

The Red Books of Prevention and Coordination: A General Analysis of Forest Fire Management Policies in Spain¹

Ricardo Vélez²

Abstract

A steadily increasing number of fires and the high intensity of fire seasons every 4 to 5 years have marked the last two decades in Spain. A generalized first attack system supported by aircraft and new technologies has achieved a main goal: more than 70 percent of fires burn less than 1 ha. Nevertheless, fuel accumulations on large areas because of rural land abandonment have increased the risk of large fires by lightning. This same socioeconomic phenomenon increases the risk of large fires by traditional agricultural and bush burning. In 1995 budgets devoted to fire management attained an average, in U.S. dollars, of \$5/ha for prevention and \$10/ha for suppression. The protected surface is nearly 25 million ha, including forest, brushlands, and grasslands in the mountains. However, suppression resources are difficult to maintain because of declining public budgets under the present economic policies in Europe. A deep analysis of the situation has been performed by the Forest Fire Committee (FFC), the Spanish equivalent to a National Forest Fire Coordinating Group. Two Red Books on Prevention and Suppression have been approved in 1997. Their approaches to implement new policies are summarized in this paper.

The Red Book of Prevention

The description of the current forest fire situation in Spain is documented in the National Forest Fire Database started in 1968, when the forest fire law was approved. The Red Book includes a series of tables and graphs for every region in Spain. The number of fires is increasing in the northwestern regions and shows stability at the Mediterranean areas, although it is not decreasing in anywhere.

Fire Causes

Lightning fires are less than 10 percent every year, but they are frequently at the origin of the largest burned surfaces. Light fuel accumulations (grasses and brushes) are also at the origin of most fires. A classification of fire causes can be established as:

- High probability motives in all regions:
 - Agriculture and grazing land burning.
 - Private revenge.
- Probable motives identified in certain localized regions:
 - Conflicts related to game hunting rights. - Conflicts related to wildland ownership.
 - Conflicts related to forest policy: reforestations in communal areas; restrictions of local use in protected areas (national and natural parks).
 - Fires set to chase off wild animals (wild boars, wolves).
 - Fires set to create jobs in fire fighting or in reforestations.
 - Rubbish burning at the tourist areas where the urbanization process is expanding.

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²Chief, National Forest Fire Service, Ministry of Environment, Gran Via de San Francisco, 4 28004 Madrid, Spain; e-mail: Ricardo.velez@gvsf.mma.es

- Low probability motives:
 - Fires set to make the price of timber drop.
 - Fires set for political reasons.

Problems and Recommendations

A questionnaire was circulated by the Forest Fire Committee (FFC) to collect views from all the people concerned by forest protection (central and regional administrations, forest owners, farmers organizations, forest companies, journalists, police, etc). The analysis of the answers led to several lists with 33 main problems and recommendations. These can be summarized as:

Problems	Recommendations
<ul style="list-style-type: none"> • Including fires in the database 	<p>Strict use of the legal definition of forest fire.</p>
<ul style="list-style-type: none"> • Investigation of causes 	<p>Training courses on investigation techniques.</p> <p>Permanent crews devoted to investigation.</p>
<ul style="list-style-type: none"> • Forecasting fire danger 	<p>Coordination of the weather station networks.</p> <p>Forecasting lightning storms.</p> <p>Spreading forecasts on drought dry storms, and dry winds.</p>
<ul style="list-style-type: none"> • Fuel accumulations at the wildlands 	<p>Promoting and supporting economic programs of preventive silviculture.</p> <p>Developing programs of prescribed burning.</p> <p>Coordinating crops and livestock, European Union subsidies, and controlled burning.</p> <p>A fire would cancel the subsidy.</p> <p>Coordinating reforestation of former agricultural land and preventive silviculture.</p> <p>Promoting self protection at the wildland /urban interface.</p> <p>Promoting research on fuel management and fire effects.</p>
<ul style="list-style-type: none"> • Dissuasion 	<p>Promoting coordinated programs of patrolling between the Forest Services and the different police.</p> <p>Promoting associations of voluntary local people for patrolling, distributing vehicles and other equipment for that purpose.</p> <p>Enforcing rules on traffic on forest roads and on garbage burning.</p>

- Sensitization
 - Enlarging the current propaganda campaigns for urban people, farmers, and school children.
 - Spreading standardized information on forest fires to the media.
 - Periodical inquiries of the public opinion on forest fire management.

Fire causes and the related prevention programs are defined according to the recommendations of The Red Book of Prevention (fig. 1).

The Red Book of Coordination

The analysis of the performance of the suppression system is also documented by the National Forest Fires Database. The Red Book includes a series of tables and graphs for Spain and for every autonomous region. The average surface per fire shows a slight decreasing trend. Although the total number of small fires (< 1 ha) is increasing, the number of fires over 1 ha is stable or decreasing in several regions. The average fire in the northwestern regions is around 5 ha; in the Mediterranean regions, it is over 10 ha. Nevertheless, the big fires over 500 ha (0.3 percent of the total) burned 45 percent of the total burned surface. In 1994, 79

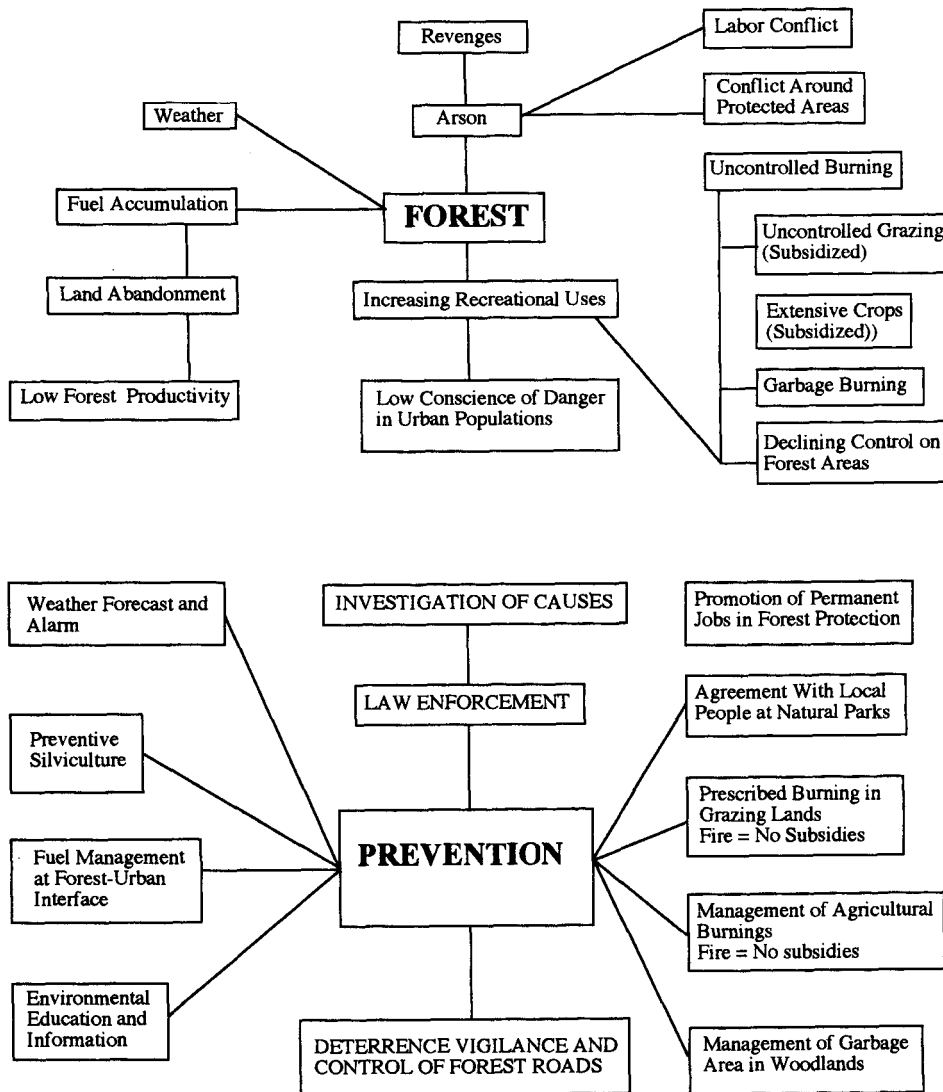


Figure 1
Fire causes and prevention policies.

out of 20,000 fires burned 80 percent of the total burned surface. Dry winds blowing from the continental areas create high danger in the coastal regions. This problem is less serious at the inland regions.

The lookout network is still the basic detection system, although mobile patrolling has detected an increasing share of the number of fires. This system is working only during the summer fire season (June to October). During the other months, the cooperation of local people is increasing.

Aircraft and infrared sensors are of limited use for detection, but very interesting for observation and transmission of images to the operation centers. By the middle of the 1980's the introduction of the helicopters brought a high reduction in the delay of first attack. Currently, that time is less than 15 minutes in nearly 50 percent of fires. Direct attack is the technique in 85 to 95 percent of fires. Fire lines opened by hand tools and dozers are typical of extended attack. Counter fire is used in very few cases because of responsibilities and lack of training. The 1990's have seen first expansion and later stability in the number of aircraft involved in fire fighting. The state fleet of 20 Canadair is the core of this use.

Agricultural aircraft are still in use in many places, but the big increase has been in the use of helicopters. Crew transportation is their main role, but dropping water and foam is also an important activity. Aircrafts are present in 15 percent of fires.

Problems and Recommendations

The same procedure described for the Red Book of Prevention was followed for Coordination. Several lists of 30 main problems and recommendations were identified for a general suppression event (figs. 2, 3).

Problems

Function: General planning limited by the annual budgets.

Function: Coordinator procedures of and rules non-homogeneous at provincial, regional, and central levels because of the structural diversity of the regions.

Function: Director of a fire. Lack of a comprehensive legal definition of this job.

Recommendations

The need for multi-year plans, adapted according to the budget allocated every year.

Coordination between the regional and the central plans.

Reports on large fires and on accidents with victims: A systematic input for planning.

Establishing a common Handbook Coordination for central support to the regions for border operations.

Designing a model Operations Center, according to the present technologies.

Auditing the regional communications systems to improve their compatibility.

Standardizing the information flow to the media.

Updating the legislation supporting a certification system based on training courses and real experience.

Documenting all decisions by written operations plans.

Covering responsibilities by a general insurance.

Function: Planning of operations.
Lack of written operation plans, including forecasts of fire behavior.
Lack of cost control mainly in large fires.

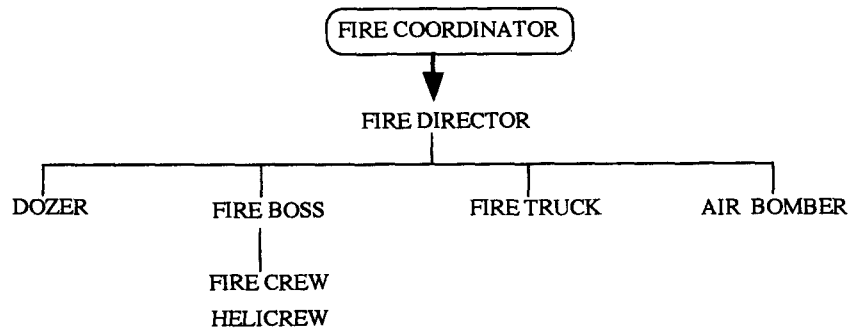
Excessive use of direct attack with water in all circumstances.
Structural fire services, with responsibilities also in forest fires, are never to counterfire, even in large fires.

Increasing the number of mobile units for meteorological and communication support that receive images from the air observation aircraft.

Establishing a common Handbook for Operations Planning.

Analysis of cost effectiveness according to previous rules to verify resources.

FIRST ATTACK



EXTENDED ATTACK

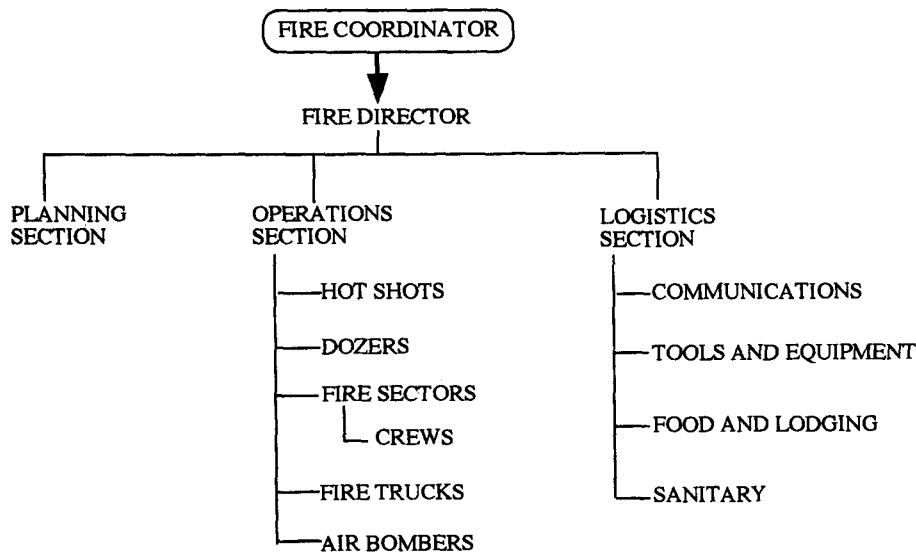
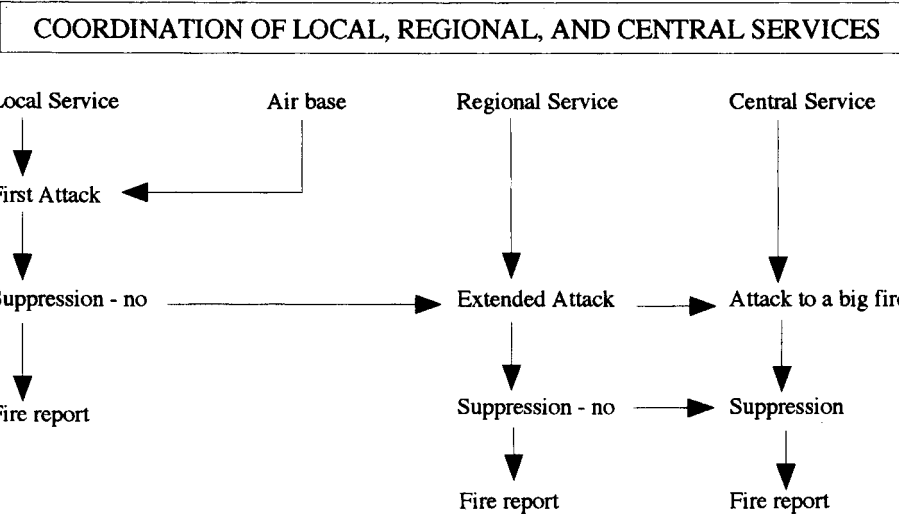
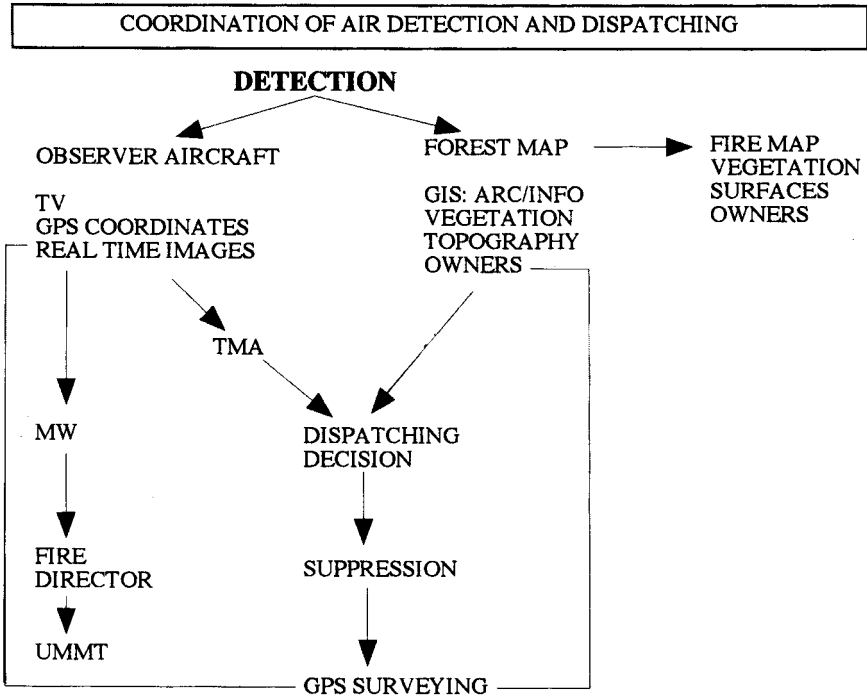


Figure 2
Schemes for attack.

Figure 3
Schemes of coordination.



Function: Operations.
Multiplicity of systems, making
difficult the Integration of resources

Standardizing rules for personnel
selection and training

Establishing a certification system
from different agencies.
for all levels of responsibility.

Standardizing the equipment for
personal protection.

Standardizing work shifts in a fire,
and compensating extra time of
suppression with vacation time.

Coordinating suppression jobs
(summer) and silviculture jobs
(winter) to retain personnel.
Following written operations plans.

Designating air coordinators when
more than two aircraft are
operating.

Function: Logistics.
Difficulties in large fires when
there are resources from several
regions.

Establishing rules for logistics,
taking into account the arrival of
resources from different agencies or
places.

Giving sanitary training to one person
per brigade.

Conclusion

Forest fire services in Spain have attained a good level of effectiveness with a high proportion of professionalism. However, there are several main difficulties to keep pace with the fire problem:

- Increasing fuel accumulations because of rural land abandonment.
- A high number of simultaneous fires in certain regions.
- Diversity of the regional administrations that have the responsibility for first attack.
- Coordination at the large fires.

The Red Books of Prevention and Coordination are a common exercise to look for new ways to improve the quality of the suppression services and to design stronger policies for prevention.