DarCo

The vertical dimension of conservation: A cost-effective plan to incorporate subterranean ecosystems in post-2020 biodiversity and climate change agendas

DURATION
15/12/2022 – 15/01/2026

BUDGET
150 045 €

PROJECT DESCRIPTION

Context
Subterranean ecosystems harbor a broad diversity of poorly understood specialized organisms that are of interest from both a conservation and evolutionary perspective. They account for a unique fraction of the global taxonomic, phylogenetic, and functional diversity that is currently imperiled by human activities, including the destruction of their subterranean habitats, pollution, and climate change. Furthermore, subterranean ecosystems and landscapes deliver critical nature's contributions to people, including an array of cultural values such as recreation (caving), tourism, education, aesthetic and scientific values, and most notably, the provisioning of potable water.
Yet, the subterranean biome is still systematically overlooked in global biodiversity targets and climate change agendas. DarCo aims to develop a concrete plan to incorporate subterranean ecosystems in the European Union (EU) Biodiversity Strategy for 2030—a plan to create Protected Areas for 30% of EU land and sea territories by 2030.

General objectives and underlying research questions
The goal of DarCo is to devise a cost-effective and adaptive conservation plan to incorporate subterranean biodiversity in the EU Biodiversity Strategy for 2030. In pursuing this goal, we seek to broadly engage with key stakeholders and the public, increasing awareness about subterranean ecosystems to ensure their effective preservation in the long run. To this end, DarCo established a research consortium composed of international researchers (11 countries, 13 units) that will be able to cover the breadth of subterranean habitats and taxa across Europe within a unified framework and shared databases. DarCo is articulated in five interconnected and modular work packages (Wps).

Methodology
WP1 is about coordination of the project and does not include a methdology component.
In WP2, Darco will map biodiversity patterns across European subterranean biomes, considering the taxonomic, phylogenetic, and functional diversity facets (biodiversity component tightly associated withecosystem functioning). Collating this biodiversity information is central to understanding the status quo on biodiversity and the human impact on it, and the development of subsequent WPs. ULB will contribute to WP2 assembling a complete database of subterranean fauna from Belgium, contributing to the assembly of databases on subterranean crustaceans (especially Copepoda and Amphipoda) of Europe, and will provide the results of molecular analyses (DNA sequences) carried out by the EBE team especially on amphipod crustaceans.
WP3 focuses on developing models to obtain a mechanistic, hierarchical description of subterranean communities' response to combined threats, especially climate and land-use change. Mechanistic relationships obtained in WP3 will provide the basis to scale-up inferences, mapping diversity patterns and threats at the European scale to develop a cost-effective plan to incorporate subterranean systems in post-2020 biodiversity and climate change agendas, which is the topic of WP4. The novel tools and approaches proposed in this project will be particularly useful in conservation planning and ecosystem functioning assessment, in line with the European Biodiversity Strategy for 2030, most national post-covid recovery plans, and general Sustainable Development Goals.

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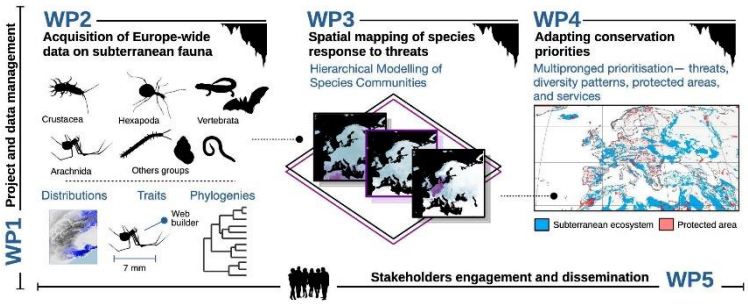


Potential impact

Informing the scientific community, relevant stakeholders and the general public is one of the core goals of DarCo. Indeed, improving awareness on biodiversity and nature's contribution to people is a key step to achieving long-lasting conservation goals.

High-rank publications are envisionned for each WP.

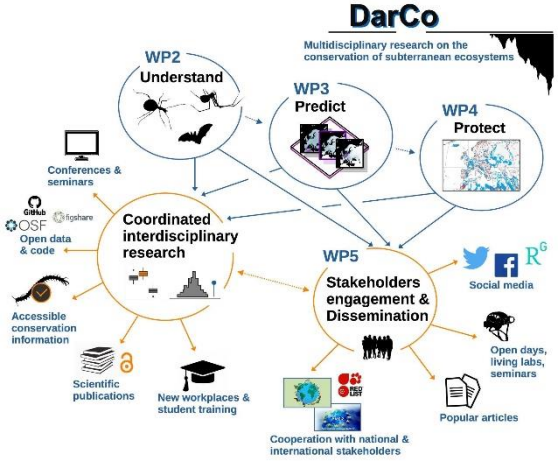
Aside from these major publications, there will be papers published in specialistic journals in targeted papers on taxonomy, conservation or red lists. These papers and the delivered database will rely also on public collections' data. Thiìs will valorize our Federal Scientific Institution's collections that will play a fundamental role as archives of biodiversity and sources of information for distributional data.

DarCo has a great potential for engaging with general audiences. Outreach activities will be carried out through the project, disseminating results during academic courses, counseling activities, seminars, and open days at the host institutions. The living labs, meetings and workshops planned to engage stakeholders offer an additional avenue for public dissemination through seminars and presentations intended for the general public. Further visibility will be ensured by creating web pages dedicated to the project in the main social network. DarCo will also propose key results to magazines and internet portals intended for the general public. Finally, DarCo will prepare a publication dedicated to kids discussing the importance of protecting the subterranean domain.

Description of the expected final research results

Firstly, DarCo will generate openly accessible, data-driven scientific evidence supporting the inclusion of subterranean systems in Habitats Directive, Water Framework Directive, Groundwater Daughter Directive, EU Biodiversity Strategy for 2030)

DarCo will also produce useful knowledge expanding our current understanding of the ecology of subterranean ecosystems. The outputs of WP3 to environmental changes, providing an operational roadmap will thus help to understand the mechanisms behind species responses guiding future studies on other settings.



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LINKS

http://www.meg.irsa.cnr.it/index.php/component/content/article?id=105