



ALP FFIRS

Alpine Forest Fire Warning System

WP6 "Procedures and Training"

**Forest Fire Prevention, Alert and Suppression:
an overview in the Alpine Space**

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Act. 6.2.1 - National / regional prevention actions

6.2.1.1. Fire Prevention Legal tools

	LAWS AND/OR REGULATIONS
France	National forestry code ; National Environment code ; National urban code
Switzerland	<p>The forest fire suppression in Switzerland is competence of the local firefighting services. It is a part of the integrated system of protection of population. The national law for the protection of the population prescribe the collaboration among the different partners:</p> <ul style="list-style-type: none"> - Partner of the first intervention: Firefighters, Police, Ambulance (blue lights), - Partners of support: civil protection, army, other technical services. <p>Every Canton (24 Cantons) as the competence and the task to concretize the dispositions of the federal law on the terrain. The Federal Government and the national Associations of the partners assures the coordination among the Cantons.</p> <p>Actually only few Cantons have taken special measures in the management of forest fires:</p> <ul style="list-style-type: none"> - Ticino (Tessin) (Southern part of the Alps with similar situation of Lombardia and Piemonte), - Graubünden (Grisons) (Eastern part of the Swiss Alps with some valleys in the South), - Wallis (Valais) (South-West part of the Swiss Alps with the driest areas of the Switzerland), - Uri (central Alps-Gotthard) <p>The coordination among the Cantons in forest fire suppression is at the moment only occasionally and not clearly structured.</p>
Austria	The Austrian Forest Act (amended BGBl. I Nr. 55/2007), Federal Constitution (Article 10-12, 15 and 118)
Germany	
Slovenia	Fire service act. n.113-5006/2005
Veneto	National general policy law about forest fires n.253/2000; Regional law n.6/1992
Piemonte	National general policy law about forest fires n. 253/2000
Lombardia	National general policy law about forest fires n. 253/2000
Friuli Venezia Giulia	National general policy law about forest fires n. 253/2000; Regional law n.8/1977 and n.64/1986.

6.2.1.2. Legal limitations to burning

France	Use of fire is forbidden during the summer (depend to the "prefet" decision) except for tactical fire (national guideline). Prescribed burning is a strong tool for fire prevention during the winter (Alpes-Maritimes: >1.000ha/year).
Switzerland	Potentially every Canton and Commune can introduce limitations to burning. For example Canton Ticino during the dry season can prohibit the igniting of any kind of fires outside. After the introduction of this limitation the number of forest fires dropped significantly (Conedera, WSL). (Legge cantonale per la lotta contro gli incendi e Legge forestale cantonale) The frequency of fires in a densely inhabited region as Ticino (Southern Ticino and Middle Ticino) can be influenced from the pyromaniac too. During the fires season the police can activate more control on the territory and persons who are registered as pyromaniac.
Austria	From a legal point of view the use of fire is forbidden as "management tool" on forest land.
Germany	There are several laws which regulate the use of fire in general. Severe punishments are in place e.g. for arson (1-10 years prison sentence) and for causing a fire danger (e.g. by smoking, open fire etc.; prison sentence up to 3 years or fine). Furthermore, a permit is needed for using fire closer than 100 meters to a forest and smoking in the forest is prohibited from March 1 to October 31. The last sentence does not apply to the forest owner, hunters and timber crews. Fines for these actions can range up to 10000 €.
Slovenia	In the periods when great or very great fire hazards are declared, the following is prohibited (Decree on fire protection in the natural environment, Official Gazette of the RS, No. 4-106/06): - to make fire, to burn objects/matter, or to use open fire - to leave or discard burning or other objects/matter that may cause a fire.
Veneto	Permit from the Regional Forest Service is needed for using fire closer than 100 meters to the forest. When the high fire hazard is declared, every fire is forbidden closer than 100 meters to the forest, and also smoking in the forest is forbidden.
Piemonte	
Lombardia	In accordance to the current regional forest law, throughout the year, outdoor burning in forest is prohibited and in every case outdoor fires must have a safety strip for a minimum distance of 100 meters around the materials being burned (art. 45, par. 10, Regional Law n° 31/08). Some activities are subject to derogation according to the art. 54, par. 4, Regional Regulation n. 5/07 but in every case they must be outside the period covered by the declaration of "Risk of serious harm" for the occurrence of forest fires. Following the communication of "Risk of serious harm", the ban of lighting outdoor fires in the forest or in a distance of at least 100 meters becomes absolute, without exceptions.
Friuli Venezia Giulia	The plain define the maximum alert periods, one fixed from 1 November until 30 April and others can be define from Regional authorities in relation to the weather conditions. In these periods the actions of police and vigilance are increased.

6.2.1.3. Prevention Plan

France	The prevention plans are conducted at the forest « massif » scale (PIDAF) or at the communal scale (PPRIF). PIDAF is a contractual management plan which aims at preventing fire by defining the forest management and areas to clear in order to prevent fire outbreaks and propagation. The PPRIF is a regulation plan, which defines the risk level and implies safety rules and obligations to the new buildings for example.
Switzerland	<p>The prevention of forest fire is a task of the Forest service of Canton Ticino. The measures are active on different fronts:</p> <ul style="list-style-type: none"> • During the dry season the Cantone can prohibit the igniting of any kind of fires outside. After the introduction of this rule the number of forest fires dropped significantly (Legge cantonale per la lotta contro gli incendi e Legge forestale cantonale) • Forestry management. For example the reconstitution of the traditional chestnut forest (selve castanili) around the villages permits to reduce the amount of organic fuel on the ground with a positive effect against fire ignition and spread. For the villages this kind of forest give an efficient protection in case of extreme fire season. • Agricultural management. The change in the agricultural land use has a very important influence on the development of the forest fires. To maintain the vine production on the hill surfaces is not only a positive measure for the landscape, but a good prevention of forest fires too. The management of abandoned pastures on the mountain part of the Southern Ticino can contribute significantly to reduce the spread of fires. • Infrastructures. The Forest service in the planning of the forest management consider the accessibility for the firefighter, the points of water to extinguish the forest fires, the landing places for the heli, • Information and education. The population and the schools are informed on the thematic of the forest fires. These activities have a good effect particularly in the alerting the firefighter services through the tel. 118 from the inhabitants.
Austria	The Austrian Fire fighting and fire prevention is characterized by volunteering and voluntary. There is no central fire command and no central service for fire men and equipment. Because of federalism, the legal competence for fire fighting is located in the federal and operational expertise in the communities. For special tasks, such as forest fire, there are some special bases of the national fire service organizations in one of the nine provinces. In this context the local public fire departments take over the tasks of preventive and protective fire protection, technical assistance and disaster relief.
Germany	Because of the low danger level and a general shift to deciduous tree species, there are no detailed plans for the implementation.
Slovenia	Plans for protection of forest against fires are elaborated by Slovenia Forest Service (hereafter SFS) for forests that are characterized by high or very high level of fire danger and confined by borders of individual forest management unit (Rules on the protection of forests (Official Gazette of the RS, No. 114-5220/2005)). In other words, each forest management unit can comprise of forest lands assigned with different forest fire danger levels. Their period of validity is 10 years.
Veneto	According to the national law, every Italian region have to make its regional forest fire prevention plan. The Veneto Region plan is dating 1999, it is actually under revision
Piemonte	The Prevention Plan is made by Regione Piemonte, the Plan actually in force is dated 2003
Lombardia	the prevention plan in force have been made by Regione Lombardia and ERSAF, it's dating 2009.
Friuli Venezia Giulia	The FVG region made a Regional prevention plan. The Friuli Venezia Giulia Region plan is dating 1999 There is also a special plan for the Karst area

6.2.1.4. Silviculture actions

France	Except South-west, the French Mediterranean forest is not more used for silviculture. To control the natural area, animals and prescribed burning are strong tools. Alpes-maritimes area is the good exemple. More than 1.000 ha is treated each year since 2002 in order to limit the number and the intensity of next fires. Results are very positive in mountainous area.
Switzerland	All the projects in forestry management must take in consideration the prevention of fires. The measures must be adapted to the specific situation. Here some examples: <ul style="list-style-type: none"> • reduction of the biomass along the roads and the path; • reconstitution of the traditional chestnut forest near to the villages (valorization of the landscape), • reconversion of the planted (in the last century) black pine forest with local natural species, agro-forestry in the high pastures (pasture in the forest of larch, ...).
Austria	What makes a more adaptive forest management partly more difficult in Austria, is the patchwork of small-sized farm-belonging forests and larger private or federal forest estates, with, correspondingly, quite different harvesting, tending, and management interests and investment efforts/facilities. It is difficult to recommend certain prevention measures as the ecological, socio economic and economic conditions are so different.
Germany	In endangered areas, growing of deciduous trees instead of conifers can be encouraged by the forest administration through consultation and (financial) encouragement.
Slovenia	Promoting tree species structure in favour of broadleaves through planned silviculture measures as thinning, natural and artificial regeneration. In some cases pasturage in forests to remove or reduce the amount of fuels (flammable plant material) on the ground - as an option allowed by legislation, but in reality it is probably almost never used.
Veneto	In order to reduce the combustible in the forest some actions are planned: grass mowing along the roads; collection of wood scraps, pruning of dead branches, thinnings. The substitution of high inflammability species with less inflammable native species is encourage.
Piemonte	Reduction of combustible biomass in the areas where it's more needed. The ordinary cutting have to be done perpendicularly to the main winds
Lombardia	Preventive forest management measures are taken to avoid forest fire occurrences, working on ecological and forestal parameters (i.e. density, structure, composition) to decrease danger and damages due to forest fire events. Forest management measures: Thinning, cutting and removal of small trees in presence of high densities or physiological stress (may include the removal of dead trees and shrubs); Selection cutting- performed in adult and monospecific forests to improve structural complexity; Cultural practices- performed in intensively managed coppice, in order to decrease dead fuel availability; Conversions- in degraded coppice located in areas with high danger of forest fire; Reforestation program- to enhance the restoration of degraded forest habitats in presence of monospecific structure or over-managed areas; Environmental cleanup-post-fire treatments to remove dead vegetation.
Friuli Venezia Giulia	In the karst area reduction of black pine forest with local forest types

6.2.1.5. Fire breaks use

France	Firebreak use is linked to the national law (july 6 th 1992) to reduce the fire risk ignition and the fire propagation. Minimum 200m of large. Firebreak is decided during the PIDAF elaboration. ONF coordinate the firebreaks for the public Wildland. Private initiative exists too for the private forest. Fire behavior models are used to define the properties of each firebreak.
Switzerland	This measure is not used in Switzerland. The incidence on the landscape recommends to give preference to forestry measures.
Austria	Fire breaks aren't provide in the Region
Germany	
Slovenia	Fire breaks are a very common measure, carried out in Slovenian forests. Slovenia Forest Service plans its construction and maintenance. The actual work is done by contractors.
Veneto	the regional prevention plan consider not convenient the construction of fire breaks, because of the heavy impact they have on the landscape and because in Veneto fires rarely have a very high intensity
Piemonte	green fire breaks have been build and maintained.
Lombardia	Firebreaks contribute to protection of vegetation from forest fire, isolating separate areas by wide strips. On the basis of the purpose for which they are used the following categories can be defined: Passive Firebreaks- suitable to contain the spread of forest fires (with a width ranging from 15 to 60); Active Firebreaks- with the aim to decrease the flame front speed aiding fire suppression operations.
Friuli Venezia Giulia	Fire breaks aren't provide in the Region

6.2.1.6. Water supply sources (map)

France	All the water supply sources (lake, sea, river) are defined and localized in the DFCI system, which is a harmonized GIS for the whole South East of France. 3 types: 1) natural water supply (first category with >120m ³ and access 8m*4m ; second category); 2) water tank (first category >30m ³ and access 8m*4m ; second category); 3) water supply point (normalized flow and pressure). Each of them is described to define the capacity of use by aerial and ground means.
Switzerland	Cantons Ticino, Wallis and Graubunden have a map of the water supply sources. The mapping not yet completed. Every new forestry project must take in consideration the water supply sources. The mapping and the realization of water points must respect the security rules for the different types of helicopters.
Austria	There is one case study example from Lower Austria (Waldfachplan Neunkirchen Waldbrand - is not the case study area) where an emergency map was created in collaboration between foresters and fire brigades in order to support fire fighting operations. In general there exists no explicit map for the fire fighters to identify the water supply sources.
Germany	construction and maintenance of water sources (e.g. ponds, fire hydrants at existing water pipes)
Slovenia	Quite recently, a series of maps with fire prevention and fire fighting infrastructure was published. The material presents spatial locations of most common infrastructural measures, like fire hydrants, fire breaks, forest roads (classified, if they are appropriate for use by fire vehicles), etc. Unfortunately these maps are not freely available and some sort of agreement with the publisher has to be drawn in order to be able to be allowed to use it.
Veneto	The Regional Forest Service provide the construction and maintenance of ponds and tanks for helicopters water supply. A regional map of helicopter water supply point is existing.
Piemonte	the prevention plan give the guideline for the constructions of ponds and tanks. 117 supply point are planned in the prevention plan. A map is existing
Lombardia	Specific water supply point locations are implemented to enable suppression operations. Water supply can be distinguished in permanent water supply and mobile water supply. Permanent water supply are located and dimensioned on the regional mean burned area (derived from statistic data on forest fire). In order to allow a correct management the capacity level of permanent water supply have to reach at least 20.000 liter per hour (l/h). The water has to get at least 1 m depth corresponding to the minimum level allowing a correct water supply of helicopters (shapefile of permanent water supply is available and will be provided).
Friuli Venezia Giulia	Construction of new tanks and hydrants are provide in the regional plan and in the Carso plan. The water supply points are mapped in Gis format.

6.2.1.7. Access to the forest (map)

France	All the forest access are localized and normalized in the DFCI system, a harmonized GIS for the whole South East of France, and available in a paper or numerical format for the firefighting units. Forest access are classified according to their size: large min 6m ; large min 4m and other. Technical details are available for each access: size, truck capacity, truck reversal capacity, slope, turns intensity, clearing of underground (min 20m).these specific forest access are forbidden for the public.
Switzerland	Cantons Ticino, Wallis and Graubunden have a map of the access to the forest witch consider the exigencies of engines of the fire brigades.
Austria	There is one case study example from Lower Austria (Waldfachplan Neunkirchen Waldbrand - s not the case study area) where an emergency map was created in collaboration between foresters and fire brigades in order to support fire fighting operations. In general there exists no explicit map for the fire fighters hwo to access the forest. However, due to the decentralised organisation many fire fighters have local knowlegde about the location (it is their home district) they can explain possible ways to access the fire. In some cases this fact might lead to unsystematic procedures.
Germany	labelling of forest roads can be carried out additionally.
Slovenia	Forest roads are suitable for use with vehicles in case of forest fires. Roads are classified according to the size or type of vehicles that can be driven on those roads and trails.
Veneto	The Regional Forest Service provide the maintenance of existing forest roads and paths and also the building of new forest roads for fire fighting use in the hight risk forests. A map of regional forest roads is under construction.
Piemonte	New forest roads are made for connecting fire breaks and supply points according to the area fire danger level
Lombardia	A specific regional law VII/14015 2003 defines the agro-forestal road network characteristics related to planning and management purposes also referred to forest fire fighting operations (i.e. setting of water supply points) (main road network shapefile is available for the entire region while forest road network is available only for a small number of regional areas).
Friuli Venezia Giulia	A large work of restructuring,ma.nentence and mapping of forest roads have been done in particular in the Karst area.

6.2.1.8. Helipads for forest fire use

France	Helipads are mapping and normalized in the DFCI nomenclature. Must respect the national aeronautic and civil aviation rules
Switzerland	The mapping in forest fire fighting in Ticino foresee the helipads too. The mapping is not completed. The helipads must be definite with strategic criteria (near to the coordinating point in cases of fire fighting intervention and in the high to allow a rapid transport of the firemen at the front of the fire) and microclimatic aspects (föhn winds, thermics, ...).
Austria	Helipads aren't build for specific forest fire fighting use. A general overview of the existing Helipads in Austria can be found at http://www.helipad.org/app/default.asp
Germany	
Slovenia	No helipads build especially for use in case of forest fires exists. Helicopters are always situated in airports.
Veneto	Helipads aren't build for specific forest fire fighting use.
Piemonte	helipad are made in proximity to the water supply points
Lombardia	Temporary helipads are settled up in those areas showing a higher probability of forest fire occurrences. Characteristicsà dimensioned to helicopter size (with at least a 30 meters side) and linked to road network. The spatial location takes into account the minimum number of helicopter discharge during a forest fire event (15-20 per hour). There are also permanent helipads (shapefile of permanent helipads is available and will be provided).
Friuli Venezia Giulia	Helicopters clear cuts are made near fires to get off firefighter teams

6.2.1.9. Population advising

France	Radio, TV and ground patrols to communicate with the public in case of strong danger. Information is available on the tourism office and on the highways.
Switzerland	The population and the schools are sensible to the forest fires. In Ticino many fires are announced from the population to Tel 118 (fire). This allow a rapid intervention of the nearest fire brigade at the beginning of the fire. Meteoswiss and the Cantons advise the population of forest fire danger through the media and web.
Austria	The fire fighting operations and fire services are mandatory tasks for the local fire department. However, the task of accepting emergency calls on forest fires is done by the fire brigade organizations at province level in almost all provinces. As a consequence the local fire departments which are responsible for the fire district will get informed about the forest fire. This alarming procedure usually takes place by fire sirens located in the concerned municipalities. Regarding prevention there is no central fire command and no central service for alarming the general public about fire risk. The ZAMG (Austrian Central Meteorological Service) is providing a map of fire risk (based on FWI) which can be visited online. Based on this map, the emergency organisations at province level are alarmed by chance.
Germany	According to the "Guidelines for forest fire defence", the forest administration informs the public about forest fires in general and about the necessary precautions.
Slovenia	In general, warning signs in forests, brochures with information on fire hazard in forests published by Slovenia Forest Service, and occasional media release on fire hazards are most common information tools used in Slovenia. Some information is also given to pupils in elementary schools.
Veneto	Prevention campaign is addressed mainly to the primary and secondary schools. They are carry on by Regional Forest Service and Volunteers associations. In case of statement on of high forest fire alert the information is given at population by the media.
Piemonte	
Lombardia	Indirect prevention is related to activities against forest fires mainly on determinant causes. Activities include education and information on forest fires problem to population.
Friuli Venezia Giulia	Prevention campaign are made by Civil protection, Forest service and volunteers also through media. In case of danger for the population the information is given by civil protection

6.2.1.10. Operative zoning

France	France is structured by 7 "defense zones". The South and South-West ones are the most concerned by fires. Each of defense zones has a COZ (Zonal Operative Center). Alpes-Maritimes department (population = 1 million, altitude from 0 to 3143m, 4299km ²) is included in the South Defense Zone. This administrative department is protected by 1 command center (CODIS), 5 operative zones and 75 operational center. 4305 firemen protect this area (1328 professional and 2977 volunteers).
Switzerland	The firefighting organization in Switzerland is very decentralized. The local and regional fire brigades have the task to fight forest fires. These organization allow a rapid intervention at the place of the fire. The instruction and the equipment of the firemen is very different to Canton to Canton. Here the example of Canton Ticino:
Austria	There exists no specific map of operative zones for forest fire fighting. However, Austria is divided in 9 provinces, 15 towns with special status, 84 administration districts, and 2.350 municipalities. There are 4.527 voluntary fire brigades, 6 professional fire brigades for towns (Vienna, Graz, Linz, Salzburg, Innsbruck, Klagenfurt) and 328 professional fire brigades on enterprise level. In the provinces, the local volunteer fire departments or institutions are public bodies of the municipality or city. At the level of political districts within a province fire districts are used as an organizational unit for fire fighting operations. A fire district is led by a single organ called the district fire chief. The fire chief at province level is subject according to each district fire chief. Due to the size of political districts and the role in the operational area, the political districts are also divided into fire sections, which serve as an operational unit for fighting forest fires
Germany	
Slovenia	Slovenia is divided into seven regions. On the basis of a 10-year series of climatological data, marginal values of fire hazard grades that serve as a basis for the assessment of fire hazard in a certain region, are stipulated for each of the above seven regions
Veneto	The part of Veneto cover by forests (mountain, hill and coast) is dived in 25 homogeneous basic areas. The areas are based on administrative units and statistical analysis of fires history
Piemonte	The region is divided in 61 homogeneous basicall areas based on administrative units
Lombardia	Criteria used to define homogeneous areas for forest fire risk are based on administrative and environmental features. More in depth are related to :a) the administrative territorial units where voluntary groups can operate from (mountain communities, provinces and Parks). Another central issue in selecting homogeneous areas is the presence of local offices of the National Forestry Corps (Control Station, Provincial Coordination). b) the environmental features employed in the homogeneous areas design. These are a synthesis of different kinds of information: meteorological data (in particular temperature relative humidity, wind speed and total precipitation); information about vegetation cover (type and condition), snow cover obtained by satellite or aerial images; topographical information, obtained from a fine scale digital terrain model.
Friuli Venezia Giulia	The Region is divided in 4 homogeneous area based on administrative unit

6.2.1.11. Existing risk maps

France	Forest protection: elaboration of prevention plan. The aim of this work is the determination of the fire risk maps. More accurately, different methodologies exist to evaluate the fire risk ignition and fire risk propagation. - Elaboration of vegetation covers maps: those maps are realized with the collaboration of DDAF. They are mainly elaborated thanks to aerial photo and mainly by data collection in situ. Those maps are updated every 10 years. Some methodologies are actually tested with satellite photos. Spatial analysis tools and method are used.
Switzerland	
Austria	In this context there are usually no formal procedures or warning concepts for the operational use in fighting forest fires. Only through the personal commitment of individual managers, often in synergy with their profession as forester, operational procedures are worked out. These documents and the resulting measures, such as planning materials, water supply, infrastructure are therefore available only to a minor extent.
Germany	in areas with a high fire danger, forest fire fighting maps can be produced by the local forest administration in cooperation with the local fire service. These would include information about forest access, meeting points, potential helicopter landing sites, water sources and tree species composition.
Slovenia	For the purpose of planning fire hazard measures, forests in Slovenia are classified in four fire hazard grades, i.e. (Regulations on forest protection from 2000, Official Gazette of the RS, No. 114-5220/2009):
Veneto	In the regional forest map also the fire potential of every forest category is considered.
Piemonte	a risk map is made based on municipalities:
Lombardia	
Friuli Venezia Giulia	The plan specifies the danger areas of the Region and divided in three classes of danger.

Act. 6.2.2 -Alerting procedures

6.2.2.1. Public Emergency call number

France	112/18
Switzerland	118
Austria	122
Germany	112
Slovenia	112
Veneto	115, 1515
Piemonte	115, 1515 or 800807091
Lombardia	115, 1515 or 800061160
Friuli Venezia Giulia	115 or 800 500 300

6.2.2.2 Fire detection

In France

Daily risk index prevision is made by the Meteorological cell Elaboration of Risk Maps for the whole forest fire zone. This map is sent to the whole CODIS (Civil protection headquarter for an administrative area at medium scale) of the forest fire zone (15 departments, 80.000 km²). According to the risk map, national means (aircraft, fire brigades, military and gendarmerie) are sent for the high risk zone survey..

Concerning the fire outbreaks detection, there is a network of lookout towers (set up by the CODIS) or automatic detection system in some strategic places and patrols that criss-cross the massifs during fire season (with horses, motorbikes or vehicles).All emergency calls are received by CODIS.

After the SDIS consultation and by prefect delegation, and according to the daily risk, some tracks or ways in forested areas are closed for prevention purposes.

Watching persons are set up in the forested massifs. They transmit their observations and if any the alert by the radio network to CODIS.

Protection patrols, composed of two foresters on specific fire trucks vehicles equipped with a water tank: those patrols survey, detect and fight nascent fires.

Aerial patrols are defined each day, depending of the daily risk estimation. Aims is to detect and attack fire as soon as possible with the maximum of impact. Retardant products are used in this objective.

In Switzerland

All the calls for firefighters (118) are centralized in one operational Center for all the Ticino (2010). The operator of the Center alert the nearest firefighter unit. Every unit can assure 5-10 firefighters in the first 15 minutes on the place of intervention. The Firefighter Rescue Centers coordinate the use of the heli.

In Austria

Fire fighting operations and services are mandatory tasks for the local fire department. Emergency calls are accepted by fire brigades at province levels almost in all provinces, but in general these calls are directed to the fire brigade organizations at province or district level.

In Germany

At times of high forest fire danger, reconnaissance flights can be ordered by a superior officer (subordinate of StMI) in the administrative district concerned. The decision is based on the Baumgartner index value and on expert information from local foresters. The flights are carried out by the Bayerische Luftrettungsstaffel (Bavarian Air Rescue Squadron, subordinate of StMI). They use small helicopters and fixed-wing aircraft. There is usually one specifically trained pilot and an observer, who is usually a forester with additional training. Altogether, 159 fixed-wing aircraft and 5 helicopters with 300 voluntary pilots are available from 32 airfields for the whole of Bavaria. In case a fire or smoke is located, local fire-fighters can be alerted and guided by radio. Furthermore, local forest authorities can take additional measures, such as patrols by car or on foot, on a voluntary basis. The operational readiness of the fire services is not increased because they are also responsible for structural fire-fighting and technical help and have to maintain a maximum operational readiness throughout the year anyway.

In Slovenia

During the declared great or very great fire hazard, a Council is liable to organize fire hazard observing in informing in the area. Here, the following subjects are liable to take part: land owners, leaseholders and other users, the Inspectorate of the Republic of Slovenia for the Protection Against Natural and Other Disasters, the Inspectorate of the Republic of Slovenia for Agriculture, Forestry and Food, the Slovenia Forest Service, hunting associations, farmers, fire brigades, the Police, and others. Aviation clubs and other associations may also be integrated into the system of observing and informing on fires in the natural environment: they are selected by the Administration, which signs a suitable contract with them. For forests

and forest space, a contract can also be signed between the Slovenia Forest Service and the subjects engaged in fire observing and informing. Cooperation by the Police air support units and Slovenian Army in observing and informing on fires in the natural environment is organized by the Administration. Anyone participating in observing and informing in compliance with this decree and perceive fire hazard in the natural environment is liable to communicate such data to the Information Centre (Decree on fire protection in the natural environment, Official Gazette of the RS, No. 4-106/06). In the Postojna Regional Information Centre, orderly duty for the monitoring of the Kras video observation system is put in force. During an increased fire hazard grade, aviation observation flights are implemented. Aviation observation flights are coordinated by the Administration of the Republic of Slovenia for Civil Protection and Disaster Relief via regional information centres. Flights are made over fire-threatened areas in compliance with the annual programme or per instructions of the Civil Defence's regional information centre or headquarters. They are implemented in such a manner that a thorough control over the fire-threatened area is provided for (National plan 2007).

At the time when great or very great fire hazard is declared, a Council is liable to organize, in cooperation with land owner, leaseholders or other land users and on the basis of municipal forest fire protection plans, plans for protection and disaster relief during great fires in nature, or on the basis of the forest fire protection plan, a fire watch, which can start putting out eventual fire in the shortest possible time (Decree on fire protection in the natural environment, Official Gazette of the RS, No. 4-106/06). Fire watch can be carried out only by fire brigades in compliance with the fire fighting law. Fire watch must be implemented until increased fire danger persists (Fire protection law, Official Gazette of the Republic of Slovenia, No. 3-102/07). The Administration's competent branch office can exceptionally allow fire making or burning in the natural environment during the period, when great or very great fire hazard is declared, to be carried out by legal and natural persons that are engaged in forest management, although only in preliminarily protected places and with an organized fire watch. In the natural environment areas that are particularly endangered by fires, it is prohibited, in the period when great or very great fire hazard is declared, to use any appliances or to carry out activities that may cause a fire, except for exceptional cases (Decree on fire protection in the natural environment, Official Gazette of the RS, No. 4-106/06).

In compliance with the regulations concerning fire protection in the natural environment, the

Service can participate in fire hazard observing and informing during the proclamation of very great or great fire hazard. On the basis of forest-fire protection plans, the Service can offer professional aid in fire fighting (Regulations on forest protection, Official Gazette of the Republic of Slovenia, No. 114-5220/2009).

Most of the fires are reported by the general public, but also by other authorities as mentioned above. The seeing of fire is reported by special emergency number 112 and therefore received by one of 14 regional offices of Administration for civil protection and disaster relief.

In Italy

- Veneto

Surveillance and prevention is carried out by Regional Forest Service personnel (SFR)- and volunteers (Volontari AIB). AIB is an voluntary organization which has to sign a convention with the Veneto Region - Forest Directorate in order to be authorized for surveillance and suppression activities. All activities carried out by AIB have to be agreed upon by AIB Volunteers and SFR official responsible for the province. National Forestall Corp is patrolling the most dangerous areas during high alert status.

- Piemonte

Surveillance and prevention are coordinated and carried out by Piemonte Region. Surveillance and prevention are carried out also by Piemonte Region, CFS (State Forest Corps) and Firefighting Volunteers (AIB Volunteers). AIB is a voluntary organization which has a contract according to the Convention with the Piemonte Region. All the sightings are received by the SOUP (Unified Permanent Operational Room) composed by: regional functionaries, functionaries of the CFS, AIB volunteers, technical consultants. In case of necessity there could be also workers of the Fire Brigades. The SOUP is coordinated by Piemonte Region, Civil Protection dept. At the present time the SOUP doesn't work, but it works with the same goals the Operational Room of the CFS.

- Lombardia

Surveillance and prevention is carried out by forestry service personnel (CFS - Regional Forest Corps) and Local authorities Firefighting Volunteers (AIB Volunteers). Regione Lomb. prot. civ.

In Lombardia region there are two main types of automatic forest fire detection: o terrestrial systems based on monitoring from ground monitoring stations (cameras) and aero and satellite systems based on monitoring from satellites.

- Ground monitoring stations

Ground monitoring stations in Lombardia region are based on cameras in visible and near infrared located in strategic places. The automatic system allows to detect a source of heat in a distance of 25-30 km with a low rate of false alarms. The system is composed by 31 stations and an operative centre. 12 cameras are directly managed by Lombardia region (shapefile of cameras is available and will be provided).

- Aero and satellite ground monitoring system is integrated by aerial monitoring. Planes are equipped with high spatial resolution cameras and a GPS system. GPS data allow for georeferencing and for orthorectification of the captured images in post-processing. Acquired images and data can also be send in real time to the operative centre of civil protection.

This system allow to:

- provide information and images on forest fire behaviour;
- survey and mapping burned surface in real time;
- provide to local entities (municipalities, mountain communities, etc.), during a forest fire, real time data useful for better coordination of suppression activities.

Starting from 2006 a project research was financed to develop remote sensing monitoring system with first encouraging results.

- **Friuli Venezia Giulia**

Surveillance and prevention is carried out by Regional Civil Protection by 24h Operative centre (OC), Firefighting Volunteers (AIB Volunteers), Regional Forest Corp (RFC-Regional Forest Corp) and National fire Brigade (NFB). Every municipalities have a Civil Protection Volunteer groups total 218 groups, 120 of them have also AIB teams. The regional Plan authorizes RFC, AIB volunteers, Fire brigade to surveillance and suppression activities. All activities carried out by CFR, AIB and NFB have to be coordinated by Operative centre of civil protection that is responsible for wildland fires in the Region and have the strategic directions of operation. The OC update and control every day the authorized fires in the region by a database.

6.2.2.3 Alert gestion (management)

In France

Daily risk index prevision is made by the Meteorological cell Elaboration of Risk Maps for the whole forest fire zone. This map is sent to the whole CODIS (Civil protection headquarter) of the forest fire zone (15 departments). According to the risk map, national means (aircraft, military and gendarmerie) are sent for the high risk zone survey. On the CODIS demand, national means are sent (aircraft, helicopters, and reinforcement troops).

DDAF set up watching persons in the forested massifs. They transmit their observations and if any the alert by the radio network to the double patrols DDAF/DDSIS. CODIS gives out the alarm and assigns means that are outside of forest fire zone.

In Switzerland

In Austria

Emergency calls are accepted by fire brigades at province levels almost in all provinces, but in general these calls are directed to the fire brigade organizations at district or municipality level. The responsible personel in the fire brigade organization at province level identifies the person who made the call and locates the forest fire inside the district based on the information content which was communicated.

In Germany

In Germany there is no specialized forest fire service. The municipalities are responsible for their local fire services, but a common framework is set by state and federal authorities, which include alerting and radio operations. Until recently, control centres were run by the fire services of major towns (which are managed 24 h a day). Now, control is being integrated into fire control centres, ambulance centres, etc. which cover a larger area (several counties). These control centres recieve emergency calls by the general public (most forest fires are detected by the general public), but also from other authorities.

In Slovenia

Information on fire is received by one of 14 regional offices (13 regional with one national) of ACPDR by observers calling the 112 number. The information is transmitted to the Information centre of the Republic of Slovenia (ICRS). The public is informed on the level of

danger and tasks of protection, rescue and aid that are being taken by different services via media, like TV, radio, internet. Information procedure is organized by the Government communication office.

Slovenia uses 5-level fire danger scale (very low danger, low danger, moderate danger, great danger, very great danger). Levels are primarily established by Environmental Agency of the Republic of Slovenia (EARS) on the basis of fire index value and statistically defined thresholds for 16 different areas in Slovenia. However, great or very great danger level is proclaimed by ACPDR in cooperation with the Slovenian Environmental Agency (EARS), Ministry of agriculture, forestry and food and Slovenia Forest Service. When one of these levels takes place:

- special measures for protection against fires in natural environment have to be taken by land owners, municipalities, railroad services (etc. reduced train speed), electric distribution services: (1) to make fire, to burn objects/matter, or to use open fire; (2) to leave or discard burning or other objects/matter that may cause a fire
- municipalities have to, in cooperation with land owners/managers or other users of land, organize a fire watch
- video surveillance system Kras is set up
- surveillance flights can be organized by ACPDR and air flight associations

In Italy

- Veneto

Spotting the fire and giving out the alarm: The alarm is received usually by National Forestall Corp (CFS) (emergency number 1515), or by Fire Brigades (VVF) (emergency number 115), the respective operations rooms will immediately give out notice to the Regional Operations Center (COR). The COR notify the SFR available official responsible for the area and the CFS operations Room for surveys and statistics. In case alarm come from other ways the COR diffuse the alarm to CFS and VVF.

- Piemonte

The alarm is recieved usually by State Forest Corps (CFS) (emergency number 1515), or by Fire Brigades (emergency number 115), then they all give the informations to the SOUP (Unified Permanent Operational Room), at the present time to the Operational Room of the CFS, which starts up the alarm procedure:

- receives and divides the flow of informations and aids the taking of decisions of the working teams, it sends the aerial units and other supports.

- decides the priority of intervention.
- provides to coordinate the ground units, the regional aerial units and to ask for the aid of state's aerial units.

- **Lombardia**

The Technical Group of the Regional Operations Centre of Civil Protection monitors the evolution of forest fires, in a continuous comparison with forecasts and updates edited by CFR / ARPA-SMR, through a remote sensing system, with fixed cameras located in strategic locations within the region and indicating possible factor promoting forest fires; Verify data and satellite images on the early detection of forest fires;

In presence of Alert Code 1 - "ORDINARY CRITICITY" the territory surveillance is assured only by the operational regional structures, sufficient to cope with forest fires potentially.

Once received the FOREST FIRES WARNING in presence of:

-> Code 2 (MODERATE CRITICITY)

-> Code 3 (HIGH CRITICITY)

security services and patrol are enabled.

- **Friuli Venezia Giulia**

The alarm is received usually by Regional civil protection operative centre (OC) (emergency number 800500300), or by Fire Brigades (emergency number 115) that send the call to OC, the OC control the authorized fires data base and will immediately give out notice to the competent RFC Station. RFC have the operative direction in the field (suppression operations director SOD).

6.2.2.4 Alert diffusion

In France

The CODIS (operational centre of fire-fighters) of each administrative department (101 CODIS for France) gives out the alert and upon its request, means for fire fighting on national level can be provided. COZ manage the reinforcement outside of the concerned administrative area.

In Switzerland

In Austria

Local fire departments working in the district will get informed on the alarm, usually by sirens located in the concerned municipalities. At the level of political districts within a province fire districts are used as an organizational unit for fire fighting operations. A fire district is led by a single organ called the district fire chief. The fire chief at province level is subject according to each district fire chief. Due to the size of political districts and the role in the operational area, the political districts are also divided into fire sections, which serve as an operational unit for fighting forest fires. For fighting the fire no formal procedures are available at the level of the local fire department, the province or national level. These procedures are implemented individually by each fire district in the province. There is a informal exchange of experiences and trainings ongoing, however there exist no universal procedures especially for fire fighting. Only through the personal commitment of individual managers, often in synergy with their profession as forester, operational procedures are worked out. These documents and the resulting measures, such as planning materials, water supply, infrastructure are therefore available only to a minor extend.

In Germany

According to the situation, one or several fire services will be alerted by public address system (services which are managed 24 h a day), siren or a pager (volunteer fire services and off-duty professional firefighters). In subsequent radio instructions and pager messages, predefined sets of keywords for different situations are used (short codes for specific fire-events/-situations). These keyword are also used for giving an idea on resources needed for firefighting.

In Slovenia

Carried out by one of regional offices of ACPDR upon the demand of chief of intervention (primarily the chief of the fire brigade that came to the site first), commander of ACPDR or the mayor (representative of municipality). Sirens, as a mean of alarm, can be used by fire fighting brigades themselves, but regional offices of ACPDR have to be notified about it as soon as possible.

Fire brigades and Slovenia forest service are activated by regional offices of ACPDR in accordance with provisions of activation plans, which are elaborated by competent fire fighting associations and Slovenia forest service.

Work of fire fighting brigades is carried out in accordance the national and regional plans (detailed provisions of national plan) for protection and rescue in the case if great fire in natural environment. When great or very great fire occurs, regional plan can be activated. It (or its provisions) is activated upon request of the chief of the intervention, who first has to consult with the regional commander of ACPDR. Besides, commander of fire fighting association and video surveillance system Kras are activated.

Upon the decision of the top commander of ACPDR, national plan can be activated. By that, regional commander of ACPDR and headquarters personnel are activated.

Upon the request of the chief of intervention, ICRS can activate helicopters of Slovenian army forces and in cooperation with police also police helicopters, which have the necessary equipment.

Help from fire fighting brigades from neighbouring countries can be requested for from the commander of a regional civil protection office, responsible for the area where fire is taking place, but the commander of the civil protection in general has to be asked for permission. The same procedure goes vice-versa, that is, when neighbouring countries are asking for help. Offices of civil protection can contact the regional office, but actions have to be approved by the commander from the chief office of civil protection.

In Italy

- Veneto

After the alarm, SFR notify the volunteers. In the case where fire spots AIB volunteers, they notify SFR and then they latter notify the COR and they then the CFS Operations Room. COR is responsible for informing the provincial command of VVF personnel, for future activation of SFR and/or voluntary AIB from other provinces and for activate aerial support. Any subsequent updates on the situation are given out by SFR. From the first alarm onwards

all information should follow the path: COR - SFR available official - professional and volunteers AIB operators.

- **Piemonte**

After the alarm the SOUP or the Operational Room of the CFS, asks for the intervention of the local station of the CFS (State Forest Corps) and for the local team of the AIB volunteers. Any subsequent updates of the situation are given out by the SOUP or by the Operational Room of the CFS. From the first alarm onwards all information should follow the path: CFS, AIB, Fire Brigades. The CFS:

- directs the operations of putting the fire out;
- coordinates the actions of the AIB Volunteers;
- in case of danger threatening houses it alerts the Fire Brigades

- **Lombardia**

1.a The Technical Group of the Regional Operations Centre of Civil Protection, if estimates of danger degree is at least "high and very high", assesses the ground effects and expectations resulting from hazardous conditions, suggesting to the Director of Civil Protection to issue a NOTICE OF REGIONAL RISK CRITICALITY for forest fires.

2.a The accountable manager of Civil protection, on the basis of the Bulletin estimates in terms of danger of forest fires and estimation of ground effects, delivers a notice the critical status as follow:

Alert Code 2 -> danger degree "HIGH AND VERY HIGH" corresponding to a "MODERATE CRITICITY" status ;

Alert Code 3 -> danger degree "EXTREME" corresponding to an "HIGH CRITICITY" status;

2.b The FOREST FIRES WARNING is transmitted by Regional Operations Centre of Civil Protection personnel, thorough Integrated Secure Email service, fax and/or SMS, to:

- National Civil Protection department - Rome/ National Operations Centre
- National Civil Protection department / Unified Aerial Operational Center (COAU)
- Provincial Prefectures
- National Forestry Corps (Regional Operations Centre for Prevention and Fight against Forest Fire Service)
- Provinces
- Mountain Communities
- Regional Fire Department service centre

- Regional territorial offices
- ERSAF offices
- Parks and Nature Reserves
- Environmental Protection Agency of Lombardia Region- SMR
- National Organization of Mountain Military Corp – (Associazione Nazionale Alpini - ANA)
- Ticino and Grigioni canton, Switzerland

2.c The FOREST FIRES WARNING is published on the Regional Centre of Civil Protection public Web site (as well as on the regional web-site of Prevention and Fight against Forest Fire Service).

- **Friuli Venezia Giulia**

The RFC confirms the fire and demands means and equipment to OC. The OC Alerts the volunteers and air fleet if its necessary. The OC could alert voluntary AIB from other municipalities or other Agencies involved in the fire. Any subsequent updates on the situation are given out by RFC to OC. If the fire is on the Border there is an specific Agreement between the neighbouring Nations for notify the fires

Act. 6.2.3 Suppression strategies and actions

6.2.3.1 Laws and/or regulaments for proceduræs in suppression operations

	Laws and/or regulaments (National Level)	Laws and/or regulaments (Local Level)
France	Civil protection law (2004) / National guideline	Civil protection law (2004) / National and Regional guideline
Switzerland	Federal law of the protection of the population --> Every Canton has the task to concretize the federal dispositions concerning forest fire fighting	Each one of the 24 Cantons is called to establish its own rule in fire fighting issues
Austria	Federal Constitution Bundes-Verfassungsgesetz (B-VG - Article 10-12, 15 and 118) --> Forest fire service is within the responsibility of the provinces	9 different fire laws regulate therefore the foundations for firefighting at the provincial level
Germany		
Slovenia	Official Gazete of the Republic of Slovenia, Fire service act No. 113-5006/2005	
Veneto	National law 353/2000 --> regions are in charge to organize forest fires fighting operation through the regional plan	Regional law 6/1992
Piemonte	National law 353/2000 --> regions are in charge to organize forest fires fighting operation through the regional plan	Regional law (D.G.R. 18-10306/2003)
Lombardia	National law 353/2000 --> regions are in charge to organize forest fires fighting operation through the regional plan	Regional law 31/2008
Friuli Venezia Giulia	National law 353/2000 --> regions are in charge to organize forest fires fighting operation through the regional plan	DPR 136/1998

6.2.3.2 Fire fighting actors and rule

National Level

	Entities	Operational centre (Coordination)	RULE
France	Ministry of the Interior --> French Civil Protection "Direction de la Sécurité Civile"	National headquarter of the Civil Security (COGIC)	National and international reinforcement asks
Switzerland	Federal authorities - Confederation	-	
Austria			
Germany	Bavarian State Ministry of the Interior & subordinates	-	
Slovenia	Ministry of Defence	Information Centre of the Republic of Slovenia	The operational-communication tasks of observing, activating and alarming during natural and other disasters as well as other emergencies and events pertinent for the protection from natural and other disasters in the country
Veneto	Ministry of the Interior --> National department of Civil Protection, National Forestry Corps, National Fire Brigades	National Civil Protection: Unified Permanent Operational Room (C.O.A.U.)	Coordination of Air Fleet of National Department of Civil Protection
Piemonte	Ministry of the Interior --> National department of Civil Protection, National Forestry Corps, National Fire Brigades	National Civil Protection: Unified Permanent Operational Room (C.O.A.U.)	Coordination of Air Fleet of National Department of Civil Protection
Lombardia	Ministry of the Interior --> National department of Civil Protection, National Forestry Corps, National Fire Brigades	National Civil Protection: Unified Permanent Operational Room (C.O.A.U.)	Coordination of Air Fleet of National Department of Civil Protection
Friuli Venezia Giulia	Ministry of the Interior --> National department of Civil Protection, National Forestry Corps, National Fire Brigades	National Civil Protection: Unified Permanent Operational Room (C.O.A.U.)	Coordination of Air Fleet of National Department of Civil Protection

Zonal Level (region, headquarter)

	Entities	Operational centre (Coordination)	RULE
France	Depend to the DSC (national level)	7 Zonal headquarters (COZ) for France	Crisis management (police, army, firemen, specialized units). Coordination of aerial means. Coordination of national and international reinforcement
Switzerland	Every Canton has the task to concretize the federal dispositions but regional and local fire service (or forestry service) is responsible for forest fires fighting	Rescue Center	
Austria			
Germany		Fire Services operational room	
Slovenia	Regional offices of Administration for civil protection and disaster	Regional Information Centres	It activates fire brigades
Veneto	The jurisdiction about forest fires in Veneto is of Veneto Region administration. It work through the "Directorate of Forests and Mountain Economy"	The directorate have a central Regional Operative Center (Centro Operativo Regionale -COR)	It starts up the alarm procedures. It aids the working teams to take decisions. It sends the aerial units and other supports. It decide the priority of interventions. It provides to coordinate the ground units in contact with Local Forestal Service and the Firing Operation leader (Direttore delle Operazioni di Spegnimento - DOS)
Piemonte	National Forestry Corp, Regional Civil Protection, National Fire Brigade	Regional Operative Centre of National Forestry Corps (CFS-AIB, Coordination of resources), Permanent and Unified Operations Room (SOUP)	It starts up the alarm procedures. It aids the working teams to take decisions. It sends the aerial units and other supports. It decide the priority of interventions. It provides to coordinate the ground units in contact with local station of Forestry Corps and the Firing Operation leader (Direttore delle Operazioni di Spegnimento - DOS)
Lombardia	National Forestry Corp, Regional Civil Protection, National Fire Brigade	Regional Operative Centre of National Forestry Corps (CFS-AIB, Coordination of resources), Permanent and Unified Operations Room (SOUP)	It starts up the alarm procedures. It sends the aerial units and other supports. It decide the priority of aerial means interventions. It provides to coordinate the ground units in contact with local station of Forestry Corps and the Firing Operation leader (Direttore delle Operazioni di Spegnimento - DOS)
Friuli Venezia Giulia	Regional Forestry Corp, Regional Civil Protection, National Fire Brigade	Regional Operative Centre of Civil Protection	It starts up the alarm procedures. It aids the working teams to take decisions. It sends the aerial units and other supports. It decide the priority of interventions. It provides to coordinate the ground units in contact with local station of Regional Forestry Corps and the Firing Operation leader (DOS)

Field level

	Fire fighting Units (composition)	Local Operational centre (Coordination)	RULE
France	Departmental forces – professional and volunteers in the same corps with the same training and the same tools. Fire-fighters manage the forest fire crisis.	99 Operational centre « CODIS » for France	Crisis management, grounds coordination and reinforcement asks
Switzerland	The fire fighting services is a local competence (Municipality). First intervention: regional and local firefighter brigades (professional and Volunteers), Police, Rescue. In support: Civil protection, Army, Technical services		
Austria	Fire fighting operations and fire services are mandatory tasks for the provincial and local fire departments (professional firefighters)		
Germany	Volunteer fire services and off-duty professional firefighters		
Slovenia	Fire fighting units and workers of the Slovenia Forest Service		
Veneto	Regional Forest Service's personnel, Voluntary groups, Firefighters personnel	Five local Forestal Services (Servizi Forestali Regionali - SFR)	Coordination of aerial and ground units in contact with the Regional Coordination Center (Centro Operativo Regionale -COR)
Piemonte	National Forestry Corps personnel, Firefighters personnel, personnel of Mountain Communities, Provinces , Parks and Voluntary groups	Local station of National Forestry Corps	Coordination of ground units in contact with the Regional Operative Centre of National Forestry Corps (CFS-AIB)
Lombardia	National Forestry Corps personnel, Firefighters personnel, personnel of Mountain Communities, Provinces , Parks and Voluntary groups	Local station of National Forestry Corps	Coordination of ground units in contact with the Regional Operative Centre of National Forestry Corps (CFS-AIB)
Friuli Venezia Giulia	Regional Forestry Corps personnel, Firefighters personnel, Civil protection personnel, Parks and Voluntary groups	Local station of Regional Forestry Corps	Coordination of ground units in contact with the Regional Operative Centre of Civil Protection

6.2.3.3 Fire fighting Coordination

	Coordination of fire fighting operations	Aerial means request (who)
France	The highest rank officier present in the site is the DOS	The DOS once evaluated forest fire spread scenario can ask for aircraft state action and reinforcements to the CODIS. He decide tactics and strategy.
Switzerland		
Austria	The operational control for a single forest fire operation has the district forest officer, or the owner of the affected area.	
Germany	District fire chief	
Slovenia	The chief of the fire brigade in place	Commander of a regional civil protection office, responsible for the area where fire is taking place.
Veneto	The role of Fire operation leader (DOS) is taken from an official of Regional Forest Service, specialist in forest fire fighting	The DOS once evaluated forest fire spread scenario can ask for regional helicopter or aircraft state action to the Regional Coordination Center (COR)
Piemonte	Under the supervision of a Firing Operation leader (Direttore delle Operazioni di Spegnimento - DOS), usually a National Forestry Corp officer (the highest rank officier present in the site) or a District Operations Responsible. He is also responsible for suppression operations and coordination of the voluntary groups	The DOS once evaluated forest fire spread scenario can ask for aircraft state action to the CFS Operational center
Lombardia	Under the supervision of a Firing Operation leader (Direttore delle Operazioni di Spegnimento - DOS), usually a National Forestry Corp officer (the highest rank officier present in the site) or a District Operations Responsible. He is also responsible for suppression operations and coordination of the voluntary groups	The DOS once evaluated forest fire spread scenario can ask for aircraft state action to the CFS Operational center
Friuli Venezia Giulia	Under the supervision of a Firing Operation leader (Direttore delle Operazioni di Spegnimento - DOS), usually a National Forestry Corp officer (the highest rank officier present in the site) or a District Operations Responsible. He is also responsible for suppression operations and coordination of the voluntary groups	The DOS once evaluated forest fire spread scenario can ask for aircraft state action to the Regional Operative Centre of Civil Protection

6.2.3.4 Fire fighting training courses

	Description	Levels
France	<p>Standard1 : FDF1 It is the first training course for the forest fire special field. It is organised by the fire fighter home department. Any person involved in a forest fire fighting should, at least, had passed this course. It represents a 40 hour training (theory and practice). At the closing of the training course, the personnel is able to utilise all the equipment available for forest fire suppression purpose, able to ensure his own safety and the others' safety. He has also got notions of topography (being able to read a map, to locate on a map, to maintain safety zone close at hand, to identify the fire prevention management...). He obtains so the title of team member during the forest fires. The second class fire fighters can apply for this training course.</p> <p>Standard2 : FDF2 It represents a 40 hour training (theory and practice). It is organised by the fire fighter home department. It is open to everyone starting from the corporal rank. At the closing of the training, the personnel is able to lead the team of a forest fire truck, to use the radios, to assign work task to the aerial resources on scene... Thus, he obtains the title of chief of equipment.</p> <p>Standard3 : FDF3 This training is provided only at the CIFSC in Valabre (Civil Security Interregional Training Centre). It represents a two week training, one week for the theory at the Valabre centre, and one week for practising in a department. It is open to everyone starting from the sergeant rank. At the closing of the training course, the personnel is able to lead a forest fire group (4 trucks). Thus, he obtains the title of chief of group.</p> <p>Standard4 : FDF4 This training is provided only at the CIFSC in Valabre (Civil Security Interregional Training Centre). It represents a two week training. It is open to everyone starting from the first officer rank (major). At the closing of the training course, the personnel is able to lead a column (4 groups). Thus, he obtains the title of head of sector.</p> <p>Standard5 : FDF5 This training is provided only at the CIFSC in Valabre (Civil Security Interregional Training Centre). It represents a two week theoretical training. It is open to everyone starting from the high rank officer (commandant). At the closing of the training course, the personnel is able to lead a site (chief of site). Thus, he obtains the title of chief of site. He is the relief commandant during large scale fires.</p> <p>Specialized training courses on Tactical Fires Different level of teaching to understand tactics, strategies and security for the tactical fire use.</p>	5
Switzerland	<p>1. Basic training (all the firefighter) 2. Technical and tactical training (officers)</p> <p>In addition: * workshops for chiefs of intervention * in field training in scale 1:1 annually for every firefighter unit</p>	2
Austria		
Germany		
Slovenia		
Veneto	<p>BASIC COURSE for operators involved in fire fighting (16 hours over a weekend - 2 days), theoretical issues: legislation, organization, fire extinguishers, extinguishing techniques, equipment and vehicles, safety, radio equipment. Practical issues.</p> <p>SPECIALIZATION COURSE IN USE OF HYDRAULIC TOOLS - 8 hours</p> <p>SPECIALIZATION COURSE FOR FOREST FIRE FIGHTING TEAM LEADER - 24 hours The course provides the knowledge for coordination of fire fighting operations (men and means logistic, safety, communications, management).</p>	3

Piemonte	<p>SPECIALIZATION COURSE - Basic training for all people involved in fire fighting field operations (theory and practice)</p> <p>SPECIALIZATION COURSE FOR FOREST FIRE FIGHTING TEAMS LEADER</p> <p>SPECIALIZATION COURSE FOR FOREST FIRE FIGHTING TEAM LEADER IN SUPPRESSION OPERATIONS (DOS) → in field training (the number of training is defined "a priori" on the basis of the regional operative procedures)</p> <p>SPECIALIZATION COURSE FOR OPERATIONAL ROOM RESPONSIBLE</p>	3
Lombardia	<p>SPECIALIZATION COURSE - FIRST LEVEL (minimum 27 hours) All people involved in forest fire fighting have passed this course. It consists of 27 hour training (13 theory and 14 practice). At the end of the training course, the personnel should have a general overview about forest fires (typologies, characteristics, statistics) techniques, means and tools for forest fire fighting. Part of the course focuses also on personal safety concepts.</p> <p>SPECIALIZATION COURSE - SECOND LEVEL STANDARD TRAINING (FOR FOREST FIRE FIGHTING TEAMS - minimum 27 hours) This course is delivered to forest fire fighting teams in two parts: a classroom session followed by a practical outdoor session with working equipment. The course is centred on: fireline organization, fundamentals of forest fire control, effects of weather, topography, and fuels on fire behaviour, forest fire suppression tools, forest fire suppression, personal safety.</p> <p>SPECIALIZATION COURSE FOR FOREST FIRE FIGHTING TEAM LEADER (minimum 27 hours) It consists of 27 hour training (theory and practice). This course is delivered to forest fire fighting team's leaders in two parts:</p> <p>SPECIALIZATION COURSE FOR FOREST FIRE FIGHTING CREW TRANSPORTED WITH HELICOPTER (min. 18 hours) The course is arranged in 18-20 hours' training (7 theory and 13 practice) focusing on: tasks and rules for transported teams, procedures and actions during flight and landing phases, management of charge and discharge for material and tools.</p> <p>SPECIALIZATION COURSE FOR FOREST FIRE FIGHTING TEAM LEADER IN SUPPRESSION OPERATIONS - DOS (minimum 60 hours) The course provides the knowledge for coordination of fire fighting operations (men and means logistic, safety, communications, management).</p> <p>In addition: * in field training in scale for every firefighter unit</p>	5
Friuli Venezia Giulia	<p>1. Basic course and training for operators in Civil Protection (a.l. Volunteers involved in civil protection)</p> <p>2. Specialization course for forest fire fighters (Theory)</p> <p>3. Specialization course for forest fire fighters (Practic)</p> <p>In addition: * in field training in scale 1:1 annually for every firefighter unit:</p>	3

6.2.3.4 Fire fighting international agreements

	International agreements (yes/no)	List of international and national agreements (country)	Mutual international personnel training (yes/no)	Mutual national aid or personnel training (yes/no)	Mutal Aids Protocols
France	yes	Liguria Region, Piedmont region (Italy)	no	yes	Yes (Protocole d'entente entre les préfctures d'Impéria et des Alpes-Maritimes pour la gestion commune de l'urgence) for : - Forest fire - Police - Boundaries survey - Highways security
Switzerland	yes	Lombardia region (Italy)			
Austria	yes	Slovenia, Region of Friuli Venezia Giulia (Italy)			
Germany	yes				
Slovenia	yes	Region of Friuli Venezia Giulia (Italy)	yes	yes	
Veneto	yes	Region of Friuli Venezia Giulia (Italy)			
Piemonte	yes	Liguria Region, Valle d'Aosta region, Puglia region (Italy)	no	yes	Yes (Protocole d'entente entre les préfctures d'Impéria et des Alpes-Maritimes pour la gestion commune de l'urgence)
Lombardia	yes	Canton of Ticino, Canton of Grigioni (Switzerland)	no	yes	
Friuli Venezia Giulia	yes	Slovenia, Region of Carinthia (Austria)	yes		

6.2.3.5 Fire fighting specific operational protocols

France	National guideline – regional guidelines
Switzerland	
Austria	
Germany	
Slovenia	
Veneto	<ol style="list-style-type: none"> 1. National Forestry Corps: operative rules for measures of perimeters and areas covered by the fire. 2. Fire Brigades: operative rules in case of forest fires and mix urban/forest fires, is being defined. 3. Volunteers associations: operative procedures for prevention and extinguishing actions.
Piemonte	
Lombardia	<ol style="list-style-type: none"> 1. Operational procedures for aerial monitoring service 2. Operational procedures for forest fire fighting crew transported with helicopter 3. Procedures for forest fire fighting volunteers teams operations 4. Procedures for the prevention of accidents arising from activities of forest fires fighting
Friuli Venezia Giulia	

6.1 Regional details

France

Introduction

The Ministry of agriculture, the ministry of the Interior, territorial collectivities and forest owners, have set up the forest fire prevention policy.

This policy contains four types of actions:

- To know the risk and the fire causes
- Set up of strengthened meteorological observation networks by the regular evaluation of fuel moisture content.
- Researches are conducted in order to identify the fire causes, allowing a daily prevention and fighting means deployment more efficient
- To keep watch on the forest in order to detect any fire start. During the high fire risk season, the forest observation combines ground fixed lookout, or mobile with different kind of patrols
- To supervise the forest fire equipment

Protection plan integrate prevention management (sylviculture, agriculture, clearing) and sometimes high-tech surveillance equipment. They are completed by a cartography system.

- To inform and increase the public awareness
- Education in the academic environment
- Professional training
- Information to the public (vacationers, land owners...)
- Information exchange between the whole actors concerned by the forest fires.

Three different Ministries are concerned with the forest fire management activities:

- Ministry of the Interior through the French Civil Security: the DDSC is in charge of the prevention part in collaboration with the Ministry of Agriculture and of the operational part through several operational centres
- Ministry of Agriculture, which is in charge of the prevention and forest management.

- Ministry of Territorial Management and Environment: participates in the rural area and forest management policy

The main tasks of the French Civil Security are:

- Prevention of all type of risks (civil, natural, technological...)
- Person protection
- Protection of property and equipment
- Environment protection (forest fires, pollution...)

The French Civil Security is represented at three levels through operational centres National level:

- Ministry of the Interior- Civil Defence and Security Department: the operational centre of this Department is the COGIC
- Zonal level: Prefecture of the Zone – Civil Defence and Security Headquarters: the operational centre at this level is the COZ.
- Departmental level: the operational centre at this level is the CODIS

The Director of the Civil Defence and Security is a high-ranking official, Prefect, appointed by the Ministry of the Interior. To fill his mission, the Director has constituted an operational centre, the COGIC, the national headquarter of the Civil Security.

This operational centre is in direct relation with the seven zonal headquarters: the operational centre of the zonal headquarters is the COZ. Each COZ is managed by a headquarter chief (professional fireman) who is under the zonal sub-prefect and prefect. The zonal prefect is the State representative at the zonal level and entrusts the sub-prefect the defence and civil security mission. The zonal headquarter is the interface between the departments of each zone and the direction of the Civil Defence and Security.

Each department has a departmental direction managed by a fireman officer, the operational centre of this direction being the CODIS.

Ministry of Agriculture:

- Represented at the national level by ONF
- Represented at the regional level by the DRAF
- Represented at the departmental level by the DDAF and the departmental or inter departmental agencies

Fire prevention

In France, prevention is managed by foresters ONF (National Forest Office), INRA (National Institute of Agriculture Research depending from Ministry of agriculture) and CODIS (civil protection headquarter / Ministry of the Interior).

ONF is a public establishment, under the Ministry of Agriculture authority. It is composed of a general direction, 10 territorial directions, 67 departmental agencies and 500 operational units.

In the frame of the fire prevention, the missions of the ONF are:

Forest protection: elaboration of prevention plan. The aim of this work is the determination of the fire risk maps. More accurately, ONF applies different methodologies in order to evaluate the fire risk ignition and fire risk propagation.

Elaboration of vegetation covers maps: those maps are realised with the collaboration of DDAF. They are mainly elaborated thanks to aerial photo and mainly by data collection in situ. Those maps are updated every 10 years. Some methodologies are actually tested with satellite photos.

Forest management; ONF realises the firebreaks, in order to reduce the fire risk ignition and the fire propagation. They propose the number of water tanks that have to be in a given forested area for the fire fighting.

Public information

Repression: if people don't respect the instructions given in the forested areas.

The prevention plans are conducted at the forest « massif » scale (PIDAF) or at the communal scale (PPRIF). PIDAF is a contractual management plan which aims at preventing fire by defining the forest management and areas to clear in order to prevent fire outbreaks and propagation.

The PPRIF is a regulation plan, which defines the risk level and implies safety rules and obligations to the new buildings for example.

DFCI (Forest Protection against the fire): Doctrine and general strategy

A multisectorial and global response :

- Prevention policy
- Operational forecasting or foresight
- Firefighting organization

Overall, it should adopt the same approach :

- To analyze / To act / To assess

There are no results without interaction and/or without global or systemic approach ...

There is a great difficulty by the plurality and diversity of the actors

- ⇒ Need to refer to a general strategy
- ⇒ Need to induce, encourage, coordinate and control the actions

Why a global strategy

- A common approach: referencial
- An idea of collective operation which makes sense only in a clear and organized sharing
- Intellectual approach ... tends to application guidelines
- From the knowledge of the « enemy » to the application of proven solutions (what do we cope with what, how ...)
- Two fundamental principles
 - Global approach
 - Anticipation
- Four main objectives
 - Reducing fires (number)
 - Control outbreaks in the initial stage (starting fires)
 - Limit the catastrophic fire developments (land planning and all)
 - Rehabilitate burned areas (soil erosion, fuel mitigation...)

Global approach

- A long belief in miracle answers
- The deep limit of the partial actions
- Forest fire is a complex domain and area
- Different field and different population, drive the solutions
- Lead the search for interactive solutions
- Give the maximum amplitude at each of the committed funds and grants
- Need for a distributed skills in a common and consistent frame

Anticipation

- Dynamic phenomenon
 - Time
 - Space
- Resolve and / or provide some possible solutions, the earlier: possible
- Precede the events as much as possible rather than suffering in a sub critical state (sustain)
- Anticipating for a better control

Main objective 1 : Reducing fires

- Identification and treatment of causes
 - Move beyond the prejudices and assertions
 - Multidisciplinary approach
 - Analyze the real causes (need investigations in the field)
 - Organize priorities in the acts of technical prevention and address the structural causes
- Information and public awareness
 - Fire behavior and safety
 - Regulatory obligations
 - Equilibrium with coercion (repressive measures)
 - Target public selection based on the causes (native, professional activities, tourist flows...)
- Estimation and Prediction Risk (danger forecasting)
 - Spatial knowledge of the hazard
 - Knowledge of issues
 - Weather Forecast
 - Analysis of operational environment (arsonist pressure, fire occurrence)
 - Updating of dynamic variables (cut roads, power outages...)
 - Evolution changes by the feedback
- Dissuasive surveillance
 - Combined Device (air and land) in case of particularly negative conditions
 - Lightness, mobility and flexibility
 - Watch towers, flyovers, mobile patrols with a strong coordination
 - Occupation of the field is a good way to reduce the occurrence of outbreaks

Main objective 2 : Control outbreaks

- Land planning
 - Move towards less vulnerability in sensitive areas for fire starting and propagation
 - Optimize the effective intervention of forestry, fire and rescue services... by ...the implementation of :
 - Cut green belts and areas for support of firefighting actions and resources
 - Shares sustainability of local clearing
 - Achievements of DFCI engineering works
 - Attack of the beginning fires
 - Control from the outbreak
 - Speed and proportionate adjustment of the operational level of response
 - This strategy of attack impose a strong preventive engagement, which is divided by the conjunction of:
 - Risk assessment
 - The involvement of the surveillance and monitoring network
 - The set up of an aerial cover and a land cover
 - The proactive coordination of resources at a supra-departmental level (regional)
 - Limit the catastrophic developments
 - Indirectly relies on the Pareto Principle
- ... Also known as the 80/20 law, about 80% of the effect is the product of 20% of the causes
- Synergy and balance between the efficiency of the fire control and the concern of people and goods
 - Realize the « part of fire » (let it burn) and organize the containment of population if needed
 - On scene commander for fire and rescue operations and local authority
 - Crisis management (preparation).
 - The end of a cycle with a return to normal life (> objective 1)
 - Do not systematize the return to the initial state
 - To make less vulnerable (mitigation)
 - Develop or redevelop the area in depth for a sustainable rehabilitation

- Imagination, collaboration, commitment, and lucidity of the partners

Fire prevision

Daily risk index prevision is made by the Meteorological cell Elaboration of Risk Maps for the whole forest fire zone.

Météo-France is the French national meteorological service.

The organisation was established by decree in June 1993 and is a department of the Ministry of Transportation. It is headquartered in Paris but many domestic operations have been decentralised to Toulouse. Its budget of around €300 million is funded by state grants, aeronautic royalties and sale of commercial services.

Météo-France has a particularly strong international presence, and is the French representative at the World Meteorological Organization. The organisation is a leading member of EUMETSAT, responsible for the procurement of Meteosat weather satellites.

In addition to its operations in metropolitan France, the agency provides forecasts and warnings for the French overseas départements and collectivités. It has four sub-divisions based in Martinique (with further divisions serving Guadeloupe and French Guiana), New Caledonia, French Polynesia and Réunion.

The Forest fire weather index (FWI) is an estimation of the risk of wildfire computed by Météo France and the Meteorological Service of Canada. Its name in French is indice forêt météo (IFM). It was introduced in France in 1992 but is based on a Canadian empirical model developed and widely used since 1976^[1].

The index is a whole number that ranges between 0 and 20 in France and up to above 30 in Canada. It is computed from five components. The first three components are numeric ratings of the moisture content of litter and other fine fuels, the average moisture content of loosely compacted organic layers of moderate depth, and the average moisture content of deep, compact organic layers. The last two components are the rate of fire spread if fuel is available for combustion, and the frontal fire intensity^[2].

The essential informations needed to calculate this index are :

- the humidity of the air at the beginning of the afternoon (when it has its lowest value);
- the temperature in the middle of the afternoon (when it has its highest value);
- the precipitations during 24h (from noon to noon) ;
- the maximum speed of the average wind.

This index is computed for 40 zones of France, three are in the Landes (département with the biggest forest of France). Météo France sends the IFM to civil defense authorities, which allows the prepositioning of men and vehicles, especially air units. The computed index is revised every year to take new data into account^[3].

This map is sent to the whole CODIS of the forest fire zone (15 departments)

According to the risk map, national means (aircraft, military and gendarmerie) are sent for the high risk zone survey

On the CODIS demand, national means are sent (aircraft, helicopters, reinforcement troops)

Concerning the fire outbreaks detection, there is a network of lookout towers (set up by the CODIS) or automatic detection system in some strategic places and patrols that criss-cross the massifs during fire season (with horses, motorbikes or vehicles).

After the Departmental Direction fire organisation consultation and by prefect delegation, DDAF can decide, for prevention purposes, the closing of some tracks or ways in forested areas of the department.

DDAF set up watching persons in the forested massifs. They transmit their observations and if any the alert by the radio network to the double patrols DDAF/DDSIS

DDAF set up protection patrols DDAF/Conseil Général, composed of two foresters on specific fire trucks vehicles equipped with a water tank: those patrols survey, detect and fight nascent fires.

Fire fighting organisation

Fire fighting is managed by the French civil security (ministry of the Interior), which is organised at French department geographic scale.

The French Civil Security is represented at three levels through operational centres National level:

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The zonal headquarter is the interface between the departments of each zone and the direction of the Civil Defence and Security.

According to the operational situation, this operational centre deals with the national means management and controls their dispatching :

- Asks the CODIS to give the alarm, and to assign means located out of the forest fire zone
- Involves reinforcement, as needed
- Requisitions the necessary means located within geographical scope
- Reports the operational situation to the COGIC and to the Prefect of the Zone

Each department has a departmental direction managed by a fireman officer, the operational centre of this direction being the CODIS.

The CODIS:

- develops fighting plans related to the main risks, and to supervise their application,
- gives information to the Prefect and others concerned authorities according to the importance of the situation,
- makes easier, during the incident, the activities of the departmental public utilities
- employs permanent personnel in a variable number according to the risk period.

CODIS provides the fire fighting plan co-ordination

- verifies the right use of the transmission network
- informs the alerts and the state of different events
- informs the operational persons in charge
- manages operational means
- looks for the required complementary means
- activates the available means required by the COZ for extra departmental reinforcement

The trucks

VLRTT: All-roads Liaison Vehicle

4*4 Vehicle of 5 places

equiped with two leakage masks

GPS

CCFL : Forest fire light tanker

600 litre water capacity

CCFM : Forest fire medium tanker

Water capacity : 3500 litres

Wetting agent capacity : 100 litres

Self-protection, roll-over bar, respirable air, excess pressure

CCFS : S forest fire tanker

Water tank : 10 000 litres

Wetting agent tank : 400 litres

Emulsion tank : 600 litres

Cannon 3000 litres / minute

Respirable air, self-protection

CCGC : High capacity tanker :

Water tank : 14 000 litres

Resupplying vehicle only

No heavy attack equipment (cannon)

Limited off-road capacity , no self-protection equipment

PCMTT : all-roads mobile command post

4x4 van

Sector CP on important intervention

Has to intervene systematically if a field CP is positioned on scene

DATT : All-road vehicle reel :

110 mm rated diameter capacity : 1600 m up to 1800 m

70 mm rated diameter capacity : 800 m

1 water or foam cannon

Hydraulic equipment of the CCF vehicles are :

The planes

Surveillance planes

Surveillance planes are in charge of :

- surveillance,
- planes guidance,
- planes co-ordination.
- Water bombers

- Water bombers are in charge of :
- patrols,
- water patrols,
- fire fighting.

Canadairs CL 415

Capacity:6130 litres in 4 water tanks.

Number of Drops: 1,2 or 4 times.

Average speed: ≈ 168 knot.

Scooping duration: 12 seconds on a minimum water surface of 1200 meters

Dropping height: ≈ 30 meters.

Dropping width: ≈ 60 meters.

Type of attack: direct.

Tracker CF 2S

Capacity:3500 litres in 4 water tanks.

Average speed: ≈ 163 knot.

Type of filling: on the ground.

Dropping height: ≈ 45 meters.

Dropping width: ≈ 50 meters.

Type of attack: indirect.

Fokker F 27

Capacity:6400 litres in 8 water tanks

Average speed: ≈ 217 knot.

Type of filling: on the ground.

Dropping height: ≈ 30 meters.

Dropping width: ≈ 70 meters.

Type of attack: indirect.

Planes integration into the fighting tactics

- Integration into aerial/ground radio frequency (channel 18, 23 or 35)
- Define the dropping objectives in collaboration with the crew
- Announce dangers on the area
- Give planes permission to drop after ensuring the security of fire fighters
- !Priority to the planes!

The helicopters

Commands helicopters missions are :

- Reconnaissance.
- Guidance of the ground fighting means
- Transport fire fighters and equipment.
- Security ensuring
- Objectives marking for the planes

Water bombers helicopters missions are :

- Growing fires attack
- Non accessible (or with difficulty) fires attack
- Vulnerable areas protection
- Drowning of the edges and fire resumptions

How to choose a dropping area

- Area with a minimum diameter of 30 meters
- Homogeneous flat and hard surface
- Maximum banking of 10%
- Non dusty ground or sprayed
- No obstacle
- No object which could fly

French fire fighters training programs

The French fire fighter training program comprises 5 levels related to a position and a responsibility on the scene :

The fire fighters can apply for these training courses, as far as they have pass the fire fighter initial training during which they got practice of how to use the whole equipment available in the SDIS (fire and relief local services) such as hoses, radios, fire-hose nozzle, trucks. The training covers a period of 120 hours for the volunteers and 4 months for the professionals.

Fire Fighter Ranking Table

Low ranking	Non-commissioned Officer	Officer	Field Officer
Corporal	Chief warrant	Captain	Colonel
Corporal	Warrant	Lt-Major	Lt-Colonel
FF first class	Staff sergeant	Sergeant-major	Commandant
FF second class	Sergeant		

- **Standard1 : FDF1 (Forest fires)**

It is the first training course for the forest fire special field. It is organised by the fire fighter home department.

Any person involved in a forest fire fighting should, at least, had passed this course. It represents a 40 hour training (theory and practice). At the closing of the training course, the personnel is able to utilise all the equipment available for forest fire suppression purpose, able to ensure his own safety and the others' safety. He has also got notions of topography (being able to read a map, to locate on a map, to maintain safety zone close at hand, to identify the fire prevention management...). He obtains so the title of team member during the forest fires. The second class fire fighters can apply for this training course.

- **Standard2 : FDF2**

It represents a 40 hour training (theory and practice). It is organised by the fire fighter home department. It is open to everyone starting from the corporal rank. At the closing of the training, the personnel is able to lead the team of a forest fire truck, to use the radios, to assign work task to the aerial resources on scene... Thus, he obtains the title of chief of equipment.

- **Standard3 : FDF3**

This training is provided only at the CIFSC in Valabre (Civil Security Interregional Training Centre). It represents a two week training, one week for the theory at the Valabre centre, and one week for practising in a department. It is open to everyone starting from the sergeant rank. At the closing of the training course, the personnel is able to lead a forest fire group (4 trucks). Thus, he obtains the title of chief of group.

- **Standard4 : FDF4** This training is provided only at the CIFSC in Valabre (Civil Security Interregional Training Centre). It represents a two week training. It is open to everyone starting from the first officer rank (major).

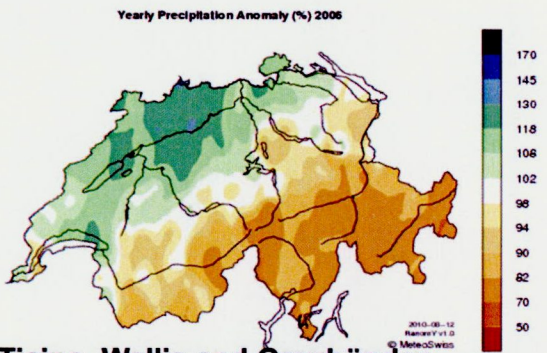
At the closing of the training course, the personnel is able to lead a column (4 groups). Thus, he obtains the title of head of sector.

- **Standard5 : FDF5**

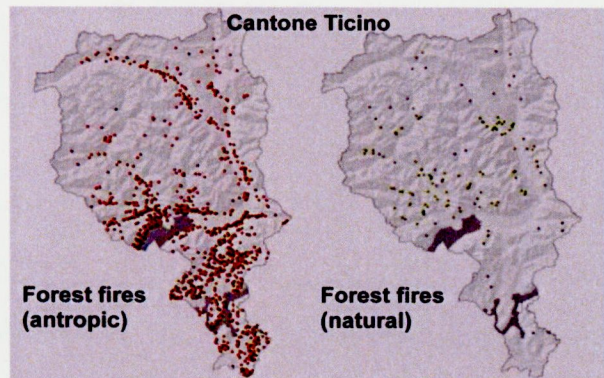
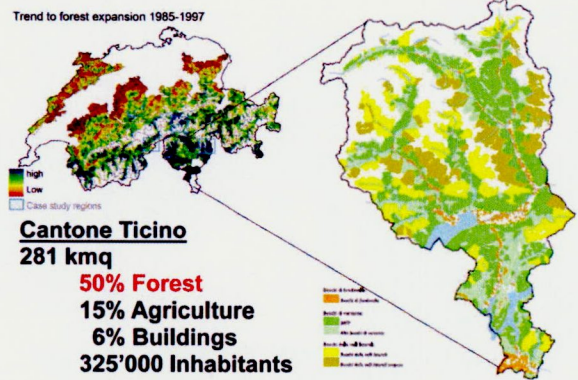
This training is provided only at the CIFSC in Valabre (Civil Security Interregional Training Centre). It represents a two week theoretical training. It is open to everyone starting from the high rank officer (commandant).

At the closing of the training course, the personnel is able to lead a site (chief of site). Thus, he obtains the title of chief of site. He is the relief commandant during large scale fires.

Switzerland (canton of Ticino)



Ticino, Wallis and Graubünden counts the most number of forest fires



6 Rescue Center
80-100 men (partially professional)

15 Regional unit every
30-40 volunteers

6 Local unit every
15-25 volunteers

5 Mountain forest fire firefighters
15-25 volunteers

Ticino dispose of about 1'600 firefighters
all trained in the forest fire suppression.



Ubicazione geografica dei corpi

Main legal tools

The forest fire suppression in Switzerland is competence of the local firefighting services. It is a part of the integrated system of protection of population. The national law for the protection of the population prescribe the collaboration among the different partners:

- Partner of the first intervention: Firefighters, Police, Ambulance (blue lights),
- Partners of support: civil protection, army, other technical services.

Every Canton (24 Cantons) as the competence and the task to concretize the dispositions of the federal law on the terrain. The Federal Government and the national Associations of the partners assures the coordination among the Cantons.

Actually only few Cantons have taken special measures in the management of forest fires:

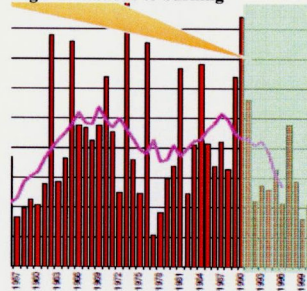
- Ticino (Tessin) (Southern part of the Alps with similar situation of Lombardia and Piemonte),

- Graubünden (Grigioni) (Eastern part of the Swiss Alps with some valleys in the South),
- Wallis (Valais) (South-West part of the Swiss Alps with the driest areas of the Switzerland),
- Uri (central Alps-Gotthard)

The coordination among the Cantons in forest fire suppression is at the moment only occasionally and not clearly structured.

Ticino counts the most number of forest fires. The forest fire is among the main theme for the Firefighting services.

Legal limitations to burning



Potentially every Canton and Commune can introduce limitations to burning. For example Canton Ticino during the dry season can prohibit the igniting of any kind of fires outside. After the introduction of this limitation the number of forest fires dropped significantly (Conedera, WSL).

(Legge cantonale per la lotta contro gli incendi e Legge forestale cantonale)

The frequency of fires in a densely inhabited region as Ticino (Southern Ticino and Middle Ticino) can be influenced from the pyromaniac too. During the fires season the police can activate more control on the territory and persons who are registered as pyromaniac.

Prevention plan

The prevention of forest fire is a task of the Forest service of Canton Ticino. The measures are active on different fronts:

- During the dry season the Cantone can prohibit the igniting of any kind of fires outside. After the introduction of this rule the number of forest fires dropped significantly (Legge cantonale per la lotta contro gli incendi e Legge forestale cantonale)
- **Forestry management.** For example the reconstitution of the traditional chestnut forest (selve castanili) around the villages permit to reduce the amount of organic fuel on the ground with a positive effect against fire ignition and spread. For the villages this kind of forest give an efficient protection in case of extreme fire season.
- **Agricultural management.** The change in the agricultural land use has a very important influence on the development of the forest fires. To maintain the vine production on the hill surfaces is not only a positive measure for the landscape, but a good prevention of forest fires too. The management of abandoned pastures on the mountain part of the Southern Ticino can contribute significantly to reduce the spread of fires.
- **Infrastructures.** The Forest service in the planning of the forest management consider the accessibility for the firefighter, the points of water to extinguish the forest fires, the landing places for the heli,
- **Information and education.** The population and the schools are informed on the thematic of the forest fires. These activities have a good effect particularly in the alerting the firefighter services through the tel. 118 from the inhabitants.

Silviculture actions

All the projects in forestry management must take in consideration the prevention of fires. The measures must be adapted to the specific situation. Here some examples:

- reduction of the biomass along the roads and the path;
- reconstitution of the traditional chestnut forest near to the villages (valorization of the landscape),
- reconversion of the planted (in the last century) black pine forest with local natural species,
- agro-forestry in the high pastures (pasture in the forest of larch, ...),

Fire brakes use

This measure is not used in Switzerland. The incidence on the landscape recommend to give preference to forestry measures.

Water supply sources (map)

Cantons Ticino, Wallis and Graubunden have a map of the water supply sources. The mapping not yet completed. Every new forestry project must take in consideration the water supply sources. The mapping and the realization of water points must respect the security rules for the different types of helicopters.

Access to the forest (map)

Cantons Ticino, Wallis and Graubunden have a map of the access to the forest with consideration the exigencies of engines of the fire brigades.

Helipads for forest fire use

The mapping in forest fire fighting in Ticino foresee the helipads too. The mapping is not completed. The helipads must be definite with strategic criteria (near to the coordinating point in cases of fire fighting intervention and in the high to allow a rapid transport of the firemen at the front of the fire) and microclimatic aspects (föhn winds, thermics, ...).

Prescribed burning

This solution encounter a hard opposition from the offices of the environment. It is necessary to make an effort in informing the different authorities, starting from pilot projects.

Population advising

The population and the schools are sensible to the forest fires. In Ticino many fires are announced from the population to Tel 118 (fire). This allow a rapid intervention of the nearest fire brigade at the beginning of the fire. Meteoswiss and the Cantons advise the population of forest fire danger through the media and web.

Operative zoning

The firefighting organization in Switzerland is very decentralized. The local and regional fire brigades have the task to fight forest fires. These organization allow a rapid intervention at the place of the fire. The instruction and the equipment of the firemen is very different to Canton to Canton. Here the example of Canton Ticino:

Surface and land use. 281 km² (50% forest, 15% agricultural, 6% buildings) and 325'000 inhabitants. It is a tourist area and one of main way south-north Europe (Gotthard). Climate typical of the southern part of the Alps (dry weather normally at the end of the winter and beginning of spring and some years dry summer, north föhn wind).

Monitoring and warning. The Forest service of Cantone Ticino is responsible of the monitoring and warning. He collaborate with Meteo swiss to decide about the prohibition to light a fire outside.

Firefighters. The Firefighter Service is a task of the local authorities. In Ticino operate the following firefighter units:

- 6 Rescue Center every with 80-100 men with partially professional employers
 - 15 firefighters units (Regional unit) every with 30-40 volunteers
 - 6 firefighters units (Local unit) every with 15-25 volunteers
 - 5 firefighters units (Mountain forest fire firefighters) every with 15-25 volunteers
- Ticino dispose of about 1'500 firefighters all trained in the forest fire suppression.

Alert. All the calls for firefighters (118) are centralized in one operational Center for all the Ticino (2010). The operator of the Center alert the nearest firefighter unit. Every unit can assure 5-10 firefighters in the first 15 minutes on the place of intervention. The Firefighter Rescue Centers coordinate the use of the heli.

Training. The organization and the coordination of the training is a task of the FCTCP (Firefighters federation of the Cantone Ticino).

- All the firefighters receives a basic training in forest fire suppression,
- The officers must follow a training in the technical and tactical forest fire suppression,
- Every three years, the chiefs of the firefighters units have a meeting to exchange specific aspects and experiences in the forest fire,
- All the firefighters units must annually organize at minimum one training in forest fire suppression.

Equipment. The FCTCP proposes at the Canton the equipment necessary for the Forest fires suppression. The costs are covered from a special Founds managed by the Canton.

Helicopter. During the forest fire season one heli is available on the place of intervention in max 30 minutes. It is possible to demand more heli in the next 30 minutes. The chief of intervention of the fire fighter decide about the task of the heli (rescue of people or animals in danger, transport of firefighter and equipment at the top of fire, aerial extinction, transport of water,).

Forest service. In the forest fire season the Forest service organize a picket to collaborate with the firefighters. The Forest service can give important information to the chief of intervention about the priorities in the extinction of the fire (forest with a protective function, accessibility of the terrain, geological dangers, alternative points of water,)

Operative coordination. The mutual aid among different units is coordinated from the Firefighter Rescue Center. In case of a catastrophic situation (more forest fires generalized on all the territory of Canton Ticino, the management is ruled by the dispositions of the law for the protection of the population (the same as in case of other kinds of catastrophic events where Firefighter, Rescue services, Police, Civil protection and Army are coordinated).

The results of this organization permit the firefighters to intervene rapidly and in the most of the cases to contain the size of the fires. (Conedera, WSL)

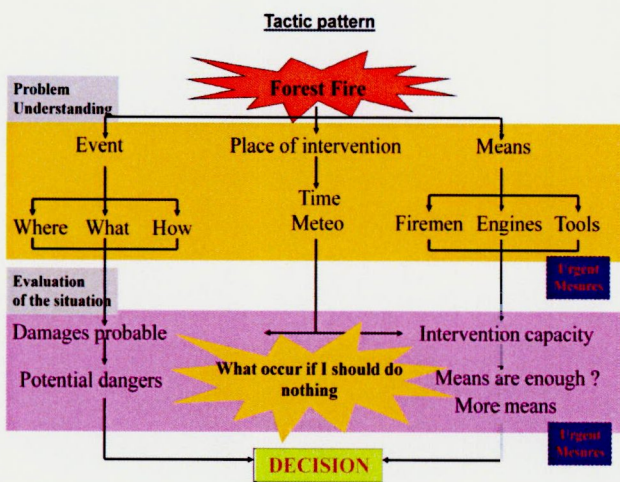
Examples of different needs of the users

Firefighters

Canton Ticino don't need to position ground units but it need to know where is to fix a threshold to alert the helicopter and the picket of the Forest Service

Touristic Steam Railway

This kind of touristic service in a dry alpine microclimate can be the cause of forest fires. It is necessary to find the a correct relation between danger level and probability of fire. In this case the danger level can change very rapidly and it is important to decide if it is possible or not to travel with steam or with diesel.



Monitoring at microregional level

Climate (microclimate)
 Geology and vegetation
 Land use
 Activities



Danger levels are to adapt for every region?
 (Same variables but different thresholds)

Non only indices but introduction of new technologies
 (online sensors)

Warning different needs

Firefighter
 User (tourism)
 User (forestry, agriculture)
 User (building industry)
 Population



Every user has a different needs
 (Correlation between danger levels and decisions or measures to take)

Slovenia

Missions of Slovenia Forest Service (SFS) for forest fire:

- Determination of necessary protection work in forest management and silvicultural plans,
- assure preventive measures,
- elaboration plans for forest, for fire protection and sanitary plans,
- elaboration of annual realization programme,
- gathering data about forest protection,
- regularly reporting to Ministry of Agriculture, Forestry and Food about damages in forests and realisation of sanitary projects,
- cooperation with fire protection organisations, civil protection,
- making annual report on forest health.

Protection against fires

- Defining potential fire hazard in forests (SFS),
- gathering data about forest fires in Slovenia (SFS),
- elaborating plans for forest fire protection (SFS),
- building the system of forest fire prevention measures – videο
- observation service (civil protection) and fire fighting infrastructure (SFS),
- cooperating with firemen during the action on forest fires, especially on big ones (SFS).

6.1.1 Fire hazard in the natural environment/forests of Slovenia – the current state

Fire hazard in the natural environment of Slovenia

In Slovenia, the fire hazard grades (indexes) for the natural environment are daily assessed by the Slovenian Environment Agency (Hydrometeorological Institute of Slovenia). In consideration of its climatic conditions and thus to different potential fire hazard in its natural environment, **Slovenia is divided into seven regions:** Coastland (Portorož), Brda, Vipava Valley and western Kras (Bilje), eastern part of Kras and part of Notranjska (Postojna), northwestern and central Slovenia (Ljubljana), Dolenjska and Bela krajina (Novo mesto), Štajerska and Koroška (Maribor), Prekmurje and Pomurje (Murska Sobota). On the basis of a 10-year series of climatological data, marginal values of fire hazard grades that serve as a basis for the assessment of fire hazard in a certain region, are stipulated for each of the above seven regions. With the aid of weather forecasts, a certain fire hazard grade can thus be foreseen for the next few days. For weather forecasting, the numerical model products are used (Pečenko 2005).

In Slovenia, the five-grade fire hazard scale in the natural environment is used (Table 1).

Table 1: Fire hazard grades (www.arso.gov.si)

GRADES	FIRE HAZARD
1 – very small	No possibility of a fire breaking out, the probability of ignition is minimal. If a fire does break out, it spreads very slowly or goes out. Little combustible material is encompassed by the fire, mainly just the undergrowth's upper layer.
2 – small	A fire may break out during the use of a steady fire, such as during camping; its spreading is slow, or medium fast in the open space. Usually, small surface fires with weak flames occur, so that only leaves are caught by fire. Such fires can be quickly restricted.
3 – medium	A fire can be caused by a single match. Its spreading in the forest is medium quick, and fairly quick in the open space. Fire burns on the surface with medium large flames, causing some of the compact organic matter to be consumed by fire. It is easily controlled and can be put out with medium effort.
4 – great	A lit match causes a fire without fail. It spreads rapidly through the forest. These are mainly hot surface fires that here and there encompass even tree crowns. During the fire, much organic matter is consumed by flames, it is difficult to control, and in order to extinguish it much effort and ample means must be invested.
5 – very great	A fire can be caused by merely a single spark. It bursts out immediately and spreads very fast indeed. This is a hot fire that spreads into tree crowns even over a wider area. Great amounts of organic matter are consumed by flames, and the fire does not spare even medium and thick stems. It then spreads even to normally wet areas. Control of the fire is extremely hard, and in order to extinguish it, huge efforts and all available means are to be invested.

- In Slovenia the Karst region is the most fire hazard area. There are 90 % of all fires in the natural environment in Slovenia.
- In Slovenia the average burnt area is reduced because of better organization and equipment services for fire protection. Since 2007 we have had the video control of the most hazard regions.
- Most forest fires are still caused by people.
- The number of forest fires is in close correlation with the number of days with high risk for fires in natural environment.
- The last large burnt area was in Karst in 2006 (840 ha burnt area).

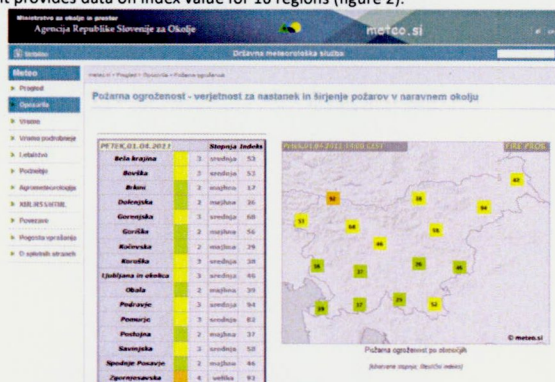
Fire hazards per separate Slovenian regions
May 11th, 2010



Figure 1: Fire hazard per Slovenian regions on May 11th, 2009 (www.arso.gov.si)

The seven region outlay is still used in the METEOALARM (<http://www.meteoalarm.eu/index2.php?country=SI&day=0&lang=SI>).

The newest layout (January 2011) of fire index information is more detailed, and it provides data on index value for 16 regions (figure 2).



Source : <http://meteo.arso.gov.si/met/si/warning/fire/>.

Figure 2: New Slovenian fire index map

The Administration of the Republic of Slovenia for Civil Protection and Disaster Relief (hereinafter referred to as »the Administration«) **assesses and declares**, in cooperation with the Slovenian Environment Agency, Ministry of Agriculture, Forestry and Food and Slovenia Forest Service, **great or very great fire hazard in the natural environment** in certain areas. With regard to geographic, weather and other conditions, **a Council can declare a certain grade of fire hazard in the natural environment within its area**, and by doing so acquaints the Administration with its decision as well as prescribes or implements special fire protection measures. Councils cannot declare a lower grade of fire hazard than the one declared by the Administration (Decree on fire protection in the natural environment, Official Gazette of the RS, No. 4-106/06).

Environmental fire hazard is declared, as a rule, a day prior to its implementation, and **remains in force until a major change in meteorological or vegetational conditions or until a major change (reduction) in the number of fires in the natural environment**. Fire hazard is thus not declared each day for a day or two in advance. At the time when declared, it is impossible to predict for how long the proclamation will remain in force (Šipec, 2010).

For separate areas of the natural environment, fire hazard is assessed on the basis of: weather conditions, climate characteristics, structure and type of vegetation on separate plots of ground from the previous article (development phase, type and position of trees and other plants), organic matter, vegetation period and spatial arrangement (roads, settlements, accessibility, water supply, relief of the area) (Decree on fire protection in the natural environment, Official Gazette of the RS, No. 4-106/06).

Fire hazard in Slovenian forests

For the purpose of planning fire hazard measures, **the forests in Slovenia are classified in four fire hazard grades**, i.e. (Regulations on forest protection from 2000, Official Gazette of the RS, No. 114-5220/2009):

- 1st fire hazard grade: very great risk;
- 2nd fire hazard grade: great risk;
- 3rd fire hazard grade: medium risk;
- 4th fire hazard grade: small risk.

Forests are categorized in fire hazard grades according to forest management units, where the following is taken into account (Regulations on forest protection, Official Gazette of the RS, No. 114-5220/2009):

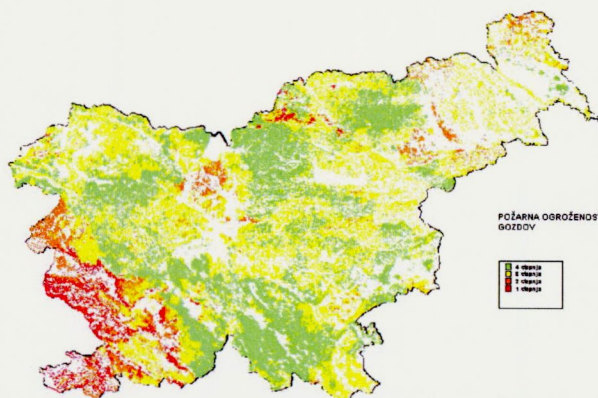
- Forest characteristics: tree species structure, development phase;
- Factors outside the forests: mean summer temperature, mean annual precipitation, mean annual relative air humidity, wind strength and frequency, periodicity of dry periods, type of soil, exposition, altitude, slope, forest facilities and other special features that enhance fire hazard.

Within the framework of forest-management plans, the Slovenia Forest Service (hereinafter referred to as »the Service«) has classified Slovenian forests according to the fire hazard grades and in compliance with the method added to the Regulations in the form of a supplement. The classification is presented on a map within the framework of regional forest-management plans, where the first grade is shown in red, the second in orange, the third in yellow, and the fourth in green colour (Regulations on forest protection, Official Gazette of the RS, No. 114-5220/2009).

Figure 2: The map of potential fire hazard in the forests of Slovenia (Forest fires...2005)

The Service prepares and supplements forest fire protection plans. With forest fire protection plans, an integral and concordant planning as well as implementation of the forest fire protection measures is provided for, which contributes to a more effective forest fire extinguishing. Through strict observance of directives laid down by forest-management plans, forest fire protection plans are prepared for forests or forest areas of very great or great fire hazard grades. As a rule, they are made for the period of 10 years for the area of one or more self-managing local communities.

6.1.2 Measures implemented during the proclamation of great or very great fire hazards and during fires themselves



6.1.2.1 Measures implemented during the proclamation of great or very great fire hazards

In the periods when great or very great fire hazards are declared, the following is prohibited (Decree on fire protection in the natural environment, Official Gazette of the RS, No. 4-106/06):

- to make fire, to burn objects/matter, or to use open fire
- to leave or discard burning or other objects/matter that may cause a fire.

During the declared **great or very great fire hazard, a Council** is liable to **organize fire hazard observing in informing** in the area. Here, the following subjects are liable to take part: land owners, leaseholders and other users, the Inspectorate of the Republic of Slovenia for the Protection Against Natural and Other Disasters, the Inspectorate of the Republic of Slovenia for Agriculture, Forestry and Food, the Slovenia Forest Service, hunting associations, farmers, fire brigades, the Police, and others. Aviation clubs and other associations may also be integrated into the system of observing and informing on fires in the natural environment: they are selected by the Administration, which signs a suitable contract with them. For forests and forest space, a contract can also be signed between the Slovenia Forest Service and the subjects engaged in fire observing and informing. Cooperation by the Police air support units and Slovenian Army in observing and informing on fires in the natural environment is organized by the

Administration. Anyone participating in observing and informing in compliance with this decree and perceive fire hazard in the natural environment is liable to communicate such data to the Information Centre (Decree on fire protection in the natural environment, Official Gazette of the RS, No. 4-106/06). In the Postojna Regional Information Centre, orderly duty for the monitoring of the Kras video observation system is put in force. During an increased fire hazard grade, aviation observation flights are implemented. Aviation observation flights are coordinated by the Administration of the Republic of Slovenia for Civil Protection and Disaster Relief via regional information centres. Flights are made over fire-threatened areas in compliance with the annual programme or per instructions of the Civil Defence's regional information centre or headquarters. They are implemented in such a manner that a thorough control over the fire-threatened area is provided for (National plan 2007).

At the time when great or very great fire hazard is declared, a Council is liable to organize, in cooperation with land owner, leaseholders or other land users and on the basis of municipal forest fire protection plans, plans for protection and disaster relief during great fires in nature, or on the basis of the forest fire protection plan, a fire watch, which can start putting out eventual fire in the shortest possible time (Decree on fire protection in the natural environment, Official Gazette of the RS, No. 4-106/06). Fire watch can be carried out only by fire brigades in compliance with the fire fighting law. Fire watch must be implemented until increased fire danger persists (Fire protection law, Official Gazette of the Republic of Slovenia, No. 3-102/07). The Administration's competent branch office can exceptionally allow fire making or turning in the natural environment during the period, when great or very great fire hazard is declared, to be carried out by legal and natural persons that are engaged in forest management, although only in preliminarily protected places and with an organized fire watch. In the natural environment areas that are particularly endangered by fires, it is prohibited, in the period when great or very great fire hazard is declared, to use any appliances or to carry out activities that may cause a fire, except for exceptional cases (Decree on fire protection in the natural environment, Official Gazette of the RS, No. 4-106/06).

In compliance with the regulations concerning fire protection in the natural environment, the Service can participate in fire hazard observing and informing during the proclamation of very great or great fire hazard. On the basis of forest-fire protection plans, the Service can offer professional aid in fire

fighting (Regulations on forest protection, Official Gazette of the Republic of Slovenia, No. 114-5220/2009).

6.1.2.2 Measures to be taken during fires

3.2 Fire fighting competence in the natural environment with regard to the extent of fires (National plan ... 2007)

Response to fires in the natural environment depends upon the extent and expected consequences of fires in the natural environment. With regard to the size and necessities to master fires in the natural environment, they are classified as follows:

1. Small fire

As a rule, such a fire spreads on the surface of up to 50 ha.

It is fought by the available municipal fire units, if necessary in collaboration with other forces for the protection, rescue and aid.

2. Medium fire

As a rule, the fire of this kind covers the surface between 50 and 100 ha.

It is fought by the available municipal fire units in collaboration with other forces for the protection, rescue and aid.

3. Large fire

As a rule, the fire of this kind encompasses the surface from 100 to 600 ha or two or even more fires raging at the same time on the surface of 50 to 100 ha, when all available local fire brigades are deployed. This fire grade includes upland fires.

Such fire is fought by fire units from the Coastal, Notranjska and Northern Primorska regions in collaboration with other forces for the protection, rescue and aid. With regard to the existing conditions, the assessment made by the intervention leader, predicted events and expected fire duration, large fire can also be fought by fire units and forces for the protection, rescue and aid from other regions.

4. Very large fire

As a rule, the fire of this kind encompasses the surface exceeding 600 ha.

Such fires are fought by fire brigades from several regions and in collaboration with other forces for the protection, rescue and aid.

Informing and alarming

The operational-communication tasks of observing, activating and alarming during natural and other disasters as well as other emergencies and events pertinent for the protection from natural and other disasters in the country are carried out by the Information Centre of the Republic of Slovenia. The operational-communication tasks of receiving emergency calls on No. 112, observation, informing, activating and alarming during perils, natural and other disasters as well as other emergencies or events pertinent for the protection from natural and other disasters in separate regions are carried out by the Regional Information Centres Brežice, Celje, Koper, Kranj, Ljubljana, Maribor, Murska Sobota, Nova Gorica, Novo mesto, Postojna, Ptuj, Slovenj Gradec and Trbovlje. The Regional Information Centres are organized by the Administration of the Republic of Slovenia for Civil Protection and Disaster Relief in the areas constituting rounded off geographic, urban or other entities and where the Regional Information Centres are unable to carry out all operational-communication tasks during natural and other disasters as well as in war. The Regional Centres are activated according to law, if so decided by the minister competent for the protection from natural and other disasters or by the Commander of Civil Protection of the Republic of Slovenia (Decree on organization and functioning of the observation, informing and alarming system, Official Gazette of the RS, No. 105-5220/07).

In the protection and relief plans and/or in the plans for informing and activating fire brigades, a Council can make a decision to activate fire fighting units in certain areas by sounding the alarm of the emerging direct threat over sirens of the public alarm system. Such a manner of activating fire units is not allowed in big town centres, in the areas with large public health facilities as well as in health or holiday resorts. On the proposal by the Fire Protection Association of Slovenia, the Minister competent for the protection against natural and other disasters stipulates, upon a preliminary consent by the mayors, which fire fighting units can be activated in compliance with this article also by sounding the alarm or direct danger. Activating of fire units by sounding the alarm or direct danger over the sirens of the public alarm system is carried out by the competent Regional Information Centre; the siren, however, can also be sounded by a fire fighting unit itself, although under the condition that the information about it is passed, without delay, to the competent Regional Information Centre. Immediately after sounding the alarm or direct danger, the Regional Information Centre is liable to inform the public or means of public information in the area where the alarm was sounded of

the reasons for alarming the public (Decree on organization and functioning of the observation, informing and alarming system, Official Gazette of the RS, No. 105-5220/07).

Activation of fire fighting units and workers of the Slovenia Forest Service during fires in the natural environment is carried out by the Regional Information Centres in compliance with current activation plans (National plan ... 2007).

In a Council, a uniform informing and activating of fire fighting units is provided for in compliance with the Council's operational fire fighting plan, the component part of which is also the plan of fire units informing and activating. The Council's operational fire fighting plan, which is made by the Council's Fire Fighting Command and approved by the mayor or person authorized by him, must be submitted by the Council to the Regional Information Centre, competent for activating firemen within the Council. When a fire fighting unit is sent to take steps in a fire or some other accident, the fire unit's commander is liable to acquaint with its task the competent Information Centre. Activating of fire units from several councils is carried out in compliance with the plans for civil protection and disaster relief on the basis of the decision made by the competent regional or national Civil Protection Commander, if the activating of fire fighting units is not foreseen in the national plan. In the Council to which the decision refers it is to be ensured that the setup of fire units remains in a state that provides for their urgent preparedness to suitably intervene within the Council (Fire-fighting law, Official Gazette of the Republic of Slovenia, No. 113-5006/2005).

During fires or other misfortunes, the fire units are liable to help each other. They can only do so, however, if suitably prepared to act in the area, for which they were set up. A help from the previous paragraph is ordained by the person in charge of the intervention or by Civil Protection Commander (Fire-fighting law, Official Gazette of the Republic of Slovenia, No. 113-5006/2005).

If help by fire units from a neighbouring country is needed during fire fighting or other major disasters, the Council situated along the border can ask for their help on request by the person in charge of the intervention, or the competent Civil Protection Commander, if not otherwise stipulated by international agreements. Help needed during fire fighting or other major disasters in the councils not

situated along the state border, is requested by the Commander of the Civil Protection of the Republic of Slovenia, if not otherwise stipulated by international agreements (Fire-fighting law, Official Gazette of the Republic of Slovenia, No. 113-5006/2005).

If help to fire units of the neighbouring countries is needed during fire fighting or other major disasters, assistance by fire units in the councils lying along the border is approved by the councils themselves or by the competent Civil Protection Commander, or by the Commander of the Civil Protection of the Republic of Slovenia for the councils not lying along the border, if not otherwise stipulated by international agreements (Fire-fighting law, Official Gazette of the Republic of Slovenia, No. 113-5006/2005).

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- Zakon o gasilstvu, Ur.l.RS št. 113-5006/2005
- Uredba o varstvu pred požarom v naravnem okolju, Ur.l.RS št. 4-106/06
- Uredba o organizaciji in delovanju sistema opazovanja, obveščanja in alarmiranja, Ur.l. RS št. 105-5220/07

6.1.3 Description of national / regional prevention actions

6.1.3.1 Legal tools

Most important legal documents that present the legal basis for planning and carrying out any kind of prevention actions against fires in natural environment are; **Decree on fire protection in the natural environment**, (Official Gazette of the RS, No. 4-106/06) and **Fire Protection Act**, (Official Gazette of the RS, No.

3-120/07) – the latter represents the framework for the Decree ... **Regulations on forest protection** (Official Gazette of the RS, No. 114-5220/09) is a legal document which summarizes some of the rules from the Decree ... and is more forestry oriented. **Protection Against Natural and Other Disasters Act** (Official Gazette of the RS, No. 51-2182/06) also deals with fire problems, but more on technical terms, like jurisdictions and obligations of different organizations or public bodies. This act, in addition to Fire Protection Act, represents a legal basis for the **National Programme for the Protection Against Natural and other Disasters** (Official Gazette of the RS, No. 57-2789/09).

6.1.3.2 Description of current Fire Preventive Plan(s)

National Programme for the Protection Against Natural and other Disasters (hereafter *national programme*) is a legal document which is in some way more of general nature. It defines goals, policy and strategy of protection against natural and other disasters in the country for the period of five years at least. The Programme comprises:

- state of protection against natural and other disasters;
- fundamental goals of protection against natural and other disasters in the period for which the programme is valid;
- development of surveillance, information, communication, logistic and other systems for needs of protection, rescue and aid;
- development of prevention actions;
- development of capacities and forces for protection, rescue and aid;
- guidance for education and training;
- guidance for developmental and research work;
- allocation of financial and other resources.

Proposal of the national programme is elaborated by the Administration for civil protection and disaster relief (hereafter *civil protection*) and then adopted by the National Assembly of the Republic of Slovenia on the proposal of the Government of the Republic of Slovenia (hereafter *government*). National Assembly also controls the execution of the programme.

Assignments from the programme are partitioned in more detail in a **Yearly plan of protection against natural and other disasters**, which is adopted by the Government of the Republic of Slovenia.

National emergency response plan in case of major forest fires (hereafter *national plan*) is one of the **National protection and rescue plans**. It is elaborated by civil protection in cooperation with other ministries and afterwards adopted by the government. Legal basis for the national plan are:

- Protection Against Natural and Other Disasters Act (Official Gazette of the RS, No. 51-2182/06);
- Decree on the contents and drawing up of protection and rescue plans (Official Gazette of the RS, No. 76-3357/08);
- Act on Forests (Official Gazette of the RS, No. 110-5465/07);
- Fire Protection Act (Official Gazette of the RS, No. 3-123/07);
- Decree on fire protection in the natural environment (Official Gazette of the RS, No. 4-106/06);
- Fire Service Act (Official Gazette of the RS, No. 113-5006/05).

National protection and rescue plans are elaborated for each type of accident separately. If the plan is elaborated by more than one entity, the "primary" plan has to be determined. The primary plan is, as a rule, the national plan for those accidents, for which the national or regional plan of protection and rescue is elaborated, when regional plans are being elaborated. In any other case, municipal plans for protection and rescue are the primary ones. Individual entities can – if it is so regulated by law, other legal document, primary plan or if the government or mayor decides in that way – elaborate only individual parts of protection and rescue plan or only documents necessary for carrying out specific measures or assignments of protection, rescue and aid.

National protection and rescue plans are dismembered in more detail on regional level. Regional plans are elaborated as national plans for those accidents that could affect a larger area of the region. These "special" areas are defined by laws on organization of civil protection and regulations on organization of surveillance, informing and alarming.

Municipal protection and rescue plans are elaborated by the administration of the municipality in cooperation with other municipal services, services for protection, rescue and aid that are organized on the level of municipality, and external professional organizations. Municipal plans are elaborated for all types of accidents that can affect the municipality.

Protection and rescue plan consists of the plan itself and annexes. The following contents are defined by the plan:

- type of an accident for which the plan is elaborated,
- extent of planning,
- concept of protection, rescue and aid when accident for which the plan is elaborated occurs,
- necessary forces, means and available resources,
- organization and realization of surveillance, informing and alarming,
- activation of forces and means,
- coordination and guidance,
- measures and assignments of protection, rescue and aid,
- personal and mutual protection,
- interpretation of notation and abbreviations.

Annexes to a plan:

- activity plan for performers of the protection and rescue plan,
- data bases that are necessary for plan realization,
- programme of training and exercises,
- guidelines for maintenance and dissemination of protection and rescue plan.

Protection and rescue plan comprises of several sections, in which specific information is given:

- a section in which the type of an accident is defined: information is given on a type of an accident and the probability of chain-accident occurrence,
- a section in which extent of planning is defined: information is given on a level of planning (state, local, district of a specific organization) in relation to other entities who carry out planning and with regard to cause and possible consequences of an accident,

- a section in which necessary forces, means and available sources are defined: information is given on forces, financial and other means necessary for realization of the plan; sources of those means and their availability,
- a section in which surveillance, informing and alarming is defined: information is given on acquiring processing of data; informing and alarming of threatened people, ones who are responsible for carrying out assignments of protection and rescue and other countries about an accident that could have cross-boarder affect,
- a section in which the process of activation of forces and means is defined: information is given on ways and protocols of activation of forces and means for protection, rescue and aid,
- a section in which management and coordination are defined: information is given on jurisdictions and assignments of management services and other entities that carry out protection and rescue,
- a section in which protocols for protection, rescue and aid are defined: information is given on protection measures and assignments for protection, rescue and aid; entities responsible for realization of those tasks; course of protection-rescue activities,
- a section in which personal and mutual protection is defined: information is given on guidelines for prevention and mitigation of consequences of accidents that occurred to people and on property; solutions for efficient personal and mutual protection,
- a section in which interpretation of notation and abbreviations: information is given on notation and abbreviation.

Entities, responsible for elaboration of protection and rescue plans have to provide the public with a possibility to participate in the planning process. Public has to be informed on public display of drafts of the plans and has to have an opportunity to give suggestions, comments etc. on the draft.

Plans for protection of forest against fires are elaborated by Slovenia Forest Service (hereafter SFS) for forests that are characterized by high or very high level

of fire danger and confined by borders of individual forest management unit¹ (Rules on the protection of forests (Official Gazette of the RS, No. 114-5220/2009)). In other words, each forest management unit can comprise of forest lands of different forest fire danger levels. Their period of validity is 10 years.

For the purpose of planning of measures for protection of forest against fires, forests are partitioned into areas, each associated with one of four possible fire danger levels. Tree species composition, developmental stage of a forest stand, average yearly temperature, average yearly amount of precipitation, average yearly humidity, strength and frequency of wind, periodicity of drought seasons, type of soil, exposition, altitude, inclination of terrain, human-made objects in forests and other particularities that could increase danger of fire occurrence are factors, all factors taken into account when distinguishing forest lands in by forest fire danger levels.

Four forest fire danger levels:

- 1. level of fire danger: very high risk;
- 2. level of fire danger: high risk;
- 3. level of fire danger: medium risk;
- 4. level of fire danger: low risk.

SFS carries out the assignment of forest fire danger levels to individual forest compartments during the forest management planning on a level of a forest management unit. Measures for forest protection against fires are planned in general in forest management unit plans and later on determined in more detail in

¹ Forest management unit is an operational management unit, defined for purposes of forest management planning by Slovenia Forest Service. Borders of these units usually follow borders of cadastral units and range in size from 3000 to 6000 hectares (Regulation on the forest management and silviculture plans, Official Gazette of the RS, No. 5-242/1998, No. 70-3002/2006, No. 12-340/2008). There are app. 248 forest management units in Slovenia They are aggregated into higher level management units called Forest management areas – there are 14 of such areas.

Plans for protection of forest against fires. The latter plans are means for completeness and reconciliation of planning and execution of measures of preventive protection of forests against fires. They also contribute to a more effective extinction of forest fires. As mentioned before, if forest management unit comprises of forest areas assigned with 1. or 2. level of fire danger, Plan for protection of forests against fires is elaborated for those areas. Forest management unit plans and plans for protection of forests against fires are elaborated for predefined lands regardless of ownership.

Plans for protection of forests against fires comprise description of current forest fire danger status and specific operational measures for decreasing of fire danger and effective forest fire extinction.

Forest fire danger description consists of following information:

- extent of forest lands by fire danger levels with description of factors by which division of forests was carried out,
- review of fire protection infrastructure,
- review of forest roads and other traffic infrastructure that are meant for forest management, but are also important for effective fire extinction,
- review of infrastructure objects that affect fire danger,
- review of fire occurrence in the past planning period by locations of fire, burnt area, causes of fire and efficiency of extinction of fires.

Measures for reducing the fire danger and effective fire extinction:

- extent of building and maintenance of fire protection infrastructure,
- extent of building and maintenance of other traffic infrastructure, which are important for effective fire extinction,
- measures for reducing of the amount of flammable materials (fuels) in forests – silviculture measures and pasturage in forests.
- protocols of taking measures when increase in fire danger occurs,
- protocols of taking measures when fire occurs.

Forest fires are recorded on predefined form and central GIS environment, which is maintained by civil protection. The record also comprises a map with ignition points.

Links with other entities

- Local community needs a plan to organize fire protection.
- Cooperation in headquarters by the law, if the fire area is above 100 ha. Almost all firemen are volunteers under ministry of defence.
- The SFS is asked to help in orientation and knowledge about vegetation.
- Forestry service in Italy.
- The video observation system (14 cameras) is working under ministry of defence.

6.1.3.3 Entities in charge of fire prevention

General operational, professional, developmental and technical assignments in the field of protection against fires are all carried out by the **Administration for civil protection and disaster relief** (aforementioned *civil protection*). In more detail, specific tasks are:

- cooperation in / coordination and reconciliation of developmental in professional-technical assignments that are related to protection against fires,
- carrying out tasks, linked to organization, planning, acting and development of actions of protection against fires,
- coordination of activities in programming and planning of protection against fires,
- specific activities regarding financing of activities and means for protection against fires,
- carrying out special measures, when increased level of fire danger is announced,
- organization of education and training for protection against fires,
- cooperation in preparing the standards for protection against fires,
- giving guidelines and comments on state, regional and local spatial development plans: setting project terms and giving concordances on project solutions in process of acquirement of building permits for buildings that need to have an assessment of fire danger,
- carrying out specific activities that are linked with fire occurrence investigation in cooperation with inspection service and police,
- carrying out activities related to building and management of objects and installations that are important for protection against fires on state level.

In general field of protection against natural disasters, the civil protection:

- elaborates proposals of research and development projects of protection against natural and other disasters,
- elaborates a proposal of National programme for the protection against natural and other disasters,

- ensures the organization and operation of informing, informing and alarming system,
- ensures the planning, elaboration and maintenance of unified information-communication system for protection against natural and other disasters,
- elaborates assessments of fire danger and other professional bases for planning of protection and rescue / reconciles measures for prevention and reduction of natural and other disasters consequences,
- attends and announces danger levels of natural and other disasters / gives guidelines for acting,
- elaborates National protection and rescue plans in cooperation with ministries and governmental services,
- organizes, equips, and trains state groups, civil protection services and other resources / assures means for activities of civil protection commander and state/regional commissions for damage evaluation,
- assures for standardization of means for protection, rescue and aid,
- forms and maintains state reserves of material means that can be utilized in case of natural and other disasters.

Inspectorate of the Republic of Slovenia for protection against natural and other disasters (hereafter *inspectorate*) ensures the unified enforcement of regulations and carries out inspection supervision for the enforcement of regulations on protection against natural and other disasters. It cooperates with other inspectorates.

In Slovenia **fire fighting** is organized as follows:

- professional fire fighting brigades;
- professional industrial fire fighting units;
- voluntary fire fighting association.

Professional fire fighting brigades are founded as public institutions and are carrying out public fire fighting services in accordance with Fire service act (Official Gazette of the RS, No. 113-5006/05). Association of professional fire fighters of Slovenia is the cover organization of professional brigades. Financial means, necessary for operation of brigades are provided by the municipality, in the area of which the brigade operates. For carrying out tasks of protection and rescue on a higher level (i.e. wider extent), the government picks up brigades with which the civil protection then makes contracts for such assignments. In such cases, government also provides those brigades with a part of funding, necessary for operation.

Professional brigades carry out prevention and operational tasks for protection against fire and protection and rescue when natural or other disasters occur. These activities have to be performed in the area for which brigades were formed to operate in. Professional brigade is as a rule the central unit in the area of entire municipality or in accordance with the Operational fire fighting plan of the municipality.

Voluntary fire fighting associations are founded by members of a community on the basis of assessment of fire danger and other types of danger. Associations perform following tasks:

- prevention against fires and other prevention actions in the field of protection against natural and other types of disasters,
- protection, rescue and aid when fires, natural or other accidents occur,
- education of fire fighting youth,
- help to citizens in the area of protection against fires,
- other tasks related to organization and development of fire fighting.

Voluntary fire fighting associations perform activities for prevention against fire in the area of entire or a part of municipality for which associations were formed to operate in. Voluntary associations are united in the Fire fighting association of Slovenia, which is the highest form of unification of fire fighting associations or units in Slovenia.

Voluntary associations can too, as professional brigades, be picked up by the government to perform specific tasks of protection and rescue on higher level. In such cases the government provides a part of funding.

Professional and voluntary fire fighting units are performing tasks of public fire fighting services in accordance with the Fire service act, but the voluntary units are doing so only if they are selected to do so by the municipality and if they are included in associations with which the municipality has made a contract.

Professional and voluntary fire fighting units can in accordance with tasks of public fire fighting services perform fire watch in order to note promptly if fire occurs or reoccurs in burnt area.

SFS contributes to prevention of fires in natural environment by surveillance of conditions in forests like the humidity of litter and coarse woody debris, health status of forest stands that are more prone to fires than the rest of the forests, etc. SFS plans maintenance and building of forest infrastructure (especially forest roads and skidding trails) so, that they can be used for transportation of fire extinction means. Maintenance of firebreaks (narrow clearcuts within the forest) are also important measure planned by SFS. SFS also tries to assure that logging residue is treated – stacked in piles, or in cases when trees were infected by insects residue can be burned – in accordance with legislation (Rules on the protection of forests (Official Gazette of the RS, No. 114-5220/2009)) When doing so, forest fire danger can be decreased. SFS also plans some silvicultural measures that can reduce fire danger, like transformation of tree species composition to more broadleaved forms that are less prone to fire or in some cases even pasturing in forest, all in order to reduce the amount of flammable vegetation, i.e. fuels. Mechanical or chemical treatment of close-to-ground vegetation is not performed, as any kind of chemical treatment in forests is strictly prohibited by Slovenia

legislation². Use of fire in forests, for any use other as for mitigating pest infestations³, is prohibited by Slovenian legislation.

Organizations that manage transportation infrastructure have to assure that the proximity of infrastructure objects is free of flammable (vegetation) materials, such as shrubs and grasses. This is especially important in the case of railroads. Train traffic is a major factor affecting fire occurrence and causes a great portion of fires in natural environment, especially in the south-west (sub-Mediterranean and Mediterranean) part of Slovenia – low Karst area.

Owners and managers of forest and other lands and communities have to assure that following measures are taken:

- constant removal of dry organic materials,
- maintenance of transition transportation ways (paths, roads, etc.),
- cleaning of fire protection belts by railroads,
- building and maintenance of fire protection breaks, water ditches and other technical objects,
- organizing of fire watch.

² Use of pesticides can be approved by SFS only in conditions of severe pest infestation (almost always for bark beetles) to treat logging residues that will be left in forests or logs that could not be transported to the processing facility promptly.

³ Use of fire for treating (i.e. burning) logging residues in cases of severe pest infestation has to be approved by SFS.

6.1.3.4 Tools (clearing of undergrowth, ...)

Besides silviculture measures like assuring close-to-nature tree species composition, forest stand structure (horizontal and vertical), and in special (and very few) cases introducing pasturing in forest in order to reduce the amount of fuels, there are no other measures that would be consistently carried out in forests to reduce fire danger. Chemical treatment and use of fire in forests are both generally prohibited and are, as mentioned before, allowed only in special cases of pest treatment. Prescribed burning was applied only a few times as pilot actions in the Karst area, but was later on as a feasible measure principally abandoned by fire fighting professionals because of the poor results. The test was probably not planned correctly and conducted in bad weather conditions with strong winds, which cause fire to spread uncontrollably.

Other entities mentioned in the report do not perform any special prevention measures to reduce fire danger in forests per se, except for occasional fire watch, which can be organized by municipality and carried out by fire fighters and foresters. Efforts are more or less concentrated on equipping fire brigades and units with necessary means.

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Italy – general aspects

Italian context: Administrative organization and command of Civil Protection operations

In the majority of European countries, Civil Protection is assigned to a particular organisation or to small public structures.

In Italy, every organisation of the State is involved in this function: from the Ministry of Interior to the smallest communes, all of the civil society is represented through the **National Service of Civil Protection** - and in particular through the Organisation of voluntary Services - founded by the *Law n°225/1992 of 24 February 1992 of organisation of Civil Protection*.

Under this scheme, the responsibilities are divided between the services of the Civil Protection on all administrative levels:

- **State** (responsible: the President of the Council or the Minister of Interior Department);
- **Region** (responsible: the President of the Region);
- **Province** (responsible: the President of the provincial Administration);
- **Commune** (responsible: the Syndic).

The forest fire management system is based on a multi-partnership organisation:

- the Department of Civil Protection of the Ministry of Interior co-ordinates the activities of Civil Protection under the authority of the Prime Minister. The system depends on all the corps which constitute the State, the **National Corps of Fires Monitoring (CNVF)**⁴, implied in the activities of fire prevention and in charge of fire fighting operations;
- the **Ministry of Agriculture and the Forestry Police** intervenes on fire prevention activities through the **State Forest Corps (CFS)**⁵;
- The **Region** ensures the implementation of forest fire protection plans and deals with the co-ordination of the **Voluntary Corps⁶ of Forest Fire protection AIB of Civil Protection** present all over the regional territory.

The ministerial Corps possesses centres that command the operations of which they are responsible for:

⁴ *Corpo Nazionale dei Vigili del Fuoco*

⁵ *Corpo Forestale dello Stato*

⁶ *Corpo Volontari*

- The **Unified Permanent Operational Room (SOU)**⁷ of the CNVF directs all the operations of Civil Safety for the Department of Civil Protection;
- The **Operational Centre of the CFS** co-ordinates prevention missions and emergency management for the environment as well as assistance actions for Civil Protection.

These national centres are in permanent alert and in co-ordination with the Regional Centres of Controls (COR)⁸, the Provincial Operational Centres (COP)⁸ and Local Operational Centres (COL)⁹.

Orientations of the Italian forest fire defence policy

The *Law n°353/2000 of November 21st, 2000 concerning forest fires* redefined the axes of the national policy by underlining the supremacy of forecasting and prevention in the fighting system and by putting the Regions in charge of programming and planning prevention activities in co-ordination with the local agencies.

Defence activities regarding forest fires are implemented at a Regional level under the authority of the Department of Civil Protection, and by the **regional Plan for the programming of forecast, prevention and active forest firefighting activities**¹⁰ articulated around four sections: territory presentation, fire hazard analysis and forecast, implementation of prevention and fighting activities.

Fire prevention

In Italy, prevention is a responsibility shared by the Ministry of Agriculture (CFS) and the Ministry of Interior (CNVF). Their missions concern:

Fuel reduction and its foreseeable consequences: forestry, forest police, maintenance of access in forests, etc;

⁷ *Sale Operative Unificate Permanenti*

⁸ *Centri Operativi Provinciale*

⁹ *Centri Operativi Locali*

¹⁰ *Piano regionale per la programmazione delle attività di previsione, prevenzione e lotta attiva contro gli incendi boschivi*

- **Reduction of fire-hazard origins:** reinforcement of territory monitoring, information programs for the public concerning fire hazard and individual protection measures against forest fires.

Fire prevision

Since 2003, the Fire Risk Service of the Department of Civil Protection, in collaboration with the meteorological national service, has developed an information system called **Ris.I.Co11**, for forest fires. It provides daily data for fire risk forecasting and management at the Provincial level. The forecasting model **Ris.I.Co** is based on three documents:

- The dynamics of daily planning of dangers ;
- A fire intensity graph and spread maps determined for the main hours of the day and based on local climatic characteristics ;
- Forecasts defined for consecutive days starting from important localised meteorological parameters leading to forest fires.

¹¹ *Rischio Incendi e Coordinamento*

Italy – Lombardia

1.1 Lombardia region forest fires operational organization

The jurisdiction about forest fires is of Lombardia Region administration. It works through the "General Direction of Civil Protection, Prevention and Local Police". Organization and coordination of forest fire suppression activities is demanded to CFS working strength together with Local authorities communities, Park and Province and voluntary groups (see below for more details).

1.2 Fire alert procedures

Definition of homogeneous areas for forest fire risk alert

Areas and municipalities classification (under the point of view of forest fire risk) is derived from the Regional Plan for the programming of forecast, prevention and active forest firefighting activities.

Always according to the requirements of the regional law, when forest fire occurrences tend to increase strongly, is declared a "Risk of serious harm", with the enactment of a special act of the Civil Protection Unit identifying:

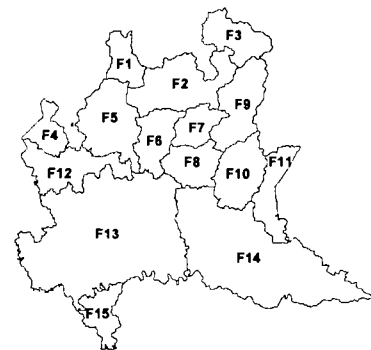
- Forest fires risk for areas and municipalities;
- List of prohibited actions;
- Penalties prescribed for violations of the expressed actions.

Criteria used to define homogeneous areas for forest fire risk are based on administrative and environmental features. More in depth are related to:

- a) the administrative territorial units where voluntary groups can operate from (mountain communities, provinces and Parks). Another central issue in selecting homogeneous areas is the presence of local offices of the National Forestry Corps (Local or provincial control and coordination stations)
- b) the environmental features employed in the homogeneous areas design. These are a synthesis of different 3 different kinds of information related to: 1) meteorological data (temperature relative humidity, wind speed and total precipitation), which together define the so-called "Risk Index", a key feature of the system of supervision and management of forest fires;

2) vegetation (type and condition) and snow cover obtained by satellite or aerial images; 3) topographical information, obtained from a fine scale digital terrain model.

The size of the identified homogeneous areas results from a compromise between high resolution data (obtained from environmental features) and forecast values provided. This compromise led to consider areas consisting of aggregated mountain communities or single, if sufficiently large or at least different from the adjacent ones for meteorological, topography or vegetation characteristics. The part of the regions where fires can occur is divided in 15 homogeneous areas, more or less coincident with the Mountain Communities boundaries.



1.3 Criticality levels and forest fire corresponding thresholds

Criticality levels for hazards

The regional alarm activation is set on the following levels of criticality: none, normal, moderate and high, in accordance with the provisions of National law (Legislative Decree 112/98).

Critical priorities assume increasing importance in relation to the degree of involvement in the following areas:

- Environment;
- Activities;
- Settlements and movable and immovable property;
- Infrastructure and facilities for transport, public and health services;
- health and preservation of the living species in general and in particular humankind.

Criticality levels for hazards deals with:

- **ABSENT CRITICITY:** no natural phenomena (external forcing like temperature, precipitation, etc.) are present or responsible for activating the accounted risk;
- **ORDINARY CRITICITY:** natural phenomena, which are assumed to lead to potential criticality, which is usually considered common and acceptable to the population (critical level due to events governed and controlled by local authorities structures through the adoption of measures and plans);
- **MODERATE CRITICITY:** presence of natural phenomena that do not reach extreme values and are believed to result in damage and moderate risk for the population, such as to affect a significant portion of the total area considered;
- **HIGH CRITICITY:** presence of natural phenomena reacting extreme values and are believed to result in damage and even serious risks for the population, involving an important part of the territory.

Each level of criticality is associated with a short warning code, as shown below:

ALERT CODE	CRITICALITY LEVEL
0	ABSENCE
1	ORDINARY
2	MODERATE
3	HIGH

1.4 Alert codes and thresholds for forest fire alert

The thresholds correspond to the degree of forest fires danger indicated in the forest fire warning issued by the Environmental Protection Agency of Lombardia Region (meteorological service). The table below shows the correspondence between codes of alert, criticality levels and danger degree/thresholds:

ALERT CODE	CRITICALITY LEVEL	DANGER DEGREE/THRESHOLD
0	ABSENCE	NULL AND VERY LOW
1	ORDINARY	LOW AND MEDIUM
2	MODERATE	HIGH AND VERY HIGH
3	HIGH	EXTREME

Criticality levels and corresponding degree/thresholds of danger for forest fires in Lombardia region is defined as follow :

- **ORDINARY CRITICITY** - Small size fires (up to 5 ha) isolated and sporadic (corresponding to the danger level "LOW AND MEDIUM")
- **MODERATE CRITICITY** - Frequent and widespread medium size fires (ranging from 5 to 18 ha) corresponding to the danger level "HIGH AND VERY HIGH"
- **HIGH CRITICITY** - Weather and climate conditions (wind, humidity, etc.) contributing to the development of fire of considerable proportions, both in size (over 18 ha) in number and seriousness (corresponding to the danger level "EXTREME").

See figure 1 for an example of forest fire warning

Alert procedures, (Body Responsible, Activities, Documents, Time, Modalità di trasmissione, Effetti)

National of grave danger is set year by year over a special act of the General Directorate of Civil Protection, Prevention and Local Police and in association with specific weather conditions suitable for forest fires development.

figure 1: *FOREST FIRES WARNING*

1.5 Forest fire fighting

PROCEDURE FOR ACTIVITIES RELATED TO FOREST FIRE SUPPRESSION AND PREVENTION SYSTEM OF REGIONAL CIVIL PROTECTION (ATTACHEMENT OF THE REGIONAL DECREE N. 6962 APRIL 2, 2008).

The National Law 353/2000, "framework law on forest fires", provides a whole series of measures to be enacted by the regions for forecasting, preventing, and fighting activities against forest fires. In accordance with this law, Lombardia Region adopted its Regional Plan for the programming of forecast, prevention and active forest firefighting activities with regional law 31/2008. The Regional Plan implements the procedure of forecast, prevention and fight against forest fires and aims to identify the forest fire prevention activities, with special interest to the tasks involving the institutions responsible for this issue.

The direction of forest fire fighting operations is entrusted, by Lombardia Region, to the personnel of the National Forestry Corps (Corpo Forestale dello Stato - CFS) but, if required by the National Forestry Corps, the suppression activities could also involve firefighters, personnel of Mountain Communities, Provinces, Parks and Voluntary groups. The fire fighters leader in suppression operations (Direttore delle Operazioni di Spegnimento - DOS) may also require to employ other organizations / institutions such as the Police or Local Police to perform his functions.

If no National Forestry Corps personnel is present during the forest fire event, the coordination of fire suppression operations is entrusted to the head for forest fire fighting (or its substitute) of the local authority (Mountain, Province, Park). Substantially he becomes the DOS.

In this case, the accountable Manager of the local authority, in his jurisdiction, has to alert the volunteers groups. Teams of volunteers involved in the forest fire suppression activities must immediately notify to the Head (or its substitute).

If, during a forest fire, homes, buildings, infrastructure, facilities or people safety are threatens, the coordination of suppression operation, limited to defense activities of the houses, buildings, infrastructure, facilities and human lives, shift

to the National Fire Department. In this case, the DOS belonging to the National Forestry Corps (or to the local authority) proceeds in forest fire-fighting operation, in close contact with the Accountable Manager of the National Fire Service (ROS) who provides his support in decisions.

ROLES

The roles that the different institutional actors are obliged to make are defined in the framework law on forest fires (National Law n. 353/2000), and in the regional law n. 31/2008 - Regional Plan for forest fire fighting.

Below is presented an overview of "Who does What" in case of a forest fire emergency. Civil protection has a rule of coordination and formal communication among all actors involved in the forest fire fighting operations (CFS and Local authorities - i.e. Municipalities or Mountain Communities responsables) while the CFS and local authorities are involved in field suppression activities, working together during all the phases of forest fire occurrence.

WHO	WHAT	WHEN
Civil Protection Operational center	Once received the notification of forest fire proceeds to contact: - CFS Operational center of forest fire fighting, - the responsible Local Authority - the Available appointed CFS officer on duty (or his substitute)	Immediately
Civil Protection appointed officer on duty	Once confirmed the forest fire existence, the appointed officer on duty (or his substitute) on behalf of the accountable Manager of Civil Defence has to contact with the Operations Centre of the CFS and the forest fire fighting Head of the local authority, authorizing the use of CFS Operations Centre helicopter found most suitable, in particular: - suggest to the operational center the most suitable landing area - reports on helicopters availability to the operational center	Immediately
Civil Protection appointed officer on duty	The appointed officer on duty (or his substitute) keeping in touch with the CFS Operational center, for planning interventions, and in touch with the regional Civil Protection operations centre; in particular for: -Availability for supply services to the helicopters (outside the operational bases); - The use of forest fire fighting teams provided by local authorities or by voluntary groups; - possible use of reconnaissance aircraft for real-time footage of fires evolution or for a first mapping of the areas involved in forest fire; - evaluation, in agreement with the CFS operational center, about the use of National aircraft (the request is done by CFS operational center) -evaluation, in accordance with the CFS operational center, on procedures for navigation ban (temporary interdiction to vessels) during the use of aircraft type "Canadair" - evaluation, in accordance with the CFS operational center, on the use of personnel and equipment to neighboring local governments, and other provinces or regions, in particular for forest fire events occurring close to Swiss boundaries; Evaluation, at the end of the day and in accordance with the CFS operational center, about the current situation in order to decide on actions for the day after (or for a turnover of the officer on duty)	steadily
Civil Protection appointed officer on duty	Can give provisions, for or in place of the Unit Head of Civil Protection task force, about aircraft observations and monitoring	advisedly
Civil Protection appointed officer on duty	The appointed officer on duty (or his substitute) once evaluated the situation, contacts the accountable Manager of Civil Protection who takes the decision on the presence, at the Regional Operational Center of Civil Protection, of: - available staff on duty; - the accountable Manager of Protection and defense against forest fires unit; - accountable Manager of the operationa. room.	advisedly

<p><u>Civil Protection</u> appointed officer on duty</p>	<p>The appointed officer on duty, if events are taking an high degree of criticality, proposes to the Unit Head of Civil Protection task force the Permanent and Unified Operations Room (S.O.U.P. - Sala Operativa Unificata Permanente) activation. The S.O.U.P.:</p> <ul style="list-style-type: none"> - ensures the management of forest fire suppression activities among the regional structures, National structures and the voluntary groups; - is activated by the Director regional Civil Protection Unit task force of Lombardia region (or the General Director of Civil Protection, Prevention and local police in the absence of Unit Head), in agreement with Lombardia Regional Command of CFS, whenever the criticality, related to forest fires suppression operations, require coordination at regional level; - Head of the SOUP is the Manager of OU Civil Protection of Lombardia Region; are activated at the Soup: <ol style="list-style-type: none"> 1. Regional Command of CFS 2. Regional Command of Fire brigades 3. Environmental Protection Agency of Lombardia region 4. the Regional Director of the National Organization of Mountain Military Corp - (Associazione Nazionale Alpini - ANA) 	<p>advisedly</p>
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National Forestry Corps Operational center of forest fire fighting	Once received the notification of forest fire proceeds to contact: - The local CFS Control Station or local CFS patrol or Provincial Command - Local authority	Immediately
National Forestry Corps Operational center of forest fire fighting	After confirming the evidence of forest fire contacts the regional Civil Protection Unit, through 1. Available established officer on duty 2. or, if not present, his substitute. 3. Regional Control room of Civil Protection (if 1. and 2. are not present) Authorization to use the regional helicopter, in particular related to - the most suitable landing area - availability of helicopters - possible intervention of regional helicopters	Immediately <i>the helicopter took off immediately with or without the forest fire fighting team</i>
National Forestry Corps Operational center of forest fire fighting	Contacts the fire fighters leader in suppression operations (<i>Direttore delle Operazioni di Spegnimento - DOS</i>).	As soon as possible
National Forestry Corps Operational center of forest fire fighting	Provides continuous monitoring of the forest fire evolution in close contact with the DOS and the officer on duty (or his substitute) of the regional Civil Protection Unit	steadily
National Forestry Corps Operational center of forest fire fighting	Can give provisions for aircraft observations, monitoring and suppression activities (**)	advisedly
National Forestry Corps Operational center of forest fire fighting	Request to the established officer on duty, who belongs to the regional Civil Protection Unit of Lombardia Region, for - Availability for fuel supplying of regional (and eventually national) helicopters (outside the operational bases); - The use of forest fire fighting teams provided by local authorities or by voluntary groups; - Evaluation, at the end of the day, about the current situation in order to decide on actions for the day after (or for a turnover of the officer)	advisedly
National Forestry Corps Operational center of forest fire fighting	Implements the activities contained in Regional Plan for forest fire fighting	steadily
Local Authority (Mountain Communities, Provinces, Parks)	Once received the notification of forest fire confirms the alert signal by contacting the CFS operational center of forest fire fighting	Immediately
Local Authority (Mountain Communities, Provinces, Parks)	Once established the actual presence of forest fire, if the DOS and the officer on duty (or his substitute) of the regional Civil Protection Unit are absent, becomes the temporary leader in suppression operations management	Immediately
Local Authority (Mountain Communities, Provinces, Parks)	Once received the alert and contacted the CFS Command Station or the CFS Operational Centre, proceeds to contact the Fire Brigade of its jurisdiction or the Fire Brigades Provincial Command unit	Immediately
Local Authority (Mountain Communities, Provinces, Parks)	The forest fire manager for the local authority supports the DOS decisions during the suppression operations, keeping in close touch with his volunteer teams.	steadily

Provinces, Parks)	For contacts with Lombardia region (if needed) the accountable Manager of Local Authority for forest fire fighting (or his substitute) will refer to the Regional Operations Centre of Civil Protection (Toll-free number: 800 061 160)	
Local Authority (Mountain Communities, Provinces, Parks)	It can give provisions (if needed) for aircraft observations and monitoring	advisedly
Local Authority (Mountain Communities, Provinces, Parks)	Implements the activities contained in Regional Plan for forest fire fighting	steadily
Local Authority (Mountain Communities, Provinces, Parks)	Implements the activities related to radio communications ensuring that, keeping in touch the local volunteers teams, the radio is tuned to the frequencies in use by the local authority, so without interfering with those in use at the Lombardia Region and CFS	steadily

(**) The CFS DOS once evaluated forest fire spread scenario can ask for aircraft state action to the CFS Operational center. National aerial fleet is provided and coordinated by the National Department of Civil Protection, through the Unified Aerial Operational Center (COAU). COAU provides its aerial means to region and province, after a request that has to be renewed annually. Aerial means placed at the disposal of Lombardia region are 1 Canadair and 1 Eriksson s64 helicopter.

1.6 Fire fighting volunteers personnel and available tools

Volunteers personnel, teams and tools involved in activities against forest fire (AIB) for each territorial unit are divided as follow:

Territorial Units	Mountain Communities	Parks	Provinces	Total	<u>1.7. Current operational partnership between alpine neighbors</u>
Number of teams AIB	326	76	57	459	A mutual assistance agreement between Lombardia and other Italian regions is starting from 2006. The agreement regards fires fighting along the regional boundaries (between the two regions) and the personnel training.
Number of volunteers AIB	5321	1565	830	7716	
Number of vehicles AIB	235	78	66	379	The agreements are listed below:
Number of modules AIB	100	45	41	186	
Number tanks fixed AIB	68	19	0	87	<input type="checkbox"/> Valle D'Aosta - mutual personnel training - years 2006 and 2007 <input type="checkbox"/> Sardegna - aid in summer forest fires fighting - year 2006; <input type="checkbox"/> Abruzzo e Molise - aid in summer forest fires fighting - year 2007; <input type="checkbox"/> Sicilia - aid in summer forest fires fighting - year 2008 <input type="checkbox"/> Abruzzo - aid in summer forest fires fighting - year 2009 <input type="checkbox"/> Liguria - aid in summer forest fires fighting - year 2010
Number of mobile tanks AIB	140	21	17	178	
Number of fixed radio AIB	88	51	9	148	
Number of Mobile Radio AIB	111	59	14	184	
Number of portable radios AIB	808	161	72	1041	
Number blowers AIB	840	119	93	1052	

Italy - Veneto



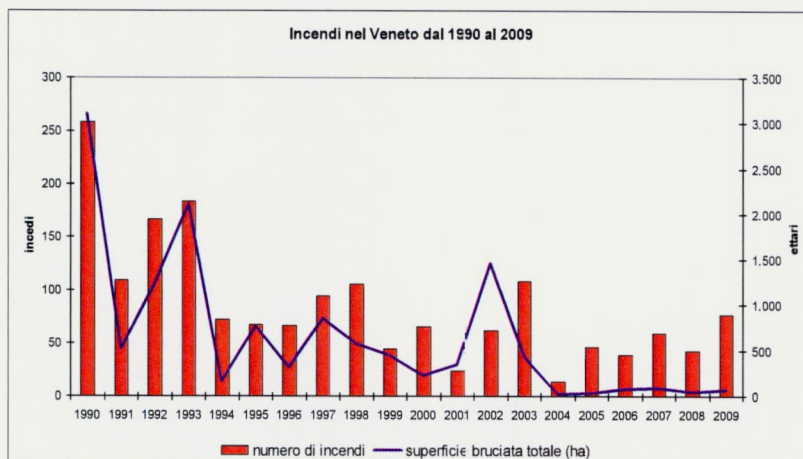
Introduction

Veneto Region have a forested surface of 412.000 ha. Forests are for the most part localized in the hills and mountains, in the plane there are some spots along the main rivers and along the coast .

The most of fires occur in the hills and at foot of mountains, mainly at the end of the winter from February to March and in summer in August and July.

In the last 20 years we had an important decrease in fire number and a very strong

decrease in burned surface. From the 2004 the average burned area have been stabilized to very low values (1,15 ha – average 2004-2009). To obtain this result we strongly worked on reducing intervention time and on staff training.



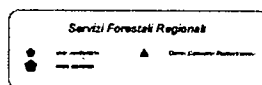
Organization:

The jurisdiction about forest fires in Veneto is of Veneto Region administration. It work thought the “Direzione Foreste ed Economia Montana” (Directorate of Forests and Mountain Economy). The directorate is organised in a Central Regional Coordination Center (Centro Operativo Regionale -COR) and five local Forest Service (Servizi Forestali Regionali - SFR). The Region have directly manage forecasting, prevention and active fighting (Just the police activity is missing because it's done by the Corpo Forestale dello Stato);

Forest Fire Service of the region of Veneto

Based at the Directorate of Forestry and Mountain Economics and performs the following activities:

- prepares and updates a "Regional Plan of forecasting, prevention and active struggle against forest fires;
- coordinate the firefighting activities of the five regional forest services;
- ensure liaison with other authorities, at local and national levels;
- make contributions to voluntary organizations for operating expenses and the purchase of equipment and resources;
- make the statistics of forest fires;
- carries out dissemination and information especially geared to schools;
- manages the activities of the Operations Room at the AIB Regional Operation Center (COR), with an availability service staff 24 hours to 24.



Regional Forest Services

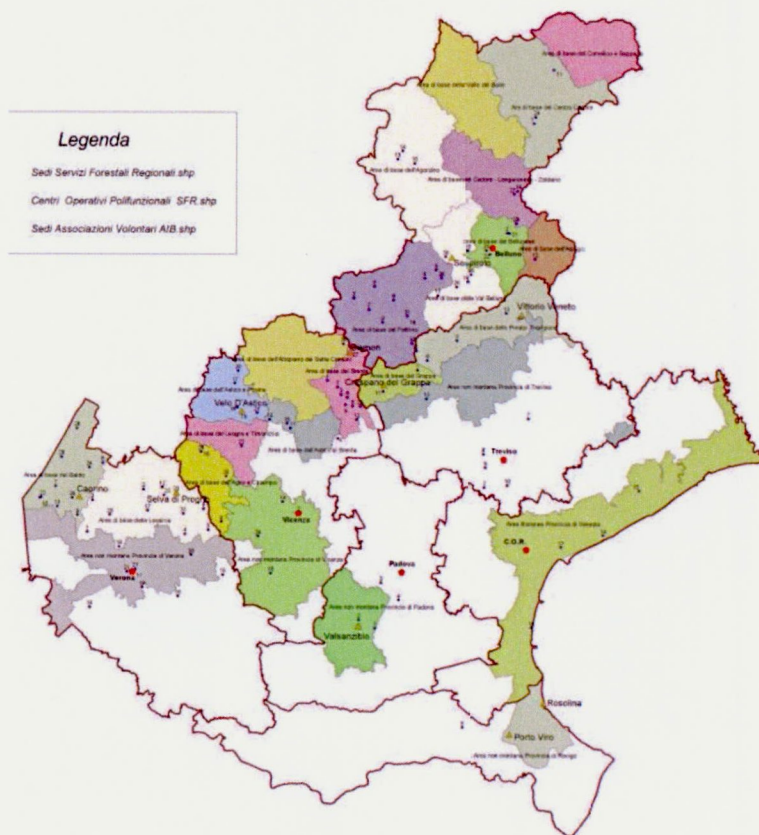
The five Regional Forestry Services (SS.FF.RR), peripheral structures of the Directorate of Forestry and Mountain Economy, are located in different provincial capitals and are working in the following provinces: Belluno, Padua (also responsible for the province of Rovigo), Treviso (also responsible for the province of Venice), Verona and Vicenza. At any Forest Service has activated an forest fire Office performing the following activities:

1. surveillance, observing and alarm with their staff and volunteers;
2. coordination of operation in case of fire by a regional official, Director of Operations (DOS);
3. interventions on the fire through their own specialist teams of forest workers;
4. activities referred to points 1, 2 and 3 are guaranteed with an availability service staff 24 hours to 24;
5. planning and execution of the works of:

Forestry cleaning for lower risk factors;
 forestry operations for the recovery of areas already damaged by fire;
 construction and maintenance of roads and logging roads for aib use;
 construction and maintenance of fire tanks;
 realization of cross fire;

6. preparation of statistical fire report;
7. training of personnel involved in fighting fires;
8. coordination of voluntary organizations in activities to prevent forest fires.

Numbers: 6 Polifunction operative centre; 116 professional operators; 5 officials specialised, 40 available officials; 18 pick up truck; 4 tanks; 11 trailer tank; 35 vehicles; 1-2 helicopters according whit the month



AIB Voluntary Association

A significant contribution during the operations of forest fire fighting is done by the voluntary associations which are widely distributed throughout the region, with their men and equipment and are coordinated by a head organizations for homogeneous area of base.

Voluntary associations to operate in the activity AIB must have signed a specific agreement with the Region, be included in the Regional Civil Protection and assured, with specific training courses organized in collaboration with the Directorate of Forestry and Mountain Economics the training of volunteers.

Numbers: 112 associations; 25 basic area; 1645 volunteers; 93 pick up truck; 14 tanks; 59 trailer tanks; 73 vehicles.

Aircraft

Prepared to work with fire buckets folding type Bamby Bucket (1000 l d'acqua) and equipped with a side basket for transporting the equipment provided to elitrasportato staff.

Normally, the operator offers a contract that is made Ecureuil AS350B3 stationed in the operational base of Sospirolo Multifunctional Operation Center (BL) owned by this administration. The helicopter can still be redeployed, as needed, in 4 operational bases that are the operational multifunctional centers of Crespano del Grappa (TV), Velo d'Astico (VI), Porto Viro (RO) and Caprino Veronese (VR). Or, in case of special emergencies both forest fire and civil protection, in the full regional territory.

Regional radio network for use AIB

The radio system consists of five regional networks synchronous (provincial areas of jurisdiction of the five SS.FF.RR) connected to each multichannel radio backbone of the Veneto Region which brings together to the COR, simultaneously, all radio communications may be in act on regional channels.

The individual networks, usually independent, may be variously interconnected with each other by the COR, coming to realize, if necessary, a unified regional network.

Good radio-frequency coverage is offered by 36 repeaters spread across the largely mountainous area, while the radio traffic is due to the 160 radios of the SS.FF.RR, the 14 base station site at the Directorate forests, SFR and the COP, the 189 vehicle and handheld radios available to the voluntary sector.

Fire danger forecasting

Actually Fire forecasting is based on FWI (Fire Weather Index). It's calculate for 11 climatic areas. Veneto Region is testing a new map for implement index calculation in the 25 omogeneous areas. The FWI is calculated once a day without forecasting..

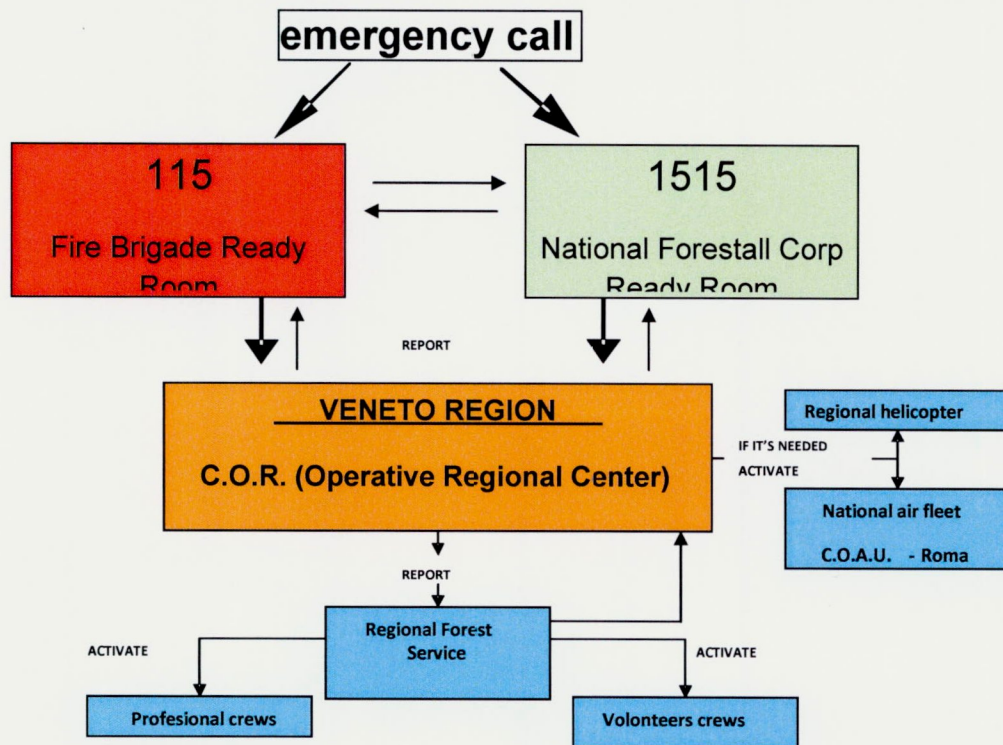
The FWI give five alert levels: very low, low, middle, high, very high. There isn't a descriptive mean for every alert level yet.

;Actually there isn't a corresponding official operational mean for every alert level. An alert levels experimental use is ongoing in Verona province for give the alert at the volunteer teams;

In case of emergency

The alarm is received usually by National Forestall Corp (CFS) (emergency number 1515), or by Fire Brigades (VVF) (emergency number 115), the respective operations rooms will immediately give out notice to the Regional Operations Center (COR). The COR notify the SFR available official responsible for the area and the CFS operations Room for surveys and statistics. In case alarm come from other ways the COR diffuse the alarm to CFS and VVF.

After the alarm, SFR notify the volunteers. In the case where fire spots AIB volunteers, they notify SFR and then they latter notify the COR and they then the CFS Operations Room. COR is responsible for informing the provincial command of VVF personnel, for future activation of SFR and/or voluntary AIB from other provinces and for activate aerial support. Any subsequent updates on the situation are given out by SFR. From the first alarm onwards all information should follow the path: COR - SFR available official - professional and volunteers AIB operators.



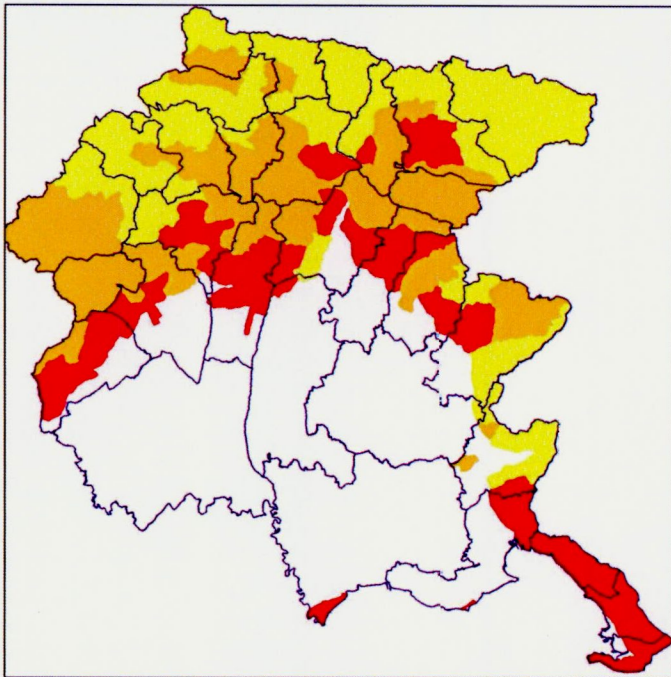
- Contacts:

Emanuela Ramon – emanuela.ramon@regione.veneto.it (+39) 0412795562

Alice Lemessi – alice.lemessi@regione.veneto.it (+39) 0412795626

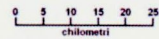
Rolando Rizzolo - rolando.rizzolo@regione.veneto.it (+39) 0412795518

Italy – Friuli venezi Giulia
Forest Fire risk area



Carta della pericolosità
 degli incendi boschivi in
 Friuli Venezia-Giulia

- Legenda
- Grado pericolosità alto
 - Grado pericolosità medio
 - Grado pericolosità basso
 - Zona bianca fuori dal Piano A.I.B.



Maximum alert period:

Regional forest fires law (L.R. 8/1977):

1° November – 30° April

Every year special Regional President declaration:

1° July – 30° August

The wildland fire-fighting system in Friuli Venezia Giulia Region(FVG)

The regional Civil Protection (PCR) coordinates the wildland fire management in collaboration with Regional Forest Corp.

The activities of the wildland fire-fighting system in FVG are:

Prevention;
Fire suppression;
Recovery and restoration of burned areas.

Prevention is focused on:
instruction of citizens about wildfires emergency;
vigilance;
prevention interventions.

The structures involve in wildland fire emergencies are:

Operative Center of PCR;
Regional Forest Corp;
Fire-fighting teams of Municipality civil protection volunteers' groups and fire fighting Associations;
Regional Air Service of civil protection;
Air Fleet of National Department of Civil Protection coordinate by COAU (Unified Air Operative Center);
National fire brigade.

The PCR coordinates the wildland fire management through its Operative Center and is active in fire suppression by means of fire-fighting teams of municipality civil protection volunteers groups and fire fighting associations and through its own Regional Air Service of Civil Protection.

Pilot area-Karst-Cross border cooperation

The pilot area-Karst area is a cross border area, in the Friuli Venezia Giulia Region there are two national border lines, with Slovenia and Austria (Carinzia region). In 2006 the Civil Protection of the Region underwrote a crossborder cooperation agreement with Republic of Slovenia and the austrian region of Carinzia on prevision and prevention of risks and common assistance in emergency situations like forest fires .

Act. 6.1.2 – Description of national / regional alerting procedures

Alert system Enties:

Citizen Regional civil protection Regional forest corp National Fire Brigade

Means and toll

-Operative center:

24 hour a day -10 operator,4 funcionary, 1 chief office

S.E.M.E. emergency management software Regional civil protection radio alert system Gsm-phone alert system.

Multi media link with Regional forest corp and Fire Brigade.

Suppression

Enties

Regional civil protection Regional forest corp National Civil Protection Department-National Air fleet

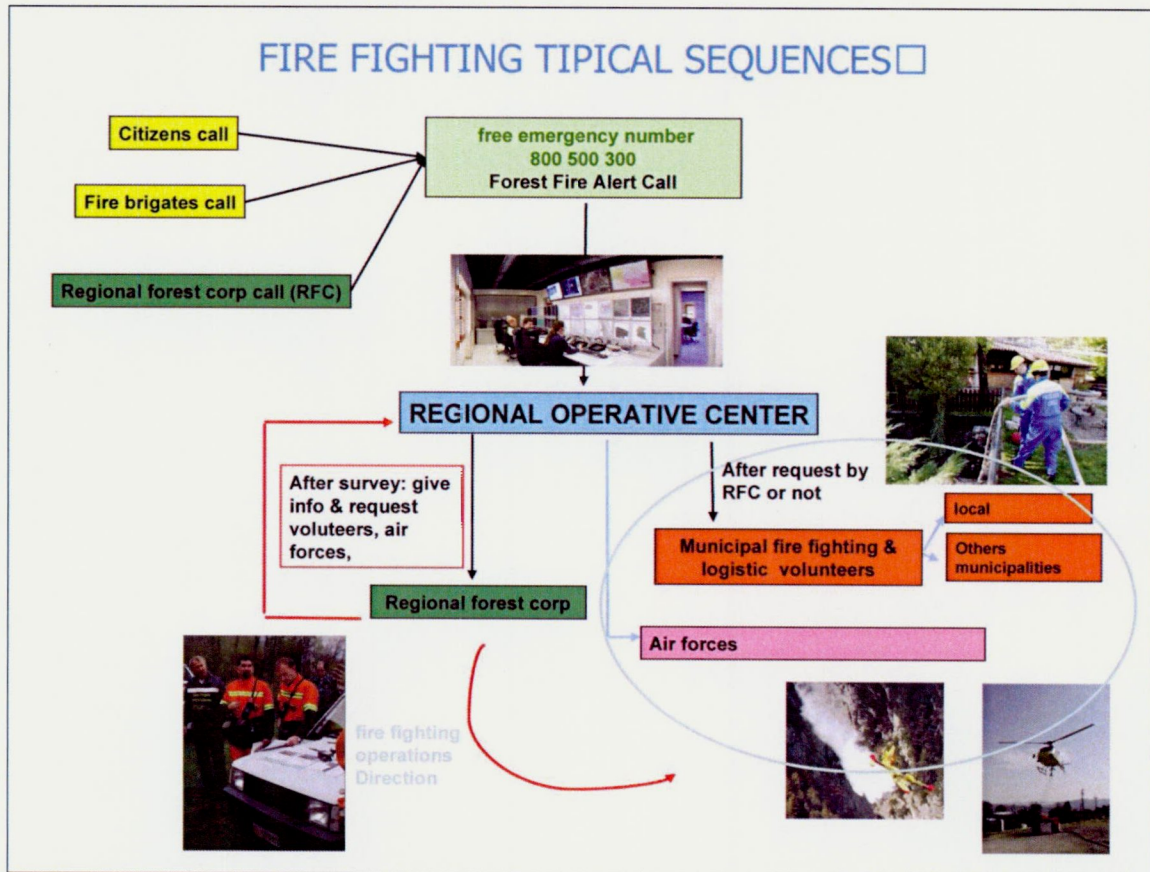
National fire brigade

Means

70 fire fighting module on vehicles 36 modules for helicopter

121 fire fighting municipality teams.

3 helicopters for suppression and 1 helicopter for video survey (visible,infrared camera).



Act. 6.1.3 – Description of national / regional prevention actions

Legal tools

-National law about fire fighting:

-L. 353/2000

-Regional law about fire fighting:

n.8/1977 and n64/1986 define the entities in charge of fire prevention

⑩ Regional Civil Protection ;

⑩ Regional Forest Corp.

-Dpr n136/1998 that approve the the Regional wildland fire fighting Plan

-Description of the current Fire Preventive Plan(s)

-Regional Plan

The regional plan describe the rules and procedures in fire fighting actions in FVG. In particular

for Prevention define the maximum alert periods, one fixed from 1 November until 30 April and others can be define from Regional authorities in relation to the weather conditions. In these periods the actions of police and vigilance are increased.

-Karst Plan

For the pilot area of Karst is define a specific prevention plan with Regional law DGR n.1356/2004 that define the actions to prevention from wild land fires. During the 2003 there were many big fires and also there was high danger for the interface areas, so the karst area needs a specific plan.

-Tools and actions:

- clearing of undergrowth, control of internal road conditions;
- improvement of water tanks and fire hydrant net
- increase vigilance by regional corps and volunteers.
- awareness raising campaign
- improvement of emergency radio system
- adjustment of Individual protection equipment, tanker and firefighting means

FVG regional end users

- **Operative Centre of Civil Protection;**
- **Regional Forest Corp**
- **Municipalities administrations**
- **Fire brigades**
- **Foreign forest fire organizations for the Carinthian and Slovenian transborder areas**
- **National Railway**
- **Highway agencies**
- **National Civil Protection Department**

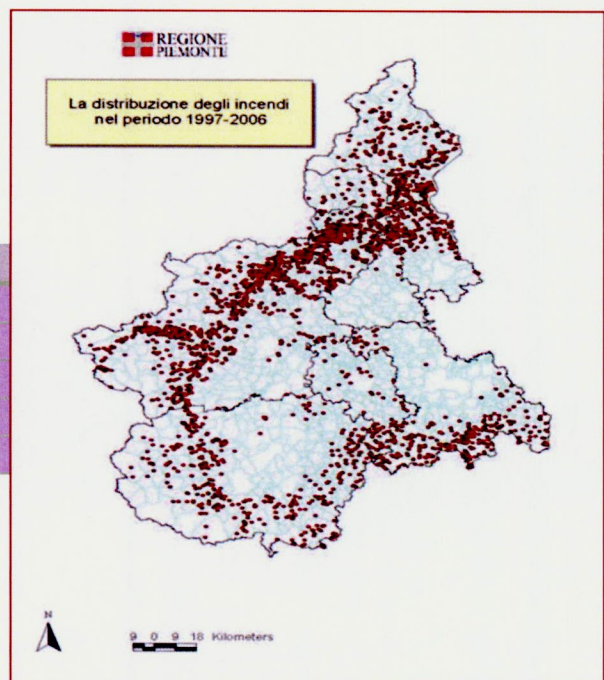
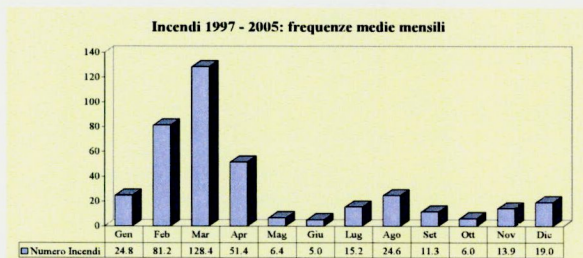
Italy – Piemonte

Piemonte Region is rich in forests:

- § forests cover more than 955.000 ha = 36% of the whole regional surface.
- § The forests in Piemonte represent about 10% of the national forest surface.

	1997-2008
Number of fires	4.392
Total burned area	40.162 ha
Forest burned area	21.678 ha
Unforest burned area	18.484 ha
Average area for each fire	

The season of fires in Piemonte is mainly winter with the absolute maximum in March, followed by February and April.



Main actors, main jobs

Regional levels:

- § Piemonte Region, Forestry Policies dept. it coordinates and does the prevention actions, it does the reestablishment of the burned areas.
- § Piemonte Region, Civil Protection dept. it organizes the Volunteers (approximately 5.000 people), it takes part in the prevention actions, it coordinates the operative group (S.O.U.P.).

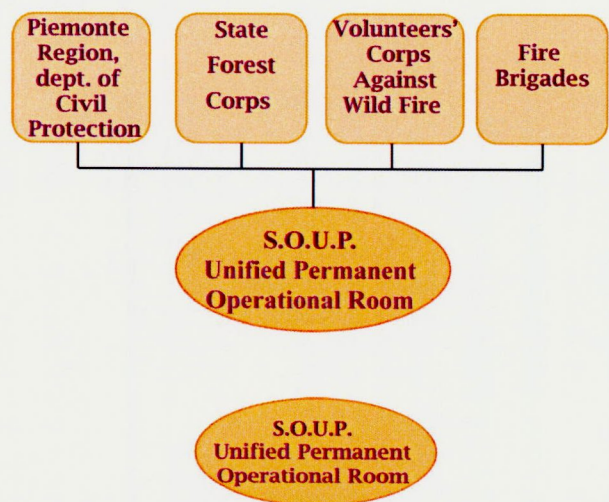
National levels:

- § State Forest Corps it helps during the fire management, takes part in the operative group (S.O.U.P.).
- § Fire brigades involved in particular cases, take part in the operative group (S.O.U.P.).

Technical levels:

- § Regional Agency for the protection of the environment of Piemonte- ARPA
- § Institute for plants and environment- IPLA

Coordination



- It starts up the alarm procedure.
- It aids the working teams to take decisions.
- It sends the aerial units and other supports.
- It decides the priority of intervention.
- It provides to coordinate the ground units, the regional aerial units and to ask for the aid of state's aerial units.

Prevention actions

Regional Forest Fire Danger Rating System

- Based on FWI (thresholds adapted to the different regional situations)
- Daily Bulletin (based on meteo data for the day and previsional data for 3 days to go)
- Calculated for each operative zone (basical areas)

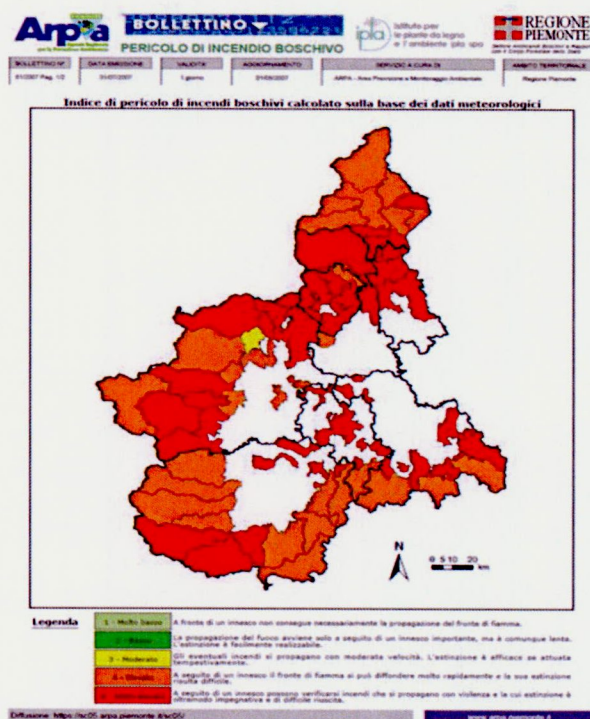
The register of the water points

It is on line, it contents all the information about the location, the technical characteristics such as the state of maintenance or the supports to the helicopters etc.

There are three categories of water points, for a total of 654 units: Natural basins, artificial basins, movable tanks.

The register of the water points is useful for different kind of end users:

- workers who organize and manage the use of the water points and the helicopter areas,
- workers who integrate the data about the water points.



Reestablishment actions

- § The Piemonte Region gave a money contribution for the reconstructions of burned forests.
- § It concerned the cutting of dead trees, the keeping out of the burned vegetation or the replantment of new trees etc...
- § The users could be private ones or public institutions.
- § There was a selection of the projects mainly based on the forestry category or the forestal functions etc...

Germany

Act. 6.1.2 – Description of national / regional alerting procedures

Operational procedures at regional and national levels
- Alert (tools, means, entities,)

In principle, the responsibilities are shared like this:

The DWD is responsible for calculating the forest fire danger index (Baumgartner index). This index is calculated for the following 4 days. There are 5 levels of fire danger.

During normal conditions, a report about the danger level and general meteorological conditions is given to StMELF (forest ministry/administration) and its subordinate authorities twice a week. In case of a high fire danger level (level 4 in spring (until May 10th) and level 5 throughout the year), a fire danger warning is issued by the DWD. There is a prearranged list of organisations and authorities which are contacted (all at the same time via fax or e-mail messages). These include the relevant Ministries, radio stations and other media.

As there are some technical restrictions within the Baumgartner fire index (in cases when there is a severe, short drought after a long wet period), the DWD has a list of local experts (foresters who are subordinates of the StMELF) who are contacted in this case before a fire danger warning is issued.

At times of high forest fire danger, reconnaissance flights can be ordered by a superior officer (subordinate of StMI) in the administrative district concerned. The decision is based on the Baumgartner index value and on expert information from local foresters. The flights are carried out by the Bayerische Luftrettungsstaffel (Bavarian Air Rescue Squadron, subordinate of StMI). They use small helicopters and fixed-wing aircraft. There is usually one specifically trained pilot and an observer, who is usually a forester with additional training. Altogether 159 fixed-wing aircraft and 5 helicopters with 300 voluntary pilots are available from 32 airfields for the whole of Bavaria. In case a fire or smoke is located, local fire-fighters can be alerted and guided by radio.

Furthermore, local forest authorities can take additional measures, such as patrols by car or on foot, on a voluntary basis.

The operational readiness of the fire services is not increased because they are also responsible for structural fire-fighting and technical help and have to maintain a maximum operational readiness throughout the year anyway.

Entities:

- German Meteorological Service (DWD)
 - National meteorological service in charge of observations & index calculation
 - M-68 and Baumgartner indices are in use
 - Distribution of warnings (incl. Fire Danger Warnings)

Dr. Harald Maier Harald.Maier@dwd.de

- Bavarian State Ministry for Nutrition, Agriculture and Forestry & subordinates - Department F3 Silviculture, Sustainability Mr Franz Brosinger, Mr Jens Ossig (forest protection) Ludwigstr. 280539 München
 - Fire statistics
 - Fire prevention (legal measures)
 - Fire Danger Warnings (forwarding of DWD indices, additional information by local experts)

- Bavarian State Ministry of the Interior & subordinates (Subject group ID4 - Civil protection) Ludwigstr. 980539 München –

- Setting technical rules for firefighting, vehicles, communications etc.
- Operating a 'situation room' which processes all helicopter requests
- Subordinate at district governments can order fire detection flights

Mr Klaus Geiger

Tel. +49 89 2192-2640

Fax +49 89 2192-12640

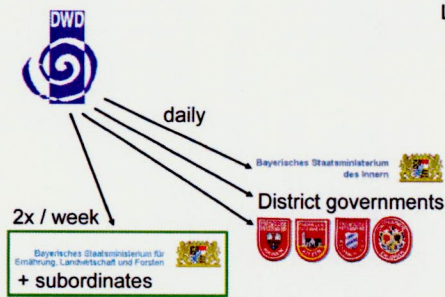
E-Mail klaus.geiger@stmi.bayern.de

- Bavarian Air Rescue Squadron
 - Carries out fire detection flights
 - 159 fixed-wing aircraft, 5 helicopters and 300 pilots

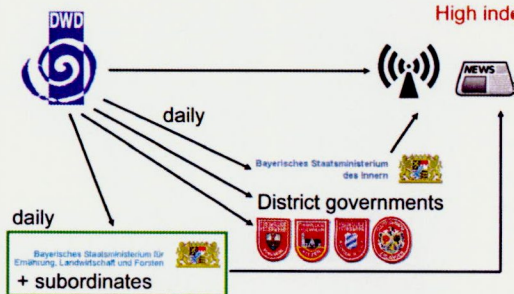
President Karl Hermann, Domweg 2897084 Würzburg, praesident@lrst.de

Index dissemination

Low index value

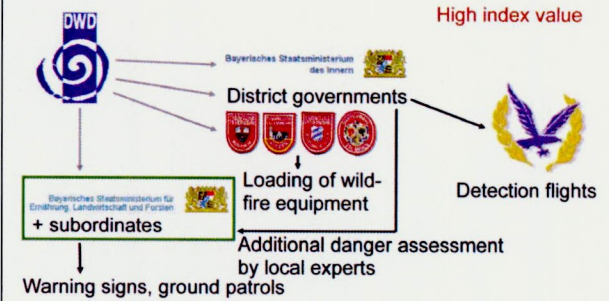


High index value

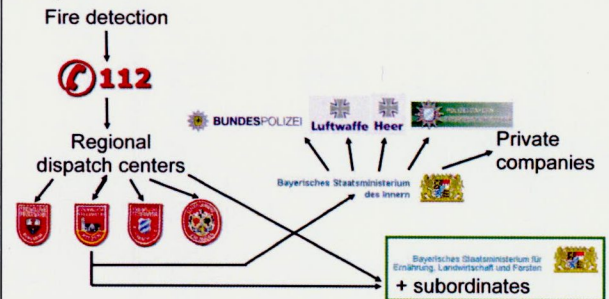


Procedures

High index value



Alert procedures



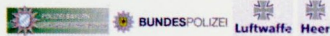
- Local fire services

- Providing 24/7 response for all kinds of fires and accidents
- >300.000 volunteer & professional firemen in Bavaria
- Main focus is on traffic accidents and structural firefighting, most vehicles without all-terrain capabilities
- Special equipment includes helicopter water buckets and helicopter-deployable forest fire toolkits



- Helicopter providers

- State and federal police, military, private companies



Requirements / indices

- Forest Fire Danger Indices have to reflect our fire regime
 - Probability of a fire start rather than potential fire behavior
 - Detection of a danger level for
 - Frequent low-intensity fires in spring
 - Rare high-intensity fires in summer

Suppression (tools, means)

There is no specialized forest fire service in Germany. The municipalities are responsible for their local fire services, but a common framework is set by state and federal authorities. This includes alerting and radio operations. In Bavaria, there are a total of 7800 volunteer fire services with 320000 members, in addition to 250 professional fire services. Until recently, control centers were run by the fire services of major towns (which are manned 24hrs a day). Now we are in the process of changing to integrated control centers for fire, ambulance etc. which cover a larger area (several counties).

These control centers receive emergency calls by the general public (most forest fires are detected by the general public), but also from other authorities. According to the situation, one or several fire services will be alerted by public address

system (services which are manned 24 hrs a day), siren or pager (volunteer fire services and off-duty professional firefighters).

In subsequent radio instructions and pager messages, pre-defined sets of keywords for different situations are used (e.g. B 3 Person = building/vehicle on fire, person in danger; B Wald = forest fire larger than 0,16ha). The keywords also give an idea of how many and which kinds of personnel and vehicles might be needed. E.g. in a B Wald situation, use of the following people and equipment is anticipated:

- local fire service
- 5000l water
- 120l foam
- 8x compressed air breathing apparatus
- 6 groups of firefighters (9 persons each)
- water logistics group
- thermal infrared camera
- local officer-in-charge
- civil protection leading group
- district fire chief
- forest service
- ambulance
- officer-in-charge for rescue service

In case of severe fires, helicopters with water buckets are available from police, StMl and armed forces. The use of private helicopter companies is also possible. As a total for Bavaria, we have 1 Smokey I (5000l), 11 Smokey III (900l each), 14 Semat FPG (900l each), 4 Semat F (5000l each) and 3 Bambi Buckets (500l each). The air force also has one Transall C160 plane which can be fitted out as an air tanker.

Further assistance on the ground can be given by fire services of the surrounding area, German Federal Agency for Technical Relief (civil protection) and armed forces. The local forest administration is usually involved to direct fire services to the site of the fire, suggest supply routes, water sources within the forest etc. However, it also occurs that the fire services find and put out smaller fires without the foresters even noticing.

The use of counter fires or prescribed burning is prohibited.

Act. 6.1.3 – Description of national / regional prevention actions

Legal tools

There are several laws which regulate the use of fire in general. Severe punishments are in place e.g. for arson (1-10 years prison sentence) and for causing a fire danger (e.g. by smoking, open fire etc.; prison sentence up to 3 years or fine). Furthermore, a permit is needed for using fire closer than 100 meters to a forest and smoking in the forest is prohibited from March 1 to October 31. The last sentence does not apply to the forest owner, hunters and timber crews. Fines for these actions can range up to 10000 €.

-Description of the current Fire Preventive Plan(s)

According to the "Guidelines for forest fire defence", the forest administration informs the public about forest fires in general and about the necessary precautions. In endangered areas, growing of deciduous trees instead of conifers can be encouraged by the forest administration through consultation and (financial) encouragement. Furthermore, construction and maintenance of water sources (e.g. ponds, fire hydrants at existing water pipes), labelling of forest roads and exercises can be carried out additionally.

Because of the low danger level and a general shift to deciduous tree species, there are no detailed plans for the implementation. However, in areas with a high fire danger, forest fire fighting maps can be produced by the local forest administration in cooperation with the local fire service. These would include information about forest access, meeting points, potential helicopter landing sites, water sources and tree species composition.

- Entities in charge of fire prevention

Local forest administration (subordinate of StMELF), law enforcement agencies

- Tools (clearing of undergrowth, ...)

In endangered areas, growing of deciduous trees instead of conifers can be encouraged by the forest administration through consultation and (financial) encouragement. The use of counter fires or prescribed burning is prohibited. Clearing of undergrowth because of fire danger is not carried out.

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- 120l foam
- 8x compressed air breathing apparatus
- 6 groups of firefighters
- water logistics
- thermal infrared camera
- local officer-in-charge
- civil protection leading group
- district fire chief
- forest service
- ambulance
- officer-in-charge for rescue service

Austria

General Introduction

Austria is a predominantly alpine Central European Country with a size of 83.871 km² and a forest cover of 47,2%. According to the Austrian Forest Inventory 2000/2002 the forest cover has a total area of 3.96 million ha. The main tree species is Norway Spruce (*Picea abies* L. K.) with a total share of 53,7% (Austrian Forest Inventory 2002). The forest ownership are 53% small private forests (<200 ha), 32% private estates (>200 ha) and 15% federal forests. At present, Austria's forest resource is underutilized because of economic and technical reasons. The current harvest is around 18-20 mil. m³, while the total increment is estimated at 31 mil. m³ a year. The mean stand volume is around 300 m³/ha in commercial forests whereas the mean annual increment is 9 m³/ha. The forestry sector's contribution to gross domestic product growth was about 2.1 % in 2003 according to the most recent calculations (€ 4.8 billions). Therefore, 0.4 % was accounted for by forest management, 0.9 % by wood processing and 0.8 % by paper and cardboard production and processing. Some two thirds of all Austrian citizens live in rural regions and forests as a major renewable resource play an important role in this context. Additionally slightly more than one million hectares of forest are identified as protected forests in accordance with nature conservation law and in natural forest reserves.

Austria is situated in the Central European climatic zone (moderate, humid), however, the eastern part and the eastern foothills of the Alps are the more continental Pannonian climate (hot, dry). Austrian forests do not fulfil the characteristics of fire prone ecosystems, nor have they seriously been fire-impacted so far. However the risk of forest fires is supposed to increase in the future due to the effects of climate change. Forest fires are usually a result of complex interactions between ecological factors such as weather, fuel type, forest structure and topography as well as socio-economic factors such as infrastructure,

population density, agricultural activities and tourism. In spite of this, in Austria more than 85% of forest fires in the course of the last 50 years are human-caused. So all aspects according fire management have to take into account the role of humans in the decision making process.

Organisational aspects of fire fighting

The Austrian Fire fighting is characterized by volunteering and voluntary. There is no central fire command and no central service for fire men and equipment. Because of federalism, the legal competence for fire fighting is located in the federal and operational expertise in the communities. For special tasks, such as forest fire, there are some special bases of the national fire service organizations in one of the nine provinces.

Austria is divided in 9 provinces, 15 towns with special status, 84 administration districts, and 2.350 municipalities. There are 4.527 voluntary fire brigades, 6 professional fire brigades for towns (Vienna, Graz, Linz, Salzburg, Innsbruck, Klagenfurt) and 328 professional fire brigades on enterprise level. In average there are 2 fire brigades per municipality in Austria with a total of approximately 340.000 fire-fighters. Almost 99% of the fire fighters are working on a voluntary basis, only 1% are professionals.

At national level the Federal Fire Brigade Federation is taking care on the interests of the fire brigades. The Austrian Federal Fire Brigade Federation (ÖBFV) based in Vienna is the umbrella organization of the nine fire brigades organizations at province level and of the six professional fire brigades of the main cities. The ÖBFV has the status of an association. Its main task is the coordination of the activities related to the organizational aspects, training and technology. Technical guidelines for the fire-prevention are developed jointly with the Austrian fire

prevention authorities. The ÖBFV is coordinating funds of the federal government for the procurement of emergency vehicles and equipment through the Disaster Relief Act. This allows a suitable financial base for the development of disaster emergency services.

At the level of the provinces nine Fire brigade organizations are used to coordinate the activities. The fire brigades organizations at province level are independent organizations ("public bodies") and have their own country-specific character. They serve as an interface for state policy and state administration. The tasks include for example the operation of the national Fire Service College and the organization of trainings. Fire-fighters can follow special courses for forest fire fighting, in particular for actions in the mountain areas, and some of them are specialized for working with helicopters and airplanes.

Through the allocation of subsidies it is possible to coordinate and support activities in case of emergency. Additionally they act as service provider in many areas of fire fighting.

In the provinces, the local volunteer fire departments or institutions are public bodies of the municipality or city. At the level of political districts within a province fire districts are used as an organizational unit for fire fighting operations. A fire district is led by a single organ called the district fire chief. The fire chief at province level is subject according to each district fire chief. Due to the size of political districts and the role in the operational area, the political districts are also divided into fire sections. The district and section commanders have primary operational tasks. At the level of the community the fire brigades are called local fire department. Each local fire department is led by a local commander who is responsible for this operational unit.

Level of Organisation	Operational unit	Responsible commander
Bund / national	Österr. Bundesfeuerwehrverband (ÖBFV) / Federal Fire Brigade Federation	Präsident / president
Land / province	Landesfeuerwehrverband (LFV) / Fire brigade organizations	Landesfeuerwehrkommandant / Fire chief at province level
Verwaltungsbezirk / district	Feuerwehrbezirk / fire district	Bezirksfeuerwehrkommandant / district fire chief
(Gerichts)Bezirk district court	Feuerwehrabschnitt / fire sections	Abschnittsfeuerwehrkommandant / section fire chief
Gemeinde / municipality	Feuerwehr / local fire department	Feuerwehrkommandant / local Commander

Table 1: Overview of the institutional name, organisational level and responsible commander of the fire brigades in Austria¹²

¹² ÖBFV: Lehrbeheft für Rechtskundeseminar, Stufenbau der Feuerwehr, ÖBFV (Hrsg.), 2008, S.28.

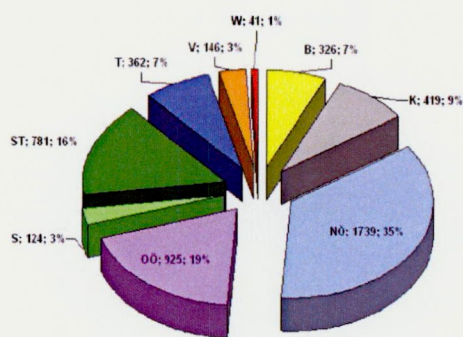


Figure 1: Number and share of public fire brigades in each province¹³

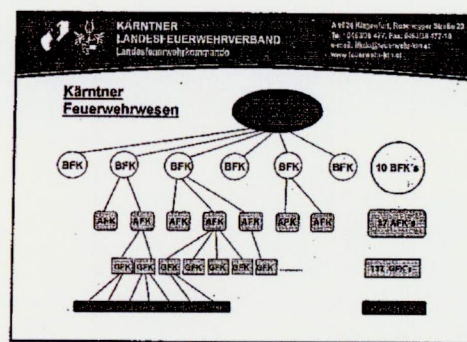


Figure 1: Example of the organisational structure of the public fire brigades in the pilot region Carinthia¹⁴

Main responsibilities of fire brigades

The local public fire departments take over the tasks of preventive and protective fire protection, technical assistance and disaster relief. The defensive fire protection, law enforcement in the local and regional fire authority is the core task of the local, public fire departments.

¹³ ÖBFV: Statistik der Einsätze für 2009

¹⁴ Kärntner Landesfeuerwehrverband 2004

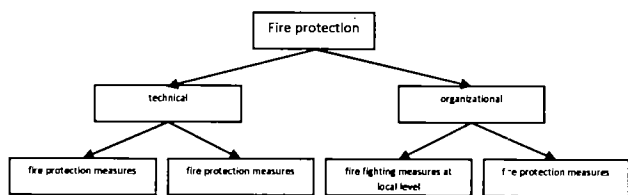


Figure 2: Classification of protective fire measures ¹⁵

Fire fighting operations and fire services are mandatory tasks for the fire department. The task of accepting calls on forest fire alarms and alarming fire departments is done by the fire brigade organizations at province level in almost all provinces. The response time by forest fires is between 10 and 15 minutes (except for mountain areas) leading to a very small burned area per fire. The large staff resource and the large number of fire departments allows to operate in an effective manner. In most cases, forest fires can be extinguished rapidly by tank fire-fighting vehicles in the early phase. However, when forest fires are discovered too late, or take place in rough terrain extensive personnel and equipment are usually unavoidable.

The operational control for a single forest fire operation has the district forest officer, or the owner of the affected area. The fire department is only responsible for the operational procedures. The local fire fighters, and even the fire brigades at province level have no formal and official role in performing preventive fire protection measures in forests and wooded areas. Only the local forest authority

¹⁵ Schneider, 2008, S.13.

represented by the forest officer can give advice on preventive forest fire measures.

In this context there are usually no formal procedures or warning concepts for the operational use in fighting forest fires. Only through the personal commitment of individual managers, often in synergy with their profession as forester, operational procedures are worked out. These documents and the resulting measures, such as planning materials, water supply, infrastructure are therefore available only to a minor extent.

However, in all provinces there are specially trained and equipped units of the fire brigades that have special equipment to fight forest fires from the air. For utilizing the aircraft (mostly helicopters of the Austrian Federal Army, the Ministry of Interior (police) or private companies) the fire department has to rely on the support of others. In some provinces, there are also bases for specialized forest fire fighting equipment such as unloading containers for helicopters, water storage tanks or nets for transportation.

Additionally core tasks of fire fighters are fire prevention and participation in the analysis of fire ignition investigations. Because of the existing human and technical skills, the fire department is utilized for private law intervention as well (use by public authorities, private-request - business activity is used). Generally the fire fighting operations would cause a fee which is often waived. The fire department also participates in educating and training the population in the self- and civil defence.

Alarming procedures in case of forest fires

Fire fighting operations and fire services are mandatory tasks for the local fire department. However, the task of accepting emergency calls on forest fires is done by the fire brigade organizations at province level in almost all provinces. Generally a emergency call is directed to the fire brigade organizations at province or district level. The responsible staff member is identifying the person/institution who has given the alarm and is locating the forest fire in the concerned district. As a consequence the local fire departments which are responsible for the fire district will get informed about the forest fire. This alarming procedure usually takes place by fire sirens located in the concerned municipalities.

For the fire fighting activities at the level of the local fire department no formal procedures are available on province or national level. These procedures are implemented individually by each fire district and province.

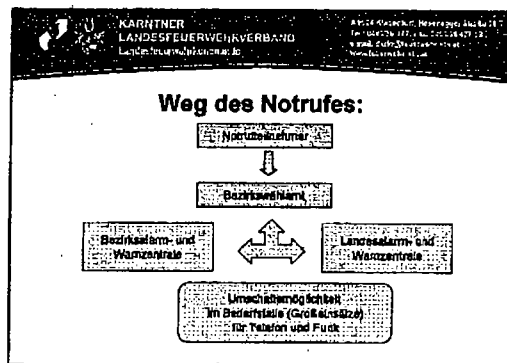


Figure 1: Example of the alarming procedure of the public fire brigades in the pilot region Carinthia

Legal aspects for fire management

Austrian Forest Act 1975

The Austrian Forest Act (amended BGBl. I Nr. 55/2007) attributes four functions to the forest: (1) productive function (i.e., sustainable timber production), (2) protective function (i.e., protection against erosion and natural hazards), (3) welfare function (i.e., the protection of environmental goods like drinking water), (4) recreational function (use for recreation) and (5) habitat function (protection of the forests as habitat for living organisms).

The overall principles of the Act are: i) The preservation of forest area, ii) the preservation of the productivity of forest sites and their functions, and (3) the preservation of yields for future generations (sustainability) for this purpose, any clearings have to be reforested, and forest sites and stands may not be destructed, degraded or damaged. The forest may not be used for any other purpose than for forest culture. More importantly, protective forests have to be treated without the impairment of the protective functions. If the preservation of a protective function or a requirement for water procurement is needed, forests have to be banned by the authority. For such a ban, forest management prescriptions have to be prescribed and forest owners have a right to compensation by the beneficiaries of the forest.

Timber production is described as the main use of forests. At the same time this use is restricted to a sustainable management. For this purpose, immature stands (as a rule no younger than 60 years) may not be felled. Stricter regulations of forest management are in force on a provincial level in the mountainous parts of Austria. E.g. clear cuts exceeding 0.5 hectares have to be approved by the authority and special supervision is carried out for fellings in protective forests.

Everybody has the right of access to any forest for recreational purposes, no matter if it is private or public property. This right is restricted to daytime use and only by foot entry. In addition to timber production, protective purposes and recreation, only certain "by-uses" are allowed. These comprise of forest pasture, tapping for resin or other non timber forest products.

Principles on fire fighting

According to the Federal Constitution (Article 10-12, 15 and 118 - local fire and emergency police) the fire service in Austria is within the responsibility of the provinces. Nine different fire laws regulate therefore the foundations for fire fighting at the province level. In general each municipality is obliged to ensure that at least one public fire department is taking care for the fire fighting procedures. The legal basis for the main responsibilities of the fire departments are found in the Federal Constitution (B-VG), § 2 of Article 118 describes the role of the local fire department as main responsibility of the municipality. In several items, e.g. in Article 10 §1, the duties of fire fighting and prevention measures for example in relation to forestry are described.

Because of federalism in Austria, there is no federal representation of the fire departments in terms of a corporation, and no official representation of the Austrian fire brigades in the European Commission. The Federal Fire Brigade Federation is therefore trying to bridge this gap by taking care of coordinative and communicative aspects.

Fire Management activities

In Carinthia, near to the Slovenian-Italian border (and insofar already Mediterranean-near), there is exhibited since some years a pilot program about the – in former times still quite common – alpine burning practice in order to make again some practical use of this 'eco-technique' on alpine pastures: the burns concern especially the undesired *Calluna vulgaris* and *Rhododendrum ferrugineum* abundance and competition effects to improve the grazing capacity and quality for domestic livestock.

What makes a more adaptive forest management partly more difficult in Austria, is the patchwork of small-sized farm-belonging forests and larger private or federal forest estates, with, correspondingly, quite different harvesting, tending, and management interests and investment efforts/facilities. It is difficult to recommend certain prevention measures as the ecological, socio economic and economic conditions are so different.

On the one hand there are legal limits for clear cut-harvesting in Austria in order to avoid overharvesting on cost of sustainability. But the often stripwise cuts in slope-down direction are opening up old forest stands and making them susceptible for storm attacks with its various after-effects. In several cases, major fires were released and quickly expanding on storm blow-downs, where salvage logging operations took place – apparently with too much negligence. In connection with increasing weather extremes, also storm blow-downs have increased dramatically in the last two decades, offering increasingly light grassy-herb fuels as well as woody debris fuels for hotter and potentially crowning and stand-replacing fires.

On the other hand there are still too small harvesting activities on the forest land owned by private small scaled forests owners, as compared to the annual increments. As a consequence forest stands become, accordingly, often too dense and with an increase of vitality-diminished trees, and insofar predisposed to bark beetle-attacks, storms and other disasters, fires potentially included.

