IRISH AFFORESTATION PROGRAMME 2023–2027

ECOLOGY SKILLS FOR FORESTERS

Foundational Plant & Habitat Identification

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BASIC MORPHOLOGY OF GRASSES – ROOTS & STEMS

Roots:

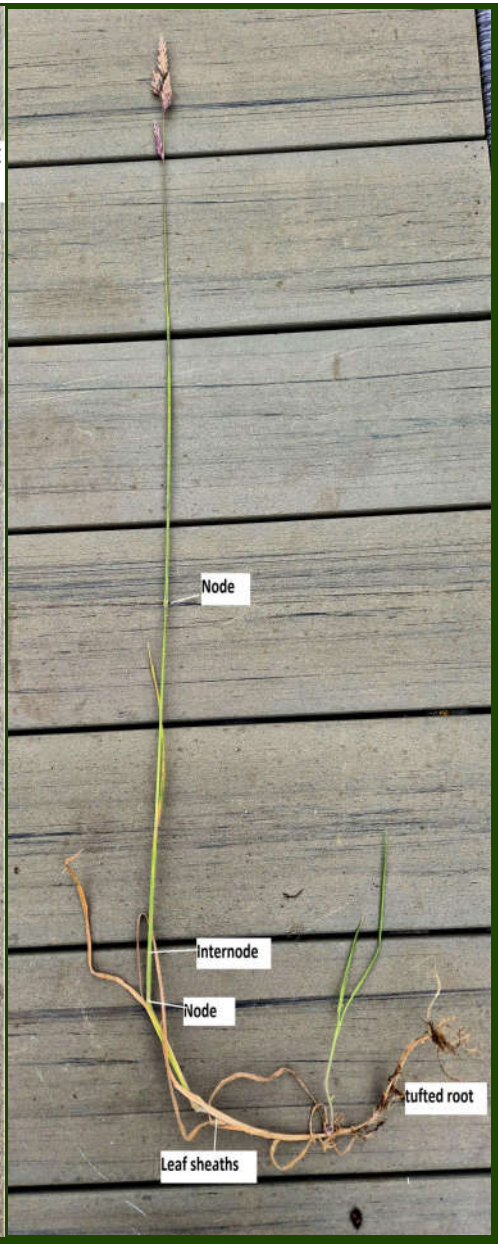
- Tufted (caespitose): Fibrous root system gives inability to spread laterally
- Rhizomes (underground stems) / stolons (runners above ground)

Stems (Culms):

- Hollow internodes, solid nodes

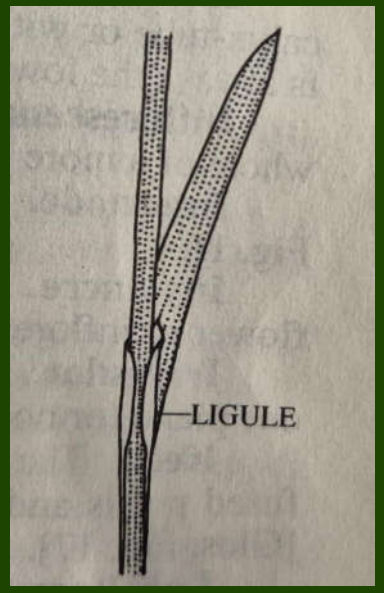
Leaves:

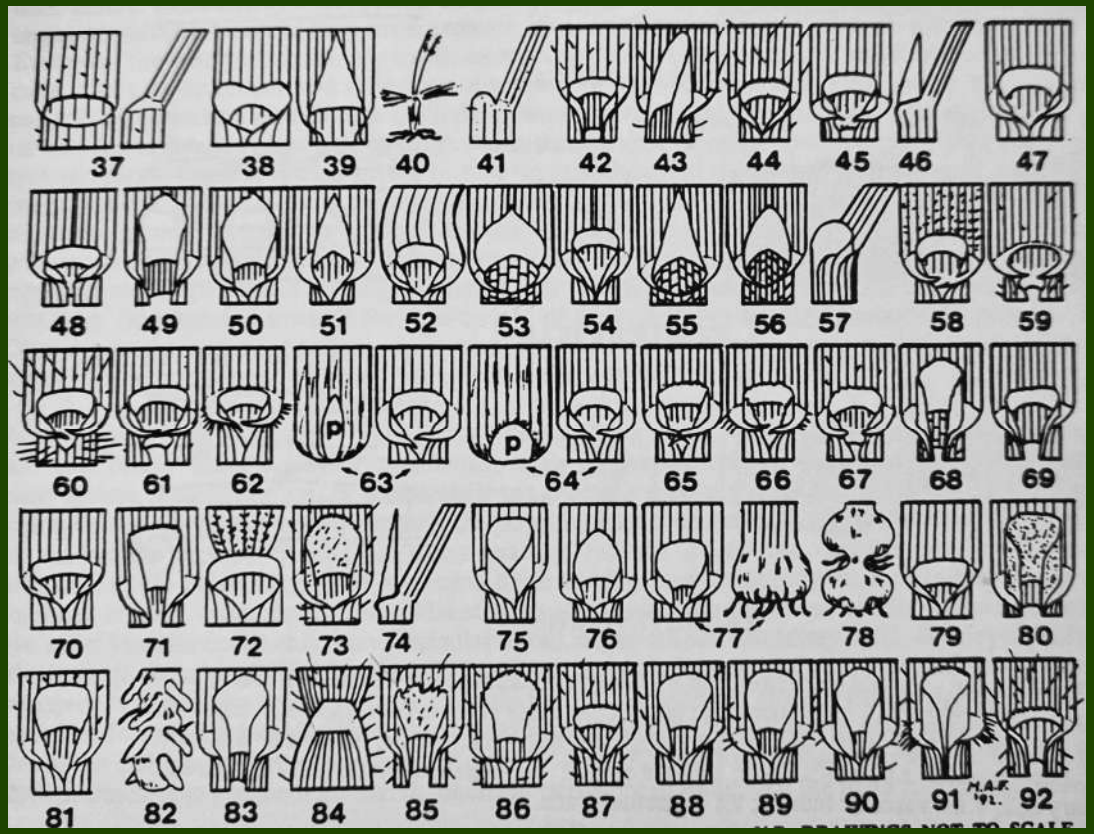
- 2-ranked and open-sheathed
- Leaf blade & Leaf sheath
- Shape is helpful diagnostic



BASIC MORPHOLOGY OF GRASSES – LEAVES – ID FEATURES

- Alternate, 2-ranked
- Sheath wraps stem (culm)
- Collar: area at junction leaf blade & sheath
- Ligule: membrane or hairs
- Auricles: ear-like projections (ID feature)
- Blade: flat/rolled, linear, parallel-veined





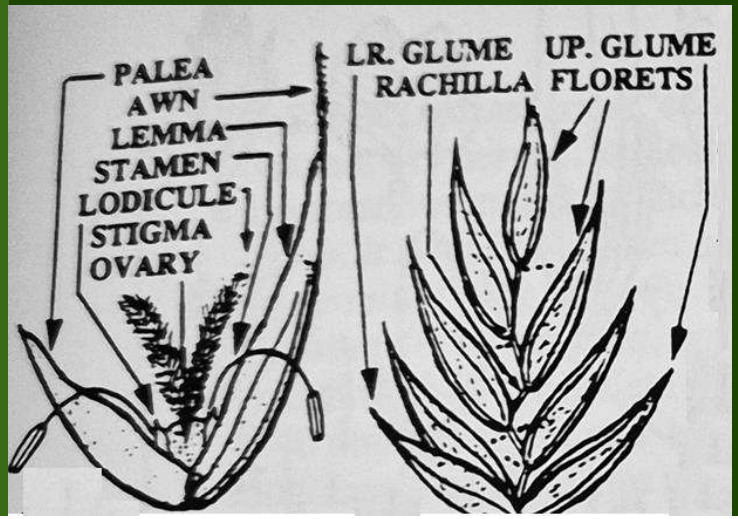
GRASS INFLORESCENCE

Types:

- **Spike** eg: Sweet Meadow Grass *Anthoxanthum odoratum*
- **Raceme** is a type of grass seed head where the individual flowers (spikelets) are attached directly to the central stem by a stalk eg. Common Rye Grass *Lolium perenne*
- **Panicle** the individual flowers (spikelets) are attached to branching stalks eg. Creeping Bent Grass *Agrostis stolonifera*

GRASS FLOWERS & FRUITS

- **Grass Spikelets = basic unit**
- **Spikelet parts:** glumes, lemma, palea & floret (M/F parts)
- **Fruit = caryopsis (grain)**
- **Florets (within):** small, wind-pollinated, no petals
- **Stamens** (usually 3), feathery stigmas



Barley

GRASS INFLORESCENCE

Spike

Panicles

Common Foxtail

Common Bent

Yorkshire Fog

Cock’s Foot

GRASS INFLORESCENCE

Spike

Sweet Meadow Grass

Panicles

Crested Dog's Tail

Velvet Bent

Raceme

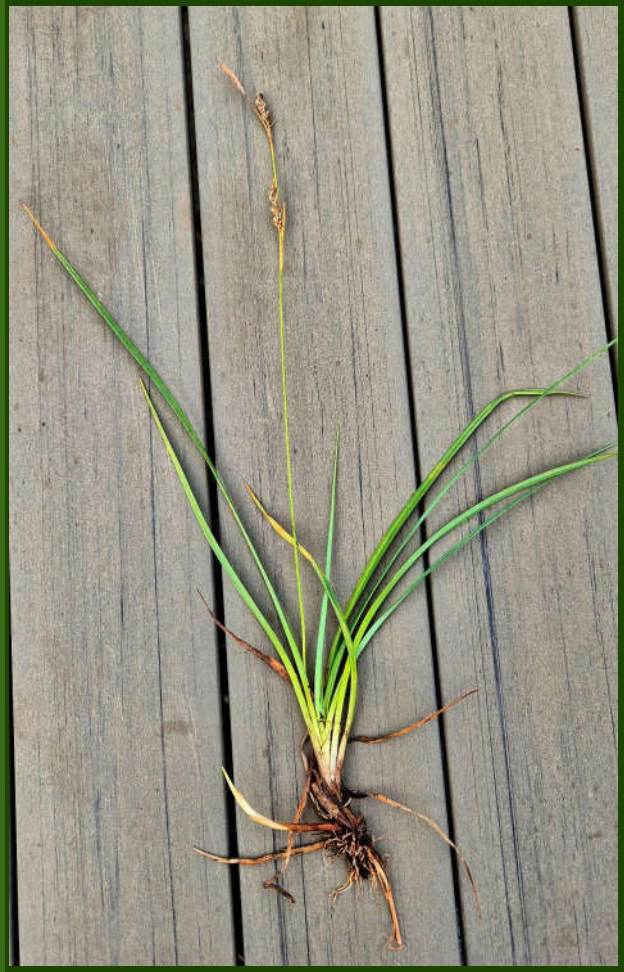
Wood Brome

MORPHOLOGY OF SEDGES – KEY FEATURES

- Solid stems, triangular (“sedges have edges”)
- 3-ranked leaves, closed sheaths- use terminal bract as diagnostic
- Spikelets male/female with glumes. One or both types on different species

Common Sedge *Carex nigra*

SEDGES INFLORESCENCE



Carex panicea

Carex echinata

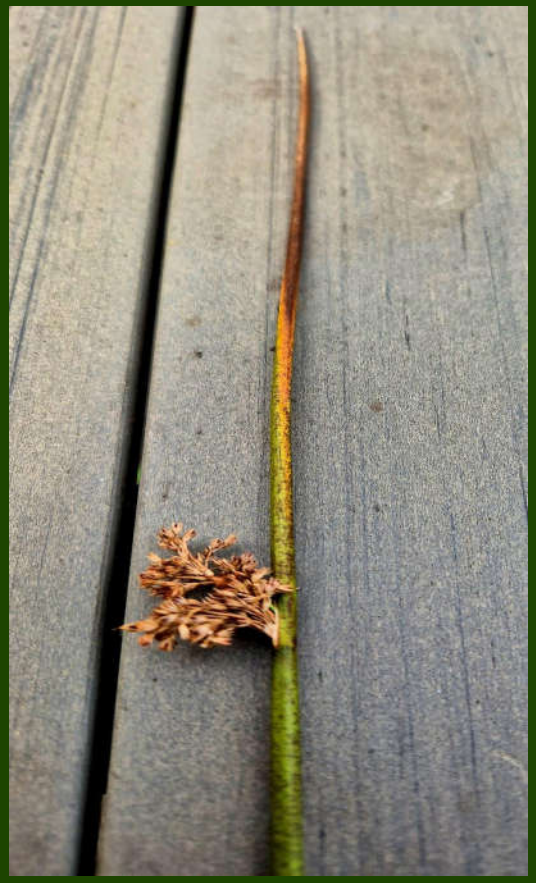
MORPHOLOGY OF RUSHES – KEY FEATURES

- Round, solid stems (“rushes are round”)
- Leaves 3-ranked/spiral, often reduced
- Inflorescences: clusters, sometimes lateral-looking
- Flowers: 6 tepals, capsule fruit

Soft Rush *Juncus effusus*

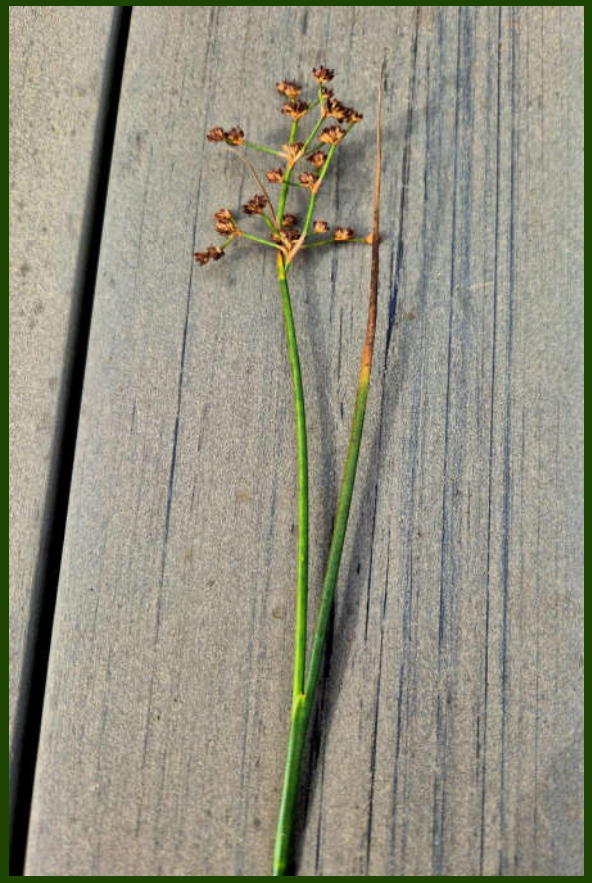
Toad Rush *Juncus bufonius*

RUSH INFLORESCENCE



Soft Rush

Juncus effusus



Articulated Rush

Juncus articulatus

Compact Rush

Juncus conglomeratus

Hard Rush

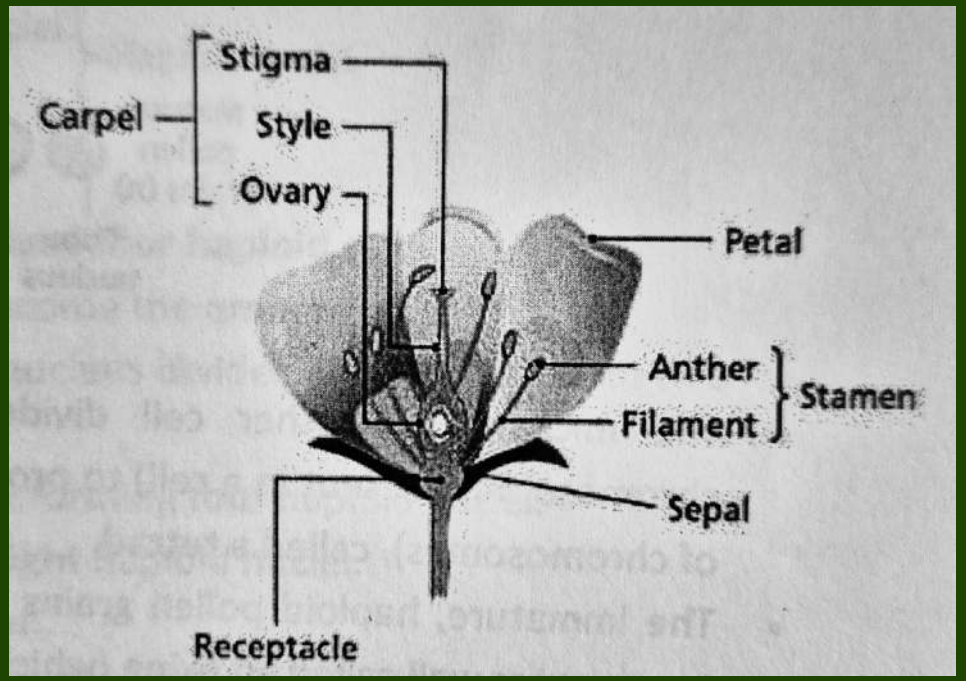
Juncus inflexus

GRASSES VS SEDGES VS RUSHES (COMPARISON TABLE)

Feature	Grasses (Poaceae)	Sedges (Cyperaceae)	Rushes (Juncaceae)
Stem (Culm)	Usually round, often hollow between nodes, with obvious nodes (joints)	Typically solid, triangular cross-section ("sedges have edges"), no obvious nodes	Round, solid, no nodes, sometimes pithy inside
Leaves	2-ranked (arise in two rows), open sheaths	3-ranked, closed sheaths	3-ranked or spiral, open sheaths
Ligule	Usually present (membrane or hairs)	Often present, variable	Usually absent or very small
Inflorescence	Spikelets with glumes, lemmas & paleas	Spikelets, in Carex female flowers in perigynia (utricle)	Clusters of small, petal-like, brown/greenish flowers
Flowers	Tiny, no petals, wind-pollinated	Tiny, unisexual (in Carex), enclosed by scales/perigynia	Small, 6 tepals (petal-like), bisexual
Fruit	Caryopsis (grain)	Achene (in Carex enclosed in perigynium)	Capsule (3-celled, many-seeded)
Key Rule of Thumb	“Grasses have joints”	“Sedges have edges”	“Rushes are round”

BASIC MORPHOLOGY OF HERBS

- **Non-woody:** annual, biennial, perennial
- **Roots:** taproot, fibrous, rhizomes/tubers
- **Stems:** green, soft, varied habit
- **Leaves:** variable arrangement, shapes, margins
- **Flowers:** diverse, diagnostic (petals, symmetry)
- **Fruits:** varied – capsules, pods, berries, nuts



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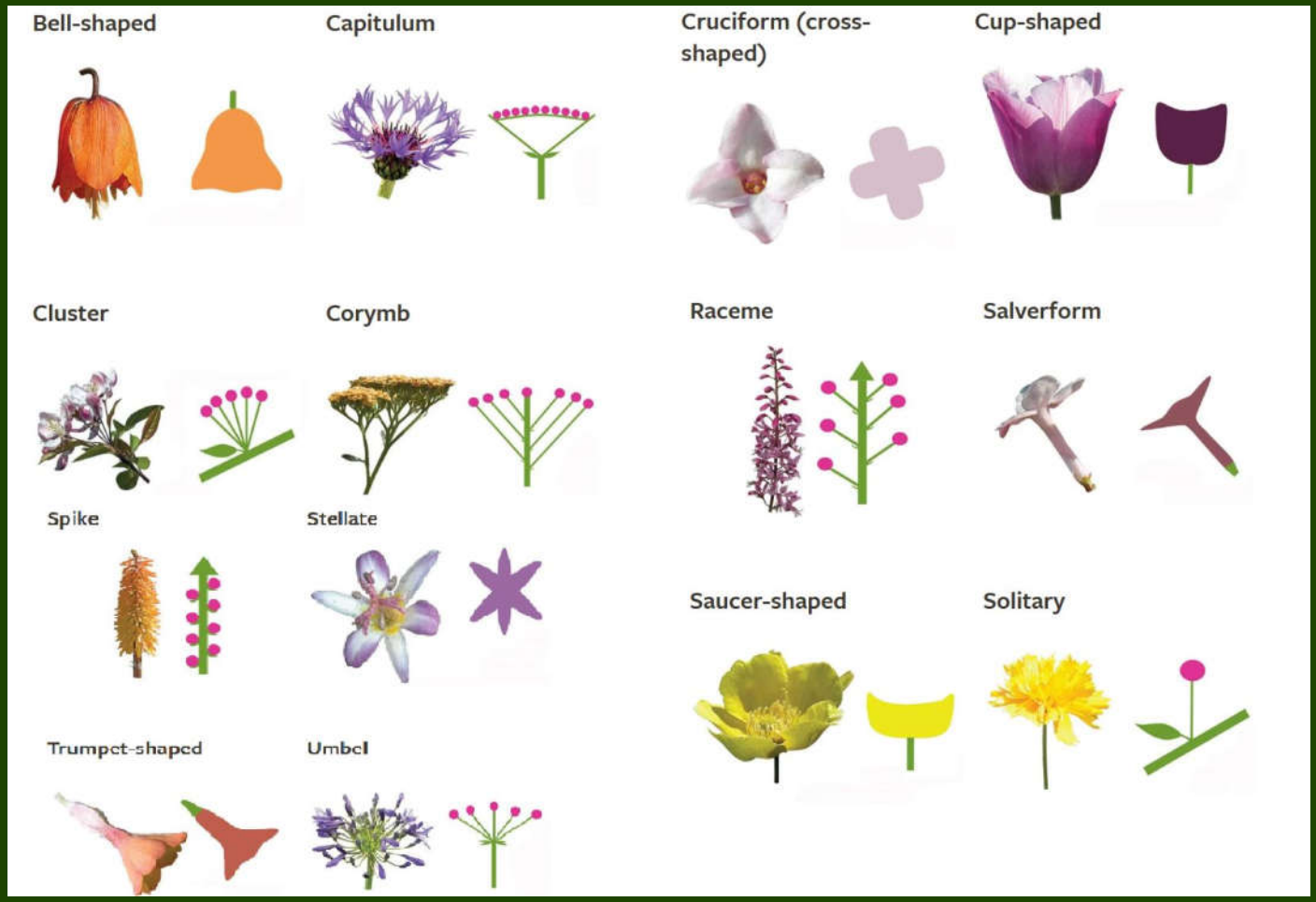
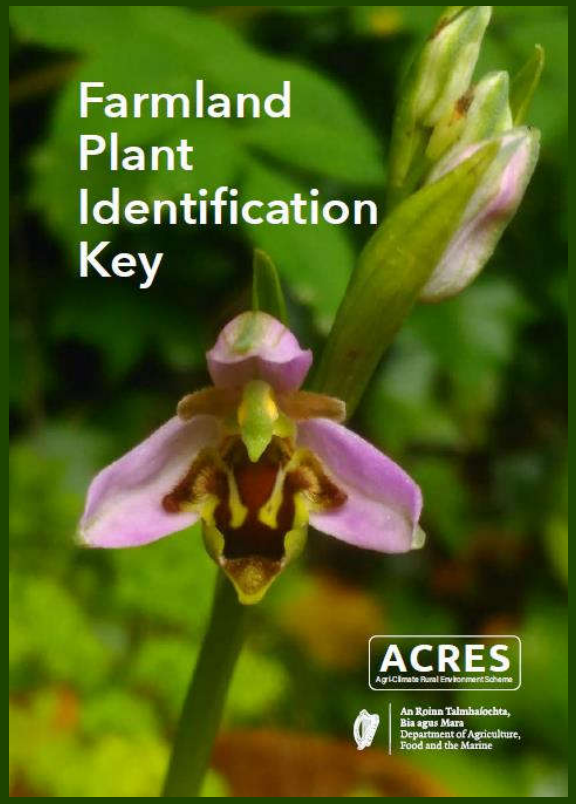


Image RHS
https://www.rhs.org.uk/

ACRES FARMLAND PLANT ID KEY

- **Intro to key & positive indicator species**
- **Examples from slides in key**



How to use this guide

Plant species are divided into four sections:

1. Positive grassland indicators
2. Positive peatland indicators
3. Negative indicators
4. Invasive alien species

Plant species are organised into groups that have similar features.

Each section is arranged by flower colour:

- red and yellow flowers first,
- white and green flowers second
- purple and pink flowers last

J F M A M J J A S O N D

Flowering months for each group are shaded in orange on the calendar.

Tips

- Keep this guide in a clear plastic bag.
- Bring the guidebook to the plant rather than picking the whole plant to bring home.
- Compare flower shape and colour first, then confirm by matching the leaf shape.
- Read the description to check flowering time, habitat, and other features.
- Pick one flower or leaf to check their sizes.
- Always choose a leaf from as close to the ground as possible. Leaves on flowering stems may be different.
- Compare with other plants as indicated.

ACRES FARMLAND PLANT ID KEY

GLOSSARY

Basal leaf A leaf at the base of a plant closest to the ground.

Bract A small scale or leaf-like structure at the base of a simple flower or compact head. May be numerous as in thistle and daisy flowers, or thin as in Large Umbels. In sedges bracts are narrow and pointed.

Cluster Several flowers held in a group.

Compact head Many small flowers held together tightly, so it looks like one flower.

Leaflet The small leafy segment of a larger leaf.

Legume A member of the pea family.

Lobed A strongly wavy edge.

Notched petal Petals which are partially split into two lobes.

Pea-like flower Flowers in the Pea family have five petals: a large standard petal at the top, two wing petals at the sides and two lower petals fused into a boatlike keel.

Petal The inner circle of leaves which surround the flower. Often coloured.

Pinnate Leaves divided into segments arranged in a ladder-like pattern.

Rosette Leaves in a flattened circular arrangement on the surface of the ground.

Sepals The green parts behind the flower which cover the petals in the bud.

Stipules Leaf-like structures where a leaf stalk joins a stem. They are often very small.

Toothed A zig-zag edge.

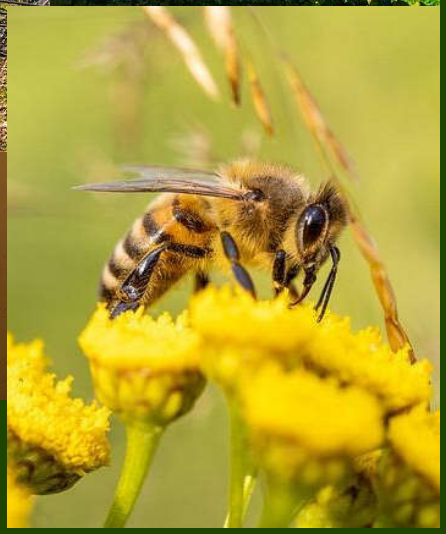
Umbel Many flowers at the top of spoke-like rays radiating from a central point.

KEY

Flower Colour	Flower Shape	Leaf Shape	Name	Page
			Bog myrtle	57
			Carline thistle	36
			Marsh cinquefoil	13
			Bilberry	57
			Common sorrel	14
			Sheep's sorrel	14
			Kidney vetch	15
			Marsh marigold	20
			Yellow flag iris	19
			Tormentils	24
			Lesser spearwort	21
			Cowslip	22
			Yellow rattle	27

NEW PROGRAMME INFLUENCED BY SOIL & BIODIVERSITY PROTOCOLS:

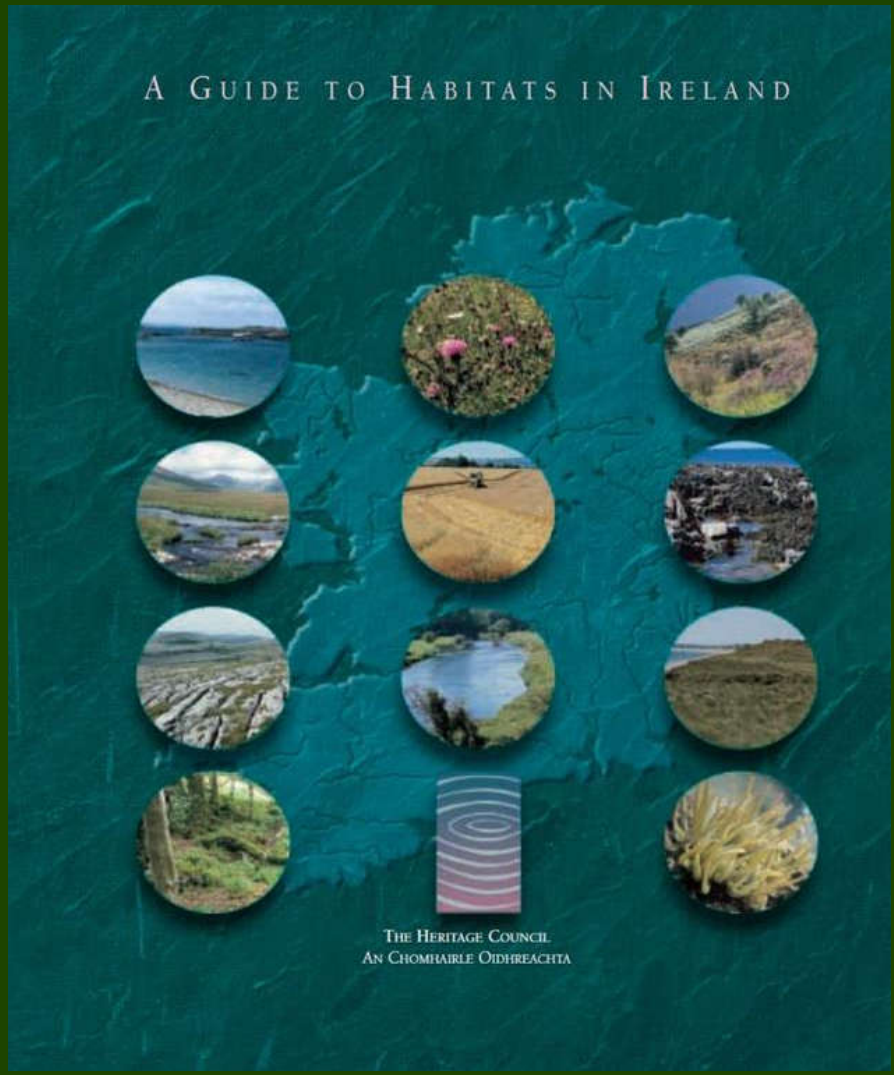
- Land Eligibility: Peat soils
- Habitat Mapping
- High Nature Value Farmland (HNVf)
- Hen Harrier
- Breeding Waders
- Wetlands
- Habitat of Protected Species eg. Marsh Fritillary Butterfly



HABITAT MAPPING & HNVf

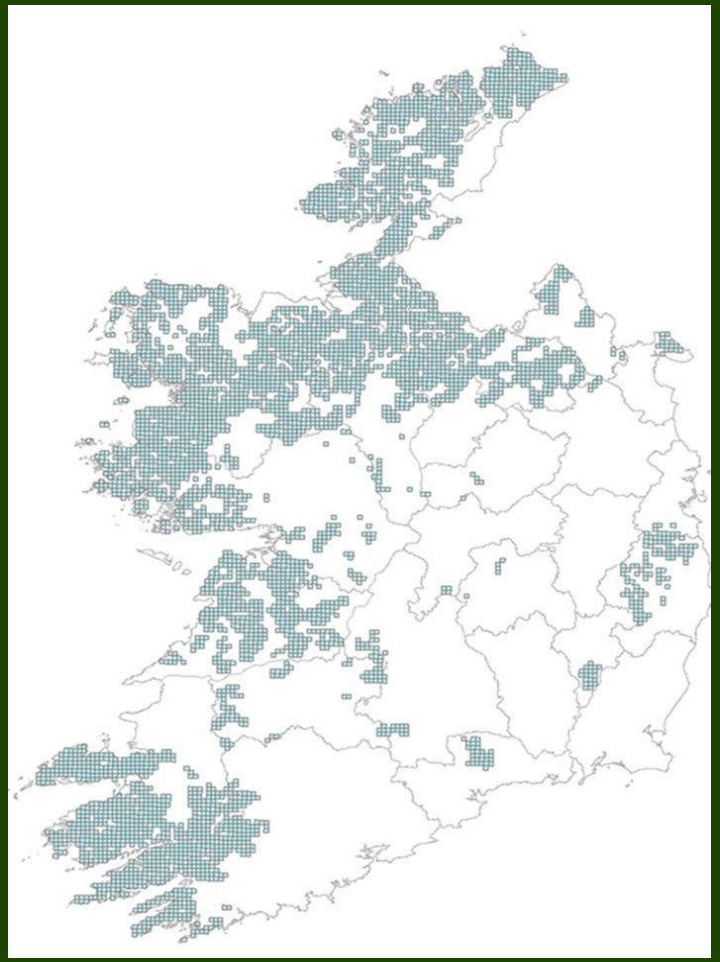
- Fossitt (2000)
- ACRES approach focus on forage indicators in HNVf layer only

Be aware that Annex I habitats present outside indicative layers are still excluded from planting



CHARACTERISTICS OF HNV FARMLAND

- **Low-Intensity Farming:** Practices are typically less intensive and more extensive than commercial agriculture.
- **High Biodiversity:** Supports a wide range of species and ecosystems.
- **Valuable Habitats:** Contains environmentally important habitats that are crucial for wildlife.
- **Causal Link to Environment:** A direct relationship exists between the farming activities and the positive environmental outcomes.



GRASSLANDS – Fossitt (2000) Types

GA Improved Grassland	GA1 Improved Agricultural grassland	
	GA2 Amenity Grassland (improved)	
GS Semi-natural	GS1 Dry Calcareous & Neutral	Semi-natural dry grasslands & scrubland facies on calcareous substrates (Festuco-Brometea) (*important orchid sites) (6210)
		Juniperus communis formations on heaths or calcareous grasslands (5130)
	GS2 Dry Meadows & Grassy Verges	Lowland Hay Meadows (6510)
	GS3 Dry Humid Acid Grassland	Species-rich *Nardus* grasslands on siliceous substrates in mountain areas (6230)
	GS4 Wet Grassland	*Molinia* meadows on calcareous, peaty or clayey silt laden soils (Molina caeruleae)(6410)
GM Freshwater Marsh	GM1 Marsh	Hydrophilous Tall Herb Fringe Communities of planes & of the montane to Alpine levels (6430)

GRASSLANDS – Improved Agricultural Grassland (GA1)

Features:

- Intensively managed/highly modified
- Re-seeded/fertilized
- Grazed/for silage
- Species-poor
  - Rye grass, White clover w/other grasses: Meadow grasses, Yorkshire fog, Timothy, Crested dog's tail
  - 'Agricultural herbs': Dandelion, Nettle, Thistle, Docks, rushes

Be careful of recently cut pasture may host more indicators than evident at first glance

GRASSLANDS – Improved Grasslands

GRASSLANDS – Improved Grasslands

GRASSLANDS – Neutral Grassland (GS1)

Features:

- Unimproved/ semi-improved
- Calcareous/ neutral
- Low-intensity/Grazed/for silage
  - Bents, Meadow grasses (Poa spp.), Yorkshire fog, Foxtails, Timothy, Crested dog's tail, Sweet Vernal, Red fescue. Can include Perennial Rye Grass but not dominant
  - Clovers. Yarrow, Knapweed, Self Heal, Common Birds Foot Trefoil, Cat's Ear, Lady's Bedstraw, Ox eye Daisy

Image Revised Standards for Afforestation(DAFM, 2024)

GRASSLANDS – Neutral Grasslands

GRASSLANDS – Wet Grasslands

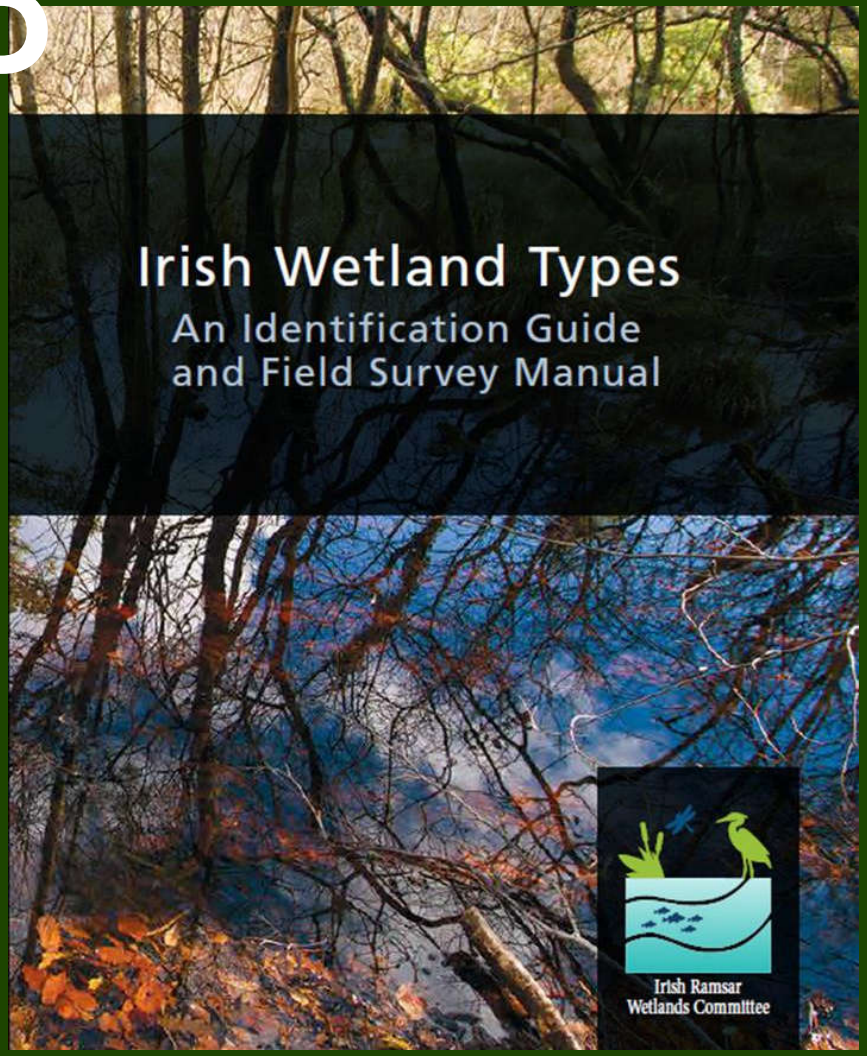
GRASSLANDS – Wet Grasslands

GRASSLANDS – Wet Grasslands

WETLANDS – FIELD RECOGNITION

- Definition & key features (hydrology + vegetation)
- Fossitt (2000) categorizes to broad habitat type
- Ramsar/EPA (2018) field survey guide

- Wetland layer is indicative only and has gaps (GS4, GM1, PF2)



WETLANDS – DEFINITION

"Wetlands are areas of marsh, fen, peatland or water whether natural or artificial, permanent or temporary with water that is static or flowing, fresh, brackish or salt including areas of marine water the depth of which at low tide does not exceed six metres. " Ramsar Convention (2010)

" natural or artificial areas where biogeochemical functions depend notably on constant or periodic shallow inundation or saturation, by standing or flowing fresh, brackish or saline water." Irish Planning Legislation." Government of Ireland, 2011

Extract Irish Ramsar Wetlands Committee, 2018. Irish Wetland Types – an identification guide and field survey manual. EPA,

WETLANDS – FIELD RECOGNITION

- Definition & key features: Hydrology & Vegetation

Ask yourself:

- ➢ Is it wet underfoot with standing water?
- ➢ If it's dry, is it within the indicative flood layers?
- ➢ Are there indicator plants present eg. Yellow Flag Iris, Marsh Marigold, Common Reed, Rushes(tussocky), Sedges, Heathers, Bog Mosses Cotton Grass?
- ➢ Is it located on Peat?
- ➢ Are there deep peat drains present?
- ➢ Is it abandoned to agriculture management...if so, why?

Wet Grassland with Yellow Flag alongside aquatic zone

Marsh GM1

<50% sedges/ grasses

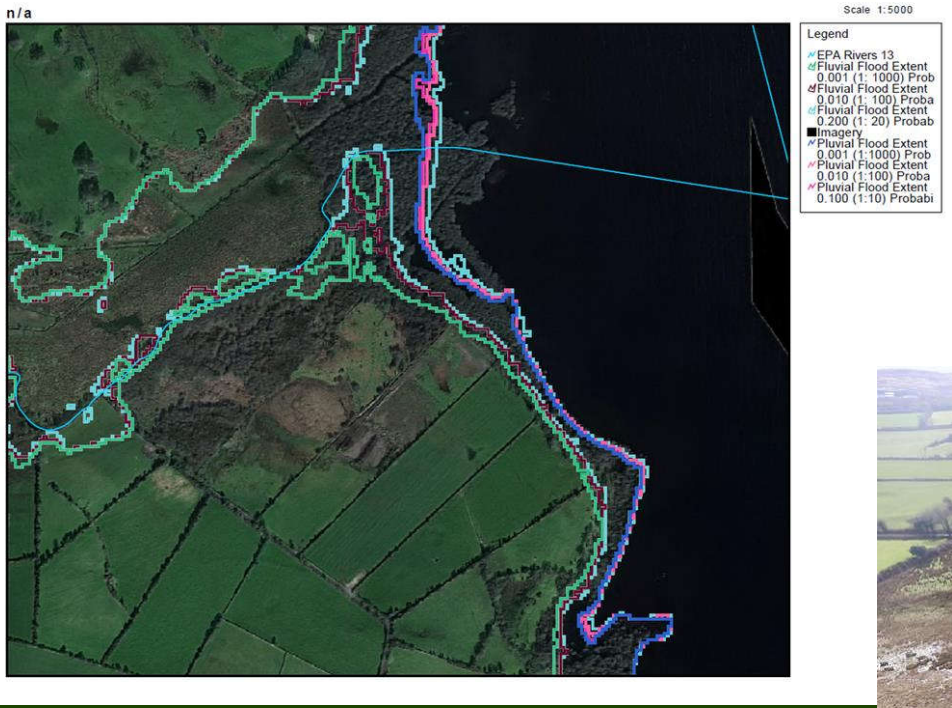
standing water year-round not a feature

Acid flush/fen PF2

sedge/ rush/ bryo. dominant on peat

wetland

sedge/ rush/ bryo. dominant on deep peat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Pluvial Flood Extent 0.001 (1:1000) Prob
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ECOLOGY OF PEAT HABITATS

- Intact Peatland habitat is not suitable to planting.
- **How to Recognize Bogland:**
- **Peat:** Generally, >0.5m is bog & <0.5m is heath
- **Structure:** Hummocky
    1. Blanket Bog groundwater/ surface water fed,
    2. Raised ombrotrophic,
    3. Fen peat found in hollows, on lakeshores, in areas prone to flood
- **Composition:** Dwarf shrubs, bog Mosses, low woody shrubs, rushes, grasses, bog cottons, sedges, *Molinia*

Wet Heath HH3

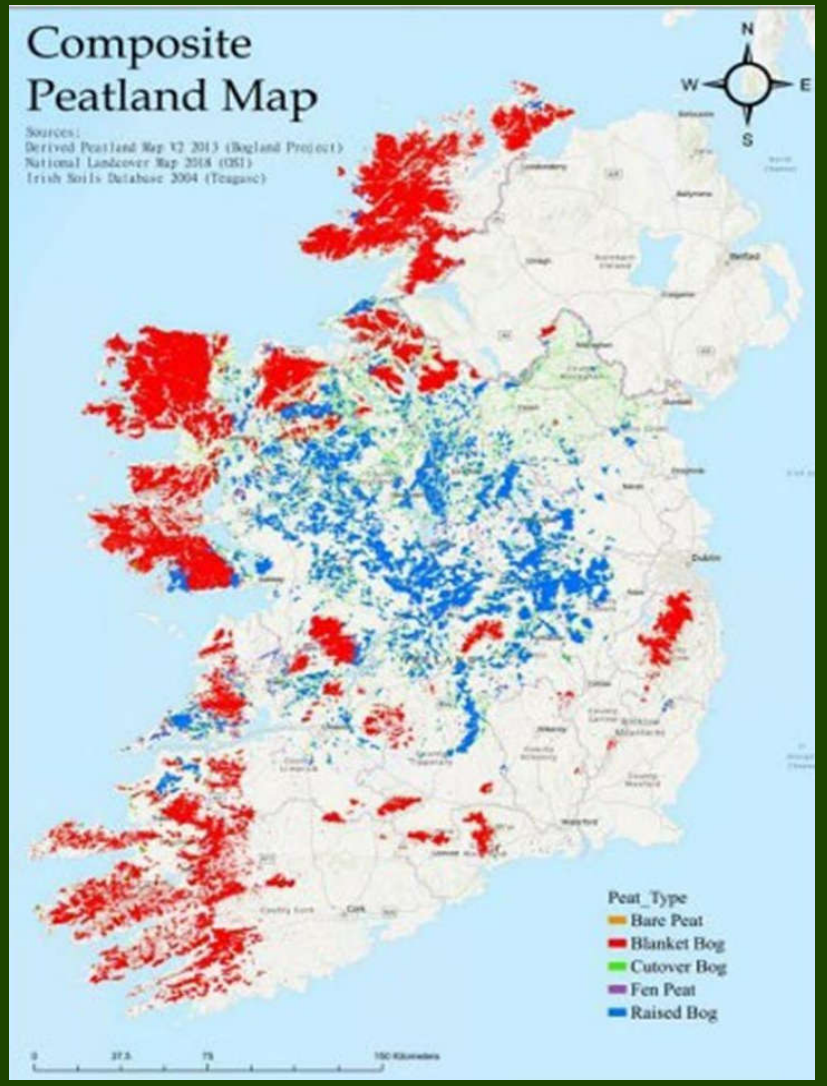
>25% dwarf shrubs over peat <50cm

Heather

Dry Heath HH1 (Revised Standards for Afforestation(DAFM, 2024)

With western gorse & bell heather

SOIL & PEATLAND PROTOCOLS



SOIL & PEATLAND PROTOCOLS

Revised Land Types for Afforestation (2024)

Appendix A Methodology for Soil Survey

- Methodology Desk review -iNet, GIS tools, Aerial imagery.
- Field procedure -GPS, Soil stick, Peat Depth Recording Sheet.

2.2 Eligible soil types

Soil types eligible for afforestation under the Forestry Programme are as follows:

- Mineral soils: Eligible soil type for afforestation under all Forest Types (FTs).
- Organo-mineral soils with a peat (organic layer) depth of 30 cm or less: Eligible soil type for afforestation under all FTs.
- Modified fens and modified cutaway raised bogs: Eligible soil type for afforestation, but only under those Forest Types (FTs) involving native woodland creation and only if capable of supporting the establishment and development of the most relevant native woodland type identified for the site, *without* further drainage.

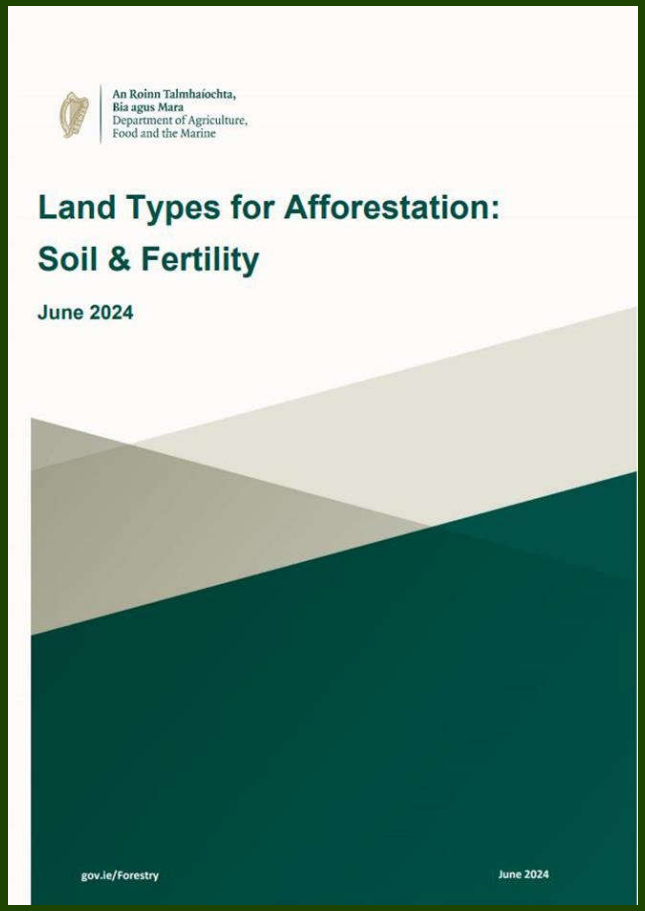
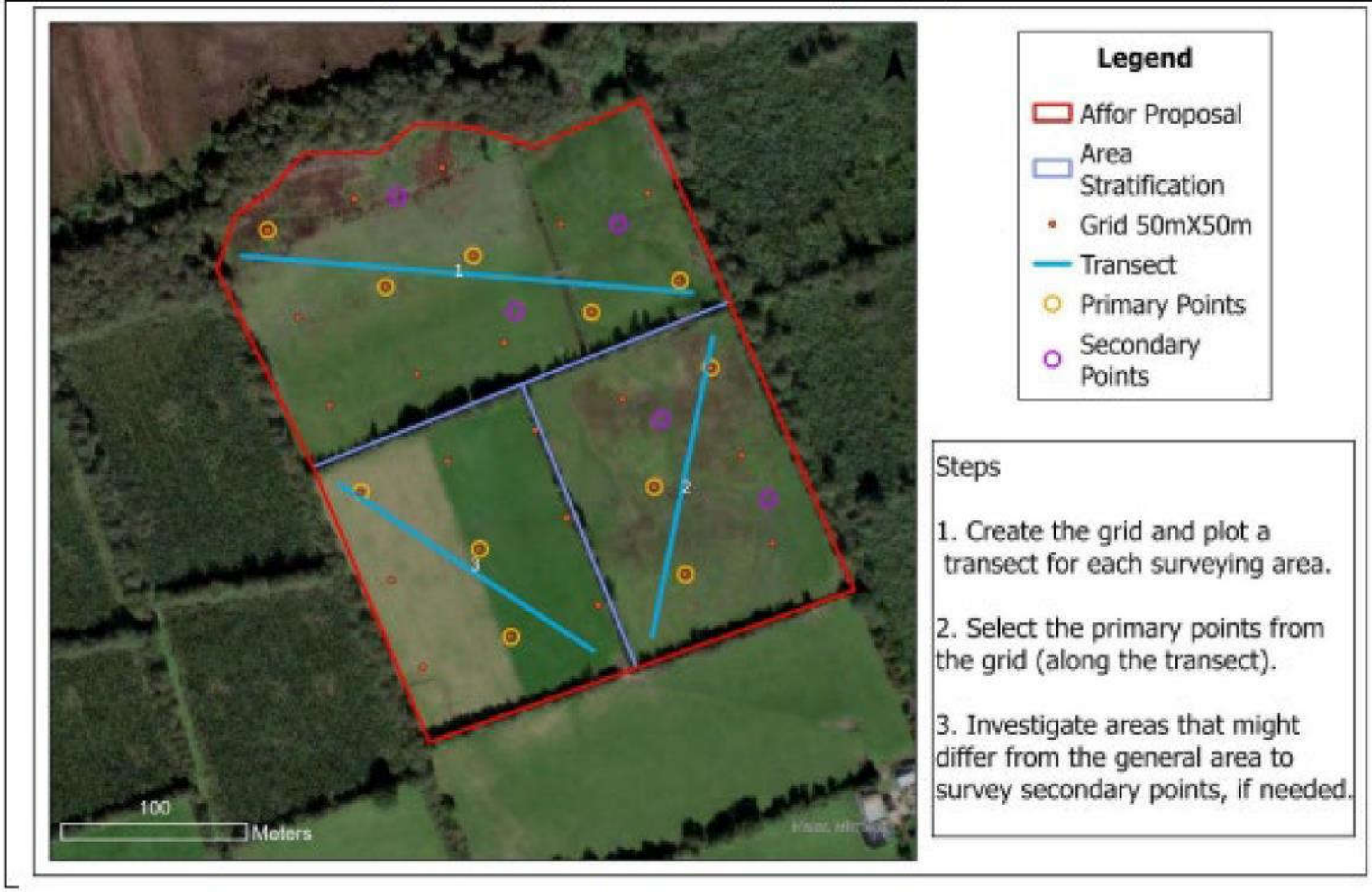


Figure 1 Stratification of application area.

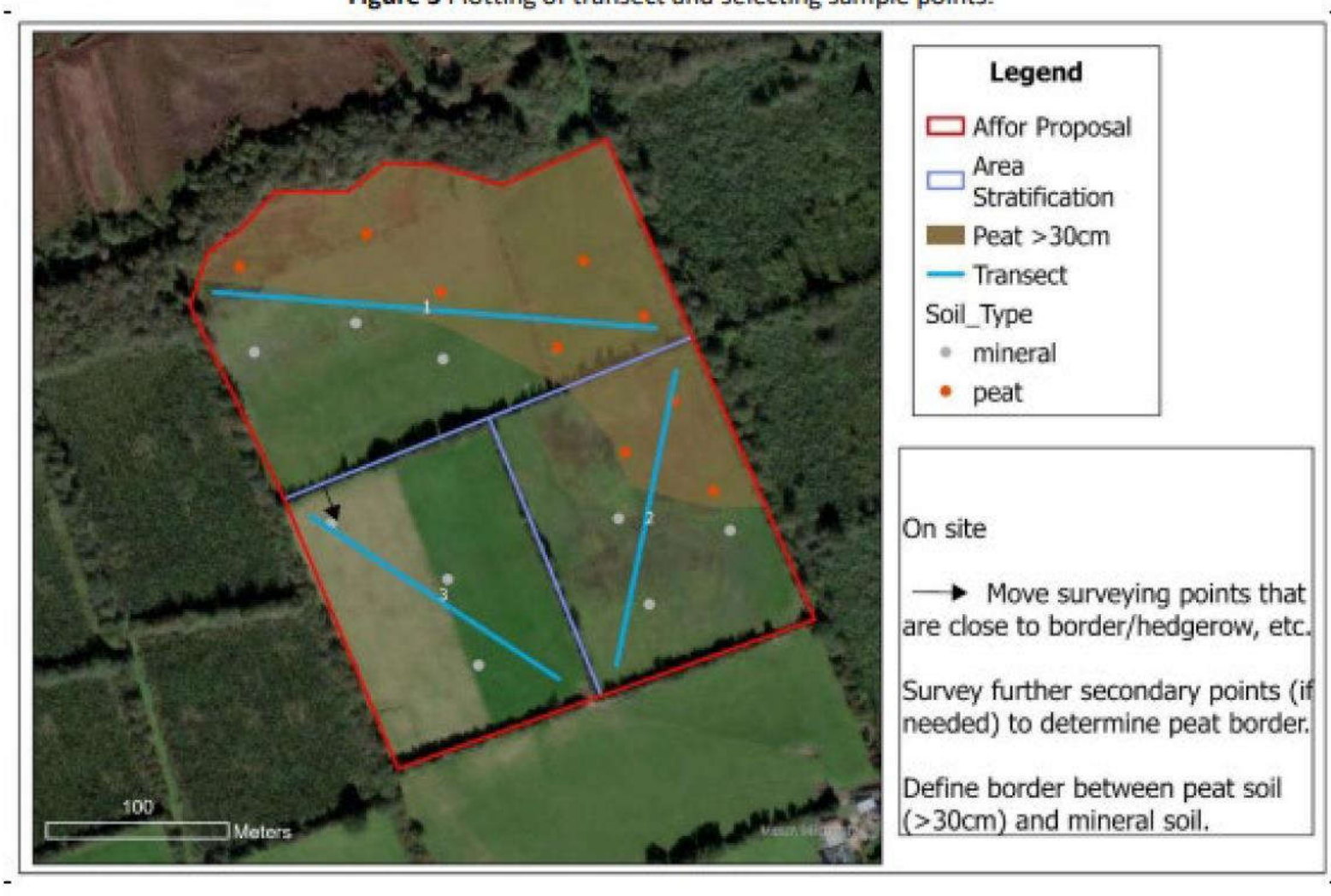
Extract DAFM Revised Requirements for Afforestation(2024)

Figure 2 Plotting of transect and selecting sample points.



Extract DAFM Revised Requirements for Afforestation(2024)

Figure 3 Plotting of transect and selecting sample points.



Extract DAFM Revised Requirements for Afforestation(2024)

Land Types for Afforestation

- Appendix B: Recording Sheet for Peat Depth

Recording Sheet for Peat Depth

(Print or photocopy as needed. A map should be provided to show transect / points taken and the eligible and ineligible areas.)

Affor. CN:		Townland(s):			
Point no.	Point type[1]	X Coordinate (ITM)	Y Coordinate (ITM)	Soil type[2]	Peat depth[3] (cm)

R+N SCORES- Hill & Ellenberg(1999) Indicator values of British Plants.

R+ N scores used to determine Silvicultural suitability:

Reaction R - Alkaline (high value) or Acid (low value).

Nutrient status N - Fertile (High value) Nutrient-poor (low value)

Find the R & N table at;
ECOFACT2a.pdf (nerc.ac.uk)

Common name	Scientific name	Hill-Ellenberg R Score	Hill–Ellenberg N Score	Combined R+N Score
Velvet bent	*Agrostis canina*	3	3	**6**
Sweet vernal-grass	*Anthoxanthum odoratum*	4	3	**7**
Ling heather	*Calluna vulgaris*	2	2	**4**
Tufted hair-grass	*Deschampsia cespitosa*	5	4	**9**
Round-leaved sundew	*Drosera rotundifolia*	2	1	**3**
Bell-heather	*Erica cinerea*	2	2	**4**
Cross-leaved heath	*Erica tetralix*	2	1	**3**
Hare's-tail cottongrass	*Eriophorum vaginatum*	2	1	**3**
Sheep's-fescue	*Festuca ovina*	4	2	**6**
Yorkshire-fog	*Holcus lanatus*	6	5	**11**
Sharp-flowered rush	*Juncus acutiflorus*	4	2	**6**
Jointed rush	*Juncus articulatus*	6	3	**9**
Bulbous rush	*Juncus bulbosus*	4	2	**6**
Compact rush	*Juncus conglomeratus*	4	3	**7**
Soft rush	*Juncus effusus*	4	4	**8**
Heath rush	*Juncus squarrosus*	2	2	**4**
Purple moor-grass	*Molinia caerulea*	3	2	**5**
Bog-myrtle	*Myrica gale*	3	2	**5**
Mat-grass	*Nardus stricta*	3	2	**5**
Bog asphodel	*Narthecium ossifragum*	2	1	**3**
Bracken	*Pteridium aquilinum*	3	3	**6**
Bramble	*Rubus fruticosus*	6	6	**12**
Deergrass	*Trichophorum germanicum*	2	1	**3**

R+N Scores

R+ N scores Methodology:

Vegetation sampling plots measuring 2 m x 2 m should be laid out within vegetation that is representative of the vegetation unit.

The location of the center point, the north-west corner and the south-east corner must be recorded on the Sample Plot Recording Sheet

Avoid any unrepresentative features such as drains and boundary edges.

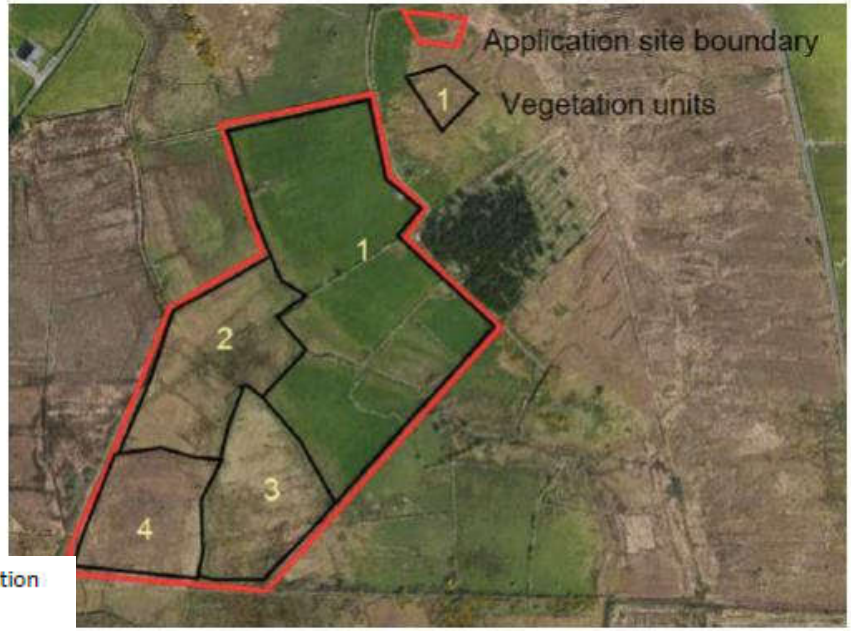


Table 1 Guidance on the number of vegetation sample plots required, based on the area of, and the vegetation variability within, the vegetation unit.

Area of vegetation unit	Variation within vegetation	Number of sample plots
< 8 ha	Uniform vegetation	5
< 8 ha	Variable vegetation	10
≥ 8 ha	Uniform or variable vegetation	≥ 10

R+ N Methodology:

Table 2 Land Types for Afforestation recording procedure.

FOR EACH VEGETATION SAMPLE PLOT	**Step 1**	**Identify and list the plant species within the vegetation sample plot, and estimate the percentage cover for each (identified as [A] in Examples 1-5).**
	Step 2	**For each species, find its combined R+N score [B], using Appendix C.**
	Step 3	**For each species, multiple its R+N score [B] by its corresponding percentage cover, to arrive at the weighted R+N score for that species [C].**
	Step 4	**Sum up the weighted R+N scores for all species to get the total weighted R+N score [D].**
	Step 5	**Determine the soil type within the sample plot. If peat, measure and record the depth of peat.**
	Step 6	Repeat Steps 1 to 5 above for *each* vegetation sample plot along the transect line crossing the vegetation unit.
	Step 7	Examine the scores of each vegetation sample plot to verify the boundary of the vegetation unit. Areas 0.2 ha or greater of the land type Ineligible Land must be excluded. Therefore vegetation units must be adjusted accordingly. For example, if plots along the first half of the transect score high and along the second half of the transect score low, this indicates the presence of more than one vegetation unit and the boundary must be adjusted accordingly.
	Step 8	Calculate the average R+N score for the vegetation unit, by adding up the total weighted R+N scores [D] and dividing by the number of vegetation sample plots involved.
	Step 9	Using Table 3, assign a land type category (Eligible Land: FT1-12 OR Ineligible Land) to the vegetation unit, along with (as applicable) the proposed Forest Type. Note, Ineligible Land, as described in Section 4, must be excluded from the application.

Table 3 R+N score and corresponding Land Type category.

Average R+N score of vegetation unit	Corresponding Land Type of vegetation unit *
6.0 or greater	Eligible Land: FT1-12
Less than 6.0	Ineligible Land

* Sites are excluded from the Eligible Land category and fall into the Ineligible Land category if various other inhibiting factors apply, as listed in Section 4, regardless of their R+N score.

R+ N Methodology:

Examples

The following examples (below and overleaf) demonstrate the scoring of individual vegetation sample plots following Steps 1 to 5 in Table 2, and the outcome regarding which land type category applies (assuming the same results are reached for other plots within the vegetation unit).

Example 1

Soil type: Brown podzolic Vegetation: Dense bracken

Species within the vegetation sample plot	% cover [A]	Combined R+N score [B]	Weighed R+N score [C]
Bracken (*Pteridium aquilinum*)	70	6	4.2
Sweet vernal-grass (*Anthoxanthum odoratum*)	25	7	1.8
Velvet bent (*Agrostis canina*)	5	6	0.3
Total cover (%)	**100%***	**Total weighted R+N score [D] 6.3**	

Therefore, Eligible Land: FT1-12

Example 2

Soil type: Peat Vegetation: Wet grassland

Species within the vegetation sample plot	% cover [A]	Combined R+N score [B]	Weighed R+N score [C]
Purple moor-grass (*Molinia caerulea*)	70	5	3.5
Bracken (*Pteridium aquilinum*)	15	6	0.9
Sweet vernal-grass (*Anthoxanthum odoratum*)	10	7	0.7
Soft rush (*Juncus effusus*)	5	8	0.4
Total cover (%)	**100%***	**Total weighted R+N score [D] 5.5**	

Therefore, Ineligible Land

* Note: vegetation cover may be less than 100%, where there is high moss cover or bare ground. It may also be over 100% where plants overlap. In both cases, adjust % Cover of each species up or down proportionately, to add up to 100%.

R+ N Methodology:

Afforestation R+N Score Recording Sheet

(Print or photocopy, as required)

CN		Date
Grid Reference	Centre Point NW Corner SE Corner	
Townland & County		Recorder's Name

Topography	***Slope (level / moderate / steep)***
Soil type	***Peat depth (cm)***
Exposed rock % cover	***Surface water % cover***
Habitat type As listed in Fossitt's *A Guide to Habitats in Ireland* (2000) Potential links to Annex 1	
Land type general description	

Vegetation Sample Plot No:			
Species within the sample plot	***% cover [A]***	***Combined R+N score [B]***	***Weighted R+N score [C]***
		Total weighted R+N score [D]	

ANNEX I HABITATS
EU Habitats Directive (92/43/EEC)

Properties:

- High biodiversity & Semi-natural
- Rare and declining in EU
- Non-designated Annex I habitats outside SAC's

Molinia Meadow on clay/ peaty soils

Annex I habitats at risk from Afforestation:

Grasslands:

- Species-rich acid grassland (6230)
- Species-rich calcareous grassland (6210)
- Molinia meadows (6410)

ANNEX I HABITATS – KEY FIELD INDICATORS

What to look for in suspected Annex I sites &/ or High HNVf sites:

Eg. *Molinia* Meadow:

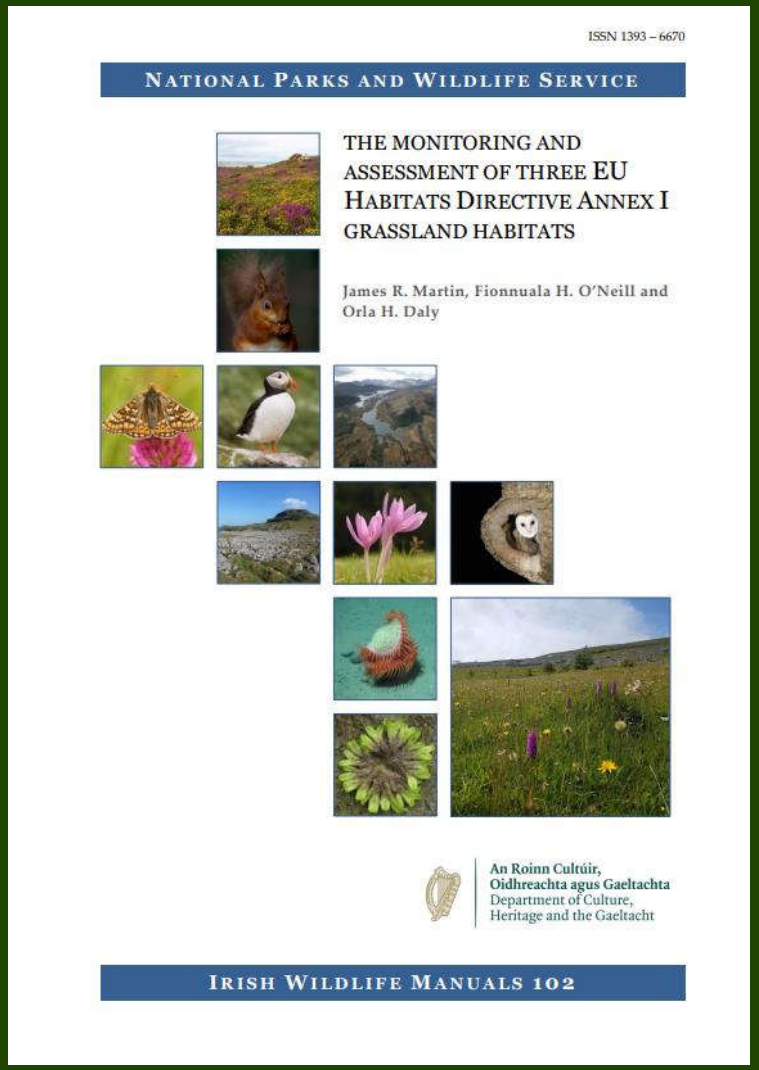
- Structure & sward composition
- Presence of positive indicators
- Hydrology & soil conditions
  - Soil: peat/ Shallow with outcropping rock
  - Hydrology: wet or flushed

Meadow thistle *Cirsium dissectum*

Spotted Orchid

ANNEX I HABITATS ASSESSMENT

Refer to O'Neill et al. (2018) e.g. Assessment of *Molinia* Meadow [6410]



ANNEX I HABITATS ASSESSMENT

Refer to O'Neill et al. (2018) e.g. Assessment of *Molinia* Meadow [6410]

***Molinia* meadows on calcareous, peaty or clayey-silt laden soils (Molinion caeruleae) (6410)**

a) Positive species data

The presence/absence of the High quality and Positive indicator species within each 2 m x 2 m monitoring plot should be recorded.

High Quality Positive Indicator Species	Positive Indicator Species
Carex pulicaris	*Achillea ptarmica*
Carum verticillatum	*Carex echinata*
Cirsium dissectum	*Carex flacca*
Crepis paludosa	*Carex nigra*
Galium uliginosum	*Carex panicea*
Juncus conglomeratus	*Carex viridula*
Lathyrus palustris	*Equisetum palustre*
Ophioglossum vulgatum	*Filipendula ulmaria*
Viola persicifolia	*Galium palustre*
Orchid species (record individual orchid species separately)	*Juncus acutiflorus/J. articulatus* (record both but count as one in assessment)
	Lotus pedunculatus
	Luzula multiflora
	Mentha aquatica
	Molinia caerulea (Pass = Present in one plot or within 20 m of a plot)
	Potentilla anglica
	Potentilla erecta
	Ranunculus flammula
	Succisa pratensis
	Viola palustris

b) High quality and Positive species criteria to assess in the field. Search the surrounding 20 m area if indicator species are failing by 1-2 species.

Criteria	Scale of assessment
High quality and Positive indicator species	
Number of high quality species present ≥ 1	**Plot + include 20 m surrounding area**
Total number of positive indicator and high quality species present ≥ 7	**Plot + include 20 m surrounding area**
IF positive indicator species are failing consider recording presence/absence of additional positive indicator species. For example, *Hydrocotyle vulgaris* can be included as a +ve indicator species for fen 6410 and *Rhinanthus minor* can be included as a +ve indicator species for meadow 6410.	

c) Negative indicator species data

% cover of **negative indicator species** and **non-native species** to be recorded using the scale of 0.1%, 0.3%, 0.5%, 0.7%, 1%, 3%, 5% , 7%, 10%, and then to the nearest 5%

Negative Indicator species	
Cirsium arvense	**Any non-native species should be recorded (e.g. *Campylopus introflexus, Crepis vesicaria, Epilobium brunnescens*)**
Cirsium vulgare	
Glyceria maxima	
Lolium perenne	
Phalaris arundinacea	
Phragmites australis	
Polytrichum spp.	
Rumex crispus	
Rumex obtusifolius	
Senecio jacobaea	
Trifolium repens	
Urtica dioica	

d) Header data (recorded using the same % cover scale as listed above for negative species)

Negative species	Scale
Record the % collective cover of scrub, bracken and heath (woody species) (Pass ≤ 5%)	**Plot**
Record the % collective cover of the above negative indicator species (Pass **≤ 20%)**	**Plot**
Record the % cover of *Polytrichum* species (Pass ≤ 25%)	**Plot**
Vegetation structure	
% forb cover	**Plot**
% graminoid cover	**Plot**
Record % cover of litter (Pass ≤ 25%)	**Plot**
Record Y or N, for if the proportion of the sward between 10-80 cm tall is ≥ 30%	**Plot**
Physical structure	
Record the % cover of bare soil (Pass ≤ 10%)	**Plot**
Record Y or N, for if the area of the habitat showing signs of serious grazing or disturbance is < 20 m^2	**Local vicinity**

***Molinia* Meadow**

***Molinia* Meadow**

Molinia Meadow Species

Meadowsweet *Filipendula ulmaria*

Meadow Thistle *Cirsium dissectum*

Juncus articulatus

Molinia Meadow Species

Devil's Bit Scabious *Succisa pratensis*

Heath Orchid *Dactyllorhiza spp.*

Marsh Violet *Viola palustris*

Molinia Meadow Species

Tormentil

Potentilla erecta

Heath Bedstraw

Gallium saxatile.

Compact Rush

Juncus conglomeratus

Heath Woodrush

Luzula multiflora

Molinia Meadow Species

Marsh Horsetail

Equisetum fluviatile

Water mint

Mentha aquatica

Jointed Rush

Juncus articulatus

Purple Moor Grass

Molinia caerulea

Molinia Meadow Species

Sneezewort

Achillea ptarmica

Marsh Bedstraw

Galium palustre

Lousewort

Pedicularis sylvatica

Wet Grassland Species

Selfheal

Prunella vulgaris

Autumn Hawkbit

Leontodon autumnalis

Common Bird’s foot trefoil

Lotus corniculatus

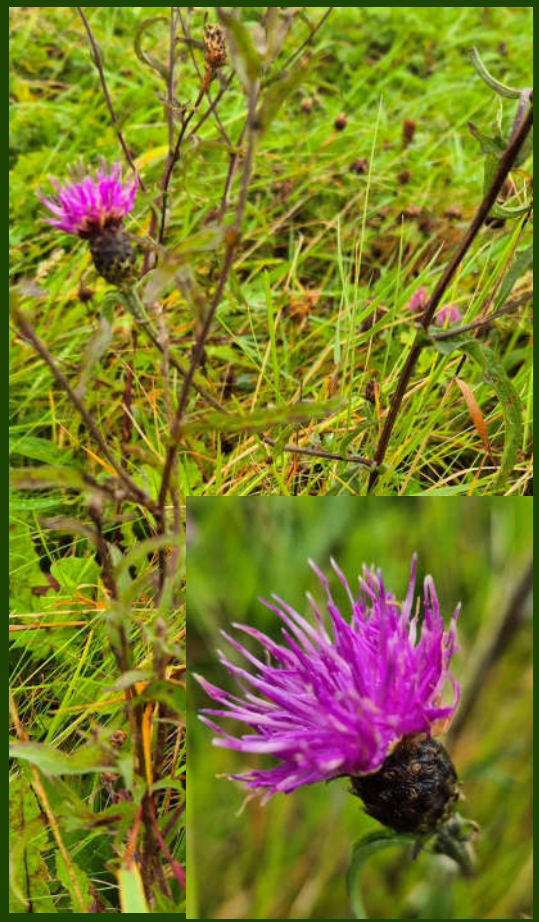
Additional Grassland Species

Yarrow

Achillea millefolium

Purple Loosestrife

Lythrum salicaria



Knapweed

Cenaturea nigra

Additional Grassland Species

Meadow Buttercup

Ranunculus acris

Creeping Buttercup

Ranunculus repens

Additional Grassland Species

Red Clover

Trifolium pratense

White Clover

Trifolium repens

Common Sorrel

Rumex acetosa

Negative Indicator Species

Dock

Rumex obtusifolius

Ragwort

Senecio vulgaris

Spear Thistle

Cirsium vulgaris

Negative Indicator Species

Dock

Rumex obtusifolius

Polytrichum species

HABITATS FOR ANNEX II SPECIES

Marsh Fritillary Butterfly Habitat Protection

- Implement larval web surveys in late August–early September per NBDC standard methods- *Weather-Dependent.*
- Protect Devil's Bit Scabious-rich *Molinia* meadows even outside SACs
- Wetland & flood-prone site checks but also upland acid pasture

HABITATS FOR PROTECTED SPECIES

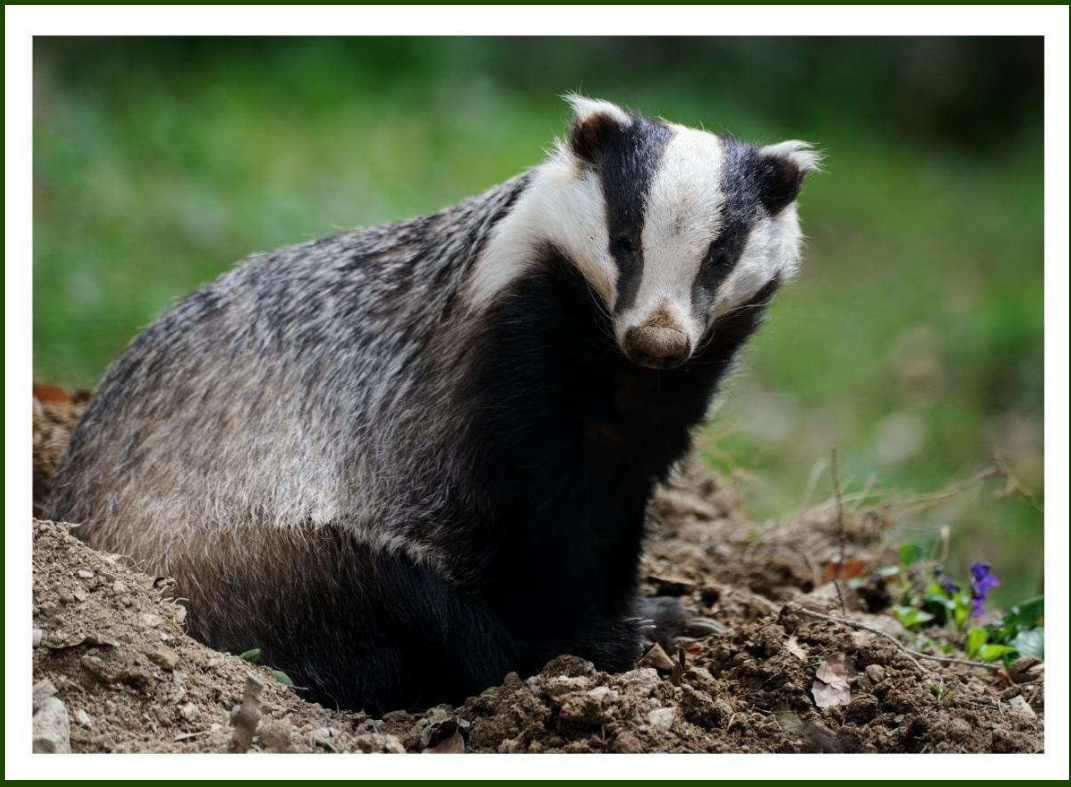
Badger

Badgers are protected by the Wildlife Act 1976 to 2018 and Wildlife Amendment Act 2000. It is an offence to hunt or injure a badger and also an offence to wilfully destroy or interfere with its breeding or resting place (sett).

Apply a set-back of minimum 10m from the Badger sett within which there will be no machinery access.

Broadleaves pit planted only within 20-30m

Fuels or chemicals should not be stored in the exclusion zone.



HNVf Methodology:

We look at positive indicators for Biodiversity.

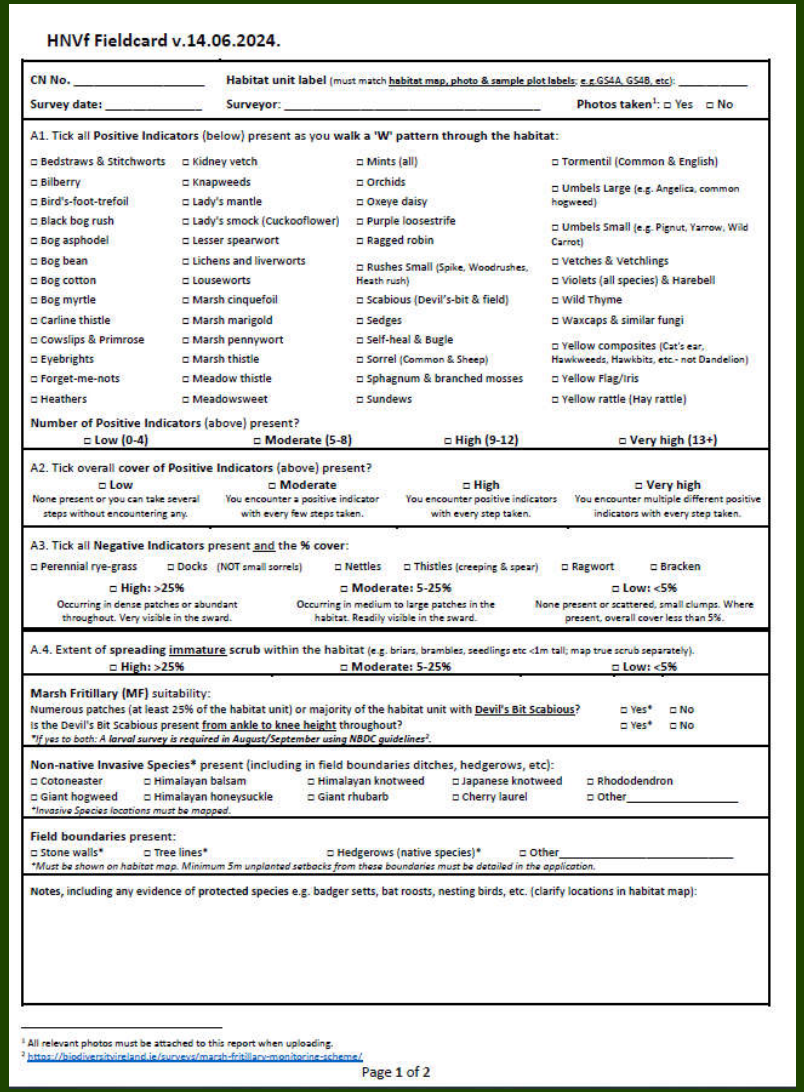
Helpful Hint: The following species if frequently found *may* mean they are in a wetland, a peatland or species-rich community:

Bilberry, Black Bog Rush, Bog Asphodel, Bog bean, , Bog Cotton, Bog Myrtle, Heather, Sphagnum, Sundew.

may need to assess for R+N, wetland habitat, ineligible area or potential ABE.

New Scoring System:

Fieldcard question	Scores
A1. Number of Positive Indicators	Low = 5, Moderate = 15, High = 35; Very high = 45
A2. Cover of Positive Indicators	Low = 5, Moderate = 15, High = 35; Very high = 45
A3. Cover of negative indicators	High = -10, Moderate = -5, Low = 5
A4. Cover of immature scrub	High = -25, Moderate = -10, Low = 5



HNVf Fieldcard v.14.06.2024.

CN No. _____ **Habitat unit label** (must match habitat map, photo & sample plot labels; e.g.GS4A, GS4B, etc): _____

Survey date: _____ **Surveyor:** _____ **Photos taken**[1]: ☐ Yes ☐ No

A1. Tick all **Positive Indicators** (below) present as you **walk a 'W' pattern through the habitat**:

☐ Bedstraws & Stitchworts	☐ Kidney vetch	☐ Mints (all)	☐ Tormentil (Common & English)
☐ Bilberry	☐ Knapweeds	☐ Orchids	☐ Umbels Large (e.g. Angelica, common hogweed)
☐ Bird's-foot-trefoil	☐ Lady's mantle	☐ Oxeye daisy	
☐ Black bog rush	☐ Lady's smock (Cuckooflower)	☐ Purple loosestrife	☐ Umbels Small (e.g. Pignut, Yarrow, Wild Carrot)
☐ Bog asphodel	☐ Lesser spearwort	☐ Ragged robin	
☐ Bog bean	☐ Lichens and liverworts	☐ Rushes Small (Spike, Woodrushes, Heath rush)	☐ Vetches & Vetchlings
☐ Bog cotton	☐ Louseworts		☐ Violets (all species) & Harebell
☐ Bog myrtle	☐ Marsh cinquefoil	☐ Scabious (Devil's-bit & field)	☐ Wild Thyme
☐ Carline thistle	☐ Marsh marigold	☐ Sedges	☐ Waxcaps & similar fungi
☐ Cowslips & Primrose	☐ Marsh pennywort	☐ Self-heal & Bugle	☐ Yellow composites (Cat's ear, Hawkweeds, Hawkbits, etc.- not Dandelion)
☐ Eyebrights	☐ Marsh thistle	☐ Sorrel (Common & Sheep)	
☐ Forget-me-nots	☐ Meadow thistle	☐ Sphagnum & branched mosses	☐ Yellow Flag/Iris
☐ Heathers	☐ Meadowsweet	☐ Sundews	☐ Yellow rattle (Hay rattle)

Number of Positive Indicators (above) present?
☐ **Low (0-4)** ☐ **Moderate (5-8)** ☐ **High (9-12)** ☐ **Very high (13+)**

A2. Tick overall **cover of Positive Indicators** (above) present?

☐ **Low**	☐ **Moderate**	☐ **High**	☐ **Very high**
None present or you can take several steps without encountering any.	You encounter a positive indicator with every few steps taken.	You encounter positive indicators with every step taken.	You encounter multiple different positive indicators with every step taken.

A3. Tick all **Negative Indicators** present and **the % cover**:

☐ Perennial rye-grass ☐ Docks (NOT small sorrels) ☐ Nettles ☐ Thistles (creeping & spear) ☐ Ragwort ☐ Bracken

☐ **High: >25%**	☐ **Moderate: 5-25%**	☐ **Low: <5%**
Occurring in dense patches or abundant throughout. Very visible in the sward.	Occurring in medium to large patches in the habitat. Readily visible in the sward.	None present or scattered, small clumps. Where present, overall cover less than 5%.

A.4. Extent of **spreading immature scrub within the habitat** (e.g. briars, brambles, seedlings etc <1m tall; map true scrub separately).
☐ **High: >25%** ☐ **Moderate: 5-25%** ☐ **Low: <5%**

Marsh Fritillary (MF) suitability:
Numerous patches (at least 25% of the habitat unit) or majority of the habitat unit with **Devil's Bit Scabious**? ☐ Yes* ☐ No
Is the Devil's Bit Scabious present **from ankle to knee height** throughout? ☐ Yes* ☐ No
**If yes to both: A larval survey is required in August/September using NBDC guidelines[2].*

Non-native Invasive Species* present (including in field boundaries ditches, hedgerows, etc):
☐ Cotoneaster ☐ Himalayan balsam ☐ Himalayan knotweed ☐ Japanese knotweed ☐ Rhododendron
☐ Giant hogweed ☐ Himalayan honeysuckle ☐ Giant rhubarb ☐ Cherry laurel ☐ Other_____
**Invasive Species locations must be mapped.*

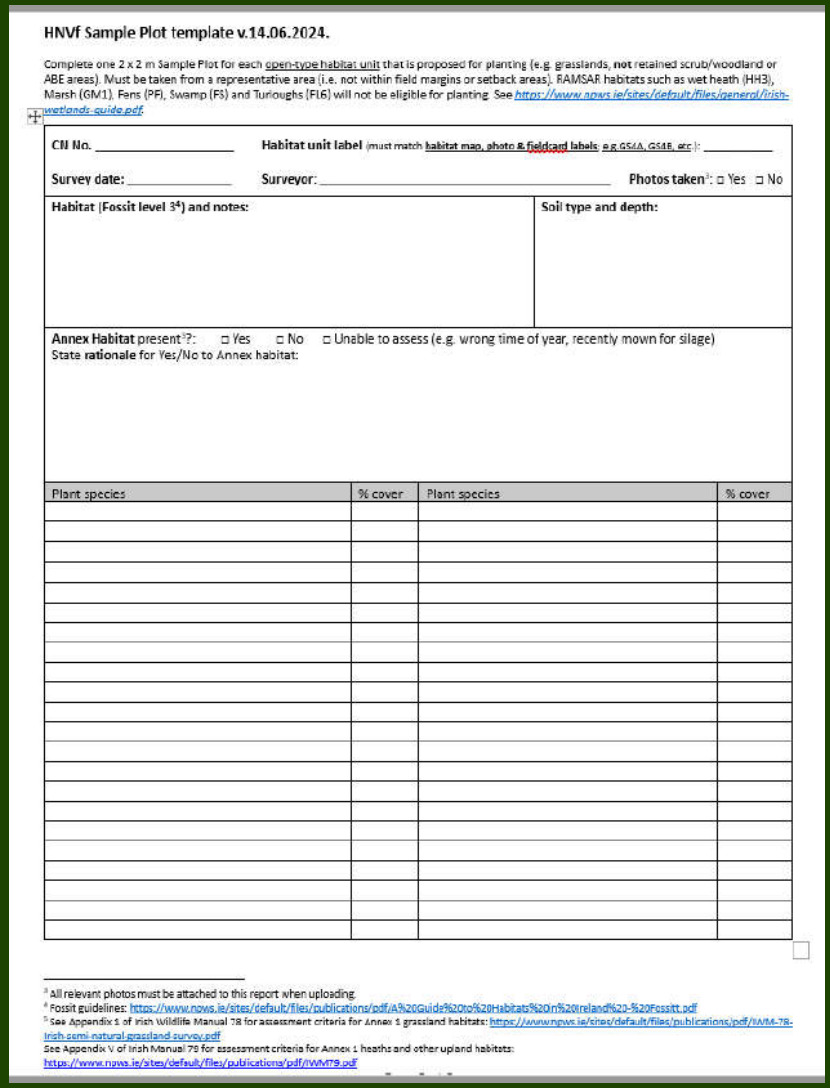
Field boundaries present:
☐ Stone walls* ☐ Tree lines* ☐ Hedgerows (native species)* ☐ Other_____
**Must be shown on habitat map. Minimum 5m unplanted setbacks from these boundaries must be detailed in the application.*

Notes, including any evidence of **protected species** e.g. badger setts, bat roosts, nesting birds, etc. (clarify locations in habitat map):

[1] All relevant photos must be attached to this report when uploading.
[2] https://biodiversityireland.ie/surveys/marsh-fritillary-monitoring-scheme/

Helpful Hint: if it's high HNVf, it will be excluded so that makes an Annex I survey unnecessary in terms of cost

The following link provides a template HNVf Fieldcard and Sample plot: https://assets.gov.ie/static/documents/hnvf-fieldcard-and-sample-plot-templates.pdf



HNVf Sample Plot template v.14.06.2024.

Complete one 2 x 2 m Sample Plot for each open-type habitat unit that is proposed for planting (e.g. grasslands, **not** retained scrub/woodland or ABE areas). Must be taken from a representative area (i.e. not within field margins or setback areas). RAMSAR habitats such as wet heath (HH3), Marsh (GM1), Fens (PF), Swamp (FS) and Turloughs (FL6) will not be eligible for planting. See https://www.npws.ie/sites/default/files/general/irish-wetlands-guide.pdf.

CN No. _____ **Habitat unit label** (must match habitat map, photo & fieldcard labels, e.g. GS4A, GS4B, etc.): _____

Survey date: _____ **Surveyor:** _____ **Photos taken**[3]: ☐ Yes ☐ No

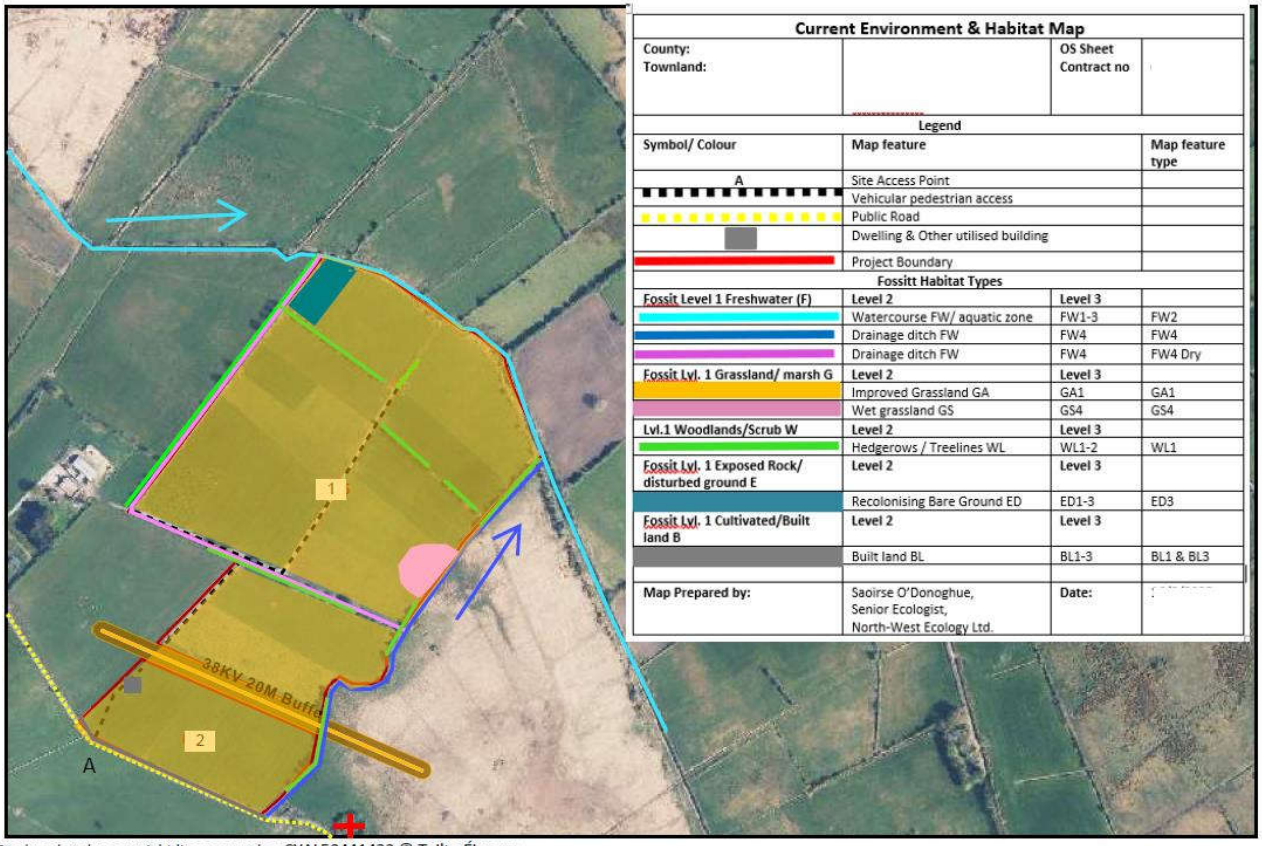
Habitat (Fossit level 3[4]**) and notes:**	**Soil type and depth:**

Annex Habitat present[5]?: ☐ Yes ☐ No ☐ Unable to assess (e.g. wrong time of year, recently mown for silage)
State **rationale** for Yes/No to Annex habitat:

Plant species	% cover	Plant species	% cover

[3] All relevant photos must be attached to this report when uploading
[4] Fossit guidelines: https://www.npws.ie/sites/default/files/publications/pdf/A%20Guide%20to%20Habitats%20in%20Ireland%20-%20Fossitt.pdf
[5] See Appendix 1 of Irish Wildlife Manual 78 for assessment criteria for Annex 1 grassland habitats: https://www.npws.ie/sites/default/files/publications/pdf/IWM-78-Irish-semi-natural-grassland-survey.pdf
See Appendix V of Irish Manual 79 for assessment criteria for Annex 1 heaths and other upland habitats:
https://www.npws.ie/sites/default/files/publications/pdf/IWM79.pdf

HABITAT MAP



Current Environment & Habitat Map

County: **Townland:**		**OS Sheet** **Contract no**	

Legend

Symbol/ Colour	Map feature		Map feature type
A	Site Access Point		
	Vehicular pedestrian access		
	Public Road		
	Dwelling & Other utilised building		
	Project Boundary		
	Fossitt Habitat Types		
Fossit Level 1 Freshwater (F)	**Level 2**	**Level 3**	
	Watercourse FW/ aquatic zone	FW1-3	FW2
	Drainage ditch FW	FW4	FW4
	Drainage ditch FW	FW4	FW4 Dry
Fossit Lvl. 1 Grassland/ marsh G	**Level 2**	**Level 3**	
	Improved Grassland GA	GA1	GA1
	Wet grassland GS	GS4	GS4
Lvl.1 Woodlands/Scrub W	**Level 2**	**Level 3**	
	Hedgerows / Treelines WL	WL1-2	WL1
Fossit Lvl. 1 Exposed Rock/ disturbed ground E	**Level 2**	**Level 3**	
	Recolonising Bare Ground ED	ED1-3	ED3
Fossit Lvl. 1 Cultivated/Built land B	**Level 2**	**Level 3**	
	Built land BL	BL1-3	BL1 & BL3
Map Prepared by:	Saoirse O'Donoghue, Senior Ecologist, North-West Ecology Ltd.	**Date:**	

Produced under copyright licence number CYAL50441432 © Tailte Éireann

Scale 1:5000

PLOTS

Overview photo

Plot photo

PHOTOS

Overview photo

Plot photo

HABITATS FOR PROTECTED SPECIES

Hen Harrier & Breeding Waders

Hen Harrier

Hen Harrier Site Inspection Form						
	Project No.:_____ **Survey date:** _____ **Surveyor:** _____ **Photos are mandatory – include photos (close up and overview) of each distinct habitat unit. Habitat Map (as per Fossitt (2000) showing habitat units**					
1	Elevation m	< 100m of built areas (town/village etc)	Yes: No:	< 100m of occupied farms and dwellings	Yes: No:	Specify any existing disturbance (separation distance etc.):
2	Habitats within site – Circle relevant habitats and show on habitat map	Heathland (HH) Bogland (PB), including cutover Bog (PB4), Semi Natural Grasslands (GS), Wet Grassland/Semi-natural (GS4), Wet Grassland/Improved (GA1i), Fens/flushes (PF), Mire/Quaking Bog (PF), Marsh (GM), Reed beds/Swamps (FS), Scrub (WS1), Hedgerows (WL1), Treelines (WL2), Salt Marsh (CM), Dense bracken (HD1), Improved Ag Grassland (GA1), Cultivated land (BC), Rivers/Streams (FW1/FW2), Drains (FW4) , Rocky out crops/boulder fields/scree slopes (ER/ED), Semi-natural woodland (WN), Immature Woodland (WS2). Other (specify)					
3	Habitats extending away/within 750m of site – circle as appropriate	Heathland (HH) Bogland (PB), including cutover Bog (PB4), Semi Natural Grasslands (GS), Wet Grassland/Improved (GA1i), Improved Ag Grassland (GA1), Cultivated land (BC), Marsh (GM), Hedgerows (WL1), Scrub (WS1), Treelines (WL2), Rivers/Streams (FW1/FW2), Drains (FW4) , Rocky out crops/boulder fields/scree slopes (ER/ED), Semi-natural woodland (WN), Immature Woodland (WS2) , Modified Woodland, Conifer plantation (WD). Other (specify) *Can be completed via Aerial/OS Maps/EPA Landcover Map etc.*					
4	Land-use - circle as appropriate	Within site: Cattle/Sheep/Horses, Grazing/pasture, Silage Harvesting, Abandoned/Unmanaged, Extensively managed farmland, Intensively managed farmland, Other (specify)					
		Extending Away: Extensively managed farmland, intensively managed farmland, Abandoned/unmanaged, developed land, recreational, Other (specify)					
5	Vegetation present – note species and % cover	E.g. Semi-natural species: Heathers (*Erica* spp.), (*Calluna vulgaris*), (*Daboecia cantabrica*), (*Potentilla erecta*), Purple moor-grass (*Molinia caerulea*), sedges, etc.					

Hen Harrier

		Species indicative of improvement e.g. Perennial Rye-grass (*Lolium perenne*), Nettle (*Urtica dioica*), Ragwort (*Senecio jacobea*), Docks (*Rumex obtusifolius, Rumex crispus*), white clover (*Trifolium repens*), etc.					
6a	Field Boundaries (tick appropriate option(s))	Hedgerows	Treelines	Earth/vegetated banks	Stonewalls	Drainage ditches	Other-
7	Hedgerow description	Intact	Broken / Sparse fragmented	Dense (3-4m wide)	Moderate (1-3m wide)	Height (m)	Other
8	Observations of Hen Harrier	Record activity such as Display (D), Food pass (FP), Hunting (H), Flying (F), on Ground (G), Mobbing (M), Other (O). Map any flight paths / commuting / foraging routes through the project site/study area.					
9	Hen Harrier prey – note any sightings/signs	Small birds such as Meadow pipits/Skylark, small mammals (evidence of burrows etc...)					
Complete Q10 – 12 for low intensity managed grasslands only (i.e. Rough grasslands, wet grasslands, dry grasslands, acid grasslands etc.). Do not complete Q10 – 12 for field areas classified as Improved agricultural grassland (GA1). **Complete for each habitat unit on site** (i.e. where habitat changes in diversity / vegetation structure in the site) and show on habitat map (GS4a, GS4b, GS4c etc)							
	Habitat Unit (show on Habitat Map)						
10	**Vegetation Structure – Tick/respond as appropriate** *(Adapted from Hen Harrier Programme Grassland Guidance (2021)).* Habitat Unit (show on Habitat Map)						
10a	Rush Cover	0%	<10%	10 -30%	30-70%		
10b	Purple moor grass cover	0%	<10%	10 -30%	30-70%		
10c	% Cover of each vegetation height	Short: < 10cm	At ≥ 10cm	≥ 20cm	≥ 30cm	≥ 40cm	≥ 50cm

Hen Harrier

10d	Tussock cover	0%	<10%	10 -30%	30-70%	>70%	
11	**Vegetation Structure: Low-intensity managed grasslands.** If habitat unit mainly used for pasture, use 11a to assess the vegetation structure. If habitat unit cut/mowed, use the 11b to assess vegetation structure. Tick as appropriate						
11a	Vegetation Structure GRAZED	Tall and medium and short vegetation throughout. Tussocks abundant throughout. Some tall dense soft rush (*Juncus effusus*), some areas of shorter sharp-flowered rush (*Juncus acutiflorus*) and some grass/sedge dominated areas.				Yes	No
		Tall/medium and short vegetation throughout. May contain frequent tall tussocks or frequent sharp-flowered (*Juncus acutiflorus*), or jointed rush (*Juncus articulatus*) Some grass/sedge dominated areas also occur.				Yes	No
		Tall vegetation cover is patchy. No areas with distinct tussocks. Grassy areas dominate field. Little variation in the height of vegetation. Dead standing leaves rare OR Uniform vegetation height throughout the field.				Yes	No
		All vegetation short OR excessively dominant unmanaged rush. Little evidence of grazing. Dead standing rushes throughout.				Yes	No
11b	Vegetation Structure CUT/MOWED	Aftermath grazing takes place providing variations in height of sward; sward does not look uniform in appearance.				Yes	No
		Low number of flowering plants and vegetation structure within the field margin poor to moderate. Some aftermath grazing providing some structural variation.				Yes	No
		Field topped right up to the field boundary line. No aftermath grazing. Little or no variation in sward height				Yes	No
12	**Scrub** (where present in low intensity managed grasslands): Use 12a for areas of patchy scrub <0.2ha. Use 12b where area of scrub is >0.2ha. **Tick as appropriate:** Adapted from NPWS (2022).						
12a	Scrub diversity and structure	Scrub with a mix of several woody plant species of varied heights throughout. Highly structurally diverse with some compact inaccessible areas.				Yes	No
		Single-species scrub (often gorse) with diverse height and irregular edge. One or two other wood plant species may be present. Base sparsely vegetated. Suitable nesting area for small birds.				Yes	No
		No scrub or isolated leggy gorse bushes.				Yes	No
12b	Lager areas of scrub/dense areas, encroaching on the grassland (and in blocks larger than 0.2ha) Provide description:						