

FOREST TYPE CLASSIFICATION

within the EU/ICP Forests Biodiversity Test-Phase (ForestBIOTA)

I. Introduction

Relations between environmental factors which are in the focus of the biodiversity test-phase will to a large extent be forest type specific. When collecting and interpreting forest plot information from a multitude of Level II plots throughout Europe, the need of categorizing the plots therefore becomes obvious. Also the Ministerial Conference on Protection of Forests in Europe (MCPFE) has taken into account that given the variability of forest conditions on a European scale, certain of the developed indicators for sustainable forest management are of little significance unless specified to „forest types“.

II. Classification coverage and forest definition

The basic MCPFE quantitative indicator, to which all other MCPFE forest type based indicators refer is forest and other wooded land area indicator as defined by the UNECE/FAO Temperate and Boreal Forest Resources Assessment 2000 (TBFRA-2000) nomenclature. The geographical scope of the classification could be all European lands that could be assigned to TBFRA-2000 forest and other wooded land domain. However, under the European Nature Information System (EUNIS) the arrangement of other wooded land is not as much evident as for forests and a stringent categorization of other wooded land might only be derived in the future. **Therefore, the present classification applies to forests as defined within the TBFRA and EUNIS** with the main criteria of 10% tree crown cover, minimum 5 m height at tree maturity and at least 0.5 ha size.

III. Hierarchical classification structure

A hierarchical categorization allows scaling levels according to the resolution preferable for reporting. According to EUNIS and TBFRA-2000 three levels can be distinguished

1st level:

1. Broadleaved deciduous forests
2. Broadleaved evergreen forests
3. Coniferous forests
4. Mixed forests

2nd level:

28 classes mostly corresponding to aggregations of EUNIS III level types

3rd level:

52 EUNIS level III woodlands

IV. Classification within ForestBIOTA

Within the ForestBIOTA project all plots are classified into one of the 52 EUNIS level III woodland types (see Tab. 1) using the operational guide for the EUNIS Habitat Classification on the subsequent pages (D. Moss. 2002). **For each ForestBIOTA plot one of the 52 codes in Tab 1 must be recorded (G1.1 – G4.F)**

An aggregation into one of the 28 2nd level classes can be carried out based on this first classification using Tables 2a – 2d (From: A. Barbati, P. Corona, T.B. Larsson and M. Marchetti: Deriving an harmonized scheme of forest types at European continental level. BEAR Technical Report No. 8).

- A : Marine habitats
- B : Coastal habitats
- C : Inland surface water habitats
- D : Mire, bog and fen habitats
- E : Grassland and tall forb habitats
- F : Heathland, scrub and tundra habitats
- G : Woodland and forest habitats and other wooded land
- H : Inland unvegetated or sparsely vegetated habitats
- I : Regularly or recently cultivated agricultural, horticultural and domestic habitats
- J : Constructed, industrial and other artificial habitats

Habitat Classification Categories

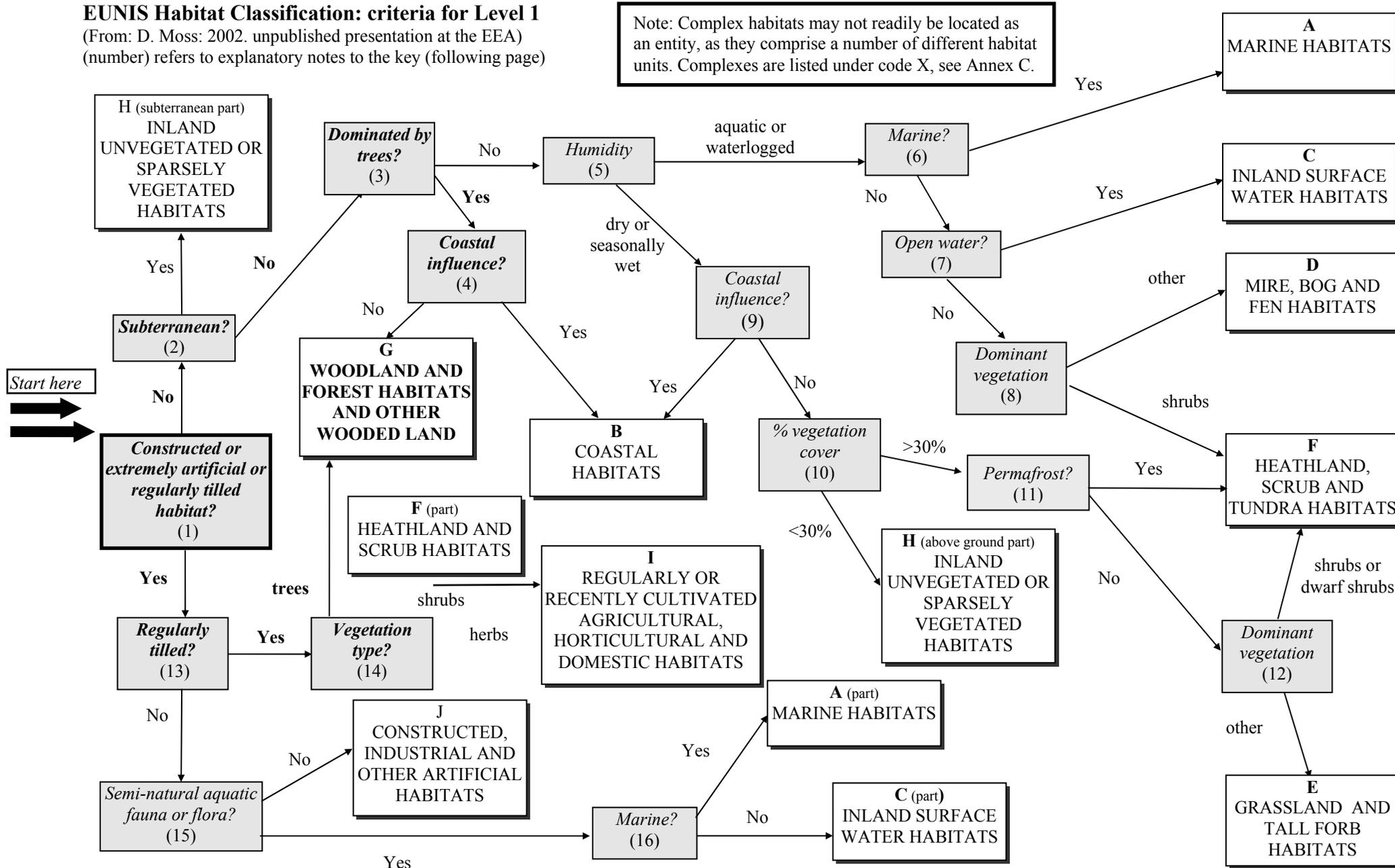
- G1 - Broadleaved deciduous woodland
 - G1.1 - Riparian [Salix], [Alnus] and [Betula] woodland
 - G1.2 - Fluvial [Fraxinus] - [Alnus] and [Quercus] - [Ulmus] - [Fraxinus] woodland
 - G1.3 - Mediterranean [Populus], [Fraxinus], [Ulmus] and related riparian woodland
 - G1.4 - Broadleaved swamp woodland not on acid peat
 - G1.5 - Broadleaved swamp woodland on acid peat
 - G1.6 - [Fagus] woodland
 - G1.7 - Thermophilous deciduous woodland
 - G1.8 - Acidophilous [Quercus]-dominated woodland
 - G1.9 - Non-riverine woodland with [Betula], [Populus tremula], [Sorbus aucuparia] or [Corylus avellana]
 - G1.A - Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus], [Acer], [Tilia], [Ulmus] and related woodland
 - G1.B - Non-riverine [Alnus] woodland
 - G1.C - Highly artificial broadleaved deciduous forestry plantations
 - G1.D - Fruit and nut tree orchards
 - G2 - Broadleaved evergreen woodland
 - G2.1 - Mediterranean evergreen [Quercus] woodland
 - G2.2 - Eurasian continental sclerophyllous woodland
 - G2.3 - Macaronesian [Laurus] woodland
 - G2.4 - [Olea europaea] - [Ceratonia siliqua] woodland
 - G2.5 - [Phoenix] groves
 - G2.6 - [Ilex aquifolium] woods
 - G2.7 - Canarian heath woodland
 - G2.8 - Highly artificial broadleaved evergreen forestry plantations
 - G2.9 - Evergreen orchards and groves
 - G3 - Coniferous woodland
 - G3.1 - [Abies] and [Picea] woodland
 - G3.2 - Alpine [Larix] - [Pinus cembra] woodland
 - G3.3 - [Pinus uncinata] woodland
 - G3.4 - [Pinus sylvestris] woodland south of the taiga
 - G3.5 - [Pinus nigra] woodland
 - G3.6 - Subalpine mediterranean [Pinus] woodland
 - G3.7 - Lowland to montane mediterranean [Pinus] woodland (excluding [Pinus nigra])
 - G3.8 - Canary Island [Pinus canariensis] woodland
 - G3.9 - Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]
 - G3.A - [Picea] taiga woodland
 - G3.B - [Pinus] taiga woodland
 - G3.C - [Larix] taiga woodland
 - G3.D - Boreal bog conifer woodland
 - G3.E - Nemoral bog conifer woodland
 - G3.F - Highly artificial coniferous plantations
 - G4 - Mixed deciduous and coniferous woodland
 - G4.1 - Mixed swamp woodland
 - G4.2 - Mixed taiga woodland with [Betula]
 - G4.3 - Mixed sub-taiga woodland with acidophilous [Quercus]
 - G4.4 - Mixed [Pinus sylvestris] - [Betula] woodland
 - G4.5 - Mixed [Pinus sylvestris] - [Fagus] woodland
 - G4.6 - Mixed [Abies] - [Picea] - [Fagus] woodland
 - G4.7 - Mixed [Pinus sylvestris] - acidophilous [Quercus] woodland
 - G4.8 - Mixed non-riverine deciduous and coniferous woodland
 - G4.9 - Mixed deciduous woodland with [Cupressaceae] or [Taxaceae]
 - G4.A - Mixed woodland with [Cupressaceae], [Taxaceae] and evergreen oak
 - G4.B - Mixed mediterranean [Pinus] - thermophilous [Quercus] woodland
 - G4.C - Mixed [Pinus sylvestris] - thermophilous [Quercus] woodland
 - G4.D - Mixed [Pinus nigra] - evergreen [Quercus] woodland
 - G4.E - Mixed mediterranean pine - evergreen oak woodland
 - G4.F - Mixed forestry plantations

Table 1: 52 EUNIS level III woodland types (From: <http://eunis.eea.eu.int>)

EUNIS Habitat Classification: criteria for Level 1

(From: D. Moss: 2002. unpublished presentation at the EEA)
(number) refers to explanatory notes to the key (following page)

Note: Complex habitats may not readily be located as an entity, as they comprise a number of different habitat units. Complexes are listed under code X, see Annex C.



Note: Complex habitats may not readily be located as an entity, as they comprise combinations of a number of different habitat units. Complexes are e listed under code X, see Annex C.

Explanatory notes to the key: Level 1

1. Is the habitat highly artificial, i.e. either constructed or with a man-made substrate; industrial; maintained solely by frequent tilling; or arising from recent abandonment of previously tilled or constructed habitats (path = *Yes*)? All other habitats follow path = *No*. Note that habitats which originated through extractive industries (quarries, mines, peat diggings etc) but which have been colonised by natural or semi-natural plant and/or animal communities (other than pioneer or ruderal communities) follow path = *No*.
2. The criterion separates subterranean non-marine caves and passages and underground waters (path = *Yes*).
3. Habitats where the dominant vegetation is, or was until very recently, trees, typically single-stemmed, and with a canopy cover of at least 10% are distinguished (path = *Yes*) from habitats dominated by other types of vegetation or without vegetation or dominated by animal communities. Lines of trees, coppices, and very recently clear-felled areas with pre-existing ground cover, not yet re-stocked and with no succession to weedy vegetation follow path = *Yes*. Note that successional weedy communities follow path = *No* and are categorised under E, Grassland and tall forb habitats. Hedges which may have occasional tall trees follow path = *No*, and are categorised under F, Heathland, scrub and tundra. Note also that sparsely wooded areas with canopy less than 10%, including parkland, are included in complexes. Trees are normally able to reach a height of 5m at maturity but this height may be lower at high latitudes or altitudes. Note that dwarf trees and scrub (under 50cm such as occur in extreme alpine conditions) follow path = *No*. Occasionally tall shrubs such as hazel (*Corylus*) and some willows (*Salix*) may have a woodland-type structure and follow path = *Yes*. Canopy cover 10% and height 5m are taken from the FAO TBFRA 2000 definitions (Temperate and Boreal Forest Resource Assessment 2000). It should be noted that in some areas e.g. the Boreal zone, the normal dividing point is 30%. Statistics produced at a regional scale might reflect this divergence.
4. Habitats occupying coastal features and characterised by their proximity to the sea (path = *Yes*), including coastal dunes and wooded coastal dunes, beaches and cliffs, are separated from other terrestrial habitats (path = *No*).
13. Habitats maintained solely by frequent tilling or arising from recent abandonment of previously tilled ground such as arable land and gardens (path = *Yes*) are distinguished from completely artificial habitats (path = *No*), which are primarily human settlements, industrial developments, transport or waste dump sites or highly artificial waters with wholly constructed beds or heavily contaminated water.
14. Regularly tilled habitats are separated according to dominant vegetation type: *shrub* orchards; *tree* nurseries and tree-crop plantations; and habitats dominated by cultivated herbaceous vegetation (path = *herbs*).

Descriptions of level 1 habitats related to forests

B Coastal habitats

Coastal habitats are those above spring high tide limit (or above mean water level in non-tidal waters) occupying coastal features and characterised by their proximity to the sea, including coastal dunes and **wooded** coastal dunes, beaches and cliffs. Includes free-draining supralittoral habitats adjacent to marine habitats which are normally only affected by spray or splash, strandlines characterised by terrestrial invertebrates and moist and wet coastal dune slacks. Excludes dune slack pools and rockpools.

D Mire, bog and fen habitats

Habitats which are saturated, with the water table at or above ground level for at least half of the year, dominated by herbaceous or ericoid vegetation e.g. bogs, marshes. Includes waterlogged habitats where the groundwater is frozen. **Excludes** waterlogged habitats dominated by **trees** or large shrubs.

Note that habitats which intimately combine waterlogged habitats with pools of open water are considered as complexes.

F Heathland, scrub and tundra habitats

Non-coastal habitats which are dry or only seasonally wet (with the water table at or above ground level for less than half of the year) with greater than 30% vegetation cover. The dominant vegetation is shrubs or dwarf shrubs. Includes regularly tilled shrub **orchards**, **hedges** (which may have occasional tall **trees**) and habitats characterised by the presence of permafrost. Also includes dwarf **trees** and scrub (under 50cm, such as occur in extreme alpine conditions).

G Woodland and forest habitats and other wooded land

Habitats where the dominant vegetation is, or was until very recently, trees, typically single-stemmed, and with a canopy cover of at least 10%. Includes lines of trees, coppices, and very recently clear-felled areas with pre-existing ground cover, not yet re-stocked and with no succession to weedy vegetation. Trees are normally able to reach a height of 5m at maturity but this height may be lower at high latitudes or altitudes. Tall shrubs such as hazel (*Corylus*) and some willows (*Salix*) with a woodland-type structure are treated as woodland. Includes regularly tilled tree nurseries and tree-crop plantations. Excludes dwarf trees and scrub (under 50cm) such as occur in extreme alpine conditions.

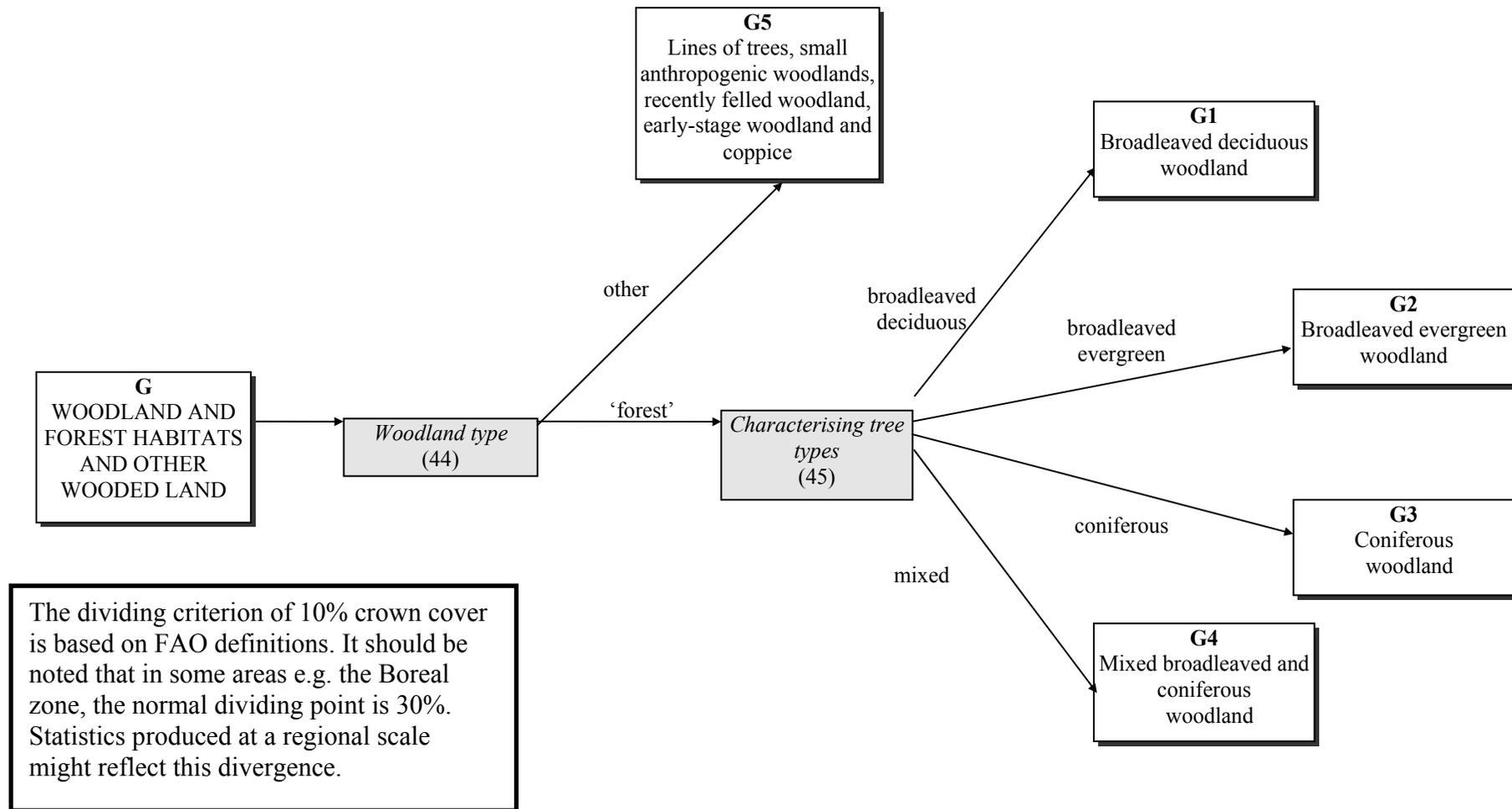
Note sparsely wooded areas with canopy less than 10% , including parkland, are included in complexes.

I Regularly or recently cultivated agricultural, horticultural and domestic habitats

Habitats maintained solely by frequent tilling or arising from recent abandonment of previously tilled ground such as arable land and gardens. Includes tilled ground subject to inundation. **Excludes shrub orchards, tree nurseries and tree-crop plantations.**

EUNIS Habitat Classification: criteria for woodland and forest habitats and other wooded land to Level 2

(From: D. Moss: 2002. unpublished presentation at the EEA)
 (number) refers to explanatory notes to the key (following page)



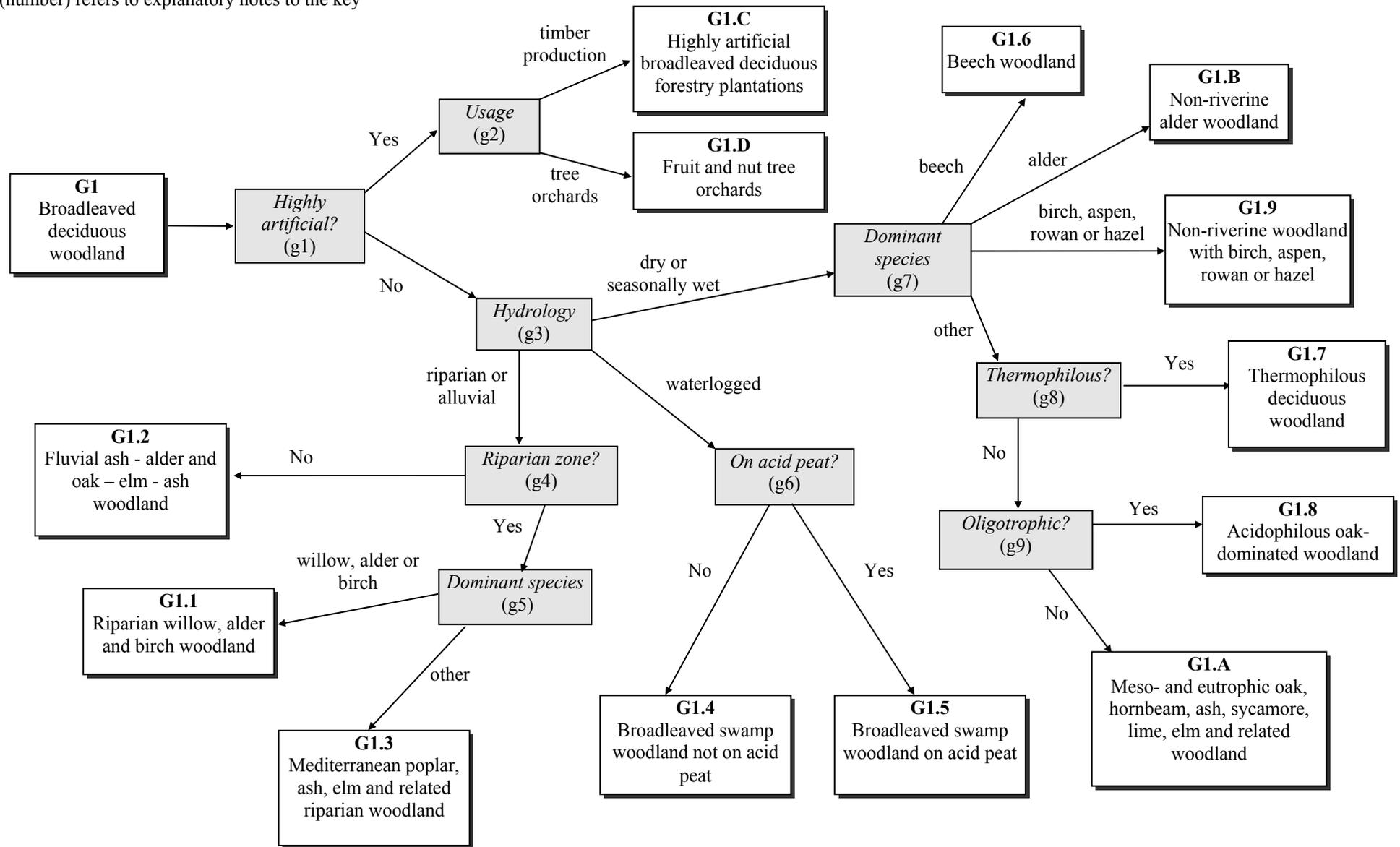
Explanatory notes to the key: Level 2, woodland and forest habitats and other wooded land

44. 'Forest' habitats are separated from *other* wooded habitats. 'Forest' habitats are defined as: natural stands of area greater than 0.5ha and crown cover greater than 10% and tree height greater than 5m; natural stands of area less than 0.5ha and crown cover greater than 10% and tree height greater than 5m with more or less natural ground flora (i.e. not heavily influenced by man through management or damage); plantations of area greater than 0.5ha and crown cover greater than 10% and tree height greater than 5m. *Other* wooded land includes: natural stands of area less than 0.5ha and crown cover greater than 10% and tree height greater than 5m heavily influenced by man through management or damage (small, intensively managed woods and small woods strongly influenced by anthropogenic activities); young natural stands with trees of height less than 5m and potential crown cover of greater than 10%; plantations of young trees with potential crown cover of greater than 10% and tree height less than 5m; plantations of area less than approximately 0.5ha with potential crown cover of greater than 10% and tree height greater than 5m; areas normally part of the forest area but temporarily unstocked as a result of human intervention or natural causes; coppice; narrow lines of mature trees, such as avenues and windbreaks. Note that dwarf trees and scrub (under 50cm such as occur in extreme alpine conditions) are included in F, Heathland scrub and tundra. Note that areas with trees where the crown cover is 5 –10 % are treated as a series of complexes. Note also that Atlantic parkland is treated as complex X12.
45. Forest is characterised by the dominant tree types, which may be mixtures of species within the categories *broadleaved deciduous*; *mixed* broadleaved and coniferous; *broadleaved evergreen*; and *coniferous*. Note that broadleaved woodland is defined as wooded land on which more than 75% of the tree crown cover consists of broadleaved species and that coniferous woodland is defined as wooded land on which more than 75% of the tree crown cover consists of coniferous species (based on FAO definition). Mixed woodland is defined as wooded land on which neither coniferous, nor broadleaved species account for more than 75% of the crown cover.

EUNIS Habitat Classification: criteria for broadleaved deciduous woodland (G1) to Level 3

(From: D. Moss: 2002. unpublished presentation at the EEA)

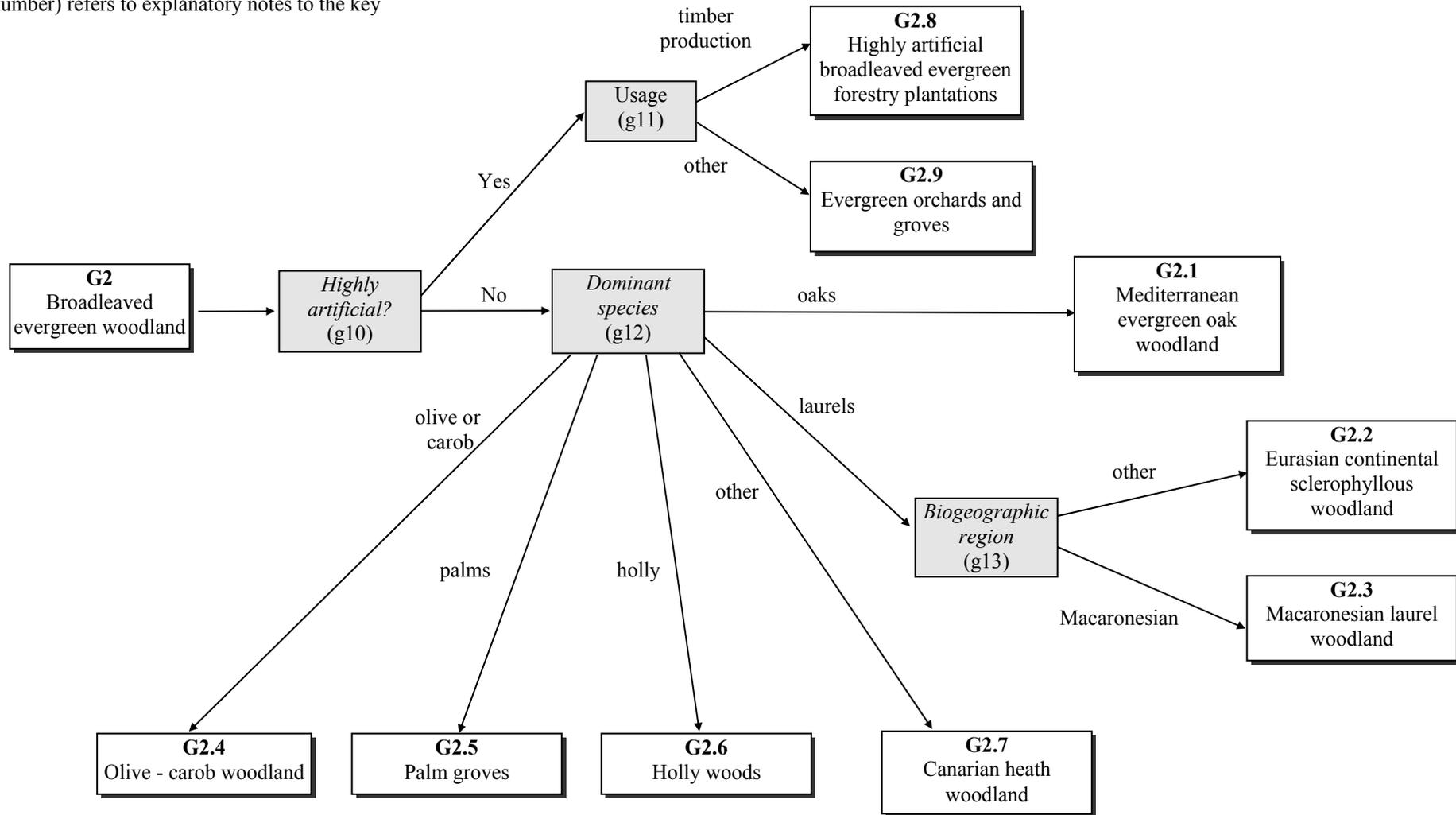
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EUNIS Habitat Classification: criteria for broadleaved evergreen woodland (G2) to Level 3

(From: D. Moss: 2002. unpublished presentation at the EEA)

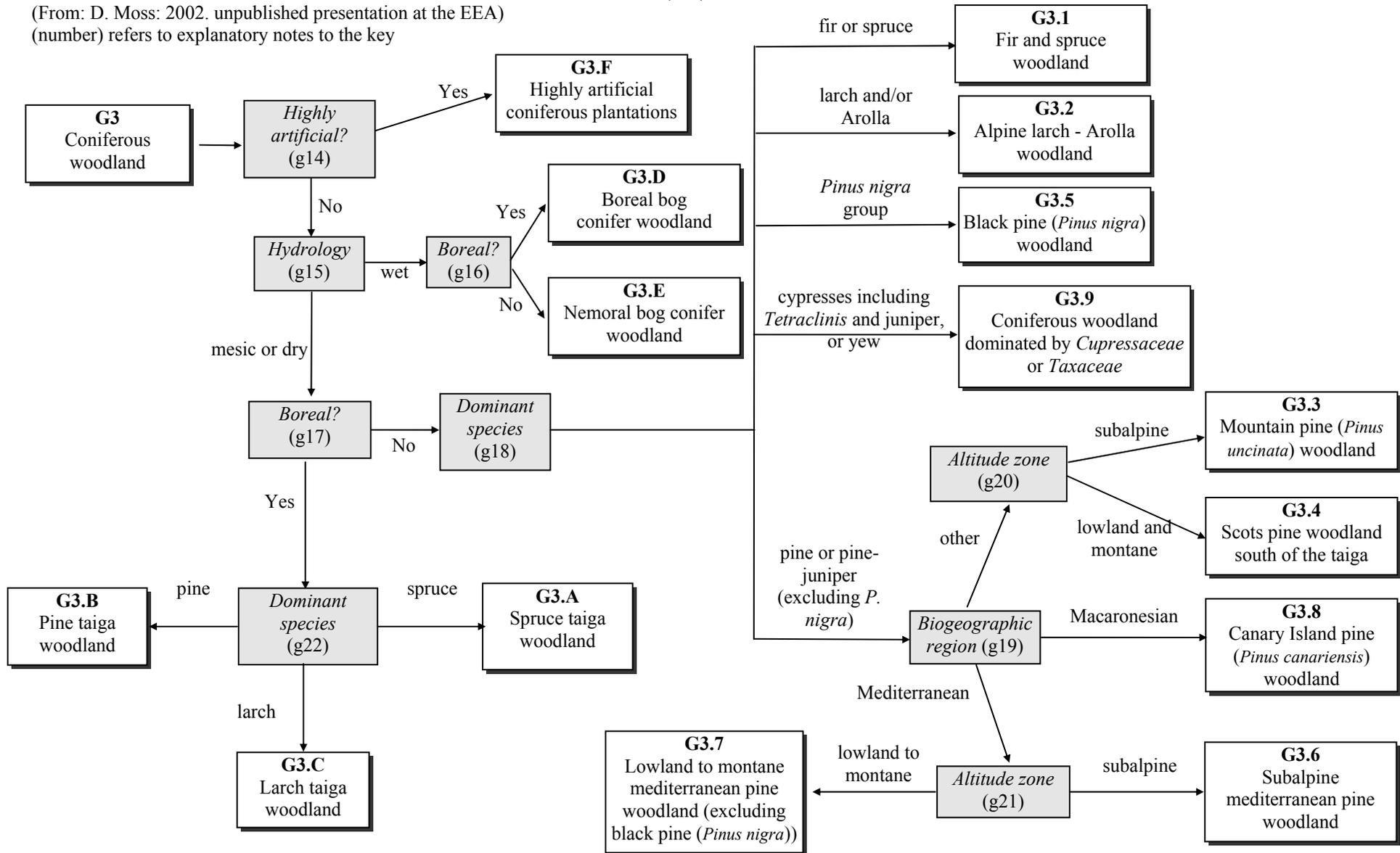
(number) refers to explanatory notes to the key



EUNIS Habitat Classification: criteria for coniferous woodland (G3) to Level 3

(From: D. Moss: 2002. unpublished presentation at the EEA)

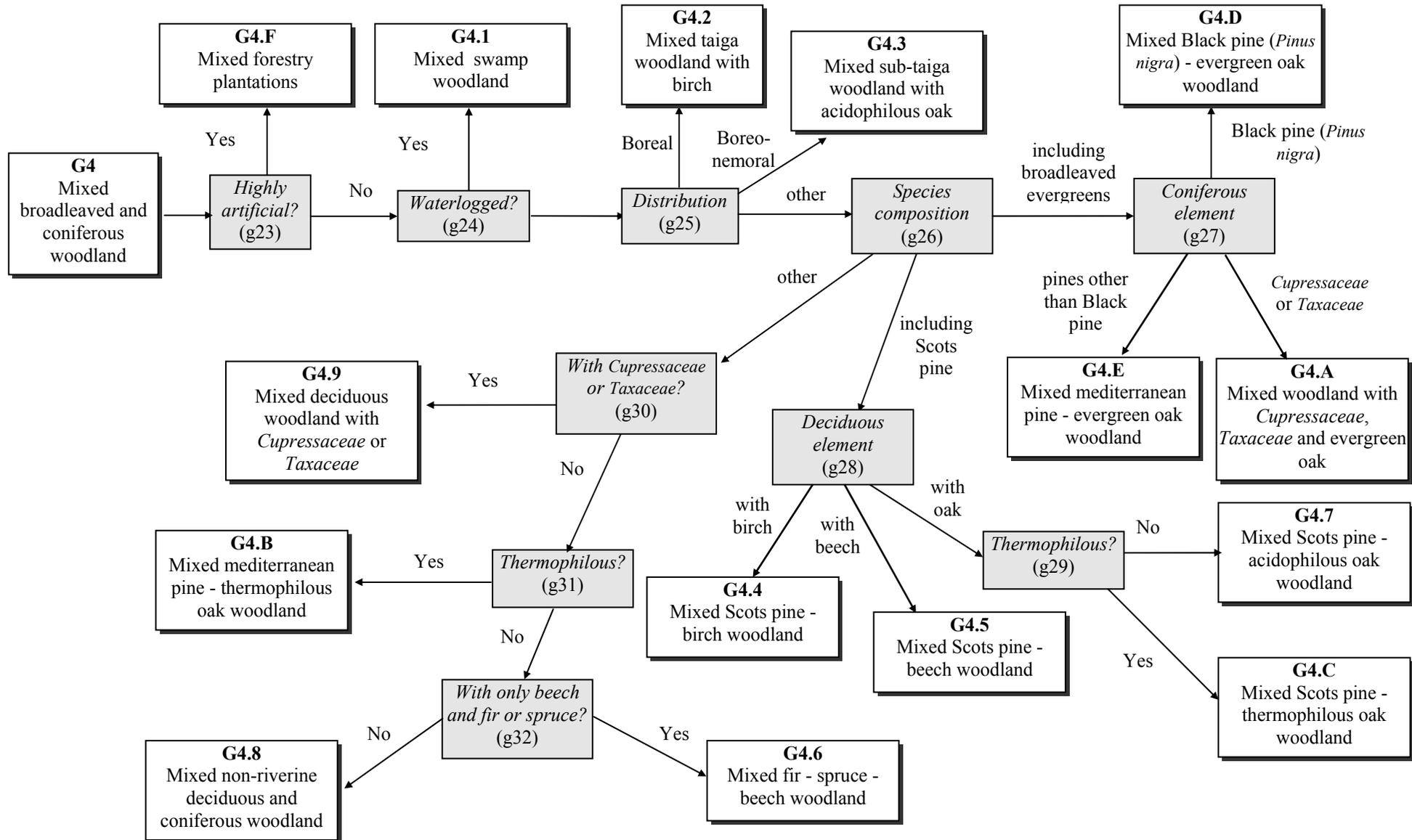
(number) refers to explanatory notes to the key



EUNIS Habitat Classification: criteria for mixed broadleaved and coniferous woodland (G4) to Level 3

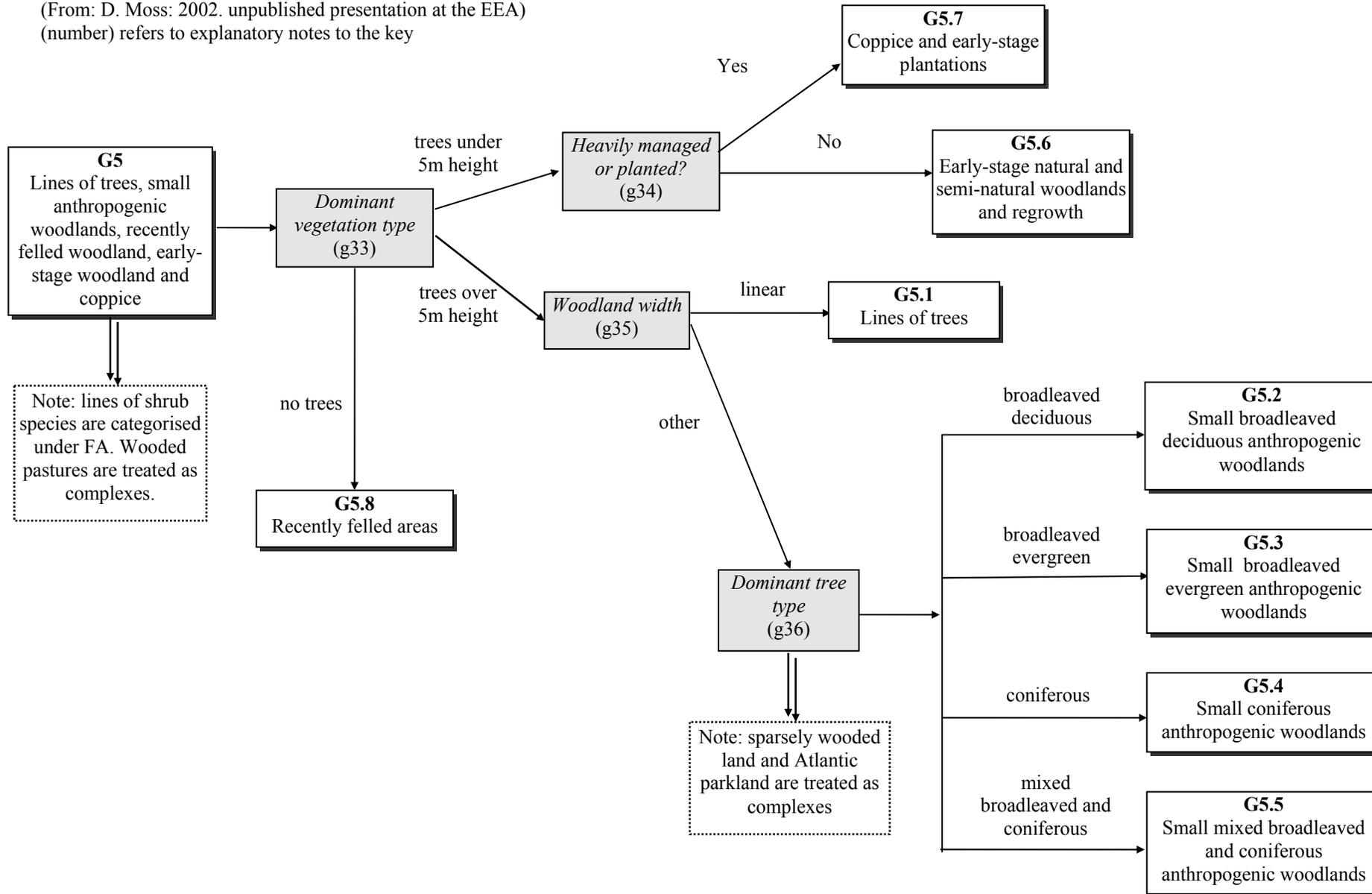
(From: D. Moss: 2002. unpublished presentation at the EEA)

(number) refers to explanatory notes to the key



EUNIS Habitat Classification: criteria for lines of trees, small anthropogenic woodlands, recently felled woodland, early-stage woodland and coppice (G5) to Level 3

(From: D. Moss: 2002. unpublished presentation at the EEA)
 (number) refers to explanatory notes to the key



Explanatory notes to the key: Level 3 (Habitat type G)

- g1. Highly artificial broadleaved deciduous forests (often of exotic species) of uniform age and structure, completely dependent on man's operations and with impoverished associated communities (path = *Yes*) are separated from less highly managed habitats.
- g2. Highly artificial forestry plantations normally used primarily for *timber production* (including for fibre and wood-pulp) are separated from fruit and nut *tree orchards*. Note that shrub orchards are categorised under FB.
- g3. Three hydrological regimes are distinguished: *waterlogged* (permanently wet, with the water table at or close to the surface), *riparian or alluvial* (dependent on flowing water, giving rise to a high water table and subject to occasional flooding) and *dry or seasonally wet*.
- g4. Ribbon-like tracts of trees on flood plains near rivers or streams (riparian gallery or fringe forests) (path = *Yes*) are distinguished from fluvial forests on river terraces (path = *No*). Note that woodlands of riparian type (mainly comprising phytosociological communities of *Salicetea purpureae*, *Alnion incanae*) can occur directly on banks of rivers and streams, but also in other parts of flood plains with sufficiently high water levels close to the ground surface.
- g5. Riparian woodlands dominated by *willow, alder and birch* are separated from riparian woodland habitats characteristic of the mediterranean climate dominated by *other* species (mainly comprising phytosociological communities of *Populetalia albae*, *Platanetalia orientalis*). Note that Mediterranean willow woods follow path = *willow, alder and birch*.
- g6. Broadleaved swamp woodlands are distinguished between those growing on acid peat (path = *Yes*) and those formed under neutral or basic conditions (path = *No*).
- g7. Dry and seasonally wet woodland habitats are separated according to their dominant species: *beech; alder; birch, aspen, rowan or hazel*; and *other*.
- g8. Woodlands characterised by thermophilous species (e.g. phytosociological communities of *Quercetea pubescentis*) (path = *Yes*) are distinguished from those of other climatic types.
- g9. Woodlands characteristic of oligotrophic soils, usually with acidophilous species, are separated (path = *Yes*) from those on more meso- to eutrophic substrates. Note that birch may be present but never dominant in habitat units in G1.8. More or less pure stands of birch are included under G1.9.
- g10. Highly artificial broadleaved evergreen forests (often of exotic species) of uniform age and structure, completely dependent on man's operations and with impoverished associated communities (path = *Yes*) are separated from less highly managed habitats.
- g11. Highly artificial evergreen forestry plantations normally primarily used for *timber production* are separated from those used for *other* purposes (including olive groves and palm plantations).
- g12. Habitats are separated according to their dominant species: *oaks* (mainly comprising phytosociological communities of *Quercetalia ilicis*, *Quercetalia pubescentis* with dominance of *Quercus ilex*, communities of *Quercus suber*); *laurels (Laurus)*; *holly (Ilex)*; *palms (Phoenix)*; *olive (Olea europea) or carob (Ceratonija siliqua)*; and *other* very tall, forest-like formations dominated by *Erica arborea*, *Myrica faya*, *Arbutus canariensis* or *Visnea mocanera*.
- g13. Laurel (*Laurus*)-dominated habitats characteristic of the *Macaronesian* biogeographic region are separated from those of the Mediterranean and Atlantic regions (path = *other*).

- g14. Highly artificial coniferous forests (often of exotic species) of uniform age and structure, completely dependent on man's operations and with impoverished associated communities (path = *Yes*) are separated from less highly managed habitats.
- g15. Two hydrological regimes are distinguished: *wet* (with the water table at or close to the surface for at least half the year); and *mesic or dry*.
- g16. Wet coniferous woodland habitats characteristic of the Boreal zone are distinguished (path = *Yes*).
- g17. Mesic or dry coniferous woodland habitats characteristic of the Boreal zone are distinguished (path = *Yes*).
- g18. Mesic and dry non-Boreal habitats are separated according to their dominant species groups: *fir or spruce* (mainly comprising phytosociological communities of *Abieti-Piceion*, *Chrysanthemo rotundifolii-Piceion*, *Piceetalia excelsae*); *larch* (*Larix spp.*) and/or *Arolla* (*Pinus cembra*); *Pinus nigra group* (*Pinus nigra*, *Pinus dalmatica*, *Pinus laricio*, *Pinus pallasiana*), *cypresses* (*Cupressus* and *Tetraclinis*), *juniper* (*Juniperus*) or *yew* (*Taxus baccata*); *pine or pine-juniper* (excluding *P. nigra*).
- g19. Pine (*Pinus*) and juniper (*Juniperus*)-dominated woodlands are separated between biogeographic region: *Mediterranean*; *Macaronesian* and *other* (Atlantic, Continental, Alpine, etc.)
- g20. Pine woodlands in the *subalpine* altitude zone (usually dominated by *Pinus uncinata*) are distinguished from those in the *lowland and montane* altitude zones usually dominated by *Pinus sylvestris*. Note that *Pinus sylvestris* forests may occur in the subalpine zone but follow path = *lowland and montane*.
- g21. Mediterranean pine woodlands other than of *Pinus nigra* are separated by altitude into a group in the montane and *subalpine* zones close to the tree-line (dominated by *Pinus heldreichii* (= *Pinus leucodermis*), *Pinus peuce*) and thermophilous pine woodlands in *lowland to montane* situations (dominated by *Pinus halepensis*, *P. pinea* and *P. pinaster*).
- g22. Coniferous woodlands of the taiga zone are separated between those dominated by *spruce*; by *pine*; and by *larch*.
- g23. Highly artificial mixed broadleaved deciduous and coniferous forests (often of exotic species and of uniform age and structure), completely dependent on man's operations and with impoverished associated communities (path = *Yes*) are separated from less highly managed habitats.
- g24. Habitats which are waterlogged (permanently wet, with the water table at or close to the surface) are separated (path = *Yes*) from those with other hydrological regimes.
- g25. Coniferous woodland characteristic of the *Boreal* zone with an admixture of birch; or of the *Boreo-nemoral* zone with an admixture of other deciduous species (usually oaks); are separated from *other* mixed woodlands.
- g26. The dominant species or species type separates three categories of mixed woodlands: those *including broadleaved evergreens*; those *including Scots pine* (*Pinus sylvestris*); and those where the species composition comprises *other* species.
- g27. Mixed woodland habitats including broadleaved evergreen species are separated according to the main coniferous species present: with cypresses and yews (*Cupressaceae* or *Taxaceae*); with mixed *pines other than Black pine* (*Pinus nigra*); and those including *Black pine* (*Pinus nigra*).
- g28. Mixed woodland habitats including Scots pine (*Pinus sylvestris*) are separated according to the main deciduous species present: those *with oaks*; those *with beech*; and those *with birch*.
- g29. Woodland habitats characterised by a mixture of Scots pine and thermophilous oak species are separated (Path = *Yes*).
- g30. Habitats characterised by a mixture of deciduous tree species and cypresses or yews (*Cupressaceae* or *Taxaceae*) are distinguished (path = *Yes*).
- g31. Habitats characterised by a mixture of pines, juniper and thermophilous oak species are separated (Path = *Yes*).

- g32. Other mixed coniferous and deciduous woodland habitats are separated according to their species composition: those with only beech and fir or spruce are separated (path = *Yes*) from those with combinations of the deciduous species birch, aspen, rowan or hazel and occasionally some beech together with fir, spruce or pine.
- g33. The dominant vegetation type separates three categories of these miscellaneous woodlands: *trees under 5 metres height* (including young stages of forest re-growth or early colonisation by tree species, trees planted for early whole tree harvesting, such as Christmas trees, and coppice, where tree species are artificially maintained in the shrub phase); areas normally part of the forest area but very recently clear-felled and not yet re-stocked and with no succession to weedy vegetation or temporarily unstocked due to natural causes such as wind-throw, (path = *no trees*); or *trees over 5 metres height*.
- g34. Young plantations and woodlands maintained in the young stage through coppicing are separated (path = *Yes*) from stands of young trees arising from natural colonisation or forest regrowth.
- g35. More or less continuous lines of trees and *linear* plantations comprising one to three distinct lines of trees, such as windbreaks and avenues, are separated from *other* small, intensively managed woods, small woods strongly influenced by anthropogenic activities and small plantations. Small woodlands are those up to about 0.5ha in extent. Tree cover may often comprise completely or partially non-native species.
- g36. Small anthropogenic woods and small plantations (less than about 0.5ha in extent) are characterised by the dominant tree types, which may be mixtures of species within the categories *broadleaved deciduous*; *broadleaved evergreen*; *coniferous*; and *mixed broadleaved and coniferous*. Small natural and semi-natural woodlands are characterised with their larger counterparts in G1 – G4. Note that broadleaved woodland is defined as wooded land on which more than 75% of the tree crown cover consists of broadleaved species and that coniferous woodland is defined as wooded land on which more than 75% of the tree crown cover consists of coniferous species (based on FAO definition). Mixed woodland is defined as wooded land on which neither coniferous, nor broadleaved species account for more than 75% of the crown cover.

Table 2a – Proposed subdivision of *Broadleaved deciduous woodland* corresponding to G1 EUNIS II level forest type. Relations between BEAR FTBAs and EUNIS III level types are reported as follows: < means BEAR type is contained within EUNIS; > means BEAR type contains EUNIS; # means there is an overlap; = means BEAR type is equal to EUNIS.

Modified from: BEAR Technical Report No. 8: Deriving an harmonized scheme of forest types at Eur continental level (A. Barbati, P. Corona, T.B. Larsson and M. Marchetti)

ForestBIOTA 2nd level		BEAR FTBA cross-links	Corresponding Eunis III level parent units	
(Code)	(Name)			
FT1N.1	Fluvial and riparian woodland		G1.1	Riparian [<i>Salix</i>], [<i>Alnus</i>] and [<i>Betula</i>] woodland
		23 >	G1.2	Fluvial [<i>Fraxinus</i>] - [<i>Alnus</i>] and [<i>Quercus</i>] - [<i>Ulmus</i>] - [<i>Fraxinus</i>] woodland
		24 #	G1.3	Mediterranean [<i>Populus</i>], [<i>Fraxinus</i>], [<i>Ulmus</i>] and related riparian woodland
FT1N.2	Broadleaved swamp woodland	21 #	G1.4	Broadleaved swamp woodland not on acid peat
			G1.5	Broadleaved swamp woodland on acid peat
FT1N.3a	Lowland beech forest	12 <	G1.6	[<i>Fagus</i>] woodland
For "Mountain mixed beech forests" see Table 2d, EUNIS III unit G4.6		13 <		
FT1N.4	Thermophilous deciduous woodland	14 <	G1.7	Thermophilous deciduous woodland
FT1N.5	Acidophilous oak-dominated woodland	9 #	G1.8	Acidophilous [<i>Quercus</i>]-dominated woodland
FT1N.6	Non-riverine woodland of pioneer species (birch/aspens/rowan hazel/alder)	9 #	G1.9	Non-riverine woodland with [<i>Betula</i>], [<i>Populus tremula</i>], [<i>Sorbus aucuparia</i>] or [<i>Corylus avellana</i>]
			G1.B	Non-riverine [<i>Alnus</i>] woodland
FT1N.7	Meso- and eutrophic oak, hornbeam, ash, sycamore, lime, elm and related woodland	9 # 10 #	G1.A	Meso- and eutrophic [<i>Quercus</i>], [<i>Carpinus</i>], [<i>Fraxinus</i>], [<i>Acer</i>], [<i>Tilia</i>], [<i>Ulmus</i>] and related woodland
FT1N.8	Mountain birch forest			
FT1A	Broadleaved deciduous plantations	30 = 31 = 33 >	G1.C	Highly artificial broadleaved deciduous forestry plantations
			G1.D	Fruit and nut tree orchards

Table 2b – Proposed subdivision of *Broadleaved evergreen woodland* corresponding to G2 EUNIS II level forest type. Relations between BEAR FTBAs and EUNIS III level types are reported as follows: < means BEAR type is contained within EUNIS; > means BEAR type contains EUNIS; # means there is an overlap; = means BEAR type is equal to EUNIS.

From: BEAR Technical Report No. 8: Deriving an harmonized scheme of forest types at European continental level (A. Barbati, P. Corona, T.B. Larsson and M. Marchetti)

ForestBIOTA 2nd level		<i>BEAR FTBA cross-links</i>	<i>Corresponding Eunis III level parent units</i>	
<i>(Code)</i>	<i>(Name)</i>			
FT2N	Natural and semi-natural broadleaved Mediterranean and Macaronesian sclerophyllus woodland	15 >	G2.1	<i>Mediterranean evergreen [Quercus] woodland</i>
			G2.2	<i>Eurasian continental sclerophyllous woodland</i>
		25 >	G2.3	<i>Macaronesian [Laurus] woodland</i>
		15 >	G2.4	<i>[Olea europaea] - [Ceratonia siliqua] woodland</i>
			G2.5	<i>[Phoenix] groves</i>
			G2.6	<i>[Ilex aquifolium] woods</i>
		25 >	G2.7	<i>Canarian heath woodland</i>
FT2A	Broadleaved evergreen plantations	32 = 33 >	G2.8	<i>Highly artificial broadleaved evergreen forestry plantations</i>
			G2.9	<i>Evergreen orchards and groves</i>

Table 2c – Proposed subdivision of *Coniferous woodland* corresponding to G3 EUNIS II level forest type. Relations between BEAR FTBAs and EUNIS III level types are reported as follows: < means BEAR type is contained within EUNIS; > means BEAR type contains EUNIS; # means there is an overlap; = means BEAR type is equal to EUNIS.

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ForestBIOTA 2nd level		<i>BEAR FTBA cross-links</i>	<i>Corresponding Eunis III level parent units</i>	
<i>(Code)</i>	<i>(Name)</i>			
FT3N.1	Fir and spruce woodland	8 <	G3.1	<i>[Abies] and [Picea] woodland</i>
FT3N.2	Alpine larch-Arolla and mountain pine woodland	1 #	G3.2	<i>Alpine [Larix] - [Pinus cembra] woodland</i>
			G3.3	<i>[Pinus uncinata] woodland</i>
FT3N.3	Scots pine woodland		G3.4	<i>[Pinus sylvestris] woodland south of the taiga</i>
FT3N.4	Black pine, Mediterranean and Macaronesian pines or pine-juniper woodland	16 #	G3.5	<i>[Pinus nigra] woodland</i>
		16 #	G3.6	<i>Subalpine mediterranean [Pinus] woodland</i>
		16 >	G3.7	<i>Lowland to montane mediterranean [Pinus] woodland (excluding [Pinus nigra])</i>
		16 #	G3.8	<i>Canary Island [Pinus canariensis] woodland</i>
FT3N.5	Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]	16 #	G3.9	<i>Coniferous woodland dominated by [Cupressaceae] or [Taxaceae]</i>
FT3N.6	Taiga woodland	2 #	G3.A	<i>[Picea] taiga woodland</i>
		4 #		
		7 #	G3.B	<i>[Pinus] taiga woodland</i>
		3 #		
		2 >	G3.C	<i>[Larix] taiga woodland</i>
FT3N.7	Bog conifer woodland	20 >	G3.D	<i>Boreal bog conifer woodland</i>
			G3.E	<i>Nemoral bog conifer woodland</i>
FT3A	Coniferous plantations	28 > 29 >	G3.F	<i>Highly artificial coniferous plantations</i>

Table 2d - Proposed subdivision of *Mixed broadleaved and coniferous woodland* corresponding to G4 EUNIS II level forest type. Relations between BEAR FTBAs and EUNIS III level types are reported as follows: < means BEAR type is contained within EUNIS; > means BEAR type contains EUNIS; # means there is an overlap; = means BEAR type is equal to EUNIS.

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ForestBIOTA 2nd level		<i>BEAR FTBA cross-links</i>	<i>Corresponding Eunis III level parent units</i>	
<i>(Code)</i>	<i>(Name)</i>			
FT4N.1	Mixed swamp, taiga e sub-taiga woodland	20 >	G4.1	<i>Mixed swamp woodland</i>
		2 > 4 >	G4.2	<i>Mixed taiga woodland with [Betula]</i>
			G4.3	<i>Mixed sub-taiga woodland with acidophilous [Quercus]</i>
FT4N.2	Hemiboreal forest		G4.4	<i>Mixed [Pinus sylvestris] - [Betula] woodland</i>
			G4.5	<i>Mixed [Pinus sylvestris] - [Fagus] woodland</i>
			G4.7	<i>Mixed [Pinus sylvestris] - acidophilous [Quercus] woodland</i>
			G4.C	<i>Mixed [Pinus sylvestris] - thermophilous [Quercus] woodland</i>
FT4N.3	Mixed broadleaved evergreen and coniferous (pines/cupressaceae/taxaceae) woodland		G4.A	<i>Mixed woodland with [Cupressaceae], [Taxaceae] and evergreen oak</i>
			G4.D	<i>Mixed [Pinus nigra] - evergreen [Quercus] woodland</i>
			G4.E	<i>Mixed mediterranean pine - evergreen oak woodland</i>
FT4N.4	Mixed deciduous woodland with [Cupressaceae] or [Taxaceae]		G4.9	<i>Mixed deciduous woodland with [Cupressaceae] or [Taxaceae]</i>
FT4N.5	Mixed fir-spruce-beech woodland	13 >	G4.6	<i>Mixed [Abies] - [Picea] - [Fagus] woodland</i>
FT4N.6	Mixed non-riverine deciduous and coniferous woodland		G4.8	<i>Mixed non-riverine deciduous and coniferous woodland</i>
FT4N.7	Mixed mediterranean pine - thermophilous oak woodland	14 >	G4.B	<i>Mixed mediterranean [Pinus] - thermophilous [Quercus] woodland</i>
FT4A	Mixed forestry plantations		G4.F	<i>Mixed forestry plantations</i>