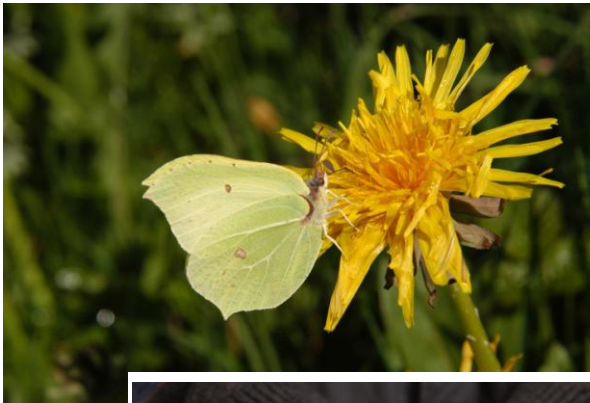


Native Woodland Scheme – Establishment

August 2011



Forest Service



Department of
**Agriculture,
Fisheries and Food**

An Roinn
**Talmhaíochta,
Iascaigh agus Bia**



National Development Plan 2007 - 2013

Introduction

The Native Woodland Scheme (NWS) is aimed at protecting, enhancing and expanding Ireland's native woodland resource and associated biodiversity, through appropriate planting and management. Where compatible, the scheme also encourages the growing of quality hardwood. The NWS is implemented by the Forest Service of the Department of Agriculture, Fisheries & Food, in partnership with Woodlands of Ireland, National Parks & Wildlife Service (NPWS) of the Department of Arts, Heritage and the Gaeltacht, and the Heritage Council. The scheme comprises two separate elements: Conservation (focused on protecting and enhancing *existing* native woodland) and Establishment (focused on creating *new* native woodland).

This document sets out procedural changes (effective from 24 August 2011) to streamline applications under NWS Establishment. Principally, the NWS Forester now uses a site appraisal framework to identify the most appropriate native woodland type (or types), planting mix and Grant & Premium Category (GPC) for the site. Furthermore, the input of a NWS Ecologist and the development of a Native Woodland Plan are no longer mandatory under NWS Establishment.

These changes, made within the context of the 20% ceiling on unenclosed land and the Forest Service Appropriate Assessment Procedure, are designed to streamline the application process under NWS Establishment, bringing it in line with those under the Afforestation Scheme and FEPS. The NWS has undergone various refinements since its launch in 2001, and changes set out in this document will be kept under review.

This document also sets out the specific requirements under NWS Establishment, which are in addition to general scheme requirements set out in the *Forestry Schemes Manual* (2003) and subsequent Forest Service communications.

NWS Establishment

NWS Establishment provides funding for establishing new native woodland on open, greenfield sites. These new woodlands must reflect the native woodland type(s) identified as being the most appropriate for the site.

Subject to normal restrictions, NWS Establishment is focused in particular on the following site types:

- Sites within areas regarded as being particularly sensitive from an environmental, landscape or amenity perspective.
- Sites located immediately adjacent or close to (i.e. within 1-2 km) existing designated native woodland (SACs, pNHAs).
- Sites that create physical connectivity between existing native woodlands and other important habitats. Of particular relevance are sites that create connectivity between designated habitats, particularly designated woodlands.

Each site under NWS Establishment must be capable of supporting the **vigorous growth** and **sustainable long term development** of the most appropriate native woodland type(s) identified for the site. These requirements must be achievable without the need for fertiliser input (with the possible exception of a once-off hand application at establishment, to boost initial growth).

In general, sites unsuitable under the Afforestation Scheme or FEPS on silvicultural grounds will not be eligible under NWS Establishment. One of the purposes of NWS Establishment is to encourage applicants to create native woodlands on sites that are suitable under the Afforestation Scheme or FEPS in the targeted areas listed above.

Note that areas adjoining streams, rivers and lakes submitted under NWS Establishment must satisfy the same general site requirements as apply under the Afforestation Scheme and FEPS. NWS Establishment projects focused on creating significant areas of native riparian woodland primarily to protect a designated riparian or aquatic habitat or species (e.g. Freshwater Pearl Mussel) may also be eligible for funding. Such projects will be examined on a case-by-case basis by the Forest Service at a national level, with a focus on site suitability, relative strategic merit and other factors.

Many sites under NWS Establishment will be suitable for growing quality hardwoods, using continuous cover silvicultural systems compatible with the scheme's overall biodiversity objectives. Applicants are encouraged to pursue this hardwood objective, where appropriate. The potential for hardwood production will vary, depending on site type. Brown earths will have a high potential, while podzols will have a low potential, due to soil acidity and infertility.

Revised procedure under NWS Establishment

Under the revised NWS Establishment, the NWS Forester¹ identifies the most appropriate native woodland type(s), planting mix and GPC for the site, using the NWS Establishment Site Appraisal Framework (see Appendix A). The input of a NWS Ecologist and the development of a Native Woodland Plan are no longer mandatory under NWS Establishment².

The NWS Establishment Site Appraisal Framework has been developed with input from Woodlands of Ireland and NPWS.

NWS Establishment Site Appraisal Framework

Based on soil type and other factors, the NWS Forester identifies which of the five scenarios in the NWS Establishment Site Appraisal Framework applies to the site. The flow chart within the identified scenario then details the following: the most appropriate native woodland type; the planting prescription required to initiate that woodland type; and the corresponding GPC from Forest Service Circular 10/2010. The GPC then forms the basis for completing the NWS Establishment Form 1 and relevant maps³. **Note, different scenarios may apply to different areas of the same site, reflecting different native woodland types. The corresponding GPCs form the basis for multiple plots within the application.**

¹ As previously the case, foresters developing applications under NWS Establishment must be listed as a NWS Forester on the Forest Service list of Registered Foresters. See Appendix 2 of the *Native Woodland Scheme Manual (2008)*.

² An applicant and/or a NWS Forester may, however, still seek the input of a NWS Ecologist, for example, to assist in site evaluation or to prepare a Native Woodland Plan (this option remains acceptable to the Forest Service). Furthermore, a Natura Impact Statement may be necessary under the Forest Service Appropriate Assessment Procedure (AAP), and the preparation of this document may require professional ecological input.

³ Certified Species Map, a Fencing Map and a Biodiversity (BIO) Map, following the Forest Service *Forestry Schemes Mapping Standards (25 May 2011)*.

Using the NWS Establishment Site Appraisal Framework

Each scenario, based primarily on soil type, is presented on a separate sheet. The first text box describes site assessment factors such as location at a landscape level, soil type and key soil properties (see Appendix B for guidance on soil surveying and classification). Associated habitats and vegetation are also outlined, including the main plant species on the greenfield site itself, within hedgerows on and adjacent to the site, and within nearby semi-natural woodlands (if present). Photos of a typical site and soil profile are also given under each scenario.

Site assessment allows the NWS Forester to identify which scenario applies to the site. Note, different scenarios may apply to different areas of the same site.

The second text box sets out the Major Native Woodland Type associated with the scenario and deemed most suitable for establishment on the site. This is informed by woodland classification information derived from the recent National Native Woodland Survey (Perrin *et al.*, 2008), which was subsequently tailored for the NWS by Cross *et al.* (2010). The characteristic trees, shrubs and ground flora of that woodland type are presented, together with a photograph to help create a 'mind's eye' image of the woodland community involved.

The third text box sets out the species mix, composition and layout required to initiate the development of the native woodland type. This is very much a 'starter kit' – other native species are likely to appear through natural regeneration, as the woodland emerges.

Note:

- The species mix, composition and layout set out under each scenario must be followed in order to be eligible under the corresponding GPC.

**Scenario 2:
Brown podzolics**

Location: Uplands (especially in the east), on shale and base-rich glacial till & at base of free draining valley & hillside slopes.

Soil type: Brown podzolics (acid, moderately fertile soils), average pH c.4.9.

Associated habitats & vegetation: Greenfield containing gorse, bracken, bramble, coarse grasses (e.g. Yorkshire fog), or improved grassland. Adjacent semi-natural woodland dominated by, and/or hedgerows containing, sessile oak, downy birch, ash, hazel, rowan & holly, with bramble, bluebell, violet, herb-Robert & wood avens.

Most appropriate Major Native Woodland Type: Q1 Sessile oak-woodrush, Subtype Q1.3 Bramble-hazel.


Predominant trees & shrubs: Sessile oak, downy birch, ash, hazel, rowan & holly.

Predominant ground flora: Bramble, ivy, broad buckler-fern, wood sorrel, bluebell, violet, woodrush & wood avens. Dwarf shrubs largely absent.

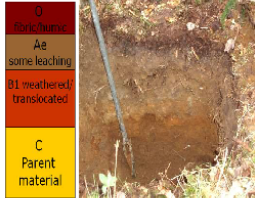
Planting mixture: Sessile oak (60%), Downy birch (5%) scattered intimately throughout oak. Ash (10%) planted in pure groups on more fertile parts of site. Hazel (10%) scattered throughout.

Minor species (15%) to comprise at least three of the following, positioned at edges & glades: Scots pine (on shallow, more acid, rocky areas, if present), hawthorn, holly, rowan, wild cherry, crab apple.


Relevant GPC: GPC 6



Recently planted sessile oak/downy birch-dominated native woodland at the footslope of an upland landscape. Brown podzolic soils often occur at the foot slopes and/or where moderately base-rich till is a component of the soil parent material. Bluebell is present in the foreground.



A brown podzolic profile with a topsoil comprising a thin, acid, peaty, upper layer overlying a yellow-brown lower topsoil layer, which in turn overlies a red-brown, iron-rich subsoil. Beneath the subsoil is the parent material from which the soil is derived.



A good example of the Q1.3 Bramble-hazel woodland type, near Lismore, Co. Waterford.

Finally, the relevant GPC is stated, as per Cir. 10/2010. As described above, two or more GPCs may apply, each for different areas of the site.

Note:

- Under Scenarios 1-4, improved and enclosed sites **only** will be considered eligible for the corresponding GPCs. Scenario 5 deals with unimproved and unenclosed sites, where GPC1 may apply.
- As set out in Cir. 10/2010, the amount of unenclosed land in any application for financial approval cannot exceed 20% of the total area.

Species mix, composition and layout

The species mix, composition and layout set out under each scenario in the NWS Establishment Site Appraisal Framework (Appendix A) must be followed in order to be eligible under the corresponding GPC. These specifications are formulated to initiate the corresponding native woodland type.

The standard planting density and spacing for all GPCs under NWS Establishment is 3,300 trees / ha and 2.0 m x 1.5 m, **except** for GPC8 Alder, in which all constituent species are to be planted at 2,500 trees / ha and 2.0 m x 2.0 m spacing.

Planting material

Section 6.8 of the *Native Woodland Scheme Manual* (2008) details the requirements regarding the sourcing of planting material for use under NWS Establishment, aimed at ensuring that such material is derived from suitable seed sources from within Ireland, and is fully traceable from seed collection to the planting site. Section 6.9 of the same manual details Plant Passport requirements relating to certain tree species, to prevent the spread of specific quarantine pests and diseases. These requirements remain unchanged under the revised NWS Establishment.

Natural regeneration

It is envisaged that natural regeneration of native species will occur on many sites under NWS Establishment, particularly along hedgerows and adjoining woodlands. Such regeneration will enrich the species diversity within the young emerging woodland, and should be retained as part of the developing woodland ecosystem. However, due to its unpredictability and the scheme's timeframe and fixed-grant nature, natural regeneration cannot form part of the species area being applied for under NWS Establishment. Instead, at the outset, all of the species area submitted is to be planted.

Natural regeneration of non-native species must be controlled. This is a requirement for the second instalment grant and subsequent premiums.

Incorporating existing habitats into 15% ABE allowance

All NWS Establishment applications may include up to 15% Areas of Biodiversity Enhancement (ABEs). As set out in the *Forest Biodiversity Guidelines*, ABEs include existing habitats specifically identified for retention.

While developing a NWS Establishment application, the NWS Forester is required to identify existing onsite habitats for retention as ABEs within the future native woodland. Such habitats represent biodiversity 'hotspots' on the site, and are to be retained and protected during planting and management of the woodland. Suitable habitats can include poor fens and flushes or species-rich grassland⁴, linear features such as hedgerows, stone walls or old drainage ditches, and point features such as individual old trees, fallen trunks or badger setts. **When identifying ABEs, the NWS Forester must prioritise areas and features of ecological value, e.g. species-rich grassland.**

⁴ Ideally, species-rich grassland should be maintained by cutting once annually. For information on identifying species-rich grassland, see pages 29-33 of *Specifications for the Agri-Environment Options Scheme and Natura 2000 Scheme* (6 April 2011) (www.agriculture.gov.ie).

ABEs also include open spaces incorporated for protective, landscape or operational reasons (e.g. aquatic buffer zones, archaeological exclusion zones, public road setbacks, ridelines, etc.), which will also have an intrinsic biodiversity value within the future woodland.

Also note:

- An ABE must be included as an intrinsic part of the project, i.e. it cannot be a completely separate area located away from the main body of the proposed planting.
- The BIO Map submitted as part of the application under NWS Establishment is to adhere to the requirements set out in the *Forestry Schemes Mapping Standards* (25 May 2011).
- The net area calculation will be applied where ABEs add up to more than 15% of the total project area.

Ground preparation, drainage, fertiliser application, vegetation control

Under NWS Establishment, the focus is on retaining natural site conditions and on planting native species suited to those conditions. This consideration influences ground preparation, drainage and fertiliser application. Ground preparation and drainage should be limited to inverted and scrap mounding, shallow ripping, scarification (to assist natural regeneration) and other forms of light operations, where appropriate. A once-off hand application of fertiliser at establishment, designed to boost initial growth, is acceptable.

Where used, pre- and post-planting herbicide application must be kept to the minimum required to ensure success, and should be used in combination with other methods, e.g. larger planting stock. For example, post-planting application should be carried out using a knapsack sprayer, with the aim of maintaining a 1-metre wide control area around the base of each tree, until trees are free from competition.

Non-herbicide control (trampling, mulches, mats) is generally only realistic on smaller sites and in highly sensitive areas (e.g. aquatic buffer zones).

Formative shaping

Rules regarding formative shaping set out in the *Forestry Schemes Manual* (2003) also apply to NWS Establishment. This will promote stem quality at an early stage, thereby increasing the scope for compatible hardwood production within the native woodland in the future.

Additional requirements

The following also apply under the revised NWS Establishment:

1. As set out in Cir. 10/2010, the amount of unenclosed land in any application for financial approval under NWS Establishment cannot exceed 20% of the total area. All species planted on unenclosed lands are paid at the rate of GPC1.
2. The Forest Service Appropriate Assessment Procedure (AAP) applies to NWS Establishment.
3. Grant and premium rates set out in Cir. 10/2010 apply (see Tables 1 and 2). The NWS Establishment Site Appraisal Framework links the most appropriate native woodland type for a site with a corresponding GPC, based on the dominant species within the required planting mix associated with that native woodland type.
4. Provisions have been made in the grant structure to encourage the use of fencing materials that comply with IS436.

5. The minimum area acceptable under NWS Establishment is 0.1 ha. The minimum average width acceptable is 20 m 'tree-to-tree' (i.e. excluding open spaces such as aquatic buffer zones, public road setbacks and archaeological exclusion zones).
6. Sites, or parts of sites, where woodland development is deemed ecologically inappropriate due to the presence of an existing non-woodland habitat of ecological significance, are excluded. This may apply to designated and undesignated sites.
7. The protocol for determining the acid sensitivity of surface water, as detailed in the *Forestry Schemes Manual* (2003) and subsequent circulars, applies to NWS Establishment applications within acid sensitive areas.

Table 1. Grant Rates for NWS Establishment

GPCs relevant under NWS Establishment (see Site Appraisal Framework)	1st Grant €/ha	2nd Grant €/ha	Total €/ha	Additional Fencing Allocation €/ha IS436	(Alternative Fencing Allocation €/ha Non-IS436)	Total Available Funding €/ha
1-Unenclosed	1,500	500	2,000	400	350	2,400
5-Broadleaves (Note, under NWS Establishment, this GPC refers to ash)	3,600	1,100	4,700	500	450	5,200
6-Oak	3,800	1,200	5,000	500	450	5,500
8-Alder	2,400	800	3,200	500	450	3,700

Table 2. Premium Rates for NWS Establishment

GPCs relevant under NWS Establishment (see Site Appraisal Framework)	Farmer	Non Farmer
1-Unenclosed	155	126
5-Broadleaves (Note, under NWS Establishment, this GPC refers to ash)	481	195
6-Oak	515	195
8-Alder	481	195

References

- Cross, J.R., Perrin, P. & Little, D. 2010. *The Classification of Native Woodlands in Ireland and its Application to Native Woodland Management*. Native Woodland Information Note No. 6. Woodlands of Ireland, Dublin.
- Forest Service. 2008. *Native Woodland Scheme Manual*. Forest Service, Department of Agriculture, Fisheries & Food, Johnstown Castle Estate, Co. Wexford.
- Perrin, P., Martin, M., Barron, S., O'Neill, F., McNutt, K. & Delaney, A. 2008. *National Survey of Native Woodlands 2003-2008*. Unpublished report to the National Parks & Wildlife Service. Dublin.
- www.npws.ie/en/CurrentResearchProjects/HabitatSite/NativeWoodlands/

APPENDIX A

NWS Establishment Site Appraisal Framework

Photos by John Cross, Declan Little and the Forest Service.

Scenario 1: Podzols

Location: Upland valley sides & hill sides on free-draining slopes.

Soil type: Podzols (acid, infertile soils), average pH c.4.5.

Associated habitats & vegetation:

Greenfield containing bracken, bilberry, heathers and gorse, with *Molinia* grass on flushed sites.

Adjacent semi-natural woodland dominated by, and/or hedgerows containing, sessile oak, downy birch, rowan & holly, with bilberry, ling heather & woodrush.

Note: Under Scenario 1, improved and enclosed sites only will be considered eligible for GPC6.



A typical upland greenfield site (sandwiched between two sessile oak/downy birch-dominated native woods) where the soil type on the slope is predominantly podzols.



Most appropriate Major Native Woodland Type: QL Sessile oak-woodrush.

Predominant trees & shrubs: Sessile oak, downy birch, rowan & holly.

Predominant ground flora: Bilberry, ling heather, woodrush, hard fen, broad buckler-fern & honeysuckle.



A podzol profile with a topsoil comprising an acid, peaty, fibrous upper layer that overlies a leached, grey/white, infertile mineral layer. The subsoil is dark brown & iron-rich, with organic matter derived from the leached topsoil. The subsoil overlies the parent material from which the soil is derived.



Planting mixture: Sessile oak (60%). Downy birch (10%), holly (10%) & rowan (10%) scattered intimately throughout oak. Scots pine (10%) positioned in small pure groups (focusing on the more shallow, free-draining soils, if present).



Relevant GPC: GPC6



QL Sessile oak-woodrush woodland, Derrycrag Nature Reserve, Co. Galway.

Scenario 2: Brown podzolics

Location: Uplands (especially in the east), on shale and base-rich glacial till & at base of free-draining valley & hillside slopes.

Soil type: Brown podzolics (acid, moderately fertile soils), average pH c.4.9.

Associated habitats & vegetation:

Greenfield containing gorse, bracken, bramble, coarse grasses (e.g. Yorkshire fog), or improved grassland.

Adjacent semi-natural woodland dominated by, and/or hedgerows containing, sessile oak, downy birch, ash, hazel, rowan & holly, with bramble, bluebell, violet, herb-Robert & wood avens.



Most appropriate Major Native

Woodland Type: QL Sessile oak–woodrush, Subtype QL3 Bramble–hazel.

Predominant trees & shrubs: Sessile oak, downy birch, ash, hazel, rowan & holly.

Predominant ground flora: Bramble, ivy, broad buckler-fern, wood sorrel, bluebell, violet, woodrush & wood avens. Dwarf shrubs largely absent.



Planting mixture: Sessile oak (60%).

Downy birch (5%) scattered intimately throughout oak. Ash (10%) planted in pure groups on more fertile parts of the site. Hazel (10%) scattered throughout.

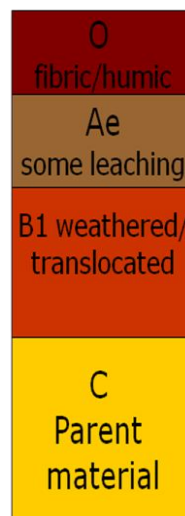
Minor species (15%) to comprise at least three of the following, positioned alongside edges & glades: Scots pine (on shallow, more acid, rocky areas, if present), hawthorn, holly, rowan, wild cherry, crab apple.



Relevant GPC: GPC6



Recently planted sessile oak/downy birch-dominated native woodland at the footslope of an upland landscape. Brown podzolic soils often occur at the foot slopes and/or where moderately base-rich till is a component of the soil parent material. Bluebell is present in the foreground.



A brown podzolic profile with a topsoil comprising a thin, acid, peaty, upper layer overlying a yellow-brown lower topsoil layer, which in turn overlies a red-brown, iron-rich subsoil. Beneath the subsoil is the parent material from which the soil is derived.



A good example of the QL3 Bramble–hazel woodland type, near Lismore, Co. Waterford.

Scenario 3: Brown earths

Location: Lowlands on calcareous soils.

Soil type: (Acid) Brown earths, fertile, heavy/moist to light/dry. Average pH c. 5.9.

Associated habitats & vegetation:

Greenfield typically improved or semi-improved grassland seeded with perennial rye-grass, often mixed with red clover.

Adjacent semi-natural woodland dominated by, and/or hedgerows containing, ash, pedunculate oak, downy birch, rowan, hazel, hawthorn, holly, spindle & blackthorn. Field layer indicators include bramble, ivy, wood avens, wood sorrel, wood speedwell, wild arum, herb Robert & bluebell.



Most appropriate Major Native Woodland Type: FH Ash-ivy.

Predominant trees & shrubs: Ash, hazel, pedunculate oak, downy birch, elm, rowan, hawthorn, holly, spindle & blackthorn.

Predominant ground flora: Bramble, honeysuckle, ivy, wood avens, wood sorrel, wood speedwell, barren & true strawberry, wild arum, wood sanicle, bluebell, violet, wood brome & enchanter's nightshade.



Planting mixture: Ash (50%) and pedunculate oak (25%), in pure groups. Hazel (15%) & hawthorn (5%) scattered throughout.

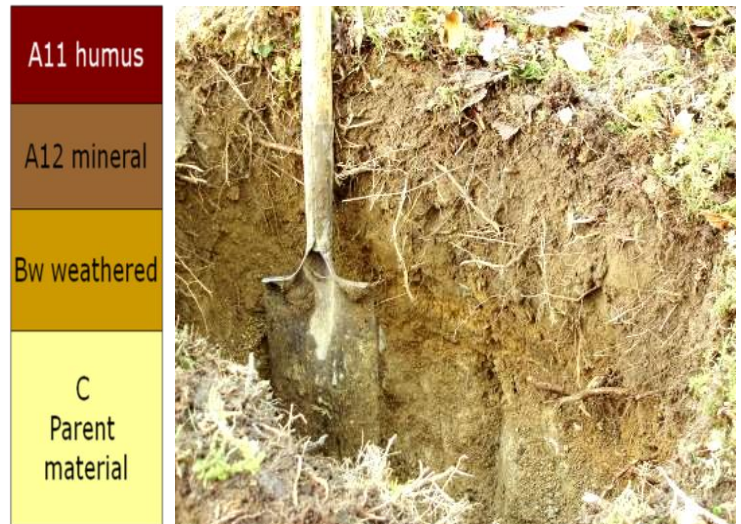
Minor species (5%) to comprise at least three of the following, positioned alongside edges & glades: downy birch, holly, spindle, rowan, wild cherry, crab apple & (on very wet soils) alder.



Relevant GPC: GPC5



A typical lowland, semi-improved grassland site on limestone with a base-rich till comprising the soil parent material. This site at Ballyvary, Co. Mayo, was recently planted, predominantly with hazel and ash, to develop a new native woodland.



A brown earth profile with a well-structured and aerated brown, friable topsoil with well decomposed organic material. This fertile topsoil gradually diffuses into the yellow-brown subsoil (below the main rooting zone), which in turn overlies a light grey-brown calcareous parent material from which the soil is derived.



One of the finest examples of the FH Ash-ivy woodland type in Ireland, Charleville, Co. Offaly.

Scenario 4: Gleys

Location: Drumlins, river valleys, lake shores and water-logged hollows.

Soil type: Mineral & peaty gleys (very wet soils, generally fertile). Average pH c.5.9.

Associated habitats & vegetation:

Wet, rushy grassland with yellow flag.

Adjacent semi-natural woodland dominated by, and/or hedgerows containing, alder, ash, grey willow, hazel, hawthorn, spindle & blackthorn. Field layer indicators include bramble, meadowsweet, creeping buttercup, remote sedge.



A typical 'rushy' field with heavy, wet gley soils. These are sometimes semi-improved for pasture and are common in drumlin belts, low-lying, and poorly drained locations.



Most appropriate Major Native

Woodland Type: AF Alder–meadowsweet.

Predominant trees & shrubs: Alder, grey willow & ash.

Predominant ground flora:

Meadowsweet, remote sedge, creeping buttercup, yellow flag & water mint.



A very poorly-drained 'dauby' gley soil profile with a clay-rich topsoil approx. 30 cm deep, which overlies a saturated and mottled, blue-grey and red-brown subsoil. The subsoil overlies a very compact parent material derived from glacial till.



Planting mixture: Pure groups (30-40 trees) of alder (50%), ash (10%), grey willow (10%) & downy birch (10%). Groups interspersed alternately. Hawthorn (5%) scattered throughout.

Minor species (15%) to comprise at least three of the following, positioned between the above pure groups: pedunculate oak, holly, hazel, guelder rose.

Note: The above interspersed group planting of major species is carried out to improve stability and robustness, and to prevent the development of an alder monoculture.



A typical AF Alder–meadowsweet alluvial woodland on gley soil. Hazelwood, Co. Sligo.



Relevant GPC: GPC8

Scenario 5: Unenclosed land

As set out in Forest Service Cir. 10/2010, the amount of unenclosed land in any application for financial approval under NWS Establishment cannot exceed 20% of the total area.

Typically, within the context of NWS Establishment, unenclosed land will lie upslope of enclosed land. Soils are most often peaty podzols or brown podzolics, or a gleyed version of either type. (Other types of unenclosed land may be considered under NWS Establishment, on a case-by-case basis.)

Based on the assessment (i.e. location, soil type, associated habitats & vegetation) of the unenclosed site, go to Scenario 1 (Podzols), Scenario 2 (Brown podzolics) or Scenario 4 (Gleys) for details on woodland classification and the planting prescription to be applied.

Note: As unenclosed land, GPC1 applies, regardless of the woodland classification and planting prescription identified for the site.

APPENDIX B

Soil surveying and classification

Introduction

Soil type provides the primary basis for differentiating between the five scenarios presented in the NWS Establishment Site Appraisal Framework (Appendix A). A simple walkover soil survey is therefore required when assessing a site. In many cases, NWS Foresters will be able to discern soil types onsite, based on experience and the use of a soil stick or soil auger.

The following notes on soil surveying and soil classification are presented as guidance, and will assist in the identification of relevant soil types, particularly on more complex sites.

Soil surveying

When assessing a site under NWS Establishment, a simple walkover soil survey is needed to identify the soil type(s) present. This can be done with a soil stick, or ideally, as described below, by using a soil auger.

Firstly, note the 'lie of the land' in the greenfield to be surveyed, dividing the site into basic soil units. Variations in topography (such as wet hollows and rocky knolls) and areas where vegetation changes abruptly should all be treated as separate soil units, as different soil types may be present (Figure 1). After dividing the site into basic soil units, the soil survey can be conducted. This is achieved by sampling along a transect within each soil unit, using a soil auger* (Figure 2).

Figure 1 is an example of a simple transect or 'free' soil survey, where transect points 1 to 7 occur in one soil unit across a free-draining slope (brown earth), and transect points 8 to 10 occur on a wet footslope or low-lying area (gleyed brown earth).

As illustrated in Figure 3, the soil profile sequence can be replicated by simply augering to the depth of the auger chamber length, and by laying out each auger sample in sequence on the ground adjacent to the coring site. A white background (such as a sheet of paper or a plastic fertiliser bag) is useful to observe the contrast between soil horizon layers, particularly when the change in soil colour between layers is gradual. The white background is also useful if photographs are being taken. An approximate pH value can be obtained from the topsoil by using pH papers available from most garden centres, or alternatively, a soil pH meter* designed for use in the field.

* For information on availability and outlets, contact Woodlands of Ireland (woodsofireland@iol.ie).

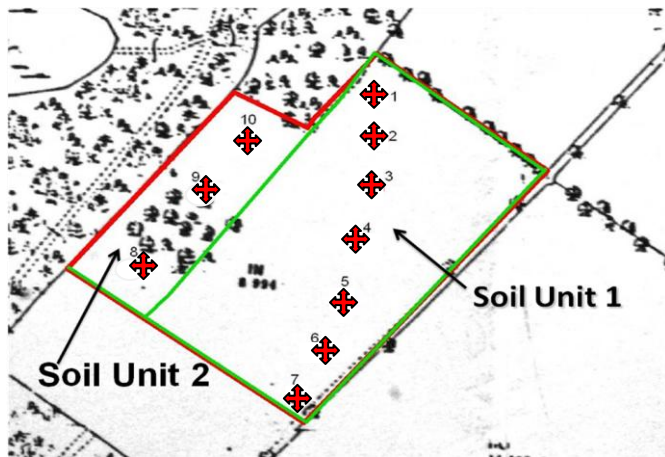


Figure 1. An outline of a 'free' soil survey on a greenfield site adjoining semi-natural woodland. Two basic soil units were identified – a free-draining slope (Soil Unit 1) and a wet footslope (Soil Unit 2). Each unit was subsequently transected, with core samples 1-7 and 8-10, respectively.



Figure 2. A topsoil core sample taken with a Dutch soil auger.



Figure 3. A soil profile derived with a Dutch soil auger. Samples are taken from the same core site and laid out in sequence (i.e. topsoil above subsoil above parent material) to ascertain the soil type.

Soil classification

The Irish soil classification system presented by Gardiner & Radford (1980) is used to describe the soil type underpinning each scenario presented in the NWS Establishment Site Appraisal Framework. The relevant soil types are podzols, brown podzolics, brown earths and gleys.

As one becomes familiar with identifying soil layers or horizons, it becomes relatively easy to differentiate between the various soil types in the field. To help in soil identification, the basic components of a soil profile should be understood, i.e. topsoil (A horizon), subsoil (B horizon) and parent material (C horizon) (Figure 4). The lettering and numbering of soil horizons help to describe properties within each soil layer, e.g. A1, A2, Bw (weathered), Bg (gleyed), O (organic), Cx (extremely compacted).

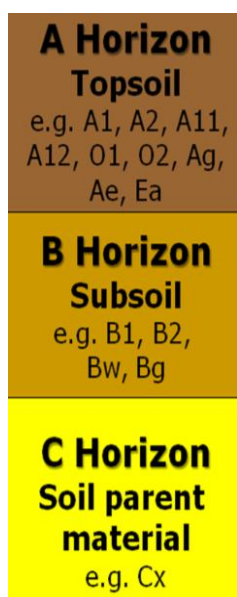


Figure 4. A typical mature soil profile showing A, B and C horizons, with designation letters which denote different soil properties present (Gardiner & Radford, 1980).

References

Gardiner, M.J. & Radford, T. 1980. Soil Associations of Ireland and their Land Use Potential. National Soil Survey of Ireland. Soil Survey Bulletin no. 36. An Foras Talúntais, Ireland.