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► To cite this version:

Pierre Gonin, Laurent Larrieu, Marc Deconchat. Index of Biodiversity Potential (IBP): for estimating the potential of forest stands for biodiversity. GoProFOR LIFE, Oct 2018, Florence, Italy. 19 p. hal-02787352

HAL Id: hal-02787352

<https://hal.inrae.fr/hal-02787352v1>

Submitted on 5 Jun 2020

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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



¹CNPFF



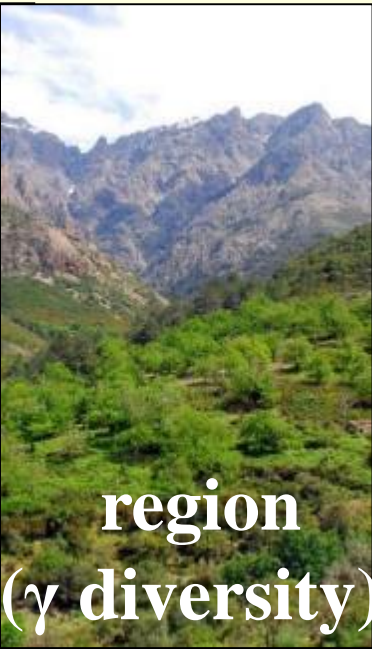




²INRA UMR Dynafor

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

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

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

→ indirect indicator

IBP: a composite indicator

Vegetation



B - Vertical structure



A - Native tree species



C - Large standing deadwood



D - Large downed deadwood

Tree-related microhabitats



E - Very large living trees



F - Living microhabitat-bearing trees

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

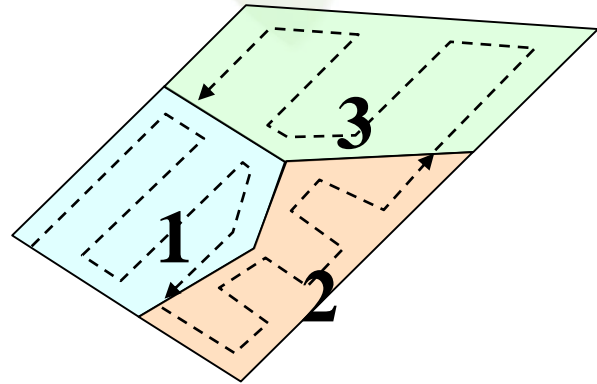
.3 layers \rightarrow score 2

.4 layers \rightarrow score 5

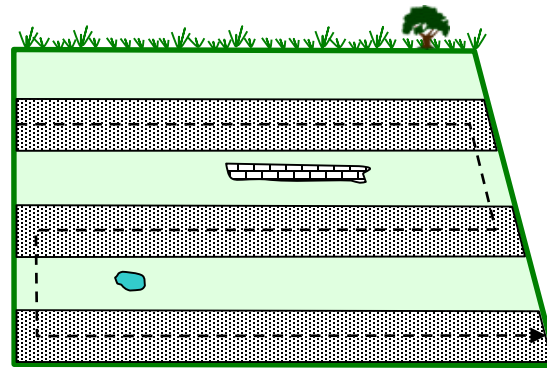
Survey methods: standardized & adapted to different contexts

Diagnose of a stand

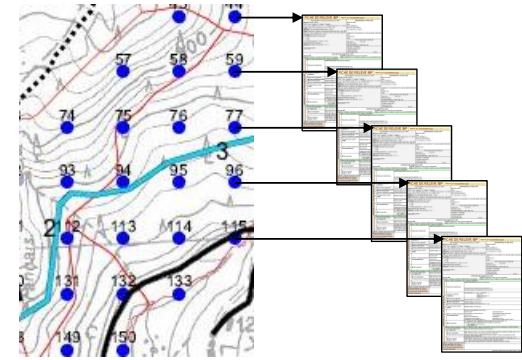
Full run



Partial run

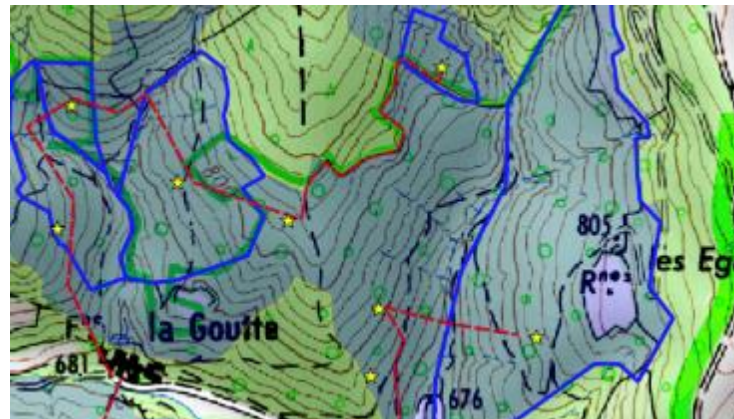


Systematic sampling run



Diagnose of stand types of or a large stand

Transect sampling



To help using the IBP method

A flyer about notation methods, Field sheet

Spreadsheet: registration & edit

Internet site

www.foretpriveefrancaise.com/ibp

The screenshot shows the website interface for 'Le Portail de la Forêt Privée'. It features a navigation menu with categories like 'ACTUS', 'LA FORÊT & SES PROPRIÉTAIRES', 'SERVICES ET FORMATION', 'LIBRAIRIE', and 'TECHNIQUES SYLVICOLES'. The main content area is titled 'IBP - INDICE DE BIODIVERSITÉ POTENTIELLE' and includes a sub-header 'Réaliser des relevés IBP'. Below this, there are several promotional cards for 'SE DOCUMENTER SUR L'IBP ET LA BIODIVERSITÉ', 'SE FORMER À L'IBP ET TESTER SES CONNAISSANCES', and 'CONCEPTION DE L'IBP - PROGRAMME R4D - CONTACTS'. Each card includes a small image and a 'Lire la suite' button.

This block contains several overlapping documents related to the IBP method. At the top left is a 'FICHE DE DEFINITION IBP - domaine méditerranéen' which lists various factors for the calculation of the index. Below it is a 'FICHE DE RELEVÉ IBP' with a 'SOMMAIRE' section listing '1 - QUELLE?', '2 - OÙ?', '3 - QUAND?', and '4 - COMMENT?'. The main body of the field sheet is divided into 'Méthodes de relevé' and 'Critères de diversité IBP'. The 'Méthodes de relevé' section includes a 'REPERES DE RELEVÉ' table with columns for 'Type de parcelle' and 'Type de relevé'. The 'Critères de diversité IBP' section lists various criteria such as 'Espèces végétales', 'Espèces animales', 'Miliers', and 'Miliers végétaux', each with a corresponding score and a brief description. At the bottom, there is a color-coded legend for the index values.

This block displays a spreadsheet and a map. The spreadsheet is titled 'Indice de Biodiversité Potentielle' and is organized into columns for 'IBP - Forêt de grande', 'IBP - Forêt de moyenne', and 'IBP - Forêt de petite'. It contains a grid of data points for various forest plots, with rows representing different plots and columns representing different criteria. Below the spreadsheet is a map showing the geographical distribution of the plots, with a color-coded legend indicating the IBP index value for each plot. The map also includes a scale bar and a north arrow.

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

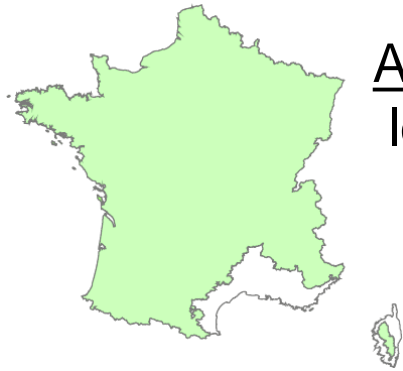
Se familiariser
avec l'Indice
de Biodiversité
Potentielle
(IBP)



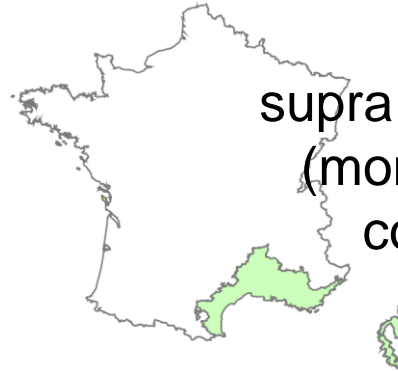
IBP: domain of validity

❖ 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

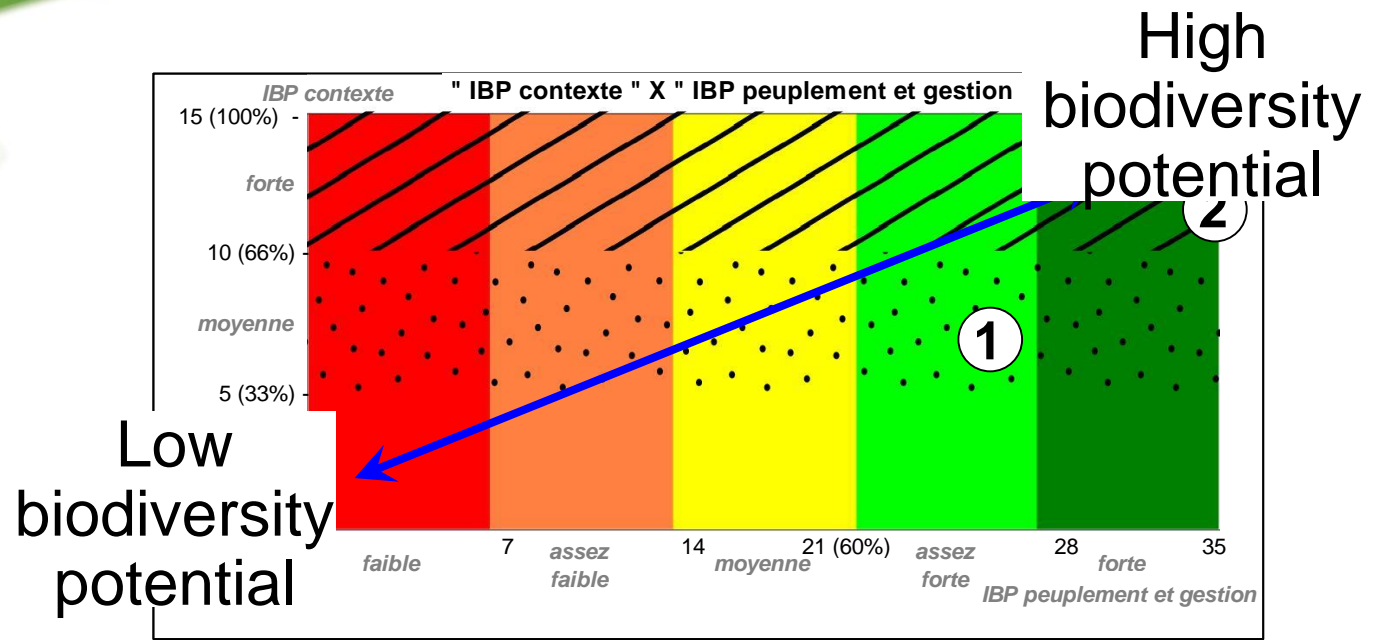
mature stand



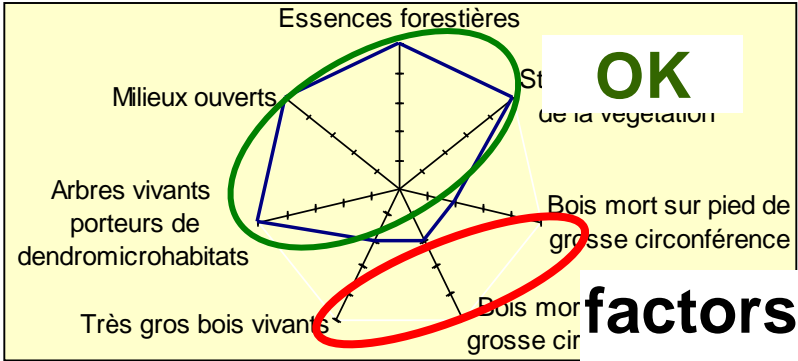
Field notation & IBP calculation

		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 %

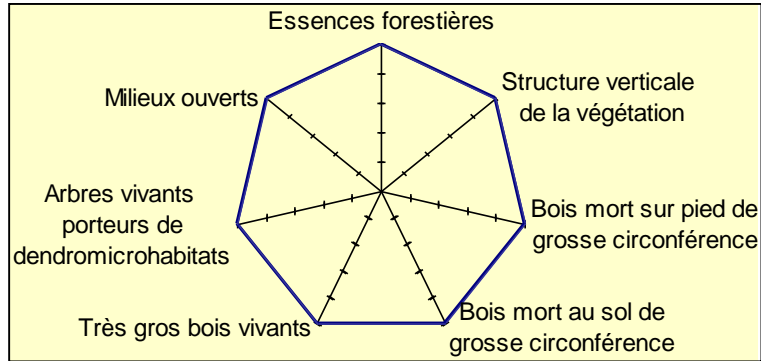
A synthetic representation helping interpretation



1 : adulte stand

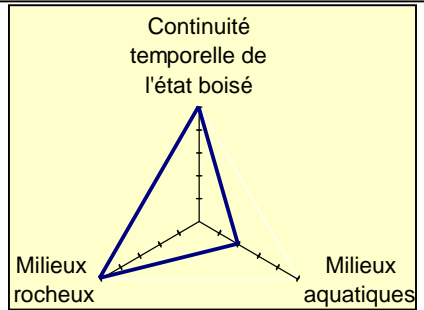
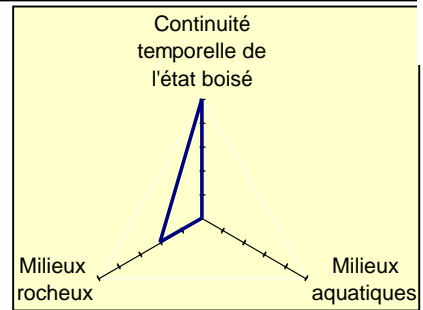


2 : mature stand



factors to be improved

context management

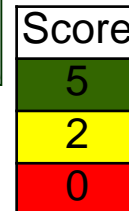
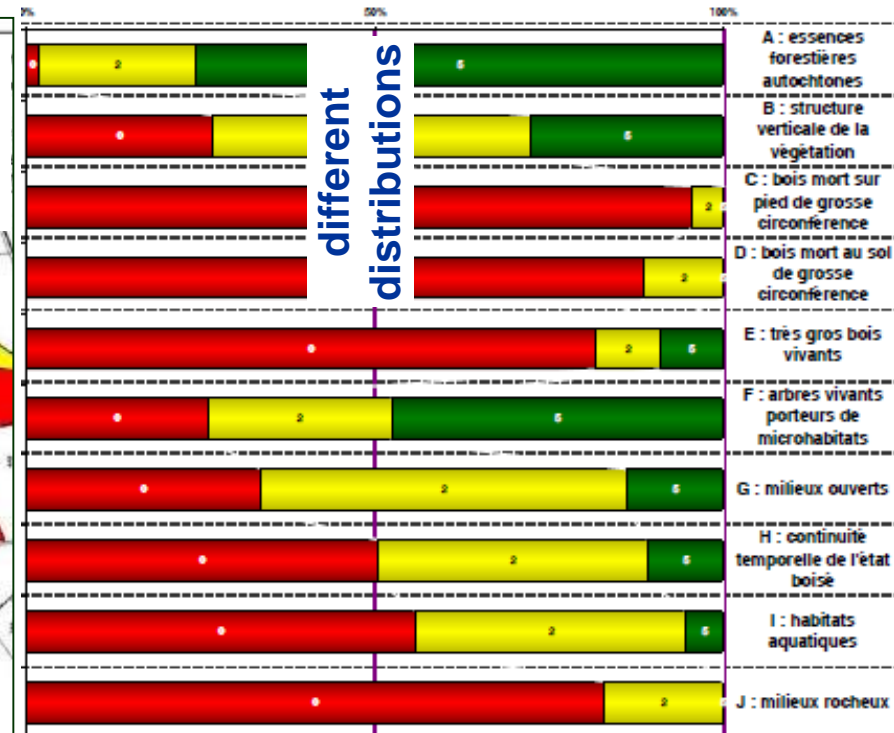
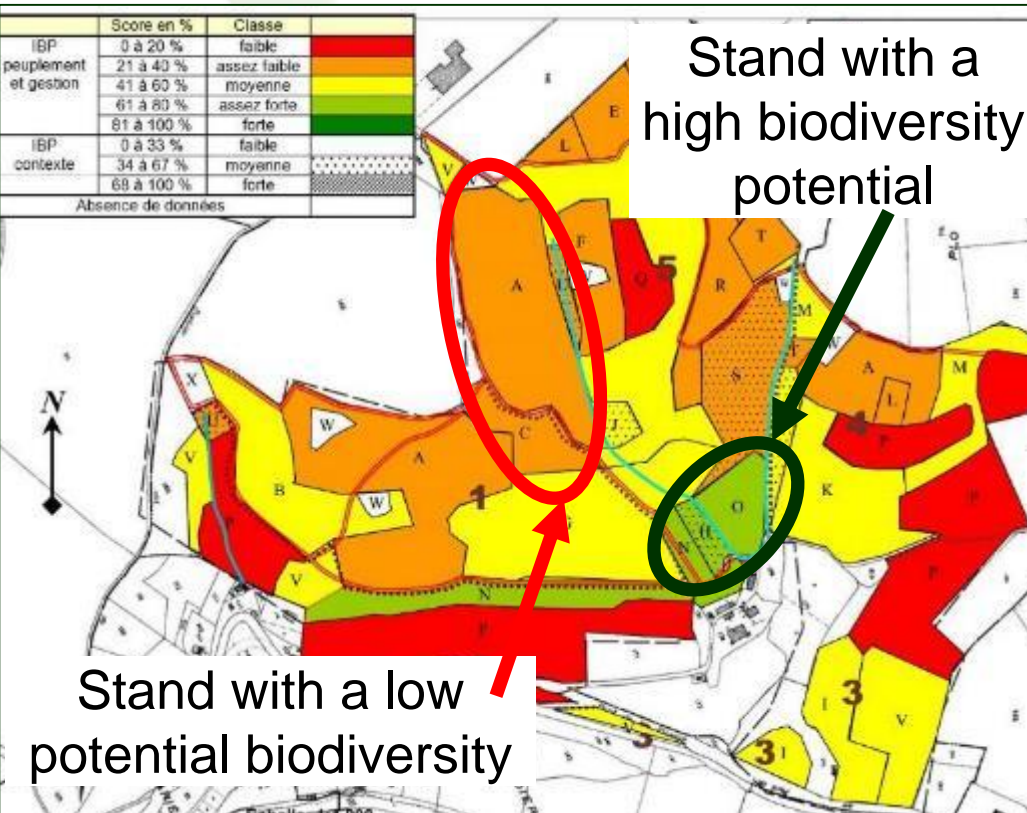


IBP for a biodiversity overview at the forest level

In a small forest (55 ha)

Scores per stand

Scores per factor






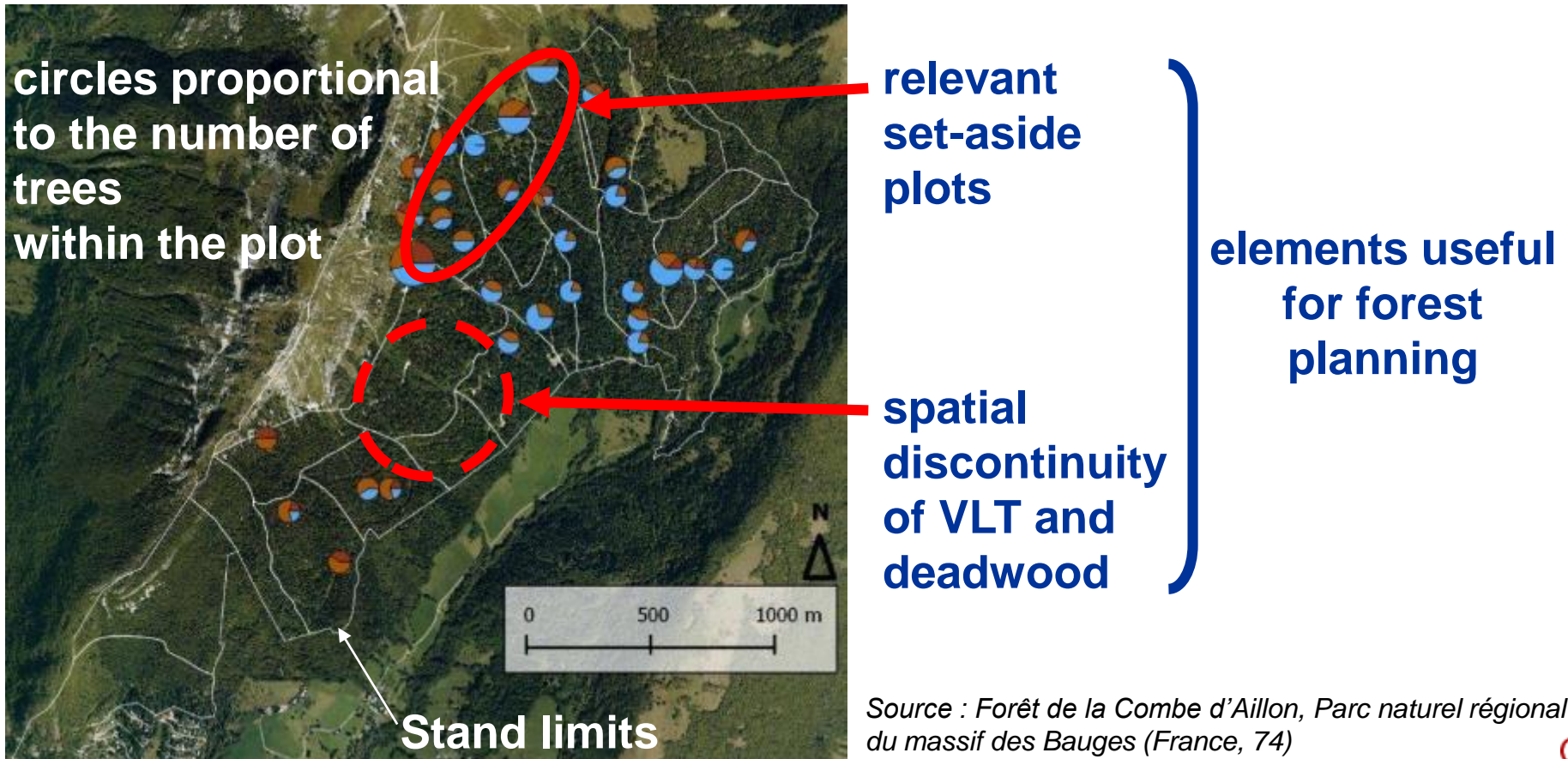
Do not calculate the IBP average!

Source : Barbazanié forest (France, 81)
CRPF Occitanie

In a larger forest (313 ha)

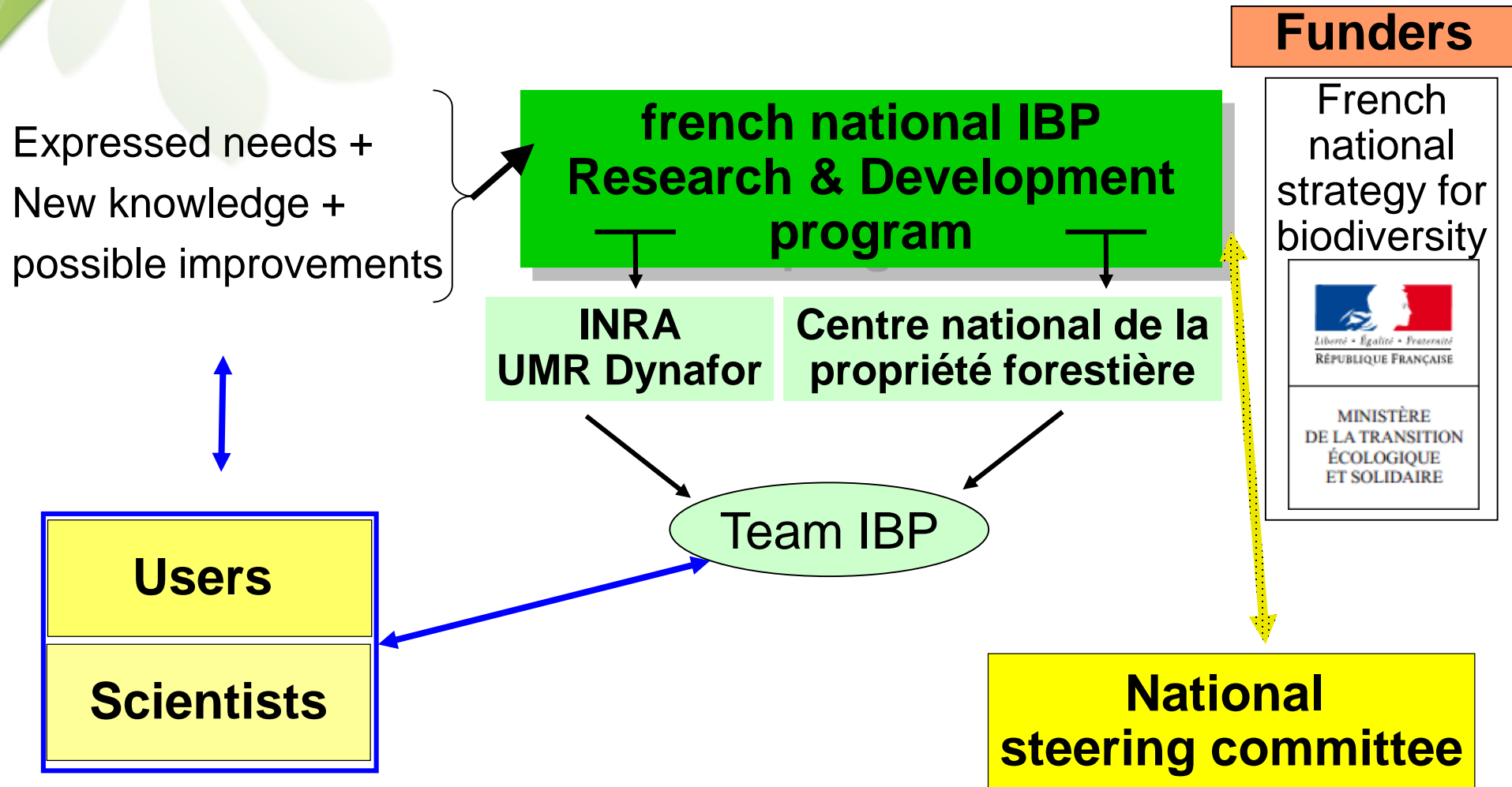
Systematic sampling, 1 plot / ha

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)

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

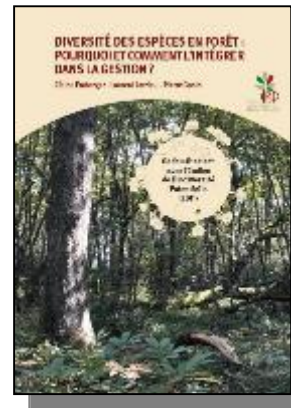
IBP in Italy?

❖ 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