



RUNOFF wildfire analysis and landscape values of the *Montnegre i Corredor* mountain ranges



Country / City **Spain / Barcelona**

University / School **Universitat Politècnica de Catalunya (UPC) / Escola Tècnica Superior d'Arquitectura de Barcelona (ETSAB)**

Academic year **2019 - 2020**

Title of the project **Runoff. Wildfire analysis and landscape values of the Montnegre i Corredor mountain ranges**

Authors **Roser Garcia & Eduard Llargués**

TECHNICAL DOSSIER

Title of the project	Runoff. Wildfire analysis and landscape values of the <i>Montnegre i Corredor</i> mountain ranges
Authors	Roser Garcia & Eduard Llargués
Title of the course	Montnegre i Corredor: landscapes in transformation
Academic year	2019 - 2020
Teaching Staff	Pepa Morán, Anna Zahonero, Lidia Carrillo, Rut Domènech, Marc Castellnou
Department/Section/Program of belonging	Projects I / MBLandArch. Master's Degree in Landscape
University/School	Universitat Politècnica de Catalunya (UPC) / Escola Tècnica Superior d'Arquitectura de Barcelona (ETSAB)



Written statement, short description of the project in English, no more than 250 words

The project is about landscape planning, management, and transformation in the Montnegre-el Corredor mountain, in Catalonia, through the study of the dynamics of the landscape and its values for achieving a transformation proposal for the reactivation of the territory and adaptation to the new scenario of global climate change. The Montnegre-el Corredor mountain has never been burned, because of that, it is now in a situation of special vulnerability in facing sixth-generation fires that we will deal with, in the following years, especially in a Mediterranean climate like ours, where we already perceive the rise in temperatures, the long periods of drought in summer, and the water stress suffered by mature and densified forests due to the gradual abandonment of forest exploitation and rural life. What we have is a mountain full of fuel and is waiting for the spark to burn whole, as its landscape is now structured. For this reason, the agents and values of the local landscape are studied, capable of reactivating and transforming the territory and returning it to a landscape structure in the form of an agroforestry mosaic more resilient against major disturbances. The proposal tries to provide tools, in this case in particular, in the form of ponds, to be able to generate and maintain an agroforestry mosaic and also have water reserves, either to extinguish fires, to diversify crops or for fauna well-being.

For further information
Máster d'Arquitectura del Paisatge -DUOT - UPC

T: + 34 93 401 64 11 / +34 93 552 0842
Contact via email at: biennal.paisatge@upc.edu

Máster d'Arquitectura del Paisatge -DUOT - UPC
ETSAB- Escola Tècnica Superior
d'Arquitectura de Barcelona
Avenida Diagonal, 649 piso 5
08028 Barcelona-Spain



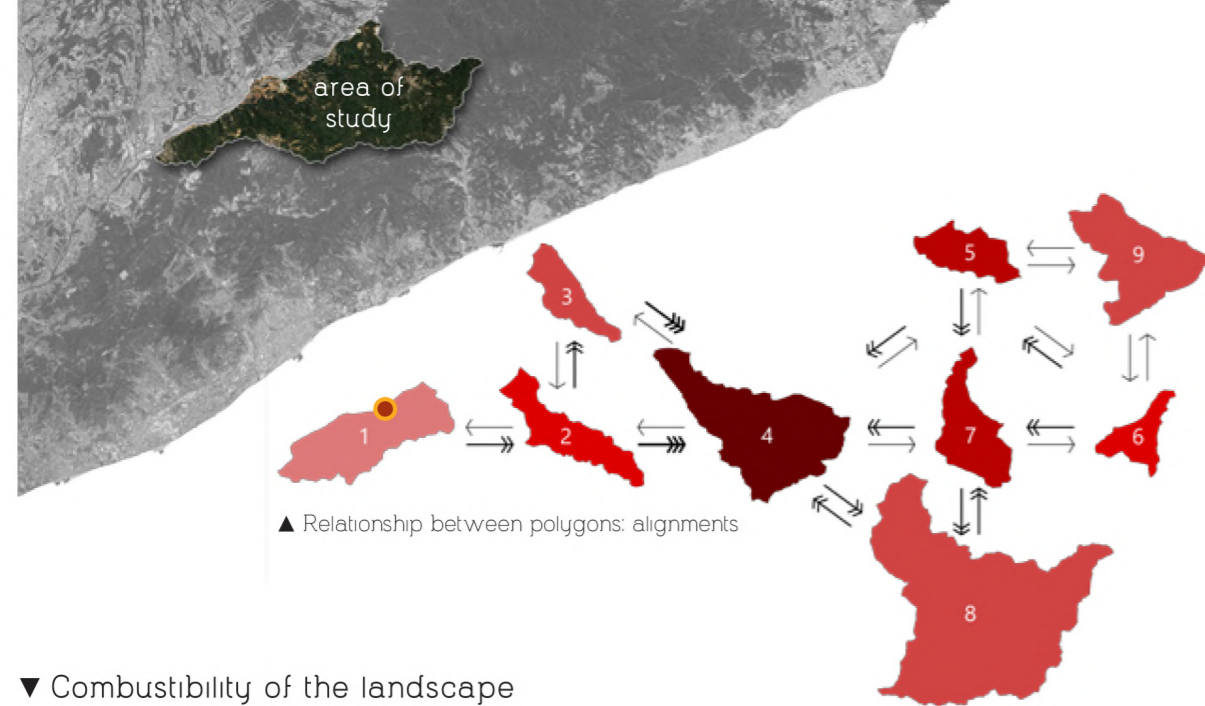
CLIMATE CHANGE AGAIN

11th International Biennial Landscape Barcelona

Barcelona September 2020
SCHOOL PRIZE

Wildfire analysis

Montnegre i el Corredor mountain ranges
Catalonia

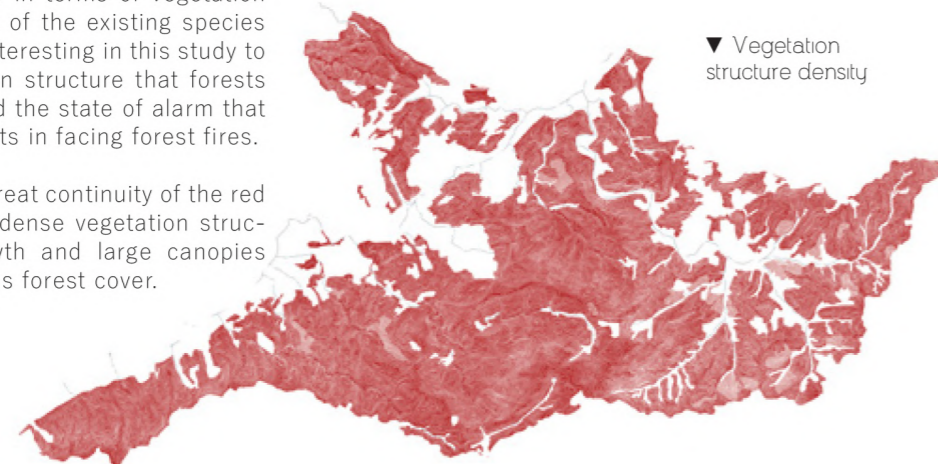


▼ Combustibility of the landscape

The areas most susceptible to burning are identified given their geomorphological conditions of topography and insolation, as well as their existing vegetation, meaning, fuel. In the following map the southern slopes are mapped with the orthophoto image. Given their sunny conditions, these areas have different vegetation than the northern slopes and are characterized by greater resistance to drought conditions, which would favor a fire that would obtain available fuel from dry vegetation. We can see large continuous slopes belonging to the main summits of *El Corredor*.



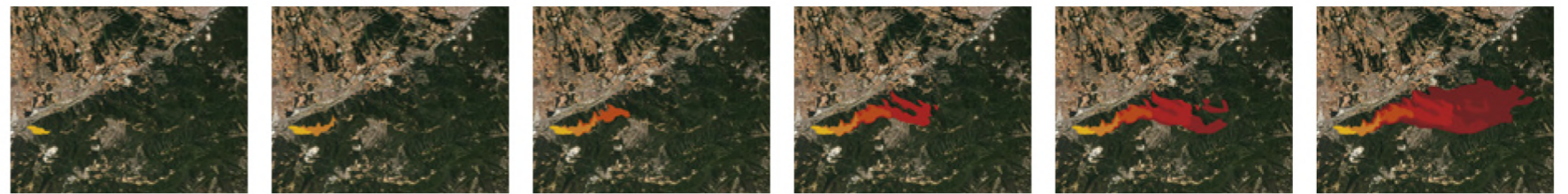
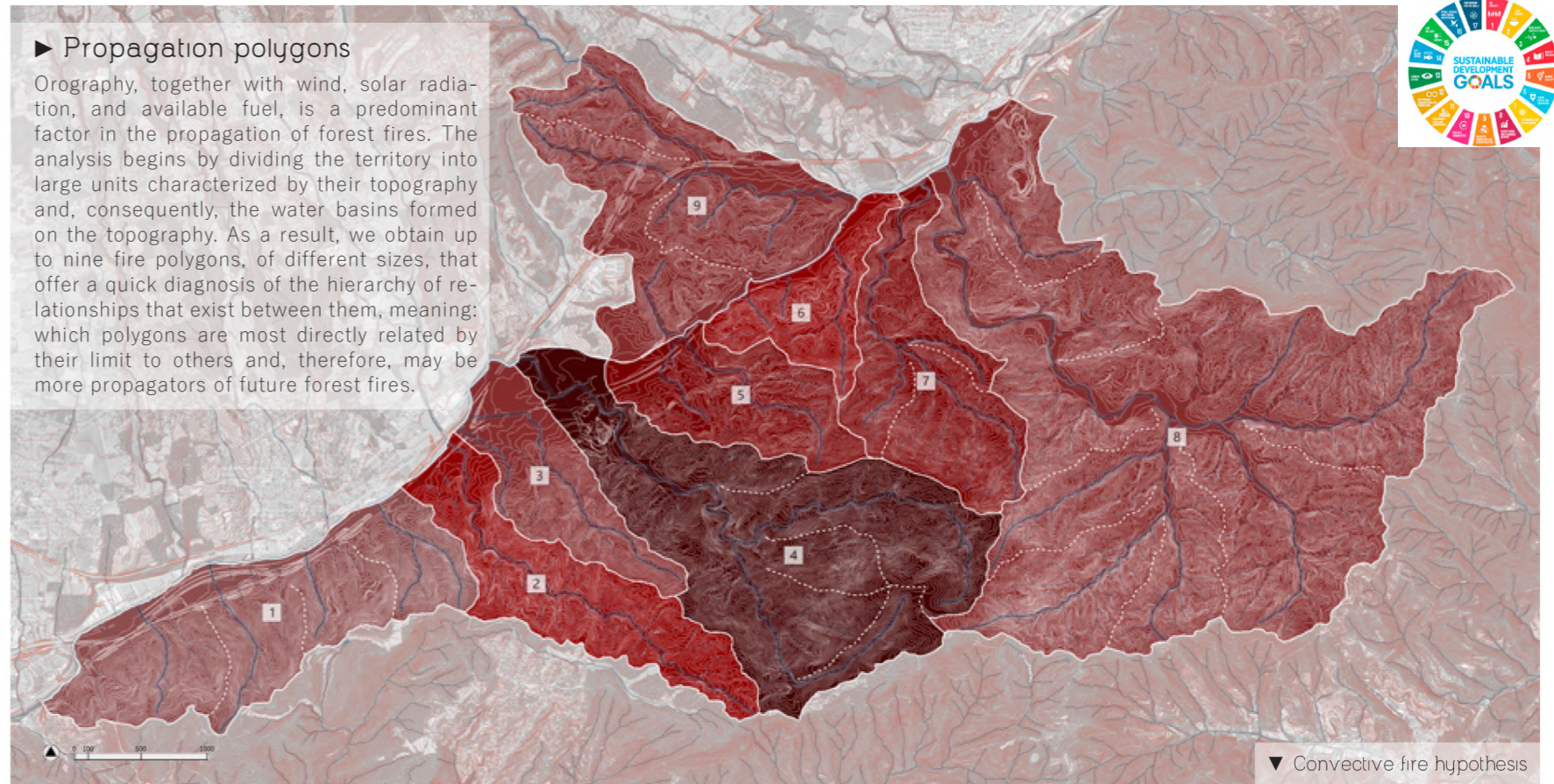
The following map highlights the areas of greater combustibility in terms of vegetation structure. Regardless of the existing species of the territory, it is interesting in this study to identify the vegetation structure that forests present to understand the state of alarm that the landscape presents in facing forest fires.



We can observe the great continuity of the red color, indicative of a dense vegetation structure, with undergrowth and large canopies that offer a continuous forest cover.

► Propagation polygons

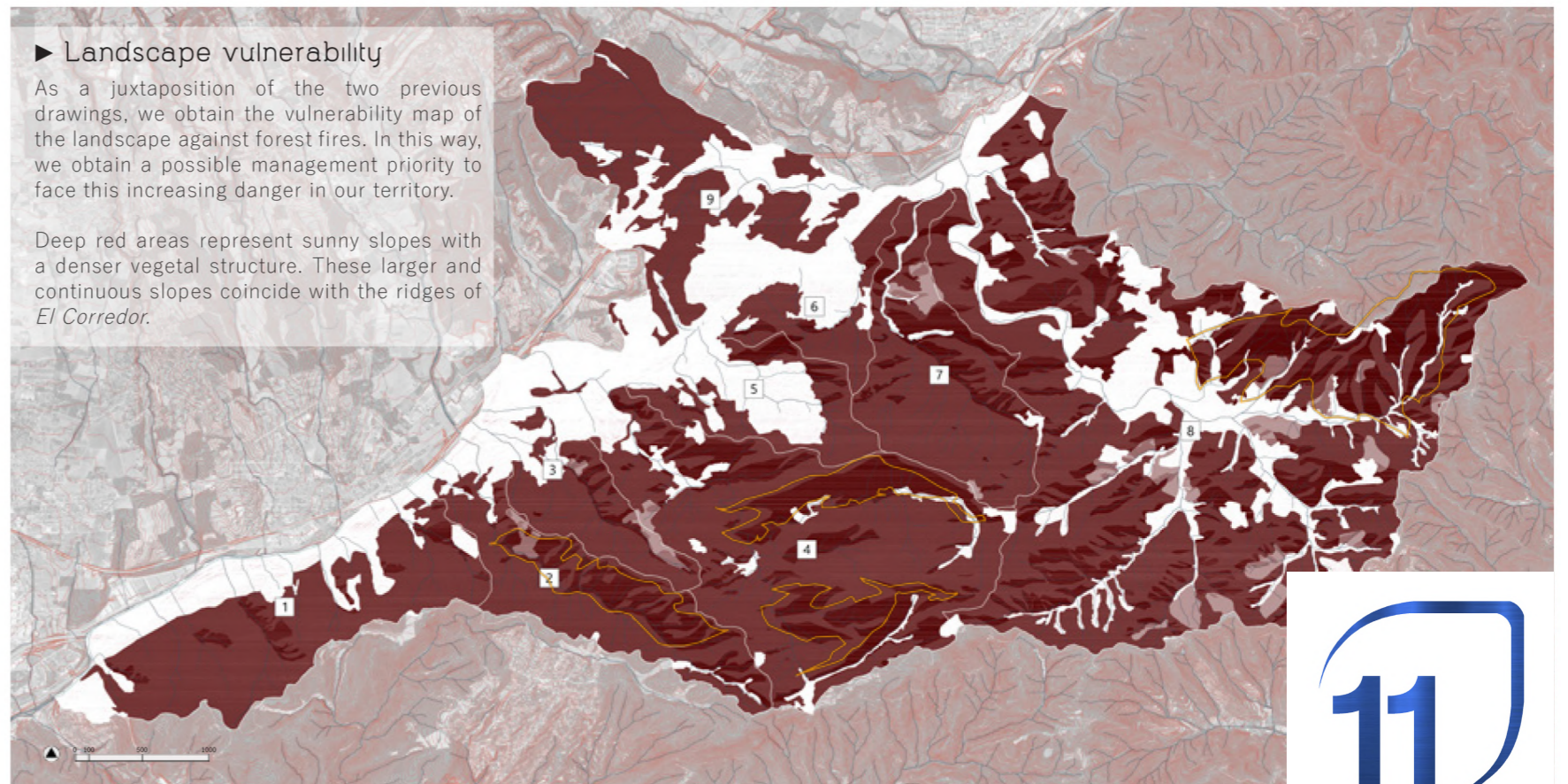
Orography, together with wind, solar radiation, and available fuel, is a predominant factor in the propagation of forest fires. The analysis begins by dividing the territory into large units characterized by their topography and, consequently, the water basins formed on the topography. As a result, we obtain up to nine fire polygons, of different sizes, that offer a quick diagnosis of the hierarchy of relationships that exist between them, meaning: which polygons are most directly related by their limit to others and, therefore, may be more propagators of future forest fires.



► Landscape vulnerability

As a juxtaposition of the two previous drawings, we obtain the vulnerability map of the landscape against forest fires. In this way, we obtain a possible management priority to face this increasing danger in our territory.

Deep red areas represent sunny slopes with a denser vegetal structure. These larger and continuous slopes coincide with the ridges of *El Corredor*.



Landscape values and opportunities

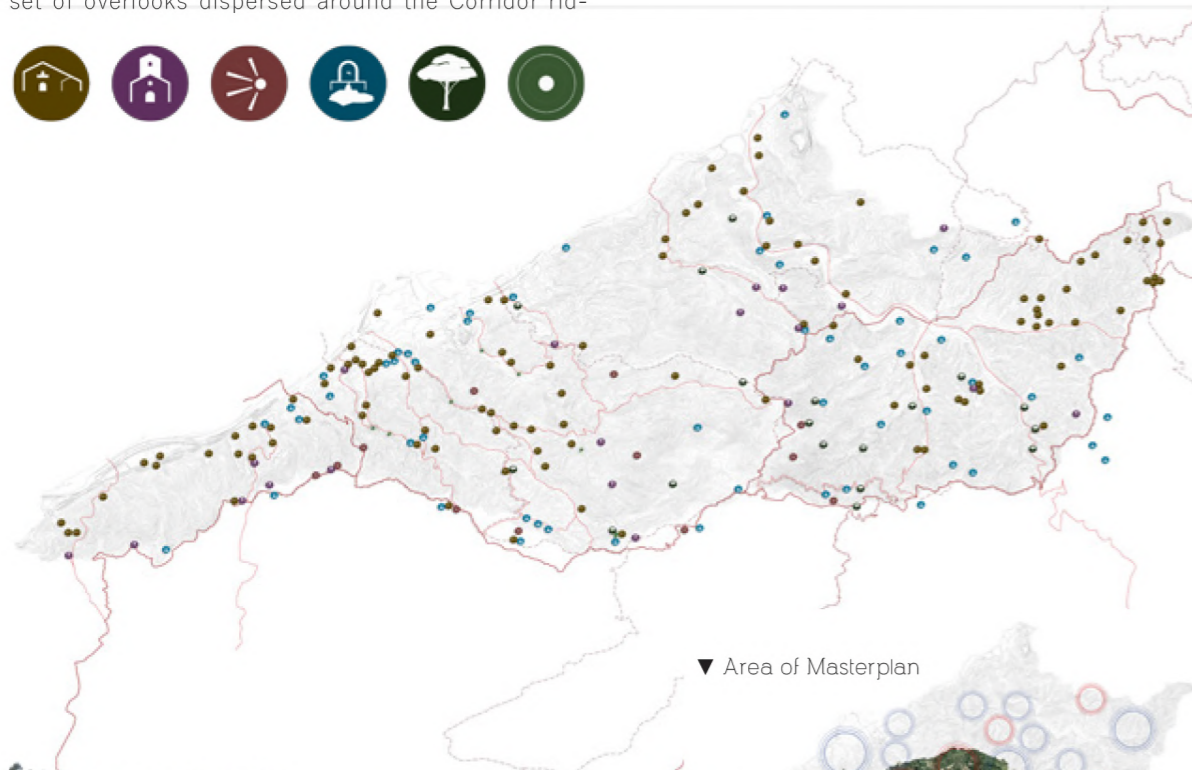
Transformer cores

► The following cartography tries to locate the existing values that contribute to generating and maintaining the landscape. A landscape considered "local" given its strong link with *masías* (country houses) associated with crops and large managed forest plots. These managed forests are often those formed by cork oaks for their great use of their raw material.

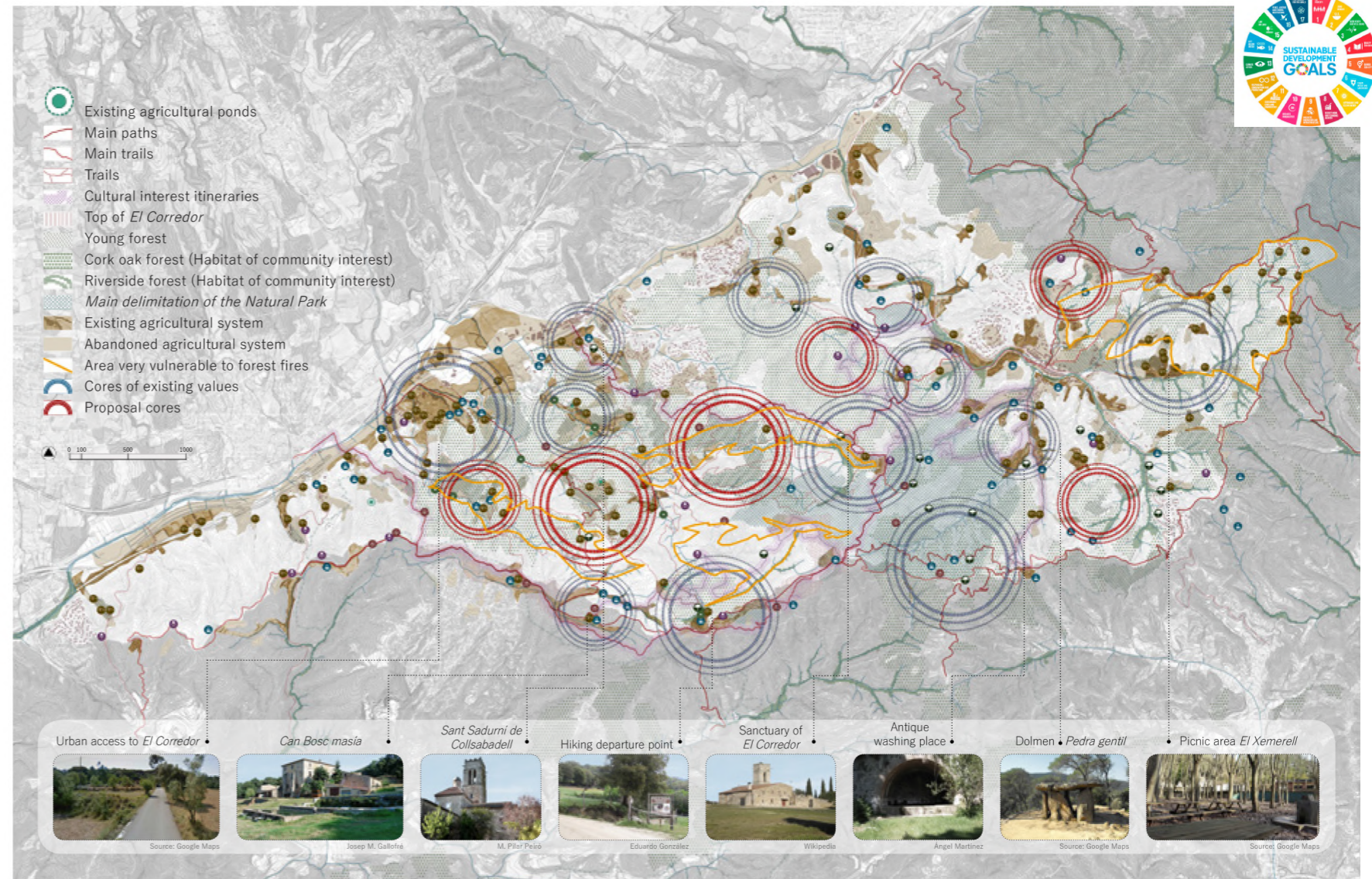
The elements considered to contribute to maintaining the local landscape are the *masías* and the built heritage associated with religious buildings or bound to basic needs as fountains or meeting points. The set of overlooks dispersed around the Corridor rid-

ges are also highlighted, as well as the historic trees and small-area habitats that may disappear due to the strong anthropization of the area. In addition, the elements and connections are related to the natural values present in the landscape: mixed cork oak forests, some riverside forests, and the main delimitation of the *Montnegre - El Corredor* Natural Park. The existing and abandoned agriculture are also combined, the last one capable of being recovered.

From all this information, the cores of existing values (blue circles) and transforming cores (red circles) that can become local values are highlighted.

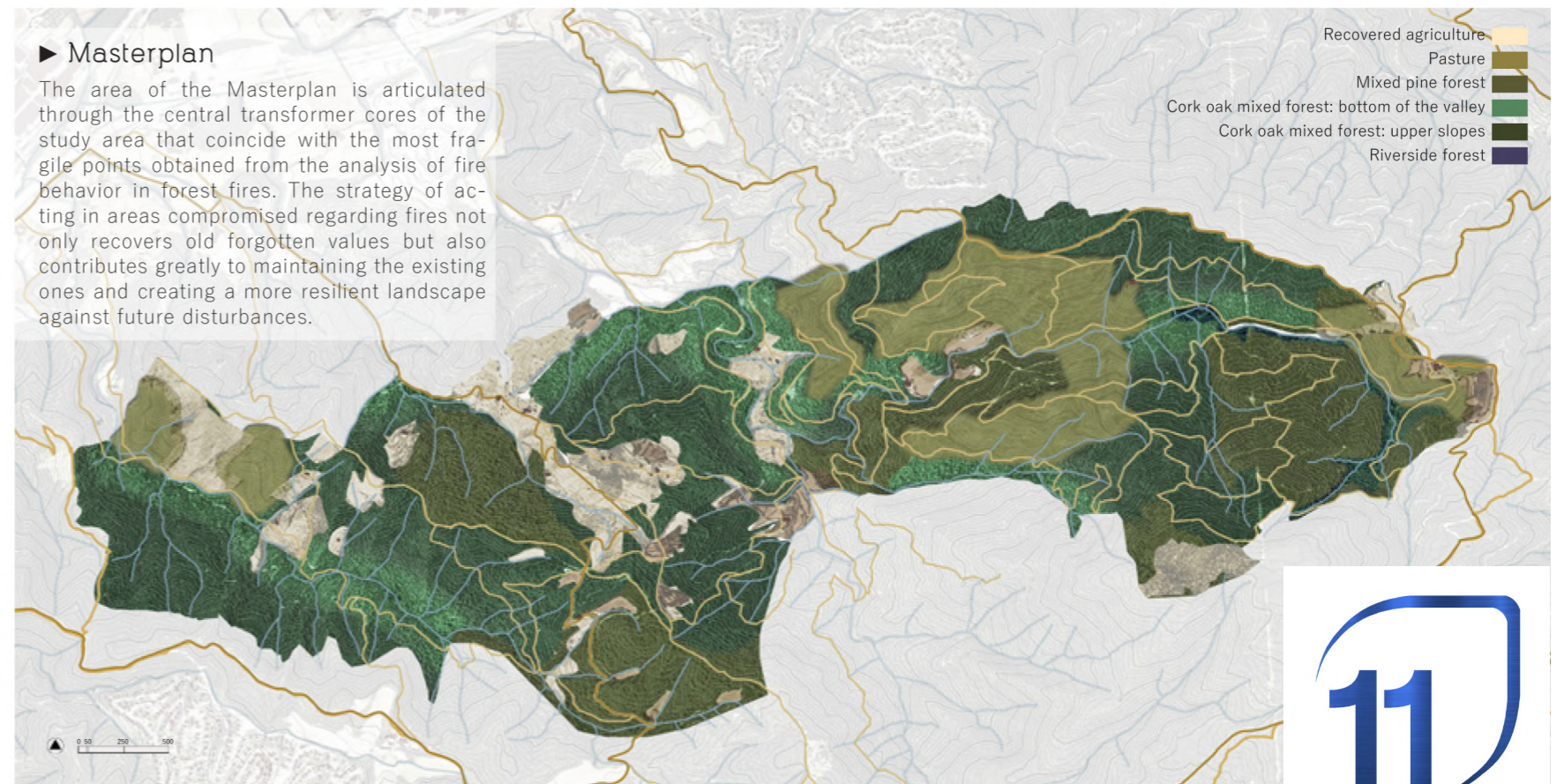


▼ Area of Masterplan



► Masterplan

The area of the Masterplan is articulated through the central transformer cores of the study area that coincide with the most fragile points obtained from the analysis of fire behavior in forest fires. The strategy of acting in areas compromised regarding fires not only recovers old forgotten values but also contributes greatly to maintaining the existing ones and creating a more resilient landscape against future disturbances.



Masterplan: growing a new future

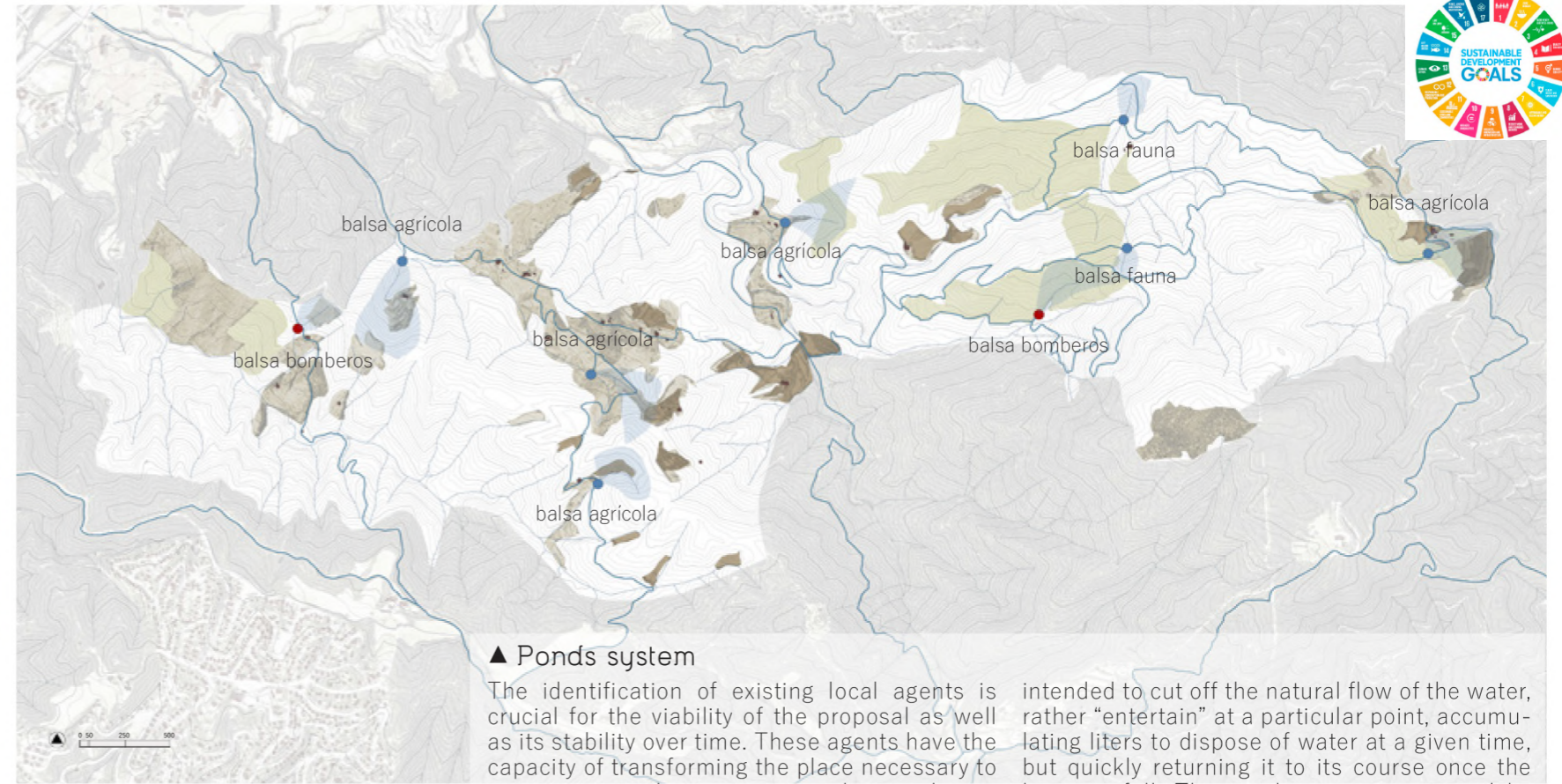
Agricultural, fauna and wildfire extinction ponds system



▼ Detail of the wildfire extinction pond

The stone walls, which act as containment by gravity, are painted with red-white stripes for aerial extinction media.

The surface runoff of the new path is directed transversely to the ditch and conducted longitudinally until connecting with the existing stream.



▲ Ponds system

The identification of existing local agents is crucial for the viability of the proposal as well as its stability over time. These agents have the capacity of transforming the place necessary to generate a resilient mosaic to climate change and the economic recovery of rural areas impoverished by the abandonment of the countryside.

intended to cut off the natural flow of the water, rather “entertain” at a particular point, accumulating liters to dispose of water at a given time, but quickly returning it to its course once the basin is full. The ponds are accompanied by other small pools or naturalized filters to obtain a certain quality for future use, both agricultural and for use by firefighters.

Along with management, the proposal also introduces a system of ponds strategically located according to the function that will supply its waters. The ponds are located at points where runoff naturally accumulates, giving rise to non-permanent watercourses, such as torrents. It is important to note that these ponds are not

Starting from the existing paths network, some routes are created to structure the ponds and provide them with accessibility, associating them with existing elements, such as masias, which help to conserve and strengthen the landscape.

▼ Wildfire extinction pond

The proposal is situated on the land with compensated earthworks. The original slope of the land allows proposing a system of stone walls, imitating the language of the local landscape of cultivated terraces, to generate three main platforms: the initial filter in the form of a naturalized pond, the supply pond, and the lower

access with the possibility of turning for trucks. A new path is also proposed, parallel to the stream, which connects the lower and upper parts of the proposal for its correct maintenance, thus generating a new route in the landscape where water is the protagonist.

