

Index of Biodiversity Potential (IBP EUR.MED v3.0): survey sheets



This document presents survey sheets relating to the IBP version v3.0 for forests in Europe and the Mediterranean Basin.

There are two versions of the sheets according to the **biogeographical region**, as for the IBP definition, and two models according to the **survey method**:

- **Survey by complete or partial coverage**, with calculation of the IBP at the end of the survey. In this method, the survey is **capped** (the observations for each factor stop when the set maximum score for each factor is reached), but it is also possible to use this sheet if you wish to carry out a survey **with no cap** (case of scientific studies, highly mature forests, etc.). In the case of a **partial survey**, it is possible to report on the sheet the **additional survey** taken in the unsurveyed area. This sheet is also used in the case of **typological sampling survey**, with several plots per type of stand. A survey sheet is filled in per plot and the IBP is calculated at the end of the survey, which makes it possible to know the dispersion and the average of the scores in a group of plots.
- **Survey by plot grouping**. A survey sheet is completed for each plot and the IBP is not calculated at the end of the survey, as in the previous cases, but when all the plots in the group have been described. In this method, **the survey is uncapped or carried out with a cap suitable for sampling** (see explanations on the sheet).

In order to standardize the description of stands (see Stand description method below), an optional **"Stand"** section is provided in the sheets.

This document is used in addition to the IBP definition for forests in Europe and the Mediterranean Basin (Gonin et al., 2023) and to the detailed description of survey methods (Gonin, Larrieu, 2023).

All IBP documentation is available on the internet: www.cnpf.fr/ibp.

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Translation: Sarah Rotiel (CNPf-IDF), Mark Bossanyi (markbossanyi@gmail.com), with the contribution of Jonathan Spazzi.

- The **IBP logo** is a registered trademark in the European Union. Its use is possible by respecting the definition of IBP given by the authors.

- **Reference:** Gonin P., Larrieu L.: 2023 - *Index of Biodiversity Potential (IBP EUR.MED v3.0): survey sheets*. CNPF, INRAE Dynafor, 01/10/23, 16 p.



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SOME INSTRUCTIONS FOR CARRYING OUT IBP SURVEYS

Survey methods are detailed in: Gonin, Larrieu, 2023 – IBP survey methods (www.cnpf.fr/ibp/)

Survey method: the IBP is measured at **stand** or **stand type** level.

The **complete coverage** method is the simplest: the entire stand is surveyed in a uniform manner along regularly spaced transects, using the **GPS in trace mode**. Along a transect, the stand is observed over a width that should not be too large (generally 10-15 m to the left, 10-15 m to the right of the transect axis), taking care **not to count the same elements twice** between two neighbouring surveyors or between two close transects. The IBP score is given at the end of the survey based on the observations.

This method is well suited to stands with a small area (< 5 ha). In other cases, **other methods** can be used, in particular:

- **Partial coverage:** only a **representative fraction** of the stand is surveyed (e.g. one out of two transects), with rapid **additional observation** in the unsurveyed area; the IBP score is given at the end of the survey based on observations;
- **Typological sampling:** survey on **several plots of 1 ha** distributed according to a non-statistical sampling plan, covering the variability of the stand as well as possible, which makes it possible to assess the average IBP score and the variability between plots;
- **Systematic sampling:** IBP surveys carried out on small plots (less than 1/3 ha) distributed according to a systematic sampling plan; in a stand type, the IBP is calculated by grouping the observations of all the plots located in this type.

Data collection during the survey: record on the sheet all the elements necessary for determining IBP score (list of tree species, number of deadwood, etc.), **from the start of the survey**, then as the survey progresses. The fastest method consists in carrying out a **capped survey**: during the survey, we stop the observations concerning a factor as soon as the conditions are met for the attribution of the final score (e.g. counting of 5 VLT/ha → score 5 for factor E).

Only a few special cases require an **uncapped** survey, with accounting for all the elements corresponding to the factors:

- Calculation of IBP on a group of plots, as in the case of the systematic sampling (see explanations in the survey sheet by plot grouping),
- IBP survey as part of a study requiring a more detailed description of the factors (scientific studies, forests with high maturity or with systematically high scores for certain factors, etc.).

Observation during the survey: the data does not come from an **exhaustive inventory**, but from a **careful visual estimation**.

The trees are therefore not observed individually, nor the stand described in detail, however the observation must be sufficiently precise to identify the selected elements necessary for the IBP assessment. To do this, **follow the transect** planned for the survey, **turning to the notable elements** to specify their characteristics (diameter, type of tree-related microhabitat, surface of a gap, etc.). In addition, the operator **must check his dimension estimates** (height, thickness) with real measurements, all the more so as he is not calibrated.

To **estimate the cover** of an element (e.g. high layer cover or native tree cover), estimate what proportion of the stand (half, quarter, etc.) can be occupied by these elements if they were grouped together, or estimate its area in m², which makes it possible to calculate the percentage in relation to the total area.

For the **estimation of areas** (gaps, etc.), estimate the dimensions of each area (length x width) or compare them with a personal reference area (area of land, etc.).

For **factors C, D and E** which require counting the number of trees in two size categories (e.g. VLT and LT in the E factor), is best to **focus on the upper category** (VLT): trees in the lower category (LT) are counted with a cap of 1 LT/ha, only if the upper category (VLT) is absent.

To **limit the surveyor effect**: the **thresholds** indicated in the definitions must be **strictly** applied; avoid being influenced by the impact of observations on scores (e.g. do not look more carefully for a tree type in order to go from a score of 2 to 5).

Field survey duration: the **search effort** must be **standardized** to avoid overestimating certain factors, the simplest being to set a maximum survey duration: **15-20 min/ha per person** is most often sufficient, but duration can exceed 25-30 min/ha in more difficult terrain and stand characteristics (heterogeneity, low visibility or difficulty walking through the stand). These durations relate to an operator experienced in the IBP survey. For the others, it takes half a day to become familiar with the IBP documents and to practice survey, then a learning period follows, during which the duration of the surveys is longer. The duration is also increased in the event of an uncapped survey.

For the total duration, you must add the preparation time (search for documents, location of survey, etc.) and data processing (archiving, editing of results).

Materials and documents

- **Tree caliper or tape measure;** GPS + binoculars + dendrometer + rangefinder (or topofil = measurer with lost wire) if possible,
- IBP documents: **survey sheets, definition of IBP and the 3 typologies**, Field guide to tree-related microhabitats, document on survey methods,
- Forest data: topographic map, stand map, management plan, ecological characteristics (site conditions, habitats...).



IBP survey by complete or partial coverage, or by typological sampling, in the forests of Europe and the Mediterranean Basin

Atlantic, Continental and Alpine regions

Lowlands, montane and subalpine levels
+ Mediterranean montane level

STAND (optional)

Composition (all DBH) note by tree species: name, % canopy cover / stand area (to within 10%; only if > 15%)
Overstory trees = trees accessing light (thresholds 15 & 75%)

Understory trees, well-represented species:

Structure (all DBH; C = coppice, H = high forest; canopy cover C & H: % / stand area)

☐ **open stand** (stand area < 40% site area); others:

C<25%: ☐ **regular H** ☐ **H with understorey** ☐ **mixed-age H**

C≥25%: ☐ **rich H ≥ 25% + C** ☐ **poor H < 25% + C** ☐ **C with no H**

Tree canopy cover (DBH > 17.5 cm) ☐ closed ≥75% ☐ partly open 40-75% ☐ open <40%

Succession stage (separately for H and C) ☐ **H** ☐ **C** **irregular** (ST+MT+LT+VLT)

☐ **H** ☐ **C** **regeneration** (open) ☐ **H** ☐ **C** **establishment** (ST) ☐ **H** ☐ **C** **growth** (MT+LT)

☐ **H** ☐ **C** **apogee** (VLT+LT) ☐ **H** ☐ **C** **collapse** (open, VLT+LT, deadwood)

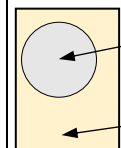
Additional (Ho, D...):

REFERENCES

Date :

Survey title:

Name of the survey groups (if typological sampling):



Survey in the described area: **area** (ha) =
and dimensions (m) circle R =
or L x W =

If partial coverage with additional observation in the
unsurveyed area: **total area** (ha) =

Names of surveyors:

LOCATION

Department:

Municipality:

File:

Forest:

Forest subdivision:

Others (plot...):

Owner, manager:

Forest access contact:

Coordinates:

Alt. (m):

Status, management...:

IBP DIAGNOSTIC CRITERIA

IBP version : Uncapped factors³ (A, B...):

Region : ☐ Atlantic ☐ Continental ☐ Alpine ☐ Mediterranean

Level : ☐ lowlands ☐ montane ☐ subalpine

Type of coverage: ☐ complete ☐ strip partial ☐ plot partial

☐ typological sampling

Additional observation in the unsurveyed area: ☐ yes ☐ no

Fertility : ☐ fertile to moderately fertile ☐ very low fertility¹

A – Native tree species	Number of living native tree species, h > 50 cm, or dead native tree species in the following list (without detailing the tree species) ☐ <i>Abies</i> ☐ <i>Acer</i> ☐ <i>Alnus</i> ☐ <i>Arbutus</i> ☐ <i>Betula</i> ☐ <i>Carpinus</i> ☐ <i>Castanea</i> ☐ <i>Celtis</i> ☐ <i>Fagus</i> ☐ <i>Fraxinus</i> ☐ <i>Juglans regia</i> ☐ <i>Juniperus thurifera</i> ☐ <i>Larix</i> ☐ <i>Malus</i> ☐ <i>Ostrya</i> ☐ <i>Picea</i> ☐ <i>Pinus</i> ☐ <i>Platanus</i> ☐ <i>Populus</i> ☐ <i>Prunus</i> ☐ <i>Pyrus</i> ☐ <i>deciduous Quercus</i> ☐ <i>evergreen Quercus</i> ☐ <i>Salix</i> ☐ <i>Sorbus</i> ☐ <i>Taxus</i> ☐ <i>Tilia</i> ☐ <i>Ulmus</i>	max ³ 5 (3 at subalpine)			Lowl, mont. 0 0 or 1 genera 1 2 genera 2 3 or 4 genera 5 5 genera and + Maximum score 2 if the canopy cover of all native tree species is < 50% of the stand described
B – Vertical structure of the vegetation	Layers present with foliage ≥ 20% of the area described (1 tree is counted in all layers occupied by its foliage; native or not)				
	herbaceous and semi-ligneous				0: 1 layer
	very low woody (< 1.5 m)				1: 2 layers
	low woody (1.5 à 7 m)				2: 3 or 4 layers
	intermediate woody (7 à 20 m)				5: 5 layers
C - Large standing deadwood	Number of deadwood (DW, native or not) ≥ 1 m high	max ³			0: LDW/ha < 1 and MDW/ha < 1
	Large deadwood (LDW): D > 37.5 cm (D > 17.5 cm on very low fertility site ² & for low-growing species ³)	3/ha			1: LDW/ha < 1 and MDW/ha ≥ 1
	Medium deadwood (MDW): 17.5 < D < 37.5 cm (count if LDW <1/ha)	1/ha			2: 1 ≤ LDW/ha < 3 5: LDW/ha ≥ 3
D - Large lying deadwood	Number of deadwood (DW, native or not) ≥ 1 m length	max ³			0: LDW/ha < 1 and MDW/ha < 1
	Large deadwood (LDW): D > 37.5 cm (D > 17.5 cm on very low fertility site ² & for low-growing species ³)	3/ha			1: LDW/ha < 1 and MDW/ha ≥ 1
	Medium deadwood (MDW): 17.5 < D < 37.5 cm (count if LDW <1/ha)	1/ha			2: 1 ≤ LDW/ha < 3 5: LDW/ha ≥ 3
E - Very large living trees	Number of living tree (native or not) :	max ³			0: VLT/ha < 1 and LT/ha < 1
	VLT: D > 67.5 cm (D > 47.5 cm on very low fertility site ² & for low-growing species ³)	5/ha			1: VLT/ha < 1 and LT/ha ≥ 1
	LT: 47.5 < D < 67.5 cm (count if VLT < 1/ha)	1/ha			2: 1 ≤ VLT/ha < 5 5: VLT/ha ≥ 5
F - Living trees bearing microhabitats (TreM)	Number of living trees with TreM (native or not; cap ³ : count a maxi of 2 trees/ha per group of TreM below and total capped at 8 trees/ha)				
	1 - Woodpecker breeding cavities				
	2 - Rot-holes (ø > 10 cm or > 30 cm if semi-open or open)				
	3 - Insect galleries and bore holes (ø > 2 cm)				
	4 - Concavities (ø > 10 cm, depth > 10 cm): dendrotelm water-filled or woodpecker foraging excavation or bark-lined trunk concavity or buttress-root concavity				
	5 - Exposed sapwood only : bark loss or fire scar (S > 600 cm ² = A4) or bark shelter/pocket (gap > 1 cm, depth and height > 10 cm)				
	6 - Exposed sapwood and heartwood : stem breakage (ø > 20 cm) or limb breakage at the trunk (ø > 20 cm or S > 300 cm ² = A5) or crack (width > 1 cm, depth > 10 cm, length > 30 cm)				0: tree/ha < 2
	7 - Crown deadwood : dead branches or dead top (ø > 20 cm and L > 50 cm, or ø > 3 cm and > 20% of the crown is dead)				1: 2 ≤ trees/ha < 3
	8 - Twig tangles : witches' broom (> 50 cm) or epicormic shoots (> 5 twig clusters)				2: 3 ≤ trees/ha < 8
	9 - Burrs and cankers (ø > 20 cm)				5: trees/ha ≥ 8
	10 - Perennial fungal fruiting bodies: Polypore (ø > 5 cm)				
	11 - Ephemeral fungal fruiting bodies: annual polypore or pulpy agaric (ø > 5 cm or number >10)				
	12 - Epiphytic or parasitic crypto- and phanerogams: bryophytes or foliose / fruticose lichens or ivy / lianas (> 20% of the trunk area covered for at least one of these types), ferns (> 5 fronds) or mistletoe (10 clusters > 20 cm)				
	13 - Nests : large vertebrate nests (ø > 50 cm)				
	14 - Microsoils (crown microsoil at any position in the tree)				
	15 - Fresh exudates (fresh significant flow of sap or resin > 20 cm)				

G - Flower-rich open areas	Flowering vegetation specific of open habitats (flowering plants different from those observed under cover, or identical but with more abundant flowers such as <i>Rubus</i>), permanent or temporary	% in relation to the surveyed area	Lowlands, mont.	subalpine
	forest gap or clearing (m ²) =		0	0%
	length edge of path (m) = x 2 m = area (m ²) =		2	< 1% or > 5% < 1%
	sparse stand or stand with light foliage		5	1 to 5% ≥ 1%
IBP stand and forest management				
H - Forest continuity over time	Ancient cartographic or photographic documents (ancient forest if not cleared afterwards):		0 : recent forest (land cleared over the entire surface)	
	Other historical documents: In the field, look for the following element: . in ancient forests : signs of agricultural use (stone wall, terraces, etc.) indicating either partial (score 2) or fully (score 0) clearing; in the presence of a plantation, clear evidence of soil disturbance over the entire area, with full cultivation (score 2) . in recent forests: signs of partial woodland continuity (relict old trees, rocky places that has remained wooded, etc.; score 2)		2 : partially continuous forested state (partially clearing) or continuous but planted with full cultivation 5 : ancient forest (land not cleared, even partially, or not planted with full cultivation)	
I - Aquatic habitats	Types present, of natural or artificial origin, permanent or temporary, in the list below (max ³ 2 types)		0: no type 2: 1 type 5: 2 types and more	
	Spring or seepage			
	Small stream, unmaintained humid ditch or small channel (width < 1 m)			
	Stream (width: 1 - 8 m)			
	River, estuary or delta (width > 8 m)			
	Backwater			
	Lake or deep water body			
	Pond, lagoon or shallow water body			
	Pool or other small water body			
	Peat bog			
	Marshy area			
J - Rocky habitats	Types present, cumulative area > 20 m ² , in the list below (max ³ 2 types)		0: no type 2: 1 type 5: 2 types and more	
	Cliff or rock wall higher than that of adult trees			
	Rock wall smaller than that of adult trees			
	Rock slab			
	Lapiaz or large fresh fracture			
	Cave or chasm			
	Unstable scree			
	Stable rock pile (stable scree, heap of stones, ruin, stone wall > 20 m)			
	Pile of boulders > 2 m			
	Large rocks (> 20 cm) or rock outcrops other than slab or lapiaz			
	Outcropping pebble bank (outside stream bed)			
Deposit of fine sediments, sparsely vegetated (alluvial deposit outside stream bed, dune)				
Loose vertical bank or wall of loose material, sparsely vegetated				
IBP context				
IBP TOTAL				

CASE OF PARTIAL COVERAGE: additional observation in the unsurveyed area

Report known information + observations without any special search effort, either in significant unsurveyed area (edges and particular features of the relief such as valleys, cliffs, etc.), or for elements visible from the surveyed area

Factor A – Native tree species, not observed in the surveyed area:

Factor G – Edges not intersecting the surveyed area (exclude the edge along its entire length as soon as it intersects the surveyed area)
 Length (m) = x 2 m = area (m²) = % in relation to the total area =

Factor I – Aquatic habitats, not observed in the surveyed area: 1st type observed - name =
 2nd type observed - name =

Factor J – Rocky habitats, not observed in the surveyed area: 1st type observed (cumulative area > 20 m²) - name =
 2nd type observed (cumulative area > 20 m²) - name =

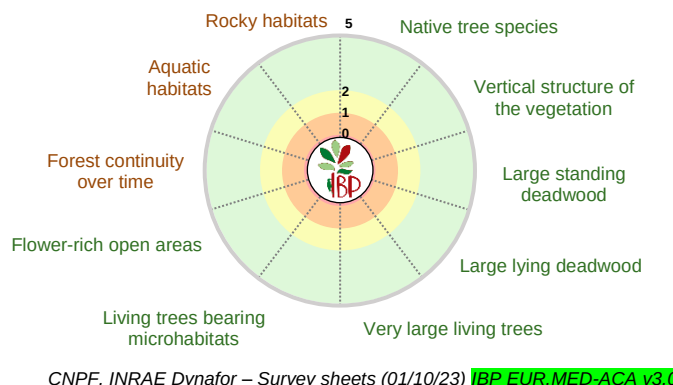
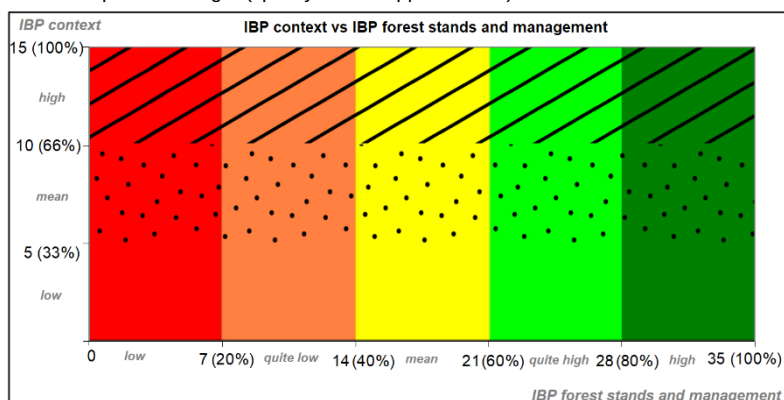
Remarkable species or habitats observed:

Comments on IBP results:

Management recommendations:

Survey comments:

- 1: very low fertility sites: when trees cannot reach VLT threshold, even at the end of their life cycle; infrequent cases (often less than 10%)
- 2: tree species that never grow to a large size (*Acer monspessulanum*, *Alnus incana*, *Arbutus*, *Malus*, *Prunus padus*, *Pyrus*, *Sorbus* other than *S. torminalis* et *domestica*...)
- 3: threshold for assigning the final score, used in the case of capped surveys; possibility of counting the elements beyond this threshold if you want an uncapped survey, more complete but longer (specify the uncapped factors)





IBP survey by plot grouping (systematic sampling...), in the forests of Europe and the Mediterranean Basin

Atlantic, Continental and Alpine regions

Lowlands, montane and subalpine levels
+ Mediterranean montane level

STAND (optional)

Composition (all DBH) note by tree species: name, % canopy cover / stand area (to within 10%; only if > 15%)

Overstory trees = trees accessing light (thresholds 15 & 75%)

Understory trees, well-represented species:

Structure (all DBH; C = coppice, H = high forest; canopy cover C & H: % / stand area)

☐ **open stand** (stand area < 40% site area) ; others:

C < 25%: ☐ **regular H** ☐ **H with understorey** ☐ **mixed-age H**

C ≥ 25%: ☐ **rich H ≥ 25% + C** ☐ **poor H < 25% + C** ☐ **C with no H**

Tree canopy cover (DBH > 17.5 cm) ☐ closed ≥ 75% ☐ partly open 40-75% ☐ open < 40%

Succession stage (separately for H and C) ☐ **H** ☐ **C** **irregular** (ST+MT+LT+VLT)

☐ **H** ☐ **C** **regeneration** (open) ☐ **H** ☐ **C** **establishment** (ST) ☐ **H** ☐ **C** **growth** (MT+LT)

☐ **H** ☐ **C** **apogee** (VLT+LT) ☐ **H** ☐ **C** **collapse** (open, VLT+LT, deadwood)

Additional (Ho, D...):

REFERENCES

Date :

Survey title:

Name of the group the plot belongs to¹ :

Plot area (ha) =

Plot dimensions (m): circle R = or L x W =

Total area of the plots in the group if known: **Ag** (ha) =

Names of surveyors:

LOCATION

Department:

Municipality:

File:

Forest:

Forest subdivision:

Other (plot...):

Owner, manager:

Forest access contact:

Coordinates:

Alt. (m):

Status, management...:

IBP DIAGNOSTIC CRITERIA

IBP version :

Region : ☐ Atlantic ☐ Continental ☐ Alpine ☐ Mediterranean

Stage : ☐ lowlands ☐ montane ☐ subalpine

Fertility: ☐ fertile to moderately fertile ☐ very low fertility²

Uncapped survey^{4, 5, 6} for C, D, E, F: ☐ yes ☐ no: cap dependent on Ag (total area of the group plots) which is known at the time of the survey

A – Native tree species	Number of native tree species, living (h > 50 cm) or dead, in the following list (without detailing the tree species) ☐ <i>Abies</i> ☐ <i>Acer</i> ☐ <i>Alnus</i> ☐ <i>Arbustus</i> ☐ <i>Betula</i> ☐ <i>Carpinus</i> ☐ <i>Castanea</i> ☐ <i>Celtis</i> ☐ <i>Fagus</i> ☐ <i>Fraxinus</i> ☐ <i>Juglans regia</i> ☐ <i>Juniperus thurifera</i> ☐ <i>Larix</i> ☐ <i>Malus</i> ☐ <i>Ostrya</i> ☐ <i>Picea</i> ☐ <i>Pinus</i> ☐ <i>Platanus</i> ☐ <i>Populus</i> ☐ <i>Prunus</i> ☐ <i>Pyrus</i> ☐ <i>deciduous Quercus</i> ☐ <i>evergreen Quercus</i> ☐ <i>Salix</i> ☐ <i>Sorbus</i> ☐ <i>Taxus</i> ☐ <i>Tilia</i> ☐ <i>Ulmus</i>	max	
	Tree cover of all native tree species / stand described (%)	5 (3 at subalpine)	
B – Vertical structure of the vegetation	Covers layer in % of the area described (1 tree is counted in all layers occupied by its foliage; native or not)		
	herbaceous and semi-ligneous		
	very low woody (< 1.5 m)		
	low woody (1.5 à 7 m)		
	intermediate woody (7 à 20 m)		
C - Large standing deadwood	Number of deadwood (DW, native or not) ≥ 1 m high	max	
	Large deadwood (LDW): D > 37.5 cm (D > 17.5 cm on very low fertility site ² & for low-growing species ³)	uncapped ⁴	
	Medium deadwood (MDW): 17.5 < D < 37.5 cm (count if LDW < 1/ha)	uncapped ⁴	
D - Large lying deadwood	Number of deadwood (DW, native or not) ≥ 1 m length	max	
	Large deadwood (LDW): D > 37.5 cm (D > 17.5 cm on very low fertility site ² & for low-growing species ³)	uncapped ⁴	
	Medium deadwood (MDW): 17.5 < D < 37.5 cm (count if LDW < 1/ha)	uncapped ⁴	
E - Very large living trees	Number of living tree (native or not) :	max	
	VLT: D > 67.5 cm (D > 47.5 cm on very low fertility site ² & for low-growing species ³)	uncapped ⁵	
	LT: 47.5 < D < 67.5 cm (count if VLT < 1/ha)	uncapped ⁵	
F - Living trees bearing microhabitats (TreM)	Number of living trees with TreM (native or not ; cap ³ : count a maxi of 2 trees/ha per group of TreM below and total capped at 8 trees/ha)		
	1 - Woodpecker breeding cavities		
	2 – Rot-holes (ø > 10 cm or > 30 cm if semi-open or open)		
	3 - Insect galleries and bore holes (ø > 2 cm)		
	4 - Concavities (ø > 10 cm, depth > 10 cm): dendrotelm water-filled or woodpecker foraging excavation or bark-lined trunk concavity or buttress-root concavity		
	5 - Exposed sapwood only : bark loss or fire scar (S > 600 cm ² = A4) or bark shelter/pocket (gap > 1 cm, depth and height > 10 cm)		
	6 - Exposed sapwood and heartwood : stem breakage (ø > 20 cm) or limb breakage at the trunk (ø > 20 cm or S > 300 cm ² = A5) or crack (width > 1 cm, depth > 10 cm, length > 30 cm)		
	7 - Crown deadwood : dead branches or dead top (ø > 20 cm and L > 50 cm, or ø > 3 cm and > 20% of the crown is dead)		
	8 - Twig tangles : witches' broom (> 50 cm) or epicormic shoots (> 5 twig clusters)		
	9 - Burrs and cankers (ø > 20 cm)		
	10 - Perennial fungal fruiting bodies : Polypore (ø > 5 cm)		
	11 - Ephemeral fungal fruiting bodies : annual polypore or pulpy agaric (ø > 5 cm or number > 10)		
	12 - Epiphytic or parasitic crypto- and phanerogams: bryophytes or foliose / fruticose lichens or ivy / lianas (> 20% of the trunk area covered for at least one of these types), ferns (> 5 fronds) or mistletoe (10 clusters > 20 cm)		
	13 - Nests : large vertebrate nests (ø > 50 cm)		
	14 - Microsoils (crown microsoil at any position in the tree)		
	15 - Fresh exudates (fresh significant flow of sap or resin > 20 cm)		

G - Flower-rich open areas	flowering vegetation specific of open habitats (flowering plants different from those observed under cover, or identical but with more abundant flowers such as <i>Rubus</i>), permanent or temporary	% in relation to the surveyed area
	forest gap or clearing (m ²) =	
	length edge of path (m) = x 2 m = area (m ²) =	
	sparse stand or with light foliage	
H - Forest continuity over time	Ancient cartographic or photographic documents (ancient forest if not cleared afterwards): Other historical documents: In the field, look for the following element: . in ancient forests : signs of agricultural use (stone wall, terraces, etc.) indicating either partial (score 2) or fully (score 0) clearing ; in the presence of a plantation, clear evidence of soil disturbance over the entire area , with full cultivation (score 2) . in recent forests: signs of partial woodland continuity (relict old trees, rocky places that has remained wooded, etc.; score 2)	
I - Aquatic habitats	Types present , of natural or artificial origin, permanent or temporary , in the list below (max³ 2 types)	
	Spring or seepage	
	Small stream, unmaintained humid ditch or small channel (width < 1 m)	
	Stream (width: 1 - 8 m)	
	River, estuary or delta (width > 8 m)	
	Backwater	
	Lake or deep water body	
	Pond, lagoon or shallow water body	
	Pool or other small water body	
	Peat bog	
	Marshy area	
	Sea or ocean	
J - Rocky habitats	Types present, cumulative area > 20 m² , in the list below (max³ 2 types)	
	Cliff or rock wall higher than that of adult trees	
	Rock wall smaller than that of adult trees	
	Rock slab	
	Lapiaz or large fresh fracture	
	Cave or chasm	
	Unstable scree	
	Stable rock pile (stable scree, heap of stones, ruin, stone wall > 20 m)	
	Pile of boulders > 2 m	
	Large rocks (> 20 cm) or rock outcrops other than slab or lapiaz	
	Outcropping pebble bank (outside stream bed)	
	Deposit of fine sediments, sparsely vegetated (alluvial deposit outside stream bed, dune)	
Loose vertical bank or wall of loose material, sparsely vegetated		
Additional survey outside the surveyed area, close to the survey and in the same type of stand Report known informations + observations when moving between plots <u>without any special search effort</u>		
Factor I – Aquatic habitats, not observed in the surveyed area: 1 st type observed - name = 2 nd type observed - name =		
Factor J – Rocky habitats, not observed in the surveyed area: 1 st type observed (cumulative area > 20 m ²) - name = 2 nd type observed (cumulative area > 20 m ²) - name =		
Remarkable species or habitats observed:		
Comments on IBP results:		
Management recommendations:		
Survey comments:		

- 1: a **survey group** (or plot group) is a set of plots installed in the same stand or stand type, each plot being the subject of an IBP survey by complete coverage. The plot can be attached to a group:
- either before the IBP survey (e.g. group of plots installed in a stand); the total area of the plots in the group (Ag) is then known before the survey;
 - either after the IBP survey (e.g. simultaneous survey of dendrometric and IBP data on systematic sampling); Ag is only known after the surveys.
- 2: very low-fertility sites: when trees cannot reach VLT threshold, even at the end of their life cycle; infrequent cases (often less than 10%)
- 3: tree species that never grow to a large size (*Acer monspessulanum*, *Alnus incana*, *Arbutus*, *Malus*, *Prunus padus*, *Pyrus*, *Sorbus* other than *S. torminalis* and *domestica*...)
- 4, 5, 6: IBP is calculated by combining the data from all the plots in the group, as if they constituted a single survey, rather than by calculating the average of the scores for each plot (see document on survey methods). This calculation method requires carrying out an **uncapped survey**, with counting of all the trees corresponding to the criteria so as not to underestimate the IBP scores, **unless the total area of the group of surveys Ag (in ha) is known** at the time of the surveys: it is then possible to cap the number of trees counted for the factors C, D, E and F:
- 4 : C and D - **deadwood LDW: max = 3 x Ag** (i.e. 3 trees/ha over the entire group of surveys); **MDW: max = 1 x Ag** (i.e. 1 tree/ha over the entire group of surveys)
- 5 : E – **very large trees VLT: max = 5 x Ag** (i.e. 5 trees/ha over the entire group of surveys); **LT: max = 1 x Ag** (i.e. 1 tree/ha over the entire group of surveys)
- 6 : F - **TreM: max = 2 x Ag per group of TreM** (i.e. 2 trees/ha over the entire group of surveys) and **8 x Ag in total** (i.e. 8 trees/ha over the entire group of surveys)

STAND DESCRIPTION METHOD

The stand description to carry out an IBP survey is optional, the only imperative being to define homogeneous zones beforehand and to know their area. However, the use of this **standardized method** facilitates the comparison of IBP surveys and can help to delineate stands in the absence of mapping or stand typology.

The description refers only to **tree species** (see Table 2). It is limited to the following four characteristics:

► 1 – Composition of tree species

Definition: list of tree species (see Table 2), **whatever their diameter at breast height (DBH). In the overstorey layer**, tree species are classified according to their **rate of canopy cover accessing light (CCL)**:

- tree species present with CCL $\geq 15\%$, divided into:
 - o **main**: the one with the highest CCL
 - o **secondary** = other
- **ancillary** species: CCL $< 15\%$

Canopy cover of a tree category (e.g. a tree species): area of the ground covered by the vertical projection of the crown of the trees concerned.

Trees accessing light: trees whose crowns have direct access to light

Rate of canopy cover accessing light (CCL) of a tree category: sum of the canopy cover accessing light of the trees concerned, divided by the stand canopy cover



E.g.: canopy cover of broadleaves accessing light = 78% (7/9) (based on IGN 2020)

Description:

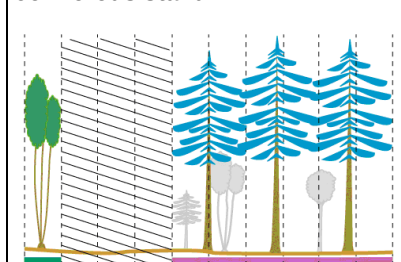
- Note the **complete list of tree species of the overstorey layer** with indication of their CCL (to within 10%; only if $> 15\%$); complete with the list of the **understorey tree species well represented**, with indication of their canopy cover as a percentage of the stand area
- Deduce two synthetic data:
 - o An **abbreviated list** of tree species: name of the **main** tree species in the case of a pure stand (CCL $\geq 75\%$), or name of the **2 most abundant** tree species in other cases
 - o **Overstorey tree species diversity**: see Table 1 and Figure 1

Table 1 – Overstorey tree species diversity

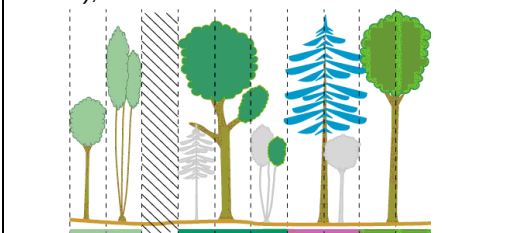
Diversity of tree species	Criteria based on the list of main and secondary tree species present (CCL $\geq 15\%$)	
Pure broadleaf	CCL of main tree species $\geq 75\%$	Broadleaved main tree species
Pure conifer		Coniferous main tree species
Mixed broadleaves	CCL of main tree species $\geq 75\%$	CCL broadleaves $\geq 75\%$
Mixed conifers	$< 75\%$	CCL conifers $\geq 75\%$
Mixed broadleaves and conifers		CCL broadleaves $< 75\%$ and CCL conifers $< 75\%$

Figure 1 – Examples of tree species diversity

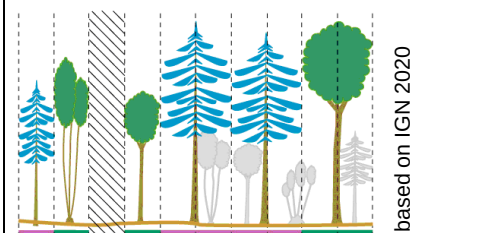
Example of a pure stand of Silver fir: Silver fir reaches 75% canopy cover accessing light (6/7), so it is a **pure coniferous stand**.



Example of a mixed broadleaved stand (with 3 tree species): broadleaves represent more than 75% of the canopy cover accessing light (7/9), and no broadleaved species reaches 75% (3/9 at best), so it is a **mixed broadleaved stand**.



Ex. of a mixed broadleaved and coniferous stand: broadleaves canopy cover less than 75% of the canopy cover accessing light (4/9) as well as conifers (5/9): it is therefore a **mixed broadleaved and coniferous stand**.



based on IGN 2020

► 2 – Stand structure

Definition: distribution of **all trees, regardless of their DBH and height**, taking into account

- the canopy cover of the high forest and of the coppice, in relation to the stand canopy cover (in coppices converted to high forests, a high stem preserved in a stump is assimilated to a high forest tree),
- in high forests, the number of layers present and their cover in relation to the stand canopy cover; layers are defined by dividing the potential dominant height of the adult stand into four.

Classification:

- **open stand**: stand canopy cover $< 40\%$ of land area, even at maturity; natural afforestation, meadow woods and sparse stands ;
- other structures (stand canopy cover $\geq 40\%$, at least at maturity):
 - o **high forest** : canopy cover of the **coppice** $< 25\%$; according to the number of layers:
 - **regular high forest**: abundance (canopy cover $\geq 60\%$) of one layer or of 2 continuous layers
 - **regular high forest with understorey**: high and low layers well represented (each $\geq 30\%$), intermediate rare ($\leq 20\%$)
 - **mixed-aged high forest**: at least 3 layers well represented (between 30 and 40% each)
 - o **mixed high forest + coppice**: canopy cover of the **coppice** $\geq 25\%$ and presence of high forest trees (includes coppices with standards)
 - **rich high forest and coppice**: high forest canopy $\geq 25\%$
 - **poor high forest and coppice**: high forest canopy $< 25\%$
 - o **coppice**: absence of high forest trees

► 3 – Tree canopy cover of the surveyed trees (DBH > 17.5 cm) – TCC

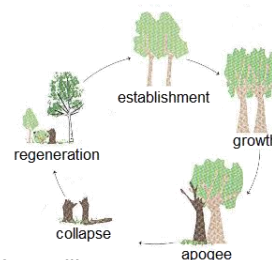
Definition: canopy cover of the surveyed tree (DBH > 17.5 cm), divided by the stand canopy cover.

Classification:

- **closed:** TCC ≥ 75%
- **partly open:** 40% ≤ TCC < 75%
- **open:** TCC < 40

► 4 – Succession stage

Definition: natural successive stages in the life of a stand refer to the natural silvigenetic cycle (Emberger et al. 2016); they are also used to describe the silvicultural cycle of logged forests. The stages are defined according to the **canopy cover of the surveyed trees (TCC)** and to the distribution of trees into **size categories** (see Table 3) calculated using basal area or volume (the thresholds for each category may be lowered on very low fertility sites and for tree species that never grow to a large size).



Description: indicate the stage separately for high forest and coppice, with the following classification:

- **regeneration:** **open stand (TCC < 40%)** in which regeneration develops. Total canopy cover of seedlings, thickets, saplings and poles having
 - < 50%: regeneration in progress or ≥ 50%: acquired regeneration
- **establishment:** **partly open to closed young stand (TCC ≥ 40%)**, dominated by small trees (**ST**) with presence of poles or medium trees (**MT**) (rare LT < ST)
- **growth:** **partly open to closed adult stand (TCC ≥ 40%)**, dominated by **MT** and large trees (**LT**), in general until the usual harvesting age (LT ≥ ST, LT + VLT < 50%)
- **apogee:** **half-open to closed adult stand (TCC ≥ 40%)**, dominated by large trees (**VLT and LT > 50%**); generally after the usual harvesting age, less frequent in logged forests
- **collapse:** **old open stand (TCC < 40%)**, dominated by very large trees (**VLT**) and large trees (**LT**), with development of natural mortality and presence of deadwood, but regeneration still limited; stage absent in harvested stands
- **irregular** in which the stand is in perpetual renewal with the presence of all size categories.

Silvigenetic cycle
(Emberger et al. 2016)

► 5 – Reminder of definitions

Table 2 – List of tree species used to describe the composition¹

Broadleaves: other ¹	<i>Eucalyptus</i>	<i>Pinus</i> : other	<i>Prunus</i> : other
Conifers: other ¹	<i>Fagus</i> (Beech)	<i>Pinus cembra</i> (Arolla pine)	<i>Prunus avium</i> (Cherrywood)
<i>Abies alba</i> (Silver Fir)	<i>Fraxinus</i> (Ash)	<i>Pinus halepensis</i> (Aleppo pine)	<i>Pseudotsuga menziesii</i> (Douglas Fir)
<i>Abies</i> : other Circum-Mediterranean ²	<i>Juglans</i> : other	<i>Pinus mugo</i> (Mugo pine)	<i>Pyrus communis</i> (Pear tree)
<i>Abies</i> : other	<i>Juglans regia</i> (Walnut)	<i>Pinus pinaster</i> (Maritime pine)	<i>Quercus deciduae</i> : native
<i>Acer</i> (Maple)	<i>Juniperus</i> (Juniper)	<i>Pinus pinea</i> (Umbrella pine)	<i>Quercus deciduae</i> : other exotic species
<i>Alnus</i> (Alder)	<i>Larix</i> : other	<i>Pinus nigra</i>	<i>Quercus rubra</i> (Red oak)
<i>Arbutus</i>	<i>Larix decidua</i> (European larch)	<i>Pinus sylvestris</i> (Scotch pine)	<i>Quercus sempervirens</i> : other
<i>Betula</i> (Birch)	<i>Laurus nobilis</i> (Laurel)	<i>Pinus uncinata</i> (Mountain pine)	<i>Quercus ilex</i> (Holm oak)
<i>Carpinus</i> (Hornbeam)	<i>Liquidambar orientalis</i> (Oriental sweetgum)	<i>Platanus orientalis</i> (Balkan plane tree)	<i>Quercus suber</i> (Cork oak)
<i>Castanea</i> (Chestnut)	<i>Malus sylvestris</i> (Wild apple tree)	<i>Platanus</i> : other	<i>Robinia pseudacacia</i> (Black Locust)
<i>Cedrus</i> (Cedar)	<i>Olea</i> (Olive tree)	<i>Populus</i> : other	<i>Salix</i> (Willow)
<i>Celtis</i> (Hackberry)	<i>Ostrya</i>	<i>Populus alba</i> (White poplar)	<i>Sorbus</i> (Nannyberry, Rowan tree, Sorb tree)
<i>Ceratonia</i> (Carob)	<i>Picea</i> : other	<i>Populus nigra</i> (Black poplar)	<i>Taxus baccata</i> (Yew)
<i>Cercis</i> (Judas tree)	<i>Picea abies</i> (Norway spruce)	<i>Populus tremula</i> (Aspen)	<i>Tilia</i> (Linden tree)
<i>Cupressus sempervirens</i> (Cypress tree)			<i>Ulmus</i> (Elm)

(1) list limited to tree species likely to be present in dominant layer of adult stands; some tree species are grouped together at the genera level (e.g. *Acer*) to facilitate comparisons and determination, in particular when they are in low proportion in the mixtures or occupy a small area. List drawn up at temperate European and Mediterranean Basin level, which can be supplemented by a genera or a species that covers a significant area or that is dominant in a habitat.

(2) *A. borisii-regis*, *bornmuelleriana*, *cephalonica*, *cilicica*, *nebrodensis*, *nordmanniana*, *numidica*, *pinsapo*

Table 3 – Size categories

	Category of wood	Heights and DBH classes (in cm)*
Regeneration (not surveyed trees)	Seedling	h < 0.5 m
	Thicket	h: 0.5 to 3 m
	Sapling	h > 3 m and DBH = 5
	Pole (P)	DBH = 10 and 15
Surveyed trees	Small trees (ST)	DBH = 20 and 25
	Medium trees (MT)	DBH = 30 to 45
	Large trees (LT)	DBH = 50 and more
	Including very large trees (VLT)	DBH = 70 and more

* Based on *Vocabulaire forestier* (Bastien & Gauberville, 2011) with no difference between conifers and broadleaves.

Sources: - Bastien Y., Gauberville C (coord.): 2011 - *Vocabulaire forestier, écologie, gestion et conservation des espaces boisés*. IDF, AgroParisTech, ONF, 608 p.

- Emberger C., Larrieu L., Gorin P.: 2016 - *Dix facteurs clés pour la diversité des espèces en forêt. Comprendre l'IBP*. IDF, 58 p.

- Gauquelin X., Courbaud B. (éd.): 2006 - *Guide des sylvicultures de montagne, Alpes du Nord françaises*. Cemagref, CRPF, ONF, 289 p.

- IGN: 2020 – *Lexique*. [En ligne]. URL : <https://inventaire-forestier.ign.fr/spip.php?page=recherche&recherche=lexique>