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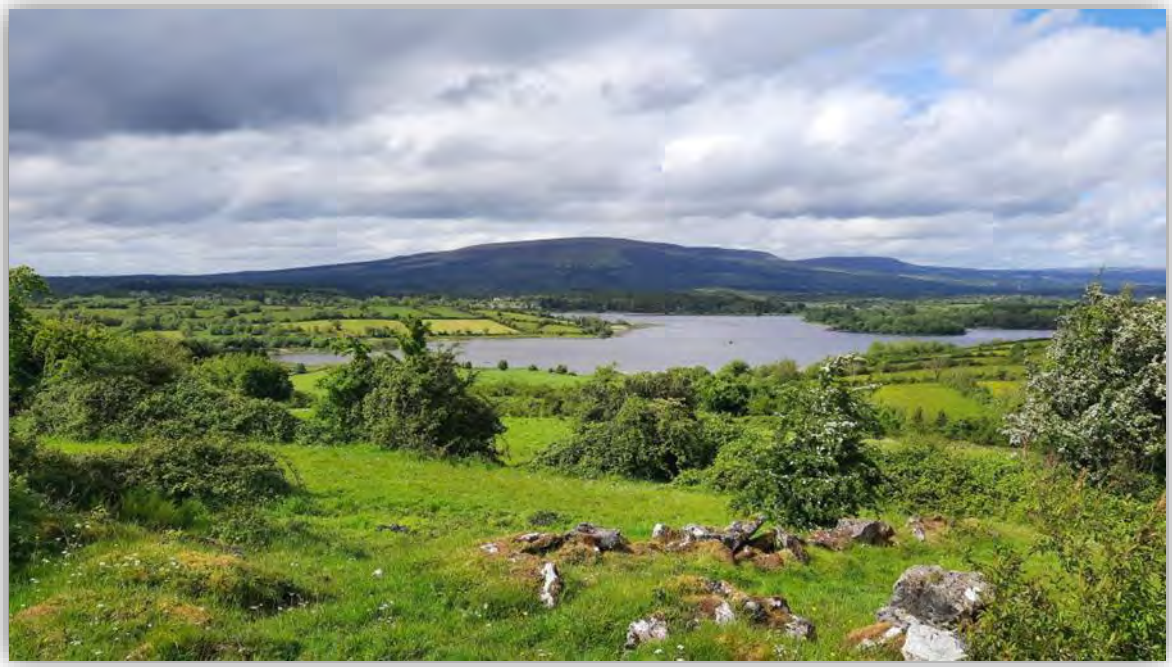

Aligning tree cover assessment methods in preparation for ground sampling hedge habitat zones and other wooded lands.

Objective: A proposal to the National Forest Industry (NFI) of the Department of Agriculture, Food and the Marine (DAFM) recommending that the ground sampling of hedges and other wooded lands (areas below the NFI definition of forest) should be undertaken by NFI staff as part of an all island tree cover inventory. December 2024

Funded by An Chomhairle Oidhreachta The Heritage Council

NPWS An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra National Parks and Wildlife Service

Department of Agriculture, Food and the Marine An Roinn Talmhaíochta, Bia agus Mara

Image 1 above: Landscape of tree cover including hedge and other wooded land plus forest as seen from Sheebeg, Co. Leitrim 2023

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Image 2: Hedge removal and mashing of remainder by excavator, Co. Leitrim 2023
(all images by Joe Gowran, Woodlands of Ireland unless otherwise stated)

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'At present, a consistent time series of changes in hedgerow extent or condition is not available and methodological issues still exist with regard to their mapping especially for past years.'

(Ireland NIR 2021 p.253)

1. Overview

The extent of the remaining hedgerow network on banks in Ireland is unique in comparison to a European mainland context (Muller 2013). The island of Ireland is estimated to have c.812,000 linear kilometres of hedgerow (Northern Ireland c.114,000km) in comparison to the island of Britain's 700,000km (Wolton 2024) Loss and damage to hedge and other wooded lands habitat is occurring every year as shown in image 2 above and image 10 below.

Apart from estimating the rate of loss or gain an Inventory can inform conservation and expansion policy and action. Ground sampling undertaken directly by NFI or its agents may also contribute to retaining staff in this section of DAFM and improve their ability to interpret data in all the tree cover categories of the NFI. In turn adopting elements of the NFI methodology into the Hedgerow Appraisal System (HAS) methodology may assist in improving its usefulness at the county or local level (image 11) A comparison is made between the HAS 2014 woodland indicator species list and the Herb species list from NFI 2022 in the 3 tables below at Appendix 4: the only species not on the more extensive NFI list are Luzula Sylvatica -Great Woodrush and Lathraea squamaria – Toothwort.

NFI staff have the advantage of being authorized to freely enter lands for the purpose of surveying where NGOs require to locate and seek permission from each individual landowner.

2. Introduction

Recent publications and Woodlands of Ireland submissions[1] provide the opportunity to reinforce the case of why the ground sampling of hedges and other wooded lands as part of an all island tree cover inventory, is essential to support fully informed strategies for conservation and active management of the resource.
In Section 3 (page 6) of the 2018 DAFM publication *Restructuring of rural land holdings in EIA Regulations Guide for Farmers* it states*:*

'With regard to (EIA) *sub-threshold works that may have a significant effect on the environment, matters to consider include the rarity of the landscape feature that may be lost as a result of the proposed works, quality of the field boundary being removed (e.g. species diversity of hedgerow being removed), impact on archaeological monument etc.(see also section 6.3).*

You should always apply for screening where the removal of hedgerows that are important commuting routes or feeding habitats for bat species is contemplated. Likewise you should always apply for screening where you propose to re-contour land that may be the habitat of protected species or flora.'

The habitat of concern is the hedgerow network and their frequently associated banks, ditches and field margins, which could be described as **'hedge habitat zones.'**

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In order to determine the extent of these hedge habitat zone types as multifaceted landscape features, a comprehensive inventory is required. This should be performed across the state and Northern Ireland, using an agreed (between stakeholders and administrations) standardised methodology.

As with the process that was ultimately applied to semi-natural woodlands of predominantly native species, including the **National Survey of Native Woodlands** (Perrin et al 2008), there is a need for

- a 'hedge and other wooded lands' inventory as part of the NFI
- a habitat classification of hedges and other wooded lands based on the findings of that inventory
- management guidelines based on that classification
- incentives or prohibitions to encourage best practice in the conservation and active management of the resource e.g EU RDP endorsed Results Based Schemes.

Examples of the components of **the native woodland process** in this regard are listed in Appendix 1 below.

In this context Woodlands of Ireland in conjunction with Neil Foulkes (who has completed 10 county hedgerow surveys) have been liaising with the National Forest Inventory (NFI) of DAFM.
More recently in an ongoing 3-year project with the Biodiversity Office of Carlow County Council a suitable methodology will be developed and piloted for ground sampling hedges and other wooded lands. These habitats have not previously been ground sampled in the NFI and consequently are not being formally accounted for comprehensively in the UN and EU Climate Change, LULUCF and Biodiversity reporting system for Ireland.

It is already observed from a 35 year study by Georg Muller published in 2013 *Europe's Field Boundaries* that the island of Ireland had a significantly larger proportion of hedges on banks still remaining than any other European state surveyed: https://wallhecke.de/en/produkt/europes-field- boundaries (Every county level DAFM office should have a reference copy of these 2 volumes).

Until such a time as a national inventory for hedges and other wooded lands is completed, **we advise that all hedges should be assessed using the Hedgerow Appraisal System** (HAS). The HAS was devised by a Technical Advisory Panel expert committee of Woodlands of Ireland and published by the Heritage Council (Foulkes et al 2014) (until more advanced assessment methods arise). The County Hedgerow Surveys, or Resurveys currently all use the HAS as standard method:
https:// www.woodlandsofireland.com/hedgerow-appraisal-system/

This should also be included **as part of the DAFM Agriculture Inspectorate decision making process**.
In addition **the DAFM agriculture Inspectorate should have a monitoring programme** that records events

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of illegal felling, chemical misuse and use of inappropriate cutting equipment (image 10) which separately or in combination can lead to the loss of hedges/other wooded lands over an extended period of time.

Image 3: Veteran coppiced Alder on field boundary of Greaghfearna townland (name translates to Alder coppice), Co. Leitrim

3. Ancient and Long Established Hedges

It should be noted that any hedge bank constructed before 1650 is in an island of Ireland context to be considered Ancient. These ancient banks continue to form part of townland, roadside boundaries as well as occurring near recorded national field monuments. The depositions of victims to the compensation tribunal of the 1641 rebellion (https://downsurvey.tchpc.tcd.ie/user-guide.html) reveal at least 27 cases of claims for compensation by Planters regarding damage to newly planted hedges by rebels, reported across several counties. These early plantation hedges are likely to be boundaries of field structures within the townland framework.

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Image 4: Ardmeenan, Co. Leitrim

Image 5: Cornacarta, Co. Roscommon

The continued persistence of woodland indicator species of ground flora (e.g. Primrose, Violet spp. and Wood anemone) listed in the HAS along with historic map evidence of the ongoing presence of these boundaries can inform determining whether a hedge (or section of it) is ancient, potentially ancient or a category of long established hedge (see images 3,4 ,5 above and 9 below).
The scoring system in the HAS will include ancient and long established categories together as **Heritage Hedges** until a base line national inventory provides a more detailed classification. These Heritage Hedges are likely to form the bulk of the 'Significant Hedges' as described in the forthcoming legislation of the Protection of Hedgerows Bill 2024: https://www.oireachtas.ie/en/bills/bill/2024/39/

'The purpose of the Bill is to provide for: the protection of significant hedgerows; the establishment of a register of significant hedgerows; a prohibition on the removal of significant hedgerows except in specified circumstances; an appeals procedure and offences for infringement; and a notification mechanism to local authorities regarding potential or actual infringements of the Bill's provisions. There is no legal definition of what constitutes a hedgerow in legislation at present and nor is one provided in this Bill'. https://www.marcocathasaigh.ie/2024/05/22/protection-of-hedgerows-bill-2024-first-stage/

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4. Carbon stock assessment of hedges in Ireland

Black et al 2023 in their introduction to the study of hedges in Waterford and Wexford state: '*It is widely acknowledged that hedgerows have the potential to sequester carbon dioxide (CO2) from the atmosphere (Drexler and Don, 2020; Drexler et al., 2021; Axe et al.,2017; Black et al., 2014; Falloon et al., 2004; Lacoste et al., 2016). Despite this potential, Denmark is the only EU country which currently includes hedgerow and tree-line biomass carbon stock change estimates in National Inventory Reports (Nielsen et al., 2021, submitted to the United Framework Convention on Climate Change (UNFCCC. National systems throughout the EU need to be developed to collect activity data (e.g. areas and hedgerow metrics to calculate biomass stocks, as well as soil and biomass carbon (C stock changes)'.*

The study uses the same 0.05 ha circular plot size for data collection as is employed in the NFI ground sampling of forest plots, which is also adapted for phase 1 of this proposal and outlined in the draft methodology below. '*The radius of the circular sample plot was 12.62 m, the same used for the Irish NFI'* (Black et al 2023). See image 6 below

The study references Leven et al 2020 which describes an assessment of non-forest woody vegetation in Denmark, where their introduction states:

According to the United Nation's (UN) framework convention on climate change (European Commission, 2013 countries are obliged to report greenhouse gas emissions from Land Use, Land-Use Change and Forestry (LULUCF. This obligation includes reporting emissions originating from changes in woody vegetation, which does not comply with the convention's definition of forest. These areas of non-forest woody vegetation (NFW comprise smaller woodlots, groups of trees, single trees with an area <0.5 hectares as well as linear wooded elements like hedgerows and lines of trees with a width of maximum twenty meters (Penman et al., 2003)

The Environmental Protection Agency's (EPA) National Inventory Report 2021 comments on the Black et al 2023 Study as follows:

'However, while projects such as that described above may be used to estimate the current carbon stock in hedgerows, questions remain in terms of establishing the carbon stock change over past years and also establishing the extent and management of hedgerows in the past.' (Ireland NIR 2021 p.249)

A further intention of this work is to move towards aligning both structural and species diversity recording and carbon account recording into an integrated methodology. This

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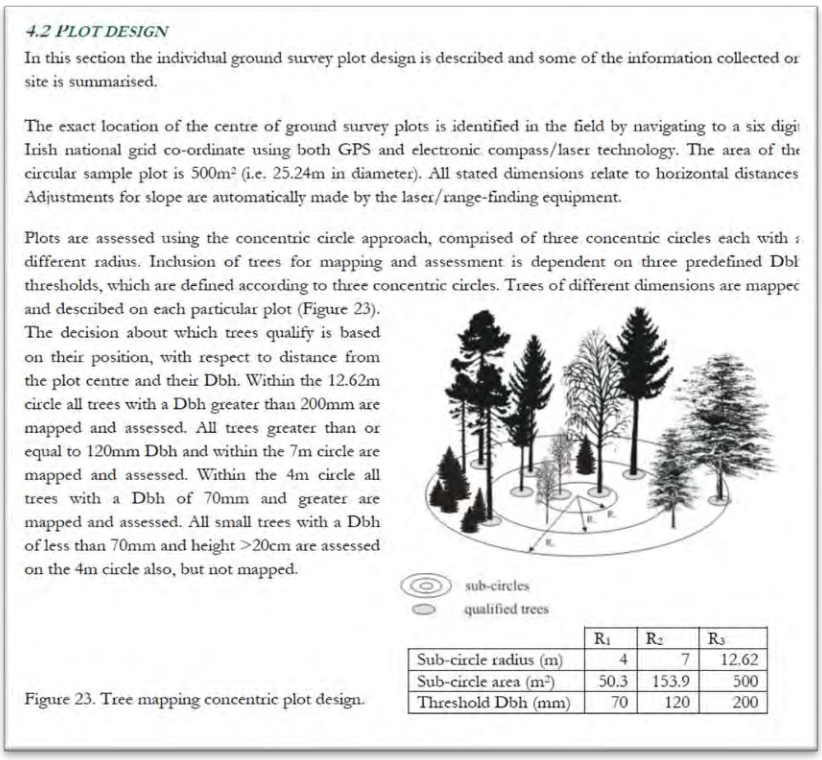
would result in a general approach to land use assessment on the principle that biological diversity and climate change issues are inextricably linked. They require to be assessed in tandem as a matter of best practice in public policy through the response of the state or their agents to the biodiversity and climate crises.



4.2 PLOT DESIGN

In this section the individual ground survey plot design is described and some of the information collected or site is summarised.

The exact location of the centre of ground survey plots is identified in the field by navigating to a six digi Irish national grid co-ordinate using both GPS and electronic compass/laser technology. The area of the circular sample plot is 500m² (i.e. 25.24m in diameter). All stated dimensions relate to horizontal distances Adjustments for slope are automatically made by the laser/range-finding equipment.

Plots are assessed using the concentric circle approach, comprised of three concentric circles each with a different radius. Inclusion of trees for mapping and assessment is dependent on three predefined Dbh thresholds, which are defined according to three concentric circles. Trees of different dimensions are mapped and described on each particular plot (Figure 23). The decision about which trees qualify is based on their position, with respect to distance from the plot centre and their Dbh. Within the 12.62m circle all trees with a Dbh greater than 200mm are mapped and assessed. All trees greater than or equal to 120mm Dbh and within the 7m circle are mapped and assessed. Within the 4m circle all trees with a Dbh of 70mm and greater are mapped and assessed. All small trees with a Dbh of less than 70mm and height >20cm are assessed on the 4m circle also, but not mapped.

sub-circles
qualified trees

	R_1	R_2	R_3
Sub-circle radius (m)	4	7	12.62
Sub-circle area (m²)	50.3	153.9	500
Threshold Dbh (mm)	70	120	200

Figure 23. Tree mapping concentric plot design.

Image 6: Screen grab on plot design from the NFI Methodology 2022

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5. Recommended approach

This is envisaged to be in implemented 2 phases

5.1 Phase 1

The objective of phase 1 is to integrate methods for hedgerow survey into the methodology of the NFI so that field staff have a clear guide to performing such surveys

The alignment in methodology proposed for phase 1 includes

1(a) The definition of hedge and other wooded lands as applied in NFI methodology 2022 and Black et al 2023: *a linear woody feature (including tree lines), usually bordering a road or field, with a minimum length of 20 m and maximum width of 20 m…If the woody feature is >20 m in width and <0.01 ha then the woody area is defined as a non-forest wooded area. All forest, hedgerow and non-forest woody areas exclude fruit orchards and Christmas tree farms.*

(b)The circular plot size (25.24m diameter) of NFI 2022 and Black et al 2023 for the phase 1 survey and the NFI 2022 protocol for locating the plot centre point in the field as indicated in image 6 above.

2.Plot design and establishment

The NFI plot survey criteria are applied plus the woodland indicator species listed in the HAS are recorded and the HAS scoring system is applied to the data collected in order to indicate *Heritage Hedges*/Hedges and other wooded lands of *Significance.*

See image 7 below reproduced from the HAS.

(3) Field data collection.

(4) Ash dieback and Fire blight disease presence and extent is recorded using the 4 point scale, where 1 is low level infection and 4 is very heavily infected

(5) Resurvey is done on the 5 year cycle of the NFI

4.4.1 Hedgerow Significance

The system is based on ranking the significance of hedges on a scale of 0-4 (0 being lowest) in five categories: Historical Significance, Species Diversity Significance, Structure, Construction and Associated Features, Habitat Connectivity Significance and Landscape Significance. A score of 4 in any category indicates a hedge of high significance (*Heritage Hedgerow*). Hedges can also be considered of high significance (*Heritage Hedgerows*) if they record a cumulative score of 6 or greater in the Historical, Species Diversity or Structural Categories, or a cumulative score of 16 or greater over the five categories. These hedges should be considered as high priority in terms of retention, management action, etc. Hedges recording lower scores may still be of value depending on the context.

Image 7: Screen grab above from page 13 of the HAS describing the scoring system.

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Phase 2 – Detailed recording of Significant hedges and other wooded lands identified in Phase 1

- The rationale for a more detailed survey is that these features are likely to be in the category of 'ancient or long established' similar to that category in the National Survey of Native Woodlands (2008).
- The phase 2 survey begins by extending the area of the plot surveyed to 500m2 from the centre point established in the initial 25.24m diameter circle (Phase 1, 1(b)).
- Images and shape files of the 500m2 irregular shaped plot can be produced by companies such as Bluesky mapping as shown in image 8 (a) and (b) below. These can include vegetation heights set at various minimal height levels and are transferable to hand held devices before the fieldwork. The image/shape files can greatly assist in identifying plot boundaries at ground level.
- The National Survey of Native Woodland Survey methodology as currently employed in Native Woodland Conservation Scheme is used for the Phase 2 survey as shown in appendix one and two of the Ecology Survey and Report Template at the following link: https://www.gov.ie/en/service/b54d3-native-woodland-conservation-scheme/
- The data from Phase 2 plots can be compared to any other NFI recorded plots in terms of all the criteria listed in the NFI methodology.

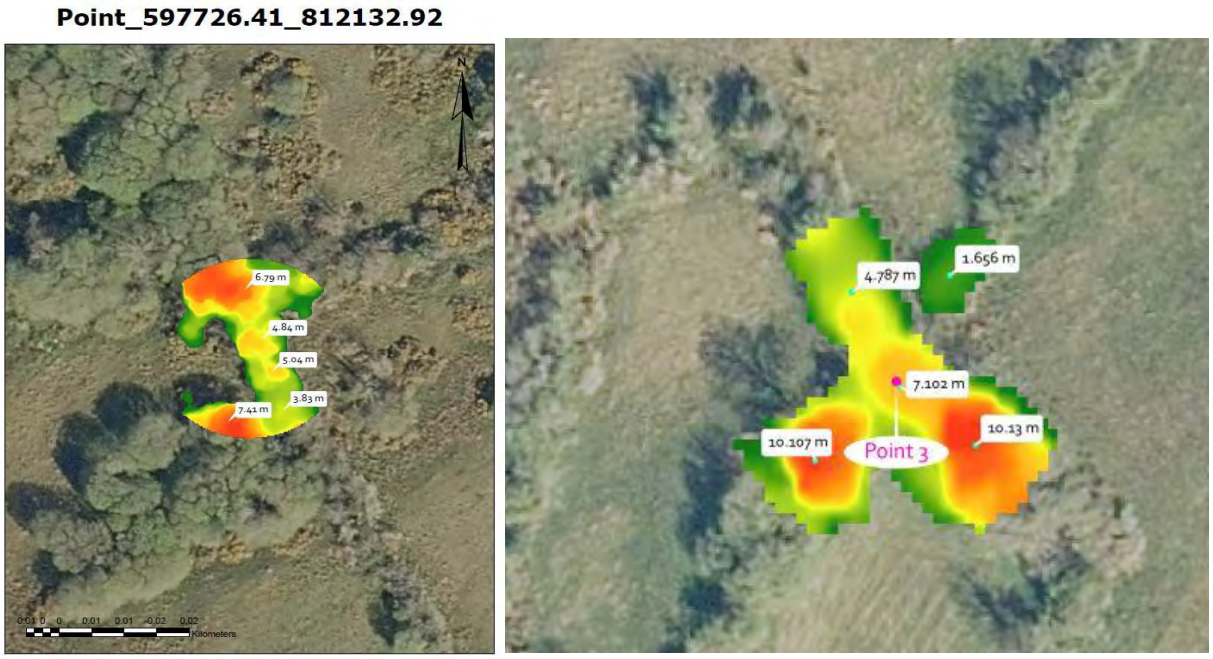

Image 8 (a) and (b) (with point 3 centre point) showing 500m2 irregular shaped plots for surveying in phase 2, created from 0.25m2 pixels produced for Woodlands of Ireland by Bluesky Mapping 2023

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Image 9: Other wooded lands along the Doolin river, Co. Clare with conservation advocate Ray Ó'Foghlú

6. Conclusion

Hedges and Other Wooded Lands which are below the size threshold of the UN Food and Agriculture Organisation (FAO) definition of 'Forest' are defined differently by various bodies including DAFM, EPA/Teagasc and various hedge and woodland related NGOs. In addition the NFI and other government agencies have never systematically ground sampled other wooded land habitats of less than 20 metres width. Uncertainty remains about the full extent and ecological value of these essential elements of connectivity in the European context.

The proposal here, following feedback from an upcoming stakeholder forum, should provide encouragement to the NFI to see that they are best placed to proceed with piloting a ground sampling methodology in 2025.

The approach here is to emphasis alignment between existing survey methodologies, with no major added elements for Phase 1 surveys and linkage with the National Survey of Native Woodland, the NPWS and the new All Island Ancient Woodland Project envisaged at a later Phase 2 stage.

In general there is a need for integrated models of combined carbon and biodiversity assessment to inform government policy and best practice incentives at ground level.

Overall the NFI capacity to interpret all tree cover data may be strengthened as a result of this undertaking.

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Image 10 above: Shredding like this (Leitrim 2022) will soon lead to disease / decline

Image 11: Hedgerow Appraisal System training event (Leitrim/Roscommon June 2023)

Photo credit: Trevor Seery

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Appendix 1: Steps in the Native Woodland process

1. **National Survey of Native Woodlands 2008**

http://www.botanicalenvironmental.com/projects/habitat-studies/national-baseline-surveys/national-survey-of-native-woodland-in-ireland/

2. **A provisional inventory of ancient and long established woodland 2010 (ArcGIS version)**

https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=e6da11a2a9804664a428315bcd105260

3. **The Classification of Native Woodlands in Ireland and its Application to Native Woodland Management 2010**

https://www.woodlandsofireland.ie/wp-content/uploads/No.-6-Woodland-Classification.pdf

4. **Management Guidelines for Ireland's Native Woodlands 2017**

https://www.npws.ie/sites/default/files/publications/pdf/Management%20Guidelines%20for%20Ireland%27s%20Native%20Woodlands%202017.pdf

5. **Native Woodland Scheme 2001**

https://www.clarelibrary.ie/eolas/coclare/heritage/pdfs/Native%20Woodland%20Scheme.pdf

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Appendix 2

The following are extracts from Ireland's National Inventory Report 2021. The EPA Report highlights the Greenhouse Gas Emissions 1990-2019. Quotes used in the main document are in bold.

'The inventory agency has funded research into remote sensing technologies and analytical techniques for the quantification of non-forest woody biomass in the landscape. In the context of Cropland, this refers to primarily hedgerows. The inventory agency has funded a project (due for completion at the end of 2022) aimed at quantifying the carbon stock in hedgerows and non-forest woody biomass features in the landscape. Hedgerows are an important feature of the Irish landscape. They are traditional means of establishing field and ownership boundaries and protecting crops from livestock incursion. In recent years, environmental payment schemes have included incentives for hedgerow plantation, maintenance and protection**. However, while projects such as that described above may be used to estimate the current carbon stock in hedgerows, questions remain in terms of establishing the carbon stock change over past years and also establishing the extent and management of hedgerows in the past**.
(Ireland NIR 2021 p.249)

The definition of Grassland includes hedgerows and small wooded areas (non-forest), which are maintained as an integral component of livestock management and to establish field boundaries. However, further research is required to complete a robust time series of hedgerow extent and condition in Ireland.
(Ireland NIR 2021 p.251)

Hedgerows are maintained as an integral system of grassland systems to control the movement of livestock, manage grazing fodder stock, and in many cases to define parcel boundaries. There is anecdotal evidence of hedgerow removal to facilitate access, traffic of machinery and deploying alternative methods to management of grazing intensity. However, recent hedgerow surveys across Ireland suggest the removal has not occurred on the same scale as has occurred in other parts of Europe. Additional work is required to quantified change over time in hedgerows in Ireland, both in terms of extent and condition, and the EPA has funded a number of research initiatives on this topic. **At present, a consistent time series of changes in hedgerow extent or condition is not available and methodological issues still exist with regard to their mapping especially for past years.**

(Ireland NIR 2021 p.253)

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Hedgerows are an integral part of the CM (Cropland Management) landscape. However, there is very limited long- term monitoring data as to conditions and extent of these features. The EPA has funded a research project to pilot an analysis of historic and

contemporary remote sensing data to establish a robust time series of changes in these landscapes. There is conflicting evidence as to the current trends in hedgerow and wooded area management within CM. Measures under planning guidelines, the Rural Environment scheme, Green Low-Carbon Agri- Environment Scheme (GLAS), its antecedents and other policies, the maintenance, of existing hedgerows and establishment of new hedgerow has been encouraged. For example, under REPS 3 and 4 and AEOS 1 and 2 rural environmental protection schemes (see Figure 11.6), support was provided for establishment of approximately 10,000 km of new hedgerow (Teagasc Newsletter, Sep 2013). However, the National Forest Inventory detected a decrease in hedgerow area of 4,548 ha between 2006 and 2012, albeit with a very large uncertainty. At present it is not possible to provide a robust time series of hedgerows, and therefore it has not been possible to produce an estimate of biomass changes associated with their management.

Ireland NIR 2021 p.340/341

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Appendix 3 excerpts from Woodlands of Ireland submission on EIA regs 2023 not included in the main text.

Every record of an application to DAFM for hedgerow removal, relocation or destruction using the HAS can be added to the county database records in a standardised way.

No hedge removal should be approved without a systematic assessment.
The assessment should be carried out by trained and qualified DAFM staff or their agents as happens frequently in the field of forestry when screening proposed projects, instead of any self-assessment by the applicant or their agent. Woodlands of Ireland can assist in the provision of training.

The HAS data recorded would provide evidence that an assessment has been carried out by a DAFM Agriculture Inspector in response to any application for hedge relocation or destruction.

Replacing 'like with like': while this is impossible to achieve fully in practise, where approval is granted for the removal or relocating of a hedge on a bank, then following coppicing of the existing woody species of the hedge, the bank material should be used to build a new bank , which is then restocked with a similar woody species mix of indigenous genetic stock, as was in the original bank.

The top layer of soil on the bank, often containing ground flora communities which takes many decades/centuries to evolve, can be a significant element to try to salvage separately for transfer to the new bank. While plants may be lost in the process, the seedbank (together with some micro-organisms) can be transferred to the surface of the reconstructed bank.

Consequently the interpretation of thresholds applied for screening proposed hedgerow removal or applying an Environmental Impact Assessment must take the above factors into account and the thresholds be reduced to the absolute minimum. Ancient Hedgerow loss must cease entirely.

Enforcement measures regarding the unlawful removal of hedges should in addition to financial penalties laid down by courts, be including the re-instatement of the hedge(s) back into the location where it was before the offence was committed. Where a hedge bank has been removed unlawfully, then it should be rebuilt to the height and width it was before removal.
Hedges can also be removed through mismanagement and abuse over a period of time, as shown in Images 2 and 3 below. A national inventory with a 5 year reporting cycle combined with a county surveys carried out at least every 10 years can provide an indication of the trend in losses both through removal and mismanagement.

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Rates of loss locally should be taken into account as a factor of cumulative impact regarding EIA. The recent resurvey of County Monaghan https://monaghan.ie/heritage/wp-content/uploads/sites/13/2021/12/Monaghan_Hedgerow_report_2021.pdf reveals the loss of c.0.55% of hedges per annum. Similar rates of loss were recorded in Northern Ireland in the 1998 to 2007 period as published by McCann et al 2017: https://www.sciencedirect.com/science/article/abs/pii/S0301479717302815

Attention needs to be paid to how Northern Ireland counterparts in DAERA carry out assessments: An example of the most recent application format used by DAERA from October 2022 https://www.daera-ni.gov.uk/publications/field-boundary-hedge-removal-application and Insight into DAERA hedgerow compliance checks (July 2022) are useful for comparisons of the regulatory approach in both jurisdictions on the island: https://www.daera-ni.gov.uk/news/insight-daera-hedgerow-compliance-checks

Hedgerows Advice for Planning Officers and applicants seeking planning permission for land which may impact on Hedgerows 2017 https://niopa.qub.ac.uk/bitstream/NIOPA/6968/1/standing_advice_9_hedgerows_final_2017.pdf

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Appendix 4: Comparing the HAS 2014 woodland indicator species list to the Herb species list from NFI 2022 in the 3 tables below: the only species not on the more extensive NFI list are Luzula Sylvatica -Great Woodrush and Lathraea squamaria - Toothwort

Appendix E: The current hedgerow survey list of ground flora species.

Note: The following list will need to be monitored and updated by the NPWS.

Herbaceous Ground Flora Species

Scientific Name	*Common Name*
Ajuga reptans	Bugle
Alliaria petiolata	Garlic Mustard
Allium ursinum	Ramsons
Anemone nemorosa	Wood Anemone
Anthriscus sylvestris	Cow Parsley
Arum maculatum	Lords-and-Ladies
Chrysoplenium oppositifolium	Opposite Leaved Golden Saxifrage
Conopodium majus	Pignut
Digitalis purpurea	Foxglove
Epipactus helleborine	Broad-leaved Helleborine
Fragaria vesca	Wild Strawberry
Galium odoratum	Sweet Woodruff
Geranium robertianum	Herb Robert
Geum urbanum	Wood Avens
Glechoma hederacea	Ground Ivy
Hyacinthoides non-scripta	Bluebell
Hypericum androsaemum	Tutsan
Lapsana communis	Nipplewort
Lathraea squamaria	Toothwort
Luzula sylvatica	Great Woodrush
Lysimachia nemorum	Yellow Pimpernel
Neottia nidus-avis	Birds-nest Orchid
Oxalis acetosella	Wood Sorrel
Potentilla sterilis	Barren Strawberry
Primula vulgaris	Primrose
Ranunculus ficaria	Lesser Celandine
Sanicula europaea	Wood Sanicle
Stachy sylvatica	Hedge Woundwort
Stellaria holostea	Greater Stitchwort
Veronica Montana	Wood Speedwell
Viola spp. (V. riviniana, V. reichenbachiana)	Dog Violets

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APPENDIX 6 HERB SPECIES

Achillea millefolium (Yarrow)
Aegopodium podagraria (Ground elder)
Aethusa cynapium (Fool's parsely)
Ajuga reptans (Bugle)
Alisma plantago-aquatica (Common water plantain)
Alliaria petiolata (Garlic mustard)
Allium ursinum (Ramsons)
Anagallis arvensis (Scarlet pimpernel)
Andromeda polifolia (Bog rosemary)
Anemone nemorosa (Wood anenome)
Anemone ranunculoides (Yellow anenome)
Angelica sylvestris (Angelica)
Antennaria dioica (Cat's foot)
Anthriscus sylvestris (Cow parsely)
Apium nodiflorum (Fools Watercress)
Aquilegia vulgaris (Columbine)
Arctium minus (Lesser burdock)
Arum maculatum (Lords and Ladies)
Atropa bella-donna (Deadly nightshade)
Bellis perennis (Daisy)
Berula erecta (Water parsnip)
Betonica officinalis (Betony)
Buglossoides purpurocoerulea (Purple gromwell)
Callitriche stagnalis (Pond water-starwort)
Caltha palustris (Marsh marigold)
Calystegia sepium (Bindweed)
Campanula sp.
Capsella bursa-pastoris (Sheperd's purse)
Cardamine flexuosa (Wavy bittercress)
Cardamine hirsuta (Hairy bittercress)
Cardamine pratensis (Cuckoo flower)
Cardamine sp.
Centaurea nigra (Knapweed)
Cerastium fontanum (Mouse-ear chickweed)
Cerastium holosteoides (Common mouse-ear)
Chamerion angustifolium (Rosebay willow herb)
Chelidonium majus (Greater celandine)
Chenopodium album (Lamb's quarter)
Chrysosplenium oppositifolia (Golden saxifrage)
Circaea lutetiana (Enchanter's nightshade)
Cirsium acaule (Dwarf thistle)
Cirsium arvense (Creeping thistle)
Cirsium dissectum (Meadow thistle)
Cirsium palustre (Swamp thistle)
Cirsium vulgare (Spear thistle)
Clematis vitalba (Traveller's joy)
Conopodium majus (Pignut)
Convallaria majalis (Lily of the valley)
Crepis paludosa (Marsh hawksbeard)
Crocosmia crocosmiiflora (Montbretia)
Dactylorhiza fuchsii (Common spotted orchid)

Dactylorhiza maculata (Heath spotted orchid)
Dianthus sp.
Digitalis purpurea (Foxglove)
Drosera rotundifolia (Sundew)
Epilobium hirsutum (Willowherb)
Epilobium montanum (Broadleaved willow herb)
Epipactis helleborine (Broadleaved Helleborine)
Eupatorium cannabinum (Hemp agrimony)
Euphorbia amygdaloides (Wood spurge)
Euphorbia sp.
Fallopia japonica (Japanese knotweed)
Filipendula ulmaria (Meadowsweet)
Fragaria sp.
Fragaria vesca (Wild strawberry)
Galanthus nivalis (Snowdrop)
Galeobdolon sp.
Galeopsis tetrahit (Hemp nettle)
Galium aparine (Gleavers)
Galium odoratum (Sweet wood ruff)
Galium palustre (Marsh bedstraw)
Galium saxatile (Heath bedstraw)
Galium uliginosum (Fen bedstraw)
Galium verum (Lady's bedstraw)
Geranium pratense (Cranesbill)
Geranium robertianum (Herb Robert)
Geranium sanguineum (Bloody cranesbill)
Geranium sp.
Geranium sylvaticum (Wood cranesbill)
Geum rivale (Water avens)
Geum urbanum (Wood avens)
Glechoma hederacea (Ground ivy)
Hedera helix (Ivy)
Heracleum mantegazzianum (Giant hogweed)
Heracleum sphondylium (Hogweed)
Hieracium sp.
Hyacinthoides non-scripta (Blue-bell)
Hydrocyte vulgaris (Marsh pennywort)
Hypericum androsaemum (Tutsan)
Hypericum perforatum (Perforate St John's wort)
Hypericum pulchrum (Slender St John's wort)
Hypochoeris glabra (Smooth Cat's ear)
Hypochoeris radicata (Cat's ear)
Impatiens grandulifera (Himalyan balsam)
Impatiens parviflora (Small Balsam)
Iris pseudacorus (Yellow iris)
Lamiastrum galeobdolon (Yellow archangel)
Lamium purpureum (Purple deadnettle)
Lapsana communis (Nipplewort)
Lathyrus montanus (Bitter vetch)
Lathyrus pratensis (Meadow vetchling)

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Leucanthemum vulgare (Oxeye daisy)
Leycesteria formosa (Himalayan honeysuckle)
Lilium martagon (Turk's cap lily)
Listera ovata (Twayblade)
Lobelia dortmanna (Water lobelia)
Lonicera periclymenum (Honeysuckle)
Lotus corniculatus (Bird's foot trefoil)
Lotus pedunculatus (Greater bird's foot trefoil)
Lychnis flos-cuculi (Ragged robin)
Lycopus europaeus (Gypsywort)
Lysimachia nemorum (Yellow pimpernel)
Lysimachia sp.
Lysimachia vulgaris (Yellow loosestrife)
Lythrum salicaria (Purple loosestrife)
Maianthemum bifolium (False lily of the valley)
Melampyrum pratense (Cow wheat)
Melampyrum sp.
Mentha arvensis (Field mint)
Menyanthes trifoliata (Bogbean)
Mercurialis perennis (Dog's mercury)
Moehringia trinervia (Three nerved Sandwort)
Mycelis muralis (Wall lettuce)
Mycelis sp.
Myosotis arvensis (Field forget-me-not)
Myosotis scorpioides (Water forget-me-not)
Narthecium ossifragum (Bog asphodel)
Neottia nidus-avis (Bird's nest orchid)
Odontites vernus (Red bartsia)
Oenanthe crocata (Water dropwort)
Orobanche hederae (Ivy broomrape)
Oxalis acetosella (Wood sorrell)
Papaver dubium (Long-headed poppy)
Papaver rhoeas (Poppy)
Pedicularis sylvatica (Lousewort)
Persicaria maculosa (Lady's thumb)
Petasites albus (White butterbur)
Petasites fragrans (Winter Heliotrope)
Pilosella officinarum (Mouse-ear hawkweed)
Pinguicula lusitanica (Pale butterwort)
Plantago lanceolata (Ribwort plantain)
Plantago major (Greater plantain)
Polygala serpyllifolia (Heath milkwort)
Polygala vulgaris (Common milkwort)
Polygonatum multiflorum (Solomon's seal)
Polygonum hydropiper (Water peppar)
Polygonum sp.
Potentilla anserina (Silverweed)
Potentilla palustris (Marsh cinquefoil)
Potentilla reptans (Creeping cinquefoil)
Potentilla sterilis (Barren strawberry)
Potentillia erecta (Tormentil)
Primula veris (Cowslip)
Primula vulgaris (Primrose)
Prunella vulgaris (Self heal)

Pulicaria dysenterica (Fleabane)
Pulmonaria sp.
Ranunculus acris (Meadow buttercup)
Ranunculus ficaria (Lesser celendine)
Ranunculus flammula (Lesser spearwort)
Ranunculus repens (Creeping buttercup)
Ranunculus sp.
Rorippa nasturtium-aquaticum (Watercress)
Rumex acetosa (Sorrell)
Rumex acetosella (Sheep's sorrell)
Rumex obtusifolius (Broad leaved dock)
Rumex sanguineus (Bloody dock)
Rumex sp.
Sanicula europaea (Wood sanicle)
Saxifraga spathularis (St Patrick's cabbage)
Scrophularia nodosa (Figwort)
Senecio aquaticus (Marsh ragwort)
Senecio jacobea (Roagwort)
Silena sp.
Silene dioica (Red campion)
Silybum marianum (Milk thistle)
Solanum dulcamara (Bittersweet)
Solanum nigrum (Black nightshade)
Solidago virgaurea (Goldenrod)
Sonchus arvensis (Field sow thistle)
Sonchus oleraceus (Sow thistle)
Stachys sylvatica (Hedge woundwort)
Stellaria graminea (Lesserstichwort)
Stellaria holostea (Greater stitchwort)
Stellaria media (Chickweed)
Stellaria uliginosa (Bog stichwort)
Succisa pratensis (Devil's bit scabious)
Symphytum officinale (Comfrey)
Taraxacum officinale (Dandelion)
Teucrium scorodonia (Wood sage)
Teucrium sp.
Trifolium pratense (Red clover)
Trifolium repens (White clover)
Trifolium sp.
Typha sp.
Umbilicus rupestris (Wall pennywort)
Urtica dioica (Nettle)
Urtica urens (Dwarf nettle)
Valeriana officinalis (Valerian)
Veronica chamaedrys (Germander speedwell)
Veronica montana (Mountain speedwell)
Veronica serpyllifolia (Thyme-leaved Speedwell)
Veronica sp.
Vicia sativa (Vetch)
Vicia sepium (Bush vetch)
Vicia sp.
Vinca minor (Lesser periwinkle)
Viola riviniana (Common dog-violet)
Viola sp.

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References

Ancient Woodlands Ireland-An All-Island Inventory of Ancient and Long-Established Woodlands for Ireland https://www.ancientwoodlandsireland.com/

Anon 2022. *Ireland's National Forest Inventory 2022 – Field Procedures and Methodology* Department of Agriculture, Food and the Marine, Johnstown Castle Estate Co. Wexford Ireland Y35 PN52

Black K., Lanigan G., Ward M., Kavanagh I., Ó. hUallacháin D., O. Sullivan L. 2023. *Biomass carbon stocks and stock changes in managed hedgerows* Science Direct http://dx.doi.org/10.1016/j.scitotenv.2023.162073

Duffy P., Black K., Fahey D., Hyde B., Kehoe A., Murphy J., Quirke B., Ryan A.M., and Ponzi J. 2021 *IRELAND NATIONAL INVENTORY REPORT 2021 GREENHOUSE GAS EMISSIONS 1990 - 2019 REPORTED TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE* Environmental Protection Agency An Ghníomhaireacht um Chaomhnú Comhshaoil PO Box 3000, Johnstown Castle, Co. Wexford, Ireland chrome- extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/Ireland_NIR-2021_cover.pdf

Hedgerows Legislation Project, Hedgerows Ireland (Tipperary) 2024 *Protection of Hedgerows Bill 2024*

https://www.lawlibrary.ie/the-climate-bar-association-welcomes-the-introduction-of-the-protection-of-hedgerows-bill-2024-in-dail-eireann-today/

https://www.marcocathasaigh.ie/2024/05/22/protection-of-hedgerows-bill-2024-first-stage/

Levin, G., Angelidis, I. & Gyldenkærne, S. 2020. *Assessment of change in biomass from 2006 to 2014/2015 of non-forest woody vegetation in Denmark*. Technical documentation. Aarhus University, DCE – Danish Centre for Environment and Energy, 30 pp. Technical Report No. 178 http://dce2.au.dk/pub/TR178.pdf

Perrin, P.M, Martin, J.R., Barron, S.J., O'Neill, F.H., McNutt, K.E. & Delaney, A.M. (2008) National Survey of Native Woodlands 2003-2008: Volume I: Main report. Report submitted to National Parks & Wildlife Service, Dublin.

http://www.botanicalenvironmental.com/wp-content/uploads/2011/03/Volume-I.pdf

Wolton, Robert. 2024. *Hedges.* British Wildlife Collection 13. Bloomsbury Wildlife, London

1. Woodlands of Ireland submission to the '*Public Consultation on the EIA (Agriculture) Regulations: Restructuring of rural land holdings - boundary removal*' 2023

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