FOCUS ON CLIMATE CHANGE AND DEFINITIONS OF HABITATS OF COMMUNITY INTEREST

IP Platform meeting – Workshop « Dealing with dynamic habitats in the framework of the Natura Directives »

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Habitats Directive

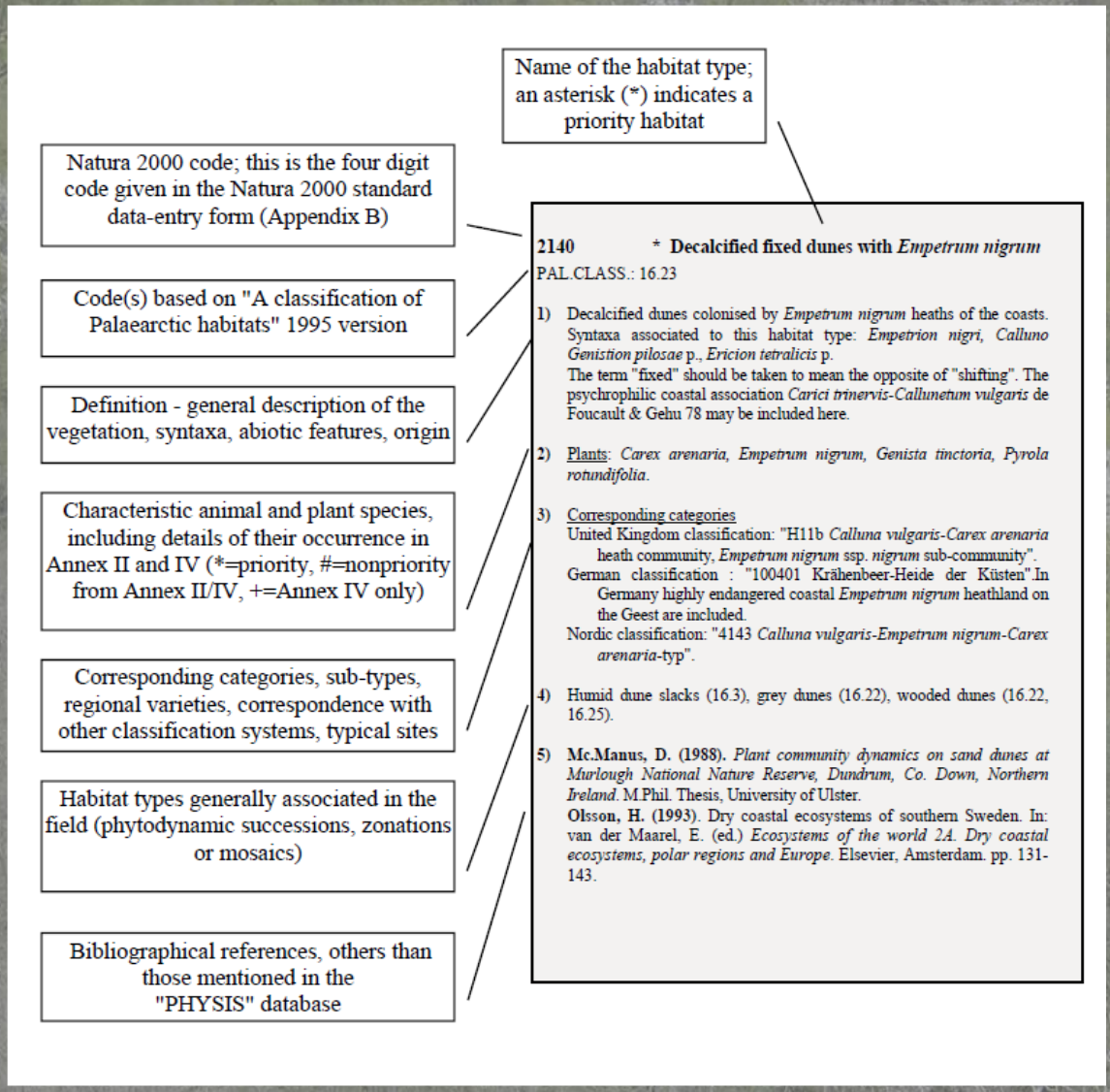
List of habitats of Community Interest in Annex I

Article 1 :

(b) natural habitats means terrestrial or aquatic areas distinguished by **geographic, abiotic and biotic** features, whether entirely natural or semi-natural;

(c) natural habitat types of **Community interest** means those which, within the territory referred to in Article 2 (…) ; such habitat types are listed or may be listed in **Annex I**;

Annex I → Interpretation Manual of Habitats of Community Interest : EUR15, 25, 27, 28…



Annex I → Interpretation Manual of Habitats of Community Interest : EUR15, EUR25, EUR27, EUR28

7230 **Alkaline fens**

PAL.CLASS.: 54.2

1) Wetlands mostly or largely occupied by peat- or tufa-producing small sedge and brown moss communities developed on soils permanently waterlogged, with a soligenous or topogenous base-rich, often calcareous water supply, and with the water table at, or slightly above or below, the substratum. Peat formation, when it occurs, is infra-aquatic. Calciphile small sedges and other Cyperaceae usually dominate the mire communities, which belong to the *Caricion davallianae*, characterised by a usually prominent "brown moss" carpet formed by *Campylium stellatum*, *Drepanocladus intermedius*, *D. revolvens*, *Cratoneuron commutatum*, *Acrocladium cuspidatum*, *Ctenidium molluscum*, *Fissidens adianthoides*, *Bryum pseudotriquetrum* and others, a grasslike growth of *Schoenus nigricans*, *S. ferrugineus*, *Eriophorum latifolium*, *Carex davalliana*, *C. flava*, *C. lepidocarpa*, *C. hostiana*, *C. panicea*, *Juncus subnodulosus*, *Scirpus cespitosus*, *Eleocharis quinqueflora*, and a very rich herbaceous flora including *Tofieldia calyculata*, *Dactylorhiza incarnata*, *D. traunsteineri*, *D. traunsteinerioides*, *D. russowii*, *D. majalis* ssp.*brevifolia*, *D. cruenta*, #*Liparis loeselii*, *Herminium monorchis*, *Epipactis palustris*, *Pinguicula vulgaris*, *Pedicularis sceptrum-carolinum*, *Primula farinosa*, *Swertia perennis*. Wet grasslands (*Molinietalia caerulaea*, *e.g. Juncetum subnodulosi* & *Cirsietum rivularis*, 37), tall sedge beds (*Magnocaricion*, 53.2), reed formations (*Phragmition*, 53.1), fen sedge beds (*Cladietum mariscae*, 53.3), may form part of the fen system, with communities related to transition mires (54.5, 54.6) and amphibious or aquatic vegetation (22.3, 22.4) or spring communities (54.1) developing in depressions. The sub-units below, which can, alone or in combination, and together with codes selected from the categories just mentioned, describe the composition of the fen, are understood to include the mire communities *sensu stricto* (*Caricion davallianae*), their transition to the *Molinion*, and assemblages that, although they may be phytosociologically referable to alkaline *Molinion* associations, contain a large representation of the *Caricion davallianae* species listed, in addition to being integrated in the fen system; this somewhat parallels the definition of an integrated class *Molinio-Caricetalia davallianae* in Rameau *et al*., 1989. Outside of rich fen systems, fen communities can occur as small areas in dune slack systems (16.3), in transition mires (54.5), in wet grasslands (37), on tufa cones (54.121) and in a few other situations. The codes below can be used, in conjunction with the relevant principal code, to signal their presence. Rich fens are exceptionally endowed with spectacular, specialised, strictly restricted species. They are among the habitats that have undergone the most serious decline. They are essentially extinct in several regions and gravely endangered in most.

Annex I → Interpretation Manual of Habitats of Community Interest : EUR15, EUR25, EUR27, EUR28

Variability of definition detail / specificity

4010 **Northern Atlantic wet heaths with *Erica tetralix***

PAL.CLASS.: 31.11

1) Humid, peaty or semi-peaty heaths, other than blanket bogs, of the Atlantic and sub-Atlantic domains.

2) Plants: *Erica tetralix*.

3) Corresponding categories

United Kingdom classification: "M14 *Schoenus nigricans-Narthecium ossifragum* heath p.p.", "M15 *Scirpus cespitosus-Narthecium ossifragum* mire", "M16 *Erica tetralix-Sphagnum compactum* wet heath" and "H5 *Erica vagans-Schoenus nigricans* heath".

Nordic classification: "5121 *Erica tetralix*-typ".

Annex I → Interpretation Manual of Habitats of Community Interest : EUR15, EUR25, EUR27, EUR28

8330 **Submerged or partially submerged sea caves**

PAL.CLASS.: 12.7, 11.26, 11.294

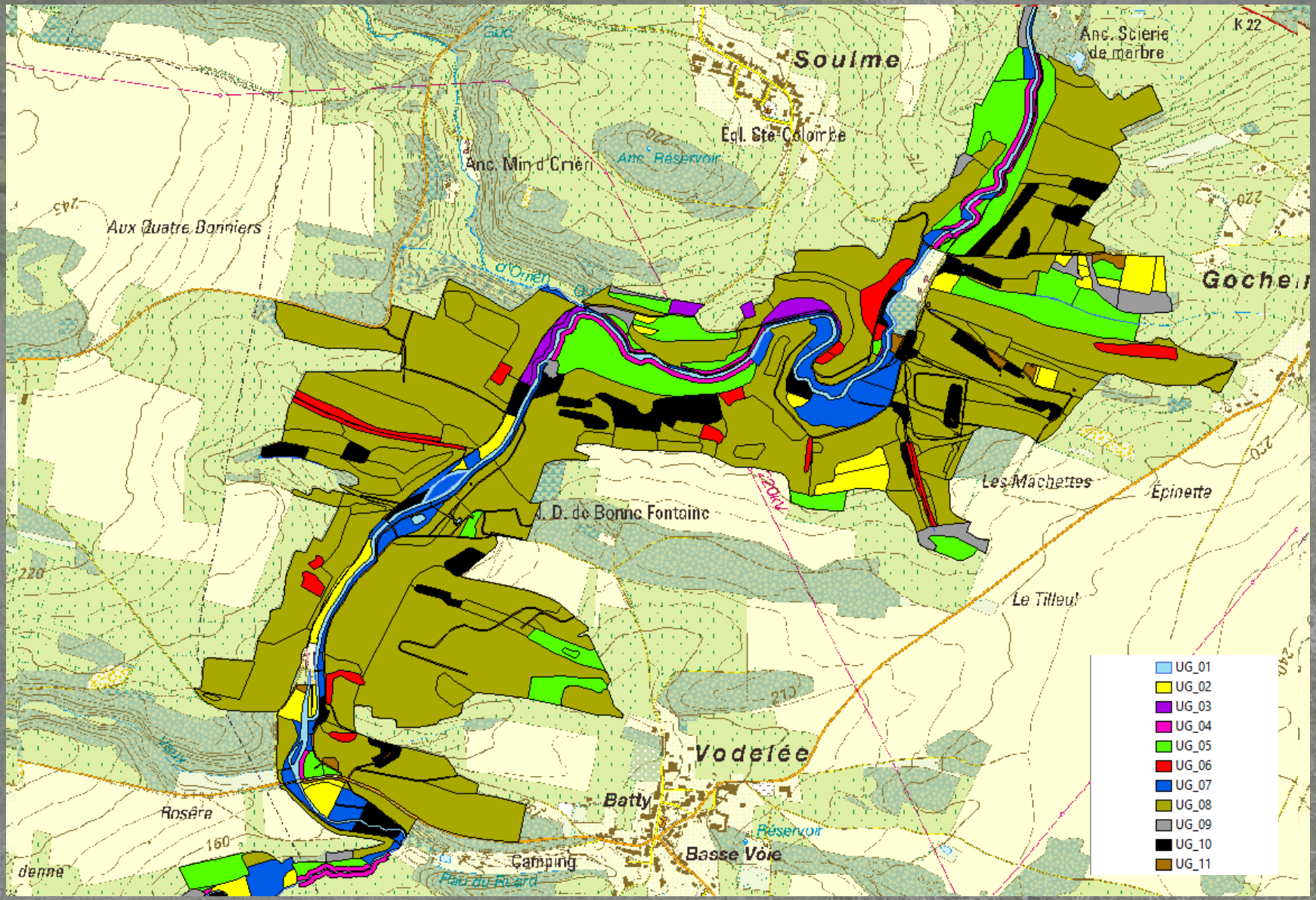
1) Caves situated under the sea or opened to it, at least at high tide, including partially submerged sea caves. Their bottom and sides harbour communities of marine invertebrates and algae.

8340 **Permanent glaciers**

PAL.CLASS.: 63.2 and 63.3

1) Rock and true glaciers.

Habitats & species distribution → Design of SAC



Example of forests

9110 ***Luzulo-Fagetum* beech forests**

PAL.CLASS.: 41.11

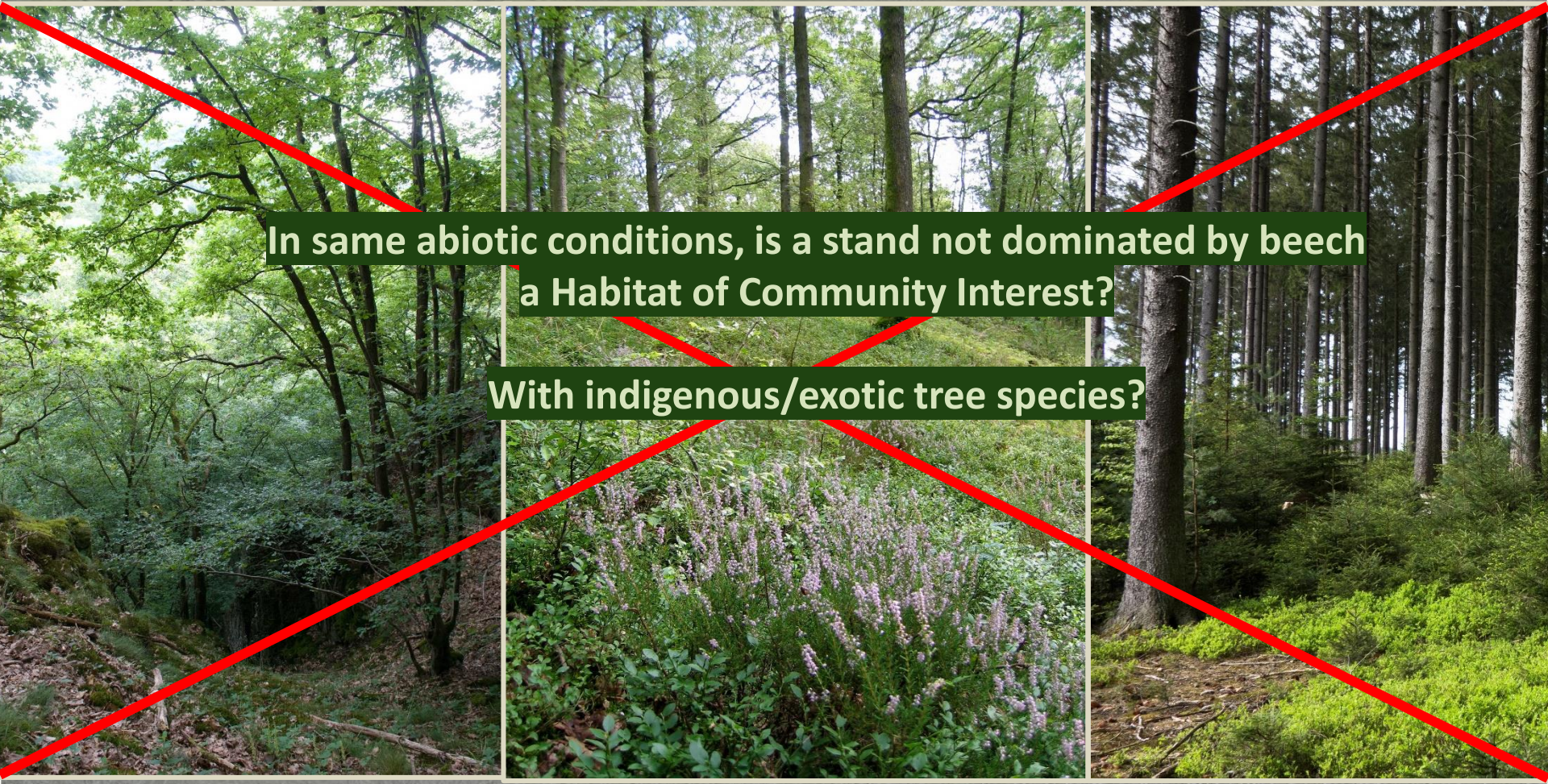
1) *Fagus sylvatica* and, in higher mountains, *Fagus sylvatica-Abies alba* or *Fagus sylvatica-Abies alba-Picea abies* forests developed on acid soils of the medio-European domain of central and northern Central Europe, with *Luzula luzuloides*, *Polytrichum formosum* and often *Deschampsia flexuosa*, *Calamagrostis villosa*, *Vaccinium myrtillus*, *Pteridium aquilinum*.
The following sub-types are included:
41.111 Medio-European collinar woodrush beech forests
Acidophilous *Fagus sylvatica* forests of the lesser Hercynian ranges and Lorraine, of the collinar level of the greater Hercynian ranges, the Jura and the Alpine periphery, of the western sub-Pannonic and the intra-Pannonic hills, not or little accompanied by self sown conifers, and generally with an admixture of *Quercus petraea*, or in some cases *Quercus robur*, in the canopy.
41.112 Medio-European montane woodrush beech forests
Acidophilous forests of *Fagus sylvatica*, *Fagus sylvatica* and *Abies alba* or *Fagus sylvatica*, *Abies alba* and *Picea abies* of the montane and high-montane levels of the greater Hercynian ranges, from the Vosges and the Black Forest to the Bohemian Quadrangle, the Jura, the Alps, the Carpathians and the Bavarian Plateau.

2) Plants: *Fagus sylvatica, Abies alba, Picea abies, Luzula luzuloides*, *Polytrichum formosum* and often *Deschampsia flexuosa*, *Calamagrostis villosa*, *Vaccinium myrtillus*, *Pteridium aquilinum*.


Strict definition → Fagus forest, with a possible mix of other tree species

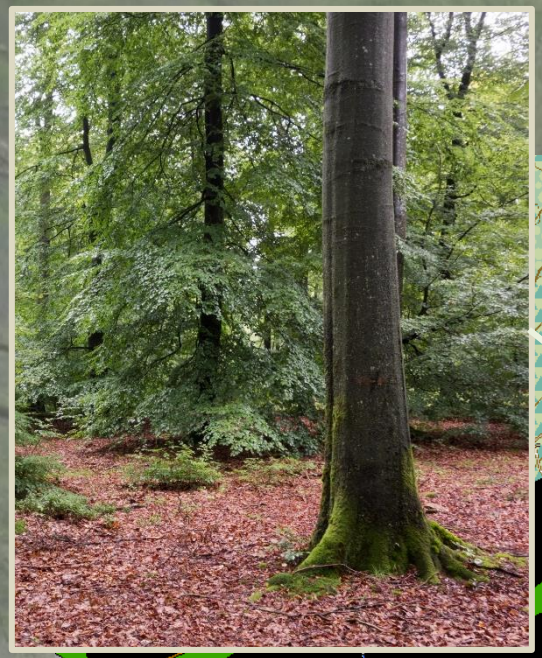
Example of forests

Currently , in conditions (soil, climate) corresponding to habitat 9110, various situations due to natural processes and human management (plantations, coppice…)



In same abiotic conditions, is a stand not dominated by beech a Habitat of Community Interest?

With indigenous/exotic tree species?



Different stands → Different levels of conservation measures/constraints

Climate change → effects on ecosystems

- Effect on species **abundance and distribution**
- Changes in **habitats** which species occupy
- Changes in **phenology** which may lead to loss of synchrony between species
- Changes in **community composition**
- Changes in ecosystem **processes, functions and services**
- **Loss of space** for habitats and ecosystems

(Source : Climate adapt, 2015 - Platform partnership between EC and EEA)

Climate change → effects on Habitats of Community Interest

- Changes in **abiotic conditions** : (micro-)climate, flooding regimes, water level in soils…

- Changes in **species composition** (migration, local extinction)

- Changes in **functioning**

- **Range shifts**

On the long term, some habitats might:

- **have a change of their functioning and typical composition, but remain in their definition (ex. caves)**

- **be replaced by other habitats (HCI or not (existing yet)) → habitats shift (ex. mountain hay meadows vs. lowland hay meadows)**

- **disappear (locally or at European scale) (ex. glaciers)**

Example of forests

- Effect on species abundance and distribution

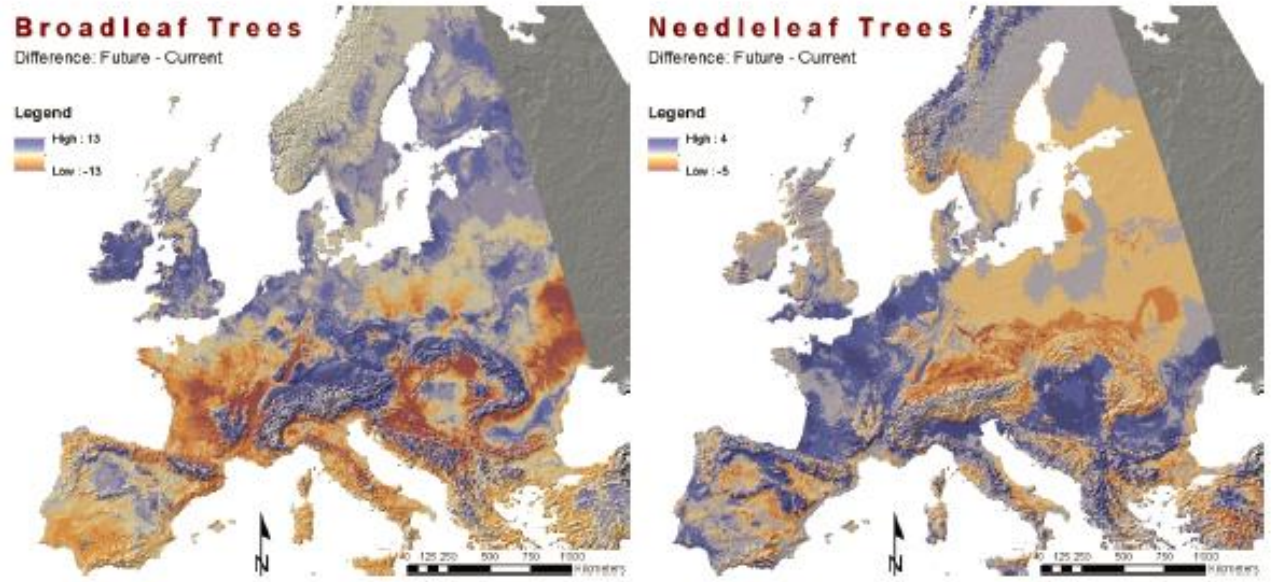
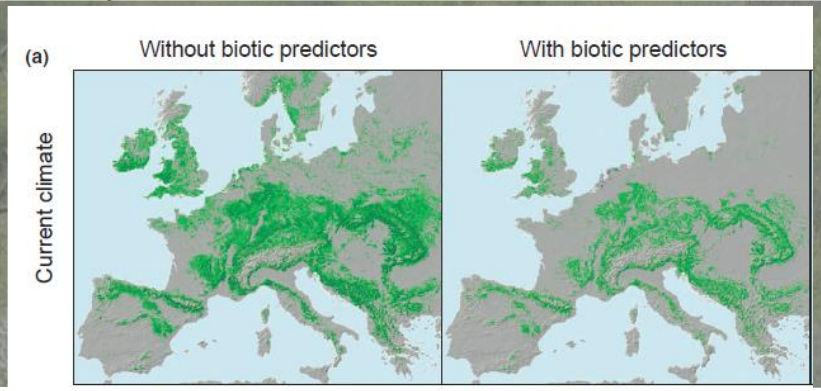


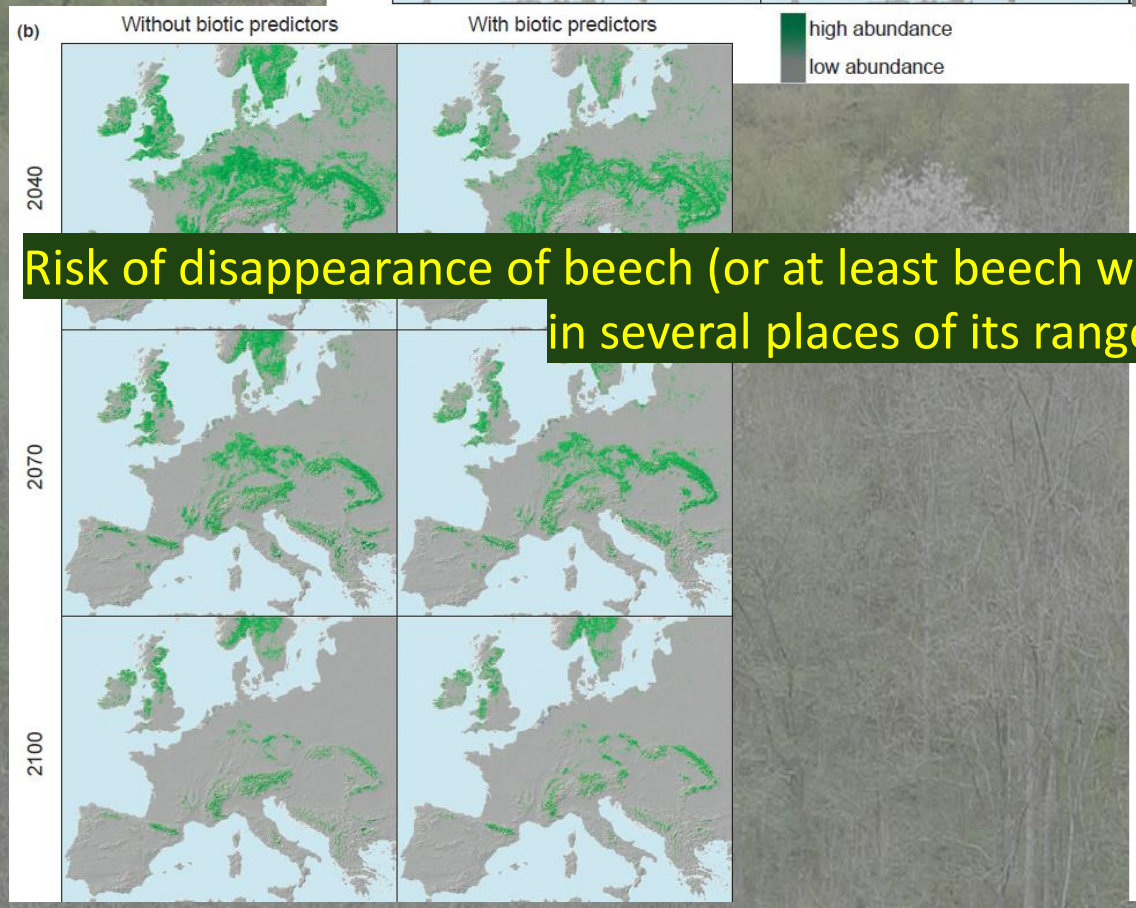
Figure 3. Changes in plant functional type composition from single species habitat suitability changes following climate change. The two panels indicate to what degree broadleaf (left panel) and needleleaf (right panel) tree species are expected to increase (blue) or decrease (red) in numbers. The results represent ensemble SDM simulations from six climate scenario (A1B) simulations and six statistical models.

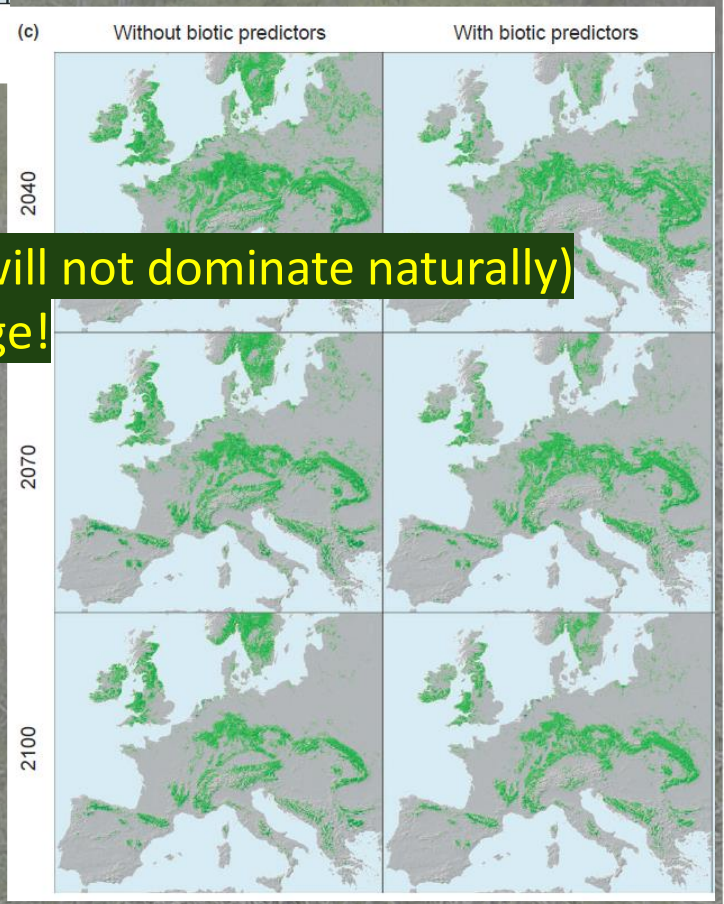
(Source : Fitzgerald & Lindner 2013)

Predictions of the relative abundance of *Fagus sylvatica* in Europe (a) for current climate; (b,c) for 2040, 2070 and 2100 according to (b) the A1fi scenario and (c) the B2 SRES scenario from models calibrated with climatic, edaphic and topographic predictors and from models calibrated additionally with biotic predictors.



(Source : Meier *et al*. 2011)





Risk of disappearance of beech (or at least beech will not dominate naturally) in several places of its range!

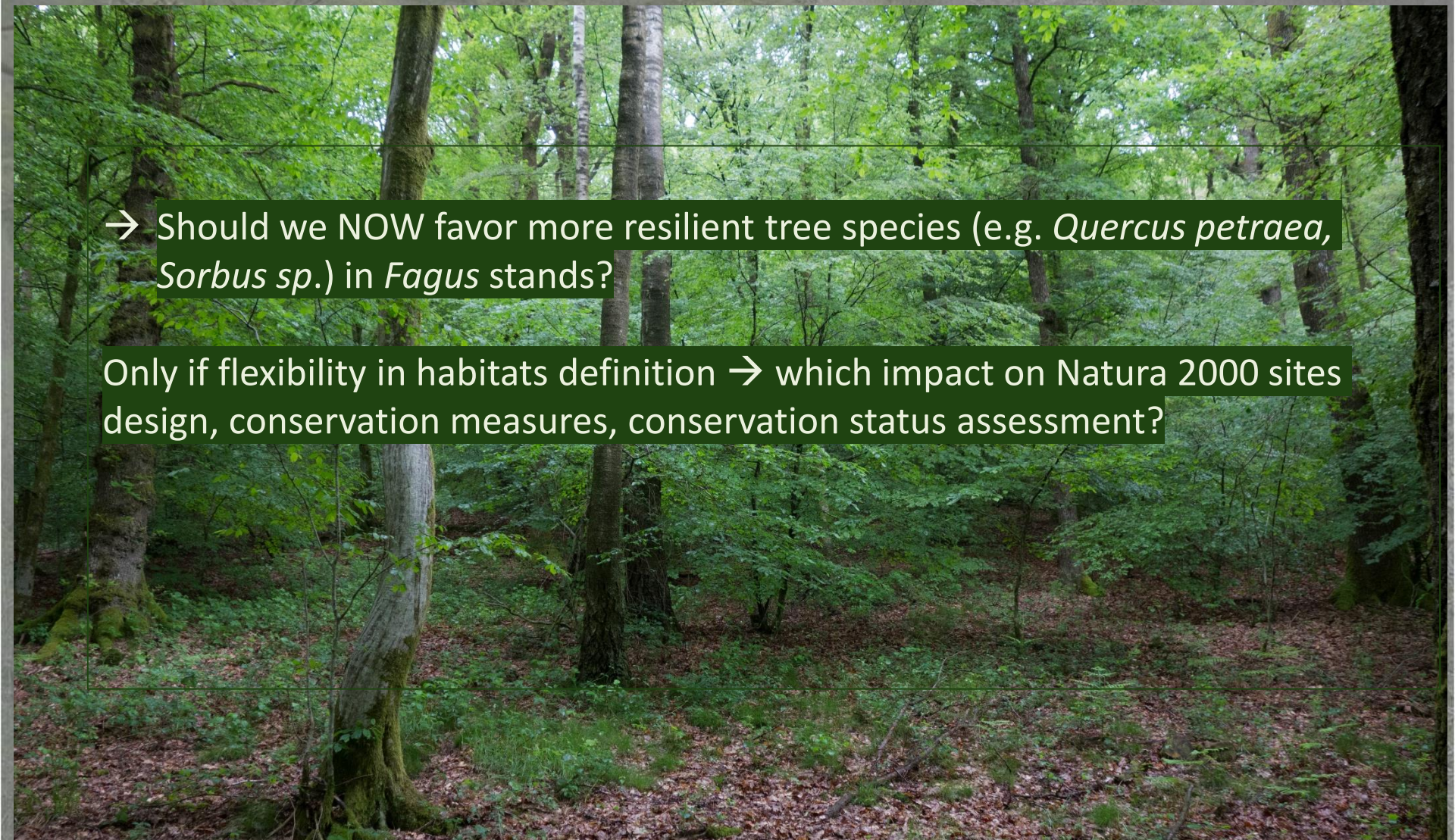
Example of forests

Habitat 9110: what if beech is not dominant any more?

Currently, if the definition is taken strictly (Interpretation Manual):
no beech (co-)dominating → no habitat of Community Interest.

Example of forests

General recommendation for forest resilience: favor mixed stands = mix of species and origins



→ Should we NOW favor more resilient tree species (e.g. *Quercus petraea, Sorbus sp*.) in *Fagus* stands?

Only if flexibility in habitats definition → which impact on Natura 2000 sites design, conservation measures, conservation status assessment?

Climate change → general adaptive management

- understand that change is inevitable – **species will respond individualistically** to climate change;

- make **space for the development of rivers and coasts** due to changes in precipitation patterns;

- establish ecological networks through habitat **restoration** and **creation** – some species will move from their current locality thus the restoration or creation of protected areas, **new habitat**, and **corridors** between patches of habitats should be promoted;

- **aid gene flow** – promoting genetic variability may be vital to enhance species adaptive capacity;

- **consider species translocation** (introduction, re-introduction or restocking) and/or ex-situ conservation;

- respond to changing conservation priorities (due to climate change) at local, regional, national and international levels by **adapting conservation targets** in the different conventions and conservation mechanisms/ plans.

(DEFRA 2008 *in* Climate ADAPT)

Annex I restricted list ⟺ Climate change adaptation

Habitats of Community Interest vs. role of other natural habitats that:

- could be more resilient (or are home to species or ecotypes that are more resilient) to climate change (ex. xerophilous forests)
- might be more sensitive to pressures from climate change
- are useful for climate change adaptation or for the migration of species

Conclusion

List of habitats of Community interest established in 1990s

Fixed definition of habitats : maps of habitats have been used to designate the N2000 network and locate and elaborate conservation and management measures

Challenges of climate change

Species communities and ecosystem functioning will change
→ habitats as we know them might not be the same in the future

Conclusion

Recommendations for resilience include:

- Interventions on habitats: mix species, or even translocate them
  → human-induced or favored changes should take place NOW or in the short-term
  → what about Habitats Directive obligations for the maintenance of habitats of annex I and their existing stuctures and functions

- Create new habitats, protected areas, habitats restoration, corridors: also using non-Annex I habitats → Natura 2000 should be the backbone of European Green Infrastructure but is this tool adapted without any change to the official text and annexes of the Directive?

Adaptation/flexibility of definitions?

Should there be

- **new habitats** in the Annex I?

and/or

- more **flexibility** in the habitats definition:
  - ➢ change in the Interpretation Manual?
  - ➢ official European guidelines?

With which safeguards: no introduction of new species? or only indigenous species? only European species...

→ Impact on Natura 2000 network: changing content and location of conservation measures and targets? Complete or change the network?
+ changes in reporting (art. 17, SDF)

References

Climate-adapt 2015. https://climate-adapt.eea.europa.eu/metadata/adaptation-options/adaptive-management-of-natural-habitats

Fitzgerald, J. and Lindner, M. (eds.) (2013) Adapting to climate change in European forests - Results of the MOTIVE project. Pensoft Publishers, Sofia, 108 pp.

Meier E. S,, Edwards T. C. Jr, Kienast F., Dobbertin M. & Zimmermann N.E. Co-occurrence patterns of trees along macro-climatic gradients and their potential influence on the present and future distribution of Fagus sylvatica L. *in* Journal of Biogeography (J. Biogeogr.) (2011) 38, 371–382