



Index of Biodiversity Potential (IBP): for estimating the potential of forest stands for biodiversity

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Index of Biodiversity Potential (IBP): for estimating the potential of forest stands for biodiversity

P. Gonin¹, L. Larrieu^{1,2}, M. Deconchat²



¹CNPF

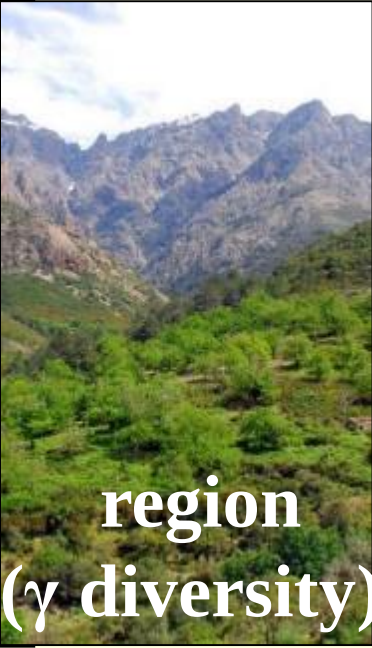
²INRA UMR Dynafor

Elaboration of IBP in 2008

❖ Context

- **need for a practical tool** to take forest biodiversity into account in daily management:
 - simple & fast tool
 - does not require taxonomical knowledge or complex measurements
 - identifying the factors which can be improved
- knowledge of **stand key features for biodiversity**

❖ Features

BIODIVERSITY	object	level		status
	 species	 stand (α diversity)	 region (γ diversity)	 common
	 habitats			 Lycopode des alpes (<i>Diphasiastrum alpinum</i> (L.) Holub)
	 genetic			 remarkable

IBP (Larrieu & Gonin, 2008):
capacity of forest stands
to support common taxonomic biodiversity
→ indirect indicator

IBP: a composite indicator

Vegetation



B - Vertical structure



C - Large standing deadwood



D - Large downed deadwood

Tree-related microhabitats



E - Very large living trees



F - Living microhabitat-bearing trees



A - Native tree species

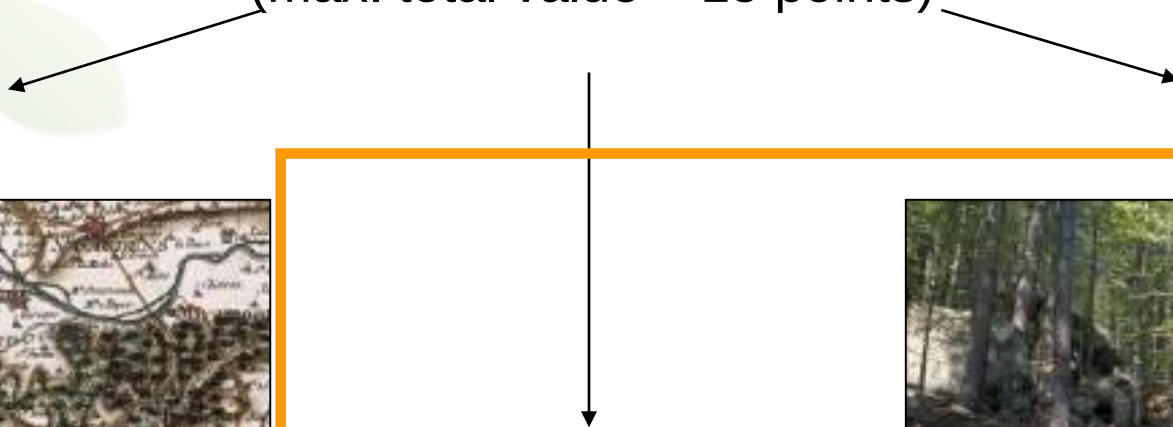
**7 factors
directly related to management**
(max. total value = 35 points)



G - Openness

Forest-associated
macrohabitats

3 factors rather concerning the context (max. total value = 15 points)



H – Continuity of
woody state



I - Aquatic habitats



J - Rocky habitats

Forest-associated
macrohabitats

Scoring system : 0, 2 or 5 for each factor

❖ Ex. factor B « Vertical structure »



4 canopy layers to be observed ($\geq 20\%$)

.for ligneous, layers occupied by foliage:

high $> 15\text{ m}^*$

intermediate $5\text{-}15\text{ m}^*$

low $< 5\text{ m}^*$

.herbaceous and semi-ligneous

(*thresholds for the Mediterranean region)

Notation:

.1 & 2 layers $\rightarrow$ score 0

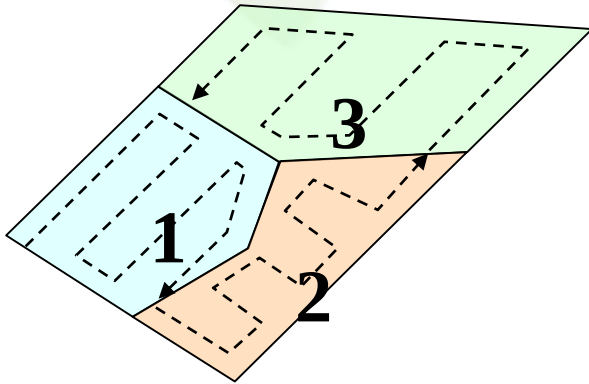
.3 layers $\rightarrow$ score 2

.4 layers $\rightarrow$ score 5

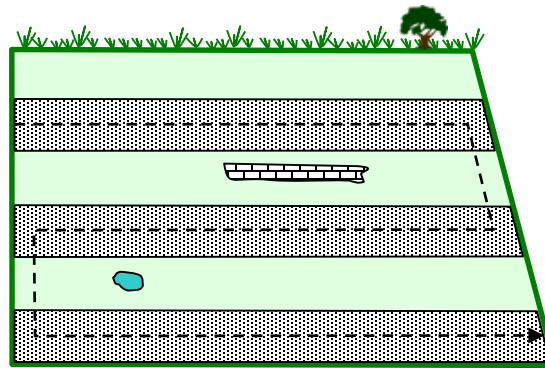
Survey methods: standardized & adapted to different contexts

Diagnose of a stand

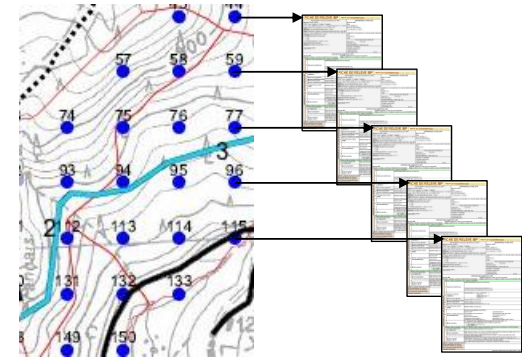
Full run



Partial run

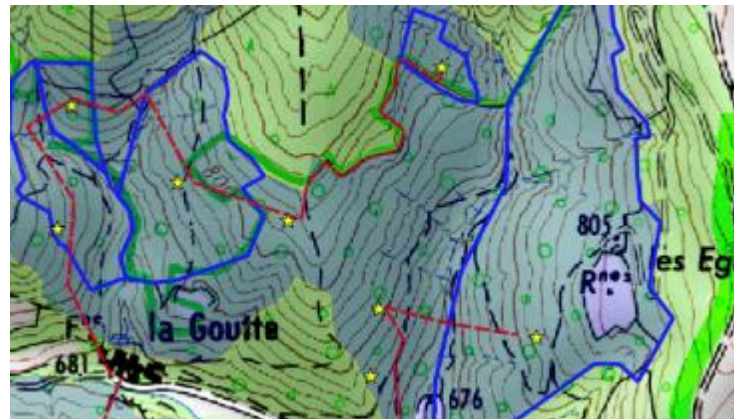


Systematic sampling run



Diagnose of stand types of or a large stand

Transect sampling



From IBP to practical recommendations

several possible recommendations
IBP ≠ management norm

IBP

?

Objectives

Forest
management

Context:
socio-economic,
regulatory framework,
type of property...

Features of the forest:
site conditions, stand,
environment, equipment...

DIVERSITÉ DES ESPÈCES EN FORÊT :
POURQUOI ET COMMENT L'INTÉGRER
DANS LA GESTION ?

Céline Emberger - Laurent Larrieu - Pierre Gonin



DIX FACTEURS CLÉS POUR LA DIVERSITÉ
DES ESPÈCES EN FORÊT

Comprendre l'Indice de Biodiversité
Potentielle (IBP)

C. Emberger
L. Larrieu
P. Gonin

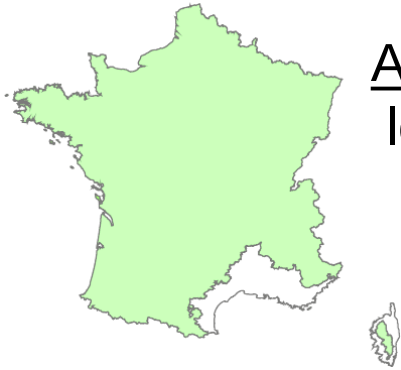
Se familiariser
avec l'Indice
de Biodiversité
Potentielle
(IBP)



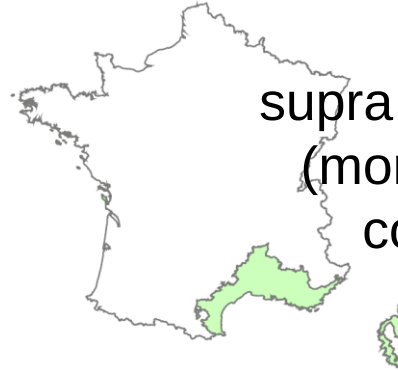
IBP: domain of validity

❖ Geographical

France: 2 versions according to the biogeographical regions



Atlantic & continental
lowland, montane &
sub-alpine levels



Mediterranean
supra + meso-Mediterranean
(montane: idem atlantic &
continental domain)

❖ Vegetation at the forest stage - from regeneration to adult stands

→ other vegetations excluded (e.g. matorral)

❖ A part of biodiversity

→ complementarity with others assessments:
naturalness, state of habitat conservation,
sustainable management...

IBP for comparison of stands biodiversity

Ex. : *Quercus Ilex* : adult stand

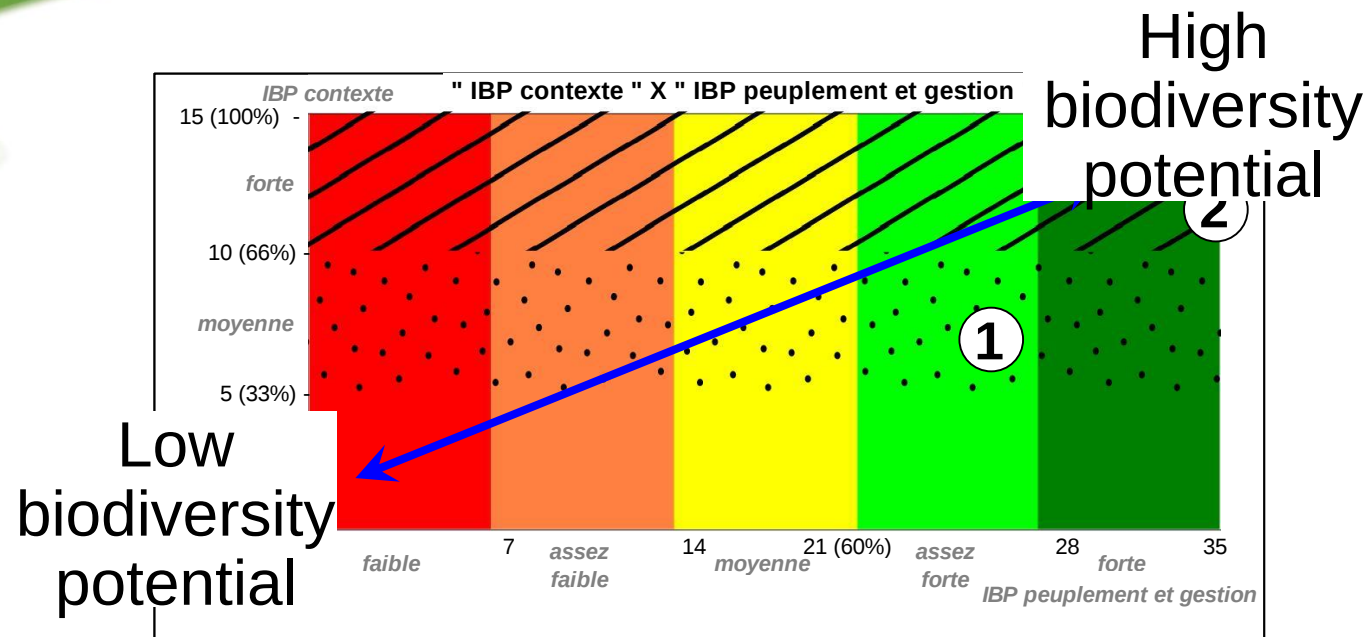
mature stand



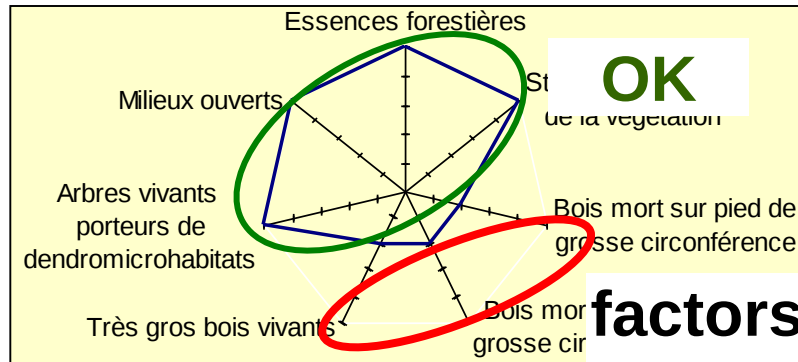
Field notation &
IBP calculation

		Management factors							Context factors			Total
		A Native tree species	B Vertical structure	C Large standing deadwood	D Large downed deadwood	E Very large trees	F Living microhabitat- bearing trees	G Openness	H Continuity of woody state	I Aquatic habitats	J Rocky habitats	
1	score	5	5	2	2	2	5	5	5	0	2	33
	IBP	74 % (26/35)							47 % (7/15)			66 %
2	score	5	5	5	5	5	5	5	5	2	5	47
	IBP	100 % (35/35)							80 % (12/15)			94 %

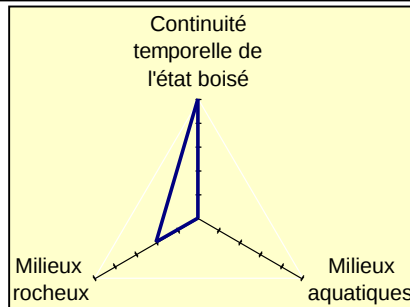
A synthetic representation helping interpretation



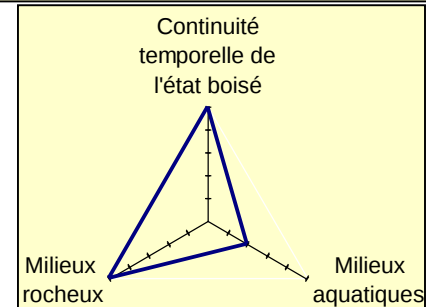
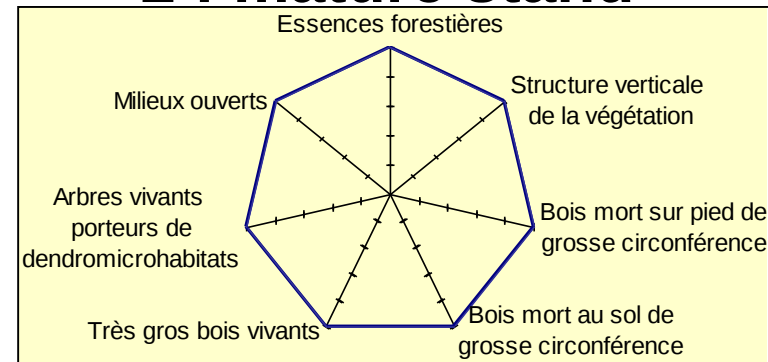
1 : adulte stand



factors to be improved



2 : mature stand



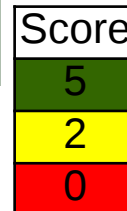
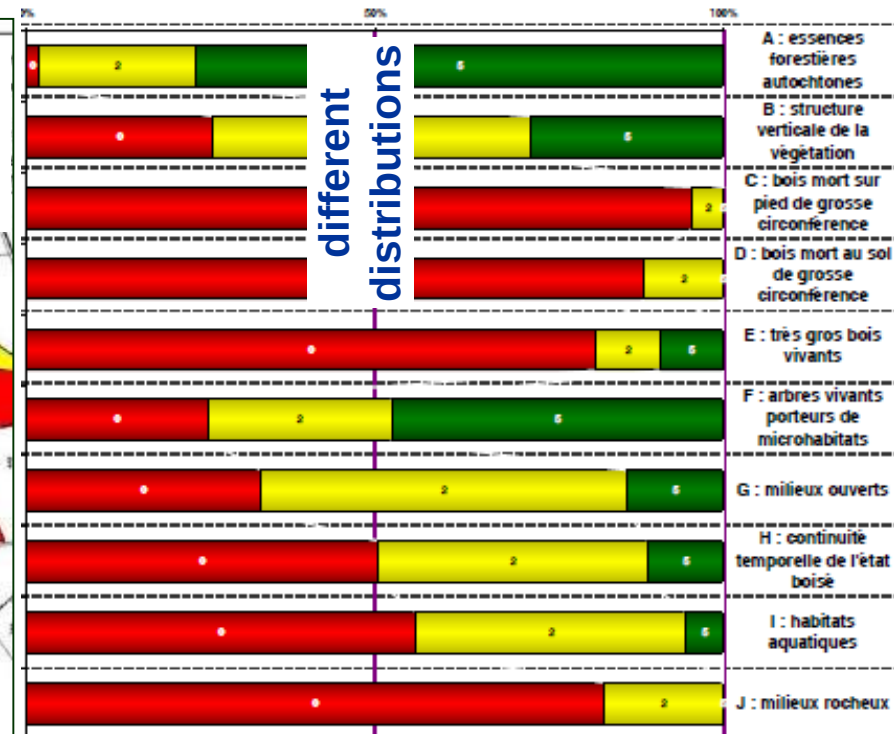
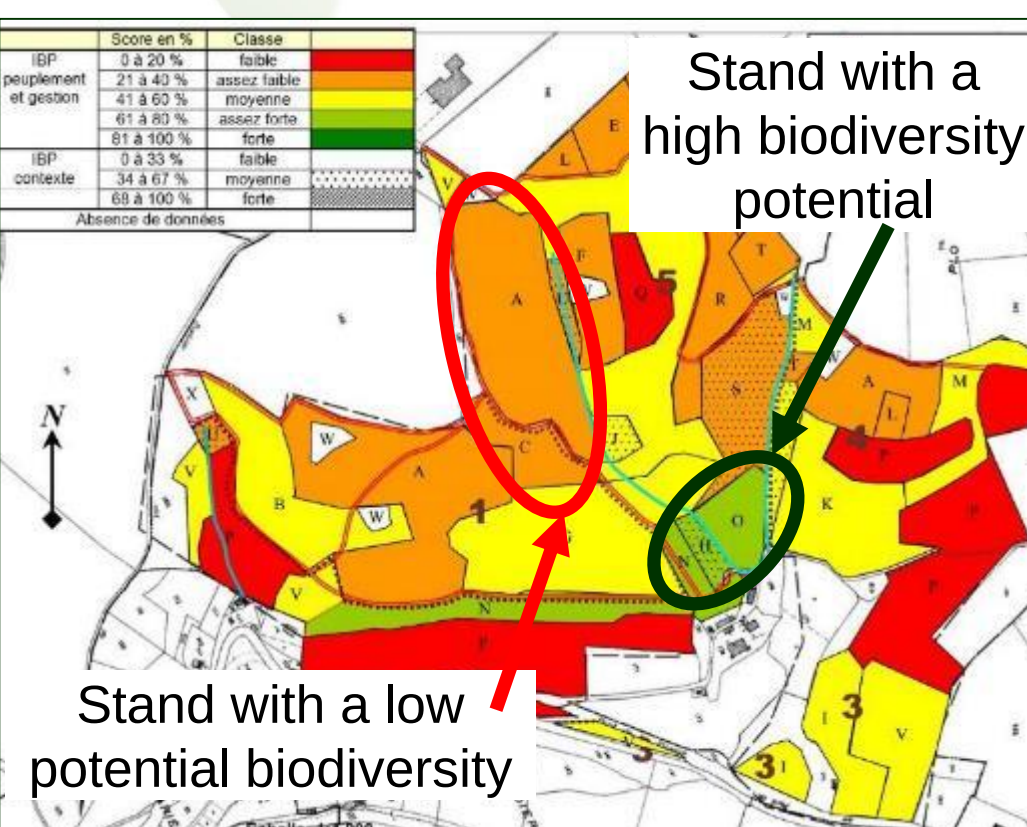
context management

IBP for a biodiversity overview at the forest level

In a small forest (55 ha)

Scores per stand

Scores per factor



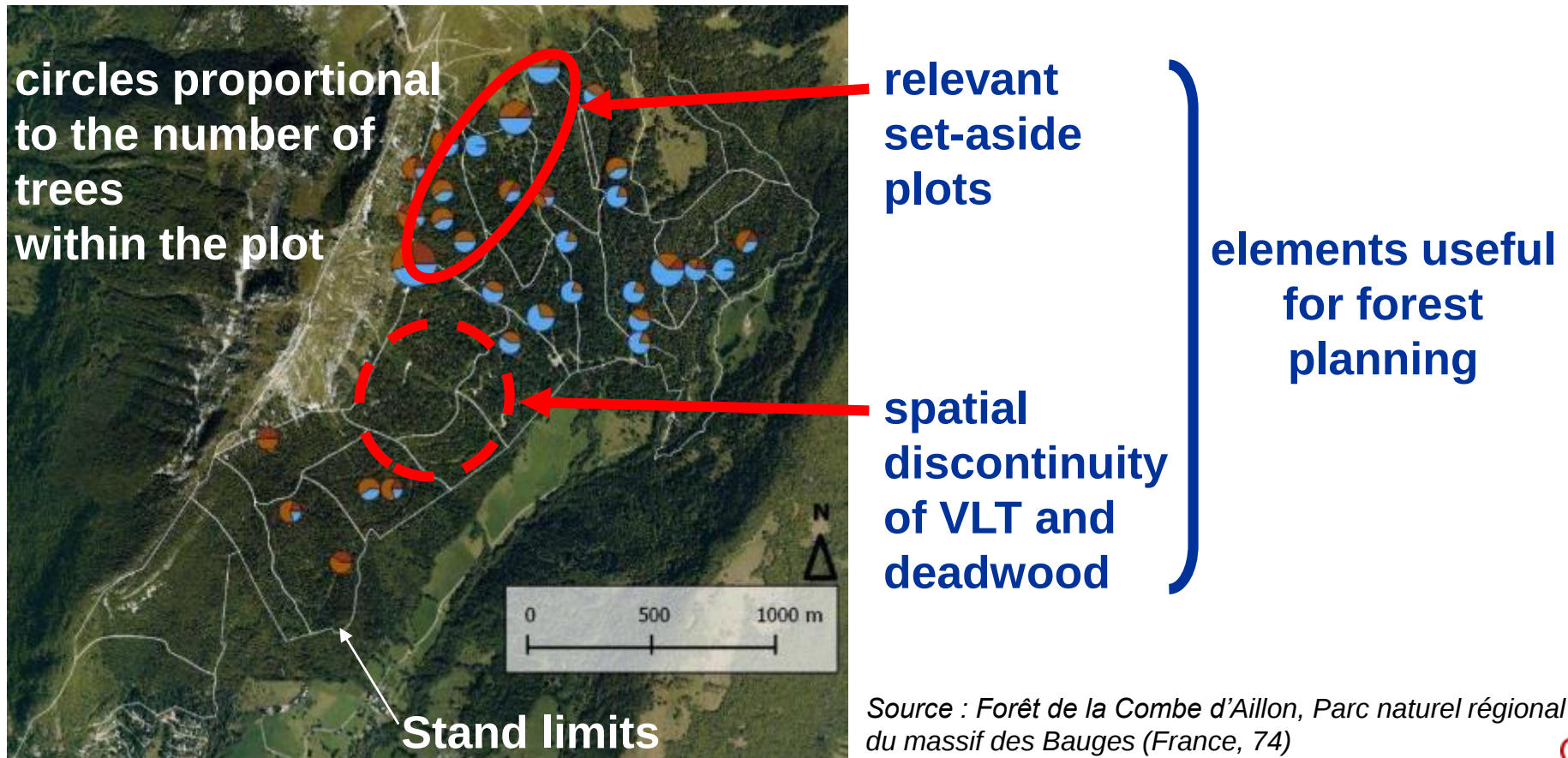
Do not calculate the IBP average!

Source : Barbazanié forest (France, 81)
CRPF Occitanie

In a larger forest (313 ha)

Systematic sampling, 1 plot / ha

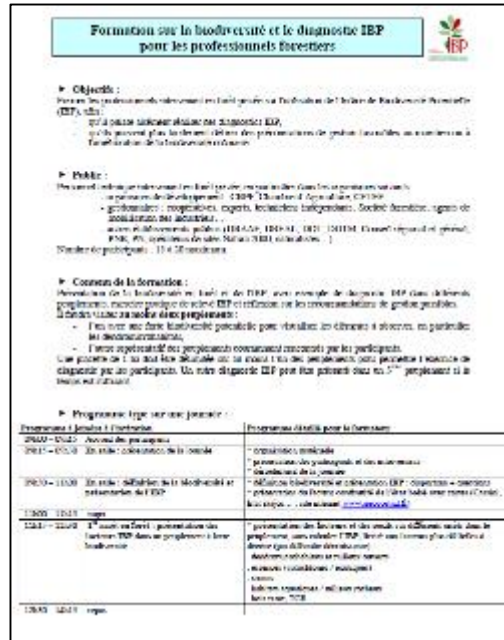
Factors : Large deadwood, standing  downed 
Very large living trees 



Source : Forêt de la Combe d'Aillon, Parc naturel régional du massif des Bauges (France, 74)

Biodiversity training & technical meetings

Training program



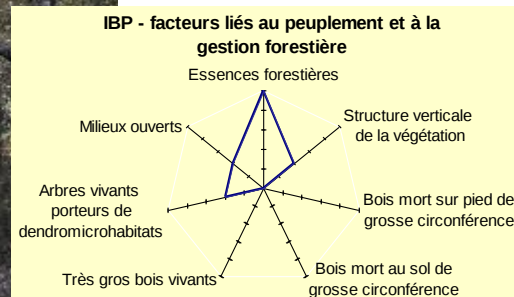
Plot in a *Quercus pubescens* stand

II

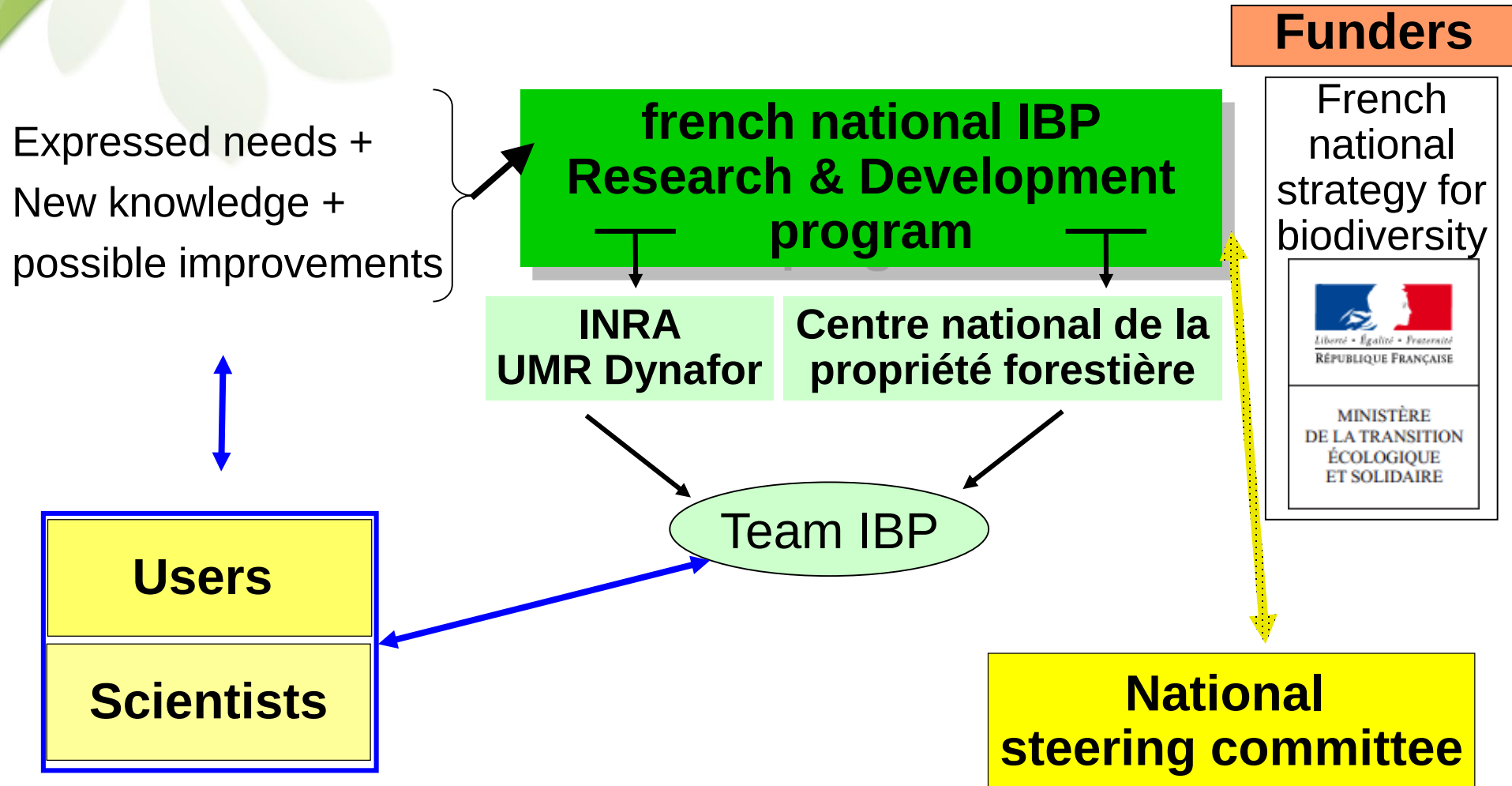
Milieu

Arbres vivants
porteurs
d'endémisme

Très gr



A co-built & evolving tool thanks to the R&D program



Current situation

❖ A recognized tool

- In France : inscribed in the french national strategy for biodiversity
- In other countries:
 - Spain: project Life BIORGEST (Catalonia)...
 - locally used in Switzerland, Belgium, Germany
 - contacts with other countries: Morocco, Algeria, Lebanon...
 - Relation with AIFM (International Association for Mediterranean Forests)

❖ Diverse and numerous users

- **production forests:** managers, forestry consultants, logging company, owners
- **areas dedicated to conservation:** national parks, regional parks, reserves...

❖ Many ways to use it

- biodiversity overview before intervention or management plan
- identification of common biodiversity issues
- territorial analysis
- educational tool



More than 2 thousand IBP

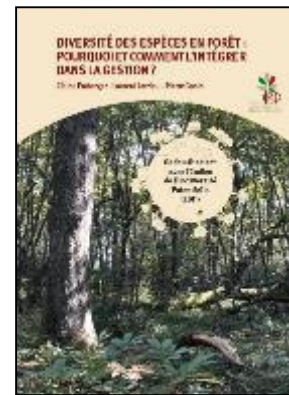
IBP in Italy?

❖ Features of the extension

- Stand, bioclimatic & site conditions similar to France: minor adaptations
- very different context: the Mediterranean version to be completed or new version
- Methodology of extension (see paper IBP 5th Med. Forest Week: Gonin, Larrieu Deconchat 2017)

❖ Goprofor project

- Translation of documents with adaptation
- Development of a training module



Thank you for your attention