

## Financial contribution of a water union to the management of a defence zone against forest fire along a strategically fire defence road (DFCI)

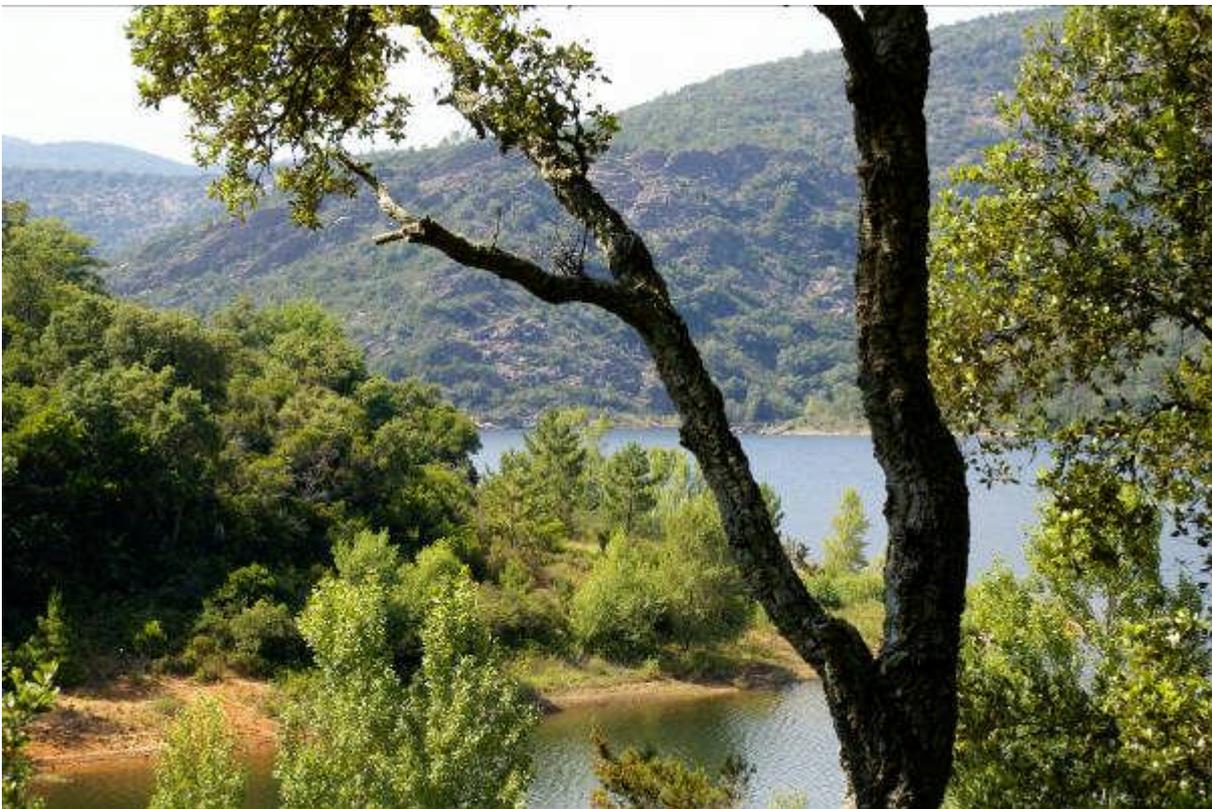
Theme	Contribution of a water stakeholder to the protection of forest
Localisation	La Môle, Massif des Maures, Var, France
Date et information	2011-03-17 – Jacques Brun, technical director of SIVOM du Pays des Maures et du Golfe de Saint Tropez, fiche rédigée par L.M. Duhén, CRPF

### 1. Context

#### 1.1. Géographical

**Forest** : Massif des Maures is very vulnerable to fires, climate characterized by sudden rainfall, steep slopes, lack of forest value, therefore lack of forest management

**Water** : The artificial lake of La Môle in a fully forested watershed dominated by cork oak, supplying water to the touristic town of Saint-Tropez (Var, France) Credit: C. Birot



## 1.2. Opportunities

Following the County Plan for the prevention of forests against fire (PDPFCI), a study of a new fire prevention plan for the Massif des Maures and the definition of strategic cleared crisscrossing the mountain were set.

Forest fires are generally very large surfaces. The probability remains high but there was a decrease in frequency due to effective prevention policy.

## 2. Conduct approach

### 2.1. Willingness to involve other actors at the expense of prevention

The head of Forestry SIVOM, tasked to set up the work of Fire, led a discussion with DDTM upon renewal of the fire prevention plan, and this has led to the definition of strategic lines crisscrossing the mountain for a better efficiency.

Two "goods" were not sufficiently protected by the current system:

- ❖ a hill reservoir supplying 9 municipalities of the Gulf of St Tropez (La Verne Lake) managed by the Union for the drinkable water distribution of the Corniche des Maures (SIDECEM)
- ❖ and a forest (FD des Maures), managed by the Office National Forests, where coordination of actions DFCI was necessary.

Within SIVOM, a process was initiated, consisting of pooling the costs of carrying roads and maintenance DFCI (amount outstanding after grants) so that the municipalities in the periphery of the mass, richer, are supportive of small municipalities within the massif. In this context, other beneficiaries of prevention have also been approached like the SIDECEM and the NFB.

### 2.2. Conducting a study to examine the impact of a fire in the watershed of the dam on the quality of drinking water:

The SIDECEM requested that a study be conducted to assess the risks in case of fire and gauge the interest to participate in these investments.

With the support of responsible SIVOM, they wrote a specification and sought funding to conduct the study (approximately 50.000 €). This was done by the Water House / SOGREAH for hydrology part and CEREN for the fire risk part. It highlighted the following points.

#### 2.2.1. Risk fire study

A critical scenario was modelled as fire throughout the watershed, for a rainfall frequency step decadal (10 years) and cinquantennale (50 years) with a duration of 24 hours, very low level in the lake. The study showed the vulnerability to fire suffered higher over western parts on the parts of the basin slope. The models confirm the strong likelihood of a fire that could burn the entire watershed with a reduced duration of about 4 hours in the critical conditions selected.

### **2.2.2. Hydrological study**

The hydrological study has highlighted the following points.

#### **Flow**

The flow of flood would increase by 50 to 100%. Surface runoff is very important during the first two years

#### **Erosion**

Concentration of fine silt in the Dam 2 to 12 g/l depending on the assumption

Settling time of 20 to 40 days

#### **Direct effects on water quality of dam**

##### ***Soil structure***

The fire will affect the soil structure: loss of organic matter, forming a hydrophobic layer which reduces the permeability during the first two years

##### ***Physicochemical Modification***

Modification Physicochemical with a loss by evaporation of N>K>P>Ca, in increasing order.

Then, fallout of these elements, especially phosphorus, in the days following the Fire and response of phytoplankton biomass.

Ash fall: resulting in higher pH and higher solubility of organic compounds.

##### ***Effect of the first flood***

Chemical Impact: ammonium concentration (toxic to fish, a problem of taste and odour for humans) and higher amounts of phosphorus, iron and manganese.

##### ***Impact of the resumption of flow on burned soils***

Presence of ammonium = treatments must be planned (too expensive over 2mg/ l)

Increase of organic matter in water = quality degradation of water and algae growth in the Lake

##### ***Medium-term effects***

The relationship watershed / water cycle returns to its initial operation fairly quickly. In the example watershed neighbour Rimbaud, which was completely burnt down in 1990, the vegetation has taken over 60% of the area two years later.

However nitrate concentrations are higher and there is even a joint peak nitrate, ammonium, a year after the fire.

##### ***Long Term Effects***

Changing in relation to new flows remain = nitrogen phosphorus, iron and manganese increased in the lake.

### **2.3. 4-year agreement to share the costs**

A convention on the protection of the watershed of La Verne and based on the study of revision of fire prevention plan was signed between the SIDECM and the SIVOM and for a period of four years.

Work necessary to protect the DFCI Watershed Verne and withholding water SIDECM intended to supply drinking water to its nine municipalities are planned under various types of intervention: creation of brush cleared area, maintenance of vegetation by grinding, stump removal and planting seedlings in the case of a pastoral maintenance.

The prime contractor is insured by the SIVOM that supports the administrative (financial plan, pre-financing of VAT, ...) and technical implementation.

The SIDECM ensures self funding which is 20% for creation of work and 40% for maintenance of existing works. For four years, these funding are about 50,000 Euros for the SIDECM (12.500 € a year). The watershed area covered about 2.000 ha. The contribution is 6,25 € / hectare/year.

This agreement may be renewed at the end of the period of 4 years which is the time of passage over the works of PIDAF.

## **3. Key lessons and reflexions**

### **3.1. Additionnal funding supports**

Exemplary operation that allows integrating additional partners to protect areas of high biological value and landscape on larger areas

### **3.2. Complementarities between Forest and Water**

This case consist in a good example of complementarities between water and forest stakeholders in each area who recognized the mutual benefits of working together and found the suitable form of contract.

- The forest contributes to a better infiltration of precipitation into the soil, reducing the emission of fine particles that accumulate in the reservoir, ensuring good physicochemical composition of water.
- The incomes distribution of water contributing to the protection of fragile forest by the specific treatment of a road and its surroundings located in a strategic position in case of fire.

### **3.3. A study argued to have the good choice**

The use of a well-argued study has demonstrated the relevance value of protecting the existing forest against fire to maintain water quality. The water stakeholders were convinced on the basis of strong technical elements.

### **3.4. But a lack of communication**

Because of the exemplary and because of its location in a high class tourist destination (The Gulf of St Tropez), this approach deserves greater communication.

That plays on elements essential to preserving the quality of the site: a much appreciated forest scenery as opposed to urban areas and water to be available in both quality and quantity at peak attendance.

That's not the result of chance or of the random but thanks of the role played by the forest and the involvement of stakeholders in the fields of forest and water who have worked well together. At the end of the convention, it would be desirable to make the balance sheet and make it known.

