

FOREST MANAGEMENT FOR WATER FLOW REGULATION WITHIN A CLIMATIC CREDIT MARKET

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Introduction

CLIMARK is a climate change mitigation project funded by the European Union (LIFE16 CCM/ES/000065) aiming to compensate forest management actions leading to improve ecosystem services of climate regulation, biodiversity and **water flow regulation**.

The overall purpose of CLIMARK project is to promote multifunctional forest management for climate change mitigation, through the design of a local market of “climatic credits”. Climatic credits are derived from a holistic perception of forest management, aligned with the newly developed Climate Smart Forestry, which:

- i. takes into account the local characteristics of the territory to identify the most cost-effective management options, and
- ii. applies solutions that capitalize adaptation-mitigation synergies.

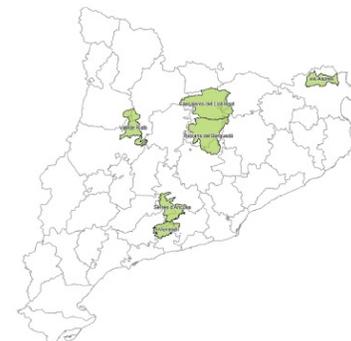
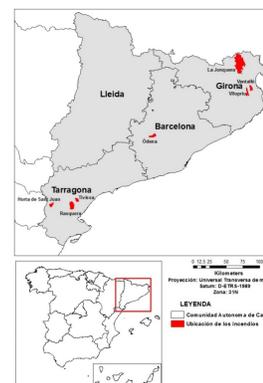
The project takes place in Catalonia (Spain) and it is replicated in Veneto (Italy). Approximately 120 ha distributed among forest stands of different structural characteristics are selected and treated for demonstration purposes in six Mediterranean landscape units in Catalonia, Spain.

Objectives

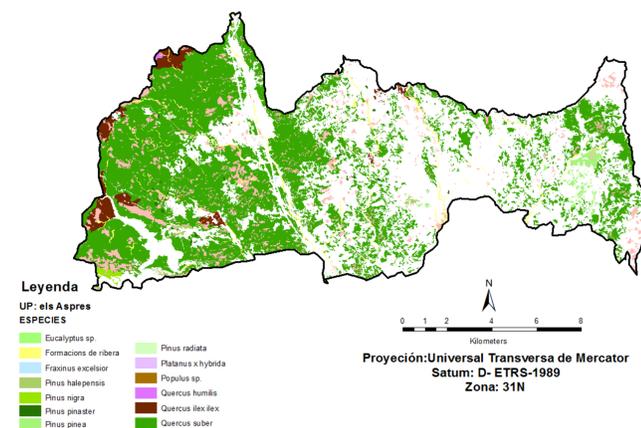
The specific goals of the project are:

1. To maintain and improve the mitigation capacity of European Mediterranean forests through the application and promotion of locally identified forestry practices (from the needs of local public and private forest owners) and to assess their impact on three ecosystem services: climate regulation, **water flow regulation** and biodiversity. Three key indicators have been identified: C sink capacity, **water use efficiency** and potential biodiversity. Valuation of these services will allow the definition of the new “Climatic Credit” concept.

2. To design a local market of “climatic credits” as a tool to promote multifunctional forest management under pervasive rural abandonment conditions, and to provide the means for its replicability in other European regions, through specific transfer and context-validation actions. The basic requirements of Emissions Trading System-ETS schemes, **permanence, additionality and a defined baseline**, need to be determined for **water flow regulation**.



Relative location of 6 landscape units in Spain and Catalonia, and locations affected by wildfires in the last 10 years.

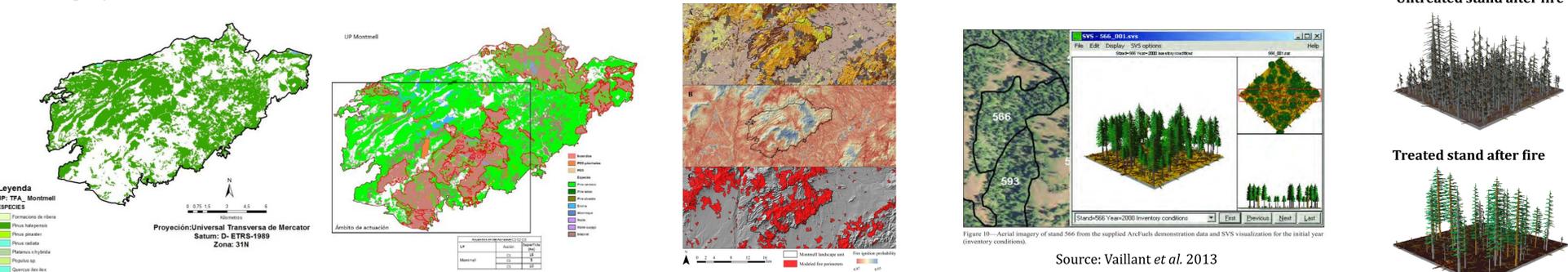


Methodology

Five forest management actions are tested for impact on **water flow regulation**:

- Management of burned areas regeneration
- Management of mature forests
- Plantations and agroforestry systems
- Soil carbon management
- Strategic management for wildfire prevention

Scenarios for non-managed (baseline) and managed (treated) landscapes are created. For instance, wildfires are modelled under no-fuel-treatment state or with strategic points PEG executed:



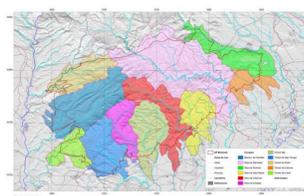
Rainfall-runoff models are then simulated with dedicated software (Watershed Modeling System v10.1) based on these scenarios. Models results are validated with gauging stations at the watershed level within the landscape units.

Expected results

The outputs of rainfall-runoff models will provide the required data to establish the basic requirements of Emissions Trading System-ETS schemes, **permanence, additionality and a defined baseline**, needed for compensation in **water flow regulation within a voluntary “climatic credit” market**.

References

Vaillant, NM, Ager, AA, Anderson, J (2013) ArcFuels10 System Overview. USDA Forest Service, Pacific Northwest Research Station Gen. Tech. Rep. No. PNW-GTR-875, Portland, OR.



<https://www.aquaveo.com/software/wms-watershed-modeling-system-introduction>