

Forest Fire Country Studies

Montenegro



WITH FUNDING FROM
AUSTRIAN
DEVELOPMENT
COOPERATION



REGIONAL ENVIRONMENTAL CENTER

FOREST FIRES COUNTRY STUDY

MONTENEGRO

2015

**Produced by the Regional Fire Monitoring Center
(Key expert: Nikola Nikolov)**

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

Contributors: Bruno Mesquita, Cecile Monnier and Danko Aleksic (REC)

Table of Contents

Abbreviations	3
I. The forestry sector, forests and fire history	4
1.1. Forest characteristics	4
1.2. Major forestry stakeholders	7
1.3. Fire history	9
II Legal framework and institutional set-up in the field of forest fire management	14
III. The impact of forest fires/wildfires on the environment, economy and human health	20
IV. Special issues	21
V. Needs for improvement in the forest fire/wildfire management.....	22
Literature	23

Abbreviations

MARD	Ministry of Agriculture and Rural Development
AIA	Administration for Inspection Affairs
FA	Forest Administration
DFHWPI	Directorate for Forestry, Hunting and Wood Processing Industry
DIF	Department for Inspection of Forestry
DES	Directorate for Emergency Situations
EU	European Union

I. The forestry sector, forests and fire history

1. Overview of the forestry sector

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

“Within the meaning of this law, forests shall be considered land spanning more than 50 ares [0.5 hectares], covered with forest trees having canopy cover above 10 percent of the land area and dominant trees higher than 5 m — that is, trees able to reach that height when physiologically mature.

Within the meaning of this law, forest land shall be considered land spanning more than 50 ares [0.5 hectares], covered by forest trees:

- higher than 5 m — that is, trees able to reach that height when physiologically mature and whose canopy cover is 5 to 10 percent of the land area; and
- not able to reach the height of above 5 m — that is, land 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 include temporarily barren areas where the natural regeneration of forest trees has started; fire protection belts; areas covered with non-forest vegetation spanning less than 50 ares [0.5 hectares] if it is within the forest or forest land complexes; forest tree protection belts spanning more than 50 ares [0.5 hectares] and wider than 20 m; and forest roads.” [5]

1.1. Forest characteristics

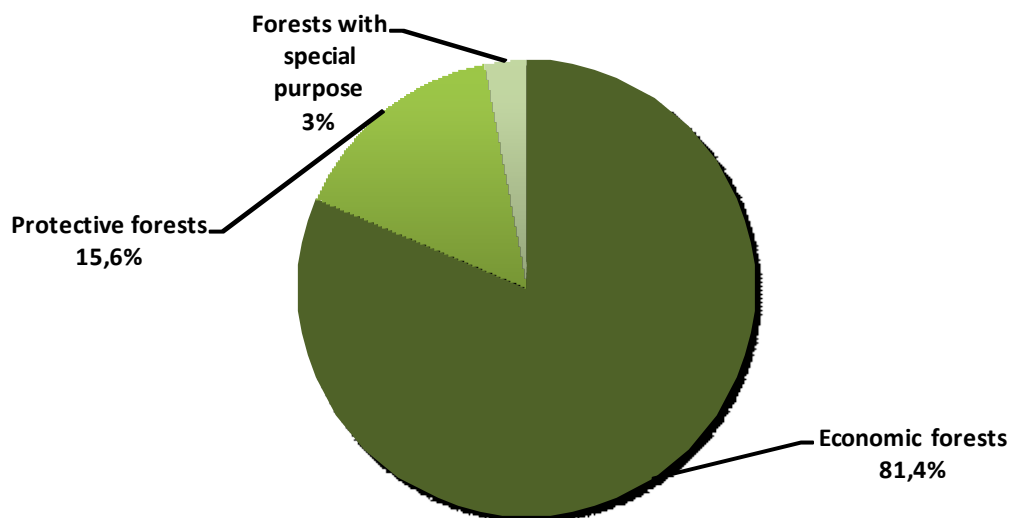
Forests and forest land cover 54 percent (743,609 ha) of the total area of Montenegro. The country has substantial forest coverage, among the highest in Europe, with 0.9 ha per capita. Forests cover 620,872 ha, while forest land covers 122,737 ha. Around 500,041 ha (67.25 percent) of the total forest area are in state ownership, while around 243,568 ha (32.75 percent) are privately owned. The total standing volume is estimated at 72,056,699 m³, comprising 29,527,555 m³ (40.98 percent) conifers and 42,529,144 m³ (59.02 percent) deciduous trees. [1]

The quality of hardwood in most of the high forests is relatively poor, due to a history of coppicing (especially in privately owned forests) as well as sub-standard forest management in state-owned forests over the past few decades, typically with the removal of better-quality trees while leaving trees of poorer quality. [1]

A trend towards reduced harvesting has been perceptible since 1989. Based on the assumption that the annual removal is two-thirds of annual growth, around 815,000 m³ of wood mass can be harvested annually. The Forest Administration releases a tender for concessions and auctions for slightly over 400,000 m³ of the wood volume. With the addition of fuel wood, as well as retail and sanitary harvesting, the annual removal is around 700,000 m³. Harvesting is therefore more or less equal to the projected volumes. [1]

In terms of forest purpose, 347,581 ha (81.4 percent) of the forests in Montenegro are economic forests, while 66,283 ha (15.6 percent) are protective forests and 12,975 ha (3 percent) are forests with special purposes. [2]

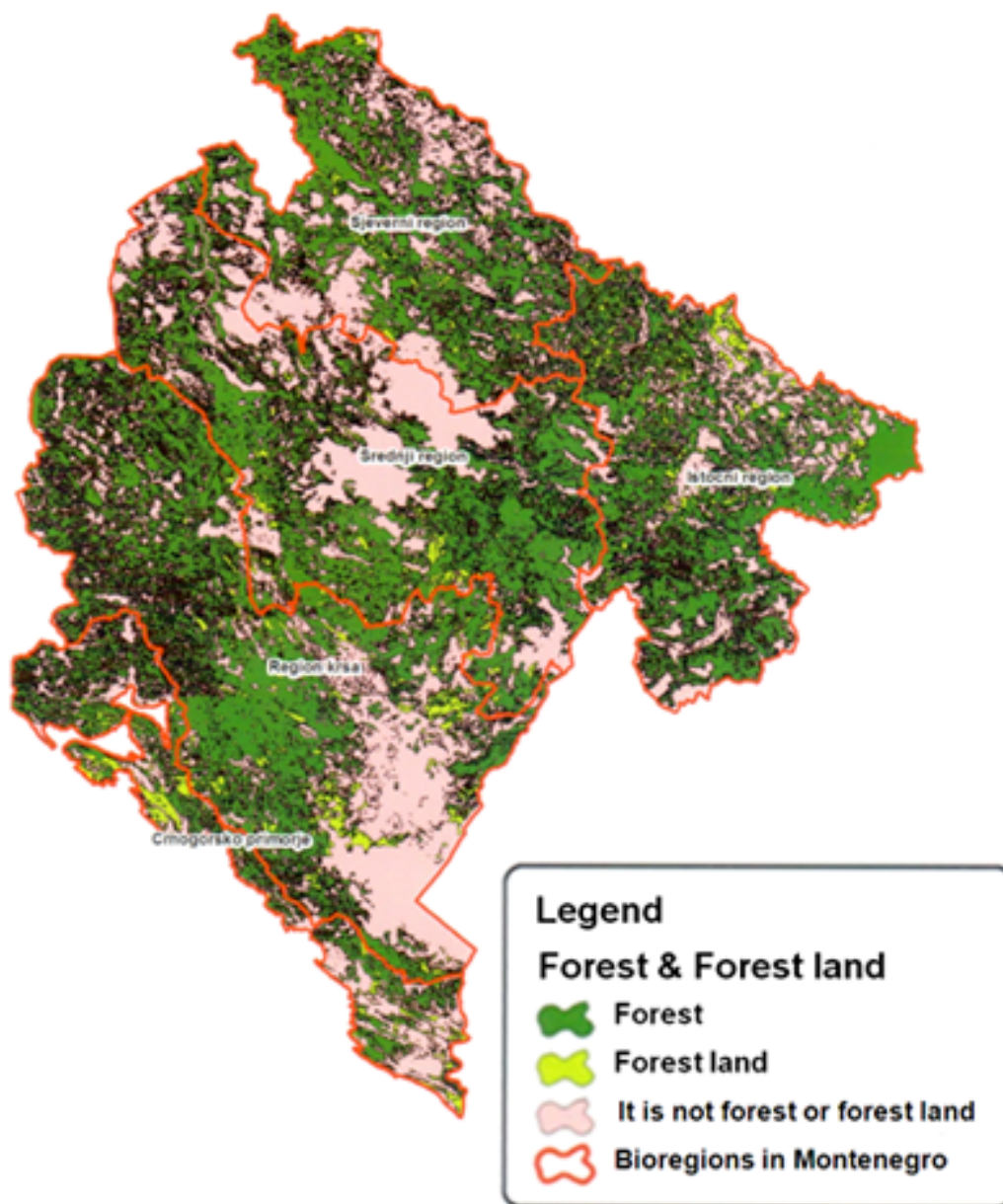
Figure 1. Structure of forests by purpose



Source [2]

Within the National Forest Inventory, the territory of Montenegro is divided into five areas: the Northern Region (which has the largest complex of black pine and mixed forests of scots pine and spruce); the Eastern Region (forests of beech and fir are widely spread through this region, along with Macedonian pine forests that can be found exclusively in this region); the Central Region (here the dominant forests are beech forests, mixed forests of fir and beech, forests of spruce and whitebark pine forests); the Karst Region (which has the thickest layers of carbonate rocks, mostly limestone, as well as severe erosion processes due to the large amount of rainfall); and the Montenegrin Coast (due to intense anthropogenic impacts over long years, the vegetation of this area has changed so that, rather than forest communities, other forms, such as underbrush, bushes and rocks, are now present).

Map 1. Forest and forest land in Montenegro



Source [2]

1.2. Major forestry stakeholders

The institutional set-up is divided between the public and private sector.

The public sector comprises:

- The Ministry of Agriculture and Rural Development (MARD)
- The Department for Inspection in Forestry, Hunting and Plant Protection, which is part of the Administration for Inspection Affairs (AIA)
- The Forest Administration (FA)
- The forestry and wood processing technology college in Berane

The private sector comprises:

- Private forest owners
- Former state-owned logging companies
- Private companies and concessionaires combining logging and wood processing [1]
- The Forestry Institute

The MARD is responsible for the overall control of the forestry sector and plays the leading role in the process of forest resources management, the development of economic and other sectoral policies; and the implementation of these policies.

The Directorate for Forestry, Hunting and Wood Processing Industry comprises three units:

1. The Department of Forestry
2. The Department of Hunting
3. The Department of Monitoring in Forestry [1]

The Directorate for Forestry, Hunting and Wood Processing Industry 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.

The Administration for Inspection Affairs (AIA) is an organ of the administration divided into seven sectors, including the Sector for the Protection and Safety of the Health of Humans, Animals, Plants and Forests. The sector comprises six departments, including the Department for Inspection in Forestry, Hunting and Plant Protection. This department carries out tasks

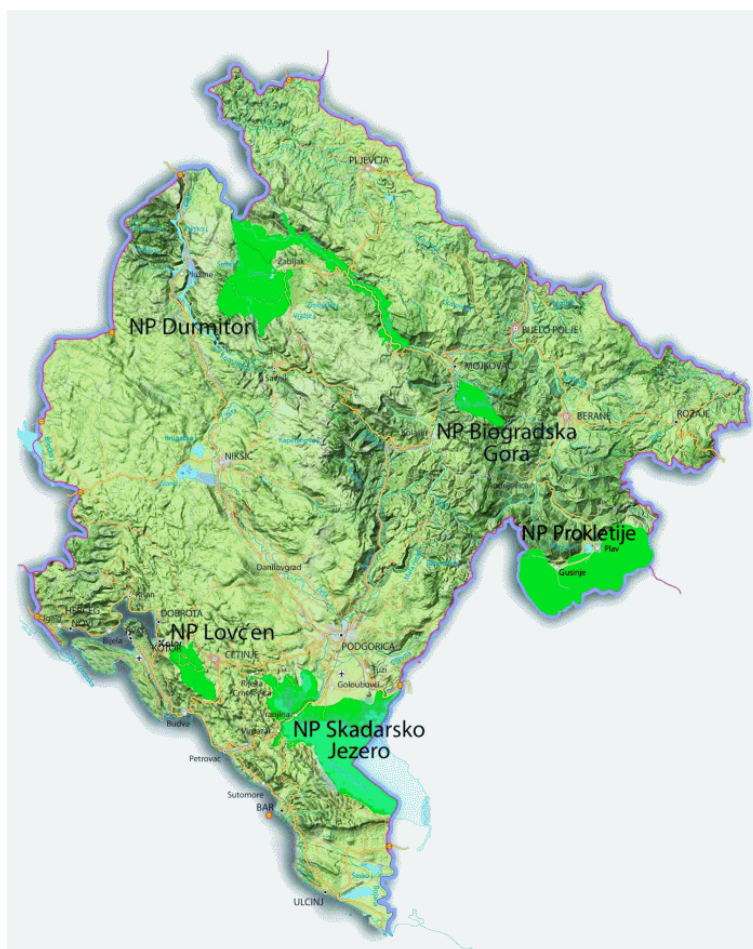
related to inspecting the implementation of laws and regulations governing the field of forestry, hunting and the protection of forest plants.

The Forest Administration (FA) is the state administration authority responsible for the management of both private and state-owned forests. It strives to improve forest management through adequate organisation and greater attention to forest protection. [1]

There are **five national parks** (<http://www.nparkovi.me/>) established by law in Montenegro:

1. Durmitor National Park, the largest national park in Montenegro, was established in 1952. It covers an area of 39,000 ha. It has been on the UNESCO World Heritage list since 1980. The park includes Mount Durmitor, the Tara River, Drage, Sušice, as well as the highest part of the Komarnica Canyon, from which numerous mountain peaks rise (48 of them are over 2,000 m above sea level).
2. Biogradska Gora National Park was established in 1952 on the territory of the municipalities of Kolašin, Pljevlja, Berane and Andrijevica. It has a total area of 5,650 ha, of which 1,600 ha are covered with forest.
3. Lovćen National Park was established in 1952 on the territory of the municipalities of Cetinje and Budva. It covers an area of 6,220 ha, of which 1,314 ha are forests.
4. Skadarsko Jezero/Skadar Lake National Park was established in 1983 on the territory of the municipalities of Podgorica, Cetinje and Bar. It covers an area of 40,000 ha.
5. Prokletije National Park was established in 2009 on the territory of the municipalities of Plav and Gusinje. It covers an area of 16,630 ha.

Map 2. National Parks of Montenegro



Source [15]

1.3. Fire history

Forest fires are a global environmental and economic problem. Due to its 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.

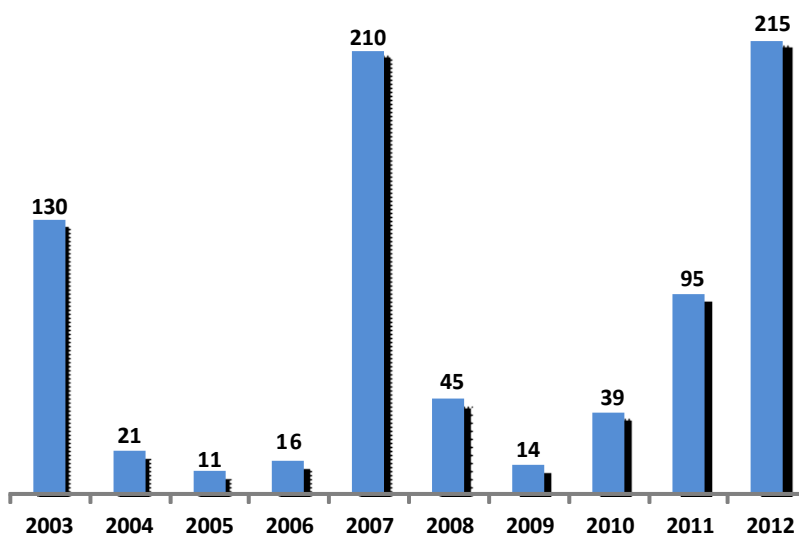
During the past 10 years there have been around 800 large forest fires in Montenegro, and more than 18,000 ha of forests and over 800,000 m³ of wood mass have been damaged or destroyed. The greatest risk is to forests located in the coastal and central regions, where high air temperatures during the 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 winter). 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 as 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, 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.

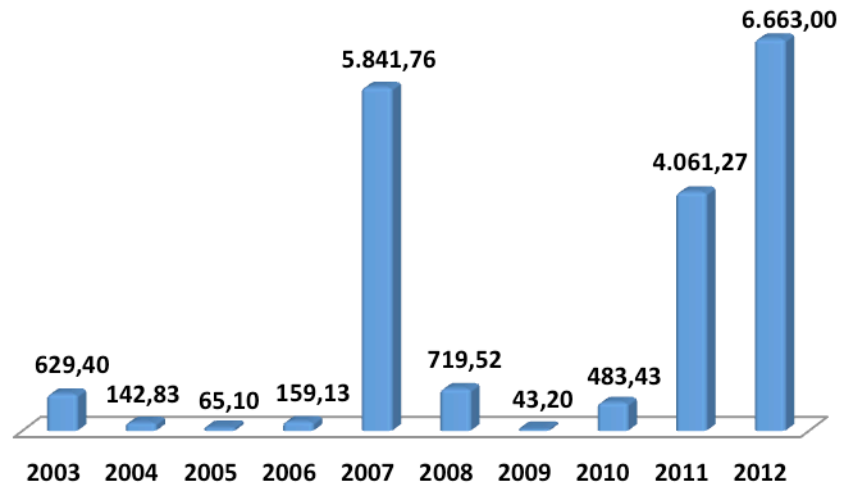
The annual average burnt area in the period between 2003 and 2012 was 1,880 ha, while the annual average number of fires was around 80. The total damage caused during this period has been estimated at over EUR 6 million.

Figure 2. Number of forest fires, 2003–2012



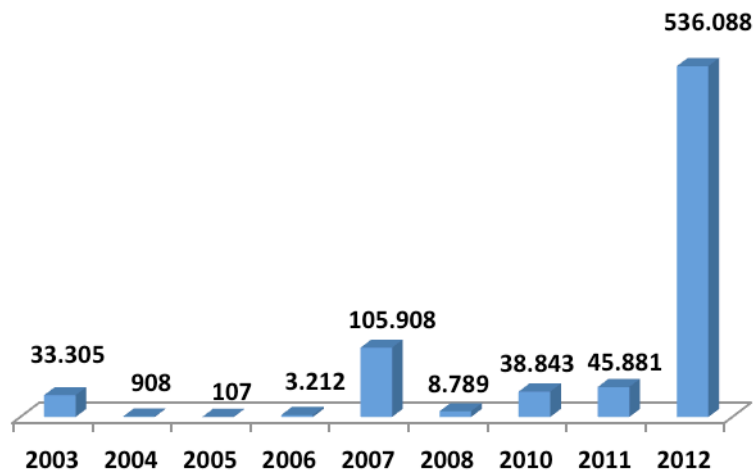
Source: Forest Administration

Figure 3. Burnt area, 2003–2012 (ha)



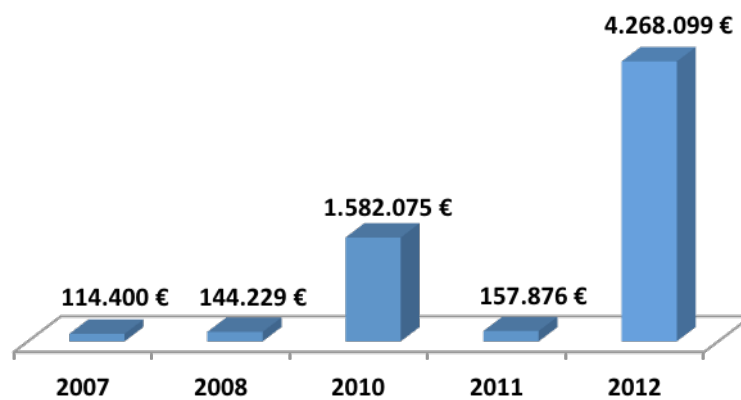
Source: Forest Administration

Figure 4. Total burnt wood mass, 2003–2012 (m³)



Source: Forest Administration

Figure 5. Total estimated damage, 2003–2012 (EUR)



Source: Forest Administration

Table 1. Burned areas of forest and forest land, 2006–2010

REGIONS	FOREST				FOREST LAND				FOREST AND FOREST LAND			
	Area	Damaged by forest fires	Share in the total	Share per region	Area	Damaged by forest fires	Share in the total	Share per region	Area	Damaged by forest fires	Share in the total	Share per region
	ha	ha	%	%	ha	ha	%	%	ha	ha	%	%
EASTERN REGION	152,194.0	6,603.0	2.6	4.3	11,249.2	1,317.5	13.6	11.7	163,444.0	7,920.4	19.7	4.8
NORTHERN REGION	127,279.3	4,160.3	13.6	3.3	33,907.3	1,024.5	10.6	3.0	161,186.5	5,185.1	12.9	3.2
CENTRAL REGION	181,979.8	4,703.7	15.4	2.6	27,598.9	806.6	8.3	2.9	209,578.7	5,510.3	13.7	2.6
KARST REGION	213,197.6	14,465.7	47.4	6.8	34,706.8	5,115.8	52.8	14.7	247,904.4	19,580.8	48.7	7.9
COASTAL REGION	53,481.4	599.7	2	1.1	18,536.2	1,403.3	14.8	7.6	72,017.6	2,030.0	5	2.8
TOTAL	728,132.1	30,532.4	100	4.2	125,998.4	9,667.7	100	7.7	854,131.2	40,226.6	100	4.7

Source: The First National Forest Inventory of Montenegro, Ministry of Agriculture and Rural Development, Podgorica, 2013

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

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

- Law on Forests (Official Gazette of Montenegro 74/10)
- Law on Game and Hunting (Official Gazette of Montenegro 52/2008)
- Law on Protection and Rescue (Official Gazette of Montenegro 13/2007)
- Law on Self-governance (Official Gazette of Montenegro 42/2003)
- Law on National Parks (Official Gazette of Montenegro 28/2014)

There are also some strategic documents that regulate the issue of forest fires as part of other issues (forests, forestry, sustainable development etc.):

- 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

According to the laws listed above, the main institutions competent in the field of forest fire protection are described below:

1. The Ministry of Agriculture and Rural Development

The Ministry of Agriculture and Rural Development (MARD) is responsible for the overall control of the forestry sector and plays the 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 [1]

The Directorate for Forestry, Hunting and Wood Processing Industry 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 performs 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. The Administration for Inspection Affairs

The Department for Inspection of Forestry, Hunting and Plant Protection (DIF) is part of the Administration for Inspection Affairs (AIA) and, as mentioned above, it 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 these regulations; submitting applications for initiating criminal proceedings and filing criminal charges; giving initiatives for amendments to laws, regulations and by-laws and 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. [10]

With respect to forest fires, and in addition to the Law on Forests, all the tasks carried out by the DIF 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.”

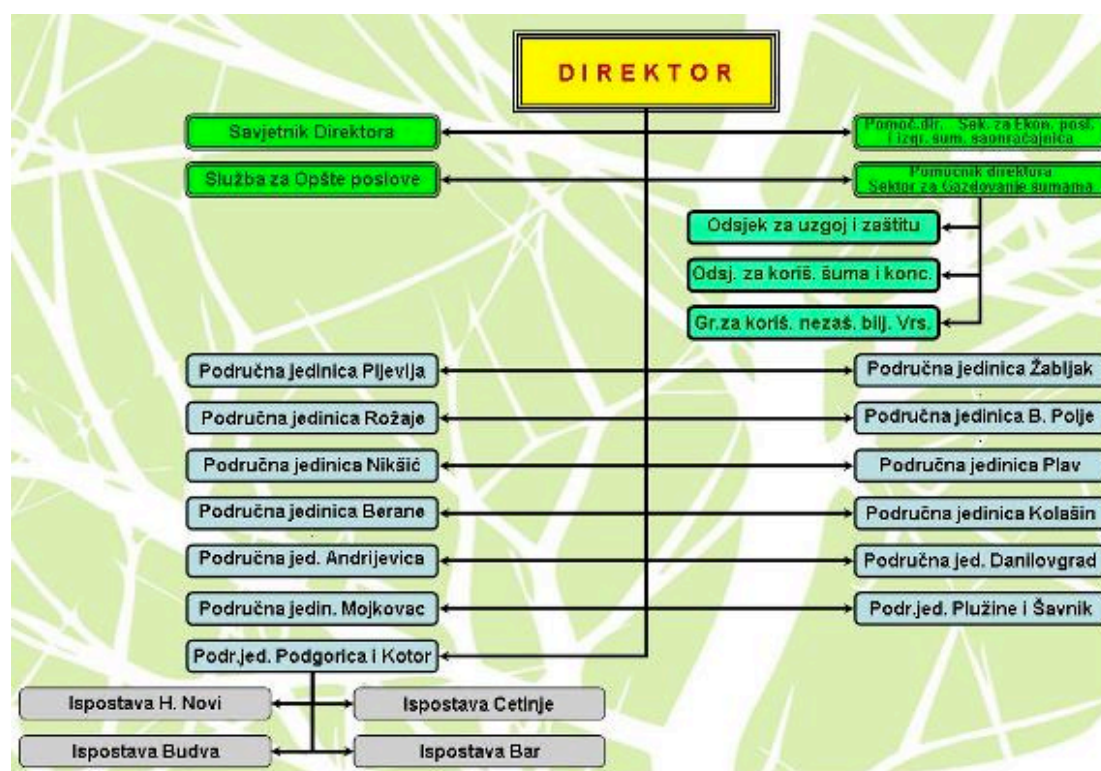
3. The Forest Administration

The Forest Administration (FA) is the state administration 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 Forest Administration 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.

[1]

Figure 6. Organisational structure of the FA



Source [12]

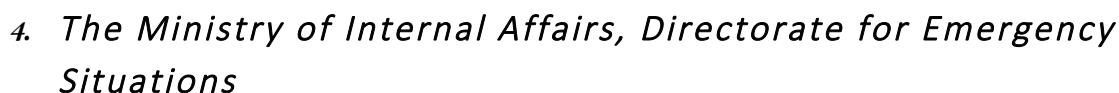
Within the FA, around 210 personnel are engaged in the field of forest protection and they are spread among the regional units. In periods of increased risk of forest fires, additional personnel are engaged (on a contractual basis) and are given the primary task of observing and reporting fires, as well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

All 15 regional management units are obliged to carry out all measures for forest fire protection (preventive, pre-suppressive and suppressive), 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

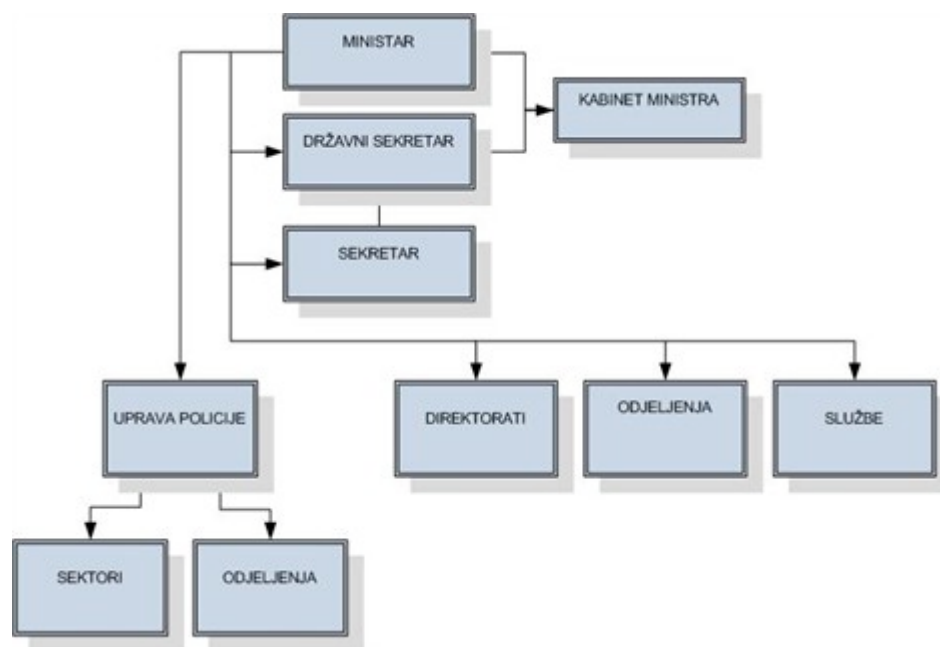
Source [12]



The DE 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 the municipal rescue and protection units. These units operate with a total of 194 fire trucks (mainly used for urban fires).

Within the DE there is also the Unit for Aerial Firefighting (an aeroplane and helicopter unit). This unit operates with four helicopters (Abell-412, Abell-212, Abell-206 and Gazelle); two Dromader aeroplanes; and two AT-802A Fire Boss firefighting aircraft.

Figure 7. Organisational structure of the Ministry of Internal Affairs



Source [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 other in accordance with the laws in force and the competences of the institution/company.

The use of fire in forestry, agriculture, conservation areas and other lands is regulated by the Law on Protection and Rescue. Also, some legal provisions for fire bans exist in the Law on Protection and Rescue as well as the Law on Forests.

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

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 burnt area and the state of the forest ecosystems. In addition to damage in terms of loss of timber, forest fires may damage or completely destroy the ecological, social and economic functions of forests. Such damage is associated with soil erosion, which eventually leads to desolate landscapes where vegetation cannot be renewed.

Even where forest fires do not cause direct significant damage to property, they have an indirect influence on the functioning of the economy in general (reduced revenues in the timber industry and 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 (many tourists leave or decide not to visit the country). Unfortunately, there are no official data about such trends.

As shown in Table 1 above, 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. Fortunately, there were no recorded cases of injury or death.

IV. Special issues

Cross-border forest fires

Fires have been recorded crossing from Bosnia and Herzegovina to Montenegro, and from Albania to Montenegro.

Rural depopulation and land-use change

Rural depopulation and land-use change have an impact on forest fires in Montenegro. As a result of the process of migration from villages to towns there is a build-up of fine “fuel” on abandoned arable land and a lack 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 (EU Mechanism), by Serbia in 2010, and by Croatia in 2012 (EU Mechanism).

V. Needs for improvement in the forest fire/wildfire management

There are various moves that should be made in order to improve forest fire protection management in Montenegro.

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 Directorate for Protection and Rescue, 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 (whether 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 Directorate for Protection and Rescue. 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 they 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 for special measures for forest fire protection (both intended for the forestry sector).

Literature

1. *Illegal Logging in South Eastern Europe: Regional Report*
Szentendre, Hungary, 2010 (<http://illegallogging.rec.org/publications.html>)
2. *Analysis of forest fires in Montenegro*. Ministry of Agriculture and Rural Development, Podgorica, 2014
3. The First National Forest Inventory of Montenegro. Ministry of Agriculture and Rural Development, Podgorica, 2013
4. Law on Forests (Official Gazette of Montenegro 74/10)
5. Law on Game and Hunting (Official Gazette of Montenegro 52/2008)
6. Law on Protection and Rescue (Official Gazette of Montenegro 13/2007)
7. Law on Self-governance (Official Gazette of Montenegro 42/2003)
8. National Strategies for Emergency Situations
9. Law on National Parks (Official Gazette of Montenegro 28/2014)
10. Directorate for Inspection: <http://www.uip.gov.me>
11. Ministry of Internal Affairs: <http://www.mup.gov.me>
12. Ministry of Agriculture and Rural Development, Department of Forestry: <http://www.upravazasume.me>
13. National Parks of Montenegro: <http://www.nparkovi.me/>
14. Questionnaire prepared for the UNECE/FAO Regional Forum on Cross-boundary Fire Management, adapted by the Regional Environmental Center (REC) Republic of Montenegro, 2014
15. 3D map of the national parks of Montenegro: <http://www.nparkovi.me/sajt/mapa-crne-gore-sa-nacionalnim-parkovima>