**10 800**	**12 200**	**1 800**	**3 200**	**8 800**	**5 200**	**12 400**	**58 200**

Source [KOS 1]

One of the most severe forest fire seasons (according to the JRC) during the last 10 years was in 2012, when 49 fires affecting over 40 ha were registered in Kosovo*, and around 8,376 ha of burned area was mapped using satellite technology. Of this area, 5,902 ha were forests and other wooded lands; 1,379 ha other natural lands; 1,085 ha agricultural land; and a small amount (10 ha) land with other types of cover. [KOS 2]

Map 8. Regions in Kosovo* with a high potential risk of fires



Source [KOS 4]

Former Yugoslav Republic of Macedonia – According to MAFWE data, in the period between 2004 and 2013 there were a total of 2,046 forest fires in the former Yugoslav Republic of Macedonia, the total burned area was 91,805.9 ha, and the total burned timber volume was 931,258.52 m^3 (Table 13). Within the same period, the average number of forest fires was 205 per year, and the average size of burned area was 9,180 ha. The most severely affected year in this period was 2007, when 652 fires were recorded, resulting in 35,248.6 ha of burned area. The most severe individual forest fire occurred in 2012 in the pine afforestation near the city of Strumica, when four people were killed and 12 injured (civilians), seven of whom were children. [FYRM 19]

The total damage (burned timber volume plus suppression fees) caused by forest fires in this period has been estimated at around EUR 51 million. [FYRM 19]

Forest fires in the former Yugoslav Republic of Macedonia are typically caused by stubble burning, the burning of pastureland, and arson. Arson has emerged as a problem in the last 15 years. There are two main reasons for arson:

- pyromania, which is very rare; and

- economically motivated arson, connected to illegal logging. In some cases, fires have been started deliberately in order to cover up evidence of illegal logging activities. In other cases, fires have been lit in order to divert the attention of official institutions (forestry service, police etc.) towards fire suppression while illegal logging activities are taking place in other forest areas.

According to Articles 22 and 45 of the Law on Forests, the entity that manages the forest must organise the reforestation of deforested areas. Also, according to Article 58 the entity must introduce "forest order" (the term "forest order" is defined in Article 12, item 40, of the Law on Forests). This means that all trees damaged by fire must be removed from the burned area. In this case, the price of the timber is significantly lower than the official price.

Table 13 Forest fires in the former Yugoslav Republic of Macedonia

Year	Number of fires	Burned area (ha)	Burned timber mass (m^3)	Suppression fees (EUR)	Total fees (EUR)
2004	94	892.05	4,322.30	23,214.55	1,469,090
2005	182	1, 368.00	1,063.00	42,018.11	411,181
2006	138	2,085.95	12,978.00	45,311.20	2,437,914
2007	652	35,248.60	617,678.67	386,852.46	21,494,700
2008	323	10,143.10	53,055.60	96,278.69	4,612,377
2009	38	197.00	756.50	313,627.00	5,812,889
2010	64	1,112.50	5,000.00	985,455.00	9,000,000
2011	390	20,856.80	65,042.80	400,153.00	1,719,105
2012	385	19,964.90	155,126.00	410,323.00	4,248,828
2013	170	6,379.12	16,235.00	115,000.00	434,333
Total	2,046	91,805.90	931,257.87	2,818,233.01	51,640,417
Average	205	9,180.00	93,125.80	281,823.30	5,164,041.7

Source: *MAFWE, State Inspectorate for Forestry and Hunting*

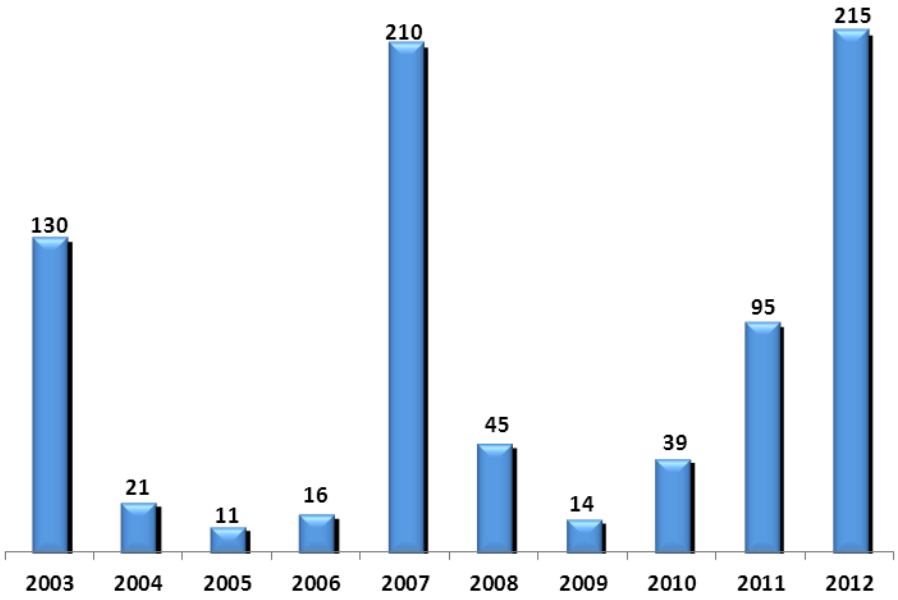
Montenegro – Forest fires are a global environmental and economic problem. Due to the country's geographical position in the Mediterranean region, and to the increasing negative impacts of climate change, Montenegrin forests are especially vulnerable. Forest fires are a constant threat to forests and forest lands in Montenegro. Along with their increased frequency, forest fires are becoming larger in scale and are threatening settlements and human lives as well as forests and agricultural land.

Over the past 10 years there have been around 800 large forest fires in Montenegro, and more than 18,000 ha of forests and over 800,000 m^3 of wood mass have been damaged or destroyed. The greatest risk is to forests located in the coastal and central regions, where high air temperatures during the summer period and the typical vegetation create the necessary preconditions for forest fires to start. July and August are critical in terms of the occurrence of fires (very low level of precipitation, or often no precipitation), as are the months of February and March (in the case of dry and warmer winters). Fires usually break out between 10:00 and 18:00, coinciding with daily human activities.

The main causes of forest fires in Montenegro are very similar to those in other countries in the region: stubble burning in fields, the burning of pastures, and arson. One particularly disturbing fact is the occurrence of deliberate arson: fires are sometimes started due to the fact that, following a fire, non-wood forest products such as mushrooms, raspberries and blackberries grow more rapidly, and grazing land is also more productive.

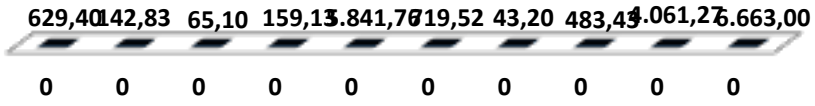
The annual average burnt area in the period between 2003 and 2012 was 1,880 ha, while the annual average number of fires was around 80. The total damage caused during this period has been estimated at over EUR 6 million.

Figure 4: Number of forest fires in Montenegro, 2003–2012



Source: Forest Administration

Figure 5: Burned area in Montenegro, 2003–2012 (ha)



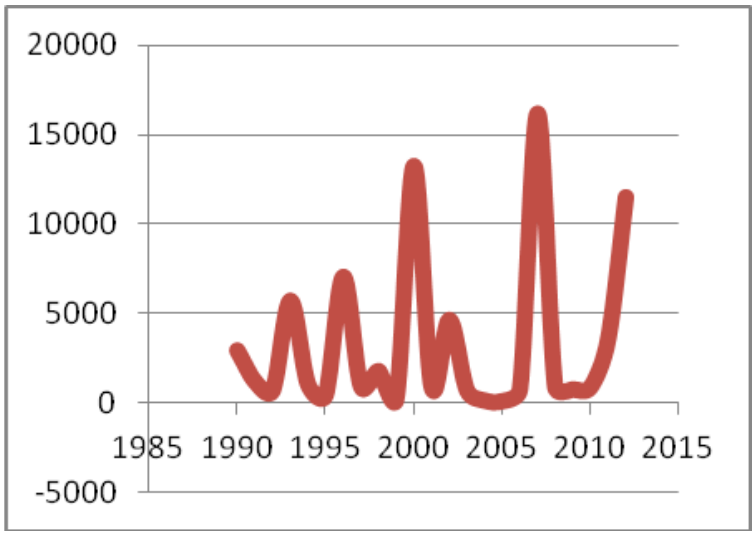
Source: Forest Administration

Serbia – 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. [SRB 4]

Figure 6. Burned area of forest and forest land (ha) and number of forest fires in Serbia (2004–2012)



Source: Forest Administration

Table 14. Number of fires in open spaces in Serbia

Number of fires in open spaces / 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

Table 15. Burned area of forests and forest land in Serbia		
Year	Number of fires	Area (ha)
2004	22	98
2005	15	63
2006	43	715
2007	**258**	**16,144**
2008	45	824
2009	84	728
2010	72	855
2011	343	3.567
2012	**328**	**11,462**

Source: Forest Administration

In the last 10 years, 66 percent of all forest fires in Serbia were started by human activities, 3 percent were of natural origin, and 31 percent were 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. [SRB 19]

Conclusions

According to the national data presented above, the most severe fire seasons in the region in the last 10 years were in 2007 (with a total burned area of 89,389 ha) and 2012 (with a total burned area of 134,338 ha). The reasons differ, but among the most significant are extreme weather conditions (high air temperature, severe winds and dryness), terrain configuration (very steep and inaccessible), type of vegetation, inappropriate measures on the part of the institutions responsible for forest fire protection (prevention and preparedness), and inadequate suppression measures.

In terms of cause, the majority of forest fires are the result of human activity, while lightning is responsible for around 2 percent of forest fires.

Most forest fires in the region (in almost all countries) are caused by agricultural burning (stubble burning in fields) and the burning of pastureland, largely because of negligence on the part of the people carrying out such activities. Fires along highways and railway lines can also be counted among fires caused by human negligence.

Arson is more frequent in some countries for economic reasons. The most typical motives for arson are illegal logging and the gathering of mushrooms, which grow more prolifically following a forest fire.

In a significant proportion of cases (in some countries over 60 percent) the cause is unknown.

According to the official available data concerning the number of forest fires in the region and the extent of the burned area during the most severe fire seasons, the highest number of forest fires in 2007 was recorded in Albania (1,190 fires) and the lowest number in Montenegro (210 fires). In terms of burned area in the same year, the biggest area was recorded in the former Yugoslav Republic of Macedonia (35,248 ha) and the smallest in Montenegro (5,841 ha). (There are no reliable data for Bosnia and Herzegovina and Kosovo* for 2007.)

The highest number of forest fires in 2012 was recorded in Bosnia and Herzegovina (5,870) and the lowest in Kosovo* (49). The biggest burned area was also recorded in Bosnia and Herzegovina (67,226 ha) and the smallest in Albania (3,300 ha).

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

Forest fire protection depends on the legal framework and institutional set-up in the individual country.

As shown in Table 16, protection against forest fires is regulated by a different number of laws in each country, from four laws in Kosovo* to 16 in Bosnia and Herzegovina. These laws are complemented by other legal acts, such as rulebooks. Protection against forest fires is typically regulated by laws in the fields of forestry, environment and nature protection, agriculture, internal affairs and civil protection, and local self-governance.

The country's institutional set-up is another parameter in the complex field of forest fire protection. A large number of institutions and organisations are involved in the forest fire protection system. Some of them are government institutions (ministries, directorates, agencies etc.) and some are public organisations (volunteer firefighters, associations of private forest owners etc.). The most important institutions and organisations involved in forest fire protection are ministries of forestry, agriculture and the environment; ministries of internal affairs and emergency situations; ministries of defence; local self-governments; associations of volunteer firefighters; and private forest owners. In the framework of these institutions, or independent of them, there are also a large number of agencies, directorates and public enterprises. This kind of organisational set-up requires the precise distribution of competencies and the coordination of activities.

The legal regulations in the countries of the region are presented in Table 16.

Table 16. Main laws governing forest fire protection

Albania	Bosnia and Herzegovina	Kosovo*	FYR Macedonia	Montenegro	Serbia
1. Law on Forests and the Forestry Service (No. 9385 of April 5, 2005) 2. Law on the Pasture Fund (No. 9693 of March 19, 2007) 3. Law on Civil Emergency Services (No. 8756 of March 26, 2001) 4. Law on Protection from Fire and Rescue (No. 8677 of April 5, 2001) 5. Law on Protected Areas (No. 8906 of June 6, 2002) 6.Other regulations: - Regulation on Forest	1. 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) 2. Law on Fire Protection and Firefighting in FBiH (Official Gazette of FBiH No. 65/09) 3. Law on Protection and Rescue in Emergency Situations (Official Gazette of RS No. 121/12) 4. Law on Fire Protection in Republika Srpska (Official Gazette of RS No. 71/12) 5. Law on Forests of Republika Srpska (Official Gazette of RS No. 66/03, 75/08, 30/10) 6. Law on Forests of Brčko District BiH (Official Gazette of BD BiH No. 14/10)	1. Law on Forests (No. 2003/3) 2. Law on Protection and Rescue from Natural Disasters and Other Disasters (No. 04/L-027) 3. Law on Firefighting and Rescue (No. 04/L-049) 4. Law on Nature Protection (No. 03/L-233)	1. Law on Forests (Official Gazette of FYRM, No. 64, of May 22, 2009) 2. Law on Hunting (Official Gazette of FYRM, No. 26, of February 24, 2009) 3. Law on Fire Protection (Official Gazette of FYRM, No. 67/4, of October 14, 2004) 4. Law on Protection and Rescue (Official Gazette of FYRM, No. 36/04, of June 10, 2004) 5. Law on Local Self-governance (Official Gazette of FYRM, No.	1. Law on Forests (Official Gazette of Montenegro, 74/10) 2. Law on Game and Hunting (Official Gazette of Montenegro, 52/2008) 3. Law on Protection and Rescue (Official Gazette of Montenegro, 13/2007) 4. Law on Self-governance (Official Gazette of Montenegro, 42/2003) 5. Law on National Parks (Official Gazette of Montenegro, 28/2014) 6. Other regulations:	1. Law on Fire Protection (Official Gazette of SRB No. 111/09) 2. Law on Emergency Situations (Official Gazette of SRB No. 111/09) 3. Law on Forests (Official Gazette of SRB Nos. 30/10 and 93/12) 4. Other documents and regulations: - Strategy for Fire Protection for 2012–2017 (Official Gazette of SRB No. 21/2012) - National Strategy for Protection and Rescue in Emergency Situations (Official

Protection against Fires, Pests and Diseases, and Related Financial Means (No. 25 of February 8, 1993) - Act of the Council of Ministers on Determining and Taking Measures against Fire and on the Rescue of Objects of Special Importance, Including Watersheds, National Parks etc. (No. 288 of June 27, 2002) - Guidelines on Determining and Taking Measures against Fire and on the Rescue of Objects of Economic and State Importance (implementing Act No. 288 of June 27, 2002) (No. 1 of July 30, 2002)	7. Law on Forests of Una-Sana Canton (Official Gazette of Una-Sana Canton No. 22/12) 8. Law on Forests of Sarajevo Canton (Official Gazette of Sarajevo Canton No. 05/13) 9. Law on Forests of Tuzla Canton (Official Gazette of Tuzla Canton No. 09/12 and 17/13) 10. Law on Forests of Zenica-Doboj Canton (Official Gazette of Zenica-Doboj Canton No. 08/13) 11. Law on Forests of Bosnian-Podrinje Canton (Official Gazette of Bosnian-Podrinje Canton No. 04/13 and 05/13) 12. Law on the Competencies of the Authorities of Sarajevo Canton in the Field of Fire Protection and Firefighting (Official Gazette of Sarajevo Canton No. 23/11) 13. Law on Fire Protection and Firefighting in the Area of Tuzla Canton (Official Gazette of Tuzla Canton		5, of January 29, 2002) 6. Law on Environment (Official Gazette of FYRM, No. 53, of July 5, 2005) 7. Law on Nature Protection (Official Gazette of FYRM, No. 67, of October 4, 2004) 8. Law on Crisis Management (Official Gazette of FYRM, No. 29, of May 4, 2005) 9. Law on Agricultural Land (Official Gazette of FYRM, No. 135, of November 8, 2007)	- National Strategies for Emergency Situations (2006) - National Strategy for Sustainable Development (2007) - National Forest and Forest Land Administration Policy (2008), which defines the direction of development and sustainable forest management - National Forestry Strategy and Plan for the Development of Forests and Forestry in the period 2014–2023 (adopted in April 2014), which sets out objectives and guidelines for the development of forests and forestry in accordance with the National Forestry Policy	Gazette of SRB No. 86/2011) - National Programme for Environmental Protection (Official Gazette of SRB No. 12/2010) - Forestry Development Strategy of the Republic of Serbia (Official Gazette of SRB No. 59/06)

	No. 1/12) 14. Law on Fire Protection and Firefighting in the Area of Central Bosnia Canton (Official Gazette of Central Bosnia Canton No. 15/12) 15. Law on Fire Protection and Firefighting in the Area of Zenica-Doboj Canton (Official Gazette of Zenica-Doboj Canton No. 5/11) 16. Law on Fire Protection and Firefighting in the Area of Una-Sana Canton (Official Gazette of Una-Sana Canton No. 04/13)				

Albania – According to the laws listed in Table 16, the main authorised institutions in the field of forest fire protection in Albania are outlined below.

1. **The Ministry of Environment, Forests and Water Administration (MEFWA)**, through the Directorate for Forest Protection and Treatment and the State Inspectorate of Environment, Forests and Waters (SIEFW).

The Directorate for Forest Protection and Treatment, as mentioned above, is responsible for forest management at state level, including forest fire protection. At regional level, this function is delegated to the Regional Forestry Services Directorate (RFSD). Besides other functions, the RFSD is obliged to ensure that all measures for prevention, preparedness and suppression are carried out, in accordance with the laws in force, by all forestry stakeholders: the public Forestry Service; the management of protected areas and national parks; forest and pasture users; and private forest owners.

The Forestry Service at regional level must prepare annual plans for forest fire protection that contain:

- an analysis of the causes of wildfires and factors that influence the spread of fire;
- fire statistics for the previous year;
- forest fire risk areas and periods;
- activities for the forecasting and prevention of forest fires;
- the name of the responsible entity and the location of the means, equipment and human resources for fighting forest fires;
- the responsible entity and the location of access roads to forests;
- technical fire prevention measures (fuel management and silvicultural and maintenance operations);
- training and information activities; and
- a financial plan.

Local branches of the national Forestry Service are dispersed throughout the country, with one in each district. When a wildfire occurs, Forestry Service personnel attend the scene but are active during the operational phase only, as observers or technical advisors. At present, the Forestry Service has no vehicles equipped to tackle forest fires.

The SIEFW inspects the above-mentioned institutions and organisations (among others) with respect to the prescribed measures for forest fire protection.

2. **National parks, forest and pasture users and private forest owners**

According to the legal regulations currently in force, national parks, forest and pasture users and private forest owners are under the same obligations as the Forestry Service.

3. The Ministry of the Interior

The Ministry of the Interior has overall responsibility for managing civil protection. The ministry's Department for Civil Emergency Planning and Response (DCEPR) is responsible for ensuring effective coordination between all ministries, institutions and bodies in the field of disaster management. It has a close relationship with civil emergency officers in each of the 12 counties in Albania. It is divided into three units:

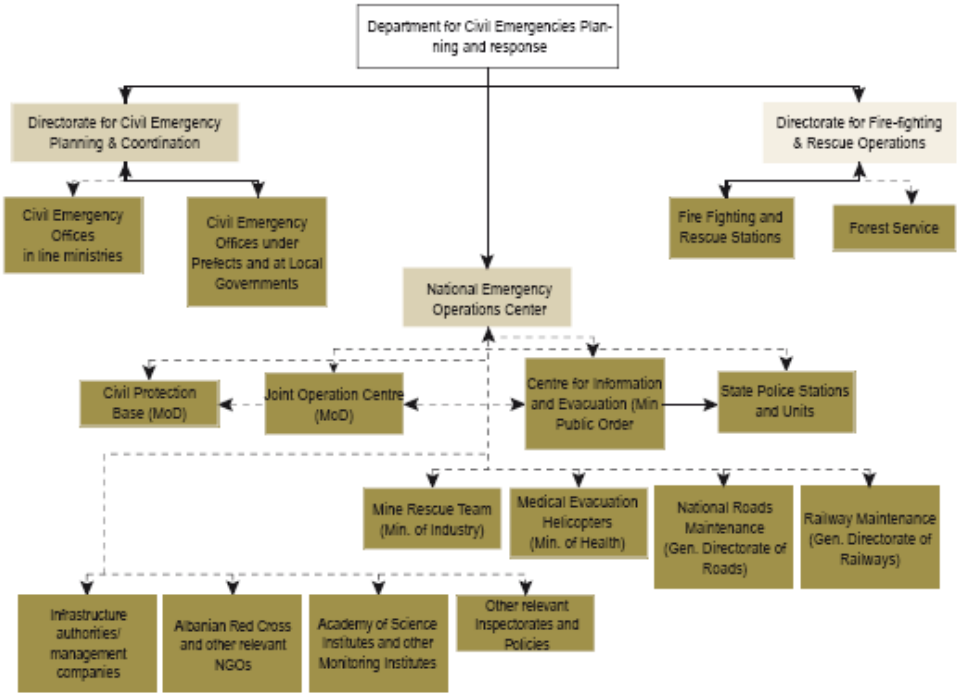
- The Directorate for Civil Emergency Planning and Coordination, which is the key institution for disaster management, especially coordination. This directorate has begun to move beyond mere preparedness and response towards recovery activities and the incorporation of disaster risk reduction elements into development plans, in particular for disaster-prone areas.

- The Directorate for Firefighting and Rescue Operations (DFFRO).

- The National Operations Centre for Civil Emergency, which has direct links with all operational forces.

At district level, professional firefighters are organised within fire stations under the jurisdiction of the DFFRO. The DFFRO cooperates with the national Forestry Service of the MEFWA. Firefighters are actively deployed by the DCEPR to tackle wildfires.

Figure 7. The structure of Albania's Department for Civil Emergencies, Planning and Response



Source: [AL 1]

Fires in forests, in agricultural and conservation areas and on other land, as well as the legal provisions for fire bans and the use of fires to reduce combustible vegetative matter and thus reduce the risk of wildfires, are regulated by the Law on Forests and Forestry Services and the Law on the Pasture Fund. The use of fire to enhance biodiversity is regulated by the Law on the Pasture Fund.

Cross-border collaboration is handled by the civil emergency service (DCEPR). Agreements have been made for collaboration during the forest fire season with Italy, Greece, the former Yugoslav Republic of Macedonia, Montenegro, Bulgaria, Kosovo* and Turkey.

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

The forestry sector

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

- The Federation of Bosnia and Herzegovina

At the level of FBiH, the Forestry Department within the Ministry of Agriculture, Water Management and Forestry of FBiH (MAWMF) has as its main bodies the Federal Forest Office (FFO) and the Federal Forest Inspectorate (FFI). Among other tasks, the FFO is responsible for silviculture and forest protection at entity level. In addition, there are 10 cantonal forest management companies (CFMCs), which are public enterprises with forest management units. Each CFMC, in accordance with existing legal regulations, is obliged to organise forest fire protection (among other activities). For this purpose, the CFMC must 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 warning, and enhance the timeliness of the initial response for the localisation and suppression of fires." [BiH 6]

At federal and cantonal level, the role of the FFI, besides the inspection of the CFMCs, is to ensure that all measures for forest fire protection are carried out in accordance with the current legal regulations.

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 Articles 27 and 44.

- Republika Srpska

The Forest and Hunting Inspectorate (FHI), as a part of the MAFWM, ensures the implementation of all the 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 Republika Srpska 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. [BiH 7]

In accordance with Article 34 of the Law on Forests of Republika Srpska (Official Gazette of Republika Srpska, BiH, 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 Republika Srpska (Official Gazette of Republika Srpska, BiH, No. 71/12) that regulates the content of fire protection plans.

National parks in Bosnia and Herzegovina

There are three national parks in Bosnia and Herzegovina: Sutjeska, Kozara and Una. They have almost the same obligations regarding forest fire protection as the forestry sector, and are regulated by the same laws: Sutjeska and Kozara National Parks in accordance with the current legal regulations in Republika Srpska; and Una National Park in accordance with the regulations in force in FBiH.

Local self-governance in Bosnia and Herzegovina

In accordance with Article 40 of the Law on Fire Protection of Republika Srpska (Official Gazette of Republika Srpska, BiH, 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).

Ministry of Security of Bosnia and Herzegovina

The Ministry of Security of Bosnia and Herzegovina is responsible for the execution of international obligations, cooperation, coordination and the revision/approval of the protection and rescue programmes and plans of the entities. There are 10 sectors within the ministry, including 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.

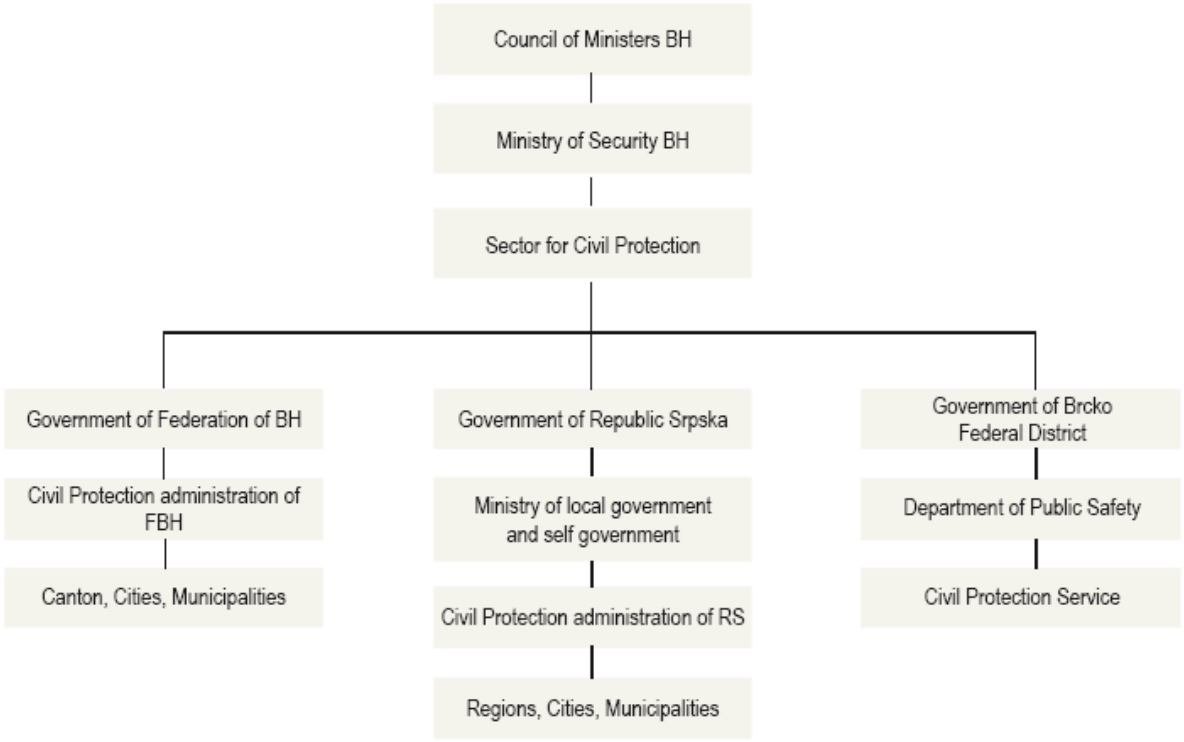
At the state level, the Sector for Civil Protection of the Ministry of Security is the highest-level body with competencies and responsibility for international cooperation, internal coordination, the strategic planning of protection and rescue measures, and training programmes.

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 Brčko District. The entities and Brčko District, within the framework of their competencies 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 8. Organisation of the Sector for Civil Protection of Bosnia and Herzegovina

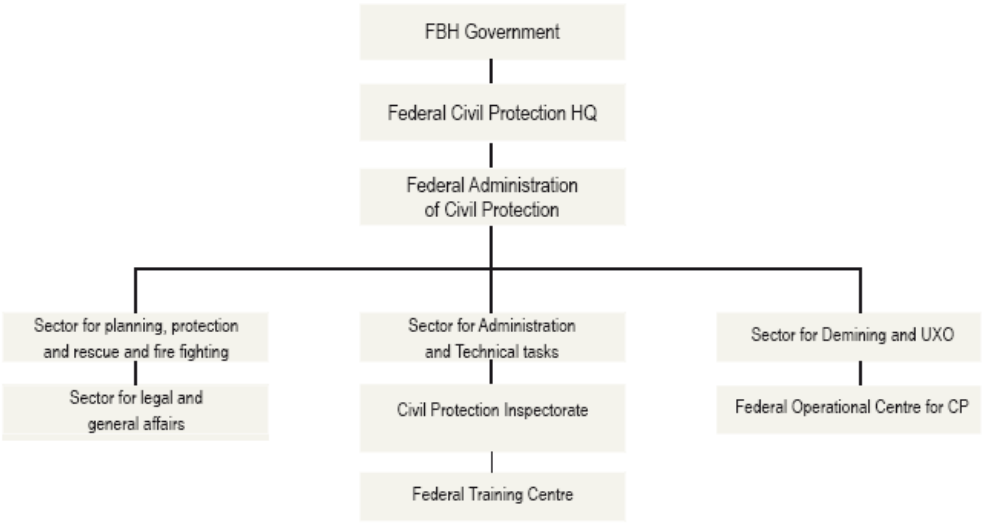


Source [BiH 8]

The structure of civil protection 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 9).

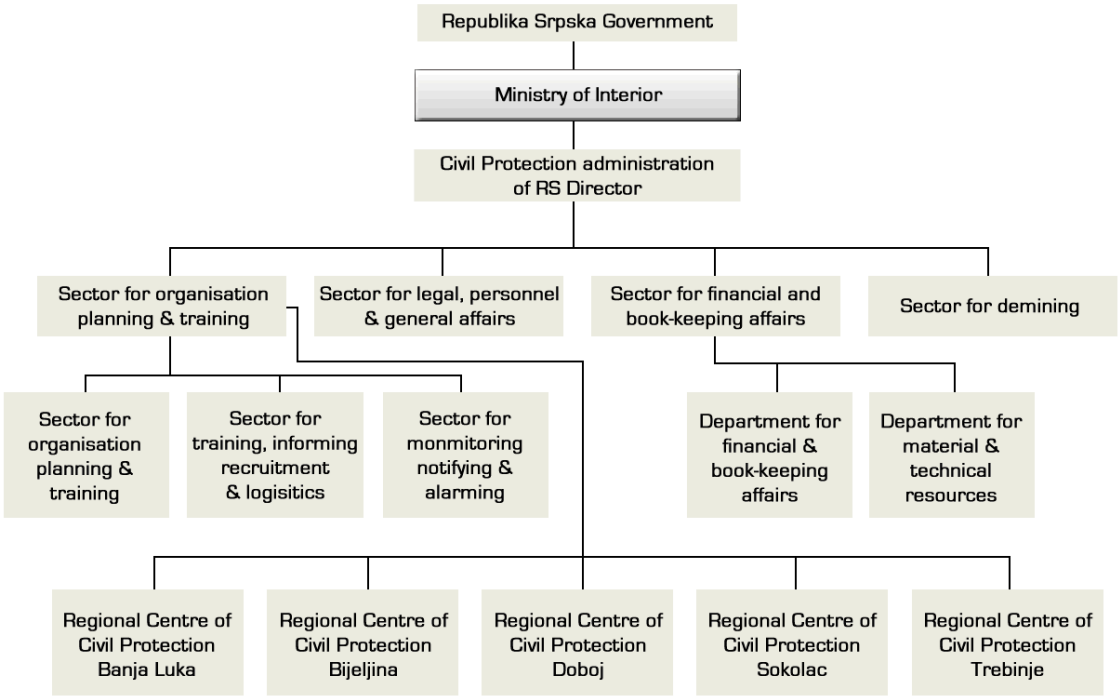
The Civil Protection Administration of Republika Srpska has competencies for planning; the issuing of obligations regarding the lending of material resources for civil protection needs; and damage assessment directives. The director of civil protection is responsible for the administration and organisation of the entire structure, as well as for training programmes for civil protection units (Figure 10).

Figure 9. Organisation of civil protection in the Federation of Bosnia and Herzegovina



Source [BiH 8]

Figure 10. Organisation of civil protection in Republika Srpska



Source [BiH 8]

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

The Brčko 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 the head of civil protection belongs to the director of the Department of Public Safety. [BiH 8]

Voluntary fire protection associations in Bosnia and Herzegovina

In accordance with Article 39 of the Law on Fire Protection of Republika Srpska (Official Gazette of Republika Srpska 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 may be engaged in fire suppression activities in urban and forest areas.

The following data help to present a clear picture of the capacities of 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 Republika Srpska there are 641 professional firefighters and 608 volunteers (1,249 in total) distributed in five centres: Banja Luka, Bijeljina, Doboj, Sokolac and Trebinje.

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

All firefighters (in FBiH, Republika Srpska and Brčko District) have vehicles and equipment for the suppression of urban fires. [BiH 4]

Kosovo* – According to the laws referred to in Table 16, the main institutions authorised for forest fire protection are those presented below.

- The Ministry of Agriculture, Forestry and Rural Development (MAFRD)

The MAFRD is the highest-level institution for the administration and management of forests in Kosovo*, working through the Department of Forestry and the Kosovo Forest Agency (KFA).

Through the KFA, the MAFRD implements legal regulations in terms of forest management in Kosovo*, while through the Forestry Inspectorate it ensures their implementation by all private and state entities in the forestry sector. The issue of forest fire protection is thus also regulated. Forest fire protection is part of all forest management plans (both annual and long term).

The issue of forest fire protection is treated in even greater detail at municipal level. The municipal branch of the KFA includes a forest protection office responsible for ensuring the implementation of regulations, and especially of Administrative Instruction MA-No22/2007 on Protection from Forest Fires. The obligations of all relevant natural and legal persons in this respect are described in Articles 2 and 3 of the instruction.

Article 2 contains the following provisions:

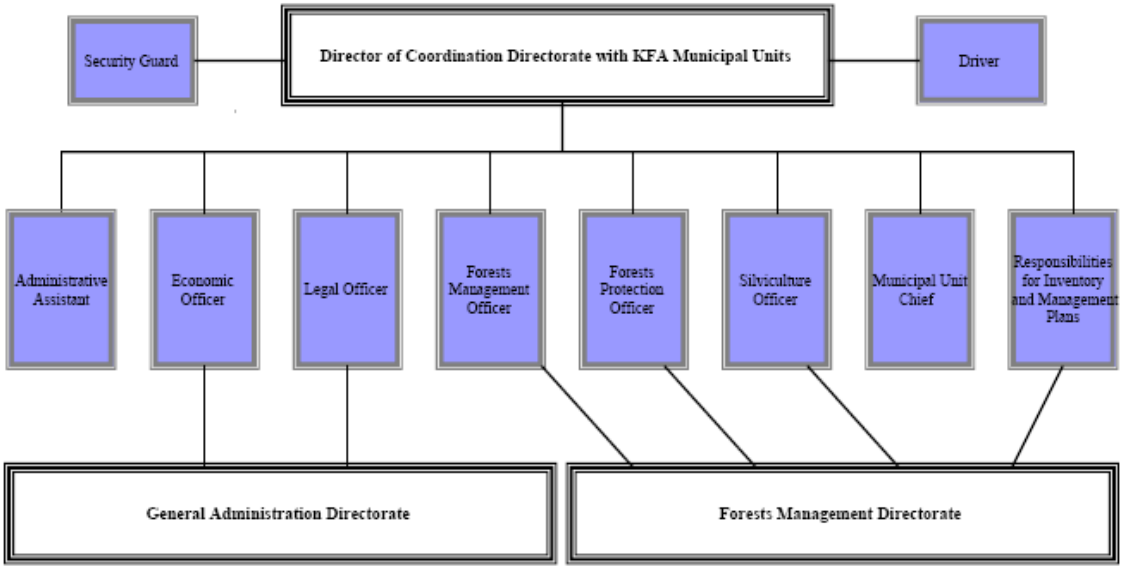
> *"(1) Natural and legal persons that manage forests and forest lands are obliged to register forests according to the risk of forest fires in harmonisation with the forest fire risk assessment provided in the appendices to the administrative instruction.*
>
> *(2) Registration includes the surface area of controlled forests ranked according to forest fire risk level.*"

Article 3 prescribes the following:

"*(1) Natural and legal persons that manage forests and forest lands are obliged to:*

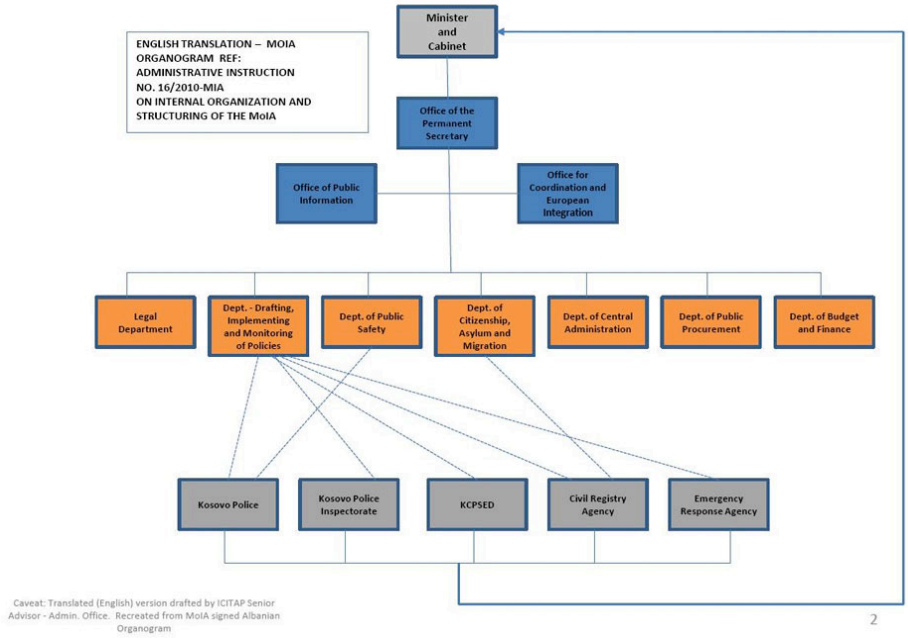
1. *compile annual plans for the protection of forests and forest lands from fire;*
2. *organise a detection and notification service;*
3. *establish a service for the protection of forests from fire, or entrust this duty to a legal person specialising in this field;*
4. *prepare and train forest staff for intervention and equip them with the necessary tools for opening up paths to fight fires and stop their spread;*
5. *inform personnel of risk levels and enforce protection measures against fires; and*
6. *raise public awareness, particularly among tourists and children, about the importance of forest protection, and undertake preventive measures according to forest fire risk."*

Figure 11. Organisational structure of the Kosovo Forest Agency municipal units



Source [KOS 15]

Figure 12. Organisational structure of the Ministry of Internal Affairs, Kosovo*



Source [KOS 14]

- The Ministry of Internal Affairs (MIA)

The main goal of the MIA is to build, preserve and increase the security of all citizens in Kosovo*, in cooperation with them.

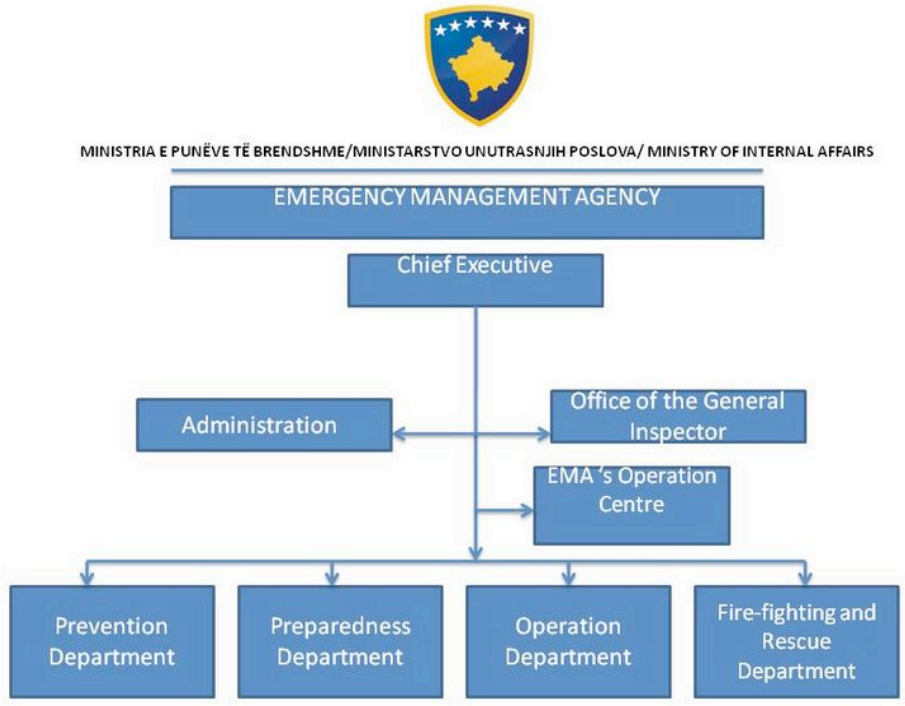
The Emergency Management Agency (EMA) operates within the MIA and is responsible for, among other things, forest fire protection. The main mission of the EMA, through the Department of Fire and Rescue, is to establish a solid foundation in the field of prevention, preparedness and response by providing leadership and ensuring the central coordination of firefighting services at all levels and within all structures.

Its functions are to:

- supervise, coordinate, direct and set standards for these tasks; provide a community fire protection, firefighting, rescue and emergency response; and act as an advocate for the Department of Fire and Rescue in terms of the challenges facing community, private and voluntary firefighters;
- develop and deliver educational programmes in the field of prevention and fire protection in partnership with other agencies, the emergency response community, the media and other stakeholders;
- support professional development, operational capacity and preparedness training for central, regional, local and private fire/rescue and emergency response structures;

- support regional and local entities in the collection, analysis and dissemination of data and special reports regarding the occurrence, control and consequences of any fire, health incidents and other emergency activities; and
- use and support the development of technologies for fire prevention, suppression and localisation; and support resource management studies and firefighting operations in the field.

Figure 13. Organisational structure of the Emergency Management Agency, Kosovo*



Source [KOS 15]

According to Article 4 of the Law on Firefighting and Rescue (No. 04/L-049), the responsibilities of the EMA include:

- structuring, classifying and defining the operational methods of professional firefighting and rescue units and professional staff;
- encouraging the establishment of volunteer firefighting and rescue associations in accordance with the risk assessment and fire protection plan; and
- establishing professional firefighting and rescue units in the territories of municipalities that lack a sufficient number of firefighting and rescue units.

- Municipalities

In accordance with Article 4 of the law, municipalities play a role in fire protection (including forest fire protection). Municipalities are responsible for:

- encouraging the establishment of one or more firefighting and rescue voluntary associations;
- structuring, organising, classifying and defining the operational methods of firefighting and rescue voluntary association units in accordance with the requirements of the agency, as defined in Paragraph 2, sub-paragraph 2.1;
- defining the tasks and number of voluntary firefighting staff; and the assets and equipment necessary for firefighting and rescue voluntary association units in accordance with the municipality risk assessment and central fire protection plan; and
- undertaking measures to establish firefighting voluntary units if they lack a sufficient number of firefighting and rescue units in their territory.

Former Yugoslav Republic of Macedonia – According to the laws listed in Table 16, the main institutions authorised for forest fire protection are described below.

1. Ministry of Agriculture, Forestry and Water Economy

The MAFWE was established by the Law on the Organisation and Operation of the Organs of State Administration (Official Gazette of FYRM, No. 58/2000, of July 21, 2000), and its competencies are described in Article 21 of the law. The MAFWE carries out activities related to:

- agriculture, forestry and water economy;
- the utilisation of agricultural land, forests and other natural resources; and
- inspection in the domain of its competencies.

There are two sectors within the MAFWE related to forestry: the Sector for Forestry and Hunting; and the Sector for Forest Police. The State Inspectorate for Forestry and Hunting also operates within the ministry. [FYRM 21]

The main purpose of the above organisational units is to secure the management of forests in accordance with Article 7 of the Law on Forests: "Forest management comprises silviculture, protection and forest utilisation, through the restoration, nursing, protection, afforestation, utilisation of forests and forest land, and other activities for the maintenance and improvement of the forest's functions."

The Sector for Forestry and Hunting is divided into four departments:

- The Department for Afforestation and Silviculture.
- The Department for Forest Protection — Among other activities, this department is obliged to monitor the situation in the field of forest fire protection and the protection of forests from other negative abiotic and biotic factors.
- The Department for Hunting — With respect to forest fires, the role of this department is to ensure the implementation of Article 23 of the Law on Hunting: "It is forbidden to burn stubble, weeds and other plant waste in hunting areas."
- The Department for the Planning of Management Activities and Utilisation of Forests. [FYRM 21]

The task of the Forest Police is defined by Article 81 of the Law on Forests: "The guarding of state-owned and privately owned forests is organised by the Forest Police."

According to Article 82 of the same act, besides guarding the forests the Forest Police have a mandate to monitor and report on the situation in the forests regarding illegal logging and forest theft, forest fires, diseases, pests and other negative influences; to inform the authorities about the illegal appropriation of forests and forest land; and to initiate procedures within the legal institutions against those who break the law.

The monitoring of the implementation of the provisions of the Law on Forests is under the competency of the State Inspectorate for Forestry and Hunting. For the purposes of monitoring there are five regional units with 22 regional inspectors covering all the municipalities in the country. Competencies are defined in Chapter XI of the Law on Forests. One of the competencies is to ensure the implementation of all prescribed measures for forest fire protection by all entities that manage forests.

2. Macedonian Forests public enterprise

The public enterprise Makedonski sumi (Macedonian Forests) was founded on the basis of Decision of the Government of FYRM No. 3028/1 of December 15, 1997 (Official Gazette of FYRM No. 65/97), and began operation on July 1, 1998, as a legal successor to earlier enterprises for forest management. Its status as a subject that manages forests is determined by Article 87 of the Law on Forests: *"The public enterprise Macedonian Forests carries out the management of state-owned forests that have an economic and protective role. The public enterprise manages state-owned forests through its 30 subsidiaries. Among other tasks, the subsidiaries are responsible for protecting and taking care of the forests."* [FYRM 22]

A total of 2,232 people are employed in the public enterprise (including its subsidiaries). In terms of highest academic qualification, two of the employees have a PhD and 15 an MSc, 410 are graduates (mainly forestry engineers), 74 have attended two years at college, 1,140 have completed high school (mainly forestry technicians), and 591 have completed primary school (forestry workers).

In accordance with Article 50 of the Law on Forests, the public enterprise (via all its subsidiaries) has "an obligation to carry out measures for forest protection from illegal logging, forest fires, natural disasters, diseases, insects, illegal pasturing and other damage".

In Article 1, items 27 and 28, of the same law the terms "fire in an open space" and "forest fire" are defined as follows:

> *"A fire in an open space refers to the uncontrolled burning of forest and forest land, regardless of the size of the burning area, the intensity of the fire or the cause of ignition, which includes the burning of agricultural land and pasture land, within 200 m of the edge of the forest.*
> *A forest fire is the uncontrolled burning of forest and forest land, regardless of the size of the burning area, the intensity of the fire or the cause of ignition."*

In the same article, item 29, the term "forest fire management" is defined as measures for protection against fires in open spaces, which comprise:

> *"1) education and public awareness raising throughout the year;*
> *2) preparatory measures throughout the year aimed at institutions in charge for forest fire suppression; and*
> *3) direct measures used during a forest fire, aimed at localising and suppressing the fire."*

All these measures are part of the annual operating plan that each subsidiary is obliged to prepare for the current year and that the public enterprise must confirm. The plan is made obligatory by the Law on Protection and Rescue (Article 51).

Taking into consideration the complexity of the issue of forest fire protection, based on Article 50, paragraph 2, of the Law on Forests, the MAFWE has also adopted the Rulebook on Special Measures for Forest Fire Protection.

3. Directorate for Protection and Rescue (DPR)

The DPR was established in 2005 by the Law on Protection and Rescue. It is an independent government authority created by the merger of the civil protection sector from the Ministry of Defence and the Fire Protection Inspectorate from the Ministry of the Interior. It comprises four sectors with 11 departments, four independent units, and 35 local offices for protection and rescue (see Figures 14 and 15).

Its competencies and scope of activities are regulated by the Law on Protection and Rescue (Official Gazette of FYRM, No. 36/04, of June 10, 2004) as well as the Law on Fire Protection (Official Gazette of FYRM, No. 67/4, of October 14, 2004).

In relation to forest fires, the competencies of the DPR are coordination, inspection, prevention and suppression.

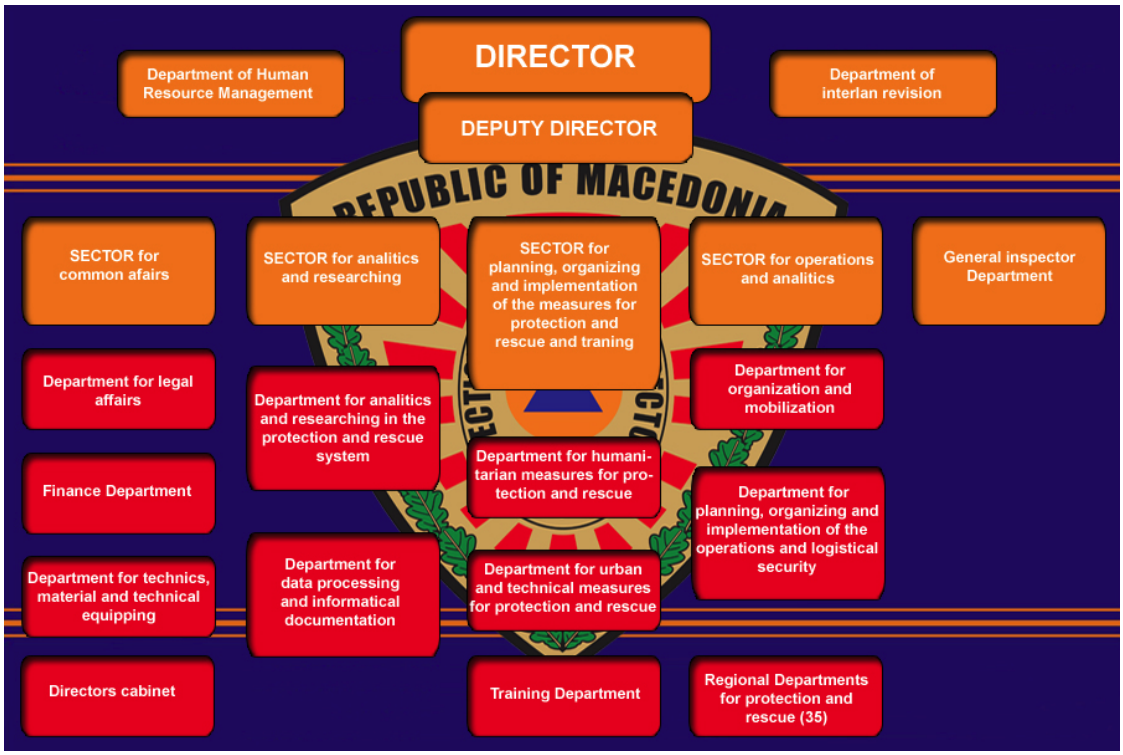
Coordination: In accordance with Article 51 of the Law on Protection and Rescue: "Organs of the state administration, organs of local self-governance units, trading societies, public enterprises, institutions and services are obliged to prescribe and project the organisation for the implementation of measures for protection and rescue and to implement measures of prevention." The DPR has a mandate to coordinate these activities/plans (in regards of forest fires protection) from all institutions and organs in accordance with the current laws and regulations.

Inspection: The General Inspectorate Department has a mandate to carry out inspections of all authorised institutions for forest fire protection (the public enterprise Macedonian Forests, local self-government units, territorial fire protection units etc.) in order to ensure that they have prepared appropriate plans and taken all the necessary measures for prevention and preparedness in accordance with the laws and regulations in force.

Prevention: The DPR has a mandate to initiate procedures for the adoption of new laws or the improvement of existing laws, to undertake public awareness campaigns (independently or jointly with other institutions or organisations), and to organise educational measures (lectures).

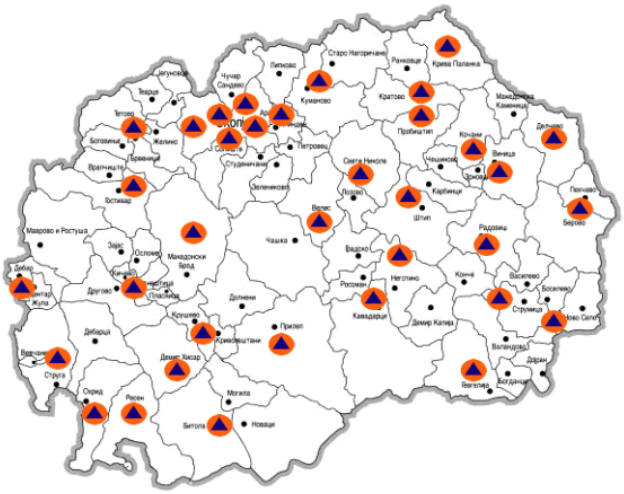
Suppression: In accordance with Article 18, item 6, of the Law on Protection and Rescue, the DPR has a mandate to participate in forest fire suppression activities. For this purpose, there are 35 teams for prompt response (around 700 people in total) to be engaged in the event of large forest fires. These teams are equipped mainly with hand tools. The Sector for Specialised Aircraft Services operates three aeroplanes (Air Tractor Europe, S.L) equipped for forest fire suppression. [FYRM 23]

Figure 14. Organisational structure of the Directorate for Protection and Rescue, Former Yugoslav Republic of Macedonia



Source: http://www.dzs.gov.mk/

Figure 15. Distribution of the regional departments of the Directorate for Protection and Rescue, Former Yugoslav Republic of Macedonia



Source: http://www.dzs.gov.mk

4. Local self-governance

In accordance with the Law on Fire Protection (Official Gazette of FYRM, No. 67/4, of October 14, 2004) and the Law on Local Self-governance (Official Gazette of FYRM, No. 5, of January 29, 2002), local self-governance units are obliged to organise a fire protection service (territorial fire protection units, or TFPUs) comprising professional firefighters. These units are trained and equipped mainly for the suppression of urban fires.

5. Crisis Management Centre (CMC)

The CMC was established in 2005 in accordance with the Law on Crisis Management (Official Gazette of FYRM, No. 29, of May 4, 2005). The main tasks of the CMC are to:

- ensure continuity in inter-sectoral and international cooperation, consultation and coordination in the field of crisis management;

- prepare and update the assessment of risks and dangers in crisis resolution; and

- propose measures and activities for the resolution of crisis situations and the performance of other duties prescribed by law.

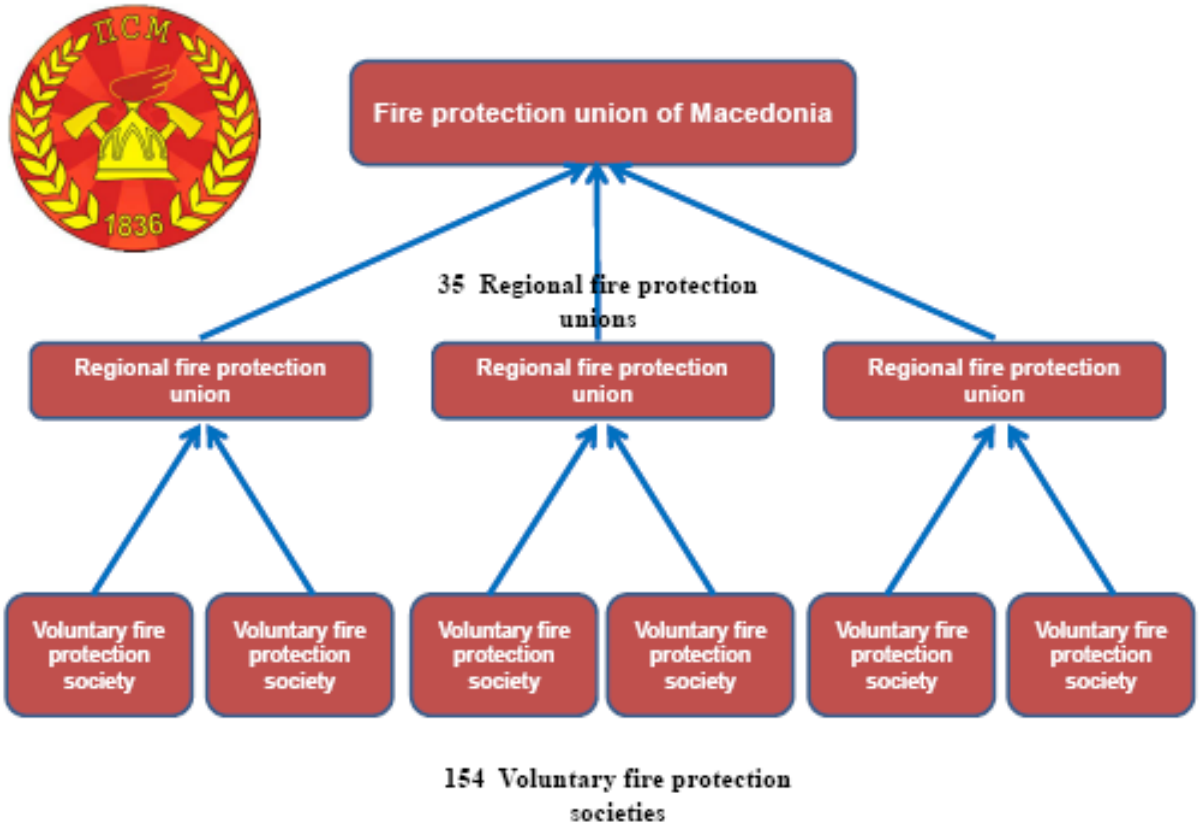
In line with the above, the CMC is in charge of forest fire management only during crisis situations at state level (such as during the 2007 fire season, when a state of emergency was declared in the former Yugoslav Republic of Macedonia). A web-based forest fire early warning system (the Macedonian Forest Fire Information System, or MKFFIS) has been available within the CMC for public use since 2014 (http://mkffis.cuk.gov.mk/). Some parts of the system are available exclusively to institutions responsible for forest fire protection in the country. [FYRM 25]

6. Fire Protection Union (FPU)

The Macedonian Fire Protection Union is an NGO that works according to the Law on Fire Protection (Official Gazette of FYRM, No. 67/4, of October 14, 2004) and the Law on Societies and Foundations (Official Gazette of FYRM, No. 52, of April 16, 2010). Its basic activity is defined in Code 8, sub-section 1, of the organisation's statutes as follows: "The union carries out measures and activities for preventing fire outbreaks, for firefighting and for rescuing people, property and valuables jeopardised by fires, climatic distress and other accidents." This means that the FPU carries out measures for fire prevention, pre-suppression and suppression, including forest fires. The engagement of firefighters (volunteers) in forest fire suppression activities is coordinated by the DPR (at state and local level). Today, there are around 154

voluntary fire protection societies within the FPU, organised into 35 regional fire protection unions (RFPU). [FYRM 16]

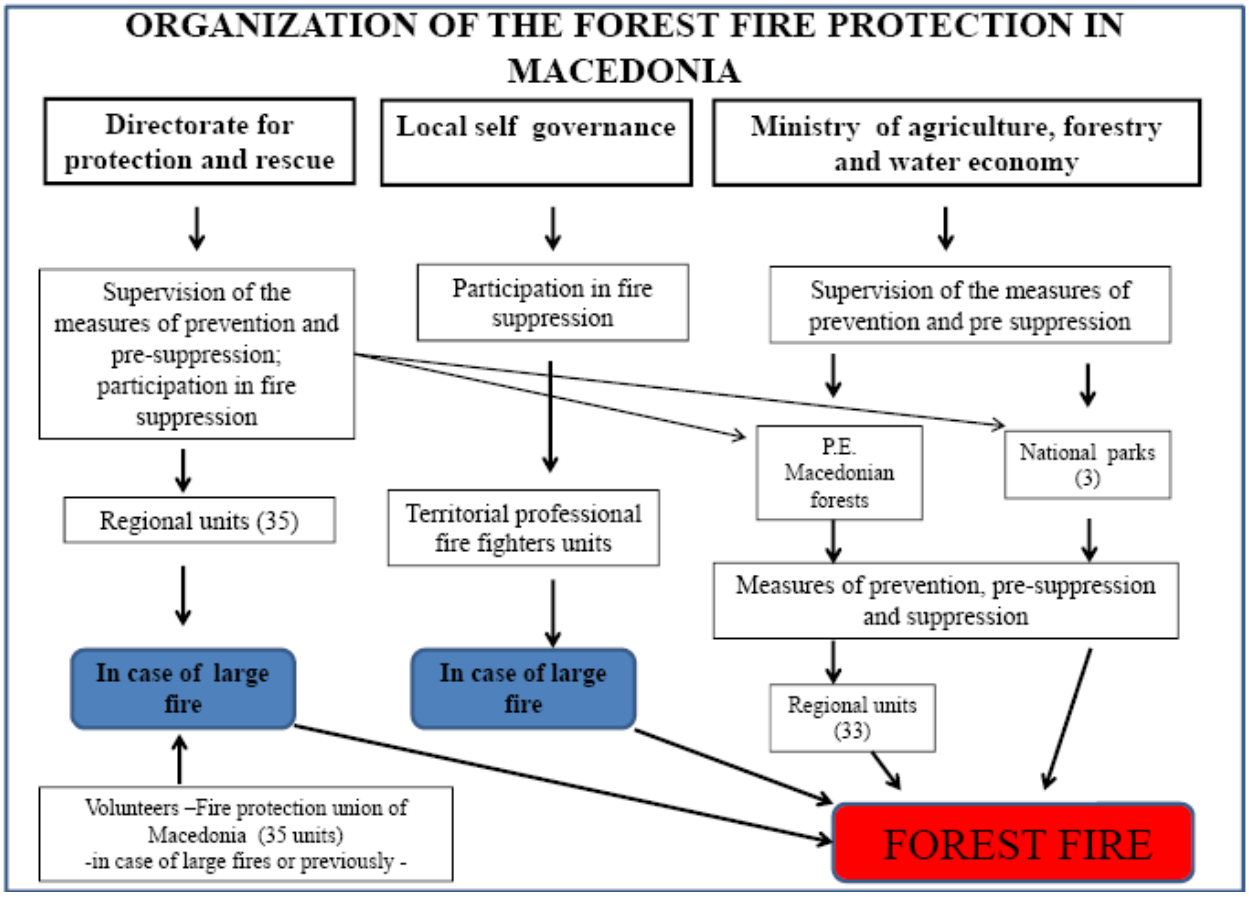
Figure 16. Organisational structure of the Macedonian FPU



Source: Nikola Nikolov. Involvement of volunteer firefighters in enhancing wildfire preparedness and response capacities in Macedonia*, Novosibirsk, 2013*

In accordance with the laws listed in Table 16, forest fire protection in the former Yugoslav Republic of Macedonia is organised as shown in Figure 17.

Figure 17. Organisation of forest fire protection in the former Yugoslav Republic of Macedonia

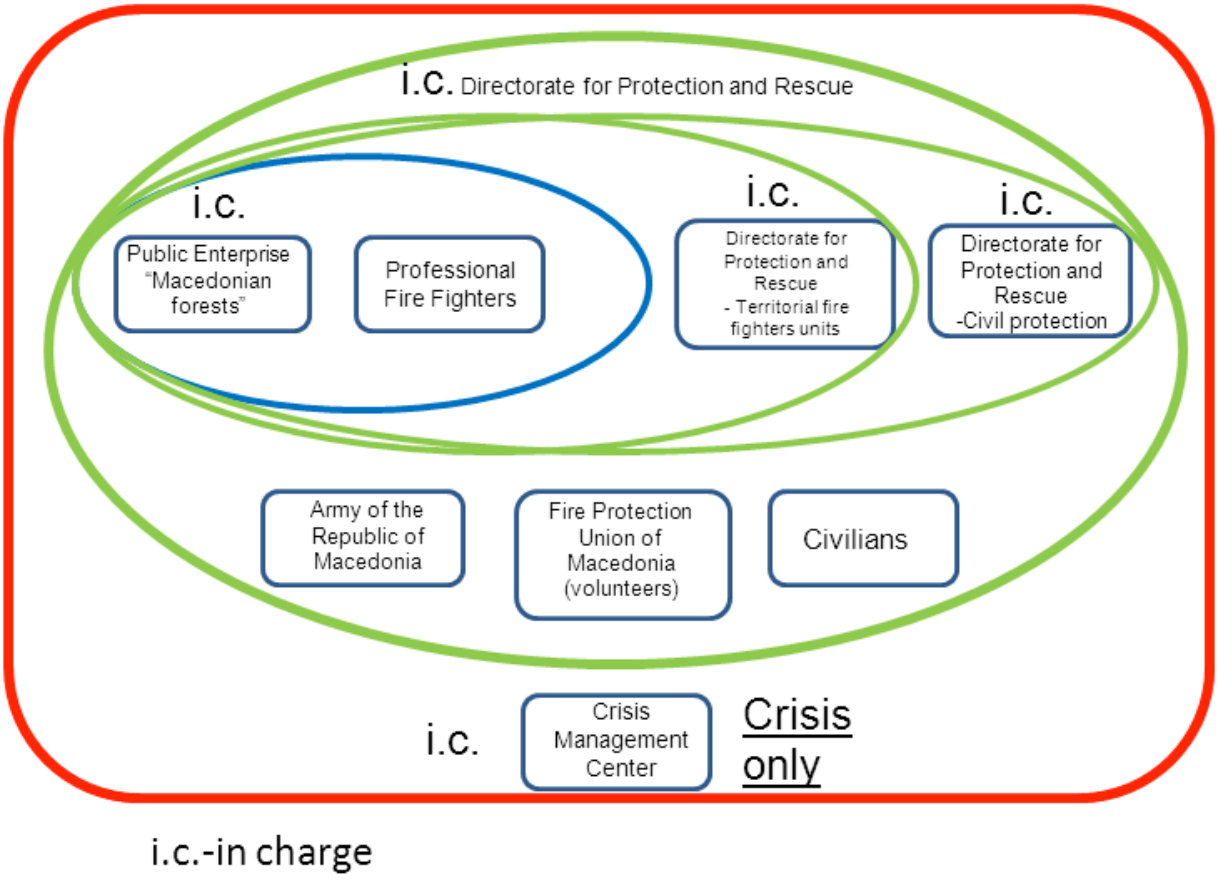


Source: Nikola Nikolov, *Organization of Forest Fire Protection in the Southeast European/Caucasus Region,* Seoul, 2013

Besides prevention and pre-suppression measures, one of the preconditions for effective fire suppression is a clearly defined chain of command and coordination. According to the Law on Forests, the company/entity that manages the forest is obliged to organise the initial fire suppression response. This is typically the public enterprise Macedonian Forests, through its regional subsidiaries. At this stage they are in charge of fire suppression actions. If a fire cannot be suppressed by the public enterprise, the local fire service can be called on for support, although the public enterprise is still in charge of fire suppression operations. If tackling the fire remains beyond their capabilities, the DPR will become involved and offer its resources. From that moment, the DPR is in charge of all operations, even if the FPU (volunteers) and the army

are involved. The CMC will only become responsible for coordinating firefighting if a "disaster situation" is officially proclaimed (i.e. if the fire becomes an emergency/crisis). This task includes the coordination of foreign assistance, for example targeting foreign aerial resources to the fire (Figure 18).

Figure 18. Command and coordination chain during forest fire suppression in the former Yugoslav Republic of Macedonia



Source: FAO/ TCP/MCD/3201

Montenegro – Based on the laws listed in Table 16, the main institutions competent in the field of forest fire protection are described below.

1. Ministry of Agriculture and Rural Development (MARD)

The MARD is responsible for the overall control of the forestry sector and plays a leading role in the process of forest resources management, the development of economic and other sectoral policies, and the implementation of these policies through the Directorate for Forestry, Hunting and Wood Processing Industry (DFHWPI).

The DFHWPI comprises three units:

1. Department for Forestry
2. Department for Hunting
3. Department for Monitoring in Forestry [FYRM 1]

The DFHWPI is responsible for approving the management plans prepared by private companies; monitoring and control in cooperation with the Forest Inspectorate; interfacing between donor projects, the ministry and forest stakeholders; overseeing the preparation of the national forest inventory; and performing environmental and social functions and services.

In relation to forest fire protection, the DFHWPI carries out the above activities and tasks mainly in accordance with Article 46 of the Law on Forests:

"It is prohibited to light fires in the open and to dispose of objects that may cause fire in forests and forest land, except in places intended for the respective purpose.

The competent administrative authority shall be obliged to ensure forest guarding services during periods of increased fire risks in forests and forest land.

In relation to forests and other forest land that are exposed to particular fire risk, special measures for prevention and preparations for fire extinguishing shall apply, in accordance with the law.

Forest owners and beneficiaries shall be obliged to act preventively, to suppress and participate in firefighting in their forests — that is, in forests they use."

2. Administration for Inspection Affairs (AIA)

Within the AIA, the Department for the Inspection of Forestry, Hunting and Plant Protection carries out tasks related to inspecting the implementation of laws and regulations governing the field of forestry, hunting and the protection of forest products; taking administrative and other measures in order to remove detected irregularities and ensure the proper application of the regulations; submitting applications for initiating criminal proceedings

and filing criminal charges; giving initiatives for amendments to laws, regulations and by-laws; proposing measures for improvements in the area of supervision; preparing analyses, reports and information within the scope of the department; cooperating with other organs of the government, institutions and businesses; and undertaking other activities within its jurisdiction. [MNE 10]

With respect to forest fires, and in addition to the Law on Forests, all the tasks carried out by the department are in line with the Law on Protection and Rescue, in particular Article 47:

"Companies, other legal entities and entrepreneurs shall, under the conditions and in a way prescribed by law, participate in the protection and rescue of people and goods and supply tools, transport, technical and other necessary resources for protection and rescue.

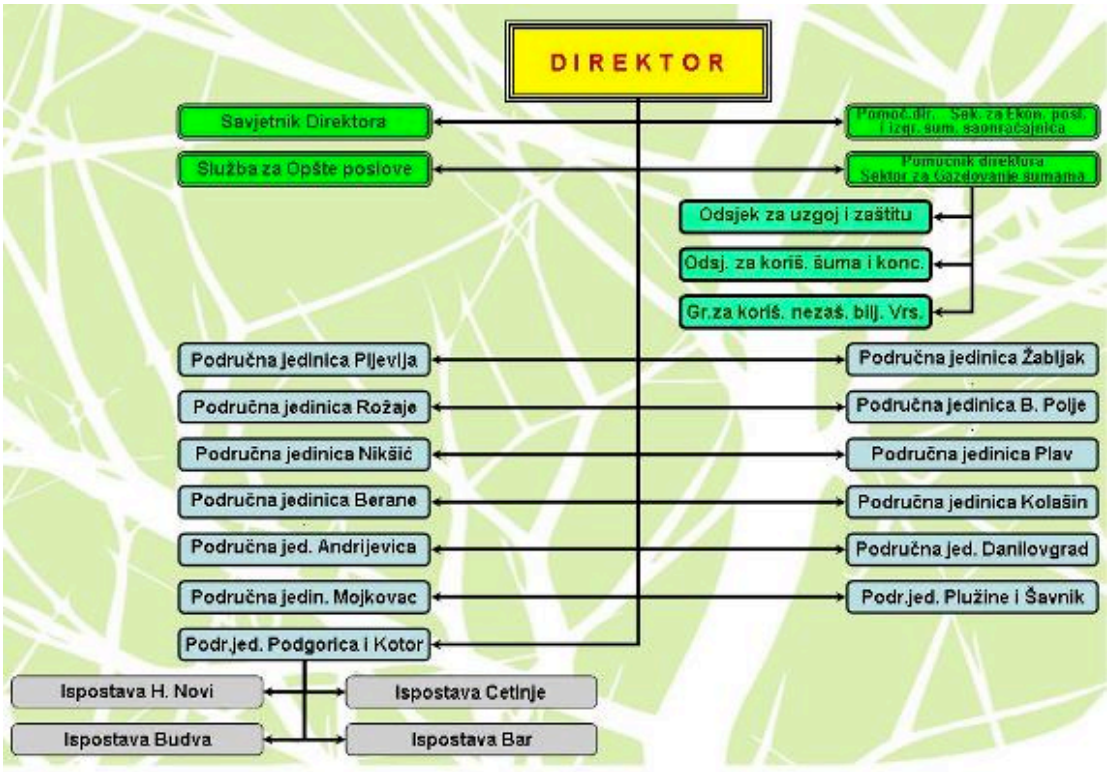
The persons referred to in paragraph 1 of this article are obliged to implement measures for protection and rescue in accordance with the law, protection and rescue plans and general acts."

3. Forest Administration (FA)

The FA is the state administrative authority responsible for the management of both private and state-owned forests. The FA has a wide range of responsibilities, including forest protection; reforestation and improvement activities; the selection of seed stands; the conservation of natural and artificial forest values; protection against fires; reporting and forest management planning; the development of forest road programmes; the provision of services for forest utilisation; and advisory services.

The FA, which has its headquarters in Pljevlja, is divided into 15 regional units. The carrying out of work in the forests and the processing of forest products are left to the private sector and the market. The FA is the largest forest-related institution with approximately 400 staff, 85 of whom have a university degree (67 forest engineers) and 206 of whom are forest wardens in charge of forest management units, although in general without adequate education. [MNE 1]

Figure 19. Organisational structure of the Forest Administration



Source [MNE 12]

Within the FA, around 210 personnel, spread among regional units, are engaged in forest protection. In periods of increased risk of forest fires, additional personnel are engaged (on a contractual basis) and are given the primary task of observing and reporting fires, as well as directly participating in firefighting.

All 15 regional management units are obliged to carry out measures for forest fire protection (prevention, pre-suppression and suppression), together with the concessionaire or the private owner. This is in accordance with the Law on Protection and Rescue, the National Plan for Protection and Rescue from Fires, municipal plans for protection and rescue from fires, and entrepreneurial plans for protection and rescue from fires.

Some of these measures are set out in the framework of various management plans:

- General 10-year plans for the districts
- 10-year management plans for the units
- Annual detailed executive plan
- Afforestation plan
- Annual fire prevention and control plan

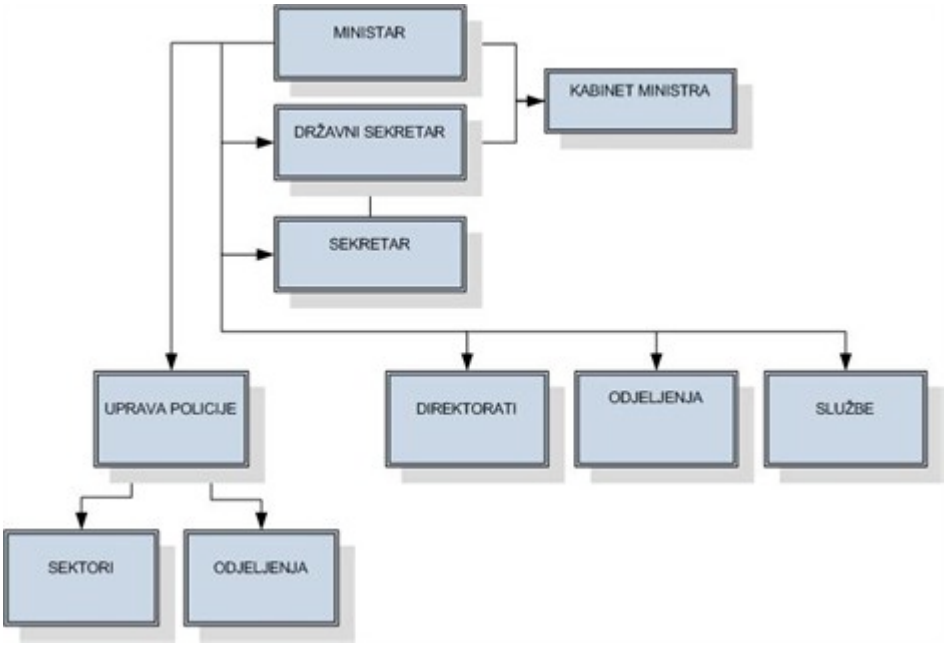
4. Ministry of Internal Affairs, Directorate for Emergency Situations

The organisation and activities of the Directorate for Emergency Situations are in accordance with the Law on Protection and Rescue (Official Gazette of Montenegro 13/2007), the National Strategy for Emergency Situations (2013) and the Law on Self-governance (Official Gazette of Montenegro 42/2003).

The directorate has a staff of 106 employees. There are units for emergency situations in all Montenegrin municipalities, with a total of 582 members. The firefighting service is organised at local level through municipal rescue and protection units. These units operate with a total of 194 fire trucks (mainly used for urban fires).

The directorate also includes the Unit for Aerial Firefighting. This unit operates four helicopters (Abell-412, Abell-212, Abell-206 and Gazelle); two Dromader aeroplanes; and two AT-802A Fire Boss firefighting aircraft.

Figure 20. Organisational structure of the Ministry of Internal Affairs



Source [MNE 11]

Inter-agency mechanisms include plans for protection and rescue from fires in Montenegro at national, local government/municipality and company level. All of these plans should be adjusted and harmonised with one another in accordance with the laws in force and the competencies of the institution/company.

Serbia – The main institutions competent in the field of forest fire protection in Serbia are described below.

1. Ministry of Agriculture and Environmental Protection (MAEP)

The MAEP (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.

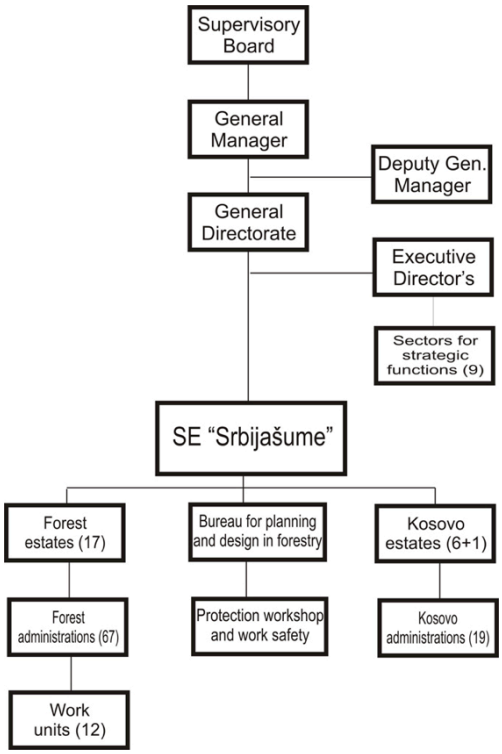
The public enterprise manages state forests and forest land on an area of 899,612.75 ha and performs professional activities in private forests on an area of 1,058,387.00 ha (data from December 2010). The public enterprise comprises nine sectors: for Forestry and Environmental Protection; for Forest Utilisation; for Commercial Affairs; for Finances and Accounting; for Development and International Cooperation; for Hunting, Fishing and Other Resources; for Legal Affairs; for Marketing and Public Relations; and 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 21. Organisational structure of the Srbijašume public enterprise, Serbia



Source: [SRB 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 the 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

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

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

5. Ministry of the Interior

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-related 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 that fall within the competency of the ministry are also performed by regional units — the regional police directorates of Belgrade, Kragujevac, Jagodina, Niš, Pirot, Prokuplje, Leskovac, Vranje, Zaječar, Bor, Smederevo, Požarevac, Valjevo, Šabac, Kraljevo, Kruševac, Čačak, Novi Pazar, Užice, Prijepolje, Novi Sad, Sombor, Subotica, Zrenjanin, Kikinda, Pančevo and Sremska Mitrovica, as well as a coordination directorate for Kosovo* and Metohija. There are four sectors within the ministry: for Analytics, Telecommunications and Information Technology; for Finance, Human Resources and Common Affairs; for Internal Affairs; and 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 risks, respond to 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. 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.

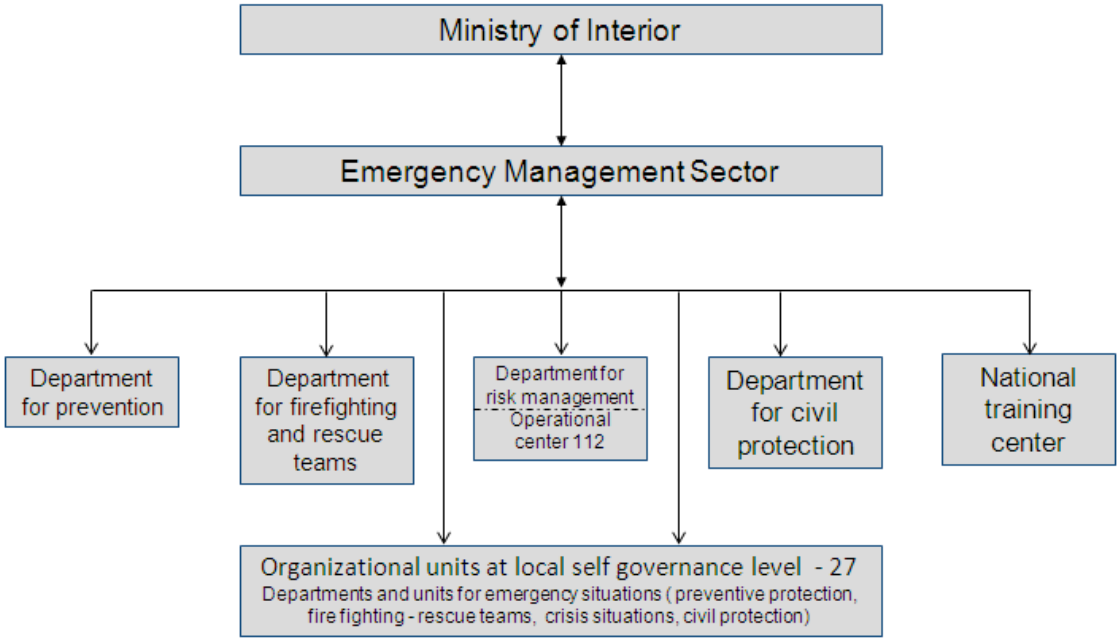
The headquarters of the sector comprises the Department for Prevention; the Department for Firefighting and Rescue Teams; the Department for Risk Management; the Department for Civil Protection; and the National Training Centre. At local level, the sector has 27 organisational units: four emergency situation 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 over their coordinated activities in the event of major emergencies. It has a direct influence over the work of the regional organisational units for firefighting and rescue operations. It comprises three units: the Unit for Technical Equipment for Firefighting 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 22. Organisational structure of the Serbian Ministry of the Interior



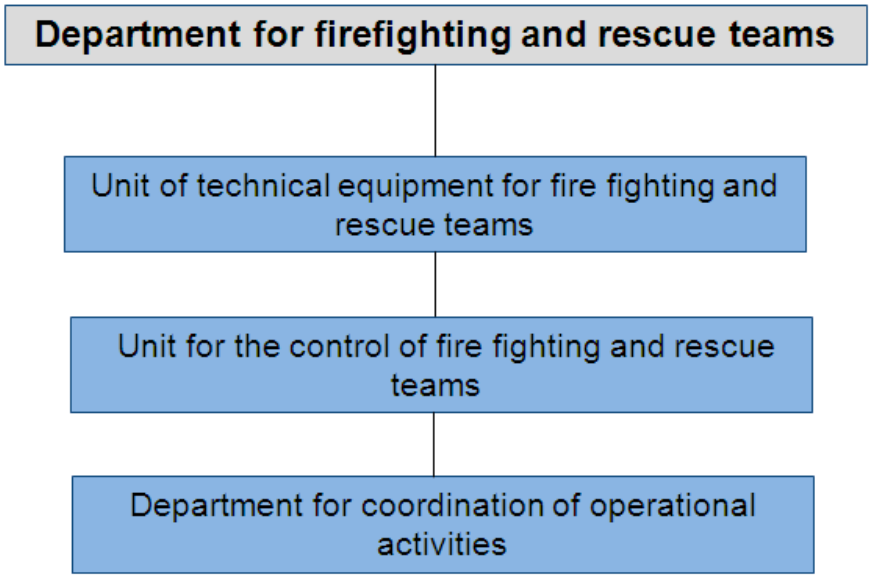
Source: [SRB 18]

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 23. Organisational structure of the Department for Firefighting and Rescue Teams, Serbia



Source: [SRB 15]

6. Firefighting Association of Serbia (FAS)

The FAS 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 the 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 for prevention, preparedness and suppression.

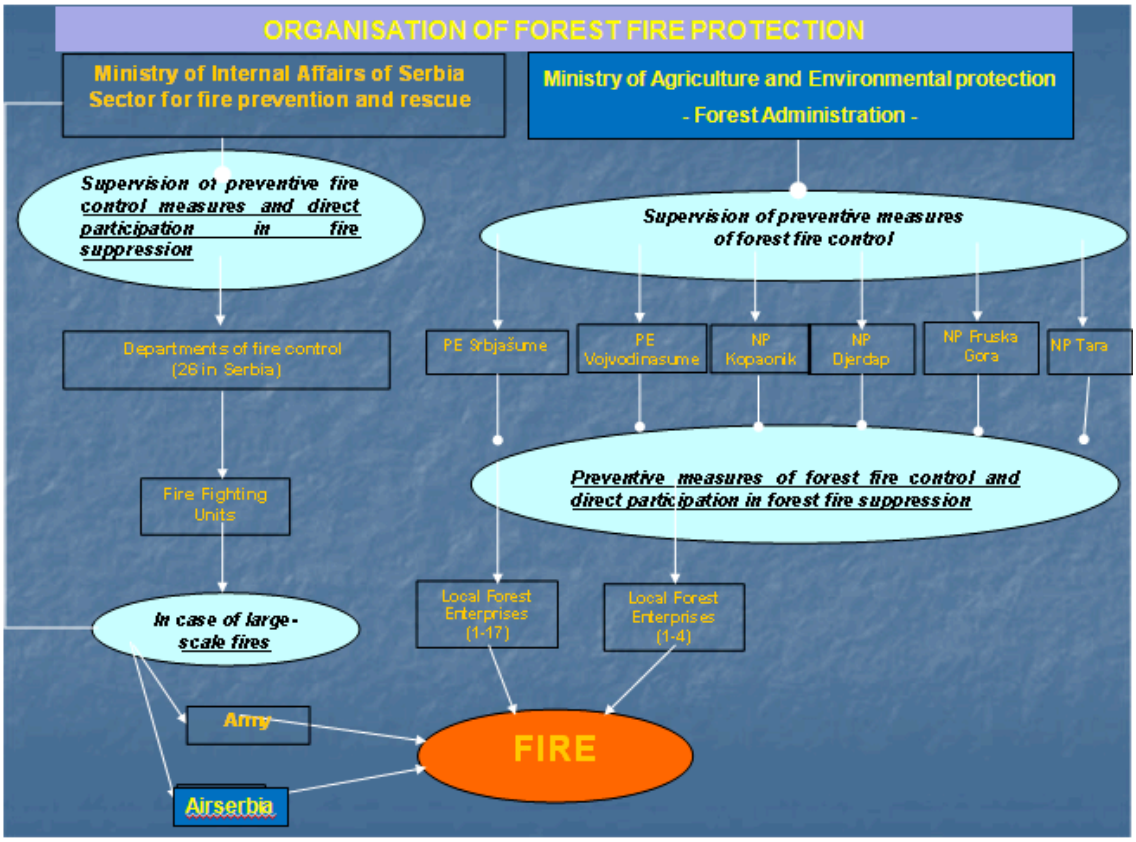
There are about 3,500 volunteer firefighters with firefighting equipment, most of them in eastern Serbia. Members of the volunteer brigades have rights, obligations and responsibilities under the Law on Fire Protection. The volunteer qualification standards are compatible with

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).

The organisation of forest fire protection in Serbia is shown in Figure 24.

Figure 24. Organisation of forest fire protection in Serbia



Source: [SRB 17]

One of the biggest issues in terms of forest fire protection, not only in the region but also worldwide, is the set-up of the forest fire protection system. This refers primarily to the number and quality of the laws that regulate the issue of forest fire protection. It also refers to the number of institutions and organisations involved in forest fire protection. Having only one law and one responsible institution would make the system more streamlined, but this is not the

reality. In general, in all countries in the region the main law that covers forest fire protection, in terms of prevention, pre-suppression and suppression, is the law on forests. However, this law is aimed at the forestry service in the country. This means that all regulations on forest management are directed exclusively to the forestry service (and not to other institutions involved in forest fire protection), and only some parts and articles of the law concern forest fire protection.

The second most important law is the law on fire protection, or the management of crisis situations, or similar. This law regulates the issue of fire protection in general (urban fires, fires in specific locations etc.), and forest fires as part of fire protection. The law is aimed mainly at professional firefighters and emergency services.

Alongside these two laws and institutions/services, there are many others related to forest fire protection, including the law on protected areas, the law on pasture, the law on hunting, the law on agriculture, various public enterprises, national parks, hunting societies, volunteers etc.

Bearing in mind the number of laws and the number of institutions involved in forest fire protection (as well as their competencies and experience), Kosovo*, the former Yugoslav Republic of Macedonia, Montenegro and Serbia have the most "simplified" national system for forest fire protection. The forest fire protection systems in Bosnia and Herzegovina and Albania are far more complicated. However, taking into consideration experiences during 2007 and 2012 in the region, the national systems even in these countries are not as efficient as they should be.

III Impact of forest fires on environment, economy and human health

In the last 20 years, and in some specific years in particular, forest fires have been the most destructive factor (both qualitatively and quantitatively) affecting forests and other vegetation in Europe as a whole, and especially the countries of the SEE region. There are different data for the (social, economic and environmental) damage and losses caused by forest fires in SEE, mainly because of the different approaches used to calculate or estimate the real costs of the damage caused by forest fires.

The costs and losses associated with forest fires are often considered exclusively in terms of suppression costs, with relatively little attention given to the related losses of timber and forage values; forest habitats and populations (including endangered species and their critically protected habitats); air and water quality; recreational opportunities; local economies; and other resources and amenities important to all citizens. Health impacts are not usually considered in terms of monetary losses at all, and tallies of domestic animal or wildlife fatalities are rarely attempted or even mentioned. Rarely is there any attempt to quantify the long-term

consequences of a damaged renewable resource base in terms of providing for the needs of an ever-growing human population.

Using available official and unofficial data, some impacts of forest fires on the environment, economy and human health in the SEE region are outlined below.

Albania – The negative impacts of fires are extensive in conifer forests but less so in coppice forests and shrub land. The main negative impacts are erosion in the burned area following the fire, the destruction of the regeneration cover, and the disturbance of the land structure and water regime. Another negative impact is the reduction in forest productivity. Forest ecosystems in Albania are very sensitive to fire. In the coastal forest protection belt alone, surface fires in pine forests have a role in maintenance and are used as a control measure to minimise the amount of flammable material available for potential wildfires. In sites affected by fires, especially in the natural pine forests in the north of the country in Puke, Kukesi and Mirdita districts, the vegetation cover following a fire differs greatly from the vegetation before the fire.

In the southern part of the country, fire has traditionally been used as a means for cleaning and regenerating pastures. At these sites, the use of fire over many centuries has made big changes to ecosystems. One of the main impacts is the establishment of annual grasses and the disappearance of perennial plants. [AL 9]

The JRC estimates the amount of biomass burned and the quantity of gas emissions from forest fires in Albania up to August 31, 2007, as follows (10^3 tonnes):

- Biomass burned – 1,161.30
- Carbon dioxide (CO_2) emissions – 2,052.60
- Carbon monoxide (CO) emissions – 82.60
- Methane (CH_4) emissions – 4.30
- Volatile organic compounds (VOCs) emissions – 4.30
- Nitric oxide (NO_x) emissions – 5.80

There have been no fatalities caused by forest fires in the last 10 years, although 15 volunteer firefighters were injured and five houses destroyed in the region of Shkodra.

Bosnia and Herzegovina – 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; and
- emissions of GHGs and other gases.

In Brčko District, in the period between 2000 and 2012, total damage caused by forest fires was estimated at around BAM 2,300,000 [EUR 1,173,000] [BiH 4].

Table 17. Forest fires in Brčko 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 [BiH 4]

According to some sources, the direct damage caused by forest fires in FBiH has been estimated at EUR 69,992 in 2004; EUR 734,995 in 2005; and EUR 883,120 in 2006. [BiH 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]. [BiH 10]

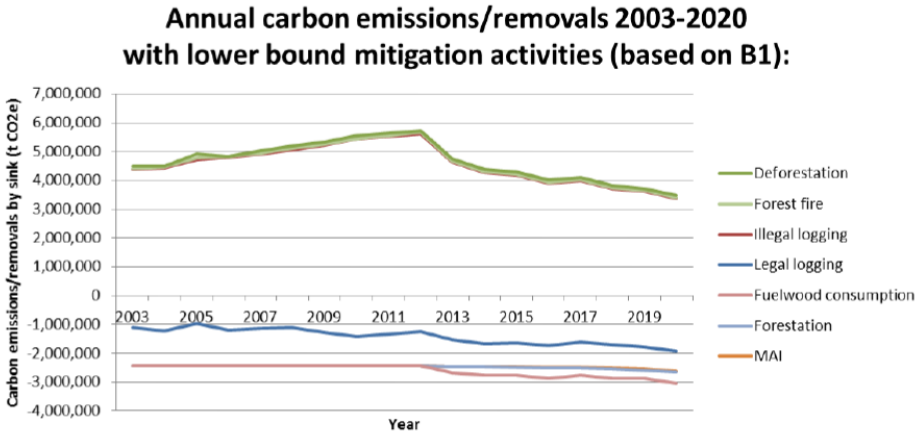
In the period between 2001 and 2007, around 291,951 m^3 of wood mass were burned in forest fires in BiH, with damage estimated at around BAM 38,174,000 [EUR 19,468,740]. [BiH 11]

Kosovo* – Economic losses as a result of direct and indirect damage to infrastructure and structures in urban and rural areas are significant, although no detailed data are available. The total timber mass burned in the period between 2003 and 2014 is estimated at 459,000 m^3. [KOS 8]

Human fatalities and injuries have been registered, although there are no available statistics.

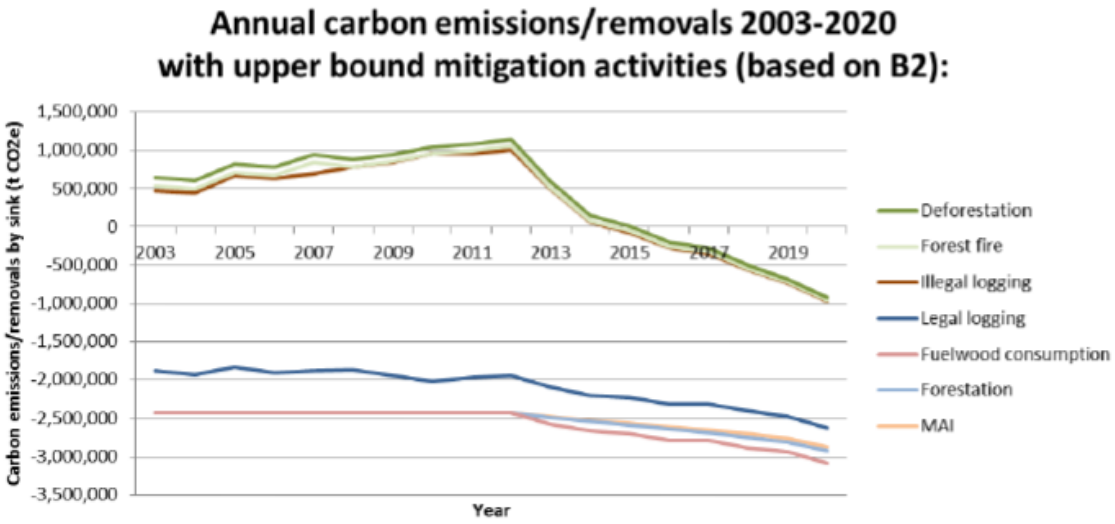
The impacts on the environment of emissions from burning vegetation are addressed only in the context of the Climate Change Framework Strategy (CCFS) for Kosovo* (issued by the MESP in 2014). There are data for annual carbon emissions in the period 2003 to 2020 (real and estimated) in two climate scenarios. Among other sources of carbon emissions, these scenarios also consider forest fires (Figures 25 and 26).

Figure 25. Estimated potential of a portfolio of mitigation activities across time (B1, lower bound)



Source [KOS 6]

Figure 26. Estimated potential of a portfolio of mitigation activities across time (B2, upper bound)



Source [KOS 6]

Former Yugoslav Republic of Macedonia – There are different data on the (social, economic and environmental) damage and losses caused by forest fires in the former Yugoslav Republic of Macedonia, mainly due to the different approaches used to calculate or estimate the damage caused by fires.

For this reason, a forest fire damage and consequence assessment methodology was developed by the Regional Fire Monitoring Center (RFMC) within the framework of the project "Technical Assistance for the Development of an Integrated System for the Prevention and Early Warning of Forest Fires", a joint project of the CMC and the Japan International Cooperation Agency (JICA). The methodology is undergoing checking, but following approval by all involved institutions it will be officially adopted. However, some aspects of forest fire damage (consequences for human and forest health, loss of biodiversity etc.) are still missing from the methodology.

The main environmental consequences of forest fires (not in priority order) are:

- forest degradation;
- deforestation;
- soil erosion;
- insect infestations and disease outbreaks;
- loss of biodiversity; and
- emissions of GHGs and other gases.

It is very difficult to prove that a particular instance of forest degradation has been caused exclusively by fire. Forest degradation is typically a long-term process caused by a variety of factors (in Macedonian forests by cutting, fires, insects etc.) and it mostly takes place in the country's oak forests (*Quercus* spp).

Deforestation, as a long-term process in the former Yugoslav Republic of Macedonia, is mainly caused by excessive cutting. Forest fires result in short-term deforestation (for a maximum of two years after the fire). After this short period, the native (generative or vegetative) regeneration of the forest begins, or the burned area is reforested (in accordance with the Law on Forests). Nevertheless, even this short period is sufficient for the appearance of the third consequence of forest fires — soil erosion.

The former Yugoslav Republic of Macedonia is a party to the United Nations Framework Convention on Climate Change (UNFCCC) and to the Kyoto Protocol. In 2014, the country therefore prepared its Third National Communication on Climate Change. A national GHG inventory was prepared within the framework of this document. As part of the analysis of land use, land-use change and forestry (LULUCF) for the period from 2003 to 2009, forest fires were identified as the most important factor contributing to high GHG emissions in the period between 2000 and 2007. [FYRM 20]

The JRC estimates the amount of biomass burned and the quantities of emissions from forest fires up until August 31, 2007, at the following levels (10^3 tonnes):

- biomass burned – 288.3
- carbon dioxide (CO_2) – 474.7
- carbon monoxide (CO) – 22.2
- methane (CH_4)– 1.1
- volatile organic compounds (VOCs) – 1.1
- nitrogen oxides (NOx) – 1.5

The Department of Forest and Wood Protection at the Faculty of Forestry in Skopje, serving as the National Centre for the Health Monitoring of Macedonian Forests, has detected a significant problem with bark beetles (*Ips* spp.) as a consequence of forest fires. After fires in pine forests, these bark beetles regularly attack the damaged and physiologically weak pine trees. After a while, infestation becomes very severe and the insects are able to attack even healthy trees. This species of insect is therefore the most important factor in the degradation of Macedonian forests (especially pine forests). It is very difficult to estimate the damage (whether economic or environmental) caused by such infestations, and their consequences, in relation to forest fires.

The total damage caused by fires (burned timber mass plus suppression fees) in the period between 2004 and 2013 has been estimated by the MAFWE at around EUR 5.1 million. Unfortunately, there is no assessment or calculation of the damage caused to the environment.

According to statistics from the DPR and the MAFWE on human fatalities and injuries, in 2012 four people died (two employees of the regional office of the public enterprise Macedonian Forests, one volunteer and one civilian), and 12 people were injured (seven children and five civilians) as a result of forest fires in the country.

In the last 10 years, only one comprehensive study on the consequences of forest fires in the former Yugoslav Republic of Macedonia has been undertaken (in 2007). Following the declaration of a state of emergency by the Macedonian Government on July 18, 2007, due to the severity of the forest fires, assistance was requested from the international community. As part of that assistance, the United Nations Development Programme (UNDP) and the Macedonian Government, represented by the CMC, agreed that the UN would carry out an assessment once the crisis had started to diminish. According to the agreement, the UN would examine the impact of the fires that had ravaged the country from three perspectives: environment, socioeconomics, and operations (disaster management). The task was completed in September 2007, and the final report, "Ecological Damage Assessment of Wildfires in the Former Yugoslav Republic of Macedonia in 2007", was published in October 2007.

Montenegro – The consequences of forest fires depend on the type of fire, the type of forest, the time and duration of the fire, the size of the burned area and the state of the forest ecosystems. In addition to damage in the form of timber loss, a fire may damage or completely destroy the ecological, social and economic functions of a forest. Such damage is associated with soil erosion, which eventually leads to desolate landscapes where the vegetation is not able to recover.

Even where forest fires do not cause significant direct damage to property, they have an indirect influence on the economy in general (reduced revenues in the timber industry as well as in the forestry, agriculture and tourism sectors). The tourism sector is very vulnerable, especially during the summer season. In case of severe fire seasons in Montenegro, forest fires may lead to significant economic losses, as many tourists leave or decide not to visit the country. Unfortunately, there are no official data regarding such trends.

According to the data for burned areas of forest and forest land from 2006 to 2010 [MNE3], most of the damaged forests are in the karst region (6.8 percent), and the percentage of fire-affected forest land is also highest in the karst region (14.7 percent) and eastern region (11.7 percent).

The total damage incurred during the 2003–2012 period has been estimated at over EUR 6 million. There were no recorded cases of injury or death.

Serbia – There are no data on hospital admissions and premature deaths related to 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 (the 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].

Conclusions

As mentioned at the beginning of this section, most of the data from the region are related to the size of the burned area, the volume of burned wood mass, the number of people injured, the number of fatalities, suppression expenses, and expenses for the clean-up of the burned areas. There are very few, or only partial, data regarding the negative consequences of fires in terms of forest degradation; deforestation; soil erosion; insect infestations and disease outbreaks; biodiversity loss; emissions of GHGs and other gases; and impacts on human health. This is largely due to the lack of a standard methodology for the assessment of such impacts, damage and expenses. A methodology that incorporates some of these parameters does exist in the former Yugoslav Republic of Macedonia in the framework of the MKFFIS early warning system that was developed under the CMC/JICA project “Technical Assistance for the Development of an Integrated System for the Prevention and Early Warning of Forest Fires”. However, the methodology is still undergoing checks and has not yet been officially adopted.

IV Special issues

Albania

Unexploded ordnance

Several areas of the country are still contaminated with unexploded ordnance (UXO) from the Second World War, although there are no official maps showing its distribution. This represents a potential danger in the case of fires in these areas. There are also landmines along the border area with Kosovo* that injure at least three to five people each year during firefighting.

Transboundary fires and international cooperation

In the past 10 years, transboundary fires in Albania have affected Greece, Kosovo*, the former Yugoslav Republic of Macedonia and Montenegro. Legal agreements on fire suppression have been signed with Italy, Kosovo* and Turkey, and international assistance for the suppression of forest fires has been given by Italy, Germany and Ukraine (during the 2007 and 2012 fire seasons).

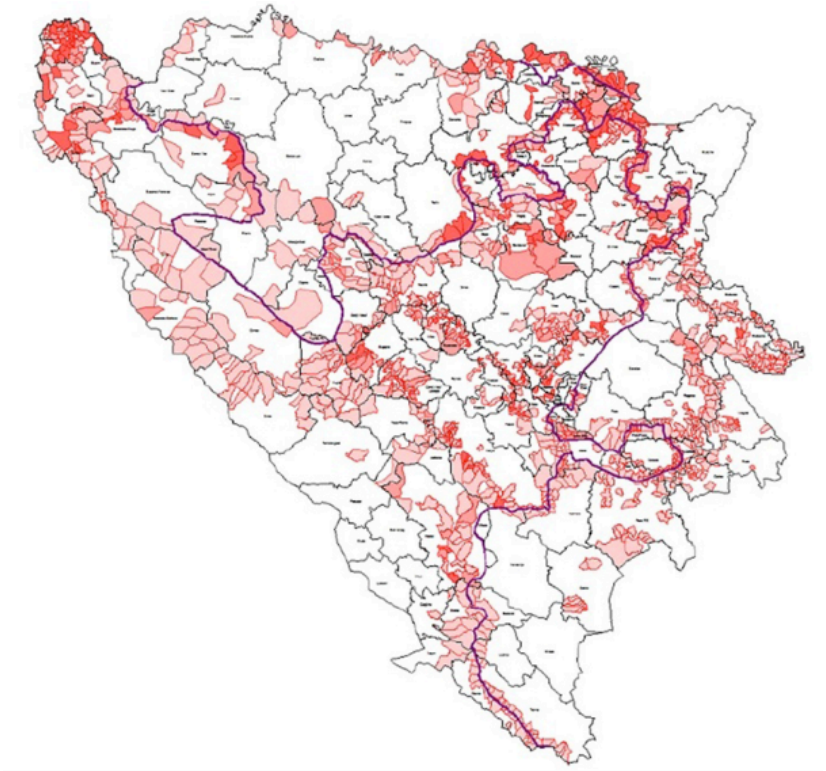
Bosnia and Herzegovina

Landmine contamination

One of the main problems in Bosnia and Herzegovina is the presence of landmines. The area currently contaminated by landmines is estimated at around 1,176.5 km^2, or 2.3 percent of the country's territory, of which 129,774.6 ha (10.5 percent) are forests or forest land. [BiH 12]

This represents a particular problem in terms of 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 9. Distribution of landmines in Bosnia and Herzegovina



Source [BiH 2]

Transboundary fires and international cooperation

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

Personnel from Bosnia and Herzegovina regularly 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 the Western Balkans, held in Antalya, Turkey, on October 15–17, 2014.

Kosovo*

Landmine contamination

As a consequence of events that took place on the territory of Kosovo* in 1998, landmines continue to present a risk. The UN managed a large mine clearance programme in Kosovo* between 1999 and 2001, which resulted in a declaration by the UN in 2001 that Kosovo* was free of mines. Since then, thousands of mines and cluster munitions have been cleared by the limited capacity of all the agencies remaining in Kosovo*. A comprehensive joint survey carried out in 2013 by the HALO Trust (the oldest and largest humanitarian landmine clearance organisation in the world) and the Kosovo Mine Action Centre (KMAC) identified 130 minefields and cluster munition strikes remaining in Kosovo*. Minefields still exist in rural areas where impoverished communities rely on agriculture and woodcutting for their income.[KOS 16] This could be a significant problem during forest fire suppression activities, as well as during forest management activities.

Transboundary fires and international cooperation

There are no data available about transboundary/cross-border fires, or about bilateral or regional agreements.

There is no official national programme or training centre for specialised training in forest fire protection, although various international projects have improved forest fire protection capacities. The first such project was for the establishment and training of a nucleus for forest fire protection in Pec/Peje. This joint project of the Italian State Forestry Service (Corpo Forestale dello Stato) and the MIA was implemented in 2004 and resulted in the training of 250 people in forest fire protection.

The second project was the participation of three people at a training organised in the framework of the Macedonian/FAO project “Strengthening National Forest Fire Preparedness in the Former Yugoslav Republic of Macedonia (TCP/MCD/3201)”, held on November 14 to 17, 2011, in Skopje.

The third project was the participation of three people at the Regional Fire Management Training for South Caucasus and the Western Balkans, held in Antalya, Turkey, on October 15 to 17, 2014.

Former Yugoslav Republic of Macedonia

Unexploded ordnance

Many forest sites and non-forest lands in the SEE region are contaminated by land mines and UXO remaining from recent conflicts. In the former Yugoslav Republic of Macedonia, there is a risk of UXO from the First World War being triggered and exploded by forest fires. The most contaminated area in the country is the 1917 front between Strumica and Bitola (i.e. between the Central Powers in the north and the Allied Powers in the south), where large numbers of grenades and mines pose a threat to firefighters and civilians. During the fires in July 2007, for example, more than 70 ammunition explosions were recorded in the immediate vicinity of Bitola, although fortunately there were no casualties. [FYRM 4]

Map 10. Distribution of UXO in the former Yugoslav Republic of Macedonia



Source: Nikola Nikolov, Wildfires management and UXO, land mines and radioactivity in the region of Southeast Europe/Caucasus*, Kiev, 2009*

Transboundary fires and international cooperation

The behaviour of forest fires is typically not predictable. Even where the course of the fire is predictable, it may not be possible to control or suppress large fires or fires on inaccessible terrain. For this reason, forest fires that break out in border regions may affect

neighbouring countries. This has happened along the Macedonian border, although such instances are rare. In September 2012, for example, a fire that originated on the Albanian side of the border spread to the Mavrovo National Park, and was tackled by Macedonian firefighters. More than 100 ha of grass and stubble near the forest were burned. In June 2012, a fire that started on the Greek side of the border spread to Kajmakchalan, a highly dangerous area contaminated with UXO from the First World War. Two firefighting planes tackled the blaze. In July 2012, near the Bulgarian border, 20 ha of grass, shrubs and low-quality oak forests were burned, and Bulgarian police assisted in suppressing the fire. No cases have been identified of fires spreading from Macedonian territory into neighbouring countries. In order to regulate such issues and to ensure efficiency in terms of forest fire protection (especially forest fire suppression), the former Yugoslav Republic of Macedonia has signed agreements, or is currently negotiating, with Bulgaria (negotiations), Croatia (agreement signed), Montenegro (negotiations), Serbia (memorandum of understanding), Slovenia (agreement signed), Bosnia and Herzegovina (cooperation agreement signed), Turkey (cooperation agreement signed), France and Hungary (bilateral collaboration). There are occasional exchanges of fire management personnel between the former Yugoslav Republic of Macedonia and neighbouring countries. [FYRM 33]

Besides bilateral and multilateral agreements, the country also has opportunities to offer and receive assistance via the EU Civil Protection Mechanism and its operational heart, the Emergency Response Coordination Centre (ERCC) (previously the Monitoring and Information Centre). The EU Civil Protection Mechanism was established in 2001 to foster cooperation among national civil protection authorities across Europe. The mechanism currently includes all 28 EU member states as well as Iceland, the former Yugoslav Republic of Macedonia, Montenegro, Norway and Serbia. It enables coordinated assistance from the participating states to victims of natural and human-made disasters in Europe and elsewhere.

Rural depopulation and land-use change

Rural depopulation and land-use change have a significant impact on forest fires, not only in the former Yugoslav Republic of Macedonia, but throughout the SEE region and Europe as a whole. In the former Yugoslav Republic of Macedonia, rural depopulation is more significant than land-use change. According to the national land cadastre, there is no significant land-use change in the country.

Rural depopulation has an influence on forest fires in three main ways:

- As a result of migration away from rural regions, large areas of agricultural land (arable land, pastures etc.) have been abandoned during the last 50 years. The lack of grazing and harvesting has resulted in the uncontrolled growth of vegetation, which has led to the build-up of huge amounts of “fuel”. This has increased the risk

of fire outbreaks during the forest fire season in these areas. This build-up of fuel also means that the fires are very severe and difficult to control.

- Some of the abandoned areas are now young forests, although according to the official cadastre they are still agricultural lands. This means that they fall outside forest management plans and are subject to almost no forest fire protection measures. There is a kind of "vacuum" in terms of competency over these areas in relation to forest fire protection.
- Since it is largely young people who are leaving the rural regions, the dramatically declining populations in these areas comprise mainly elderly people. This creates a problem in terms of the early detection of forest fires also affects the organisation of a prompt initial response by members of the local population.

There are no official data regarding the extent of abandoned agricultural lands, although unofficial estimates suggest around 60,000 ha. According to Law on Fire Protection, the territorial firefighting units, landowners, and the DPR are responsible for fire management on these lands.

Montenegro

Cross-border forest fires

Fires have been recorded as having spread into Montenegro from Bosnia and Herzegovina and from Albania.

Rural depopulation and land-use change

Population migration from villages to towns results in the build-up of “fuel” for forest fires on abandoned arable land, and to a shortage of people capable of participating in fire prevention and suppression.

Bilateral agreements

The Government of Montenegro has concluded bilateral agreements in the field of protection from natural and human-made disasters with the governments of Croatia, Greece, the former Yugoslav Republic of Macedonia, Slovenia, Serbia, Slovakia and Ukraine. Memorandums of understanding in the field of prevention and emergency situations have been signed with the Russian Federation, Italy and Armenia. There are also initiatives for agreements with Turkey, France, Bulgaria, Albania and Azerbaijan.

With respect to exchanges of fire management personnel with other countries, three requests for assistance from Albania were received during the fire season in 2012, and just one of them was realised. Assistance was provided by the Russian Federation in the 2007 and 2008

seasons, by Italy in 2009 (via the EU Mechanism), by Serbia in 2010, and by Croatia in 2012 (via the EU Mechanism).

Serbia

Radioactive contamination and unexploded ordnance

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 Kuršumlija. There are still areas contaminated with UXO, although no data are available. There are large areas of UXO 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).

- Gas emissions from forest fires in these areas will also be radioactive. If transported further by the wind, these contaminants may be deposited over long distances and in urban areas.

Terrain contaminated with UXO presents a danger to 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.

Transboundary fires and international agreements

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 the 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 personnel specially trained and equipped to fight wildfires. The National Training Centre for Emergency Management is responsible for their training. Serbia has participated in joint fire management trainings 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 being negotiated with Bulgaria, Croatia, the former Yugoslav Republic of Macedonia, Greece and Romania. Women participate actively in the professional rescue services.

Rural depopulation

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 there are fewer capable rural farmers and volunteers available.

The individual analyses above indicate the presence of various special issues in the region in terms of forest fires:

- unexploded ordnance and landmine contamination;
- transboundary fires and international cooperation; and
- rural depopulation.

Unexploded ordnance and landmine contamination

Unexploded ordnance in the region has two origins: UXO and landmines remaining from the conflicts in the 1990s (Bosnia and Herzegovina, Croatia and Kosovo*); and UXO remaining from the First World War (the former Yugoslav Republic of Macedonia). The situation is complicated by the fact that there are no adequate maps available showing the location of UXO and landmines in the region (with some exceptions), and there is no methodology for fire management in these terrains. In forests contaminated by UXO and landmines, this means the absence of any forest management methodology for fire risk reduction and fire suppression tactics.

Transboundary fires and international cooperation

Like other disasters, forest fires do not respect administrative borders. Permanent communication and coordination are therefore essential between the countries of the region in such situations. Firstly, there is a need for joint reporting from the affected area, followed by the organisation of joint fire suppression activities. This may involve firefighters crossing the national borders and pooling their capacities. In order to regulate this issue and ensure that activities are carried out appropriately and safely, certain documents and protocols are required. Almost all

countries in the region have signed bilateral agreements for collaboration on forest fire protection, including agreements with countries outside the region. These agreements cover not only the offering and receipt of assistance during forest fire suppression, but also the joint training of firefighters and other kinds of collaboration.

Rural depopulation

Rural depopulation, as a problem in terms of forest fire protection, has been explained above in the case of the former Yugoslav Republic of Macedonia. The process is ongoing in the region and must be taken very seriously.

V Recommendations for improvements in forest fire management

Based on the foregoing analysis, it is clear that forest fires have been one of the most detrimental factors in terms of forest, forestry and the environment in the SEE region in the past two decades. This is due, among other things, to extremely dry and hot periods (especially during the summer months), weak institutional capacities, poor legal regulations, and a low level of public awareness. The main weaknesses identified in terms of forest fire protection, and the required improvements, are outlined below.

Albania – A large number of institutions and organisations, both public and private, are involved in forest fire protection in Albania. In some cases, this is the main reason for the high number of fires and the large burned areas in some fire seasons. Problems arise when such a large number of authorised institutions and organisations are acting at different levels. In accordance with the legal regulations in force, all these institutions are obliged to carry out certain preventive, pre-suppression and suppression measures. In order to be efficient and effective, these measures must be coordinated and harmonised, and this is particularly important in the case of certain pre-suppression measures (early detection, the training of firefighters, the drafting of operational plans etc.) and during fire suppression. However, this is not what happens in reality, thus the existing regulations need to be reviewed and adjusted. Competencies must be made clear, with no overlapping, and procedures must be precisely established.

There are no qualification standards for personnel involved in firefighting. The Forestry Service provides training for staff involved in forest fire suppression. This training covers basic knowledge and firefighting techniques, but there is no professional training. Several study tours have been organised to Italy and Turkey, but these have been ad hoc and not part of an official training programme, nor are there any official training materials for forest fire protection.

The number of volunteer firefighters (seasonally) is between 2,500 and 3,000. These volunteers are integrated into firefighting operations and trained by the Forestry Service and the Fire and Rescue Training Centre. There are no legal insurance mechanisms and the volunteers are equipped only with hand tools. In addition, several programmes supported by forestry projects have been developed in the past 10 years to involve the local community in fire management. However, the involvement of the local community in forest fire protection (usually only in fire suppression) is only a partial and temporary solution. The organisation of fire protection associations and unions of volunteers (at national and local level), following the experiences of neighbouring countries (Serbia, the former Yugoslav Republic of Macedonia and Croatia), will engage the local community efficiently and permanently. Citizens of all ages can

be involved in forest fire protection, depending on whether the measures are aimed at prevention, pre-suppression or suppression, and this involvement would be permanent throughout the year.

Albania is a hilly/mountainous country with very steep terrain and a fragmented topography. These conditions favour the very rapid spread of forest fires. At the same time, access to such areas for fire suppression is very difficult. This is often one of the reasons for inefficient fire suppression and large burned areas. In order to improve the situation, the network of forest roads should be expanded (in accordance with the needs of the Forestry Service and the community).

There is a lack of professionally trained firefighters (in both the Forestry Service and the emergency services). There is also a lack of equipment, especially off-road vehicles. In this respect, it would be appropriate for the equipment to be provided first of all, and for trainings to be organised subsequently for firefighters on using the new equipment. This is particularly important in the case of specialised vehicles.

Bosnia and Herzegovina – As outlined above, the unique political structure of Bosnia and Herzegovina 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 competencies, there are also a large number of legal acts (laws, by-laws, rulebooks etc.). This goes some way to explaining why the system of forest fire protection in Bosnia and Herzegovina 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 most important legal acts among entities and institutions should be harmonised. This is one of the most important preconditions for the better functioning of the forest fire protection system in Bosnia and Herzegovina.

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

The country also faces the problem of ensuring the existence of well-trained firefighters and appropriate vehicles for forest fire suppression. There is a need for training centres at entity level, offering 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 appropriate vehicles, and, more importantly, will lead to an efficient, harmonised and functional forest fire protection system.

According to past experience and the 2014 study *Forest Fire Suppression in Bosnia and Herzegovina* [BiH 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 two urgent approaches related to "solving" 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 vital not only for the local population and institutions competent for forest fire protection, but also in terms of the equipment (mainly aeroplanes) received as international assistance. The second is to identify the most appropriate way to manage these areas in order to reduce the risk of forest fires, and to select the most appropriate means of fire suppression. The final de-mining of these territories is, of course, essential.

Kosovo* – The existing laws and legal acts that regulate forest fire protection need to be harmonised. The issue of forest fires is currently regulated by a variety of laws implemented by different institutions, thus there are some overlapping competencies, uncertainties in procedures, and a lack of tools for coordinating activities between institutions.

There are no specialised, well-trained forest firefighters, and no educational institutes for training decision makers, planners, command staff or firefighters. In order to improve this situation, a special programme should be created for training existing firefighters and new personnel. This is equally important for the KFA and the EMA and is also related to the findings regarding the current legal regulations.

There is also a lack of special vehicles for forest fire suppression: there are no first-response vehicles in the forestry sector and no off-road fire trucks in the framework of the EMA.

There is no voluntary fire protection organisation in Kosovo*. One of the ways in which members of the local population can be actively involved in protection against fires (including forest fire protection) is through the establishment of voluntary organisations. Through the activities of such organisations, people of all ages can be engaged in forest fire protection (i.e. in prevention, pre-suppression and suppression). This is one of the best ways to raise public awareness, increase the preparedness of local communities for forest fire suppression, and address the problem of the lack of personnel in the relevant institutions.

One of the preconditions for defining the level of preparedness of the institutions responsible for forest fire protection during the fire season is the existence of an appropriate early warning system. Such a system in Kosovo* would allow the institutions responsible for forest fire protection to be more efficient and better organised.

Former Yugoslav Republic of Macedonia – Legal regulations with respect to forest fire protection in the former Yugoslav Republic of Macedonia are at a satisfactory level. However, there is still a need for a law or other legal document that harmonises the activities of the different institutions and organisations. One possibility would be to adopt a national plan for forest fire management. A document of this kind is being drafted in the framework of the FAO/TCP/MCD/3201 project "Strengthening National Forest Fire Preparedness". The role, purpose and tasks of the plan are outlined as follows:

> "The National Fire Plan (NFP) is being created to ensure the safe, effective, and coordinated management of wildland fires. All entities covered by this plan agree to follow the procedures, protocols, and requirements included in the NFP as well as those adopted by the actions of the Steering Committee under the authorities included in this plan.
>
> The NFP Steering Committee will be established with representatives from each of the departments and agencies covered by this plan. The individuals appointed to the Steering Committee will hold positions within the agencies, and have the authority to propose, negotiate, and approve all measures authorised in the NFP. The individual members will also take appropriate actions within their agencies to ensure that policies, procedures, and actions are understood and that the agencies initiate whatever process is required to comply with the requirements of the NFP.
>
> The Steering Committee will appoint working groups to develop guidelines and protocols. The working groups will be staffed with qualified members of the appropriate agencies and organisations, including representatives from other groups not included on the Steering Committee if needed, to provide expertise and guidance. The working groups will develop plans, products (such as training materials) and guidelines. Final products will be submitted to the Steering Committee for adoption under the authority of the NFP."

Another aspect that needs to be improved is the organisation of forest fire prevention campaigns (e.g. public awareness raising and educational campaigns). According to certain laws, the entities that manage forests and forest lands are obliged to undertake all measures for forest fire protection, including preventative measures. The related campaigns are organised separately by the managing entities, in an uncoordinated and non-harmonised manner, conveying different messages and with some overlapping. In this context, particular attention should be given to the following pre-suppression measures: the provision of specialised (properly trained) forest firefighters; the procurement of special vehicles and tools for forest fire suppression; the enhancement of the quality of planning documents; and the strengthening of research capacities.

The existence of specialised (properly trained) forest firefighters is one of the preconditions for effective and efficient forest fire suppression. Currently, the country has no specialised or well-trained forest firefighters, nor does it have an educational institute dedicated to the training of such personnel. In order to solve this problem, a special programme should be created for

training already active firefighters and new personnel. It would be aimed primarily towards the forestry sector (the Macedonian Forests public enterprise, national parks etc), the DPR and TFPUs. Relevant trainings have been organised within certain projects in recent years, for example the TCP/FAO project in 2012 and 2013 (trainings for trainers); and the OSCE/ENVSEC project "Enhancing National Capacity in Fire Management and Wildfire Disaster Risk Reduction in the South Caucasus" (Antalya, Turkey) in 2010 and 2014. However, these were one-off activities.

The issue of training is closely connected with the need for proper equipment, tools and vehicles for forest firefighters. As well as being appropriately trained, firefighting personnel must be adequately equipped. At the moment there is a lack of equipment (mainly personal protective equipment), hand tools and special vehicles. The existing vehicles (off-road vehicles for initial response and special fire trucks) are very old and in poor condition. The number of hand tools is limited and the tools are not appropriate for the specific terrain and vegetation conditions.

Almost all measures for fire prevention and pre-suppression have to be prescribed and described in the framework of planning documents. In the forestry sector, these documents are the 10-year management plans and annual operating plans, while in the case of the DPR they comprise strategic and annual operating plans. The quality of the existing plans does not correspond to the current situation and needs.

Besides these prevention and pre-suppression measures, there are two other specific issues that should be addressed. One such issue is research in the field of forest fire protection. The only relevant national institute is the Faculty of Forestry in Skopje (Department of Forest and Wood Protection), and research is also carried out by the RFMC as a regional branch of the Global Fire Monitoring Center (GFMC). Many projects have been implemented to date, although there is no permanent research programme. Due to the increasing problem of forest fires in the former Yugoslav Republic of Macedonia and the technologically and scientifically advanced methods currently being used in forest fire protection, there is a clear need for a better national research programme.

The second issue concerns UXO. There is no precise map showing the distribution of UXO in forests and forest lands, which creates problems during forest fire suppression activities in these areas. A management approach, along with tactics/procedures for forest fires suppression in these areas, have not yet been defined, which remains a challenge.

Montenegro – There are various ways in which forest fire protection management in Montenegro should be improved.

A law on fire protection should be adopted, as there is no such law at present. Some issues related to forest fire management are regulated in existing laws (e.g. the Law on Forests and the Law on Protection and Rescue), but this is not sufficient. There are no regulations on

special equipment for forest fire suppression, personal protective equipment, volunteers etc. The new law on fire protection should regulate the formation, organisation and activities of firefighting units, fire protection associations and volunteers, as well as fire suppression and the conditions for producing, using and maintaining appliances, equipment and means for fire suppression.

The lack of such a law causes problems for various institutions (the Forest Administration, the DPR, local self-government units etc.) in regulating forest fires and harmonising joint activities.

The training of firefighting personnel is an issue of the utmost importance. In Montenegro there are 582 local rescuers (who also serve as forest firefighters), but only 117 of them have completed a specialised course on wildfires in the framework of projects and international training programmes. According to the Law on Protection and Rescue, all rescuers are obliged to complete basic training, but because of problems with the establishment of the National Training Centre, most rescuers have not completed such training. Some fire management training has been organised in neighbouring countries, thus Montenegro might make use of identical training materials and approaches.

There are no trained forest firefighters in the forestry sector (in either state-owned or private forests).

There are only three units of volunteer firefighters, with a total of 84 rescuers. These volunteers are mainly engaged in forest fire suppression activities during the summer fire season by the DPR. However, as has already been mentioned, their activities are not properly regulated and there is no national organisation of fire protection volunteers.

Improvements to the Law on Forests and the preparation of other legal acts can also be considered necessary. Although current legal acts contain some articles related to forest fires, the current Law on Forests must be improved, especially in relation to forest management. These improvements should be accompanied by the drafting of further legal acts, such as rulebooks.

There is also a need for a rulebook on the preparation of an annual forest fire operational plan, as well as a rulebook on special measures for forest fire protection (both intended for the forestry sector).

Serbia – 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 natural disaster risk map for the country. Since 2008, the State Hydrometeorological Service of Serbia (RHMS) has forecast the risk of forest fires 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 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 above, Serbia has specially trained and equipped personnel for tackling wildfires, and the National Training Centre for Emergency Management is responsible for their training. However, bearing in mind that the forestry sector (public enterprises, national parks etc.) is responsible for forest fire protection, including fire suppression, there remains a shortage of trained personnel. The forestry sector is obliged to organise initial response and to participate in fire suppression, therefore more trained personnel are required for forest fire suppression.

Revision and improvement of forest fire protection plans

Although forest fire protection plans exist, some are not of appropriate quality, and their content is more formal than operational. Such plans need to be more accurate in terms of prescribed measures and duties in accordance with the competencies of the institutions. All plans must be harmonised in terms of content, quality and prescribed measures and activities.

Regional forest fire management issues

Although all fields/topics/issues related to forest fire management that require improvement or strengthening are explained above for each individual country, some are summarised below at regional level.

Institutional and sectoral responsibilities in forest fire management

The nature of wildfires dictates that their direct management — from prevention to preparedness to suppression — must be undertaken at a very local level. Land must be managed for prevention by the Forestry Service, individual foresters and farmers; and firefighters must be ready to respond quickly to nearby fires. However, this local organisation must be part of a broader, landscape-scale strategy to reduce the damaging potential of fires on the environment. This must be expressed in the land management and emergency response policies under which various agencies and sectors have obligations to manage aspects of wildfires.

A common theme running through the legislation and institutional set-up of the individual countries is that the relevant agencies and sectors undertake wildfire management activities to some extent in isolation from one another. Preventive action, in particular, is not connected to responsibility for suppression. The highest level of inter-sectoral coordination exists in relation to suppression activities, but it is still insufficient. The existing laws and institutional set-up need to be revised and improved in all the analysed countries.

Abandoned agricultural land and pastures

In contrast to trends elsewhere in the world, where primary forest is being cleared to make way for agricultural land and developments, the area of agricultural land in many parts of the SEE region is decreasing as fields are abandoned. This trend is associated with the ageing of rural communities and the migration of young people away from villages in the hope of better opportunities and lifestyles in urban areas or abroad. This is true of all the analysed countries with the exception of Kosovo*.

In terms of wildfires, this results in a greater threat to the remaining rural populations, settlements and resources. Due to the increasing quantity of fuel in abandoned fields, highly flammable areas are connected in the vicinity of rural settlements. To compound the problem, the ageing, declining and scattered populations in these areas have little capacity to prepare themselves for, or defend themselves against, the threat of uncontrolled fires.

Unexploded ordnance and landmines

The presence of UXO is an emerging concern in the management of wildfires on any land with vegetation cover. The combustion of UXO and the dispersal of contaminants pose a threat to the public and the environment over a wide area, and a particularly serious threat to firefighters working in contaminated areas.

Unexploded ordnance can be found on hundreds of thousands of hectares of forests and other land throughout the SEE region. Remnants from First World War battles along the 1917 frontlines in the southern area of the former Yugoslav Republic of Macedonia have repeatedly caused problems. During the 2007 fire season, for example, over 70 explosions of ammunition triggered by forest fires were recorded.

On some sites of earlier armed conflicts on the territory of the former Yugoslavia (e.g. in Bosnia and Herzegovina and Kosovo*), active landmines are limiting access and forest and fire management over large areas. In Bosnia and Herzegovina alone, more than 200,000 ha of forests are contaminated by landmines, and landmines are also a problem in Albania.

Improving the mapping of contaminated areas and gaining a better understanding of how to manage such lands in the interests of ecology, fire prevention and safety are essential activities in the above-mentioned countries.

Specialised training and personnel

Due to the nature of wildfires, those involved in prevention and suppression activities require additional skills and specialised equipment. This is particularly important in cases where wildfires are only one aspect of the firefighters' work, rather than their professional focus.

There are no firefighters dedicated primarily to tackling wildfires in any of the analysed countries. Firefighters in the forestry sector are recruited from among the sector's permanent employees (forest workers, forestry engineers etc.), and only for forest fire suppression activities. In most cases, emergency responders are given some level of specialised wildfire training to complement their primary roles in civil protection, urban firefighting or military service.

Training and expertise are shared among some of the countries in the region on an ad hoc basis.

Volunteer firefighters

The recruitment of volunteer firefighters is a popular way both of engaging local populations in wildfire management and of increasing overall wildfire response capacities in a cost-effective manner by training and equipping a widespread, part-time force of local people to assist in fire emergencies.

Although the approach taken varies greatly across the SEE region and beyond, some aspects are generally considered desirable, including: sufficient and compatible training to enable volunteers to effectively assist professional fire responders; sufficient and compatible equipment and communications; and reasonable financial and legal assistance and insurance to protect volunteers, their families and employers should volunteering result in time off work, injury or, at worst, fatality.

A comprehensive organisational structure of this kind exists only in the former Yugoslav Republic of Macedonia and Serbia, and only some aspects of it in Montenegro and Bosnia and Herzegovina. Where volunteer fire brigades exist, but without taking into consideration all the above-mentioned factors, the reasons for their shortcomings may be simply lack of funding, inadequate representation at higher levels of government, or even a preference to remain autonomous and self-reliant.

Special vehicles and equipment

As indicated above, there are a large number of institutions and organisations involved in forest fire protection, including forest fire suppression. All of them have certain resources for forest fire suppression (tools, equipment, vehicles etc.) at their disposal, but they are not sufficient.

Much of the equipment is outdated (the specialised vehicles, for example, are typically over 30 years old), non-operational or insufficient. The institutions and organisations involved in forest fire protection do not take the same approach or follow the same rules when it comes to the procurement of equipment and vehicles. All equipment and vehicles, regardless of ownership, must be part of the unique national forest fire protection system.

Newly procured vehicles are almost all designed for tackling urban fires. Other forest fire suppression equipment (hand tools, water supply systems, personal protective equipment etc.) is either obsolete or lacking. This is the case in all of the analysed countries. The equipment and vehicles currently in use need to be reviewed and a comprehensive national plan and strategy drawn up, including short-term, mid-term and long-term activities for the improvement of the situation. This must be done taking into consideration EU regulations and standards for the relevant equipment and vehicles. In this way, national resources would be shared efficiently at regional and wider level.

Participation of civil society

The goal of most agencies tasked with managing wildfires is to protect public assets as well as the lives, livelihoods and assets of the communities living in those areas that may be affected

by fires. Engagement with these populations can take a number of forms, including the formation of volunteer fire brigades, as mentioned above.

The most common form of engagement with civil society is raising public awareness of the possibility of wildfires during the fire season, along with providing advice to evacuate the area or take cover in the event of a wildfire. Emphasis is given to preventing forest fires from being started accidentally, for example by campfires or cigarette ends. Forest recreation areas may even be closed when the risk of fire is particularly high. Public information is usually disseminated via television and radio and roadside signage. Advice may also be published on websites in an attempt to reach a wider audience.

In the former Yugoslav Republic of Macedonia, in order to reduce the risk of accidental fires, members of the Fire Protection Union carry out "inspections" of the condition of farm machinery and the presence of fire extinguishers, ensuring adherence to fire prevention laws.

Year-round initiatives are also implemented, for example in the former Yugoslav Republic of Macedonia and Serbia, to raise awareness of the steps that individuals and organisations can take to reduce the national wildfire threat. The former Yugoslav Republic of Macedonia, for example, has a “Month for Protection against Fires” and a “National Day of Firefighters”. An inter-sectoral approach is taken, integrating the agricultural sector in the fire management dialogue.

These are just a few examples of good practice in the region, but there is still a need to strengthen the participation of civil society in forest fire protection in all the analysed countries.

Use of advanced data and information systems (forest fire early warning systems)

In all countries in the region, a system operates during the fire season to provide at least the daily evaluation and reporting of the weather conditions in relation to fires, based on hydrometeorological input data. Almost all the systems in the region are based on the adapted Canadian Fire Weather Index (FWI) scale.

All the countries use internationally available datasets, such as the Moderate Resolution Imaging Spectroradiometer (MODIS), the European Forest Fire Information Service (EFFIS), the EU Meteorology Satellite (EUMETSAT) or the Canadian Global Early Warning System (EWS). Only the former Yugoslav Republic of Macedonia has its own national forest fire early warning system (MKFFIS).

There is an urgent need to develop a national forest fire early warning system in each of the other countries. In the future, using these national systems, a regional SEE system could also be developed.

Fire research and its application in forest and fire management

Research into wildfires and wildfire management can be divided into two broad directions. The first is related to the institutions carrying out the research. In the case of Spain, for example, research into wildfires is undertaken within the forest industry/forestry. This may contribute to reinforcing the misleading notion that vegetation fires are predominantly a “forest” issue. On the other hand, research in the former Yugoslav Republic of Macedonia, Serbia and Bosnia and Herzegovina is integrally linked to university departments that specialise in forestry, fire science, natural disasters and atmospheric science. No research is currently being undertaken into wildfires or their management in Albania, Kosovo* or Montenegro.

Another way of approaching wildfire research is to look at the main topics being investigated. In cases where the science of fires in the environment is at a relatively early stage, research is dominated by the exploration of fundamental fire behaviour and fire ecology topics, as researchers and managers alike attempt to understand the nature of fire in the landscapes of interest. This approach is taken in the former Yugoslav Republic of Macedonia and Bosnia and Herzegovina. Regardless of the approach used, wildfire research must be strengthened in all countries in the region.

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