Sardinia 7-9

LIFE GoProForMED: preserving and managing Mediterranean forest habitats

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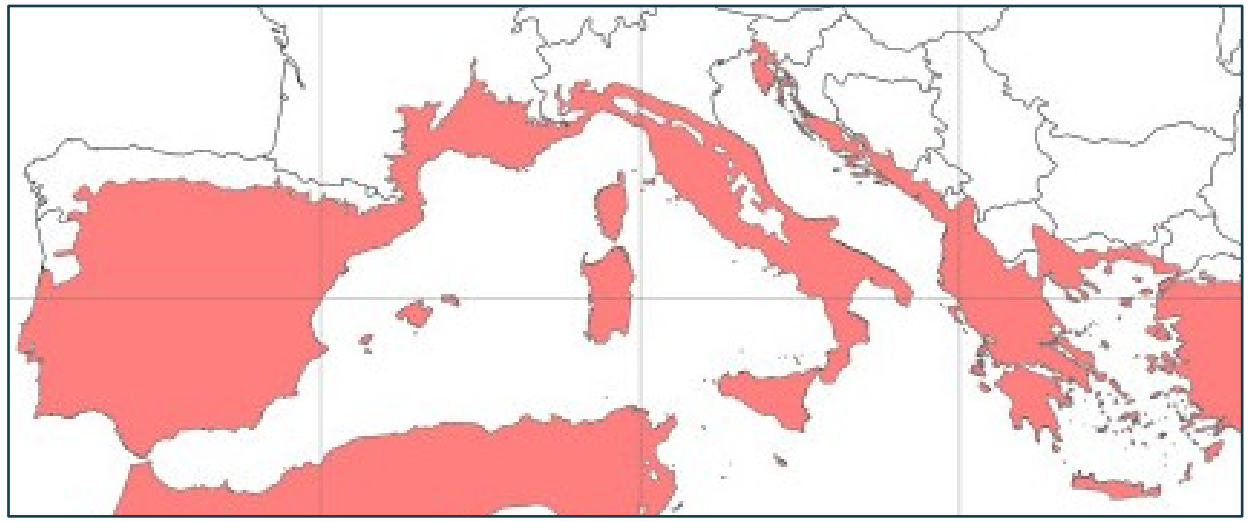
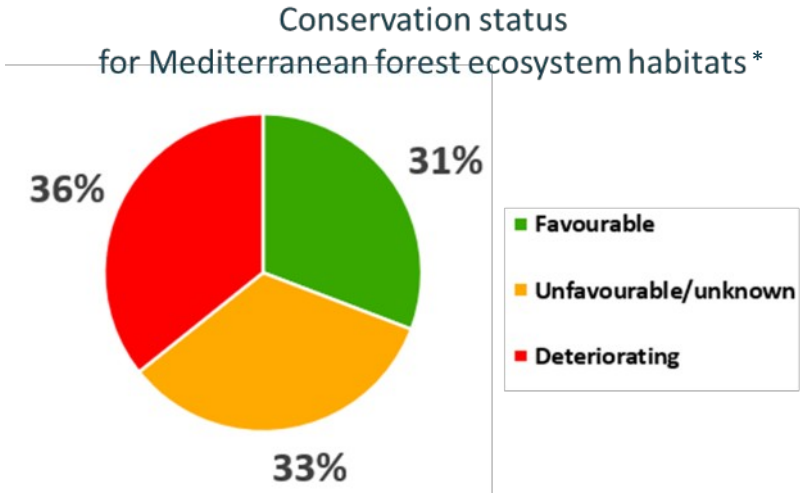
(D.R.E.Am Italia)

Coordinator beneficiary





BACKGROUND

Mediterranean forests are currently very vulnerable to a variety of risks such as

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

* Brussels, 27.7.2023 SWD(2023) 284 final – Guidelines on Closer-to-Nature Forest Management

- Disparities in skills among different Member States regarding the application of biodiversity-friendly forest management practices.
- Lack of permanent training programs and advisory services for foresters.
- Need to contextualize and locally apply the European guidelines on forest management.
- Low integration of biodiversity-friendly forest management into existing academic and vocational training curricula.

Life

GO PRO FOR Med

Life PINASSA PINEGRAL PINUS NIGRA

BIORGEST

LIFE CLIMARK

forestLIFE

LIFE RED BOSQUES

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Coordinator

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Partners

Consiglio Nazionale delle Ricerche

UNIVERSITÀ DI TORINO

SAPIENZA UNIVERSITÀ DI ROMA

Compagnia delle Foreste

Forestas

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THE GOULANDRIS NATURAL HISTORY MUSEUM
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CTFC
SCIENCE FOR FOREST MANAGEMENT, BIODIVERSITY & BIOECONOMY
Change the future, today

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CNPF

Centre de la Propietat Forestal

Generalitat de Catalunya
Departament d'Acció Climàtica, Alimentació i Agenda Rural

Regione Toscana

Affiliated entities

Unione dei Comuni del Frignano

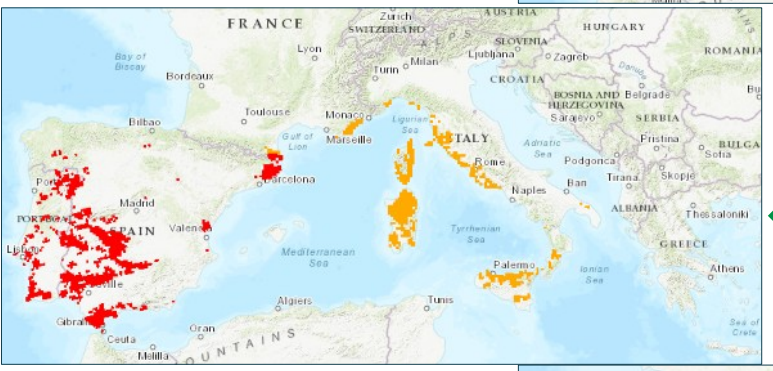
Associazione FORESTA MODELLO delle MONTAGNE FIORENTINE

DURATION
01/09/22 - 31/08/28

BUDGET
Total: 4.797.797 €
EC Co-funding: 60%
(2.878.672 €)

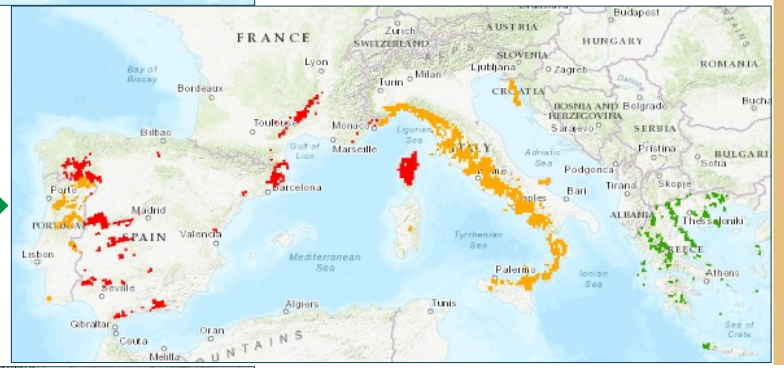
- ✓ Technicians/researchers
- ✓ Managers
- ✓ Implementers

9340
Quercus ilex and
Q. rotundifolia forests



9330
Quercus suber forests

9260
Chestnuts



9530*
(Sub-) Mediterranean
pine forests

Target forest habitats:

Distribution and conservation status in Europe

- ✓ widespread and representative in terms of surface area
- ✓ unfavorable / inadequate current conservation status
- ✓ all target habitats are subject to silvicultural activities
- ✓ sensitive to management practices that can accentuate regressive effects, threatening their conservation status

Project sites

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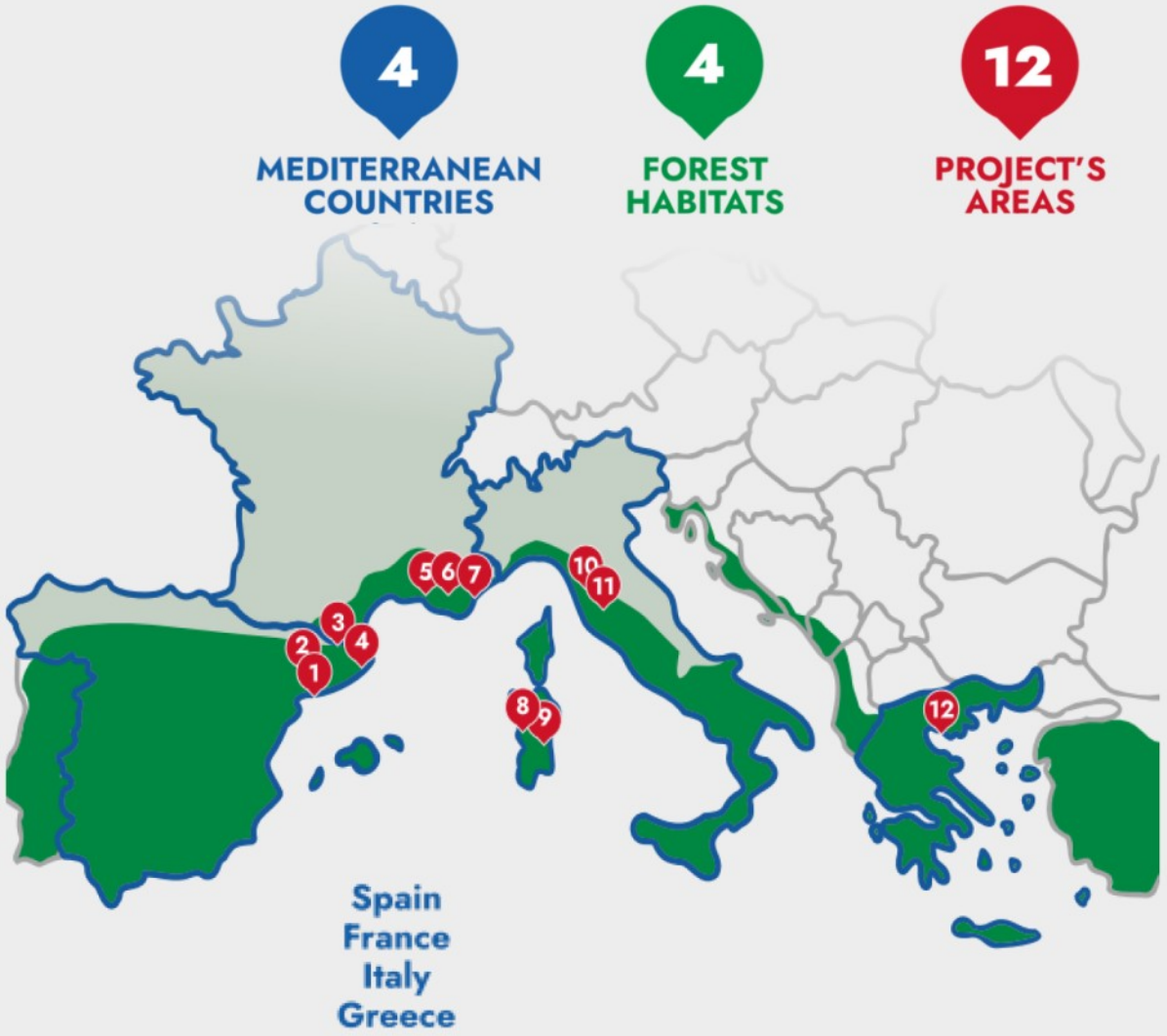

	NATURA 2000 SITES		HABITAT
1	ES5140008 - Muntanyes de Prades	foresta di Plans i baridana	9530*
2	ES5140008 - Muntanyes de Prades	foresta di Poblet	9340
3	ES5120001 - Alta Garrotxa-Massís de les Alberes, foresta di Muntanya de les salines, fucimanya i balló		9260
4	ES5120015 - Litoral del Baix Empordà, foresta di Paratge i pla de castell		9330
5	FR9301585- Massif du Luberon		9340
6	FR9302007 - Valensole		9340
7	FR9301570 - Préalpes de Grasse		9340
8	ITB011102 - Catena del Marghine e del Goceano		9330
9	ITB022212 - Supramonte di Oliena, Orgosolo e Urzulei - Su Sercone		9340
10	IT5140012- Vallombrosa e Bosco di S. Antonio		9260
11	IT5180011- Pascoli montani e cespuglieti del Pratomagno		9260
12	GR1220009 - Limnes Koroneias - Volvis, Stena Rentinas Kai Evryteri Periochi		9260

Key action lines of the project

- common system of habitat recognition and classification
- methods & indicators for assessment of conservation status
- adaptation of IBP to Spain and Greece

- to improve habitats conservation status
- to prevent and reduce fire risk

- according to Closer-to-Nature Forestry criteria
- to prevent and reduce fire risk

- promote the models through common training courses

- technical-scientific contents ↔ simple and accessible

- involvement of experts, forest institutes & associations, projects…

Key concept and methodology

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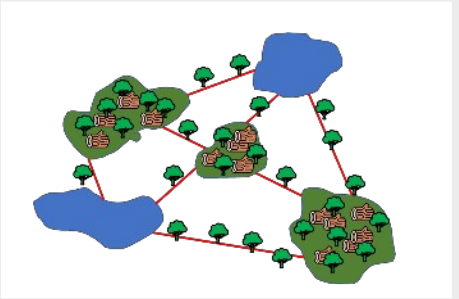
Planning procedures

1ST LEVEL OF PLANNING & INTERVENTIONS — AIM — **PRESERVE & IMPROVE KEY STRUCTURAL ELEMENTS FOR HABITAT FUNCTIONALITY**

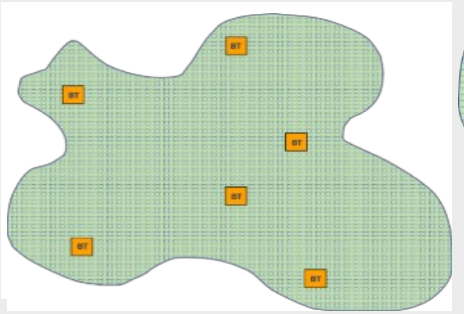
HOW TO IDENTIFY, LOCALIZE & CHARACTERIZE THE ECOLOGICAL NETWORK

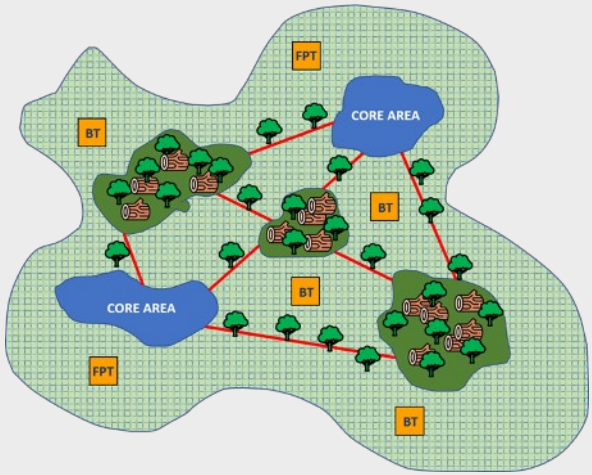
- CORE AREAS
- BIODIVERSITY ISLANDS
- HABITAT TREES



DEFINE MODELS TO MANAGE THE REST OF THE HABITAT ACCORDING TO CNF PRINCIPLES & FIRE RISK REDUCTION

- DEMONSTRATIVE PLOTS IN THE EDGE AREA





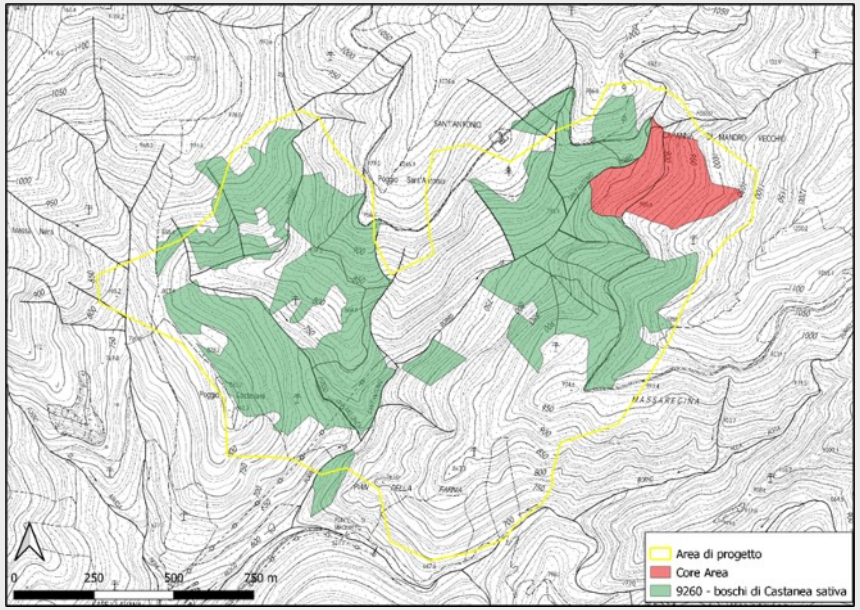
2ND LEVEL OF PLANNING & INTERVENTIONS — AIM — **DEFINE MODELS TO MANAGE THE REMAINING FOREST SURFACE**

Operational procedures

FIRST LEVEL OF PLANNING

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

- ✓ High functional and qualitative value **(biodiversity hotspots)**
- ✓ **Permanently maintained**
- ✓ Function: source of biodiversity and diffusion of mobile species



CORE AREAS REQUIREMENTS

- ➢ Correspondence with the definition of the target **habitat** (essential prerequisite)
- ➢ Maturity and temporal continuity of the forest stand (recommended prerequisite)
- ➢ High level of potential biodiversity (recommended prerequisite)
- ➢ Min. surface: **5 ha**

Operational procedures

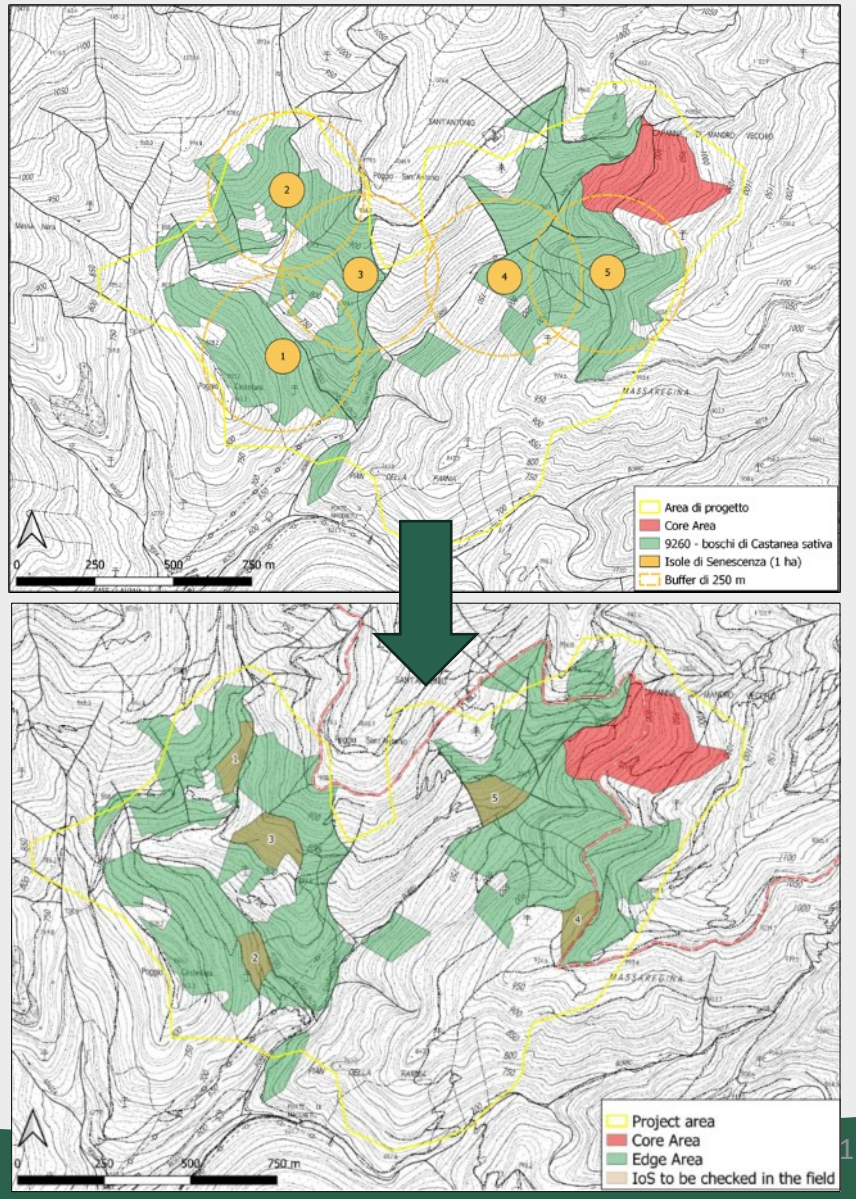
FIRST LEVEL OF PLANNING

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

- ✓ **Small forest reserve**
- ✓ Function:
  - **Connect** CAs, favouring the dispersion of less mobile species
  - **Preserve** deadwood & other elements for ecosystem and species conservation
- ✓ **Active management** to create/maintain these elements

IBs REQUIREMENTS

- ➢ Correspondence with the target **habitat**
- ➢ High level of **potential biodiversity** (current or attainable)
- ✓ Min. surface: 1 ha
- ✓ Average distance: 200-400 m
- ✓ Coverage: **at least 5% of the target area**



Operational procedures

FIRST LEVEL OF PLANNING

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

- ✓ a standing living tree that bears **tree microhabitats** (TreMs)
- ✓ Function: connection between CAs and IBs
- ✓ Number: ~ 3 for each IBs

Tree Microhabitats (TreMs)

Operational procedures

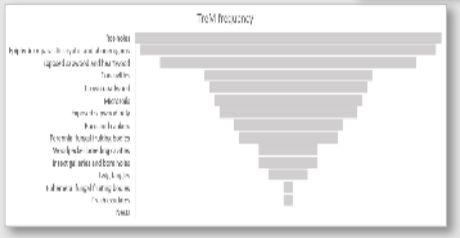
FIRST LEVEL OF PLANNING

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

IBP

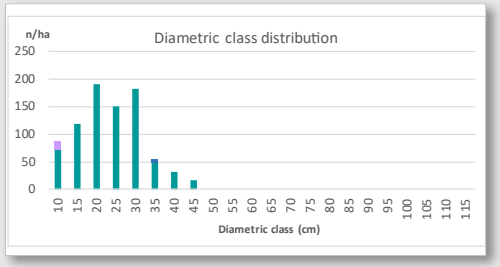
Qualitative description of IBs

TreMs distribution on stand scale



Dendrometric data

Structural characterization of IBs



Management objectives

AIM
collect information needed for

Definition of silvicultural intervention

Operational procedures

FIRST LEVEL OF PLANNING

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

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

INTERVENTION OBJECTIVES

- **OB1**. Aim for a **structure** of maximum theoretical functionality
- **OB2**. Favour the presence of **very large trees**
- **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** and flowering herbaceous and shrub species
- **OB7.** Increase the amount of laying and standing **dead wood**

IB - Free evolution

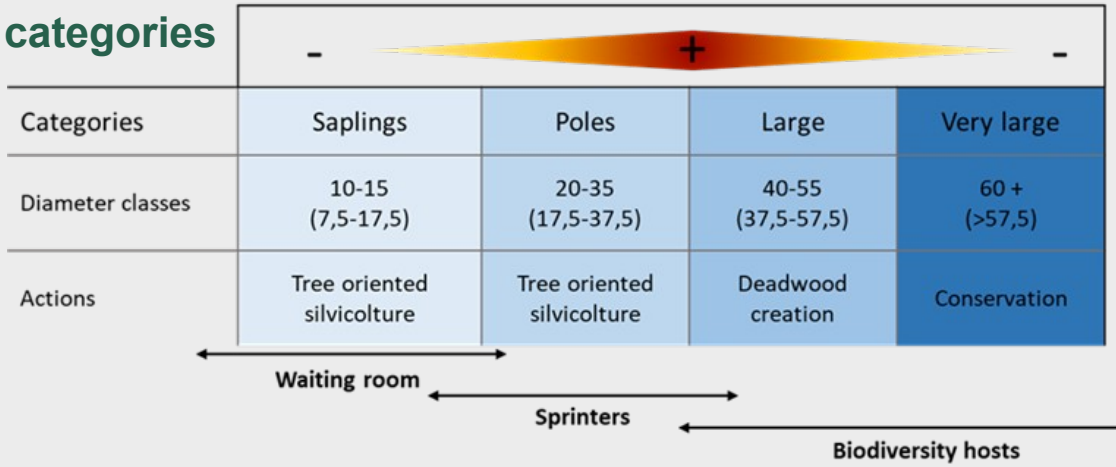
IB - to be improved

Operational procedures

FIRST LEVEL OF PLANNING

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

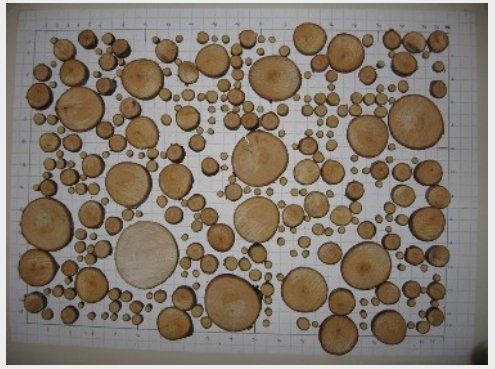
4 size categories



INTENSITY OF INTERVENTION

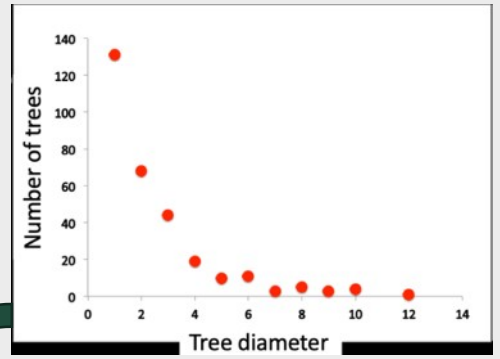
Stand characteristics	Intervention intensity	Actions
Mature stands, articulated structure Population volume is more concentrated in the 'large' and 'very large' categories	-	Preservation of current conditions. Punctual tree-oriented silviculture interventions aimed at achieving Ob. 1-7
Regularly structured adult stands or irregularly structured young-adult stands; Population volume is more concentrated in the "poles" category	+	Selective thinning to achieve Ob. 1-7 Impact limit on the number of Saplings: 25-30% Impact limit on the number of Poles: 25-30% Impact limit on the number of Large: 15%
Regularly structured young stands; Population volume is more concentrated in the "saplings" category	-	Ensure the conservation of all habitat trees and larger plants. Punctual tree-oriented silviculture interventions only when necessary to favour larger plants and habitat trees (OB2 and 3).

OB1. Aim for a **structure** of maximum theoretical functionality



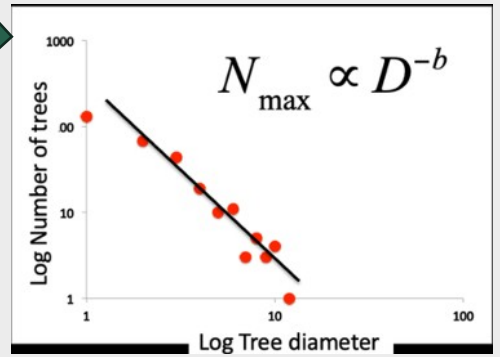
A community as a whole grows by utilising all available resources, which are finite.

The maximum functional structure of a forest is one that is able to optimise all resources



Not transformed

Tree-size distribution is a descriptor of the structure



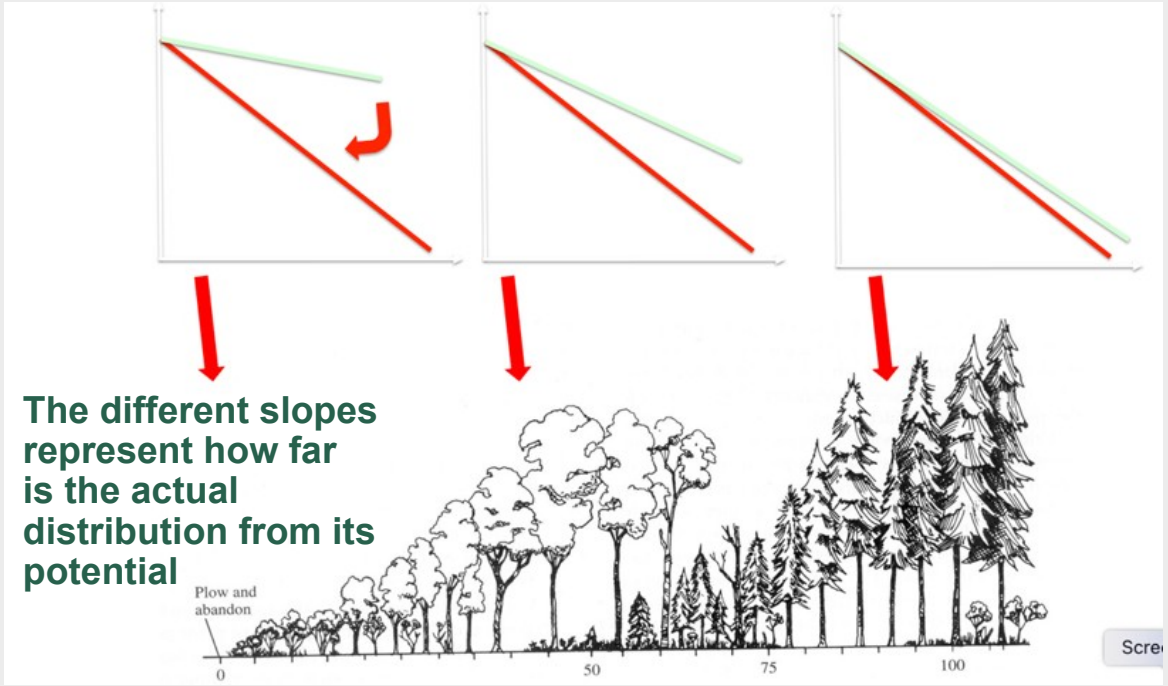
Log-transformed

H-MODEL

(Simini et al 2010, Anfodillo et al 2013)

- **allometric model - developed at the University of Padua**
- **based on statistical mechanics principles**

The H-Model predicts the potential distribution of the frequency of tree individuals per size class in a forest at its maximum state of available resource utilisation



The different slopes represent how far is the actual distribution from its potential

The approach is universal, site and species independent and it is easily applicable to any forest

Operational procedures

FIRST LEVEL OF PLANNING

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

4 size categories

Categories	Saplings	Poles	Large	Very large
Diameter classes	10-15 (7,5-17,5)	20-35 (17,5-37,5)	40-55 (37,5-57,5)	60 + (>57,5)
Actions	Tree oriented silvicolture	Tree oriented silvicolture	Deadwood creation	Conservation

Waiting room

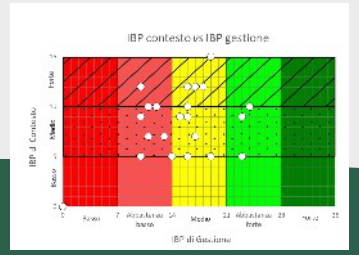
Sprinters

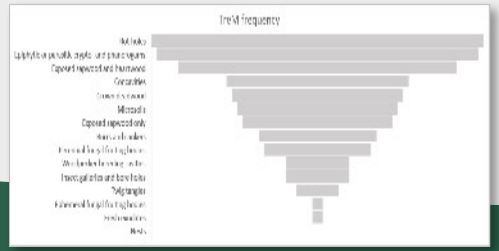
Biodiversity hosts

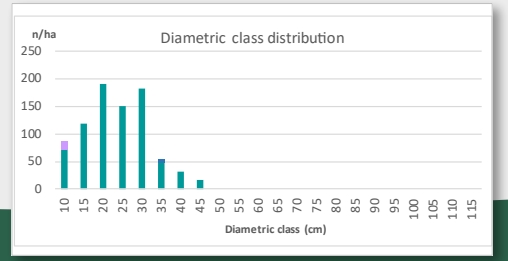
Case study: Montes Forest (Sardinia – IT)

Categories	Saplings	Poles	Large	Very large
Diametric classes (cm)	10-15 (7,5-17,5)	20-35 (17,5-37,5)	40-55 (37,5-57,5)	60 + (>57,5)
H Model %	53%	36%	8%	3%
Real distribution % (n/ha)	25% (207)	70% (581)	6% (48)	0% (0)
Supernumerary percentage	-	34%	-	-

Potential diametric distribution for habitat 9340 - *Quercus ilex* and *Q. rotundifolia* forests







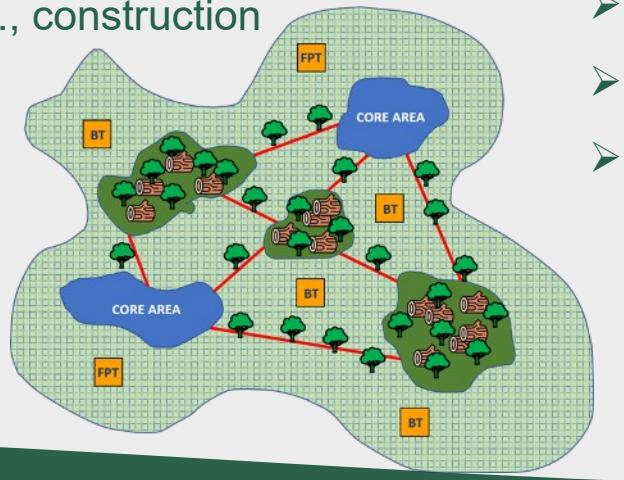
Operational procedures

SECOND LEVEL OF PLANNING EDGE AREAS

AIM: provide alternative and innovative models, aimed at promoting the best management of target forest habitats, in line with Closer-to-Nature principles

EDGE AREAS - DEMONSTRATIVE AREAS

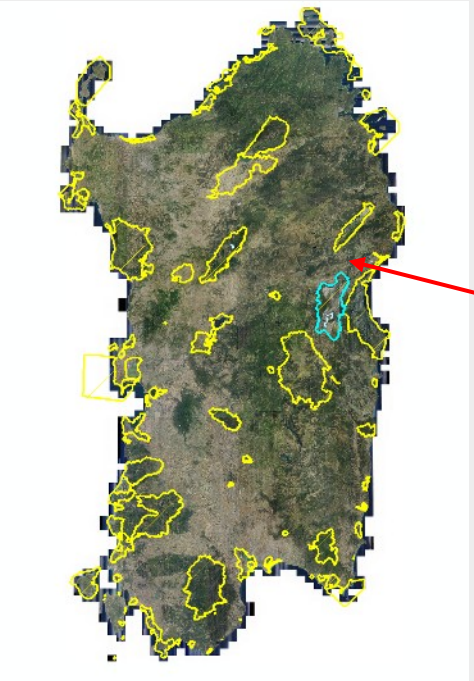
- Plots of 1 ha in the **Edge Area**
- Defined according to **stand characteristics** and **fertility conditions**
- Forest stands managed with criteria similar to those of Close-to-Nature Forestry, but where the goal is to improve wood quality by increasing products intended for long-term use (e.g., construction timber, parquet flooring, sawn wood, etc.).



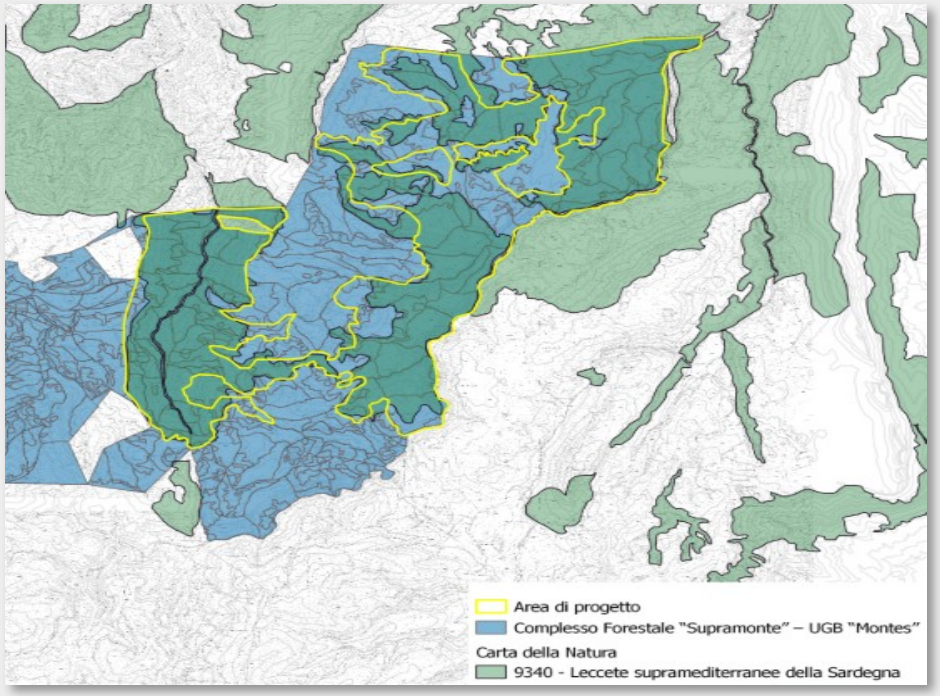
INTERVENTIONS according to 7 KEY CRITERIA

- *Equilibrium* capital
- wood quality
- Structure and stage of development
- Stability
- Regeneration
- Specific diversity
- Preservation of biodiversity

Montes IB and Core Area



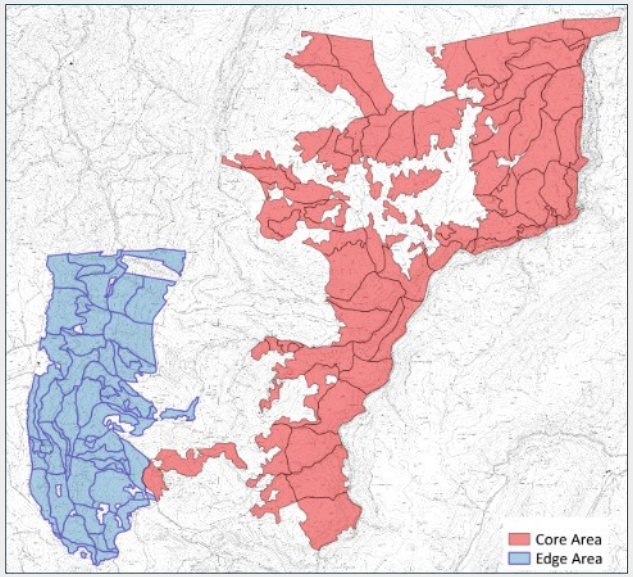
Project site: ITB022212
Supramonte di Oliena, Orgosolo e Urzulei - Su Sercone



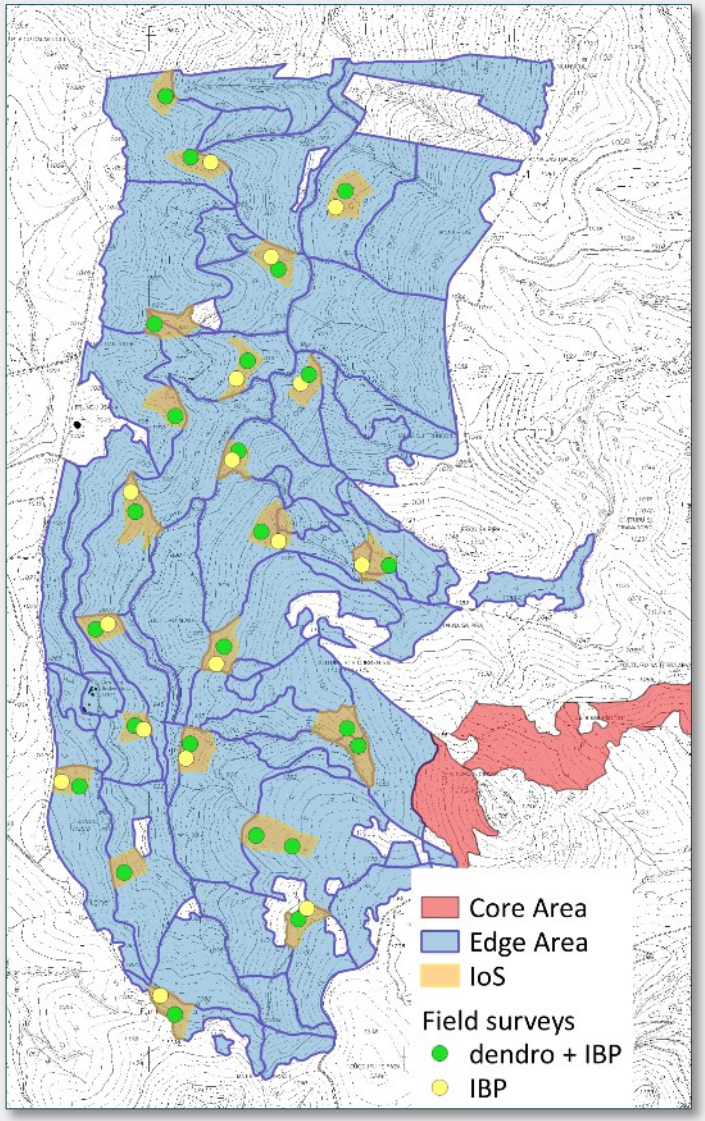
Total area 23.474 ha

- Target habitat: **9340** (Foreste di Q. ilex e Q.rotundifolia) Extension **4.695 ha**
- Project area (habitat surface): **1616 ha**
- Forest manager: Agenzia **Fo.Re.STAS** – Territorial Service of Nuoro
- Tot. Forest complex area: 4.659 ha of the "Supramonte" Forest Complex "Montes" Forest
- Type of management: planned; **conservation and production.**
- Peculiarities/**problems**: **grazing** in the forest contains the potential of **regeneration from seed**, climate change with **high temperatures and prolonged droughts** cause unsustainable stress from the system

Montes IB and Core Area



	Surface (ha)
Core Area	1.122
Edge Area	459



N. IoS	22
IoS tot surface	35
Mean IoS surface	1,6 ha
Min. IoS surface	0,9 ha
Max. IoS surface	3,2 ha

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Core Area of Montes «*Sas Baddes*»

	Surface (ha)
Core Area	1.122 ha
Edge Area	459 ha

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Islands of Biodiversity (IB) Most representative typologies

IB 5: *Su Tuale/Funtana Bona*

Type 1: young coetaniform stands with a simplified structure with small diameter classes below 35 cm

IB 11*: Gutturu Alasi*

Type 2: slightly more developed peers with more articulated diametric and chronological classes than type 1

IB 13*: Is Porcargios*

Type 3: disetaneiform, with well-distributed diametric (> 40 cm) and chronological classes, dead wood present standing and on the ground

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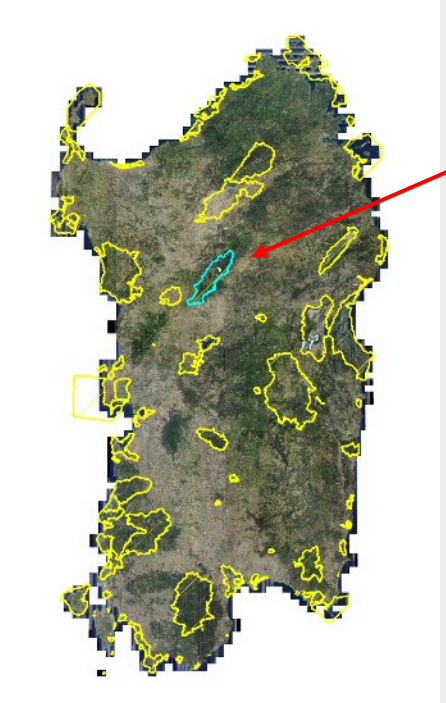

Project site: ITB011102 Catena del Marghine e del Goceano

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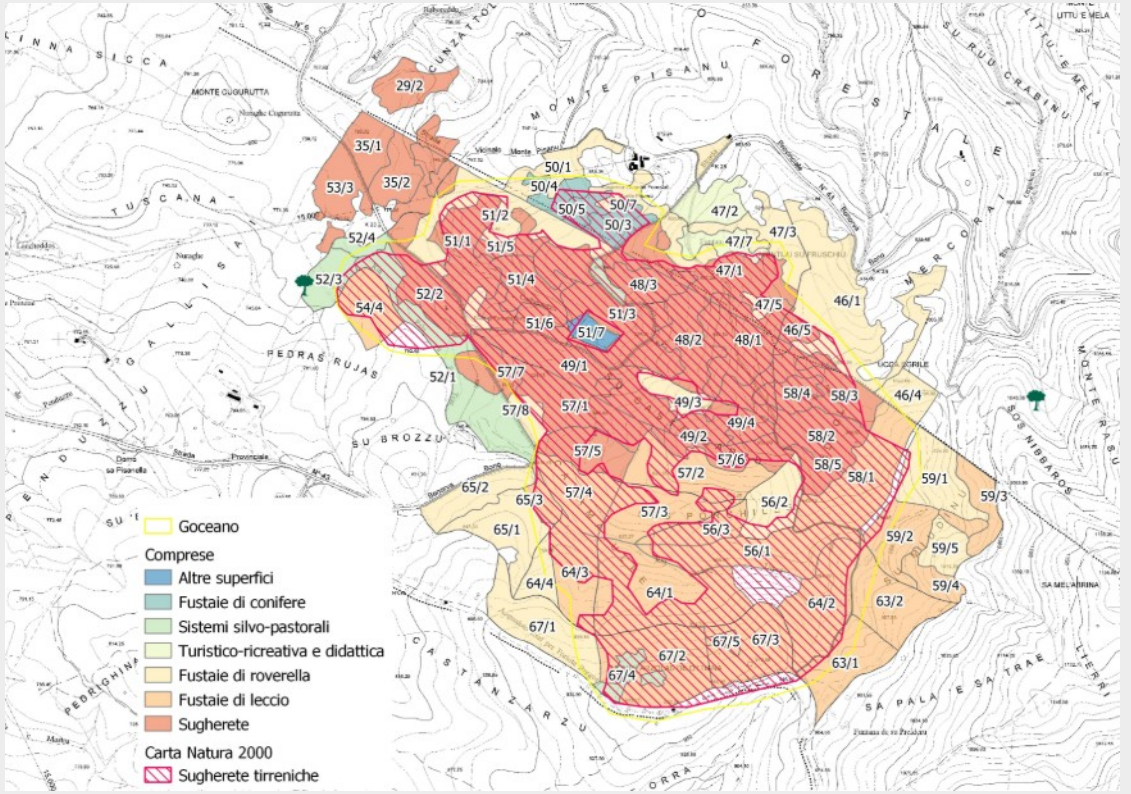
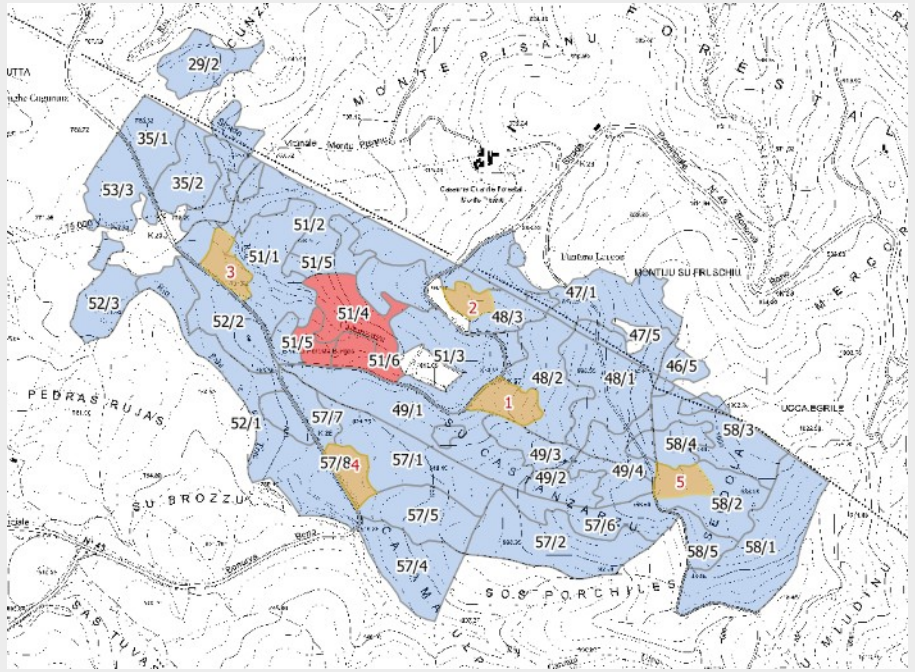


Total area 14.976 ha

- Target habitat: **9330** (Foreste di Quercus suber) Extension **2.096,64** ha
- Project area (habitat surface): **177** ha
- Forest manager: Agenzia **Fo.Re.STAS** – Territorial Service of Sassari
- Tot. Forest complex area: **4.807** ha
- Peculiarities/**problems**: lack of active management on cork forests benefits **competition from competing broadleaved trees**; grazing in the forest contains the potential of **regeneration from seed**, climate change with **high temperatures and prolonged droughts** cause unsustainable stress from the system

Monte Pisanu IB and Core Area



	Surface (ha)
Core Area	7
Edge Area	165
IoS tot surface	5

➢ Dashboard tool

The tool is designed for forestry technicians to facilitate the collection and processing of dendrometric data and assist during marking operations.

The tool can be used for:

- Collecting dendrometric data and IBP data
- Displaying information derived from the processing of dendrometric and IBP data for a given intervention area
- Guiding forestry technicians during the marking phase

Data storage

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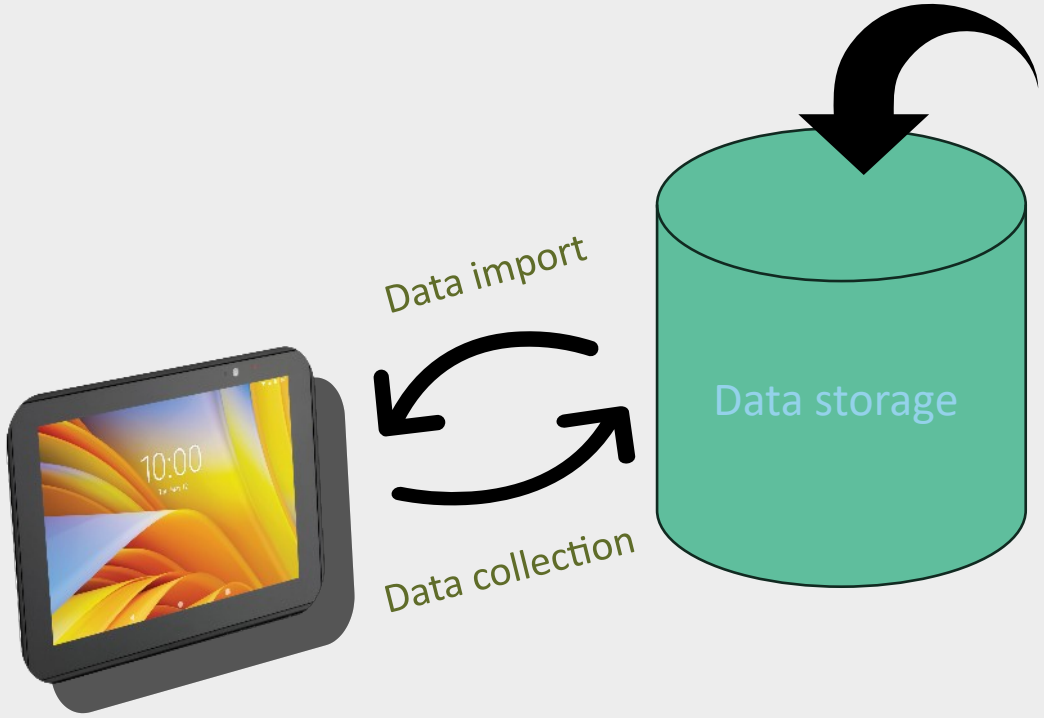
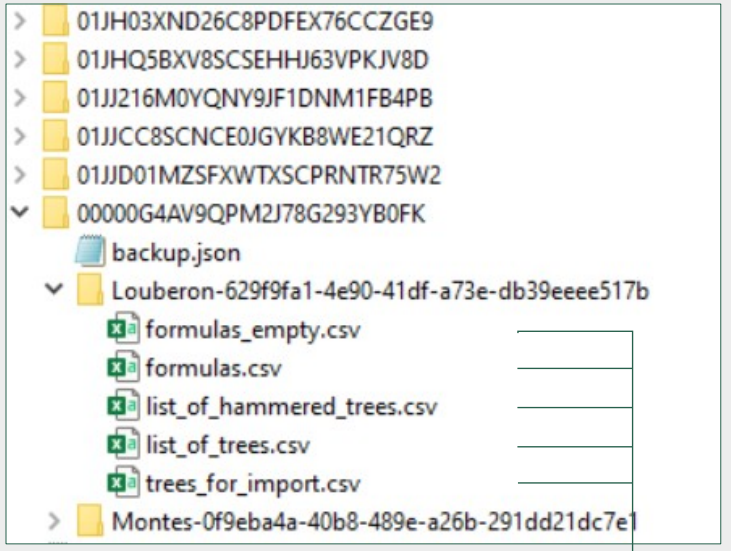


Administrator:
Dream Italia



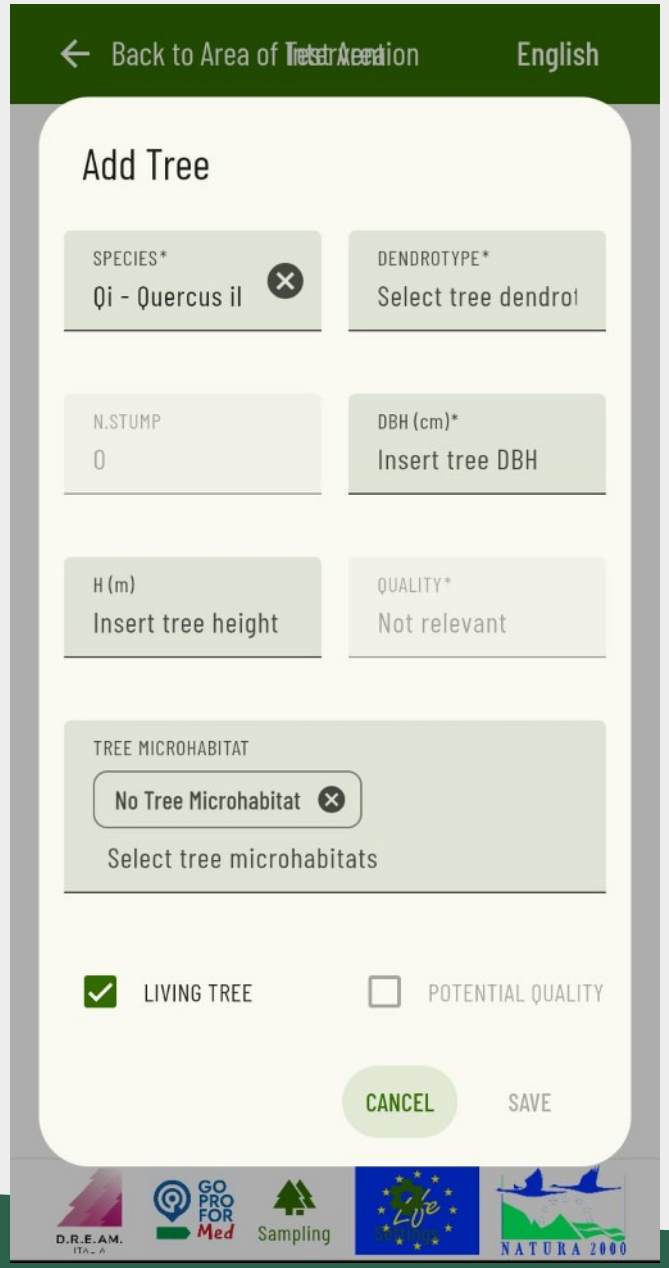
Databases with defined structure

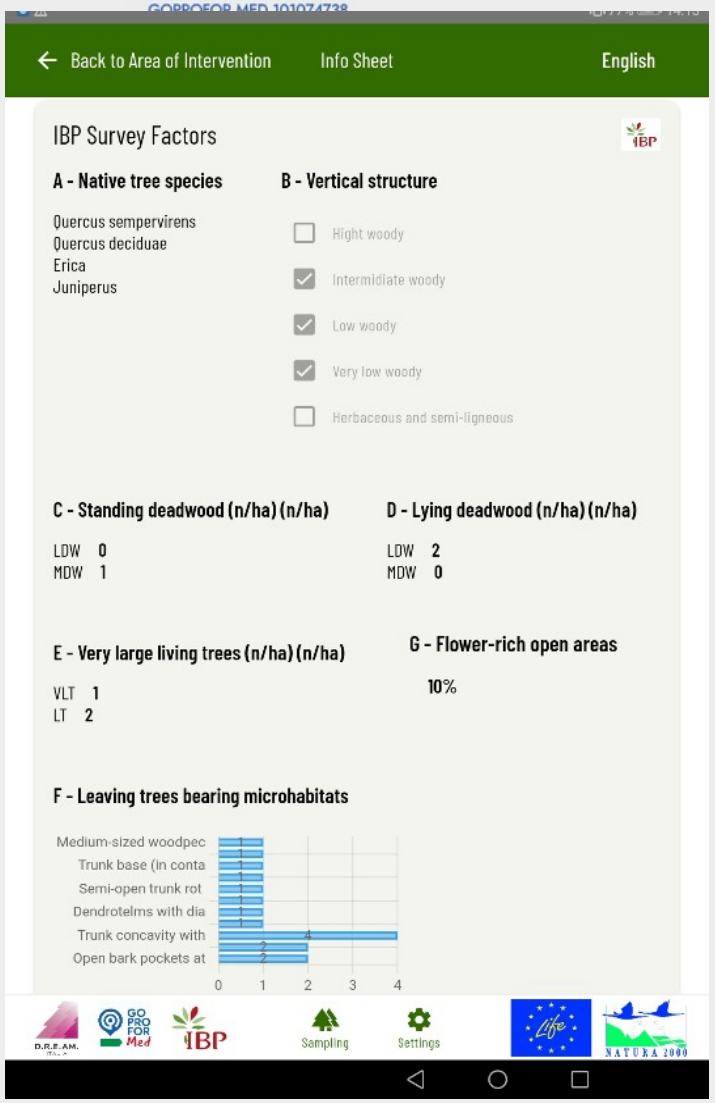
Data collection – dendrometric survey, IBP

Dendrometric surveys are done in circular plots with a fixed radius (defined by the operator). For each tree the following data are collected:

- **Species**
- **Dendrotype**
- **DBH**
- H (% of recorded trees)
- Tree microhabitat
- **Status (living/dead)**

IBP Survey





Displaying information – Dendrometric and IBP data

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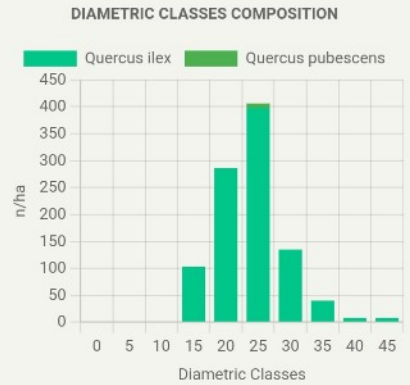
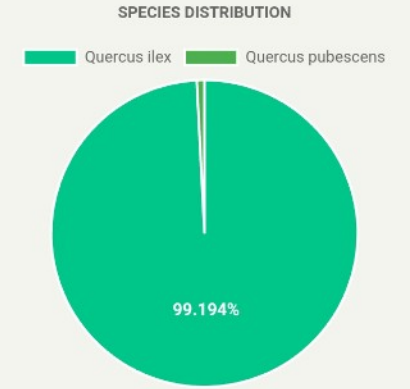
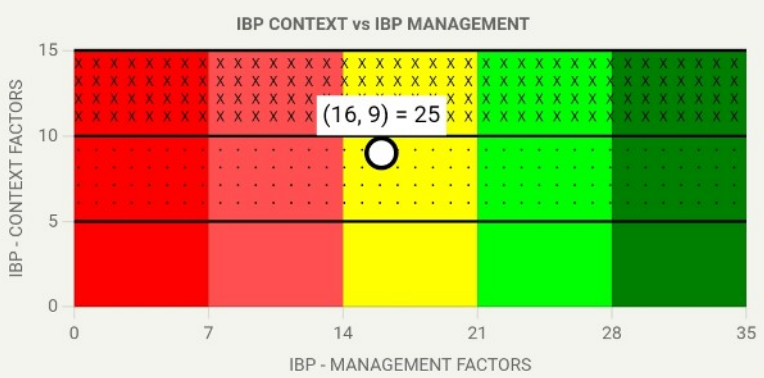
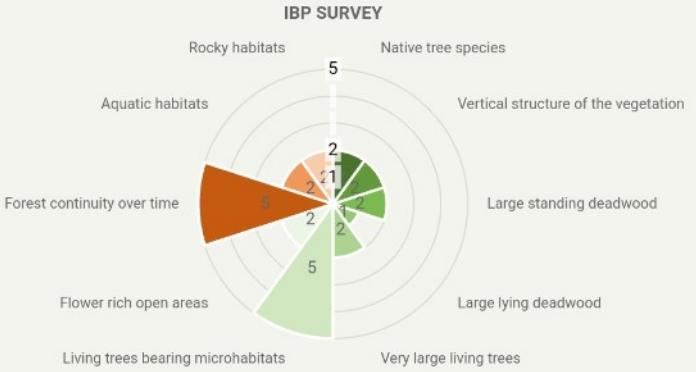
CATEGORY	Saplings 10-15	Poles 20-35	Large 40-55	Very Large >60	TOT
Initial Stand Distribution	10.5%	87.9%	1.6%	0%	100%





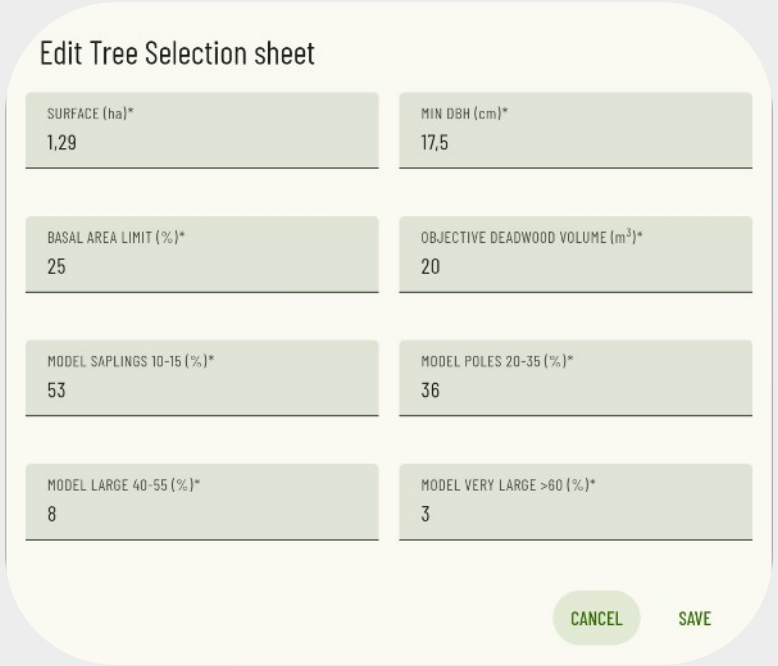




Tree marking

To start tree marking operation, tree marking model should be defined enter the following data:

- Surface
- Desired impact limit on saplings (%)
- Desired impact limit on poles (%)
- Desired impact limit on large (%)
- Target deadwood volume
- Percentages of Potential distribution for saplings, poles, large and very large categories



Based on the data entered, the tool give the number of trees that can be removed for each diametric category

Tree marking

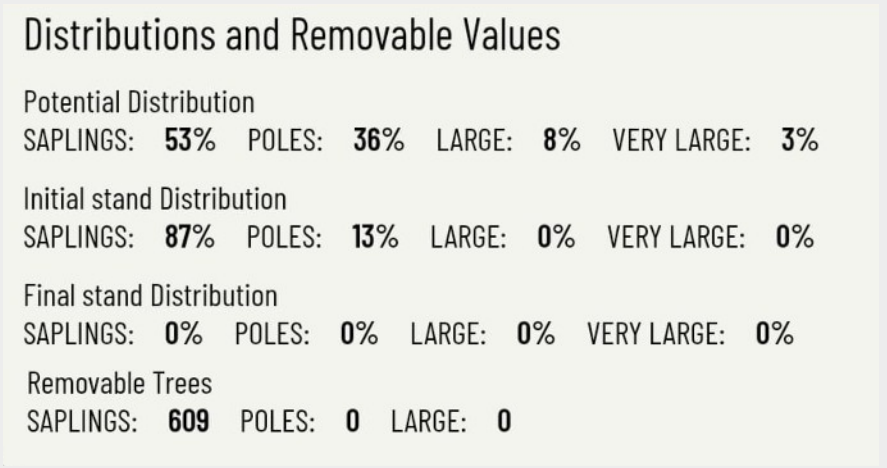
During tree marking it is possible to record data related to:

- Elite trees: DBH, species, reason for selection, potential quality (Y/N)
- Competitor trees: DBH, species, reason for selection, type of deadwood (lying/standing)
- Deadwood already present in the area of intervention: height, diameter, type (lying/standing)
-

Tree marking

During tree marking, a GPS system allows to estimate covered surface. The tool updates then the following indicators:

- n/ha
- BA/ha
- V/ha
- Mean DBH
- Mean H
- TDD (Tree Diameter Variability)
- THD (Tree Height Variability)
- Eveness index (Species diversity)
- Open areas
- Deadwood



Thank you!

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