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Life Biorgest: Forest management strategies to enhance biodiversity in Mediterranean forests

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Consorci Forestal de Catalunya

- **Who we are?** Founded in 1948, active private forest owners.

  Active member in the forest owners organization on national (COSE). And through COSE works actively in CEPF.

- **Our main goals:**

  o Promote and support SFM and forest owner's interests and property rights

  o Promoting multifunctional forest management through fostering economy and its equilibrium with environmental and social values

  o Contribute to the improvement of competitivity along the forest value chain

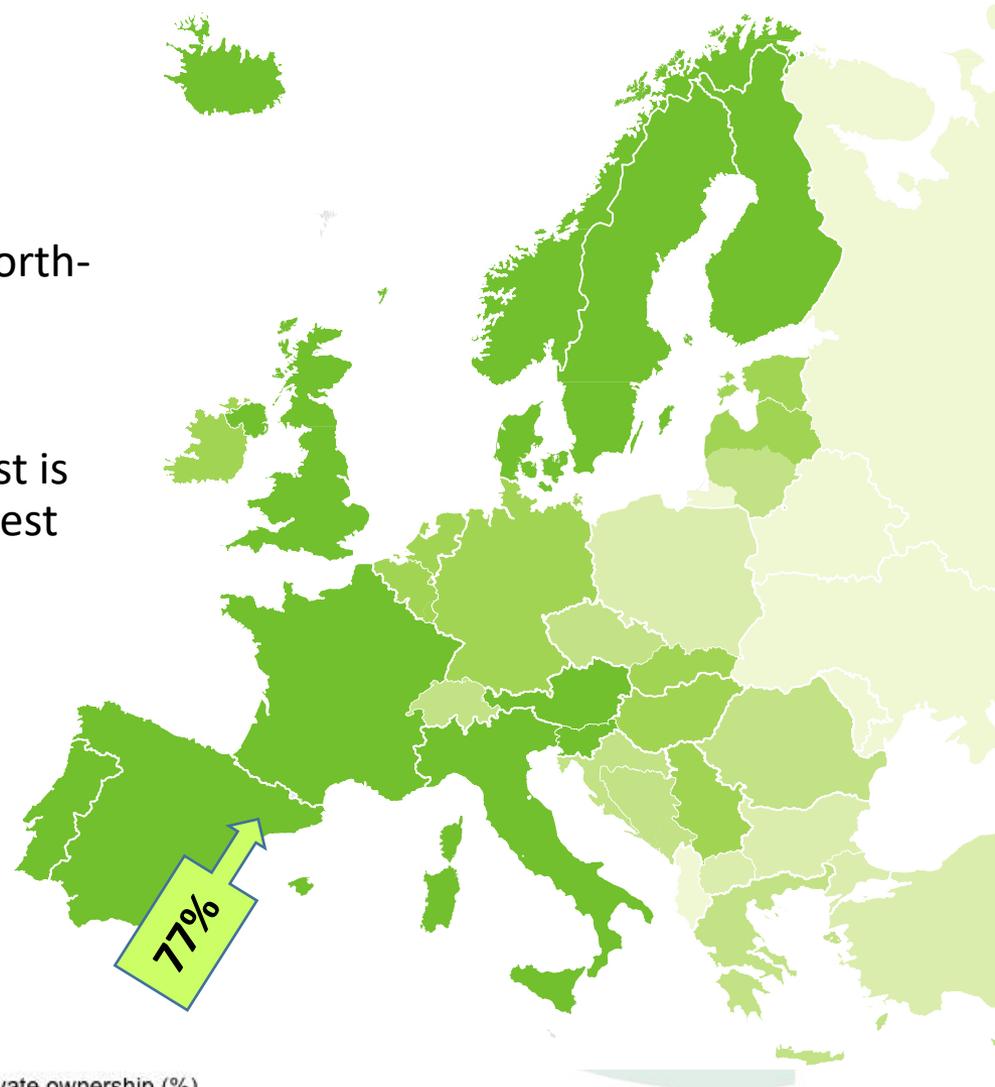 o Strength forest owner's capacity building: training, innovation, advice, …

- **Activities:**

  o lobbing, communication, technical advice and support, capacity building, active collaboration with administration and I+D+I institutions → Life Biorgest project.
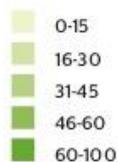
The catalan territory

- Catalonia is an extended region in the north-east of Spain. 3 M Ha on a total surface.

- More than 64% of the territory is forest.

- 73% of the property of the forest is forest is private, counting more than 220.000 forest owners.

- A ¼ part of this forest is certified (PEFC or FSC)

- Variability of landscapes and uses

- Annual fellings represents 20% of natural growth

77%

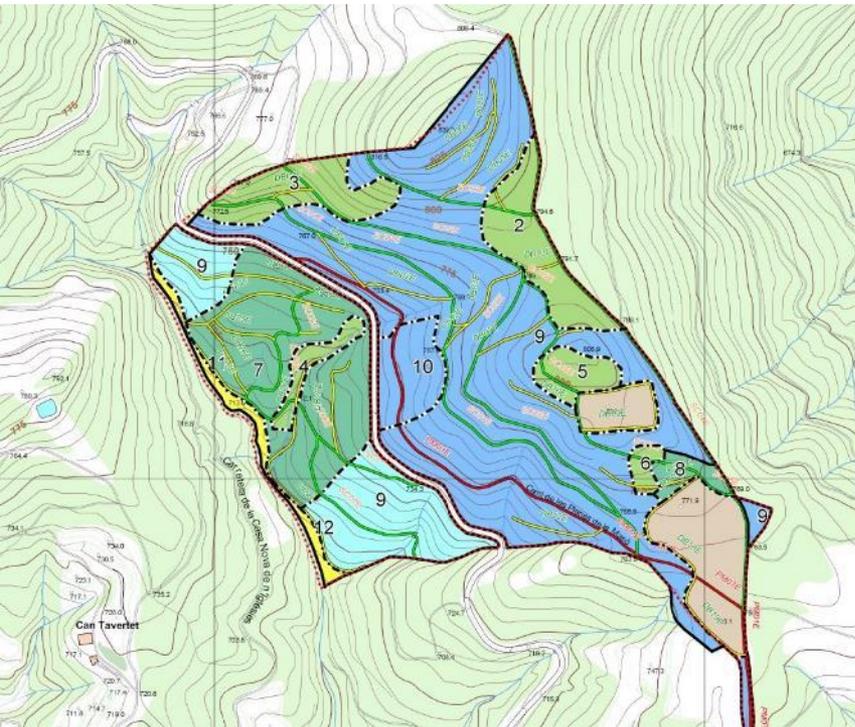Private ownership (%)

- 0-15
- 16-30
- 31-45
- 46-60
- 60-100

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Forest management instruments in Catalonia

Currently, **32% of Catalonia's forest area** is managed under different forest management instruments.

The plans have to be written by forest engineers and signed by the forest owner.

Delimitation of stands (minimum inventoriable unit) on the basis of:

1) The different forest typologies and the structure of each stand.
2) The preferential objective(s) of the stand.

This regulation also establishes the need to request reports on the adequacy of management and possible impacts **on protected areas or areas of faunistic or floristic interest**.
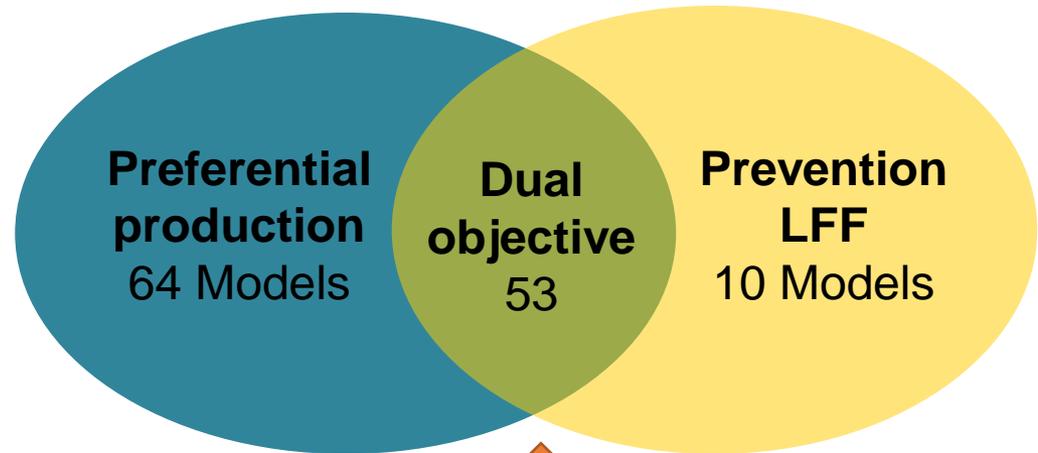
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Stand-Scale Guidelines

Regional Sustainable Forest Management Guidelines (ORGEST)

**142 reference models
29 tree species**

Pure and mixed forests

Regular, irregular and semi-regular structure

Preferential production
64 Models

Dual objective
53

Prevention LFF
10 Models

Integrating biodiversity into forest management

Integrating biodiversity conservation into forest planning and management. Why?

- Consensus on the importance of preserving biodiversity in Mediterranean forests (**EU Biodiversity Strategy**).
- **Climate change context + Mediterranean región.**
- **Biodiversity = Resistance**
- Lack of consensus on what measures should be implemented to enhance biodiversity.

  To integrate biodiversity measures into forest management, we need:

  - Objective indicators
  - Technical practices and guides

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LIFE BIORGEST 2018-2023

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Innovative forest management strategies to enhance biodiversity in Mediterranean forests.

Incentives & Management Tools

Coordinating Beneficiary: Consorci Forestal de Catalunya (CFC) – Private Forest Owners Association

Associated Beneficiaries: CNPF, CPF, CREAF, CTFC, XCN

Cofinancers: Life program and regional forest and conservation administrations

Main objective of the project

To **improve the biodiversity** of the Mediterranean forest through the **integration of specific measures and innovative practices** into forest planning and management instruments, and through new **financing and compensation mechanisms**.

The aim is to make **biodiversity enhancement compatible with the economic sustainability of forest management**, guaranteeing the persistence of the stands and their adaptation to climate change.

Let's valorize Sustainable Forest Management in terms of biodiversity conservation and improve techniques to face a challenging future.

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Specific objectives

1. **To improve the biodiversity of the most representative Mediterranean forests**, making their environmental and socio-economic values compatible and fostering their capacity to adapt to climate change.

2. **To demonstrate the applicability of innovative forest management measures through fieldwork**, the effect of which is defined in detail during the project.

3. **To develop new measures for enhancing forest biodiversity**:

(i)   forest management models and manuals, including forestry concepts close to nature and criterion for preparing and establishing naturally evolving areas

(ii)   (ii) the development and adaptation of a Potential Biodiversity Index adapted to the Mediterranean forest

4. **To develop innovative financing mechanisms** to remunerate forest owners for loss of income caused by the implementation of practices to encourage biodiversity.

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Specific objectives

5. **To integrate the developed measures into regional policies and regulations** governing Mediterranean forest management:

(i) forest ordinance instruments

(ii) guidelines for sustainable forest management.

6. **To pass on the developed techniques, indicators and measures to the main actors involved in forest management** (owners, managers, forest administration, enterprises) in order to further their adoption.

7. **To raise awareness among society** of the importance of enhancing biodiversity through sustainable and multifunctional forest management, preventing rural abandonment and fostering dynamic forests capable of generating ecosystem services (renewable products, recreation, landscape, soil and water protection, carbon storage) and providing habitats for a resilient and diverse ecosystem.

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Where?

Mediterranean forest habitats of community interest included in Natura 2000 Network. 28 stands (8 ha/stand)

- *Pinus halepensis*
- *Quercus ilex*
- *Quercus pubescens and Q. canariensis*
- *Quercus suber*

How?

Integrating

KEY elements

managed forest

Natural dynamics
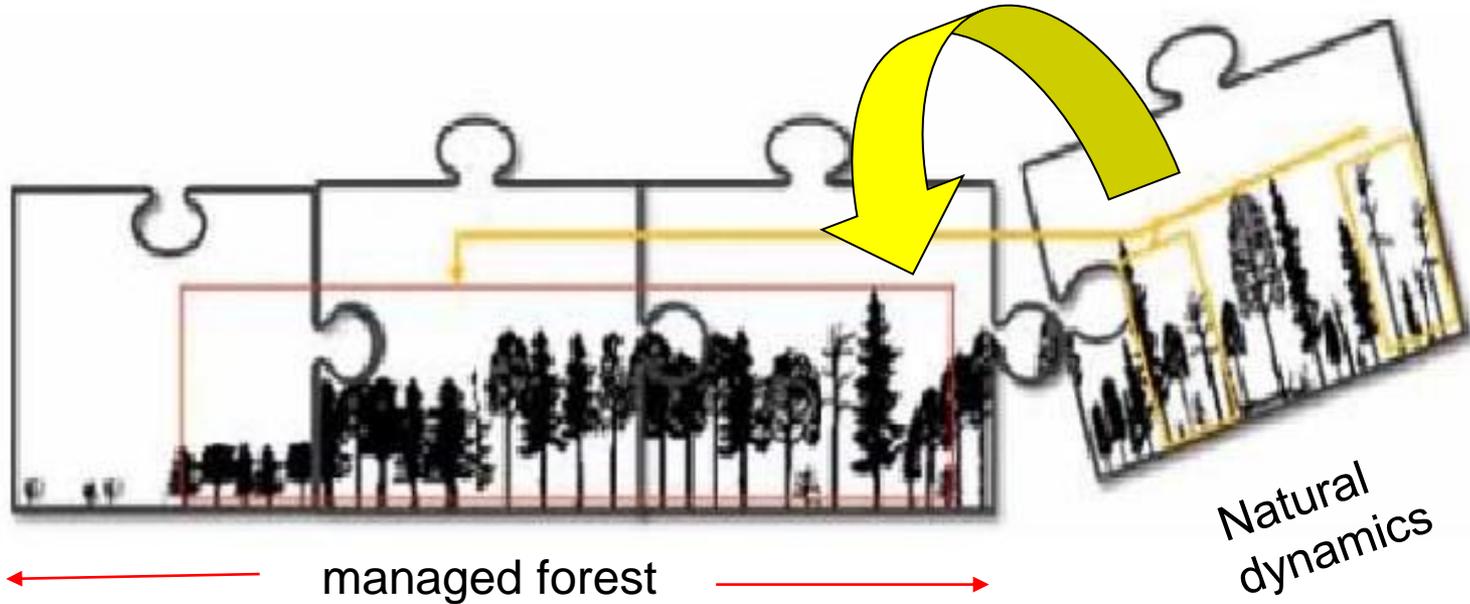
Kraus D., Krumm F. (eds) (2013). *Integrative approaches as an opportunity for the conservation of forest biodiversity*. European Forest Institute. 284 pp.

Actions

A. Preparatory actions

Defining and aligning baseline biodiversity indicators; making an initial diagnosis of each stand, designing conservation measures and forestry interventions.

B. Compensatory measures for landowners by way of use rights.

C. Conservation actions

Innovative management models for improving biodiversity and preparing for natural dynamics in Mediterranean forests dominated by *Quercus ilex, Quercus pubescens/faginea* and *Pinus halepensis*; the application of the Potential Biodiversity Index and specific conservation measures; and the integration of biodiversity enhancement measures into regulations and policies governing the management of Mediterranean forests.

Actions

D. Monitoring actions

The evaluation of the areas concerned from the perspective of forestry, biodiversity and other ecosystem functions; socioeconomic evaluation of the project as well as its progress; and economic valuation of the implementation of measures for the improvement of biodiversity and the design of compensation mechanisms for owners.

E. Communication actions, especially those related to the transfer of knowledge and technology, aimed at:

owners, specialists and managers, authorities, local politicians and society in general (at local, regional, national and international levels).

Website, conferences and communications, an informative video; and the drafting of articles and the publishing of technical documents (4 guides, 1 manual and cards related to PBI).

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Life Biorgest: our experience of how to reconcile forest management with biodiversity conservation

1. Initial diagnosis

2. Management alternatives

Regional Sustainable Forest Management Guidelines (ORGEST) --
Current
- 142 FMG
- 29 forest types

Menú de MODELS de gestió per a masses pures de roure martinenc					
Qualitat d'estació	Risc d'incendi	Estructura	Objectiu preferent	Característiques del model	
Qh_A	Baix o alt	Regular	Producció de llenyes	Torn curt	Qh01
			Augment de la resistència al foc. Producció a llarg termini de llenyes	Torn llarg	Qh02
			Producció de fusta de qualitat	Torn llarg	Qh03
	Baix	Semiregular	Producció de llenyes	Per claps/ bosquets petits	Qh04
Qh_B	Baix o alt	Regular	Producció de llenyes	Torn curt	Qh05
			Augment de la resistència al foc. Producció a llarg termini de llenyes	Torn llarg	Qh06
	Baix	Semiregular	Producció de llenyes	Per claps/ bosquets petits	Qh07
Qh_A Qh_B	Baix o alt	Regular	Gestió estructural amb objectiu de producció de llenyes, prevenció d'incendis i ús de pastures	Torn llarg	Qh08

2. Management alternatives

Close-to-nature silviculture. Principles:
- Canopy maintenance
- Individual evaluation of tree's functions
- Production of less trees, but with higher value
- Natural regeneration
- Structure and composition heterogeneity
- Reduction of the actuation's intensity

Next guidelines to add ORGEST

Stand characteristics	Priority goals	Guideline
Homogeneous, young	Boost free growth of best trees	GN1
Homogeneous, adult	Boost natural differentiation and improve initial continuous regeneration	GN2
Homogeneous, mature	Boost scaled regeneration by heterogeneous patches	GN3
Heterogeneous, decapitalized	Boost education of best trees and regulate continuous regeneration	GN4
Heterogeneous, capitalized	Regulate continuous regeneration and boost free growth of best trees	GN5

3. The Potential Biodiversity Index

INDIRECT ASSESSMENT OF THE BIODIVERSITY CAPACITY OF A STAND, based on structural variables and knowledge of the relationships between these and the fauna they host

IDENTIFIES 10 KEY STRUCTURAL FACTORS FOR BIODIVERSITY
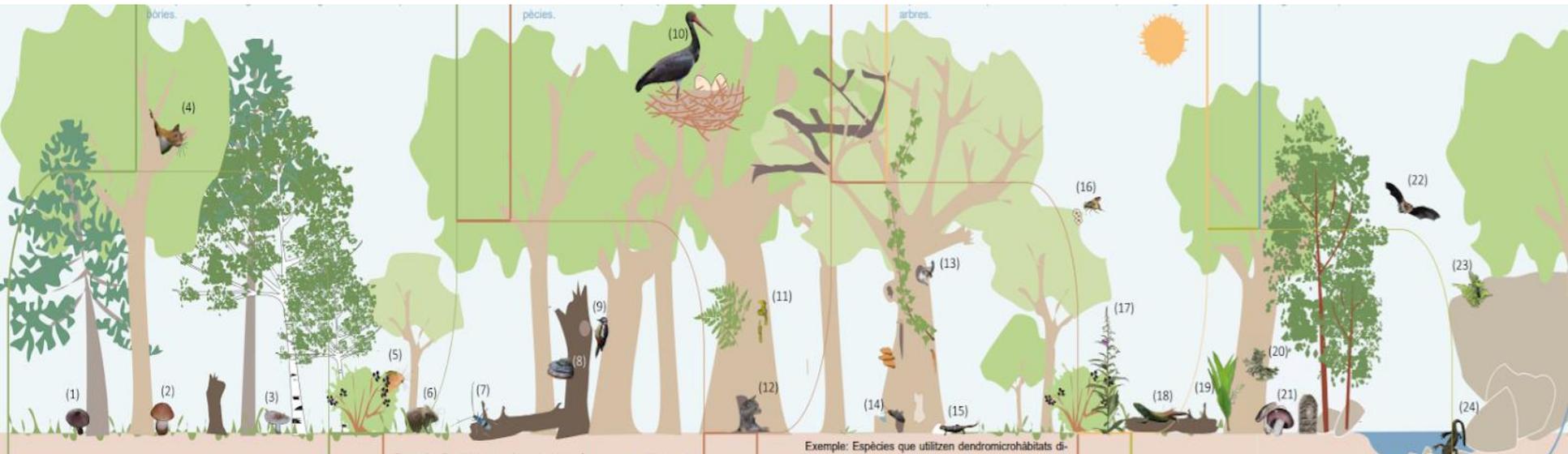
Potential Biodiversity Index
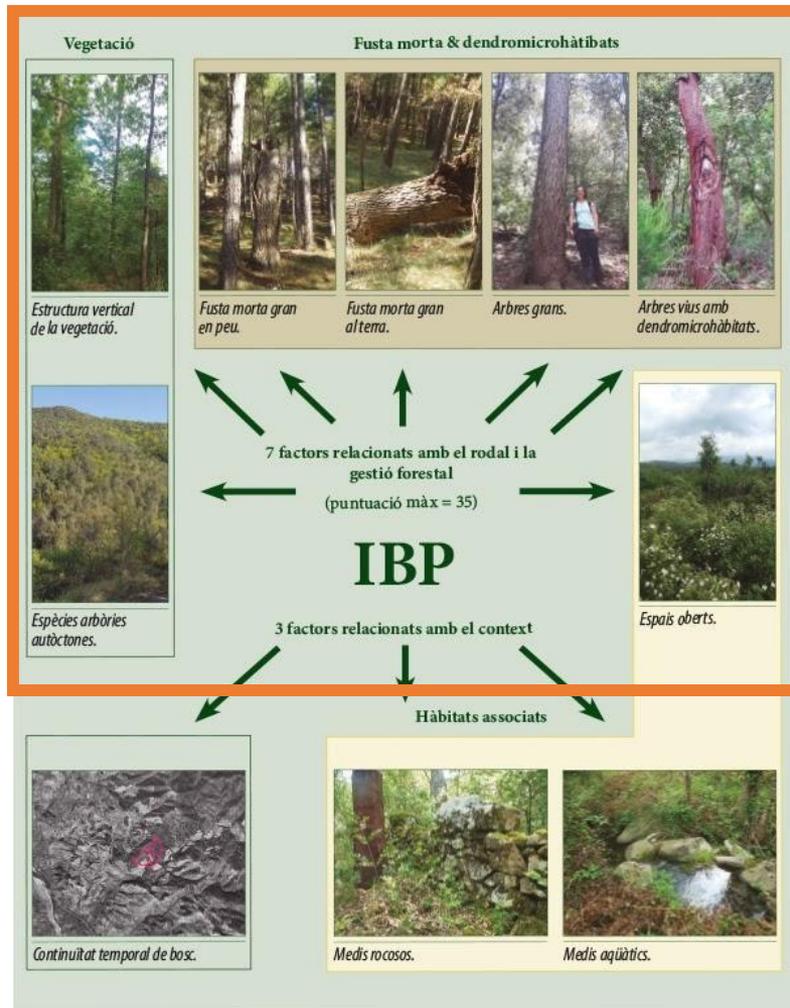
7 related to **Management**

- Vertical structure
- Autochthon species
- Dead wood (standing)
- Dead wood (aboveground)
- Large trees
- Dendromicohabitats
- Open areas

ASSESSMENT OF THE STATE OF EACH FACTOR (establishes thresholds) 0 - 1- 2 - 5

Potential Biodiversity Index
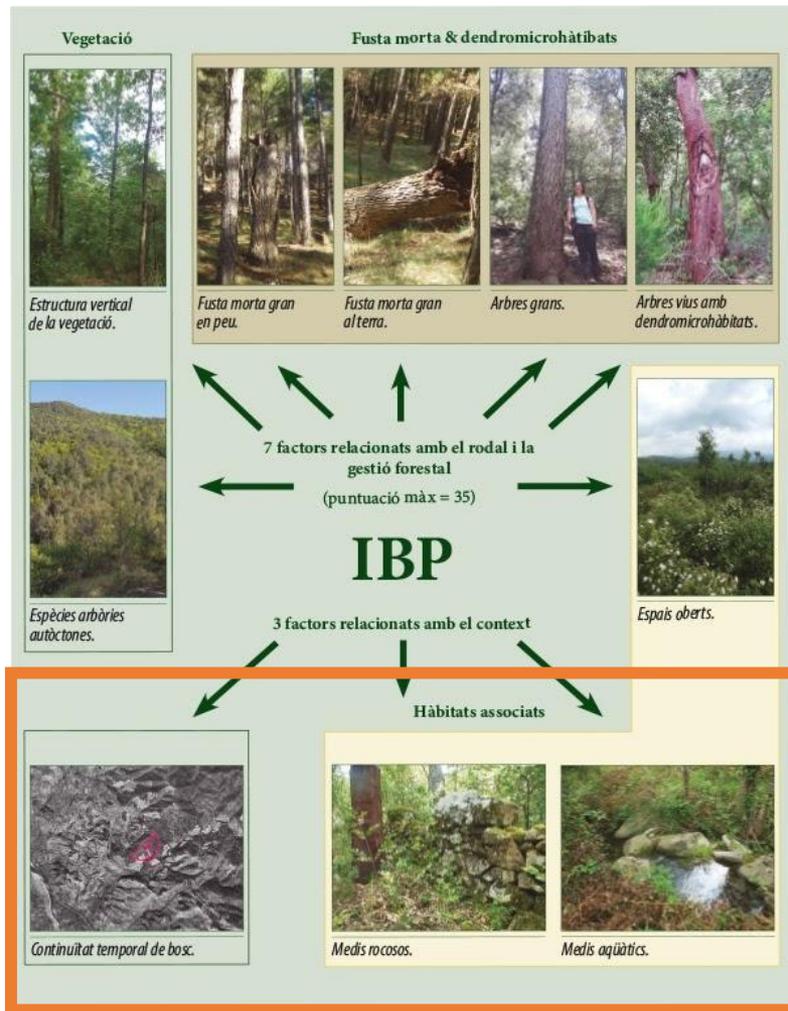
10 FACTORS

3 related to **Context**

- Temporal continuity
- Rocky habitats
- Aquatic habitats

ASSESSMENT OF THE STATE OF EACH FACTOR (establishes thresholds) 0 - 1- 2 - 5

More than 10 years of work with a broad scientific basis

- **2008: France: Creation (CNPF)**
- **2012: IBP – Catalonia** (Programme coordinated by the CPF)
- **2018 – 2022: International harmonization and validation**

International expert committee

Rapid diagnosis by non-experts
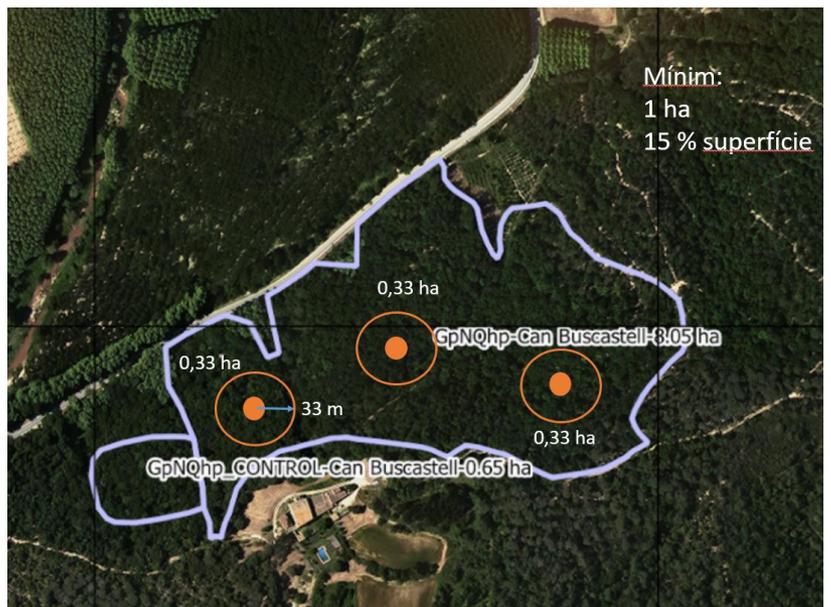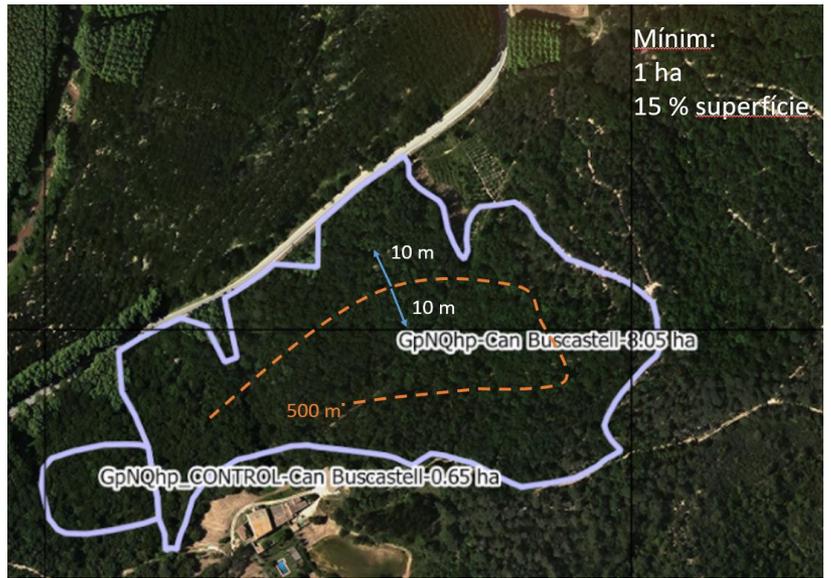
Native species diversity

A – Espècies autòctones	**Espècies arbòries autòctones presents**, individus vius o morts de h > 50 cm, de la llista següent: *Abies* / *Acer* / *Alnus* / *Arbutus* / *Betula* / *Carpinus* / *Castanea** / *Celtis* / *Cercis* / *Cupressus* / *Fagus* / *Fraxinus* / *Juglans (regia)** / *Juniperus (thurifera)* / *Malus* / *Olea* / *Pinus* / *Populus* / *Prunus* / *Pyrus* / *Quercus de fulla caduca* / *Quercus de fulla perenne* / *Salix* / *Sorbus* / *Taxus* / *Tilia* / *Ulmus*	**0:** 0 o 1 gènere **1:** 2 gèneres **2:** 3 o 4 gèneres **5:** 5 gèneres o més
* Espècies naturalitzades	**FCC del conjunt de les espècies autòctones al rodal:** < 50 % o ≥ 50 %	Si Fcc **< 50 %: puntuació = 2**

> 15 m

< 15 m

Vertical structure

2

< 5 m

< 1,5 m
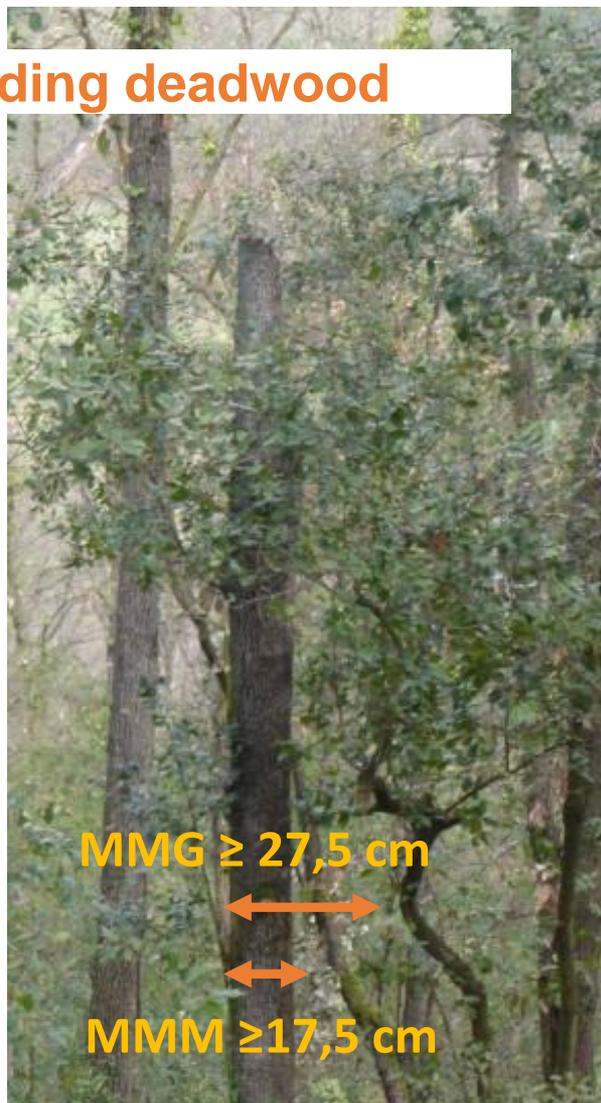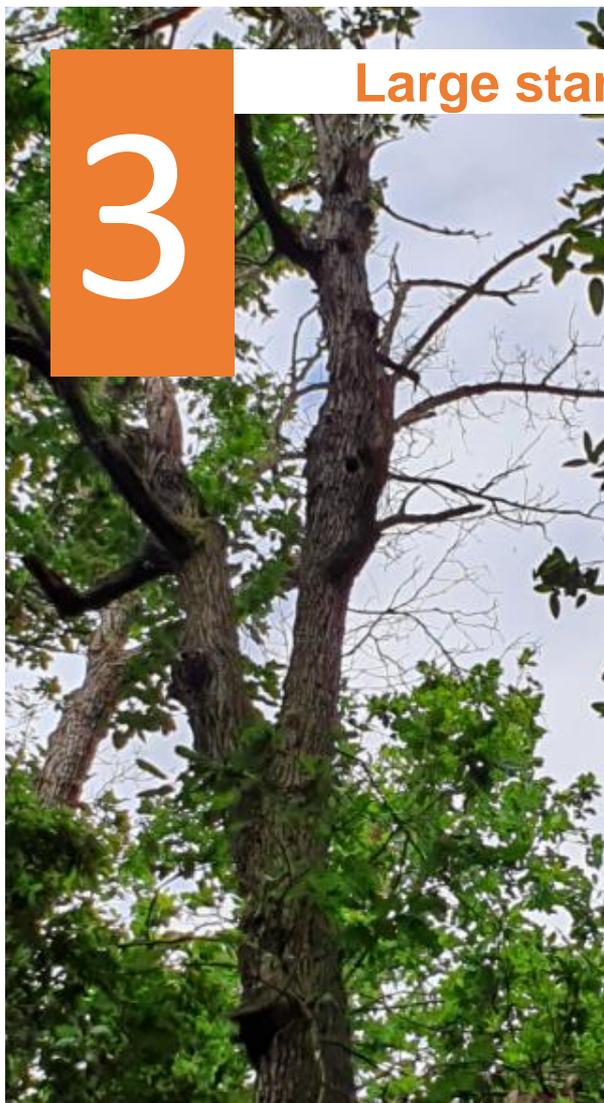
Estrats presents ≥ 20 %:
. Estrat herbaci i semillenyós (vegeu la llista a l'annex III, «Protocol») = √
. Llenyós, estrat ocupat pel fullatge   Molt baix (< 1,5 m) = √
                                                                        Baix (1,5-5 m) = √
                                                                        Intermedi (5-15 m) = √
                                                                        Alt (> 15 m) = √

0: 1 estrat
1: 2 estrats
2: 3 o 4 estrats
5: 5 estrats

Large standing deadwood

3

MMG ≥ 27,5 cm

MMM ≥17,5 cm

≥ 1 m

Fusta morta (FM) d'alçària ≥ 1 m
- **Nombre de FM gran (FMG) D > 27,5 cm =** ‖‖
- **Nombre de FM mitjana (FMM) D: de 17,5 a 27,5 cm =** ‖

En estacions poc fèrtils i espècies de creixement lent (vern, arboç, auró, perer, pomer, servera):
D > 17,5 cm per a FMG i FMM

0: < 1 FMG/ha i < 1 FMM/ha
1: < 1 FMG/ha i ≥ 1 FMM/ha
2: ≥ 1 i < 3 FMG/ha
5: ≥ 3 FMG/ha

4 Large aboveground deadwood

MMG ≥ 27,5 m
MMM ≥17,5 cm

≥ 1 m

Fusta morta (FM) d'alçària ≥ 1 m
- **Nombre de FM gran** (FMG) **D > 27,5 cm =**
- **Nombre FM mediana** (FMM) **D: de 17,5 a 27,5 cm =** ‖‖
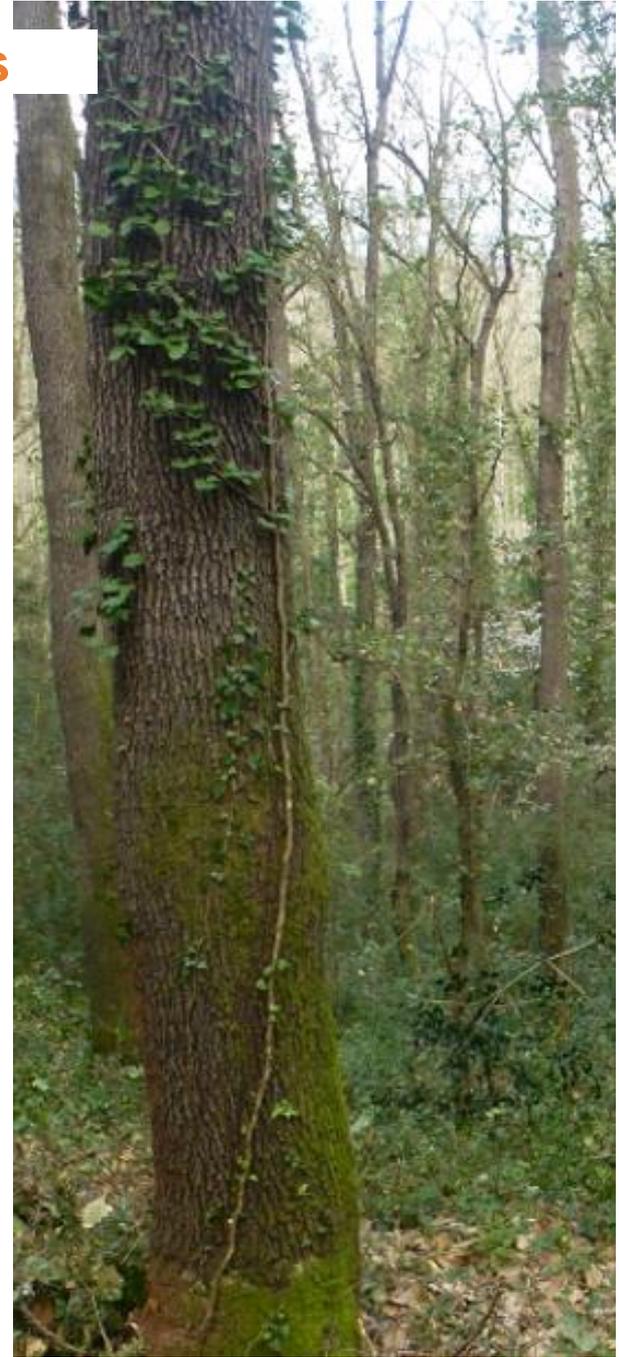
En estacions poc fèrtils i espècies de creixement lent (vern, arboç, auró, perer, pomer, servera):
D > 17,5 cm per a FMG i FMM

0: < 1 FMG/ha i < 1 FMM/ha
1: < 1 FMG/ha i ≥ 1 FMM /ha
2: ≥ 1 i < 3 FMG/ha
5: ≥ 3 FMG/ha

20–30% of the forets fauna depends on dead wood (Siitonen 2001)

Rosalia longicorn
(*Rosalia alpina*)

Great capricorn beetle
(*Cerambyx cerdo*)

Zitronengelbe Tramete
(*Antrodiella citrinella*)

Hermit beetle
(*Osmoderna eremita*)

5

AMG ≥ 57,5 cm

AG ≥ 37,5 cm

- Nombre d'arbres molt grans (AMG) **D > 57,5 cm** =
- Nombre d'arbres grans (AG) **D: de 37,5 a 57,5 cm** = IIIII IIIII IIIII II = 17

En estacions poc fèrtils i espècies de creixement lent (vern, arboç, auró, perer, pomer, servera):
D > 37,5 cm per a AMG i AG

0: < 1 AMG/ha i < 1 AG/ha
1: < 1 AMG/ha i ≥ 1 AG/ha
2: ≥ 1 i < 5 AMG/ha
5: ≥ 5 AMG/ha

6

Lista europea de Microhábitats (Larrieu, Pallet, Winter *et al*, 2018)

Open areas with flowering species

Espais oberts amb **vegetació florícola**, permanents o temporals

. **Obertures o clarianes** – superfície (m²) × % esp. flors =

. **Zones poc denses** – superfície (m²) × % esp. flors =

. **Espais oberts de vora** – longitud (m) × 2 m amplada (m²) = sup. (m²) x % esp.flors

Superfície total (m²) =

60 m² (0,6%)

0: 0 %

2: < 1 % o > 5 %

5: d'1 a 5 %

Results

	Factores	scoring	Total IBP parcial	Total IBP global
Management	A- Native species diversity	5	24 (69%)	29 (58%)
	B- Vertical vegetation structure	5		
	C- Large standing deadwood	5		
	D- Large aboveground deadwood	1		
	E- Large living trees	1		
	F- Living trees with dendromicrohabitats	5		
	G – Open areas with flowers	2		
Context	H- Temporal continuity of the forest	5	5 (33%)	
	F- Aquatic habitats	0		
	G – Rocky habitats	0		

Guidance on where to pay more attention (e.g. rare MH,...)

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4. Design of conservation measures and forestry interventions

- **Measures favouring structural (vertical and horizontal), species, and genetic diversity**

Favour accompanying or sporadic tree species.
Encourage the presence of floriferous and fleshy fruit-producing species.
Favour individuals from seed
Favour the presence of several strata of vegetation: selective clearing and maintenance of trees in regeneration cuts.

- **Retention and promotion of key elements in felling and cl**

Protected species
Large trees
Standing dead trees and dead wood on the ground (excep
Live trees with dendromicrohabitats(MH)

- **Generation of standing and ground dead wood (medium and/or large).**

At each action, in any stand? To be decided depending on the objective and the amount of existing dead wood, estimated by PPI diagnosis, the stage of the forest and the context.

4. Design of conservation measures and forestry interventions

Forestry interventions

STAND	ESTATE	MANAGEMENT GUIDELINE + BIODIVERSITY INTEGRATION	FOREST ACTION	DESCRIPTION	STAND PARAMETRES		
					Tree cover%	trees/ ha	BAe %
GOQhp	Can Casas	QhQii1 (Qh06) + IM	Selective thinning	Corta del 25% del AB del conjunto del rodal, dejando una densidad final entre 600-700 pies/ha.	75	600-700	25
			Selective shrub clearing	Se elimina el matorral con altura >1,3 m por la base y el resto del matorral hasta una cobertura próxima al 30%. El desbroce se concentra en zonas de continuidad vertical con las copas de los árboles. Se realizará de manera selectiva manteniendo los pies de acebo, álamo temblón, cerezo, tilo, etc.	30	np	np
			Dead wood generation	Valorar mantener un algún roble de CD 20 o superior cortado sin desemboscar en la parcela	El factor con valor IBP más bajo es la presencia de árboles grandes (valor 1 IBP). Como el rodal ya tiene un nº importante de árboles muertos en pie y en suelo (valor 2 IBP) y no hay apenas pinos de CD 20, no se propone anillado.		
			Key elements to retain	Se respetarán los pies de roble dominantes y de mayor tamaño y las especies acompañantes, así como una presencia significativa de pinos. En el desbroce se mantendrán un número significativo de lianas.			

Other Conservation measures

special shelter boxes for bats

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How and when can it be interesting to use PBI?

1 Pedagogical use - aware...

2 Diagnosis for planning / forest action

3 Assess impact of forestry actions

Conservation measures agreed in the BIORGEST project

**Objective:
To conserve and enhance forest biodiversity (ordinary).**

Any model of sustainable forest management (SFM) integrating conservation criteria:

1. **General criteria:** defined on the basis of existing knowledge and agreed by the project partners.

2. **(Specific criteria according to forest formation:** Holm oak (HIC9340); Aleppo pine (HIC9540), Sub-Mediterranean oak (HIC9240)).

Integration of the criteria in the description of the silvicultural action (itinerary) based on the silvodasometric diagnosis and the PBI.

Thank you for your attention!