

The elaboration of an integrated plan of fire preventions for the Domogled-Cerna Valley National Park

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Abstract The concept of fire risk includes both the probability of fire producing and its potential consequences. This is a reason why it is necessary that the investment in the activity of forest fire prevention to be correlated with the degree of fire risk, the economic, touristic, ecological, scientific benefits and the risk for the population. At present, fire prevention has a wide feature including beside the known preventing activities also the necessary endowments in fighting against fires. Therefore, it is normal that the investment for the fire prevention activity to greater in the scientific reservation and touristic areas of high interest. The Domogled-Cerna Valley National Park with a surface of 45641,8 ha forestry that surround the resort Baile Herculane, presents a special interest concerning fire prevention because: it is known as being with high degree of biodiversity, has over 100 ha resinaceous forests (therefore very high fuel), includes mountain areas where the water source is missing, etc. The elaborated plan includes the following main elements:

- the detailed map of the objective (scale 1:50000)
- the position on the map of the storehouses with means, chemical substances and apparatus for fire extinction and the position of fortified places
- the assessment of the number of terrestrial patrols and of the critical periods
- the position of water supply places
- the position of existing roads with the specification of capacity and degree of utilization

the organizing of the informing campaign for the population concerning the danger of fire and the informing during the critical periods.

Domogled – Cerna Valey National Park is known as one of the best areas of biodiversity in the country. It sums up 45.641,8 hectares of forest and it extends on an area controlled by 3 county forestry departments (Reșița, Drobeta Turnu Severin and Târgu Jiu (table 1, figure 1).

The park spreads around Băile Herculane Resort and has over 1.000 hectares of resinous species and it is thus difficult to predict the real dimension of the damage caused by forest fires on both the biodiversity and the scenery in the resort.

Therefore, special care needs to be given to fire prevention in the national park, considering the importance of the place and the fact that fires are easier to prevent than to put out.

Fire prevention is a complex activity which implies campaigning to inform and warn the locals but

Key words

fire risk, prevention, activity, map

which also covers fire detection, effective communication and logistics. The damage caused by fires and the cost of the means for fighting them raise fast, proportional to the time the fire spreads freely. This interval corresponds to the sum of intervals needed until:

1. the fire is detected
2. the alarm is given to the nearest team
3. the personnel and the active fighting means are assembled
4. cars and the nearest fire-fighters gain access

Under these circumstances, there is the urgent need to come up with an integrated fire prevention plan that would take the potential damage into account.

Material and Method

In order to draw up a fire prevention plan for this particularly significant area, the first step was to consult the administrative documentation on fire prevention in countries where there are many fires (France, Greece, Spain, Germany). The next step was to study the prevention means used for certain

mountain ranges covered with forests from France and Spain, but also those used for the forests lying in the vicinity of Salonic (the study of this area was made empirically). A prevention plan was drawn up based on this analysis and it contains all the measures used in the above mentioned norms and prevention plans which were analyzed in order to establish their actual implementation potential.

Table 1

Current state of the forest resources from Domogled – Cerna Valley National Park administered by the forestry departments

Nr. crt.	Direcția silvică	Ocolul silvic	Unitatea de producție	Suprafața		Procent din supr. totală ha
				Totală ha	În conservare specială ha	
0	1	2	3	4	5	6
1	REȘIȚA	Băile Herculane	III Băile Herculane	4.377,5	3.725,7	85
			IV Topenia	2.223,6	670,1	30
			V Iauna Craiovei	5.753,0	2.588,0	45
			VI Domogled	5.666,1	4.136,7	73
		Mehadia	V Belareca	1.641,7	1.641,7	100
TOTAL D.S. REȘIȚA				19.661,9	12.762,2	65
2	DROBETA TURNU SEVERIN	Baia de Aramă	VIII Olanu	6.467,7	1.035,6	16
			IX Balmeș	2.895,0	200,6	7
			X Ivanul	3.080,1	167,8	5
			XI Cernișoara	5.180,0	1.921,1	37
		Târnița	V Coșuștea	64,1	64,1	100
			VI Vârful lui Stan	2.291,4	2.288,4	100
TOTAL D.S. DROBETA TURNU SEVERIN				19.978,3	5.677,6	28
3	TÂRGU JIU	Padeș	I Motru Sec	3.634,2	806,9	22
			II Motru Mare	2.367,4	508,6	21
TOTAL D.S. TÂRGU JIU				6.001,6	1.315,5	22
TOTAL P.N.D.V.C.				45.641,8	19755,3	43

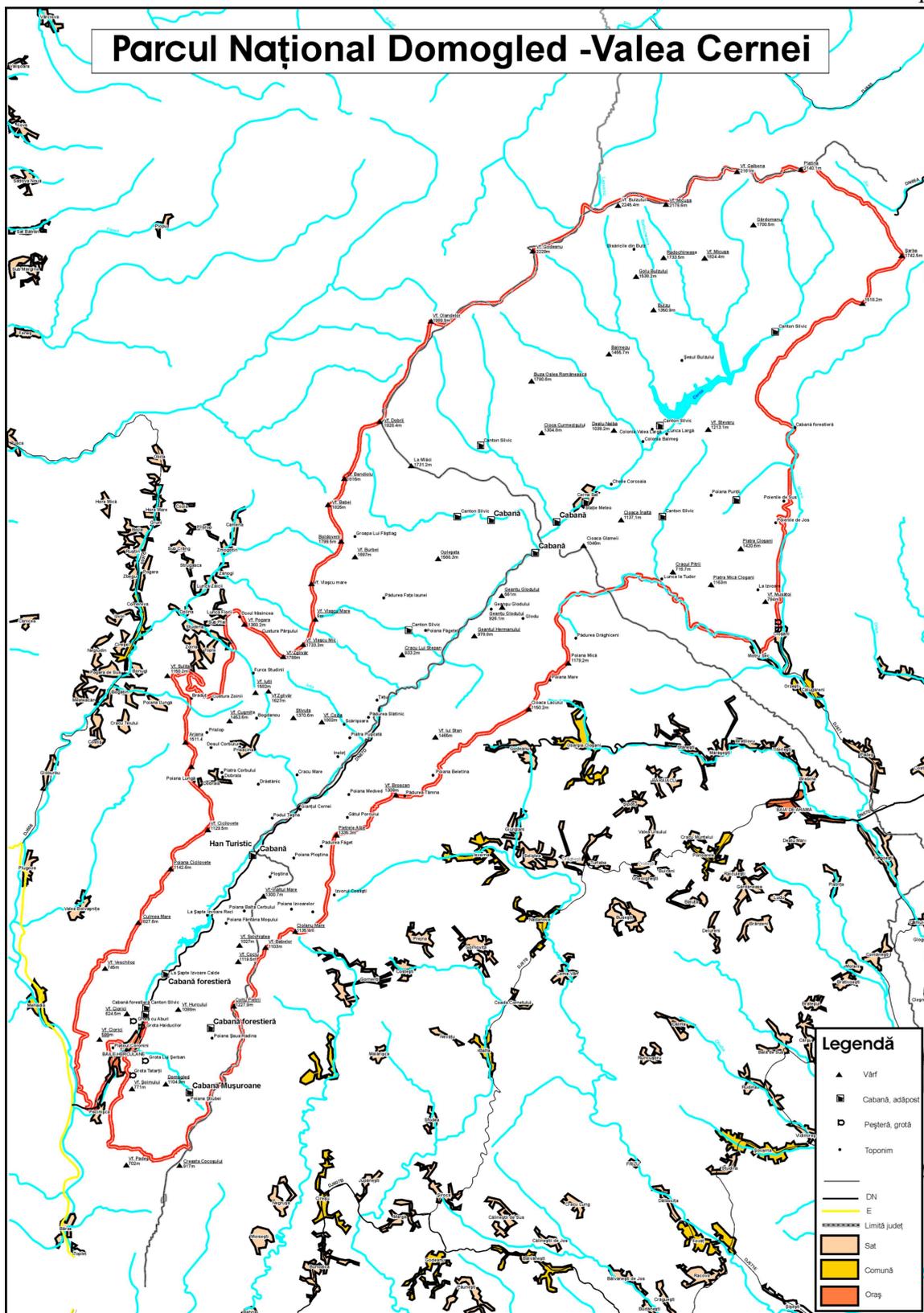
The key elements of the plan are:

- 1) A detailed area map (at a 1:50.000 scale, all basic strategic fire prevention elements clearly marked)
 - 2) An informing campaign concerning :
 - the public
 - the people directly concerned
 - involving school education
- Giving information at critical times:
- local radio and TV station
 - land patrols that warn the tourists and the locals
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Deciding the fundamental strategic elements concerning prevention infrastructure:

- fire detection activity and alarm transmission means
- deciding the logistics level
- the number and position of the storehouses and all the means, equipment and substances required
- the water supply improving and maintaining the road network.

Figure 1



Results and Discussions

Hereafter, we shall analyze each element from the prevention plan and we shall advance propositions and even investment estimates in some cases.

1) The detailed map of the area

The map must include the area covering the park and its proximity, administrative details from the forest planning (O.S.-forest service, U.P.-production unit, u.a.-management unit), details concerning stand composition and road positioning (picture 1). All basic strategic elements concerning prevention infrastructure will be marked on the map: the position of the observation posts, the number and position of the storehouses where there are tools and chemical substances, the position of the fortified posts and the water supply posts. A 1: 50.000 scale map is recommended because it can also be used to make the intervention plan.

2) The informing campaign

Informing the public is firstly aimed at the category which is most often responsible for starting the fire. The most effective ways are local radio and TV stations (Cerna T.V.), then the local press. Sources suggest that collaboration with these institutions is possible. The permanent signalling panels are in a good state. The public can also be informed by the rangers who ensure the respect of current regulations and inform the public on the forests usefulness and vulnerability. Collaboration can be started with the Caraş Severin School Inspectorate to organize applied ecology lessons (in neighbouring schools), concerning the National Park's protection against fire danger (the lessons can be held or prepared by the park's qualified staff).

According to the new fire management code (currently on the working table at FAO), but also taking into consideration the international trend in fire prevention, a recommended measure is to get involved the local community in fire prevention in areas surrounding the national park. It is also very important that, together with the military fire fighters, simulations should take place in which these forces could participate and improve work coordination. The exercise could be published in the press and broadcasted on Cerna SAT T.V.

3) Giving information at critical times

Empirically gathered information suggests that critical periods are March-April and September-October (after the leaves fall). In these periods the fire danger announcements can be broadcasted together with the weather forecast (on local radio and TV). The rangers can also warn the tourists and the population.

4) Deciding the fundamental strategic elements concerning prevention infrastructure

a) Fire detection

It is essential that fires should be detected right after the flames burst out. Detection means must be selected considering the following:

- the economical, scientific, ecological and tourist interests and also the risk run by locals
- the watches

In order to reach alert response efficiency, it would be best to combine several detection means:

- ground resources
- fixed means (observation posts)
- mobile means (rangers)
- aerial resources: liners

Following talks with the qualified personnel, we have reached the conclusion that the fixed observation posts can be set up without any substantial financial efforts. Building "light" observation posts (platforms on piles in the highest locations) is recommended. Based on the analysis made with the field personnel, we concluded that their most efficient locations are: Baile Herculane Forest Service: U.P. III u.a.12 and U.P VI u.a.40 and u.a.113. In the critical periods, in France and Germany, security on the observation posts is ensured by rangers and forest workers, and in Spain 240 people (from outside the forest service) are paid for 4 months for fire supervision. The mobile means recommended are field patrols on light vehicles. Their mission is to detect fires as early as possible and alert and guide the units to the fire scene. They also inform the public and supervise that fire usage regulations are respected. The personnel who is part of the surveillance patrols is made up of:

- the national park's personnel (or the forest service from the specific area)
- locals listed by the mayor
- authorised personnel (if possible) from the Environment Protection Office (who can give fines if the case may be)

Empirically gathered information suggests that fire detection made with the help of the locals is very important because it is them who give most of the alerts. No definite statements can be made at this point regarding the possible collaboration with the air lines, but we are aware that such collaborations took place in the past and they are one of the solutions in most countries with a high fire incidence risk.

In relation to the alert transmission (currently made by locals and rangers), we point out that the costs for setting up a transmission network (particularly in areas without mobile phone signals) as used in other countries is unknown to us.

b) Deciding logistics level

The means, equipment and chemical substances needed for the forest services in order to be able to put out forest fires are mentioned in the forest fires prevention and extinction norms. In view of the importance of the area, setting up a few fortified spots is required. This ensures a sufficient number of fire extinction materials, regardless of the fire amplitude. Fire extinction expertise, particularly in Gorj and Mehedinți, shows that often the participants to the fire extinction action do not return the tools or the stock is not properly kept or refilled. The analysis performed with the field personnel led to the conclusion that 3 fortified posts are needed and they are to be placed as follows:

1. Toplet fish farm (outside the reservation)
2. Baile Herculane Forest Service U.P.VI u.a.116 (near Cheile Ferigari quarry , near D.N.67D)
3. Baia de Arama Forest Service, U.P.VIII u.a.297 and u.a.172 (downstream from the village Cerna)
4. Baia de Arama Forest Service, U.P.11 u.a.84 (the cottage at the Cerna springs)

The fortified spots will be equipped according to current regulations [1].

In order to supply water to the fight vehicles, high-pressure water pumps are used. Water supply stations can be set up along the rivers. These could be placed in:

1. Baile Herculane Forest Service U.P.III u.a.62 and U.P.VI u.a.59
2. Baia de Arama Forest Service U.P.VIII u.a.172 (Ivanu accumulation lake), u.a.199, u.a.320 , U.P.X u.a.13 and U.P.XI u.a.3 (near the cottage at the Cerna springs), u.a.84
3. Tarnita Forest Service U.P.VI u.a.132 (downstream from the village Cerna)

In order to use them, an access area must be made on the river bank where the vehicles could be manoeuvred or stopped. This area needs to be equipped with a solid pipe for water absorption. Water stations can be set up along the river stream together with buried plastic pipes that could be checked at specific intervals.

In areas where there are no water sources in the Mediterranean countries and Germany, plastic and metallic tanks or prefabricated elements are used. Metallic tanks of 30 c.m. are considered fairly priced. They would be useful in the Baile Herculane Forest Service U.P.6 u.a.13, 41, 80 and 105 (we do not yet have sufficient information to be able to recommend them).

Other countries use 60 c.m. concrete tanks, poured on the spot and that do not have an excessive price.

The roads are suitable and at this point there can be no discussion on building special access ways for fire fighting (access runways, fight runways or short runways).

The plan we drew up includes the measures considered useful in fire prevention in the case of such an important area. Such measures are taken abroad for similar objectives. No doubt that environment protection is rather costly, but an important part of the plan's provisions could be met at an early stage.

Conclusions

There have been punctually analyzed the elements of the proposed plan in the paper and there have been made concrete suggestions for its achievement . Like all the activities that include the environmental protection, the fire prevention needs a high costs. Nevertheless at a first stage an important part from the stipulations of the plan could be accomplished and as other funds are to be obtained, this will be integrally achieved.

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