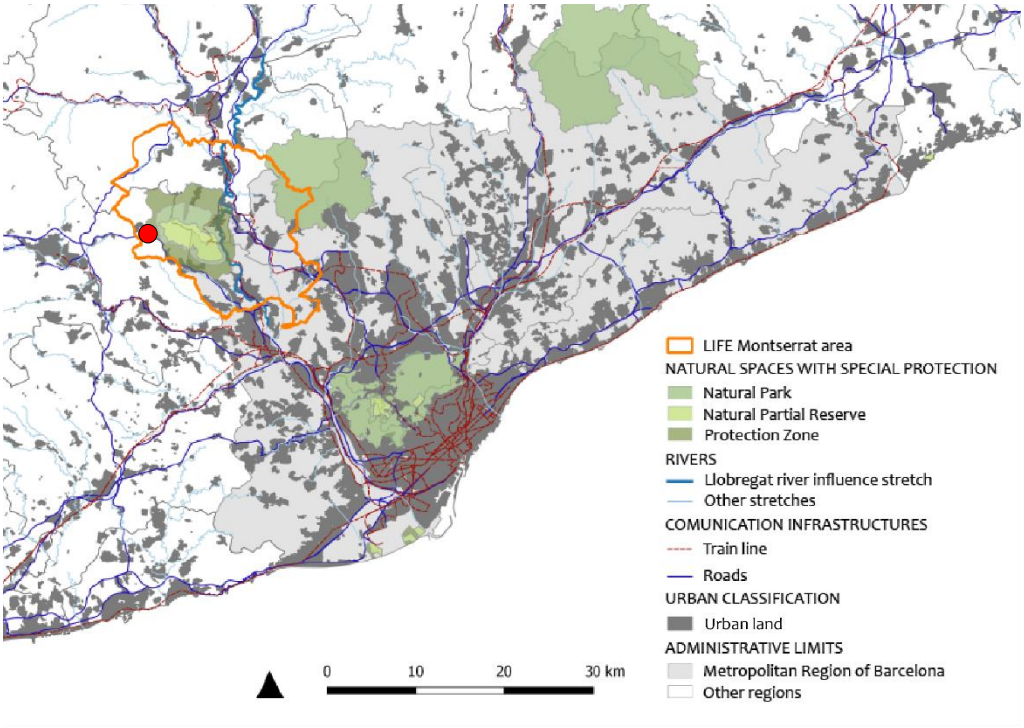
Territorial context of the field trip area

Where is the field trip area located?

The field trip area is located around the Llobregat river, the Montserrat mountain, the peri-urban area of Barcelona, the pre-coastal mountains and the agricultural plateau of central Catalonia.



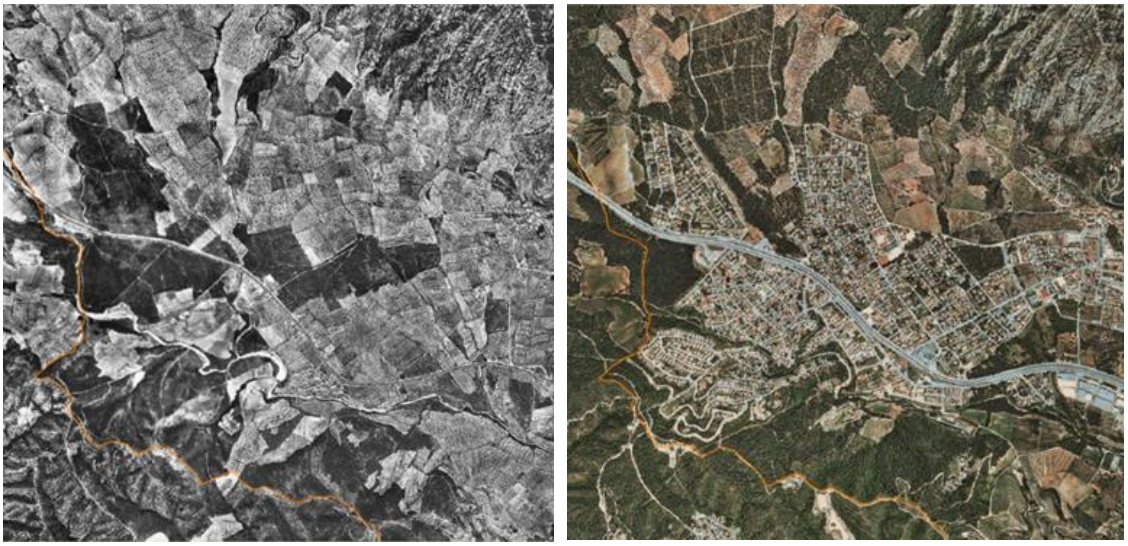
Main territorial elements of the area. Source: FPRGD elaboration (CTFC).

Which is the socio-economical history of this area?

This subchapter explains the main historical factors of the last decades that have affected land uses and the distribution of forest fuels.

During the 60s and 70s is produced an economic and demographic growth in the country. The economic trends derive in a specialization of the tertiary sector, taking prominence as an economic sector. As a consequence, cities grow in population in the contrary of rural areas tendency, which are gradually being abandoned, together with the activities of the first sector. The great agricultural abandonment begins, which in the following decades will have a determining effect on forest cover growth and the increase of wildfire risk. Until later decades it will not be reversed as a landscape change.

On the other hand, in this decades many of the urbanizations housing development (urbanizations, suburbs) in this area is built. These are new urban morphologies, never built before. The technological innovations and the approximation of them to the population (the car as a tool), facilitates the appearance of these "commuter towns", which will allow to live close to nature and work in cities (Terrassa, Manresa, Barcelona, etc.). Therefore, this urbanism involves, for the first time, the establishment of population and consumption of the land in contact with agricultural and forest areas in which the management is abandoned. These housing development occupy old cultivated crops or forest plots, and are characterized by the lack of basic urban services. In general, at the moment of its implantation, the adjacent forest mass presents little density or continuity. However, it supposes the origin of the **wildland-urban interface**, which in the coming years will become a determining factor in wildfire prevention in terms of protecting people and houses.



Aerial views of Collbató and el Bruc Residencial. Orthophoto 1956 (left): agricultural landscape with discontinuity of land uses and agroforestry mosaic. Orthophoto 2015 (right): Landscape strongly urbanized with dense forest structures and increasing in extent on abandoned crops, and conservation of some agricultural areas. The orange line marks the limit of the LIFE project area (source: ICGC).

Has this area been affected by large wildfires?

In 1986 and 1994, Montserrat is affected by its first large wildfire, caused by the increase of the continuity of fuels, the densification of the forest and the colonization of agricultural terraces after the abandonment of land management in recent decades. Together with the increase of the potential wildfire propagation, it is necessary to take into account the limited response capacity of extinguishing systems of these years, sized to face urban fires.

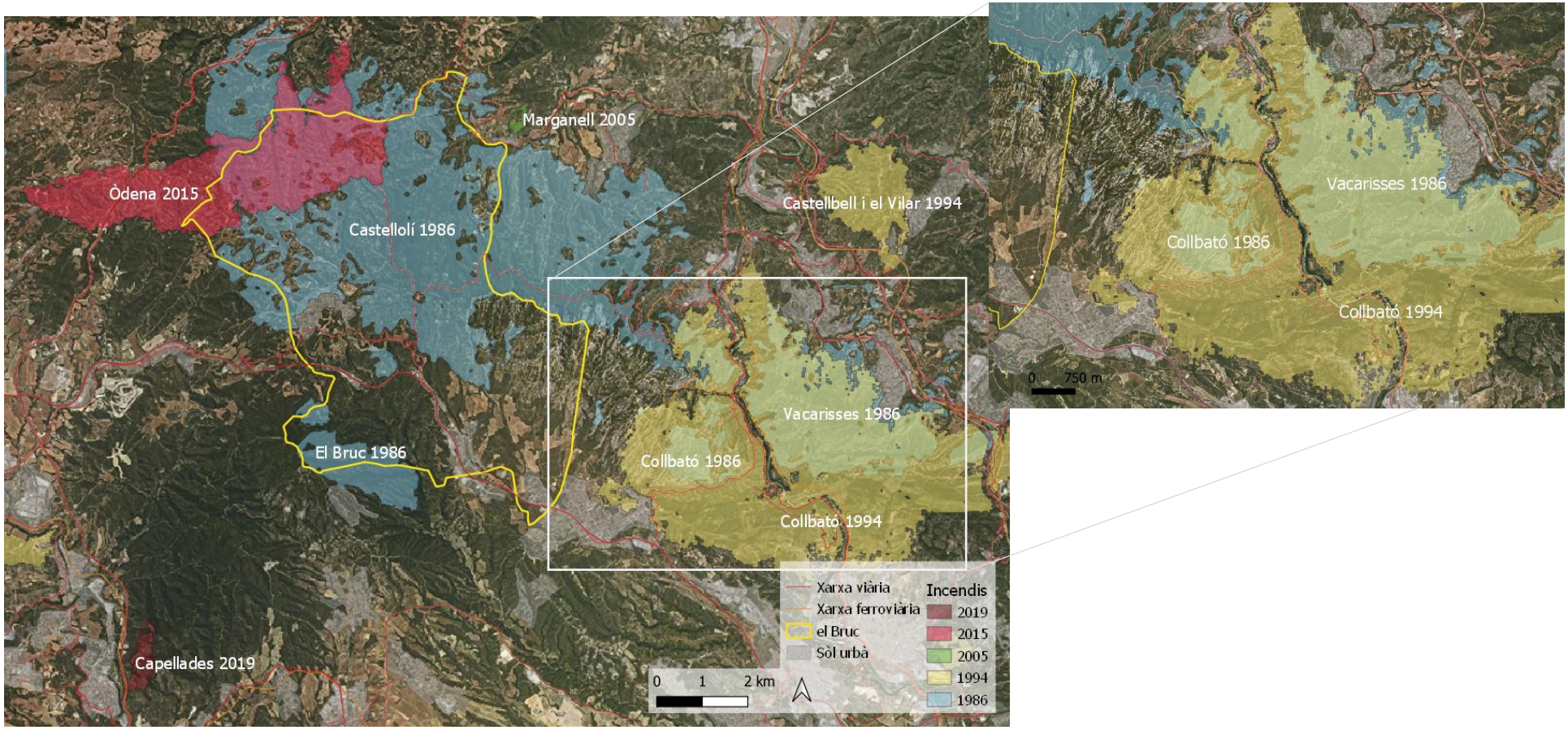
The wildfires of August 1986 were important because different outbreaks appear over a week burning more than 5,000ha. The main focuses are located at the east of the mountain (with south wind), and the west of it, in this case, with west wind, reaching to cover the skirt of the northern slope of the massif.

In July of 1994, the focus of the wildfire was born in Collbató, burning more than 3,000ha. The front opens to the north and progresses inside the massif showing the chimney effect.

Wildfires of Montserrat in 1986 (Source photo left: Bonvehí, J., 2013; right: Regió 7 through de J.Comellas)

These two wildfires will highlight the problem posed by the landscape of the late twentieth century where urbanized areas and forests are mixed and integrated forming a single landscape.

In 2015, the Òdena wildfire burns more than 1,200ha. It was a convective wildfire with wind from west to east. In addition to having a favourable synoptic situation (wind) to the development of the wildfire, the fuel characteristics that were burning (accumulation of fuel due to the abandonment of activities and agricultural uses) were perfect for the fire to result in a large wildfire. The sum of these physical and morphological conditions of the urbanism of the area resulted in the evacuation of different housing development that are stalked by the wildfire.



Historical wildfires perimeters. Source: Catalan Fire Prevention Service
Red line: Roads; Orange line: trainline; Yellow line: el Bruc municipality; Grey: Urban land; 1986-2019 Wildfires (and corresponding names)

The landscape nowadays, after rural abandonment and historical wildfires

Nowadays, the activities of the primary sector in this area are minority and occupy a small area over the whole. Instead, there are an important presence of wildland-urban interface. According to the data from the last agrarian census (2009, available in IDESCAT), the approximately 32,000ha of surface area resulting from the sum of the 15 municipalities in the LIFE project area, 2,400ha correspond to crops and 800ha are classified as permanent pastures.

Visiting a grazing area promoted by LIFE+Montserrat to prevent large wildfires in the downhill of Montserrat Parc suburb, and the fuel treatment area promoted by the Natural Park in the entrance's paths for hikers and climbers, which suppose a tricky issue in terms of exposition of visitors to wildfires.

The agricultural activities offers an excellent frame where to build synergies regarding fuel and land management risk mitigation actions. Mosaic landscape surrounding the Natural Park of Montserrat (and within the Rural Park) may be understood as a green infrastructure protecting the Park from wildfire impacts. This is a very relevant issue, considering the local visitors and the thousands of tourists that every summer are visiting the area.Changes in land uses, derived from changes in economic activities, have derivate in a largely forested landscape, with predominance of dense forest stands (with vertical and horizontal continuity) that mix easily with the urban sprawl. The forest stands are mainly adult masses regenerated on terraces or grazed areas, *Pinus halepensis* on the south slope or *Pinus nigra* on the north slope. In the areas affected by 80s and 90s wildfires, there are usually young and dense masses of *Pinus sylvestris* in the southern areas, or of regenerated bushes in the northern slopes in lands occupied by *Pinus nigra*.

The current elements of the landscape of this area that are most vulnerable to possible wildfires are the protected areas (Natural Parks, etc.) and the urban land. Understanding that these two elements are those that present more needs of suppression and civil protection services. In addition, secondary roads, which are usually those that communicate directly with the housing developments, can be a

high risk routes in case of wildfire, because these infrastructures are totally immersed in forest areas, without a discontinuity of land uses, and therefore with a forest mosaic that reduces the vulnerability of it.

And what about climate change?

To the change of land uses, are added climate change scenarios, which can lead to an increase in aridity and stress on forest masses, increasing the potential of extreme behavior (high intensities and propagation capacity) of wildfires and their capacity to impact with the urban infrastructures.

In this sense, in addition to the urban areas and infrastructures, it should be noted that there is a high number of visitors to the Montserrat massif (due to the proximity to the metropolitan region), which, due to its complex orography, makes it difficult the fire and rescue services to suppress wildfires and facilitates the wildfire propagation.