

IMPLEMENTING A MANAGEMENT MODEL TO PROMOTE NATURALNESS OF FORESTS

Lluís Comas¹, Jordi Vayreda¹, Jordi Camprodon² & Roser Mundet³

l.comas@creaf.uab.cat | ¹CREAF; ²Forest Science and Technology Centre of Catalonia (CTFC); ³Consorci Forestal de Catalunya

Action objective

Implement management practices to prepare forests for natural dynamics, thereby promoting naturalness and good habitat condition.

Treatment types

The forest treatments to prepare the stand for natural dynamics involved cutting or girdling strategically distributed trees. The goal was to enhance ecological processes by introducing old-growth attributes that were missing in the stand:

Increase the diversity of sizes and ages

- Maintain large live trees
- Maintain living trees with microhabitats
- Open small gaps
- Release regeneration patches

Increase the amount of deadwood

- Generate large standing deadwood
- Generate large dead wood on the ground

Increase tree diversity

- Release associated tree species present in the stand

Intensity of the treatments

Number of trees cut or girdled in each forest type.

	Aleppo pine stands		Med. oaks stands		Holm oak stands	
	Mixed	Pure	Mixed	Pure	Mixed	Pure
Area (ha)	8.1	8.9	8.4	8.2	8.1	8.4
Girdled	28	15	65	54	43	55
Cut	55	69	84	236	73	66
Conifers	57	111	60	23	65	32
Broadleaves	26	8	89	267	51	89
Total trees	83	119	149	290	116	121
Total trees/ha	10.2	13.4	18.5	35.4	14.2	14.4



LIFE BIORGEST

Project objectives

The main objective of the project is to enhance biodiversity in Mediterranean forests by incorporating targeted measures and innovative practices into forest planning and management tools, as well as through new financing and compensation mechanisms. The project aims to reconcile biodiversity improvement with the economic sustainability of forest management, thereby ensuring forest persistence and adaptation to climate change.

Action areas and forest management applied

The project was carried out in Mediterranean forests of Catalonia (northeastern Spain), classified as Habitats of Community Interest (HCI) under Annex I of the EU Habitats Directive. These forests include both pure stands (over 80% of a single species) and mixed stands composed of typical Mediterranean species. Three distinct forest management models were implemented during the 2020–2021 dormant season across 18 forest stands, covering a total of 163 hectares.

Forest types (pure or mixed)

- Aleppo pine forests (*Pinus halepensis*)
- Holm oaks (*Quercus ilex*)
- Mediterranean region oak forests

Forest management applied

- Reference silvicultural models of the region
- Close-to-nature silviculture
- Preparation to natural dynamics

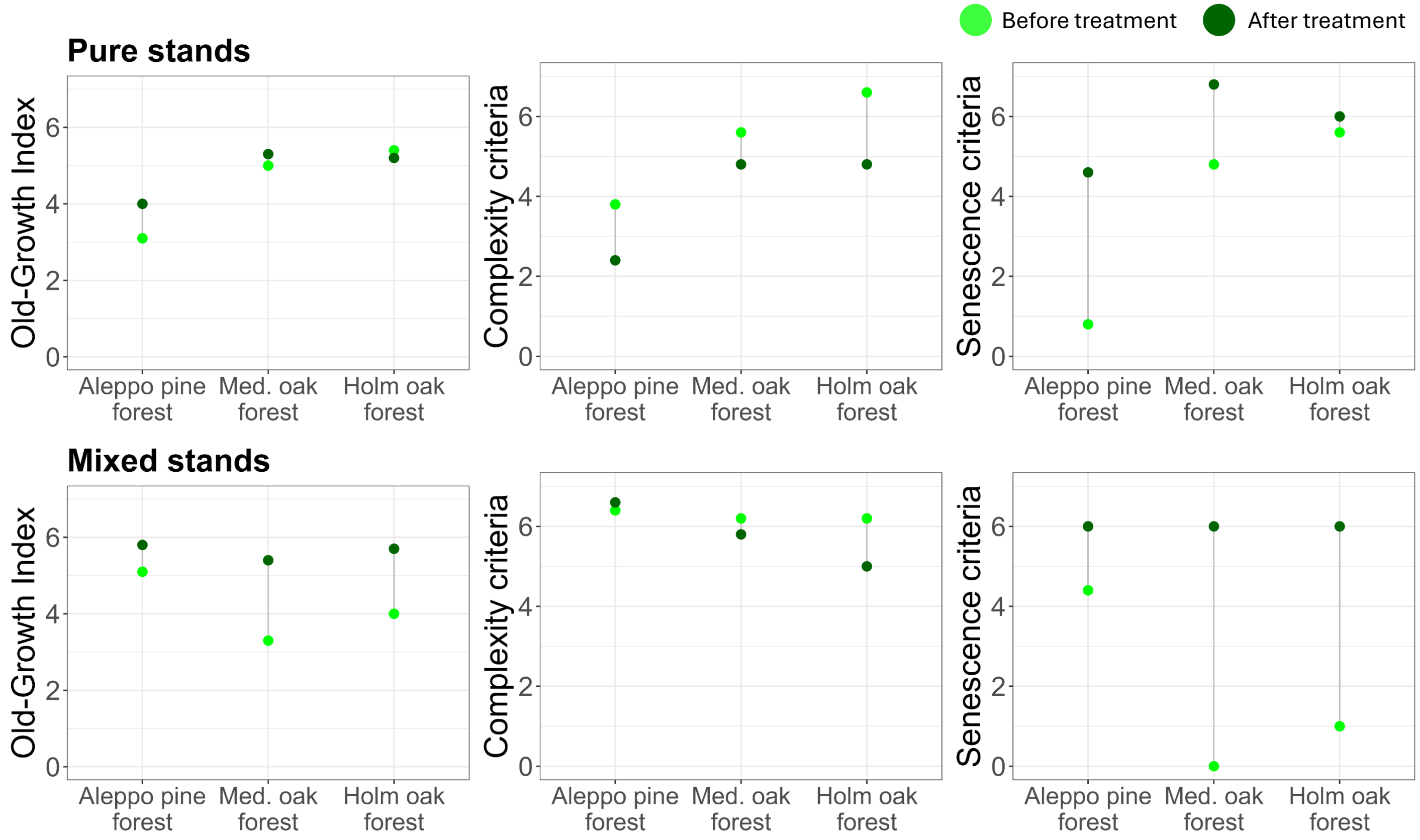


Conclusions

- Active forest management can be applied to accelerate natural dynamics or to better integrate them into the stand.
- Stand maturity can be significantly enhanced in a short time through the selective removal of 10–20 trees per hectare.
- Large amounts of deadwood can be generated rapidly—within 2 to 3 years. This method is particularly recommended for stands nearing maturity.
- If necessary, the treatment can be repeated every 5–10 years to maintain maturity conditions.
- It is a simple, quick, and low-cost intervention.

Results: maturity and biodiversity changes

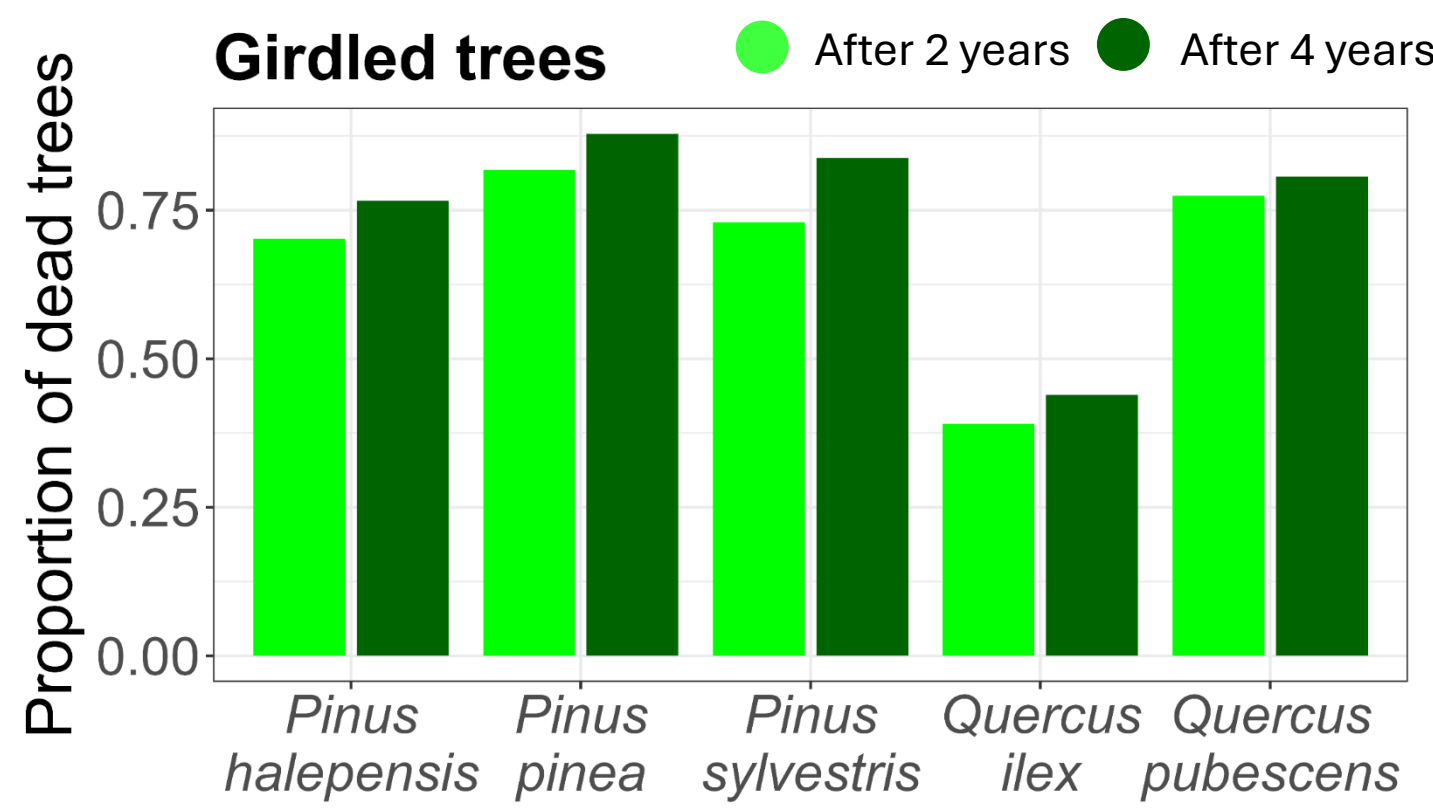
Changes in old-growthness (RedBosques Index) due to forest treatments (2 years after treatment).



Abundance of biodiversity tree-related microhabitats (TreMs) after 2 year and 4 years after treatments.

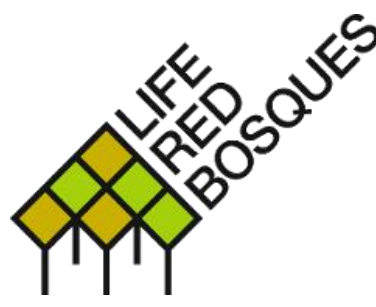


Changes in dead trees abundance after 2 year and 4 years after treatments.



REDBOSQUES OLD-GROWTH INDEX

LIFE RedBosques project has developed a methodology for the identification and characterization of old-growth forest stands, made available through manuals and field data sheets.



Complexity



Senescence



Old-growthness

Central to this approach is the **RedBosques Old-Growth Forest Index**, which evaluates a range of ecological and structural indicators, including large tree abundance, tree species diversity, deadwood volume, and structural complexity. These indicators are grouped into two main criteria: complexity and senescence.

To support practical application, an online tool —the **RedBosques tool**— was created to assess the degree of old-growthness. It also includes a database of reference forest stands that represent varying levels of old-growthness across Spain.