Ecological Site Classification

Version 1.7

Field Survey pack

This Field Survey Pack has been designed to be printed or photocopied for use in the field. Multiple copies of the Site Description Form and the Soil Assessment Form will be needed. Users are encouraged to consult a Field Guide to confirm identification. A small selection of guides are listed in the Reference section. Up-to-date copies of this Field Survey Pack can be found at: www.forestry.gov.uk/esc

Forestry Commission

Recording information on site

Choice of location

When choosing a location for vegetation and soil sampling, avoid man-made or other obvious irregularities of the ground surface – especially where the humus layer has been disturbed or lost. Normally avoid the zone within, say, 15 m of a forest road where the soil may be affected by road dust (more important nutritionally than physically). Choose an area of uniform ground vegetation representative of the site.

Plant indicator species

Within the site decide whether the plants are 'clumped' or 'distributed'. If the plants are clumped you will probably need to sample between 5–10 quadrats to characterise the site type. If the plants are evenly distributed 5 quadrats should be sufficient.

Define the boundaries of the 2 m x 2 m quadrat and begin identifying and listing the vascular plants present. Use the cover percentage chart (page 3) to estimate the ground cover of each species. Use the Site Description Form (page x) to organise your data. A key to the ferns, horsetails, grasses and sedges used in ESC is included with this Pack. Use a field guide to confirm the identification of all the vascular plants (see reference list on page 20).

Vegetation cover - percentage charts (Ontario Institute of Pedology 1985)

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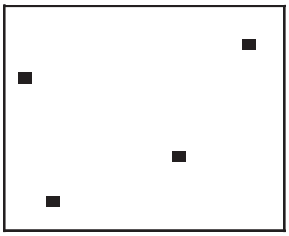

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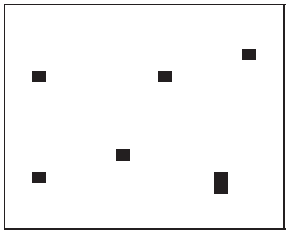

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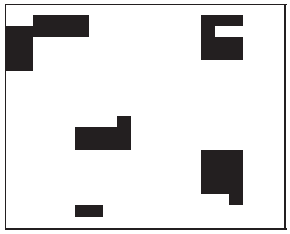

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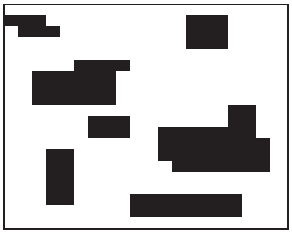

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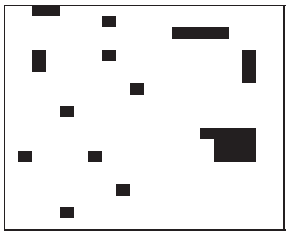

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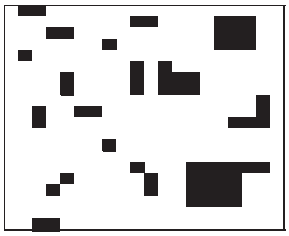

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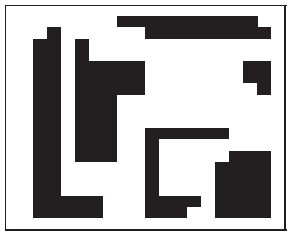

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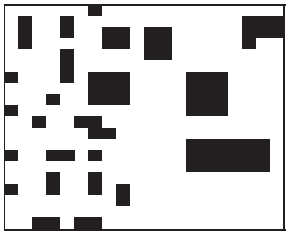

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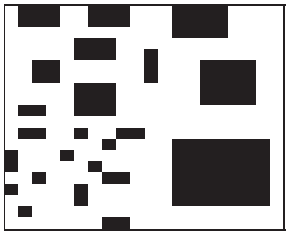

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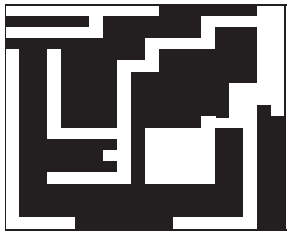

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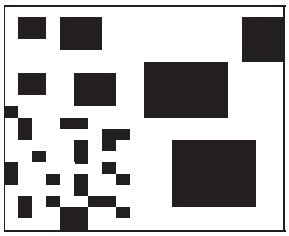

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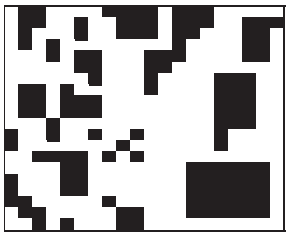

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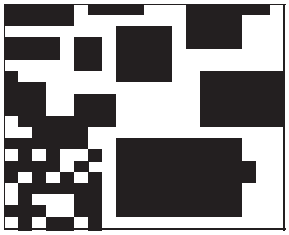


80%

90%

Key to ferns and horsetails used in ESC

Ferns

Growth form a rosette; fronds lanceolate and simply pinnate

1 Hard Fern — Fronds hard and shiny, fertile fronds erect, infertile fronds more prostrate; sori in bands along pinna edge

Growth form like a shuttlecock, fronds ovate-lanceolate, 2 pinnate

2 Scaly male fern — Kidney shaped indusia, along pinule mid rib; many golden scales on stipe; black mark at base of pinna where it joins rachis

3 Male fern — Kidney shaped indusia, along pinule mid rib; few golden scales on stipe; no black mark at base of pinna where it joins rachis

4 Lemon-scented fern — Circular sori clustered along edge of pinnule; white scales on stipe

5 Lady fern — J shaped indusia along pinnule of mid rib; rachis sparsely scaly, sometimes wine-red, but usually green

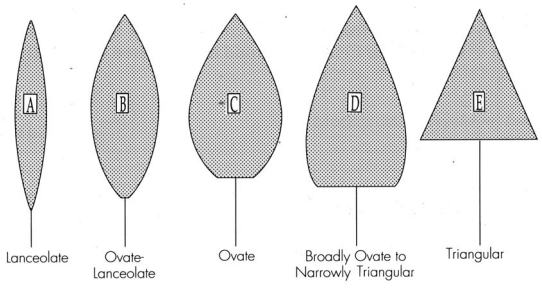
Growth form like a shuttlecock, fronds ovate or narrowly triangular, 3 pinnate

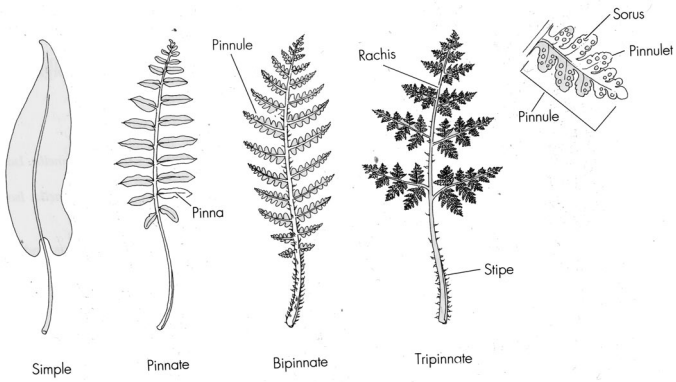
6 Broad buckler fern — Kidney shaped indusia, along pinnule mid rib, scales on stipe brown with a distinct darker stripe down the middle of each scale

Growth form scattered fronds; fronds triangular and composed of three or more distinct triangular shapes, 3 pinnate

7 Bracken — Plants 0.5 – 2 m tall with many triangular pinna, sori (if present) arranged along margins of pinnules

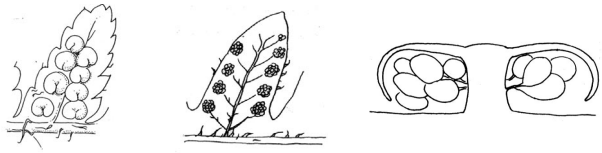
8 Oak fern — Plants less than 50 cm tall, fronds composed of three triangles – 2 large lower pinna and rachis and smaller pinna above





Sori and indusia

Sori are a group of spore bearing cells on the underside of the fern frond. These can be exposed or covered by a flap of tissue called an indusium. The indusium shrivels when the spores are mature.



Horsetails

Growth form of single jointed, upright stems each joint bearing a whorl of sheath teeth and sometimes a whorl of branches

1 Wood horsetail — Stems with whorls of branches, branches branched; 3–6 sheath teeth (fewer than grooves on stem)

2 Field horsetail — Stems with whorls of branches, branches unbranched; 6–19 sheath teeth (same no. as grooves on stem)

Key to sedges and allies used in ESC

Grass-like leaves present :

Stems jointed, stems hollow, stems round; leaves usually soft, sometimes hairy but lacking long white hairs	**Grasses** (see separate key)
Stems not jointed, stems solid, stem triangular; leaves channelled	**Sedges and allies (A)**
Stems not jointed, stems pithy or hollow, stems round; leaves soft with long white hairs	**Rushes (B)**

Green stems but no grass-like leaves (leaves can be minute and scale like):

Stems not jointed , stems solid, stem triangular/round	**Sedges and allies (C)**
Stems not jointed, stems pithy or hollow, stems round	**Rushes (D)**

A

1. *Carex binervis* green-ribbed sedge.
Grows to 150 cm tall

2. *Carex echinata* star sedge.
Grows to 40 cm tall

3. *Carex remota* remote sedge.
Grows to 75 cm tall

4. *Carex sylvatica* wood sedge.
Grows to 60 cm tall

Sedge illustrations reproduced with kind permission from the Botanical Society of the British Isles (BSBI).

B, C, D

Please refer to a field guide such as the *Collins Pocket Guide to Grasses, Sedges, Rushes and Ferns of Britain and Northern Europe.*

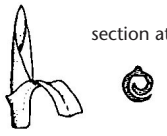
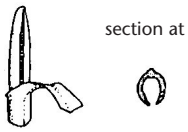
Key to grasses used in ESC

	a) Leaf Blades		b) Youngest Leaf		c) Ligules		d) Sheaths		e) Nodes	
	Flat	Bristle	Rolled	Folded	Membrane	Hairs	Open	Tubular	Hairless	Hairy
Group 1	Yes		Yes		Yes		Yes		Yes	
Group 2	Yes		Yes		Yes		Yes			Yes
Group 3	Yes		Yes		Yes			Yes	Yes	
Group 4	Yes		Yes		Yes			Yes		Yes
Group 5	Yes		Yes			Yes				
Group 6	Yes			Yes	Yes		Yes		Yes	
Group 7	Yes			Yes	Yes			Yes	Yes	
Group 8	Yes			Yes		Yes	Yes		Yes	
Group 9		Yes			Yes		Yes		Yes	
Group 10		Yes			Yes			Yes	Yes	

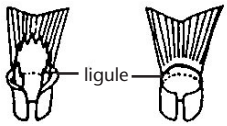
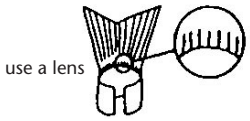
a)

LEAVES FLAT-TYPE	LEAVES BRISTLE-TYPE
sections 	sections 
Youngest blade rolled lengthways with one edge innermost	*Blade folded lengthways about middle nerve*

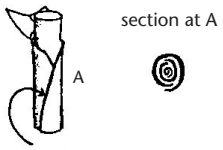
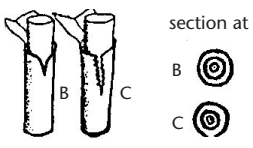
b)

YOUNGEST LEAF ROLLED	YOUNGEST LEAF FOLDED
	
Youngest blade rolled lengthways with one edge innermost	*Blade folded lengthways about middle nerve*

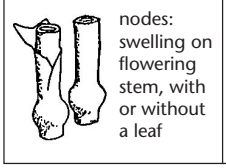
c)

LIGULE MEMBRANOUS	LIGULE-RING OF HAIRS
	
*Ligule: a membranous outgrowth of tissue on the inner sides of the junction between blade **A** sheath*	

d)

SHEATHS OPEN *edges may overlap*	SHEATHS TUBULAR
	
Youngest blade rolled lengthways with one edge innermost	*Blade folded lengthways about middle nerve*

e)

NODES HAIRLESS	NODES HAIRY
	
EXAMINE FLOWERING STEMS	

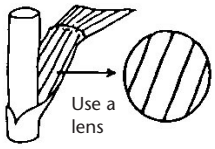
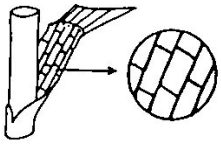
1 Examine the plant using these 5 simple key character diagrams to establish within which group the grass belongs

2 Turn to the page describing characters within each group to identify the grass species

3 Check the species you key out with the characters described in Hubbard (1984), there may be other grasses (not used in ESC) which have similar key characters.

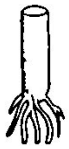
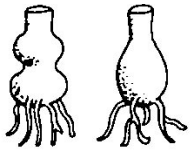
Some key characters

1)

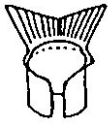
SHEATHS WITHOUT CROSS NERVES	SHEATHS WITH OBVIOUS CROSS NERVES
	

To look for cross nerves hold sheath up to light and inspect inside with the aid of lens

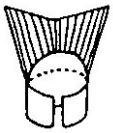
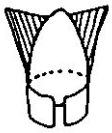
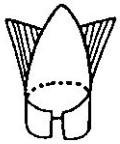
2)

SHOOTS NOT BULBOUS BASED	SHOOTS BULBOUS BASED
	

3)

TUFT OF HAIRS AT BLADE-SHEATH JUNCTION ABSENT	TUFT OF HAIRS AT BLADE-SHEATH JUNCTION PRESENT
	

4)

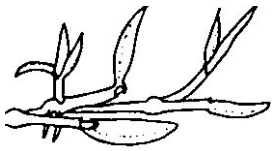
LIGULES SHORTER THAN WIDE	LIGULES AS LONG AS WIDE	LIGULES LONGER THAN WIDE
		

5)

RHIZOMES PRESENT	STOLONS PRESENT
	

Stolon: above-ground trailing stem, usually green, with leaves and roots at the nodes (it should not have an inflorescence inside). ***Take care to distinguish rhizomes from stolons*** *white or colourless stems, usually below ground and developing small white or brownish scale -like leaves and roots at the nodes.*
Note: *Stolons are creeping shoots with real leaves, not just scale leaves.)*

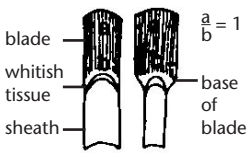
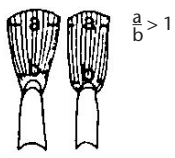
6)

STOLONS WITHOUT LEAFY TUFTS AT NODES	STOLONS WITH TUFTS OF FINE SOFT LEAVES AT NODES
	

7)

LEAF TIPS FLAT	LEAF TIPS HOODED
	 At tips, sides joined like bow of boat 

8)

LEAF BASES EQUAL	LEAF BASES NARROWED
	

Compare width at base of blade (i.e. above whitish tissue at junction with sheath) with blade width above

Could be one of these species – check key characters within the Group

Group 1 Species	Key characters – refer to numbered pictures on previous pages
Phalaris arundinacea	Lvs >5mm wide. **1**. Cross nerves in sheaths. **2**. Base of stem not bulbous.
Arrhenatherum elatius	Lvs >5mm wide. **1**. No cross nerves in sheaths. **2**. Bulbous base to stem.
Anthoxanthum odoratum	Lvs =< 5mm wide. **3**. Tuft of hairs at leaf-sheath junction. Aromatic leaves when crushed. Flag leaf on flowering stem
Agrostis capillaris	Lvs =< 5mm wide. **3**. No hair tufts at lf sheath junc. **4**. Ligules shorter than wide. **5**. Rhizomes and sometimes stolons present.
Agrostis canina montana	Lvs =< 5mm wide. **3**. No hair tufts at lf sheath junc. **4**. Ligules as long/longer than wide. **5**. Rhizomes present.
Agrostis stolonifera	Lvs =< 5mm wide. **3**. No hair tufts at lf sheath junc. **4.** Ligules as long/longer than wide. **5**. Stolons present. **6**. Single shoots at stolon nodes
o	
Agrostis canina canina	Lvs =< 5mm wide. **3**. No hair tufts at lf sheath junc. **4**. Ligules as long/longer than wide. **5**. Stolons present. **6**. Leafy tufts at stolon nodes.

Group 2 Species	Key characters – refer to numbered pictures
Brachypodium sylvaticum	Leaves yellow green with scattered hairs. **2**. No bulbous base.
Arrhenatherum elatius	Leaves mid-green, rough or scattered hairs. **2**. Bulbous base to stem.
Holcus mollis	Leaves white-green, sofly hairy all over and especially hairy at nodes. **2**. No bulbous base.
Holcus lanatus	Leaves white-green, sofly hairy all over but not especially hairy at nodes. **2**. No bulbous base.

Group 3 Species	Key characters – refer to numbered pictures
Agrostis canina canina	**3**. No hair tufts at lf sheath junc. **4**. Ligules as long/longer than wide. **5**. Stolons present. **6**. Leafy tufts at stolon nodes.
Agrostis canina montana	**3**. No hair tufts at lf sheath junc. **4**. Ligules as long/longer than wide. **5**. Rhizomes present.
Anthoxanthum odoratum	**3**. Tuft of hairs at leaf-sheath junction. **4**. Ligules shorter or as long as wide. **5**. No stolons/rhizomes Aromatic leaves when crushed.
Festuca rubra	**3**. No hair tufts at lf sheath junc. **4**. Ligules shorter than wide. **5**. No stolons/rhizomes

Group 4 Species	Key characters – refer to numbered pictures
Brachypodium sylvaticum	Leaves yellow green with scattered hairs.
Holcus mollis	Leaves white-green, sofly hairy all over and especially hairy at nodes.
Holcus lanatus	Leaves white-green, sofly hairy all over but not especially hairy at nodes.

Group 5 Species	Key characters – refer to numbered pictures
Molinia caerulea	Leaf undersides dull. **7**. Leaf tips flat.

Group 6 Species	Key characters – refer to numbered pictures
Deschampsia cespitosa	**8**. Leaf bases narrowed and **4**. ligules longer than wide. Leaves rough to the touch.
Cynosurus cristatus	**8**. Leaf bases don't narrow. **4**. Ligules shorter than wide. **7**. Leaf tips flat (not hooded – not boat shaped)
Poa trivialis	**8**. Leaf bases don't narrow. **4**. Ligules shorter than wide. **7**. Leaf tips hooded or boat shaped.

Group 7 Species	Key characters – refer to numbered pictures
Dactylis glomerata	Ligule >= **2** mm long. **7**. Leaf tips hooded or boat shaped.
Cynosurus cristatus	Ligules less than **2** mm long. **7**. Leaf tips flat (not hooded – not boat shaped).
Poa trivialis	Ligules less than **2** mm long. **7**. Leaf tips hooded or boat shaped.

Group 8 Species	Key characters – refer to numbered pictures
Danthonia decumbens	Leaf undersides shiny. **7**. Leaf tips hooded or boat shaped.
Molinia caerulea	Leaf undersides are dull. **7**. Leaf tips flat.

Group 9 Species	Key characters – refer to numbered pictures
Agrostis canina montana	**5**. Rhizomes present. **5**. Stolons absent
Nardus stricta	**5**. Rhizomes present. **5**. Stolons present. Tips of leaves hard or prickly to touch.
Deschampsia flexuosa	**5**. Rhizomes present. **5**. Stolons present. Tips of leaves hard soft to touch.
Festuca ovina	**5**. Rhizomes absent. **5**. Stolons present. Ligules less than 0.5 mm long.
Agrostis canina canina	**5**. Rhizomes absent. **5**. Stolons present. Ligules > 1mm long

Group 10 Species	Key characters – refer to numbered pictures
Agrostis canina montana	**5**. Rhizomes present. **5**. Stolons absent.
Agrostis canina canina	**5**. Rhizomes absent. **5**. Stolons present. Ligule > 1 mm long.
Festuca rubra	**5**. Rhizomes absent. **5**. Stolons present. Ligule < 0.5 mm long.

Ecological Site Classification: Site Description Form

Forest/Estate:	Grid Ref:	
Location:	Elevation: m	Aspect:
Site description:	Distance from sea:	km
	Slope gradient:	deg. or %
	Slope type:	
	Slope position:	
	Tree species:	
	P. Yr:	GYC:

Climate: AT5	d-d	MD: mm	DAMS: Cont.

Vegetation description:

Species list: Tree,shrub,field & Ground layers	Cover in quadrat										Freq	Max cover
	1	2	3	4	5	6	7	8	9	10		
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

Abund weighted: SMR SNR	Freq weighted: SMR SNR

Description of humus

A description of the humus will help improve the estimate of soil nutrient regime. Use the key in this pack to identify the humus. Note the humus form on the Soil Assessment Form.

Key to humus form (after Katzensteiner et al, in prep)

1a	Either L only or L & F horizons present; H if present is very thin or discontinuous. A horizon (>2 cm thick) with organic and mineral material blended together in aggregates (crumbs or blocks), earthworms present. Sharp break between organic and A horizon	MULL
1b	L,F and H horizons present and continuous.	
2a	Gradual transition between H and A horizon. A horizon with few or no earthworms, organic and mineral particles usually separate, but may be blended. Many faecal pellets.	MODER
2b	Sharp break between the H horizon and an A horizon which is sometimes black and humic, but often light coloured. Fungal mycelium usually present. Few faecal pellets. Earthworms absent or rare.	MOR

Subdivision of MULL

3a	Ln present but Lv and F absent. Breakdown very rapid, many earthworms	EUMULL
3b	LN, LV and F present. Breakdown of litter relatively slow, fewer earthworms.	
4a	F horizon discontinuous, H absent.	OLIGOMULL
4b	F horizon continuous, H discontinuous or very thin.	MODER-LIKE-MULL

Definitions

L	Fairly fresh plant residues, origin readily identifiable. No fine decomposed material
Ln	(n = new) Fresh litter that has not undergone decomposition. The leaves remain whole, only their colour may have changed. Where rapid breakdown of litter occurs the horizon may be present only between autumn and spring.
Lv	Litter showing little fragmentation, but colour, cohesion or hardness has changed. Underlies the Ln where present.
F	Fragmented material in which plant structures are generally recognisable. Mixed with fine faecal pellets, often occurs with roots and mycelia.
H	Contains more than 70% fine organic material (irnoring roots) in which plant structure is not recognisable. Reddish brown to black, fairly homogeneous in appearance. Mineal grains may be present. Horizon often more coherent than the underlying horizon. Distinguished from peat (O horizon) as the material is not formed in saturated conditions.
A	Horizons containing a mixture of organic and mineral material (< 30% organic matter).

Soil assessment

In order to assess soil moisture and nutrient regimes, make a simple soil description including soil type, lithology, humus form, rooting depth, soil texture and stoniness. A description of the ground vegetation will help provide a refinement of the assessment of soil nutrient regime.

If the soil profile has more than one distinct layer or horizon, each should be identified and described separately.
The properties that should be recorded for each horizon are: colour and mottling, stoniness, texture, roots and parent material of the whole profile.

The method of describing a soil profile given here is a simplified version of that provided by Hodgson (1974). Proformas for recording description of the site, soil profile and vegetation are given below.

Description of soil horizons

Record the thickness of each layer, including the variation if large in comparison with the average thickness of the layer. The sum of the thickness of the horizons should equal the total depth described.

Make a brief description of the soil profile describing where appropriate the 5 main kinds of horizon: Organic, A, E, B and C, although for identification of humus form subdivisions of the Organic horizon are needed.

Organic Horizon composed of organic material (>30% organic matter), usually lying on top of the mineral horizons. Is subdivided into Ln, Lv, F, H and O horizons (peat) for the purpose of identifying the humus form (see key to humus form).

A Mineral horizon (<30% organic matter) formed at or near the surface, characterised by incorporation of humified organic matter.

E Sub-surface mineral horizon that contains less organic matter and/or less iron oxide and/or less clay than the immediately underlying horizon, presumably as a result of removal of one or more of these constituents.

B Mineral sub-surface horizon characterised either by deposition (from horizons above) of clay, iron oxide, aluminium oxide or humus, or by alteration of the original material by weathering in situ and the formation of soil structure.

C Relatively unaltered parent material. This may be modified by gleying due to waterlogging, accumulation of carbonates, or induration inherited from the glacial period.

The following lower case letters may be attached to the above, to indicate common types of horizon.

g (gleyed) Colour mottled or dominantly greyish due to periodic waterlogging. The stronger colours are yellow, ochreous or rusty and represent the concentrations of iron oxide. The weaker, i.e. greyer, colours represent the loss of iron oxide. In permanently waterlogged Cg horizons the colour may be bluish or greenish due to ferrous iron compounds. Can be attached to A, E, B or C horizons.

h (humose) Colour darkened by high concentration of humus material, but still less than 30%). Used with A or B horizons.

x (indurated) Used to emphasise the presence of firm or very firm consistence, brittle and usually platy structure, and the characteristic silty cappings on stones. Indurated material is normally treated as a C horizon.

Colour

Colour is one of the most important soil properties, but is open to a good deal of subjectivity. Describe the main colour and any relevant subsidiary colours eg mottling, streaking or patchy colouration due to gleying. If ped surfaces (see **Structure** below) are greyer than their interiors this may reflect gleying. (See also comments on root channels.) You should confine your choice of colours to: brown, red, yellow and grey, with ochreous or rusty being useful for describing mottles. Colour indicates most of the soil processes. Red colours are mostly inherited from the parent material. Brown colours normally indicate good aeration, grey colours and mottled or streaked grey/yellow colours indicate gleying caused by poor aeration. Paler E horizons overlying darker or stronger colours in B horizons indicate podzolisation or clay translocation.

Roots

A lot can be learned from observing the distribution of roots either in a soil pit or in a windthrown root system. Root systems exposed on the roadside are informative if they are fairly fresh, but beware the roots that have grown down the loose material on the face since being exposed. They may even re-enter the profile lower down, beneath compacted layers. Roots can penetrate surprisingly compact or hard soil, and they can usually penetrate ironpans. They do not, however, penetrate indurated subsoils except down the occasional narrow crack. An ironpan lying directly on an indurated layer is a very effective barrier to roots. Roots make very 'determined' attempts to penetrate fissures within hard rock and the tree must gain greatly in stability from such rooting, but abraded roots are commonly found in very stony layers. Dead roots are usually a sign of periodic anaerobic conditions due to a fluctuating water-table.

Describe the rooting in terms of:

- depth: (horizons),
- intensity: few, many roots,
- size: diameter in mm or cm,
- condition: alive, dead, abraded.

Stoniness

Stoniness refers to the proportion of stones. Stoniness affects water capacity. Describe stoniness using the following terms:

- stone-free: 0% of soil volume
- slightly stony: <5% of soil volume
- moderately stony: 5-15% of soil volume
- very stony: 15-30% of soil volume
- extremely stony: >30% of soil volume

The cover-percentage charts may be a help in visualising these percentages.

Texture

Texture refers to the proportion of sand (2–0.06 mm), silt (0.06–0.002) and clay (<0.002 mm) sized particles. Texture influences many other properties including available water capacity, structure, aeration and nutrient retention. Use the flow chart attached to assess texture. It is sufficient to be able to put each horizon into the following classes: organic, sandy, coarse loamy, fine loamy, clayey, but for the four mineral classes it is also worth noting whether the material is 'humose' or 'very humose'. This can usually be assessed from the colour relative to the less humose horizon beneath and from the feel.

Parent material

This refers to the material of the whole soil profile, not just the C horizon. Lithology describes the hardness, grain size and mineralogical composition of the rock from which the parent material is derived. Lithology has an important influence on soil texture, stoniness and nutrient regime. Clearly rocks with plenty of calcium will tend to produce soils with higher pH and richer soil nutrient regime. Hard lithologies tend to produce stony or shallow soils. The type of drift material from which many soils are formed will have a major influence on all soil properties. Soil materials are often layered, eg sandy or loamy over clayey, friable over indurated, less stony over very stony and these layers may be emphasised by soil horizons.

Describe the parent material in terms of:

- map-unit no. on the Geological Survey 10 mile map (British Geological Survey, 3rd Edition, 1979),
- geological age of parent rock,
- lithology including colour,
- layering and depth,
- type: glacial till, fluvio-glacial sand or gravel, scree, solifluction, alluvium, windblown sand.

Structure (not used in ESC)

Structure describes the degree to which the individual sand, silt and clay particles are aggregated into natural units called 'peds'. The soil will usually need to be handled before this structure is fully evident. If the topsoil is well worked by earthworms it will be strongly aggregated into small blocky or crumb-like peds reminiscent of the well-raked tilth of a garden soil. Other soils, including subsoils, may be strongly aggregated due to high content of iron or aluminium oxides. Loamy soils are more likely to be well structured than sandy soils, which are often structureless ('single-grain'). Clayey soils are normally well structured with peds that have angular shapes, in the subsoil usually with fissures that are mainly vertical ('prismatic structure'). Indurated and some other layers have mainly horizontal fissures and are described as 'platy structured'. Soils that are cohesive but not obviously structured are described as 'massive'. A 'clod' differs from a ped in that it is made by man, usually by cultivating when the soil is too wet. It may consist of many peds or be structureless, massive. Soil structure is important in drainage and aeration, especially in loamy or clayey soils, and to root penetration. A good structure is almost invariably a 'good thing' for a loamy or clayey soil, but many sandy soils are productive regardless of their poor structure.

Structure should be described in terms of:

- strength: strong, weak, absent,
- type: crumb, blocky, prismatic, platy, single-grain or massive.

Forest soil classification tables

Note that this use of these letters is independent of their use as part of the soil type codes, types and phases (after Pyatt 1982)

A much fuller description of the forest soil classification is available via the 'Help files' of the ESC Decision Support System. See also Kennedy (In prep.)

TABLE 1 THE MAIN MINERAL AND SHALLOW PEATS SOILS (peat <45 cm)

	Soil Group	Soil Type	Code
Soils with well aerated subsoil	1. Brown earths	Typical brown earth Basic brown earth Upland brown earth Podzolic brown earth	1 1d 1u 1z
	3. Podzols	Typical podzol Hardpan podzol	3 3m
	4. Ironpan soils	Intergrade ironpan soil Ironpan soil Podzolic ironpan soil	4b 4 4z
Soils with poorly aerated subsoil	5. Ground-water gley soils	Ground-water gley	5
	6. Peaty gley soils	Peaty gley Peaty podzolic gley	6 6z
	7. Surface water gley soils	Surface-water gley Brown gley Podzolic gley	7 7b 7z

TABLE 2 DEEP PEATS (peat 45 cm or more)

	Soil Group	Soil Type	Code
Flushed peats	8. *Juncus* bogs (basin bogs)	*Phragmites* fen *Juncus articulatus or acutiflorus* bog *Juncus effusus* bog *Carex* bog	8a 8b 8c 8d
	9. *Molinia* bogs (flushed blanket bogs)	*Molinia, Myrica, Salix* bog *Tussocky Molinia bog; Molinia, Calluna* bog *Tussocky Molinia, Eriophorum vaginatum* bog *Non-tussocky Molinia, Eriophorum vaginatum, Trichophorum* bog *Trichophorum, Calluna, Eriophorum, Molinia* bog (weakly flushed blanket bog)	9a 9b 9c 9d 9e
Unflushed peats	10. Sphagnum bogs (flat or raised bogs)	Lowland *Sphagnum* bog Upland *Sphagnum* bog	10a 10b
	11. *Calluna, Eriophorum, Trichophorum* bogs (unflushed blanket bogs)	*Calluna* blanket bog *Calluna, Eriophorum vaginatum* blanket bog *Trichophorum, Calluna* blanket bog *Eriophorum* blanket bog	11a 11b 11c 11d
	14. Eroded bogs	Eroded (shallow hagging) bog Deeply hagged bog Pooled bog	14 14h 14w

(Explanatory comments in parenthesis)

TABLE 3 OTHER SOILS

Soil Group	Soil Type	Code
2. Man-made soils	Mining spoil, stony or coarse textured Mining spoil, shaly or fine textured	2s 2m
12. Calcareous soils (soils on limestone rock)	Rendzina (shallow soil) Calcareous brown earth Argillic brown earth (clayey subsoil)	12a 12b 12t
13. Rankers and Skeletal soils (rankers = shallow soils < 30 cm to bedrock) (skeletal = excessively stony)	Brown ranker Gley ranker Peaty ranker Rock Scree Podzolic ranker	13b 13g 13p 13r 13s 13z
15. Littoral soils (coastal sand and gravel)	Shingle Dunes Excessively drained sand Sand with moderately deep water table Sand with shallow water table Sand with very shallow water table	15s 15d 15e 15i 15g 15w

TABLE 4 PHASES OCCURRING WITHIN TYPES OF TABLE 1

Suffix	Name*	Description
a	shallow	Predominately 30-45 cm depth of soil to bedrock.
c	cultivated	Considerable alteration to physical or chemical properties or to vegetation by former agricultural use.
e	ericaceous	Vegetation contains sufficient *Calluna* (dominant to frequent) to become a weed problem after planting.
f	flushed	Considerable enrichment with nutrients from flush water, as indicated by the presence and vigour of tall *Juncus* species, *Deschampsia cespitosa* or *Molinia*.
g	slightly gleyed	Subsoil slightly mottled or with grey patches.
h	humose	Topsoil contains between 8 and 25% organic matter by weight.
i	imperfectly aerated	Applied to gley soils with less prominent grey colouration than usual for the type (but which do not quality as 7b).
k	calcareous	With pH > 7.0 in the A, E or B horizons.
l	loamy	Used for surface-water gley soils and peaty gley soils where the texture throughout the profile is not finer than sandy clay loam.
p	peaty (or deeper peat phase)	Surface horizon containing more than 20% organic matter by weight.
		Thickness definitions: 3p and 5p = 5-45 cm of peat 4p = 15-45 cm of peat 6p = 25-45 cm of peat
s	extremely stony	(Note that types 6 and 6z have a peaty horizon 5-25 cm thick) Stones occupy more than 35% of the soil volume.
v	alluvial	Soil developed in recent alluvium of sandy or coarse loamy texture.
x	indurated	Has strongly indurated material within 45 cm or surface. Implies loamy texture. Where indurated material is only moderately developed or is at depths of 45-60 cm, (x) is used.

* Naming soil types with phases: the preferred form is to give the name of the soil type followed by a comma, then the phase name in the usual order, ending with the word 'phase', for example: upland brown earth, shallow phase; peaty gley, deeper peat and loamy phase.

Rules for the Use of Phases (for brevity, suffixes are used here rather than names).

i. Phase f, h, i and l are used only for gley soils.

ii. Phase g is used for brown earths, podzols, or ironpan soils.

iii. Phases which are mutually exclusive: e and f
c and e
h and p
a and x
v and x

iv. Unlikely combinations: a and v
f and i

v. When x or v is used, l is unnecessary.

vi. Where more than one suffix is used they are placed in the order: v, l, p, h, x, g, i, s, a, f, c, e.

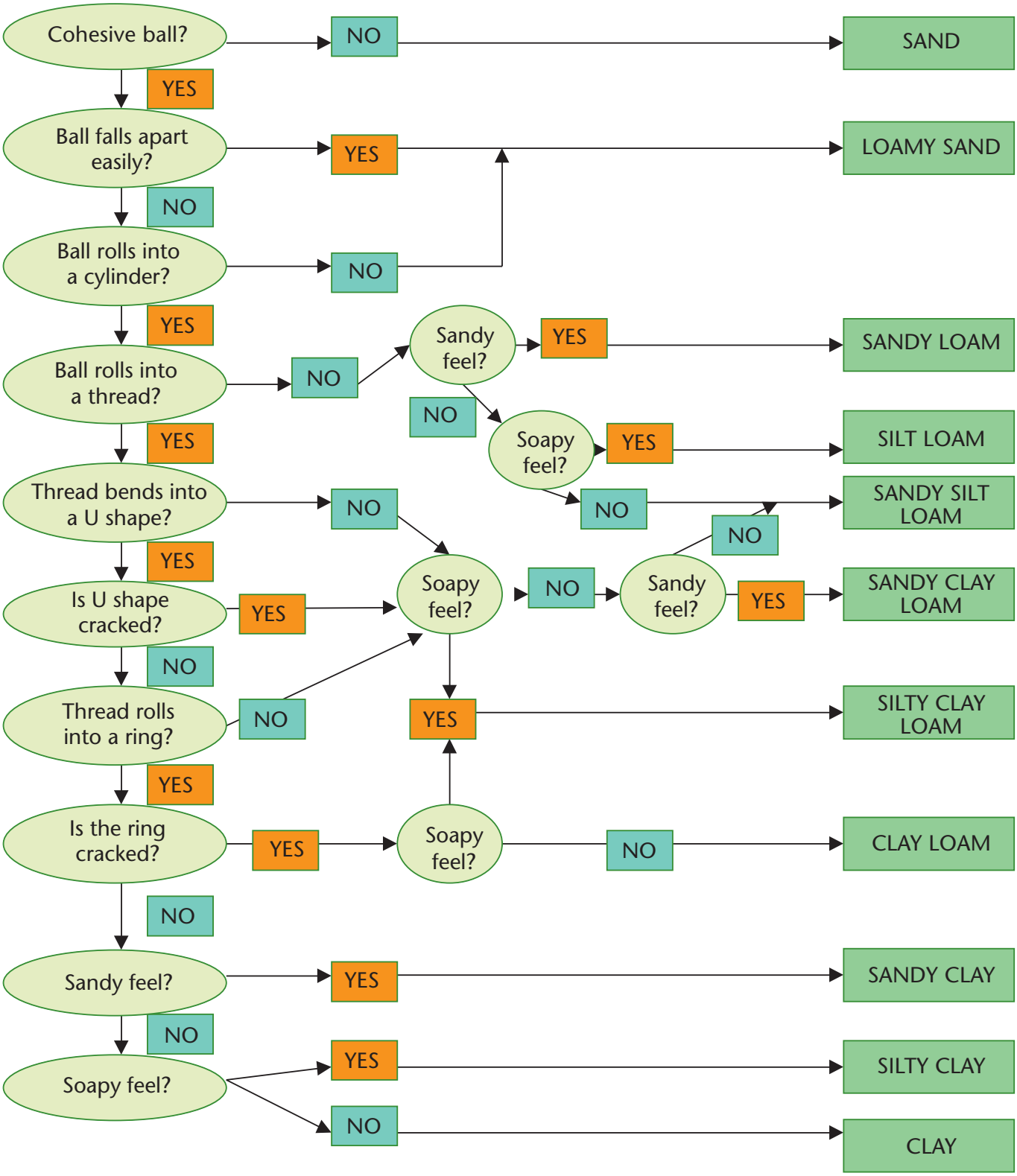
vii. A soil type within Table 16 should always be given one or more phase suffixes where these are clearly capable of improving the definition of the unit, but there are numerous occasions where no phase is appropriate.

vii. The phase suffixes always follow the soil type suffix.

Assessment of soil texture key (after Landon 1988)

Start with a 2.5 cm diameter mass of soil at the sticky point. Sticky point is defined as the moisture content at which dry soil being moistened gradually begins to stick to the fingers.

Cylinder is about 5 cm long and about 1.5 cm diameter
Thread is about 13 cm long and 0.6 cm diameter
Ring is about 2.5 cm diameter formed from about 8 cm of thread



Ecological Site Classification: Soil Assessment Form

Site Name:	Grid Ref:	Elevation:

Horizon	Thickness	Colour & mottling	Stoniness	Texture	Rooting depth	Notes

Parent Material	Geology Map Unit	Geol Age (egORS) No.			
Soil type	FC Soil Type	FC Soil Code	Soil Series	Soil Association	
Humus Form					

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