

## We Value Nature 10-Day Challenge Event

### *Integrating biodiversity value in quarry restoration: Linking business and applied science, 19 March 2021*

#### Session summary & key takeaways

This session focused on ecosystem restoration and biodiversity promotion in quarries using the unique case study of “Outão quarries”. It addressed the relation between applied scientific research and the sustainable exploitation of resources and how business integrates this scientific output in quarry restoration. It focused on habitat management and restoration strategies to promote ecological services and uplift the conservation value of quarried areas. Several concepts and examples were discussed related to: challenges and opportunities in quarry restoration, comparison of restoration techniques, tools for the assessment of ecosystem services and biodiversity, including flora and fauna, and based on field and remote sensing data. The session was divided in three parts: (1) part I, consisting of short lectures intermingled with questions asked to the participants with *mentimeter* to stimulate participation; (2) part II, a small group discussion exercise was proposed, (3) whose topics were then presented and discussed among all participants in part III.

#### Key takeaways:

1. Quarry restoration is a challenging process and several arguments/criteria must be considered during the planning and implementation stages (e.g. ecological value, social context, exploitation technique, scientific knowledge, stakeholders' involvement).
2. Scientific knowledge and applied research are important pillars in the process of quarry restoration. Carrying out scientific studies and communication within multidisciplinary teams is essential for the identification of innovative solutions and the development of new techniques.

Warm thanks to the speakers for the insights shared:

*Alexandra, Silva, Engineer, Secil*

*Alice Nunes, PhD, Faculty of Sciences of the University of Lisbon I cE3c*

*Pedro Salgueiro, PhD, University of Évora I UBC I MED Institute*

## Key solutions presented / actions to take

- Setting the best approach to recover quarries (e.g. spontaneous vs. assisted; reclamation vs. ecological restoration) should take into account the characteristics and context of the sites to be restored.
- Soil requires a lot of time to recover so, whenever possible, original topsoil should be saved and used. The effectiveness of different soil amendments should be assessed to match the soil type, plant species or climate of the site to be restored.
- In many cases, using native plant species is key for restoration success and resilience, due to their e.g. functional role, resilience towards disturbance, and biotic interactions. Yet, their requirements (e.g. pre-treatments to break seed dormancy) should be considered, and the best combination of species and dosages should be adjusted to each specific context.
- Long-term monitoring is essential to assess restoration trajectory and adopt adaptive management strategies to redirect it if necessary (e.g. dealing with undesired/invasive species).
- The origin (provenance) and quality of the plants and seeds used may be essential for restoration success, and the maintenance of the genetic heritage to deal with future conditions/disturbance.
- The integration of field data with remote sensing information (e.g. from LiDAR and satellites) allows to upscale restoration assessments to the landscape scale, e.g. to quantify and map ecosystem services and their trade-offs.
- Quarry sites may provide new habitat elements that may benefit pioneer or rare species and habitats.
- Improving habitat conditions for animal communities in restored quarries (e.g. provide water in xeric environments, nest support or food provisioning for fauna), as well as connectivity with natural remnants, may improve biodiversity and restoration success.
- Net impact assessment is an important tool to integrate biodiversity in business, but should also recognize 'new' biodiversity as an added value.

## Useful resources

<https://www.ser.org/page/SERStandards/International-Standards-for-the-Practice-of-Ecological-Restoration.htm>

<https://onlinelibrary.wiley.com/doi/10.1111/rec.13160>

<https://quarriesalive2018.uevora.pt/>