

INNOVATIVE PRACTICES TO IMPROVE THE ADAPTIVE CAPACITY OF PINUS PINASTER REFORESTATION

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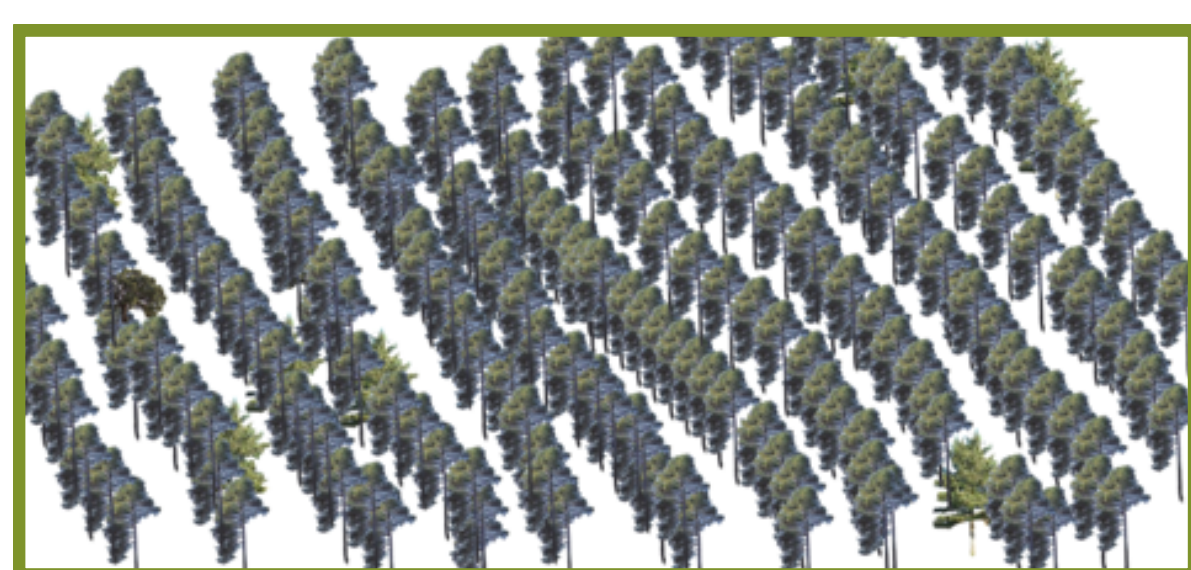
The LIFE RedBosques_Clima project

The maritime pine forests of the Northern Mediterranean (*Pinus pinaster* subsp. *escarena*) in the decarbonated limestone areas of the interior of the Valencian Community present a serious regeneration problem, caused by the **recurrence and intensity of fires**, together with the **lack of precipitation** and the **summer heat** typical of very dry years. An opportunity for improvement for this species is to act on restocking.

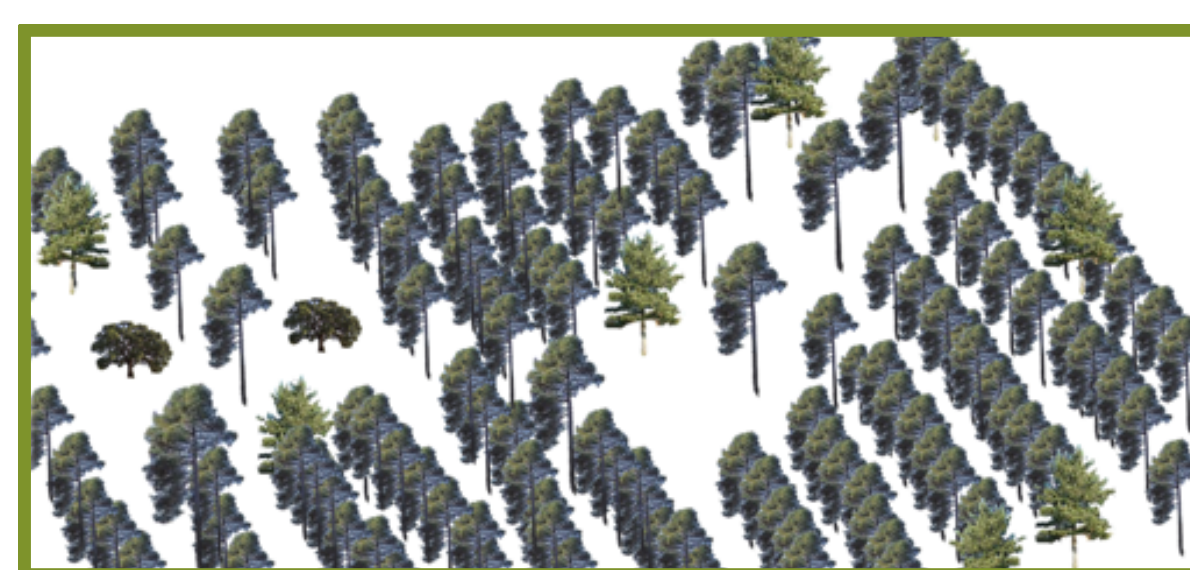
The **LIFE** project, **RedBosques_Clima** aims to implement pilot actions that allow the improvement in the adaptation capacity of several types of forest, promoting forest management with conservation objectives under the umbrella of the concept of **"Ecosystem-based Adaptation"**.

Among the pilot cases of the project is the **"Improvement of the adaptation capacity in reforestation in Castellón, Valencia and Alicante"**.

Renaturalization actions in reforestation will consist of applying a **"natural process forestry"** that mimics nature, aimed at promoting attributes of forest maturity, by modifying the structure of forestry to aid natural regeneration, increase species diversity and reduce competition.



In the reforested plots, 99% of the trees are the same age. A mass with these characteristics is more vulnerable to disturbances such as pests, diseases and fires.



This reduction in tree density will reduce competition for resources, creating a more balanced and stable forest mass that reduces water dependence. In addition, by breaking the linearity of the streets, through the groves we have improved the landscape.

The project foresees a monitoring system that will be carried out through permanent plots, this is the **"ECOLOGICAL MONITORING PLAN"** that will help quantify the effectiveness of the adaptation actions. The data before and after the performance has already been collected, and a third measurement campaign is also planned in 5 years.

First appraisals

The usual treatments, in which every third tree is cut down, hardly allow light to pass through to the ground, preventing the regeneration of light-demanding species. These treatments do not break linearity either, since in a few years the trees widen their crowns, thus preventing natural regeneration. On the contrary, this type of thinning in groves opens wide areas where more light reaches the ground, **favoring regeneration**, while leaves other denser areas where no action is taken to provide shade and **favor species diversity, particularly nemoral species**.

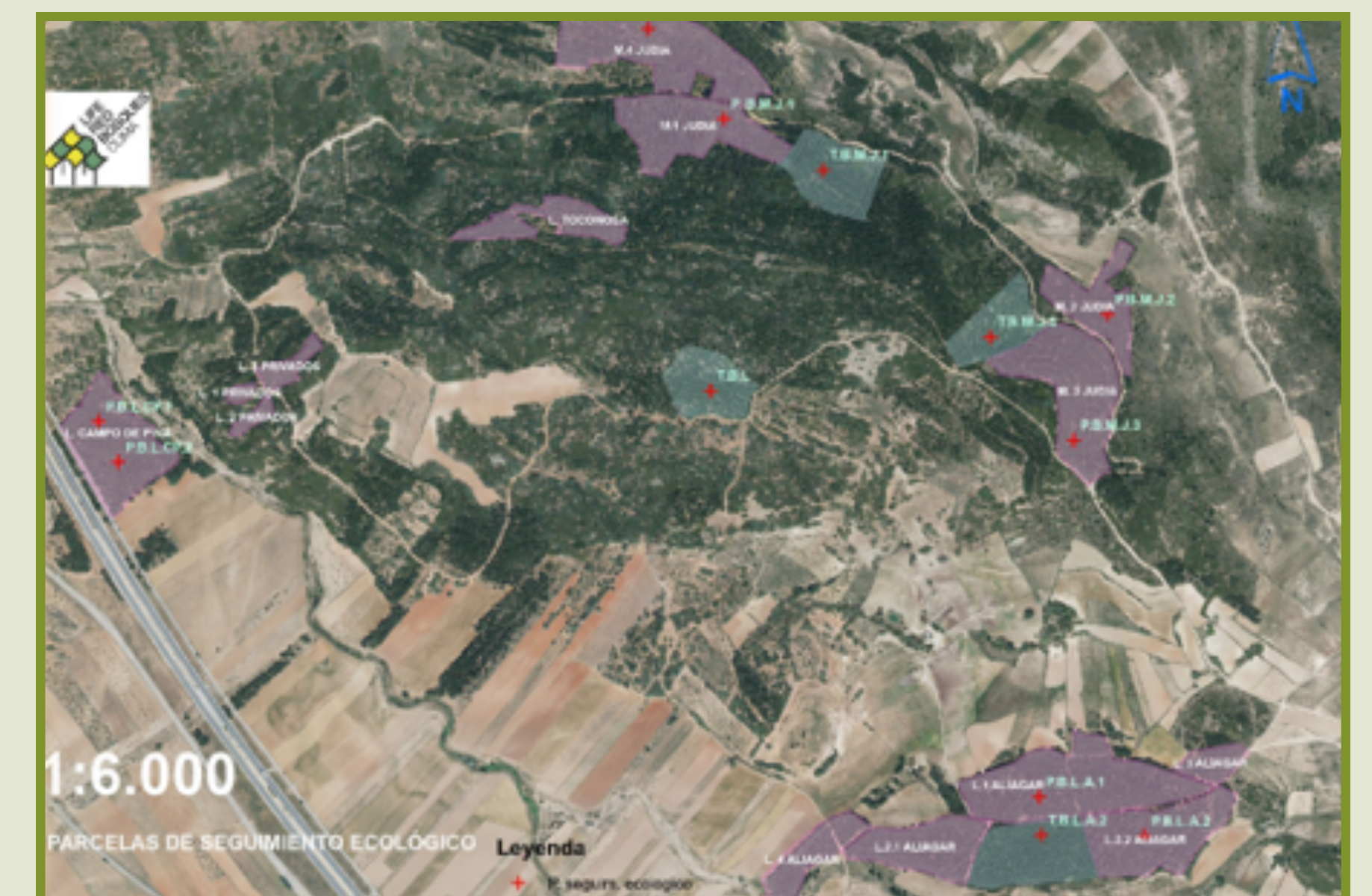
Economic viability and effects on local socioeconomic activity: the methodology used (trees were cut down by operators, extracted and chipped) **is currently not profitable**. To do so, the price of wood chips would have to increase. Likewise, the final destination of the wood chips should **change**, taking advantage of the **domestic market**. On the other hand, thanks to the project **forestry workers have been trained**.

What did we do?

Method and means to renaturalize repopulation in the T.M of Barracas (Castellón)

1

Selection, through a **participatory process**, of **28 ha. in repopulated plots and 8 ha. in control plots** in order to observe and study the thinning in groves and its future replication. This action will **improve the landscape** by creating mosaic. In the future, this will give continuity to naturally existing habitat **9540** in a contiguous rodeneo mass in Pina de Montalgrao. It will also restore the habitat **9340** in some plots where it already existed prior to the reforestation.



2

Promote spatial heterogeneity through small disturbances (thinnings in groves). Before marking the trees, groves are selected; these will cover a **surface of 40% of the plot** (although in the picture groves are represented with a circular shape, in the field they are irregular).

The radius of the grove is determined as a function of the dominant height, establishing two types of groves: **large**, 2.5 times the dominant height, and **small**, 1.5 times the dominant height.

25% of the trees in the plot are harvested.

3

Modify the tree structure. Diversification in diameter classes and species is considered during the thinning. Species other than the reforested one are released, and future trees are also selected.

Trees that harbor **MICROHABITATS** have been respected and all **DEAD WOOD**, either standing or on the ground, has been left. This helps maintain ecological processes and interactions between species, promoting **more resilient ecosystems**.



The selected plots are mixed pine forest with an average density of 930 trees/ha, 45% *Pinus pinaster*, 5% *Pinus sylvestris*, 21% *Pinus nigra* subsp. *salzmannii*, and 29% *Pinus nigra* subsp. *nigra*. The median age is 56 years.



4

The trees are **not delimbed or topped**, they are removed with a self-loading forage wagon, then the wood piles are chipped. The volume of wood chips auctioned: **1,459.47 m³** (1089.2 t), with an income of €24,500 in Monte Mairana; in Monte Las Lomas, **1,835.87 m³** (1,370.1 t) (still in the process of public auction); as well as a small amount of wood chips from private properties.