

REWILDING IS RESTORING MEDITERRANEAN MOUNTAIN FOREST ECOSYSTEMS

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Study Description

Cultural landscapes are places where the long-lasting synergy between human and environment has shaped and modified natural ecosystems. The Mediterranean basin was the cradle of Western culture, and it is not surprising to find within it countless cultural landscapes where ancient traditions and practices were born. These practices have inevitably impoverished natural ecosystems, especially forests. In southern Italy, palaeoecological evidence showed that rewilding can restore vulnerable forest habitats and increase forest cover and biomass. Modern urbanization is causing the depopulation of rural areas and new forest expansion. Today rewilding represents a nature-based solution for climate mitigation and biodiversity conservation.

Palli, J., S. A. Mensing, E. M. Schoolman, F. Solano, and G. Piovesan. 2023. Rewilding is Restoring Mediterranean Mountain Forest Ecosystems. *Bull Ecol Soc Am* 00(00): e02034. <https://doi.org/10.1002/bes2.2034>



Photo I. Cultural landscape (upper panel) vs. seminatural forest landscape (lower panel) in southern Italy. The cultural landscape in the upper picture (Campotenese plain, Pollino National Park) depicts a mountain rural environment similar to that characterizing the study area (Lago del Pesce) in the 10th century. In the 14th–16th centuries, the demographic collapse due to the Black Death outbreak led to rewilding and increased forest cover and biomass. The seminatural landscape in the lower picture is from the core area of the Aspromonte National Park, where the Italian Forest Service (today Carabinieri Forestali) restored since 1960 a mixed forest of *Fagus sylvatica*, *Abies alba*, *Quercus petraea*, and *Pinus nigra* subsp. *laricio*. Photo credit: Gianluca Piovesan and Jordan Palli.



Photo 2. Rewilding in a secondary grassland in southern Italy (Pollino National Park). Mountain pasturelands below the timberline have been historically created and maintained through the use of fire and livestock grazing. Once these pressures are reduced or removed as a consequence of socioeconomic and demographic changes, ecological succession takes place, and the woody vegetation increases. The image above is shown the first phase of secondary succession with low-growing shrubs of the pioneer species *Juniperus communis*, acting as a nurse plant that facilitates the establishment of pioneer trees. Photo credit: Jordan Palli.



Photo 3. Luxuriant silver fir (*Abies alba*) regeneration under mature beech trees (*Fagus sylvatica*) in southern Italy. Silver fir is a vulnerable forest species that creates mixed forests with beech in the Mediterranean mountains. Centuries of intensive land and forest use (fire, grazing, and coppicing) have reduced silver fir populations and promoted pure beech stands in most of the Apennines. The protection ensured by National Parks and Natural Reserves is today contributing to the expansion of silver fir without any human input. Upper panel: Spontaneous silver fir regeneration in an old-growth mixed forest in Sila National Park. This natural forest habitat has high carbon stock and high biodiversity and characterized the landscape around Lago del Pesce during late Medieval and Modern times. Lower panel: Rubbio Natural Reserve (Pollino National Park) where the restoration activities promoted by the Carabinieri Forestali is allowing silver fir to regenerate in pure beech stands. Young silver fir trees do not produce pollen and their recent recolonization of seminatural beech forests still eludes palaeo-ecological reconstructions. Photo credit: Jordan Palli.



Photo 4. How to reconstruct and study past ecological processes? Fossil pollen studies from natural archives, such as lake sediment, reveal landscape ecology through time. The sediment stores and conserves microscopic pollen grains produced by local and regional plants and provides a picture of past vegetation and ecology. Left panel: Sampling operations in Lago del Pesce: A mountain pond within the Pollino National Park (southern Italy). Right panel: Professor Scott Mensing extruding a sediment core from a lake in Italy. Photo credit: Michele Baliva and Jordan Palli.

These photographs illustrate the article: “Historical ecology identifies long-term rewilding strategy for conserving Mediterranean mountain forests in south Italy” by Jordan Palli, Scott A. Mensing, Edward M. Schoolman, Francesco Solano, and Gianluca Piovesan. Published in *Ecological Applications*. <https://doi.org/10.1002/eap.2758>