

# QUARRY RESTORATION – SECI-OUTÃO IN ARRABIDA NATURAL PARK A PROJECT WITH 36 YEARS OF REHABILITATION



## OBJECTIVE

Restore the quarries using native species and minimize the impacts of quarrying activities.

## CONTEXT

Extraction activities have a profound impact on the landscape and on biodiversity. As the natural regeneration of these areas and the restoration process of ecosystems may take hundreds of years, it is important to minimize these impacts and accelerate the process of natural colonization, especially in areas of high conservation value. This can be achieved by developing programmes to recover the structure and functioning of plant and animal communities, and the original ecosystems, that are not aimed solely at restoring the aesthetic qualities of the landscape.

With these aims in mind, SECIL has implemented a **Landscape Rehabilitation Plan** at Outão cement plant.

Outão plant is located within a Natural Park and a Natura 2000 site, southwest Portugal. The exploitation area covers about 99 ha, which includes two active quarries, one for limestone and one for marl. Both quarries and the cement plant are surrounded by natural areas, which cover about 425 ha.

## SOLUTIONS

Resource exploitation started from top to bottom in both quarries, leaving a set of benches available for restoration after exploitation. The process of progressive revegetation began in 1983 aimed at recreating the natural habitats surrounding the quarries, dominated by Mediterranean sclerophyllous vegetation, using various techniques:

- Reintroduction of substrate to facilitate plant development.
- Introduction of herbaceous and shrub vegetation by hydroseeding.
- Encouraging the development of native species (through planting) produced in the plant's own nursery.

The location of these quarries within a Natural Park imposes specific restrictions and obligations in terms of restoration actions, such as the use of native species in revegetation.

## RESULT

During the 36 years of this revegetation programme, habitats have been established with different plant communities, ages and cover in a restored area of 44 ha.



SECIL Quarries

Different extraction strategies have been used in the limestone and marl quarries in Outão, and consequently different revegetation techniques have been implemented over time.

### **Limestone quarry**

Limestone exploitation started from top to bottom resulting in a set of benches (20x20 m). On each bench platform a layer of marl was introduced and then planted with multiple native species and one pioneer species the Aleppo-pine (*Pinus halepensis*).

In 2002, the limestone exploitation technique changed: bench height was reduced to 10 m and the revegetation began to be carried out on the sloped surface, after they were filled in with marl (substrate). To prevent erosion and favour stabilization, the 10 m slopes were first hydroseeded and then planted with native species.



### Marl quarry

As in the limestone quarry, marl exploitation started from top to bottom resulting in a sequence of benches (20x20 m). However, the revegetation technique was different, with planting being carried out on the sloped surface after filling in with marl and hydroseeding. After 2002, bench height was reduced to 10 m.

SECIL has adopted an ecological approach using native species in the revegetation of the quarries, which helps to accelerate the colonization of these areas, thus improving the self-sustainability of the ecosystem and its resilience as well as promoting spontaneous colonization by plant and animal species.

The native species used in revegetation are produced in the plant's own nursery. Since 1983 the company has invested in creating its own nursery, where 17 native species are currently grown. All the seeds used in germination processes are collected in the natural areas surrounding the quarries, which secures the genetic resources, as well as the local biodiversity, especially in areas of high biodiversity value.



Some examples of the seeds/fruits of the species produced in the plant nursery

Scientific knowledge and applied research are important pillars in the process of restoration in SECIL's quarries. Carrying out scientific studies and communication within multidisciplinary teams is essential for the identification of innovative solutions and the development of new techniques.



**PARTNER** Faculty of Sciences of the University of Lisbon - CE3C Centre for Ecology, Evolution and Environmental Changes

Contact: Alexandra Silva  
[alexandra.silva@secil.pt](mailto:alexandra.silva@secil.pt)

---