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**Directorate for Security  
and Defence Cooperation**

## **PROTECTING OUR FORESTS FROM FIRE**

### **Global Strategy Guide**



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# **PROTECTING OUR FORESTS FROM FIRE**

## A WORD OF CAUTION

Please note these two preliminary remarks on the purpose and overall philosophy behind this document.

The term **Forest Fires** is used here in the broad sense. It covers all forms of vegetation liable to burn in nature, including forests, scrubland, chaparral, heathland, wildland, grassland and peatland.

This document is a formal guide to the overall principles that should underpin any approach to the forest fire issue. As such, it contains a **STRATEGY** designed to serve as a common reference for all stakeholders affected by this risk.

However, nothing can be set in stone, and while this initial guide is based on the experience and work of practitioners, it is designed to be:

- **Periodically updated** to incorporate feedback and evolving techniques
- **Expanded** with additional doctrine and operational techniques
- **Adapted** to take account of local situations while preserving its core principles.

All these documents combined shall constitute the **official French doctrine on forest fires**.

## WHAT IS IT AND WHY?

It is a general **concept of operations** and is meant to guide decision-makers in their choices as they design and operationalize initiatives in response to forest fire risks.

This approach takes account of the characteristics and effects of the risk in question and is based on effective, tried-and-tested guidelines.

This new strategic 'package' contains two fundamental principles and four main imperatives or objectives:

### **Fundamental principles**

Holistic approach

Anticipation

### **Main objectives**

Prevent fires

Control fire starts in the initial stage

Limit catastrophic developments

Rehabilitate burned areas

## FUNDAMENTAL PRINCIPLES

### 1. HOLISTIC APPROACH

Forest fire responses to date have shown that partial intervention has limited results when it comes to finding a conclusive and meaningful solution.

Experience proves that all factors of the problem interact with each other, as do the proposed solutions. These solutions become less meaningful and less effective when isolated from the overall context. The arbitrary, artificial separation of **prevention** and **response** is no longer acceptable. We must look beyond any remaining jurisdictional conflicts or professional rivalries that may have led to this outdated division, which until now has merely fragmented efforts and resources and constituted a major obstacle to effectively dealing with the forest fire problem.

It is crucial that all players, whatever it takes and irrespective of their actual jurisdiction, act within a **common and consistent framework** that stems from a **holistic**, systemic approach that should also include land use planning, particularly urban planning.

**From now on, nothing should be done separately from the whole.**

### 2. ANTICIPATION

Anticipation must be the golden rule when it comes to forest fires.

By definition, because they move and evolve over time and can have different causes and take on different forms, as a risk they are particularly challenging to tackle. This is why **the rule should always be to make anticipation the absolute top priority.**

As such, when designing and implementing strategies and guidelines, this rule means two things: seek to solve forest fire issues **as far upstream as possible**, and always and in all circumstances, **take action before events occur.**

**Anticipation is the best form of control.**

## MAIN OBJECTIVES

The four main objectives are:

1. Prevent fires
2. Control fire starts in the initial stage
3. Limit catastrophic developments
4. Rehabilitate burned areas

Objectives 1 and 2 are the cornerstones of any successful policy to protect against fires. To achieve them, **priority mobilization, solidarity and convergence** among all stakeholders and players is required.

### 1. PREVENT FIRES

This objective was often neglected in the past, but today it is the **top priority**.

Experience shows that having more fire-fighting resources is not the conclusive answer to fire issues. It is no longer cost-effective enough. Solutions must first be sought as far **upstream** as possible, with a view to preventing or at least drastically reducing the number of fires. There are several ways of achieving this, and all should be explored in more detail.

There are four main actions that can be taken to achieve this:

- A) Identify and treat the causes
- B) Public awareness-raising and information
- C) Estimate and predict risks
- D) Dissuasive patrols

A and D are the cornerstones of this procedure.

#### A. IDENTIFY AND TREAT THE CAUSES

Any lasting solution to forest fires requires identifying and analysing their **causes** so as to better target preventative measures.

Spontaneous combustion does not cause forest fires.

The overwhelming majority of these fires are human-caused, and the rest (very marginal) are the result of natural phenomena such as lightning.

Human-caused fire starts are difficult to detect because they are **unpredictable and evolve** spatially and over time. However, the causes can be better understood through historical and statistical research and analysing certain criteria like fire occurrence and the human environment (the socio-economic context, the presence of agriculture and livestock production, recreational behaviour, conflicts of interest etc).

This requires a **multidisciplinary approach**, taken within an appropriate, permanent body

comprising all the main stakeholders and reporting to the national government's representative in the province.

Local authorities - civil service - courts - law enforcement - provincial fire and rescue service - forestry department etc.

It is crucial to look beyond unverified assertions and gather better intelligence about the context so as to develop a rational understanding.

Thanks to this approach, we can better target immediate technical prevention measures (forest patrols, public awareness-raising and information). Also, and most importantly, we can target and eliminate the structural causes via appropriate measures (eliminating illegal dump sites, restricting burning practices in agriculture or forestry, brush clearing below power lines, regulating subsidies for livestock production etc.).

## B. PUBLIC AWARENESS-RAISING AND INFORMATION

Coordinated information and awareness-raising campaigns should focus on knowing how fire behaves and what the dangers are, rules on the use of fire, and what to do in the event of danger. These campaigns should be evaluated afterwards.

The target audience will depend on the local situation and fire causes:

- Children, so as to change behaviours at an early age.
- Certain stakeholders (elected officials, tourists, livestock farmers etc), who play a specific role.
- Local communities, who need to be informed and convinced because they play a huge role in both fire prevention and response operations.

## C. ESTIMATE AND PREDICT RISKS

This is now a conventional approach, which involves better addressing the causes from two angles:

By **establishing "spatial zoning"** through mapping fire risks. This can be done using statistics to assess fire occurrence, and analysing the vegetation (flammability and combustibility criteria, exacerbating factors such as the relief of the terrain, response time etc).

By **updating information** about identified causes that may make certain sectors more vulnerable, and by **analysing the meteorological context**. When this is done in almost real time, the alert level can be determined and decisions can be made about what sort of coverage to apply to the zone, through patrols and pre-positioned response equipment.

Particular attention should be paid to sensitive zones that need to be conserved for economic or environmental reasons, and wherever permanent or temporary human settlements can be a safety issue: campsites, holiday resorts, and **urban-forest interfaces**.

Not everything can be protected in the same way and choices must be made based on locally-

established priorities. These choices should be documented in the official provincial plans, which must be **regularly revised and updated to incorporate feedback, experience** and any changes in the local situation that affect the risk.

Those in charge - especially provincial fire chiefs - must use spatio-temporal risk assessment to ensure that all preventive measures are appropriate for local conditions.

This approach can be even more effective when it includes developing and implementing Geographic Information Systems (GIS) and data sharing among public stakeholders.

#### D. DISSUASIVE PATROLS

Once the causes have been identified and the risks accurately assessed and planned for, the next priority is to prevent potential arsonists or careless people from deliberately or accidentally setting fire to these sensitive zones, especially when **weather conditions are particularly unfavourable** (drought, wind).

This requires the selective implementation of a system of **dissuasive land and airborne patrols** to ensure surveillance of the areas to be protected.

This system must be light, mobile and flexible, and ready to be deployed whenever a combination of pre-defined conditions is met. It can be swiftly redeployed or reinforced in real time as the situation evolves.

##### **Dissuasive patrol measures include:**

- Activating lookout towers
- Air patrol over sensitive zones by light aircraft and by operational air patrols ready for an immediate drop (Air Patrol for Initial Attack - APIA).
- Mobile land patrol in a grid pattern, by an organic force or by a combined patrol (fire fighters, foresters, district or provincial patrols, military, law enforcement), equipped with light vehicles (off-road vehicles, motorbikes, bicycles, horses etc). **These patrols must be coordinated** and allocated to precise surveillance zones. They will focus on access routes, any suspicious movement or vehicles, and always report fire starts.

**Dissuasive patrols** are the **first link** in the chain of preventive mobilization. They must be a priority and an integral part of the system.

**A fire start means that prevention has begun to fail.**



## 2. CONTROL FIRE STARTS IN THE INITIAL STAGE

Immediately attacking incipient fires is the only effective response to fires that have not been prevented by the measures taken in the preceding phase.

This method has produced significant results, with a high percentage of fires being contained to very small areas.

We can improve this even more, as long as:

- Dissuasive measures taken upstream at least reduce the number of fire starts even if they do not prevent them all;
- Operational intervention is combined with appropriate land use planning in sensitive zones
- Attacking an incipient fire takes priority over all other response operations and sufficient resources are allocated to this.

### A. LAND USE PLANNING

Proper land use planning in sensitive zones makes it harder for fire starts to spread and easier for fire fighters to get close access and respond effectively.

Preventive land use planning mainly involves:

- **Cutting firebreaks** to protect sensitive zones (forests) by dividing them into compartments, and properly maintaining them,
- **Brush clearing** around sensitive locations (villages, campsites, clusters of homes or isolated houses, roads),
- Building infrastructure designed to facilitate firefighting (water supply, trails, helipads, firebreak zones).

Note that firebreaks, whether they are made by clearing scrub or by planting, are only effective when they are reinforced and **held** by appropriate active or passive defensive measures (fire fighting apparatus, static spraying systems etc).

### B. ATTACKING INCIPIENT FIRES

This is **the major** firefighting measure. Because fires can be unpredictable as they travel and evolve over time, especially during high-risk periods, they must be **controlled as soon as they break out**.

To succeed, the attack must be **swift** and **strong**,

which requires the advance positioning of suitable resources. This **preventive mobilization** must be as broad as possible.

Risk assessment (human-caused risk, weather etc) is used to determine when to trigger preventive mobilization and at what scale.

It is always triggered by the weather index used during the summer fire season, but experience

has shown that this data should be combined with **local information** for a **better understanding of the situation** at any given time. This results in a more precise response.

A preventive mobilization plan must be adjusted to the specific situation in each province.

Preventive mobilization is comprised of:

- The dissuasive patrol network, which is closest to the field and must work seamlessly with other response mechanisms.
- Aerial coverage
  - **Helicopter Water Bombers** positioned in sensitive zones every day Light helicopters (AS350 or equivalent) for the initial attack on incipient fires. These helicopters can also remain beyond the initial attack, to support heavyweight aircraft. Heavyweight helicopters (H215, H225) can also be positioned in highest-risk areas or those least accessible to planes. These heavyweight helicopters may take part in the initial attack and then remain at the fire to support teams on the ground, performing drops and shuttling crews and supplies to the most inaccessible areas.
  - **Heavy fixed-wing aircraft** (from the Civil Protection Agency, such as the Dash 8) providing APIA over a wider area across multiple provinces or regions. Their flight plans are adjusted as the risks evolve. In APIA mode, these planes are loaded with long-term chemical retardants. Their main mission is to attack incipient fires.
- Ground coverage, via:
  - Patrols by light, first-response vehicles (firefighters, foresters),
  - Strike teams with forest fire engines.

When using airborne and ground resources to attack incipient fires, everyone involved - even at the most basic level - must be well-trained in combined air and ground operations.

In the past, airborne resources were brought in to support ground teams when they were in difficulty. This concept is now outdated.

In some circumstances, often during high-risk periods, airborne resources arrive first to attack incipient fires. Ground teams benefit from the aerial drops and finish extinguishing the fire. When ground teams arrive first, they are supported by helicopters or planes. In most cases, the **support is mutual**. It is crucial to understand that effective preventive mobilization relies on:

- Making the right choices of where and when to position resources,
- The capacity to deploy a rapid initial response to the event,
- Complementarity between the attack teams and the dissuasive patrol network

This means:

- Advance risk management is crucial.
- Significant response capacity is needed. When risks are at their highest, there must be excess capacity.
- The initial response should never be delayed by any administrative requirements.
- In all circumstances, **attacking incipient fires** takes priority over all other types of response.

It is not easy to define what constitutes an incipient fire. There is no set duration or size. Fires start and spread in many different ways depending on the type of vegetation, what condition it is in, the terrain, how accessible it is by land and air, and especially on any potentially exacerbating weather conditions.

To have the best chance of succeeding, the attack should be launched in the **first few minutes**.

The initial attack **must be swift and strong, and targeted at the right spot**.

Effectively tackling the most active, fastest-spreading fires inevitably requires the use of chemical retardants mixed with water. Ground teams, helicopters and water-scooping planes must use short-term retardant or wetting-foaming agents, which increase the effectiveness of direct attacks. Heavy fixed-wing aircraft that fill up at an airbase must use long-term chemical retardants, which are much more effective for indirect attacks, to prevent fire from spreading.

**If the initial attack on the fire also fails, then there could potentially be catastrophic developments.**

### 3. LIMIT CATASTROPHIC DEVELOPMENTS

The final operational phase is aimed at ensuring that those fires that survived the initial attack do not become potentially catastrophic fires.

In average weather conditions, particularly when there is no wind, fires that have not been extinguished in their initial stage can still be effectively contained to no more than a few hectares or a few dozen hectares. This is the best-case scenario.

However, if weather conditions are extreme and the response is not aggressive enough, the outcome can be far worse. The fire enters a critical phase as it erupts into a blaze and spreads uncontrollably. As the phenomenon accelerates, the initial attack operation becomes ineffective and overwhelmed. At this point, there is a brief, partial window of opportunity for the fire to rage out of control and become extremely dangerous.

There are multiple problems to address in this type of situation, from effectively fighting the fire to ensuring the safety of people and property and more generally managing the impending crisis situation.

#### A. EFFECTIVELY FIGHTING THE FIRE

Given the rapidly evolving situation, as it becomes more challenging to send in resources, and as the scale of the event begins to paralyse certain operators, with the techniques we have today, there is **no single specific protocol** for fighting a major forest fire.

Even when massive resources are mobilized, certain fires refuse to be tamed. They continue to spread naturally until the wind drops or it rains or they come up against some impassable barrier like an expanse of water.

With major fires, static responses cease to be effective and a **more aggressive, more mobile strategy** is needed. This must include a **massive, dynamic, combined, land and air strike** at the right place and time to “break” or “disrupt” the spread of the fire. These strikes must continue until the fire is fully extinguished.

Incident command must have a full understanding of the situation at any point in time, always be capable of anticipating how the fire will progress and deploy “rapid response task forces” with the necessary firepower.

#### B. ENSURING THE SAFETY OF PEOPLE AND PROPERTY

This becomes the key concern as the situation deteriorates. There should be no improvising. The rules must be strictly applied, and safety must be considered at every level of command.

Safety depends on command making the right tactical choices, and more directly, on following instructions for personal and collective protection from heat and smoke.

Equipment may have improved, but this is no reason for sending firefighters in too close to the flames.

As for members of the public, experience shows that most victims who were caught by a fire were on

the move (trying to flee by car or on foot). Traditional concrete, stone or brick buildings do not catch fire unless the fire reaches the windows and enters once the glass has broken.

Therefore, the rule should be for residents to shelter in place. Only specifically vulnerable locations where occupants cannot safely shelter in place should be evacuated (buildings made of wood or other combustible material, campsites etc).

In addition, simple rules like moving combustible material away from homes can be enough to prevent them from being destroyed by fire. This includes cars, firewood, gas cylinders, garden furniture or planters.

### **C. CRISIS MANAGEMENT**

A crisis can be prepared for and managed. Preparation should take place before the fire season starts and be stepped up as soon as the risk level reaches a point where specific measures are mandated.

During major fires or incidents, an Incident Command Post (ICP) is activated, comprising all the forces involved (fire service, foresters, law enforcement, environmental protection agency, meteorological office etc). This cross-cutting structure ensures a comprehensive response to the crisis where all teams work in synergy.

It can be particularly helpful to use the media, especially local radio stations, to inform the public about the situation, risks and safety precautions.

Successfully addressing this type of situation also requires excellent coordination among different forces and agencies and communicating transparently with the local community.

## **4. REHABILITATE BURNED AREAS**

This is the final phase in fighting forest fires. The aim of rehabilitating fire-damaged areas is to make them less vulnerable than they were before the fire. This is not just about what species of trees to replant, but more importantly, it is a question of suitable land use.

Rehabilitation should therefore be approached as a redesign of land use in the area, placing the priority on eliminating the causes behind the disaster.



# DCSD

**Direction de la coopération  
de sécurité et de défense**

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