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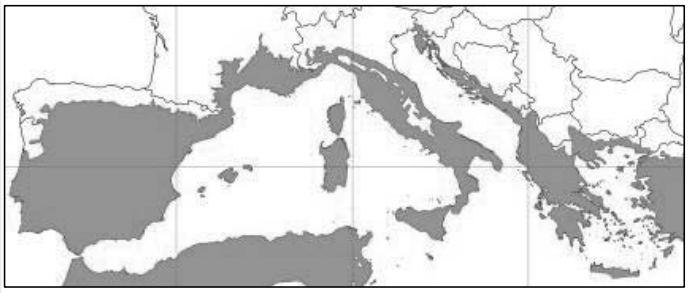
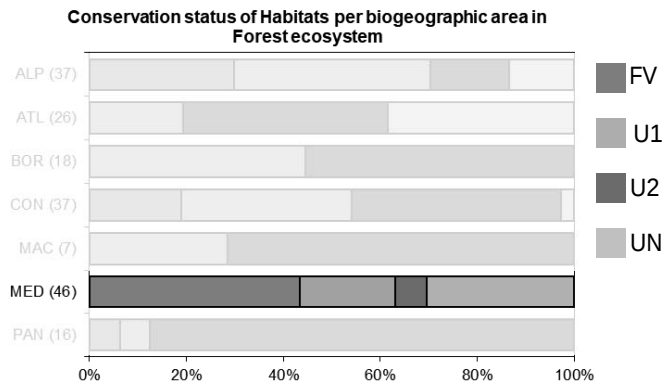
Forest adaptation to climate change
from a Mediterranean region perspective

Forest management in Mediterranean Europe: *key challenges identified in LIFE GoProForMed*

Serena Corezzola – D.R.E.Am Italia

D.R.E.AM. ITALIA





Habitats Directive (Art. 17) 2013-2018

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BACKGROUND

Mediterranean forests are currently very vulnerable to a variety of risks

- ✓ **over-exploitation** in some areas
- ✓ **abandonment** in some areas
- ✓ inadequate **management practices** / planning
- ✓ changes in natural **fire** regimes
- ✓ **desertification**
- ✓ **degradation** of water and soil ecosystems

BACKGROUND

Much of the mediterranean forest area is:

- young
- very dense
- homogeneous, continuous
- with regular structure
- monospecific…

Vulnerable to climate changes

Less bio-diverse

Biodiversity conservation **SYNERGIES** ***Climate change adaptation***

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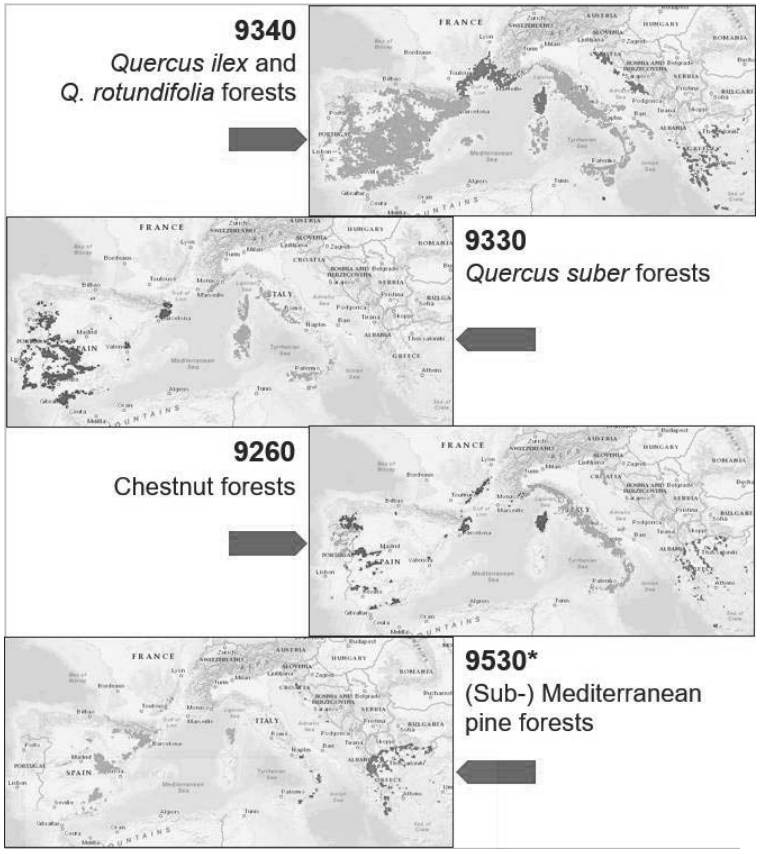


BACKGROUND

Target forest habitats
Distribution and conservation status in Europe

- ✓widespread and representative
- ✓inadeguate/Bad conservation status
- ✓subject to silvicultural activities
- ✓sensitive to management practices
- ✓long history of human-driven disturbance regimes

Habitats	2013-2018, Forests, overall assessment	MED
9260 - Castanea sativa woods		U2
9330 - Quercus suber forests		U2
9340 - Quercus ilex and Quercus rotundifolia forests		U1
9530 - (Sub-)Mediterranean pine forest with endemic black pine		U1

Habitats Directive (Art. 17) 2013-2018

FV U1 U2

MAIN AIM

to enhance the conservation status of four target forest habitats within the Mediterranean Biogeographical Region

Establish a **transnational conservation strategy** for target forest habitats, considering primary risks associated with forest fires.

Define **management and conservation models for the 4 target habitats** and implement them extensively in terms of area and distribution, including demonstrative implementations.

Advocate for the adoption of target habitat **management and conservation models** among key forest management stakeholders through training activities and supportive management tools.

4 MEDITERRANEAN COUNTRIES

Spain
France
Italy
Greece

12 PROJECT'S AREAS

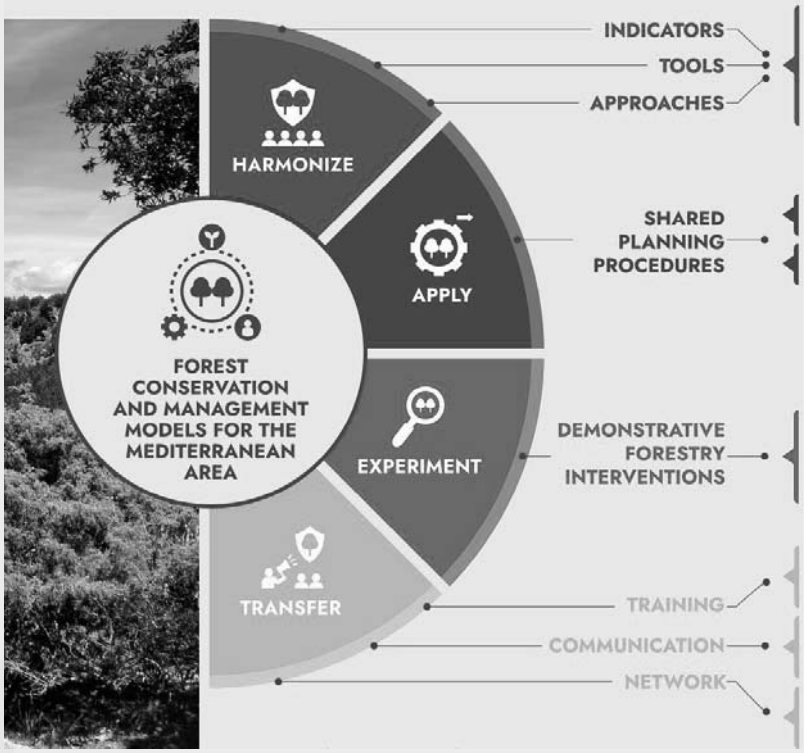
4 FOREST HABITATS

DURATION
01/09/22 - 31/08/28
BUDGET
Total: 4.797.797 €
EC Co-funding: 60%
(2.878.672 €)

Coordinator | Partners | Affiliated entities

D.R.E.AM. ITALIA · Consiglio Nazionale delle Ricerche · Università di Torino · Sapienza Università di Roma · Comunità delle Alpi · Forestas Sardegna · Centre de la Propiété Forestal · Universitat de Catalunya · CTFC · République Française · CNPF · The Goulandris Natural History Museum Greek Biotope/Wetland Centre · Regione Toscana · Associazione Forestale Bellunese

Key challenges → action lines of the project



- Test TreMs as indicators
- Adapt indicators to the Med. area
- Adapt Index of Biodiversity Potential (IBP) also to Spain and Greece
- Common habitat classification system
- Assessment of hab. conservation status

- Ecological network for biodiversity conservation
- Wildfire risk mitigation

- Biodiversity conservation
- Wildfire risk mitigation
- Economic production

CLOSE TO NATURE PRINCIPLES

- Common training system
- Transposition of technical contents
- Involvement of experts and associations of the Mediterranean area

GO PRO FOR Med

Key challenges → WHERE ARE WE KNOW?

- Test TreMs as indicators
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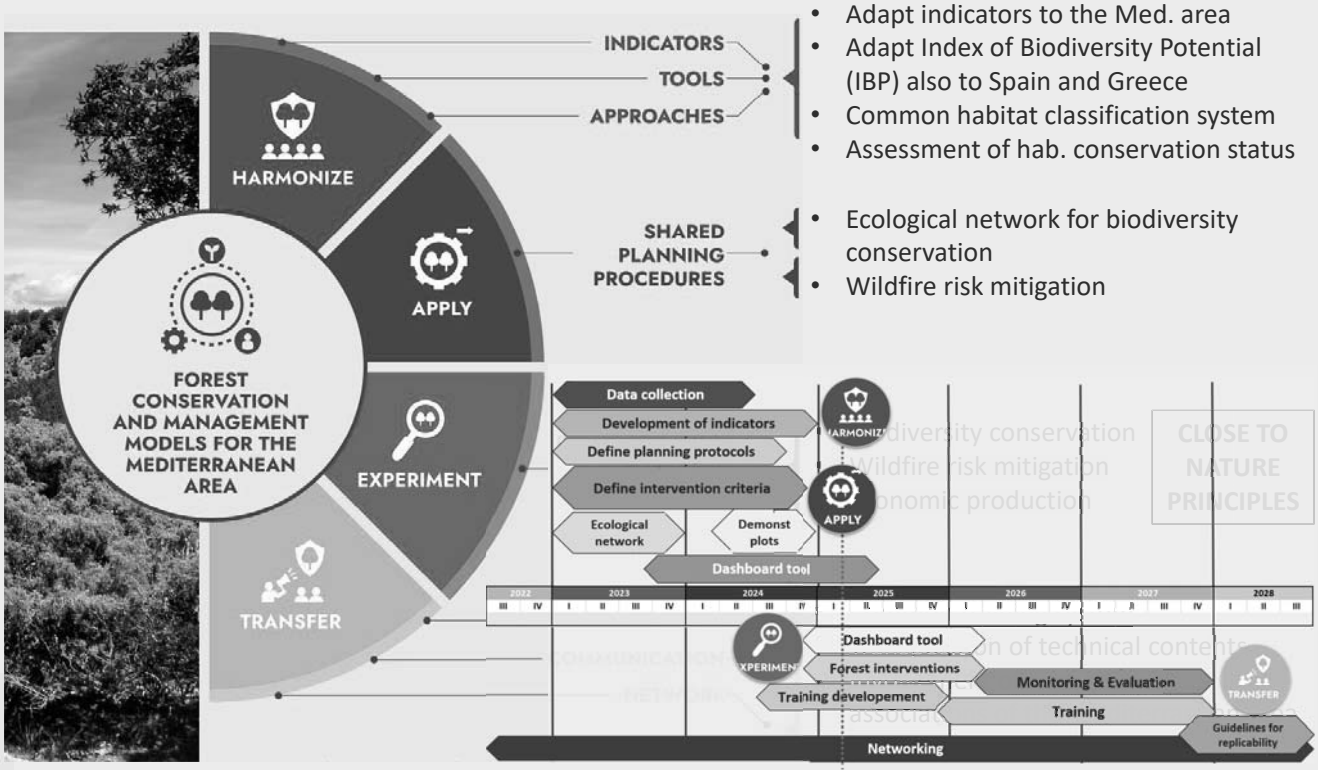

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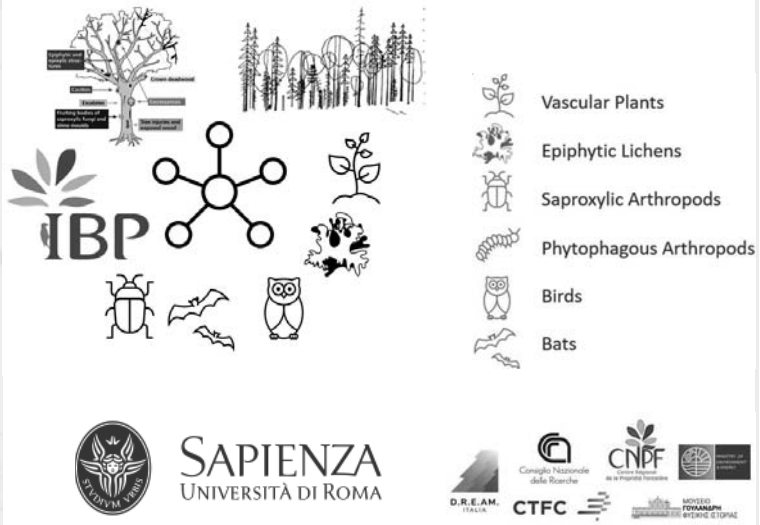
AIMS

Assess the effectiveness of TreMs in indicating the species diversity across key taxonomic groups

Validate TreMs and IBP as indicator of biodiversity potential, analyzing their reliability in assessing habitat quality

Identify stand structures and elements that support a favourable habitat conservation status



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SOME RESULTS

Canopy cover within 50-70% favours habitat diagnostic specie allowing for a high lichen diversity

Plots with more than 50 TreMs recorded are more biodiverse regardless of TreMs' diversity

An IBP value greater than 20 generally indicates a more diverse habitat

A decay class greater than 3 is linked to a greater functional diversity of saproxylic arthropods

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<u>Manual for habitat recognition and conservation state assessment</u>

AIMS

Standardize habitat classification by adopting common classification systems to improve recognition

Provide a unified list of diagnostic species for the entire biogeographical region

Define indicators and benchmarks to assess habitat conservation status

FIELD INSTRUMENT

PRACTICAL

SIMPLE TO USE

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SAPIENZA UNIVERSITÀ DI ROMA

Key challenges → action lines of the project

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- **Common habitat classification system**
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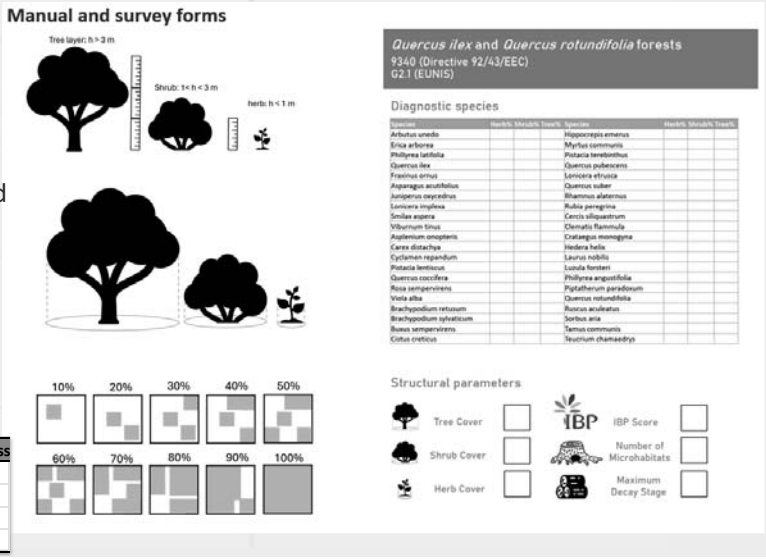
Field data & Literature

Steps

- Analysis of commonalities across countries and with the EUNIS list
- Regionally valid diagnostic species lists
- Locally valid diagnostic species lists
- From species list to quantitative parameters



Structural Parameter	Canopy Cover	Shrub Cover	IBP	N° of TreMs	Max decay class
Quercus ilex	55 - 70 %	> 10 %	> 20	> 44	≥ 4
Quercus suber	45 - 65 %	> 40 %	> 19	> 72	≥ 4
Castanea sativa	50 - 70 %	> 15 %	> 14	> 69	≥ 4
Pinus nigra	55 - 60 %	> 5 %	> 6	> 10	≥ 4

Key challenges → action lines of the project

- Test TreMs as indicators
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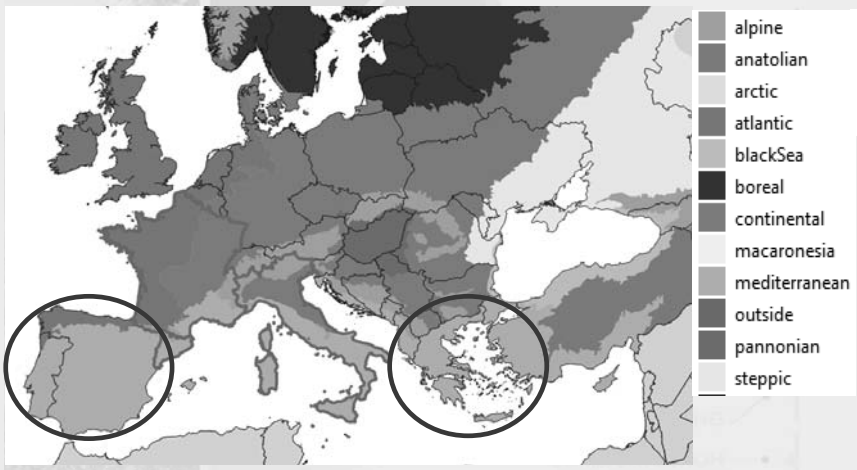

IBP CNPF

IBP: validity domain of the current harmonised IBP

new IBP versions to be produced: Spain & Greece

2025/26

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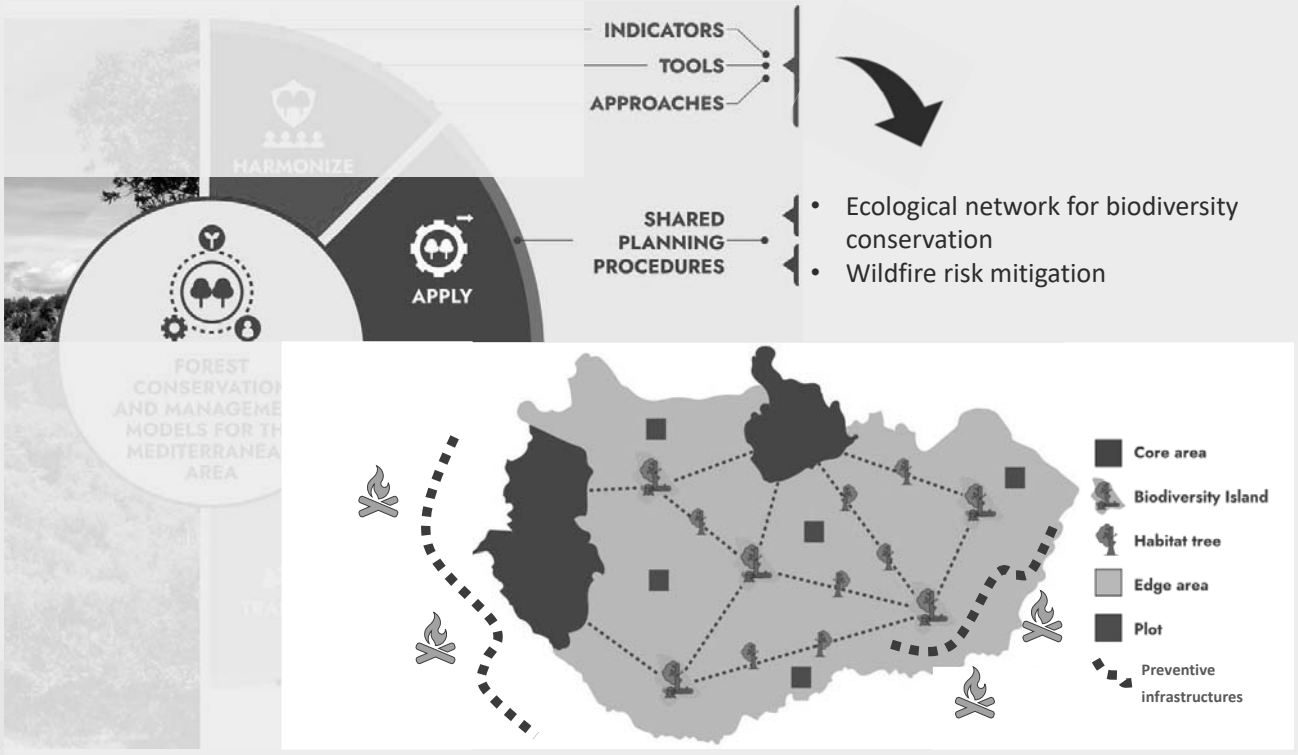
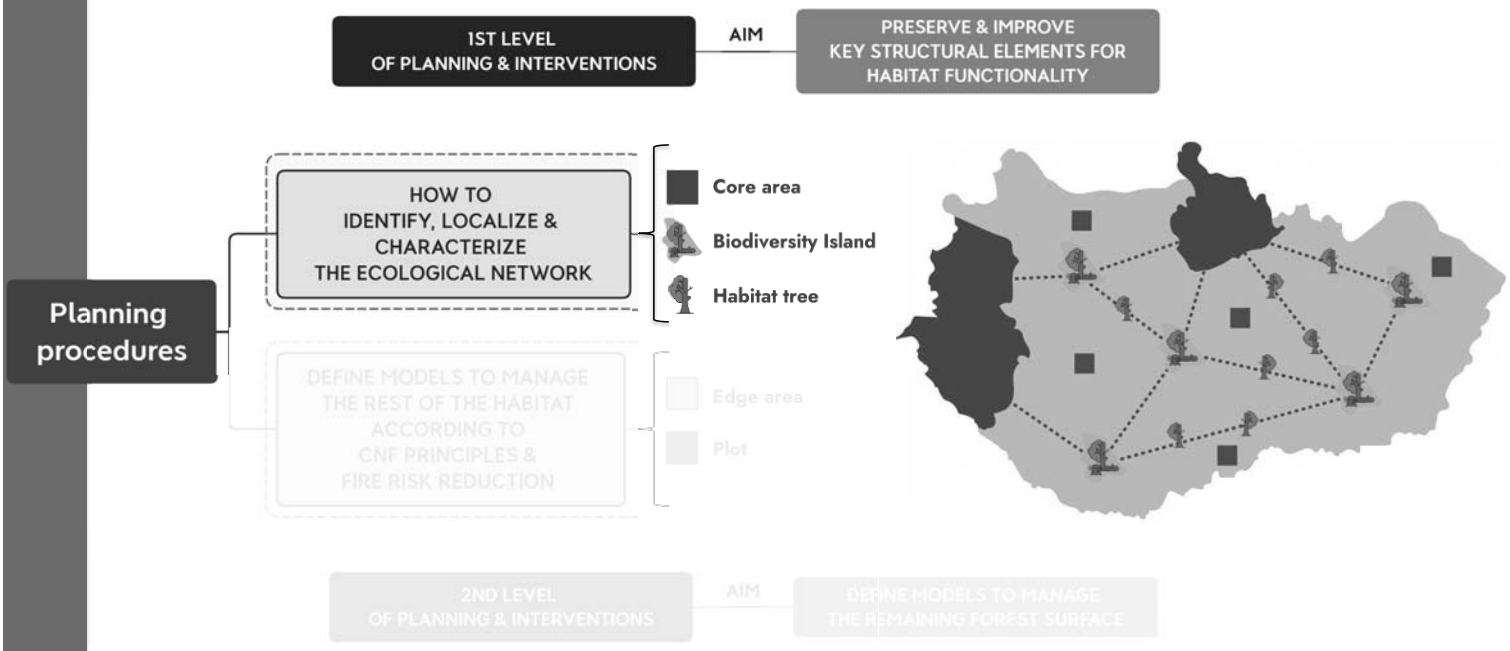
https://www.cnpf.fr/ibp-index-biodiversity-potential

Key challenges → action lines of the project



Key concept and methodology



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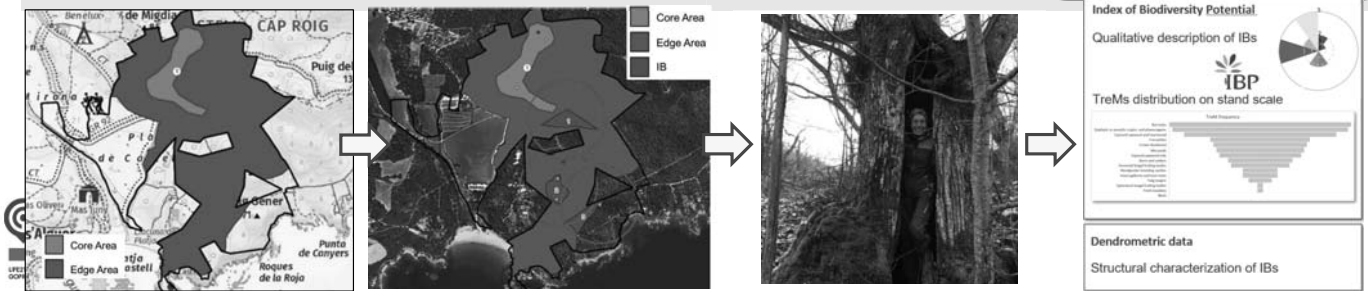
First level of planning – setting the ecological network

Identification of Core Area	Identification of Core Area	Identification of Core Area	Identification of Core Area
Identification of Biodiversity Islands	**Identification of Biodiversity Islands**	Identification of Biodiversity Islands	Identification of Biodiversity Islands
Identification of Habitat trees	Identification of Habitat trees	**Identification of Habitat trees**	Identification of Habitat trees
Characterization of IBs	Characterization of IBs	Characterization of IBs	**Characterization of IBs**
Definition of interventions for each IBs	Definition of interventions for each IBs	Definition of interventions for each IBs	Definition of interventions for each IBs



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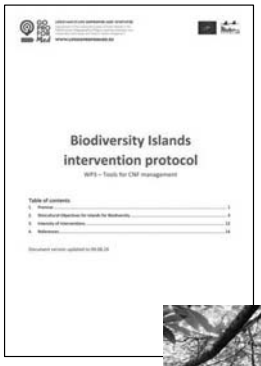
Characterization of IBs	Characterization of IBs	Characterization of IBs	**Characterization of IBs**
Definition of interventions for each IBs	Definition of	Definition of	Definition of

First level of planning

AIM: initiate or consolidate natural processes that are considered to be significant in fostering the function of IBs as stepping-stones



- Identification of Core Area
- Identification of Biodiversity Islands
- Identification of Habitat trees
- Characterization of IBs
- **Definition of interventions for each IBs**

Specific objectives

OB1. Aim for a structure of maximum theoretical functionality

OB2. Promoting the presence of Very Large Trees (VLTs)

OB3. Favour the presence of Habitat Trees

OB4. Favour the specific diversity of the forest

OB5. Favour a heterogeneous vertical structure

OB6. Favour the presence of open areas

OB7. Increase the amount of laying and standing deadwood

IB - Free evolution

IB - to be improved

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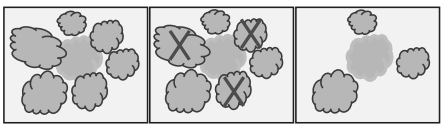
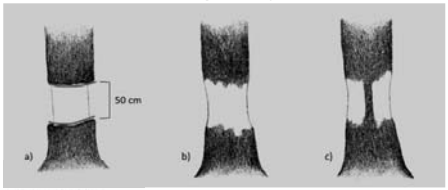
Silvicultural intervention type

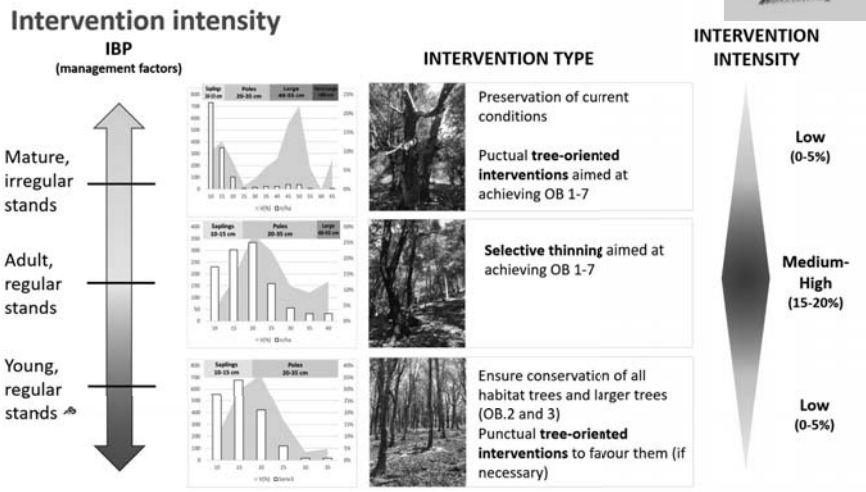
Selective thinning with low intensity

- Identification of elite trees
- Removal of 1-3 **competitive trees** per elite tree
- Competitive trees can be cut or girdled
- No skidding foreseen



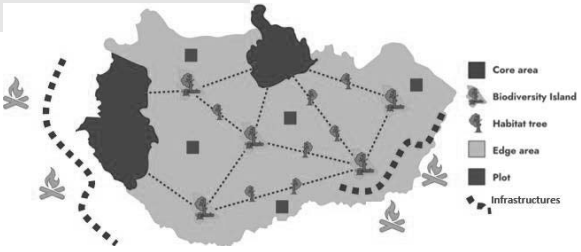
Girdling tecniques





SHARED PLANNING PROCEDURES

- Ecological network for biodiversity conservation
- **Wildfire risk mitigation**



Wildfire risk mitigation and biodiversity conservation

CHALLENGE: TRADE OFF

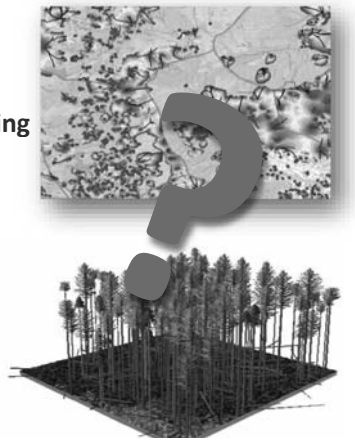
Two scales of analysis

1) Landscape scale

How to integrate **biodiversity conservation** for the strategic **planning** of **preventive infrastructures** at the landscape scale

2) Stand scale

How to **reconcile** criteria for **reducing flammability** at preventive infrastructures with the prescribed **biodiversity requirements**



UNIVERSITÀ DI TORINO

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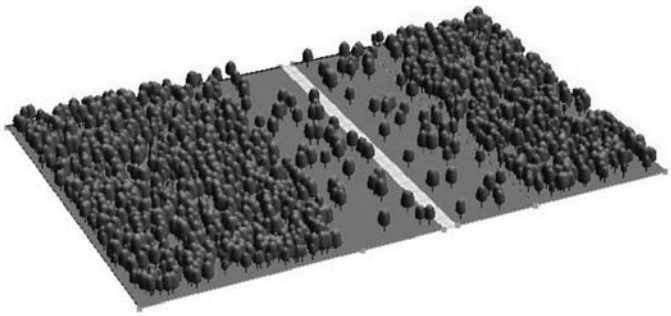
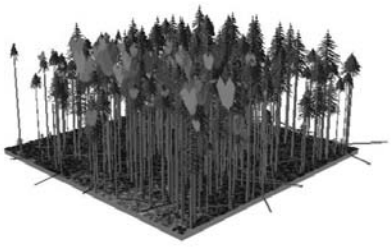
Infrastructure

T1: Shaded Fuel break

T2: Stand self-resistance

Type 1: to increase fire fighting capacity and safety





Type 2: to increase stand self-resistance

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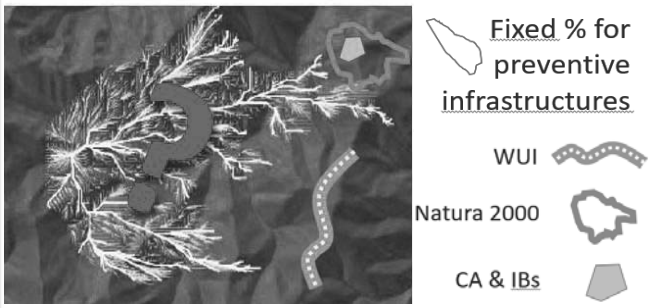
Landscape scale: strategic wildfire risk mitigation

Problem: Given a fixed % of the surface to be treated out of the total burnable area, **what should be prioritized for protection?**

Goal: Method for **strategic planning** of preventive infrastructure that considers **trade-offs** between **WUI protection**, **ecosystem services** (carbon stock, soil protection), and **CA & IBs conservation**.



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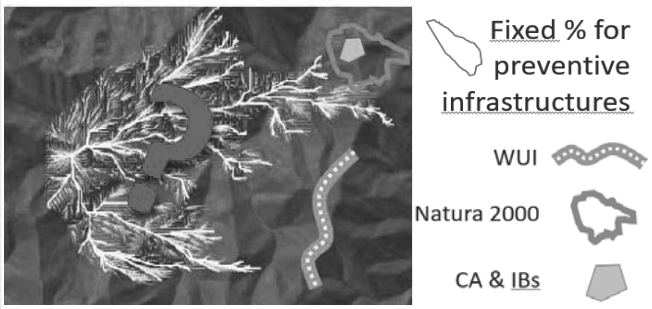
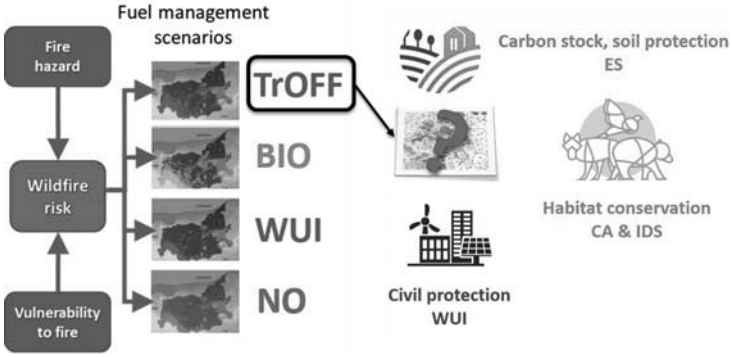
Action: scenario comparison with DSS (Driven Decision Support)



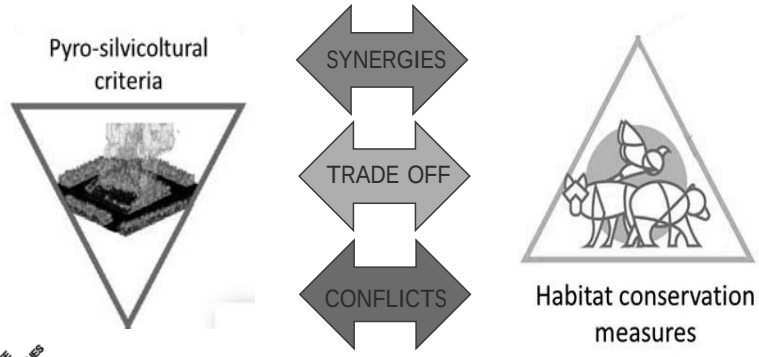


Stand scale: support fire-fighting and self-resistance

Problem: In the **CAs** and **IBs** more exposed to fire, do we intervene **near** or **within** biodiversity conservation areas?

If I intervene **inside areas**, are the **characteristics** of the **preventive infrastructures** (self-resistance forests and fuelbreaks) **consistent** with the **conservation objectives?**

Goal: Analysis method to evaluate **synergies**, **conflicts**, and **trade-offs** between conservation measures and **prescriptions for fire risk mitigation** at the stand scale.



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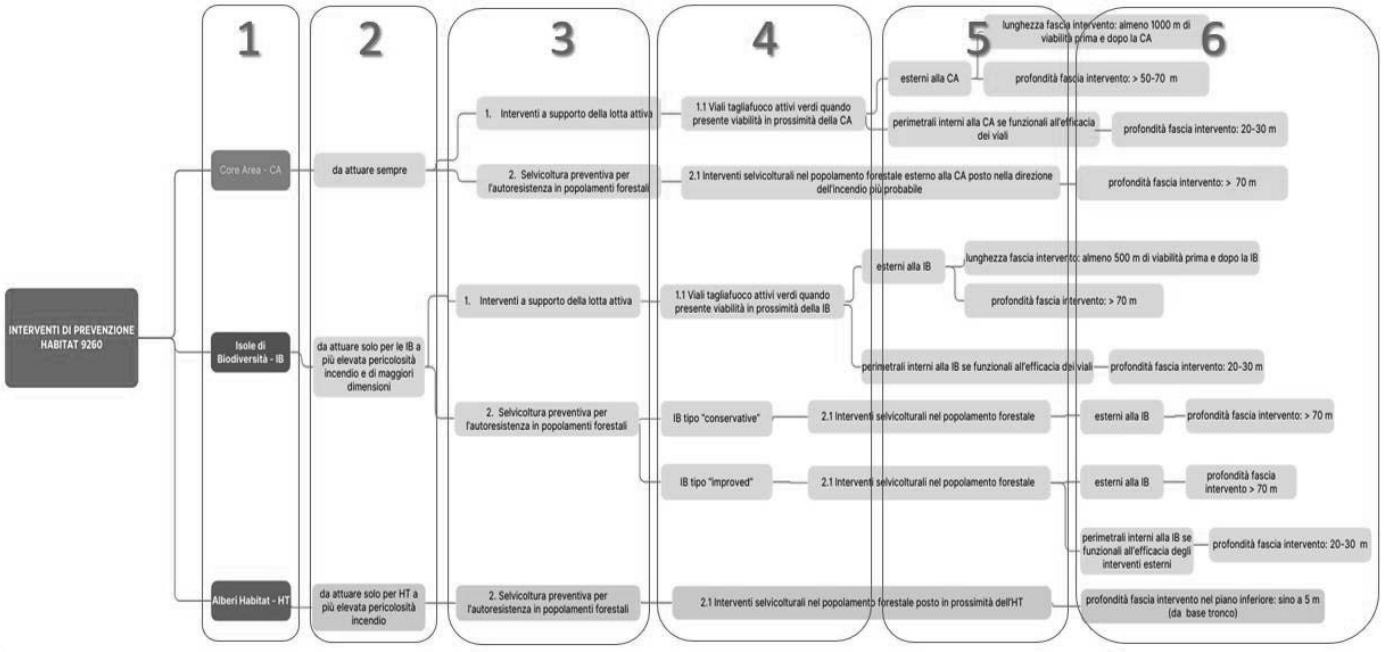
Stand scale: support fire-fighting and self-resistance HABITAT 9260 & 9530*

Action: Implementation of a protocol (Decision Tree) based on 6 steps and on species ecology



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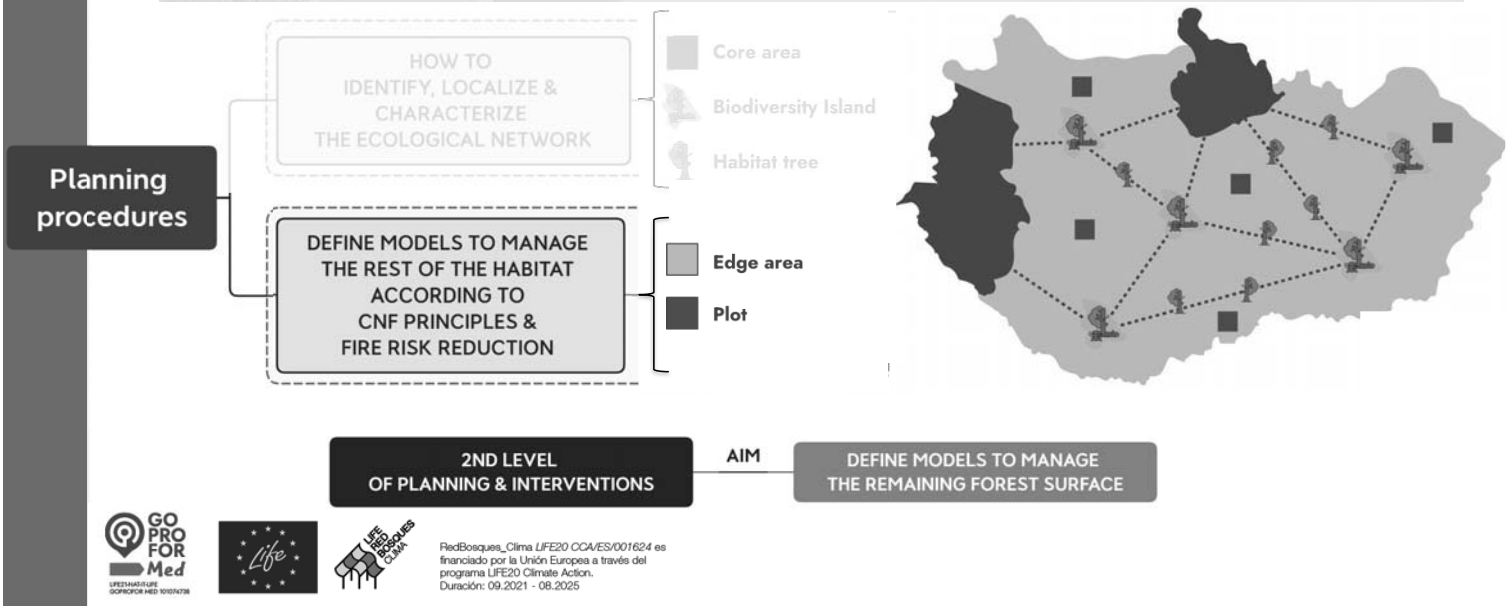

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Objective of the interventions

Guide forest structure towards an irregular, continuous-cover system, **enhancing ecosystem health and resilience** to ensure **greater multifunctionality**.

Specific objectives

- Ensure sustainable production and high-quality timber and cork.
- Preserve biodiversity and landscape value.
- Protect soil and promote natural forest regeneration.
- Increase the forest's capacity to store CO_2.

Demonstration intervention models for target habitats

Plot (1 ha)

- Different forest conditions (fertility, stand maturity…)
- Observation and analysis of the forest stands
- Interventions adapted according to **6 key criteria**

1. Sustainable standing stock
2. Structure and stage of development
3. Stability
4. Regeneration
5. Species diversity
6. Biodiversity conservation (using IBP)

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IN CONCLUSION

The **KEYWORD** of the project approach is **APPLICABILITY**

- clear procedures
- standard protocols
- use of indicators
- affordable costs

Project sites	Tot Hab. surface (ha)	Ecological network (ha)	IBs (N)	Effort
(ALL except Montes)	2.467	310	66	13 %

Biodiversity conservation **SYNERGIES** ***Climate change adaptation***

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from a Mediterranean region perspective

THANK YOU
FOR YOUR ATTENTION