



Belleek Woods, Ballina, Co. Mayo Biodiversity Action Plan 2022-2026



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Citation: O’Connell, C. A. (2022) Belleek Woods, Ballina, Co. Mayo Biodiversity Action Plan 2022-2026. Prepared for River Moy Search and Rescue, Ballina, Co. Mayo.

Cover Photos:

Clockwise from the top left hand corner: ferns are a feature of the ground layer in Belleek Woods; the wildflower meadow area along the River Moy, the western edge of Belleek Woods opens onto farm land, the duck pond, the immature woodland area, a tufa stream, the Knox Gore mausoleum, Cyril’s Way and beech trees. Photos: © J. FitzGerald

Acknowledgements

Thanks to The Community Foundation for Ireland for funding provided under the Environment and Nature Fund 2021 to allow the development of this Biodiversity Action Plan for Belleek Woods.



I am grateful to River Moy Search and Rescue Ballina and the Belleek Woods Enhancement Committee for the invitation to work with them over the past year. I also wish to thank all of the members of the community who met with me on field survey days and provided much information about Belleek Woods and the work undertaken by the community to enhance Belleek Woods for wildlife and amenity. I wish to acknowledge and thank Janice Fuller and Darren Reynolds from Coillte for comments on the draft plan.

1. Executive Summary

The Belleek Woods Biodiversity Action Plan 2022-2026 is supported by the Community Foundation for Ireland and is an initiative of River Moy Search and Rescue Ballina.

Belleek Woods is owned by Coillte who are managing the forest for biodiversity through Continuous Cover Forestry (CCF). This approach aims to restructure the woodland to broadleaf-dominated by creating gaps in the canopy through selective thinning thereby promoting natural regeneration of trees and shrubs and allowing the ground flora to develop naturally. CCF thinning is targeted in order to improve the diversity of the canopy, to increase deadwood and the number of veteran trees. Prior to the CCF operation in Belleek, a biodiversity area management plan will be developed to determine the CCF thinning intensity and approach across the site.

This biodiversity action plan documents the species and habitat richness of the woods. The woods cover an area of 61.5ha of which 60ha is mixed broadleaf and conifer woodland.

106 plants, 15 birds and 7 animals were identified by the biodiversity survey carried out during two visits in May and September 2022. Three birds recorded in the survey are of conservation concern including grey wagtail, black-headed gull and starling. The first two birds are red listed and the starling is amber listed. These birds have lost habitat and their numbers are declining as a result.

A habitat map is presented for Belleek Woods in Figure 6. Nine habitats were identified in Belleek Woods during the survey including WD1/WD2 mixed broadleaf and conifer woodland, FL8 artificial pond, BL1 stone wall, GS2 dry meadow and grassy verge, WS1 scrub, WS2 immature woodland, FS1 reed and large sedge swamp, GS4 wet grassland and GA2 amenity grassland.

The northern half of Belleek Woods located north of Belleek Castle has the greatest conservation value at present in terms of age structure, species diversity and specialised habitats including a network of tufa streams. This area should remain undisturbed, apart from necessary invasive species removal and selective thinning under the CCF management programme and be allowed to continue its natural succession to mature broadleaf/deciduous woodland.

The southern half of Belleek Woods located south of Belleek Castle is more heavily used by visitors and many of the enhancement recommendations made in Chapter 7 of this report are targeted in this area. These in combination with Continuous Cover Forestry management will in the long term create a biodiverse, close to nature woodland in Belleek.

Open areas where sunlight and warmth penetrate to the forest floor are uncommon in Belleek Woods and are confined to the duck pond, the Mausoleum, the Knox-Gore picnic area, the wild flower picnic area and the immature woodland area. These sites within the woods add greatly to the species diversity present and need to be retained and enhanced as part of this biodiversity plan. These areas are dealt with separately in this report and each has a specific set of biodiversity enhancement recommendations outlined in Chapter 7.

Belleek woods is unique in terms of its size (61.5ha) and location (adjacent to Ballina town) in Co. Mayo. The woods are located on the western banks of the River Moy Special Area of Conservation. Land managers need to be aware of the sensitivity of the location of the woods and retain a natural buffer zone between and woods and the river. Cyril's Way which runs the length of the woods close to the River Moy provides a practical division between the woodland interior and the transitional habitats occurring along the river bank.

47 biodiversity enhancement actions are proposed in this plan. The main thrust of the recommendations is for the community working with Coillte ecologists and foresters to enhance the

woodland flora, to encourage a more complex woodland structure, to eradicate invasive species and to manage open areas for wildflowers to attract pollinators.

Ash die back is an issue in Belleek woods which needs to be addressed. A survey of the extent of the disease in ash trees is recommended. Trees that may pose a health and safety issue need to be identified and monitored. A public awareness campaign is required to help contain the disease (particularly in autumn when leaves fall) and to prevent the spread of the disease to other areas inside and outside the woods.

The on-going targeted species work on red squirrel is a great achievement of the community. The programme of supplementary feeding of the red squirrel and the on-going management goal of providing a diverse woodland habitat for this animal in terms of species composition and age structure should be continued.

The biodiversity actions proposed in this plan can be achieved if River Moy Search and Rescue Ballina package them in themes and seek funding for a suite of actions across a different range of biodiversity areas in the woods. For example a pollinator project might see the community enhancing biodiversity through less mowing, planting bulbs and sowing wildflower seeds targeting woodland path verges, car parks and viewing points.

To achieve the biodiversity enhancement actions in this plan, wider community engagement will be essential. Visitors and users of Belleek Woods need to be informed of any proposed changes likely to occur and if possible they should be engaged in helping to plant spring bulbs for example.

Eight invasive or potentially invasive plants and shrubs were recorded throughout Belleek Woods as part of this study. It was clear that action is being taken in relation to cherry laurel and Japanese knot weed. A targeted survey of invasive species within the woods is recommended for the following species: cherry laurel, *Rhododendron*, Japanese knot weed, snowberry, montbretia, bamboo, pheasant bush and winter heliotrope. These must all be removed following best practice methods in liaison with competent authorities. This work that will take a sustained effort over a number of years.

Any intervention in Belleek Woods whether under Continuous Cover Forestry involving the removal of trees or thinning, pond enhancement and wild flower meadow creation must only take place outside the bird and red squirrel breeding seasons. In addition this work needs to ensure that there is no damage to the tufa streams within the woods, to potential veteran trees or to historical/ archaeological structures.

The on-going work of removing litter from the woods and keeping all of the public paths, car parks and picnic areas litter free should continue.

It is essential that planting of exotic garden species discontinues in the woods and that efforts are made to remove herbaceous plants and shrubs that are not native to the Irish flora from the woods.

Funding for the actions in this plan may be sought from a variety of sources and some suggestions in this regard are made in Chapter 8 of this plan.

Two additional areas have been included in this study that occur adjacent to the woodlands. These are the Ballina to Killala Greenway near the northern entrance to Belleek Woods and an area south of the woods along the River Moy and adjacent to Ballina Soccer Club. Suggestions on the enhancement of these sites for biodiversity are presented in Appendix 3.

Species data recorded on this survey are presented in Appendix 4 of this report and have been lodged with the National Biodiversity Data Centre.

2. Introduction

This Belleek Woods Biodiversity Action Plan 2022-2026 has been created as an initiative of River Moy Search and Rescue Ballina and Belleek Woods Enhancement Committee. The project is funded by The Community Foundation for Ireland. This funding allowed the River Moy Search and Rescue Ballina to employ Dr Catherine O'Connell as an ecologist to develop the Belleek Woods Biodiversity Action Plan, devise actions to maintain and enhance local biodiversity and to help the community to gain a better understanding of the biodiversity importance of the woods.

River Moy Search and Rescue Ballina

River Moy Search and Rescue is a non-profit voluntary organisation. The search and rescue service they provide was established on 5th May 2011. It is based at The Old Quay School in Ballina. The group is also a search and recovery organisation. The objectives of the group are:

- to perform search and recovery work on the River Moy in Ballina
- to combat the problem of marine litter and to improve the marine environment
- to promote all of the skills used in searches as sport.

Members regularly participate in recreational sport together, particularly diving and kayaking. They are also involved in a number of high profile environmental projects. They have signed up to the Ballina Green Town Charter and in this regard in addition to their work combating marine litter they are also focused on Belleek Woods and have a number of on-going and completed projects taking place there. These include:

- A project to combat the annual summer algal blooms in the Belleek Woods Duck Pond - on-going
- A study to map petrifying springs in the woods and assess their conservation status 2021. See: <https://rivermoysearchandrescue.files.wordpress.com/2021/12/conservation-assessment-of-petrifying-springs-in-the-moy-estuary-2021.pdf>.
- A project to develop an amenity wildflower meadow on the banks of the River Moy - on-going
- Monitoring of Red Squirrels in the woods - on-going
- Restoration feasibility studies on listed buildings - on-going
- Attracting a funding award from the Community Foundation for Ireland 2021 to develop a Biodiversity Action Plan for the woods.

Contact Details

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3. Belleek Woods Location

Belleek Woods is located on the western bank of the river Moy approximately 2km north of Ballina town on the R314 to Killala (co-ordinates: E 54.131498, W -9.142100). This is in a very historic area of Co. Mayo. Belleek or Beal-Leice in Irish, the mouth of the Flagstones, indicates an early crossing of the river Moy and there was probably a settlement at this location which predates the town of Ballina.

The lands in this area formerly belonged to the Knox Gore family who acquired almost 750 hectares in 1701. The Knox Gore family were benevolent landlords who cared for their tenants in hard times and instituted relief works during the famine. They planted many trees in the 19th century, mostly oak, beech, ash, sycamore, chestnut, lime, willow and yew, some of which are still standing.

In 1950 the Department of Forestry bought Belleek Forest and replanted the land with Norway spruce, Japanese larch, Scot's pine, Monterey pine and silver fir. In 1989 Coillte Teoranta took over the running and management of Belleek Woods. A long term management plan for the woods is in place: Tiernan, D., McEvey, J. and Collins, C. (2009) *Belleek Long Term Forest Management Plan (2009–2040)*, Coillte Teo.

The woods are 61.5ha in extent and hold a title of one of the largest urban forests in Europe (see Figure 1).

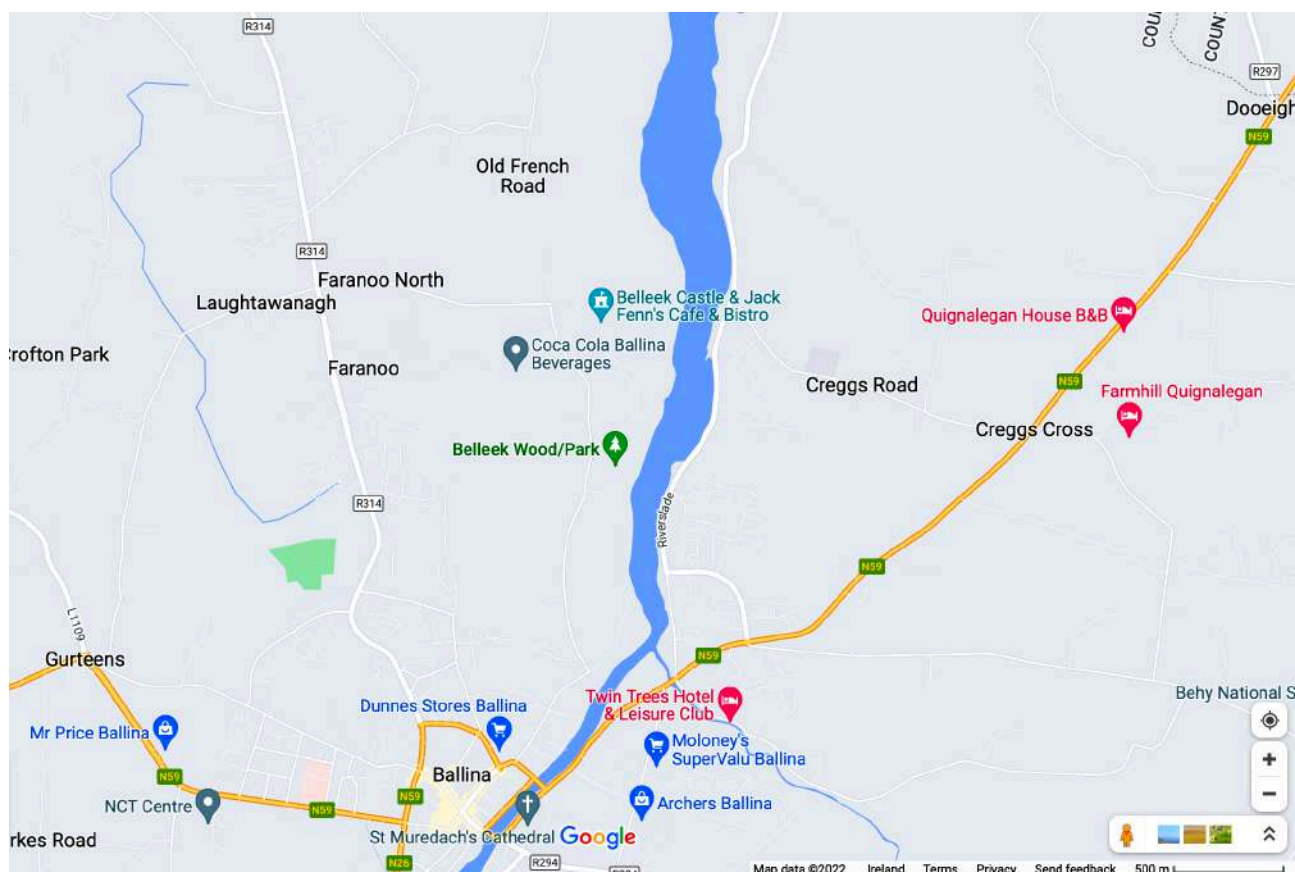


Figure 1: Location Map of Belleek Woods north of Ballina and on the western bank of the River Moy, Co. Mayo. Source: googlemaps.com.

Within the woods there are up to 10km of forest pathways (see <https://www.coillte.ie/site/belleek/>). These offer visitors walking, running and cycling options. A walking map for visitors is available at https://walks.mayo.ie/media/Media_10668_en.pdf. The “Monasteries of the Moy” Greenway runs through the woods (see <https://www.greenway.ie/monasteries-of-the-moy/> and https://content.irishexaminer.com/walks/87_belleekwoodgreenway_1500.webp). Both maps are shown in Figure 2. There is a multi-access trail and a heritage nature trail with 34 points of interest in the woods. A leaflet about the woods documenting all of the points on the heritage nature trail is available on site for visitors to use (see Appendix 1). In addition a book has been published about the woods entitled: *Belleek Wood A National Treasure* (2004) by Belleek Forest Park Enhancement Committee. Other facilities include parking, seats and picnic tables.



Figure 2: Amenity walking route and greenway route through Belleek Woods, Ballina Co. Mayo. Source: <https://www.coillte.ie/site/belleek/> and https://content.irishexaminer.com/walks/87_belleekwoodgreenway_1500.webp

Níor chóir go léirmhíneodh an léirscaíl de na bóithre, raonta agus cosáin taobh amuigh de réadmhaoin Coillte mar go bhfuil ceart slí tugtha. The representation on the map of roads, tracks and paths outside Coillte property should not be interpreted as conferring a right of way.



There are a number of sites of archaeological and historic importance within the woods which are included in the inventory of historic environments documented by Archaeology Ireland (see <https://maps.archaeology.ie/HistoricEnvironment/>). Some of these are designated of regional importance. These are shown in Figure 3 and include Belleek Manor Funerary Monument (#31303019), the monumental structure below the funerary monument (#MA030-037), Belleek Manor Stables (#31303018) and Belleek Manor Country House (#31303017). See the full listing of sites of archaeological and historic importance in Table 1.

In addition to the listed sites there are other built structures within the woods associated with its history and use. These include Curter's Cottage, the boathouse, lime kiln, Famine wall, a ring fort and a hermitage site.

Figure 3: Map showing the sites of archaeological (red dot) and historic (blue dot) importance located within Belleek Woods, Co. Mayo (source: <https://maps.archaeology.ie/HistoricEnvironment/>). The key to the numbers included on the map is presented in Table 1.

Belleek woods have their own facebook site at <https://www.facebook.com/belleekforestpark/>. In August 2022 the activity on this site was as follows: 5,588 people like the site and 5,922 people follow the facebook site.

Table 1: Sites of archaeological and historic importance in Belleek Woods, Mayo

Map Code (see Figure 2)	Site Registered Number	Name	Description	Rating
1	MA030-054	Belleek	Cairn of stones unclassified	Currently not rated
2	MA030-053001	Belleek	Megalithic Structure quarried in the past and disturbed by construction of an ice house adjacent	Currently not rated
3	MA030-037	Garrankeel	Monumental Structure - substantial circular, flat-topped earthen mound on top of which is a funerary monument memorial to Sir Francis Arthur Knox-Gore (see Number 4 in this table)	Currently not rated
4	31303019	Belleek Manor, Garrankeel	Funerary Monument - memorial to Sir Francis Arthur Knox-Gore 1870-1896	Regional
5	31303018	Belleek Manor	Belleek Manor Stables 1820-1835	Regional
6	31303017	Belleek Manor	Belleek Manor Country House 1820-1835	Regional
7	31303025	SS Creteboom	Submerged reinforced concrete tugboat hull 1915-1920	Regional
8	31303029	The Ice House, Quignalecka	Salmon Fishery Ice House Building 1855-1860	Regional
Source: https://maps.archaeology.ie/HistoricEnvironment/				

4. Methods

Meetings and Project Management

Regular email and phone calls were conducted throughout the project with Vincent Lang Chairman of the Committee of River Moy Search and Rescue Ballina and with members of the Belleek Woods Enhancement Committee. Liaison was also established with other projects occurring within the woods and those completing them including Emily Reilly NUIG, Paul Green BSBI, JBA Consultancy and Coillte Teoranta.

Study Site

The study area is the entirety of Belleek Woods excluding the grounds of Belleek Castle. This includes woodland, pond, grassland and streams.

Biodiversity Field Visits

Field visits were undertaken to document the habitats and species present in Belleek Woods with a view to mapping the information and making recommendations on biodiversity enhancement and maintenance. These visits took place on the 23rd and 24th May 2022 and the 4th and 5th September 2022.

Desktop Studies

A desktop study was undertaken to establish information in the public domain about Belleek Woods, its history, archaeology, habitats and biodiversity. Information was searched on the following web sites, all of which have map viewer facilities: National Biodiversity Data Centre website (biodiversityireland.ie), the National Parks and Wildlife Service (npws.ie), Ordnance Survey Ireland (osi.ie), Archaeology Ireland (archaeology.ie) and Wetland Surveys Ireland (<https://www.wetlandsurveys.ie>).

Additional information including published documents about the woods were provided by River Moy Search and Rescue Ballina and Coillte.

Biodiversity Survey Work Sheet

A field recording sheet for biodiversity was developed for the project and is presented in Appendix 2. The information collected at each study site was as follows: plants, animals and birds present, invasive species, threats, land management, habitat description and classification, biodiversity enhancement recommendations and location co-ordinates.

Community Engagement

On all site visits, members of the community who have shown a very strong interest in the project joined the ecologist. Notices were erected in the woods to inform visitors that the survey was underway.

National Biodiversity Data Centre

Species data recorded on this survey have been lodged with the National Biodiversity Data Centre in the format recommended (see Appendix 4).

5. Biodiversity in Belleek Woods

Desktop research of biodiversity information available about Belleek Woods was undertaken. A search for designated sites in the area indicates that the woods are located on the boundary of the proposed Killala Bay/Moy Estuary NHA (Site Code 000450), the Killala Bay/Moy Estuary Special Protection Area (SPA Code: 004036 see <https://www.npws.ie/protected-sites/spa/004036>) and the Killala Bay/Moy Estuary Special Area of Conservation (SAC Code: 000458 see <https://www.npws.ie/protected-sites/sac/000458>). There is a richness of habitats and species associated with estuarine and tidal habitats included in these proposed and designated sites (see Figure 4).

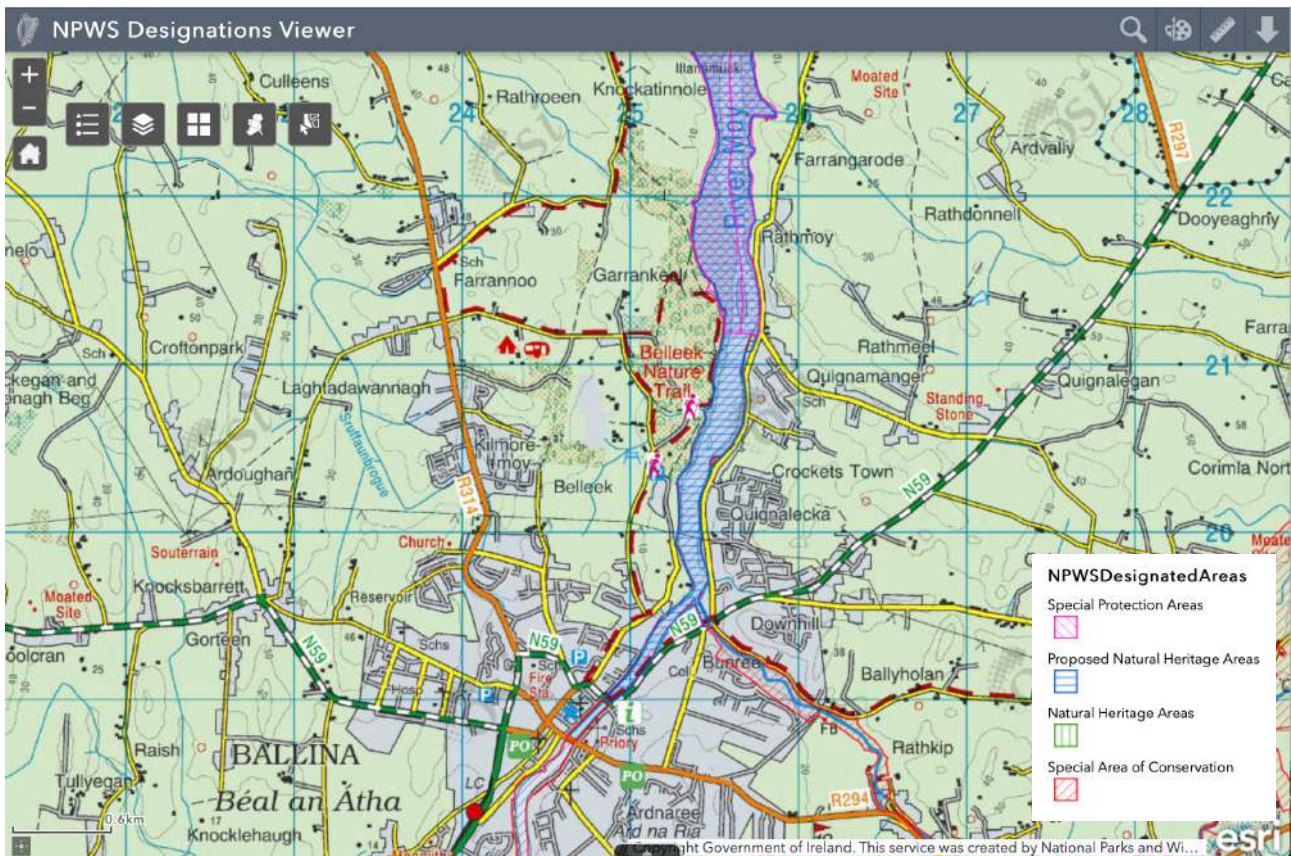


Figure 4: Location Map for parts of Killala Bay/Moy Estuary proposed NHA (shaded in blue), the Killala Bay/Moy Estuary SAC (shaded in red) and the Killala Bay/Moy Estuary SPA (shaded in pink) designated areas in relation to Belleek woods, Ballina, Co. Mayo. Source: npws.ie.

Information on the species diversity present in Belleek Woods is available from the National Biodiversity Data Centre (NBDC). Species records can be found for areas of the country based on a system of 1km square grids (see <https://maps.biodiversityireland.ie/Map>). The grid numbers screened for Belleek Woods were G2422, G2522, G2421, G2521 and G2520. Data is uploaded by various recorders to the NBDC.

A scan through the NBDC data set indicates that Belleek Woods have been included in a number of species surveys including: Birds of Ireland dataset, Vascular plants: Online Atlas of Vascular Plants 2012 Onwards, National Invasive Species Database, Harvestmen (Opiliones) of Ireland, Butterflies of Ireland, Amphibians and reptiles of Ireland, Mammals of Ireland 2016-2025, Bees of Ireland, Sawflies of Ireland, Atlas of Mammals in Ireland 2010-2015, Rare birds of Ireland, Irish Vascular Plant Data - Paul Green (2015), Irish Crop Wild Relative Database, Moths Ireland and Bryophytes of Ireland.

Belleek Woods Long Term Management Plan (2009-2040)

The Long Term Management Plan (2009–2040) for Belleek Woods includes detailed habitat information for the woods and an ecological assessment undertaken in 2005. This survey described Belleek as a mixed wooded area of conifer and broadleaf trees. Species such as Norway spruce, Scot's pine, silver fir, beech, oak and ash were recorded. The woodland habitats within the woods documented in 2009 are presented in Table 2.

Table 2: Woodland management changes for Belleek Woods from 2009 to 2040.

Woodland Type	Description	Area (ha) and % cover of total property 2009	Projected Area (ha) and % cover of total property by 2040
Coniferous high forest (CHF)	Canopy of mainly coniferous trees	30.7ha 50%	5.4 ha 9%
Mixed high forest (MHF)	Canopy of broadleaf and coniferous trees in mixtures	19.6ha 32%	44.9ha 73%
Broadleaf high forest (BHF)	Canopy of mainly broadleaf trees	9.8ha 16%	9.8ha 16%

Source: Tiernan, D., McEvey, J. and Collins, C. (2009) *Belleek Long Term Forest Management Plan (2009–2040)*, Coillte Teo.

The overall aim of the management plan for the woods is to shift gradually from a conifer dominated woodland to a mixed woodland of both conifer and broadleaf trees. The area of pure broadleaf will remain the same at 9.8ha but the area of mixed high forest will increase from 19.6ha to 44.9ha and the area of pure conifer woodland will decrease from 30.7ha to 5.4ha (see Table 2).

The main method to be used to transform the conifer dominated areas of Belleek Woods to broadleaf deciduous woodland is Continuous Cover Forestry (CCF) which through selectively thinning the forest creates a patchwork structure of canopy gaps and mixed age stands of trees.

The management plan describes a work plan of 10 yearly removals with a view to allowing more light to penetrate to the forest floor. In the right conditions this action allows the understorey of deciduous trees to naturally develop and eventually mature into a broadleaf woodland. If this is not possible small-scale planting of native trees in the gaps may be necessary. Naturally regenerated trees show adaptation to locally prevalent environmental conditions, often surviving better than planted trees. They also create varied species and uneven-aged tree mixes, which can be far more beneficial for wildlife. The timing of thinning cycles 1, 2 and 3 in Belleek woods is provisionally planned for 2013, 2023 and 2033 respectively according to the long term management plan provided no emergency situation such as windblow occurs which would require direct intervention.

Belleek woods are currently managed under the NeighbourWood Scheme which provides financial assistance to create woodland amenities for local people to utilise and enjoy.

Target Species Management Red Squirrel Translocation

A project is underway in Belleek Woods to monitor the Red Squirrel population within the woods. In 2007/2008 fifteen squirrels were introduced to the forest and in 2022 there were between 40 and 50 squirrels in the woods, which represents a viable breeding population (Emily Reilly NUIG pers. comm. 3.8.22). The translocation of red squirrels to Belleek woods is part of a collaboration between N.U.I. Galway, Coillte and the National Parks and Wildlife Service (see https://www.npws.ie/sites/default/files/publications/pdf/Finnegan_2007_Squirrel_translocation.pdf). A

citizen science project co-ordinated by Emily Reilly, a Ph. D. researcher from NUIG is underway to monitor red squirrel distribution in the Ballina area as there is anecdotal evidence that the squirrels have extended their range out from Belleek Woods. Supplementary peanut feeding stations are being provided in the woods year round to help with the on-going monitoring of the species.

Besides providing a mixed forest species composition and age structure, management for red squirrel includes planting tree species that provide food and habitat in particular Scot's pine and hazel.

Belleek Woods Enhancement Committee

The Belleek Woods Enhancement Committee was set up in 1998 under the chair of Cyril Collins. This group worked in partnership with Coillte, state agencies, sponsors and the local community to rejuvenate Belleek Woods through a variety of actions. Their work included:

- Developing a heritage trail through the woods of 34 points
- Publishing a book entitled: "Belleek Woods A National Treasure"
- Publishing a trail and woods leaflet
- Upgrading paths and picnic areas
- Providing seating in beauty spots
- Rejuvenating the woods through planting 50,000 trees or more
- Achieving an RDS award in 2001 in the Urban and Recreation Forestry Category
- Attracting funding for a variety of projects from a variety of local and national sources
- Assisting with the red squirrel project

Table 3 outlines the history of tree planting and ownership of Belleek Woods in Co. Mayo over almost two centuries.

Table 3: Timeline of Tree Planting, Biodiversity Actions and Ownership of Belleek Woods, Co. Mayo.

Year	Event	Group Responsible	Notes
1831-1841	Beech, oak, sycamore, yew, ash, chestnut, willow and lime tree planting on estate land	Knox-Gore Family	During their period of ownership the family planted over 2 million trees. Some trees survive from this era and can be seen at the following stops on the Heritage Trail: beech trees stops 2 and 15, lime trees stops 4 and 25, oak trees stops 8 and 16, yew stop 18, Spanish chestnut stop 19, Monterey pine stops 29 and 34.
1940	Belleek Woods privately purchased and trees harvested	Local timber merchant	
1950	Department of Forestry purchase Belleek Woods and plant conifers, mainly Norway spruce	Department of Forestry	See Scot's pine tree at stop 12 on the Heritage Trail
1970	Conifers harvested and area replanted with oak and beech	Department of Forestry	
1975	Beech trees planted	Department of Forestry	Stop 11 on the heritage trail
1989	Coillte take over management of Belleek Woods	Coillte	
1998	Belleek Woods Enhancement Committee set up with Cyril Collins as Chairman	Belleek Woods Enhancement Committee	
1999-2009	Belleek woods managed under the NeighbourWood Scheme funded by the Forest Service	Belleek Woods Enhancement Committee and Coillte	
2000	Planting of oak plantation (<i>Quercus robur</i>) of 5,000 trees	Belleek Woods Enhancement Committee	Stop 31 on the heritage trail is the oak grove. The first oak tree was planted by Mr Hugh Byrne TD on 1.4.2000.
2000	Planting of 1,000 lime trees	Belleek Woods Enhancement Committee and Coillte	
2001	500 Sweet Chestnut trees planted	Belleek Woods Enhancement Committee and Coillte	Stop 22 on the heritage trail

Year	Event	Group Responsible	Notes
2001	RDS award in the Urban and Recreation Forestry Category	Belleek Woods Enhancement Committee	In recognition of work undertaken to enhance Belleek Woods and provide recreational facilities through co-operation with a wide variety of community and organisational stakeholders
2001-2002	Planting of 4.000 beech trees	Belleek Woods Enhancement Committee	Stop 32 on the heritage trail is the beech grove. The first beech tree was planted by Mr John Brosnan of the Tree Council of Ireland on 12.9.2001
2001-2002	Planting of 10,000 ash trees under the NeighbourWood Scheme	Belleek Woods Enhancement Committee and Coillte	Planting supported by the NeighbourWood Scheme
2002	Belleek Wood Flora Study	Coillte	Produced a species list for the woods
2004	<i>Belleek Wood A National Treasure</i> published	Belleek Woods Enhancement Committee	Guide Book to the woods for the general public
2005	Belleek Woods Ecologist Survey	Belleek Woods Enhancement Committee and Coillte	Assessment of the ecological value of the woodland. Made long term management recommendations
2007-on-going	Red Squirrel Translocation Project	National Parks and Wildlife Service, Coillte and National University of Ireland Galway	15 squirrels were introduced to Belleek Woods. Project supervised by Dr Colin Lawton of NUIG. Supplementary feeding on-going with peanuts by Belleek Woods Enhancement Committee members
2009	Belleek Long Term Forest Management Plan (2009 – 2040) written by Dermot Tiernan, Joe McEvey and Cyril Collins 2009	Coillte	Details of forest management actions (including long term retention and continuous cover forestry) with the broad aim of shifting the woodland from conifer dominated to broadleaf dominated forest, eliminating invasive species and providing recreation amenity facilities for the local community. Actions funded through the NeighbourWood Scheme
2015	Species list for Belleek Woods submitted to National Biodiversity Data Centre as part of Irish Vascular Plant Data Collection	Paul Green, Botanical Society of Britain and Ireland under contract to the National Biodiversity Data Centre as part of the 'Crop Wild Relatives' European Project.	Area of study is Belleek Woods south between the main visitor car park and Belleek Castle

Year	Event	Group Responsible	Notes
2018	Fairy Door Trail	Belleek Woods Enhancement Committee and Ballina Men's Shed	Children's trail constructed in the woods near the pond. Stop 10 on the Heritage Trail
2019	Planting 3,500 hazel trees (hazel grove)	Coillte	The first tree planted by Michael Ring in 3.2019. Stop 3 on the Heritage Trail
2019	Ph.D. Research project on the success of the red squirrel translocation to Belleek Woods	Emily Reilly, Researcher NUIG	Population are doing well in Belleek with 40-50 adults which represents a viable breeding population. Supplimentary feeding with peanuts may be a factor in their success
2021	Belleek Woods Treasure of North Mayo Visitor Leaflet	Belleek Woods Enhancement Committee	Visitor guide to the woods available from leaflet dispensers in car parks.
2021	Study by Joanne Denyer to identify and assess the conservation importance of petrifying springs in the Moy Estuary. The study included springs in Belleek Woods	River Moy Search and Rescue Ballina	See: https://rivermoysearchandrescue.files.wordpress.com/2021/12/conservation-assessment-of-petrifying-springs-in-the-moy-estuary-2021.pdf . Study identifies two areas of importance within the woods, the very northern area of the woods - Belleek Woods North (Garrankeel) and the duck pond and its stream source - Belleek Woods South.
2022-ongoing	Belleek Woods Pond Enhancement application for planning permission by JBA Consultants	River Moy Search and Rescue Ballina	
2022-ongoing	Wildflower meadow enhancement project applicaton for planning permission by JBA Consultants	River Moy Search and Rescue Ballina	
2022	Belleek Woods Community Biodiversity Plan 2022-2026	River Moy Search and Rescue Ballina	Field Survey and Report completed by Dr Catherine O'Connell, Ecologist

6. What is Biodiversity?

Biodiversity is the variety of living things around us, from mammals and birds to plants and microbes, and the habitats they live in. It is a term used to mean wildlife, but more inclusive, as wildlife is often thought to refer to animals only.

The biodiversity of a site or locality is the range of species found there. A green space in any housing estate includes the familiar biodiversity of the blackbird and the robin, ducks, butterflies and the trees and grass, as well as many hundreds of species of smaller, more elusive and less familiar species such as bats, hoverflies, molluscs and fungi.

The Value of Biodiversity

Biodiversity is a key component of vibrant, rich and attractive open spaces in villages and the surrounding countryside. The values of biodiversity are listed in Table 4. Biodiversity value is reflected in the way that habitats, parks and green spaces are managed. People want nature in their public spaces and want to get involved in its management. Success will be the result of leadership, teamwork and commitment. What to aim for is that the care of parks, habitats and open spaces is informed by ecological principles. The result of this approach is the creation of more self-sustaining, cost-effective landscapes that provide better wildlife habitat and more locally distinctive surroundings. Using the biodiversity approach can put small villages and parks on the visitor map and help local communities to be proud of their village because of it.

Biodiversity Value	Notes
Biodiversity is good for people	Naturalistic landscapes offer an alternative experience to more formalised, green space, and can be used for both exercise and relaxation.
Biodiversity involves communities	Encouraging biodiversity offers opportunities for people to get involved in creating and looking after parts of their local neighbourhood or park or for recording species through citizen science initiatives.
Biodiversity is cost-effective	Because biodiversity schemes, such as planting woodland, require less intensive maintenance, resources, which are always limited, can be directed to other activities in the community.
Biodiversity creates a sense of place	Biodiversity helps to make an area reflect the character of its own locality, rather than looking and feeling the same as everywhere else.
Biodiversity is good for wildlife	Biodiversity is good for wildlife, whether rare and protected species or common, familiar plants and animals, all of which are interconnected.
Biodiversity contributes to sustainability	Less intensive techniques and the reduction of chemicals, water and fertilisers are all aspects of managing for biodiversity. The best ecological systems require low levels of intervention and are therefore readily sustainable.
Biodiversity contributes to a green infrastructure	The network of habitats, parks and green spaces in a village helps to ameliorate the effects of climatic extremes, heavy rainfall and pollutants. Naturalistic green spaces are generally more effective in this respect thanks to their more complex vegetation structure.

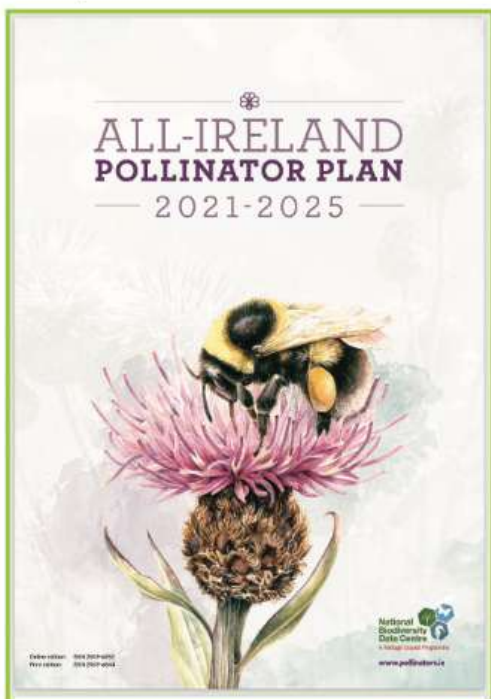
Where can we find biodiversity?

When people think of places to encourage wildlife, it is often the wilder, more out-of-the-way parts of the village or the woodland and hedges at the edge of the village. Actually everywhere has the potential for biodiversity (see Table 5). In order to enhance the opportunities for biodiversity, groups must create and encourage more species-rich and structurally diverse vegetation. Common examples include reducing mowing to encourage wildflowers and the establishment of field and shrub layers under groups of planted trees.

Biodiversity Locations in Your Area
Parks and public/private gardens
Natural and semi-natural spaces (including wastelands and derelict open land)
Green corridors
Rivers, streams and wetlands
Roadside verges
Cemeteries, churchyards and other burial grounds
Civic spaces, including market squares and other hard-surfaced areas designed for pedestrians
Accessible countryside in urban fringe areas
Urban planting schemes
Amenity green spaces
Playgrounds for children and young people
Allotments, community gardens and city farms
Outdoor sport pitches
Running tracks
Walkways

Why Does Belleek Woods Need a Biodiversity Action Plan?

Global biodiversity is under threat. Action is required at local, national and global levels to protect our natural heritage. Habitat loss from



exploitation of resources, agricultural conversion and urbanization are the main factors contributing to the loss of biodiversity. The consequent fragmentation of habitat creates small isolated patches of land that cannot maintain populations of species into the future.

Ireland's National Biodiversity Plan 2017-2021 (see <https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf>) highlights the role that Communities can play in enhancing and protecting the biodiversity in their locality. A key action area arising from the National Biodiversity Plan is the need to take steps to protect pollinators. The All Ireland Pollinator Plan 2021-2025 (see <https://pollinators.ie/wp-content/uploads/2021/03/All-Ireland-Pollinator-Plan-2021-2025-WEB.pdf>) aims to help local communities to enhance habitat for pollinators through planting native species that provide food and shelter year round (see the Pollinator-friendly Planting Code at <https://www.biodiversityireland.ie/wordpress/wp-content/uploads/Pollinator-friendly-planting-code-temporary-draft.pdf>).

The Basics of Biodiversity Management

Managing sites for biodiversity involves thirteen general principles that may challenge traditional practices.

1. **You don't know what you've got until it's gone.** Make the most of what is already there. Very often the value of this may not be recognised. For example, regularly-mown amenity grassland may in places contain a good number of wildflowers but these never flower because of the frequent mowing. Dandelion and clover, two of the top valuable plants for pollinators are found in grassland (see Table 6). Always make sure you know what you already have before you try to change it.
2. **Challenge the myths.** It is important to seek expert advice to ensure that myths about wildlife do not infiltrate management decisions. For example, not all birds nest in trees; many nest on the ground. Many shrubs promoted as good for butterflies are suitable only for the adults, which drink nectar, and if the food plants of their larvae are not present as well, they will not serve their purpose.

Table 6: Top 5 Plants for Biodiversity

(Source: <https://www.fingal.ie/sites/default/files/2020-04/gardening-for-biodiversity-booklet.pdf>)

Plant Name	Importance for Biodiversity
Dandelion	<ul style="list-style-type: none">• Flowers in early spring providing vital food early in the season.• Seed heads are bird food for greenfinch and goldfinch.• Leaves are food for Garden Tiger Moth Caterpillars
Willow	<ul style="list-style-type: none">• Flowers in spring providing vital food (pollen and nectar) early in the season.
Bramble	<ul style="list-style-type: none">• Flowers provide vital food for pollinating insects in late summer.• Berries are loved by birds, mammals and people.• Bramble provides secure nesting sites for birds.• In spring moth larvae feed on its leaves.
Red Clover	<ul style="list-style-type: none">• Flowers are a rich nectar and pollen source for bees including the common carder bee, honeybee and red-tailed bumblebee.
Ivy	<ul style="list-style-type: none">• Ivy flowers in late autumn providing pollen and nectar when food is running low for insects such as bees, wasps, hoverflies and butterflies including Red Admiral, Painted Lady, Small Tortoise Shell and Speckled Wood.• Holly blue butterfly caterpillars feed on ivy flower buds in autumn and then the caterpillars pupate hidden in the ivy until spring when they emerge.• 16 species of moth use ivy as caterpillar food.• Black ivy berries are a very important source of food for birds such as blackbirds, thrushes and pigeons in late winter.• Ivy provides cover for nesting birds and hibernating butterflies.

- 3. Keep it appropriate.** Most habitats, parks and green spaces have a local distinctiveness: the species and their habitats generally relate to their locality and are derived from the underlying substrates and geology, climate, hydrology and ecological characteristics. A green space in the South West will have different biodiversity from one in the North East, even if the layout and structure are broadly similar. To ensure that biodiversity has a long-term future, management objectives must be appropriate to the local ecology, as must the species that are planted.
- 4. Keep it clean.** Wildness is often thought to mean leaving nature to look after itself. But it is important to make sure the site does not appear neglected. Litter picking is as important in a wildlife area as in a formal rose bed.
- 5. Keep it dynamic.** Standard management practice aims to keep elements of the landscape in the same condition: shrubs are pruned to a regular shape, lawns are close mown to the same height, all self-sown plants are removed from flower beds. Change is therefore limited. Management for biodiversity, on the other hand, may actively encourage change so that more varied opportunities are present for wildlife. Some grassland might be allowed to change gradually into woodland or shrubs may be pruned less frequently. Many species have no permanent place in a green space managed to suppress all change, yet continuity of habitat is absolutely vital to many species.
- 6. Size matters.** Although the quality of a park is not generally dependent on its size, in the context of increasing biodiversity it can often be crucial. Some species, mainly birds and mammals, have minimum area thresholds. So it is important to provide the largest area or mass of habitat wherever possible, as this enhances the chances for species that have large territories or that are vulnerable to disturbance. This provides the basic rationale to extending biodiversity beyond the bounds of the nature garden and integrating it into the wider management of parks and green spaces.

7. **Safety in numbers.** A greater diversity of plants is likely to support a wider range of animals. For example, a wildflower meadow is usually thought to be better for wildlife than areas of unmown, tall grassland, because the greater variety of flowering plants supports more nectar-feeding insects than grasses alone. Similarly, a mixed planting of shrubs or a mixed hedge may help encourage more species of birds than a planting or hedge made up of a single species.
8. **The sum is bigger than the parts.** Combining different habitat types together creates a more complex and varied environment for wildlife, because of the larger number of opportunities for shelter and feeding. For example, the song thrush feeds both on invertebrates in open lawns and on berries from hedgerows or woodland edge. Thus, combining areas of short-mown grass with shrubs, hedges and woodland provides all sorts of foraging opportunities as well as nesting cover. Rich mosaics of different habitats can also be very attractive to people and are desirable if the size of the site and local circumstances permit.
9. **More structure means more diversity.** The key to providing enhanced habitats for biodiversity is generally increasing the structural diversity of the habitats. For example, long grass meadows provide more opportunities than short swards. A woodland with ground flora, dead wood and a small tree layer provides significantly more habitat than one stripped of everything except its trees.
10. **It's a matter of life and death.** We are used to thinking of nature as the living things we can see all around us, whether they are plants or animals. However, biodiversity – the totality of living things – includes also those myriad species that are scarcely visible. Many organisms are involved in death and decay and in feeding upon and recycling the dead remains of other life into soil nutrients. Therefore, one of the ways of encouraging greater biodiversity is to encourage this natural recycling by, for example, leaving dead wood on the ground in woodland areas.
11. **Life on the edge.** Biodiversity hotspots often occur at the meeting point between two or more habitats. For example, where a shrubby woodland edge meets tall grass or meadow, plants and animals from both grassland and woodland habitats can thrive. Such boundaries and edges can be very useful where space is limited, particularly if allowed to merge rather than being maintained as two or more separate areas. They can be especially valuable in warm and sunny aspects where the greatest diversity of wildlife can be expected.
12. **Remember the bigger picture.** It is easy to focus on an individual site or a particular area or feature within that site, to the exclusion of the surrounding area. However, wildlife rarely takes notice of our site boundaries. We should not forget to look at how an individual site fits into a much wider network of spaces and how that connection can be strengthened. We should also consider the role of private gardens, which extend the habitat available for wildlife beyond the public open space.
13. **Keep it sustainable.** Throughout the 20th century, managers of parks and green spaces (as well as the countryside) often unintentionally used specific techniques to remove biodiversity, which was seen to be a problem. This later rebounded through the food chain, or caused damage well away from the parks themselves. Adopting more sustainable approaches, for example reducing chemical inputs, water extraction and fertilisers, mulching to bulk up soil and avoiding the use of peat, can greatly enhance biodiversity.

Biodiversity Enhancement Actions

Measures to enhance biodiversity in Belleek Woods generally and in open areas are presented in Chapter 7 of this plan.

7. Belleek Woods Biodiversity Survey

7.1 Mature Woodland Habitat - Location 54.134911, -9.141381



Description

Belleek woods are located along the western bank of the River Moy stretching from Ballina town in the south to a distance of 2km northwards as the crow flies. They cover an area of 61.5ha. Belleek Castle occurs within the woods. This was the original home of the Knox Gore family who planted the first trees in this location in the 19th century (see Table 3).

The woods are bounded on the eastern side by the River Moy Special Area of Conservation. On the northern side there is farmland. On the western side there is a minor road from Ballina town that leads to the rear entrance of Belleek Castle, further north on this margin there is farmland and another minor road along the very north western tip of the woodland. On the southern boundary of the woods Ballina Sports Grounds, sewage works and town park occur (see Figures 5 and 6).

Figure 5: overview of the location, paths, roads and car park locations within Belleek Woods, Ballina, Co. Mayo. Source: © Belleek woods Heritage Trail visitor leaflet.

Along the eastern margin of the woods from north to south Cyril's Way is the main thoroughfare for pedestrians. There is a narrow strip of woodland to the east of the route which acts as a buffer zone between the woodland proper and the River Moy Special Area of Conservation. From this route there are multiple access tracks to the interior of the woods.

There is a vehicular access road from the minor road to the west of the woodland to Belleek Castle which passes a small car park at the duck pond.

There are a number of open areas within Belleek Woods which are described in separate sections of this report. These include the Knox Gore picnic area, the Mausoleum, the duck pond, the recently felled woodland and the riverside wild flower meadow.

Management

A long term management plan is in place for the woodland habitats of Belleek Woods. This document covers a time span of 30 years from 2009-2040 and was published in 2009 by Coillte in collaboration with the Belleek Woods Enhancement Committee (see Table 3). The overall aim of the management plan for the woods is to shift gradually from a conifer dominated woodland to a mixed woodland of both conifer and broadleaf trees. Of the 60ha wooded area, the plans are that the area of pure broadleaf and mixed high forest will increase to 89% of the area (see Table 2 from the Belleek Woods Long Term Management Plan). A Continuous Cover Forestry (CCF) approach will be used to achieve this goal. This aims to restructure the woodland to broadleaf-dominated by creating gaps in the canopy through selective thinning thereby promoting natural regeneration of trees and shrubs and allowing the ground flora to develop. CCF thinning is targeted in order to improve the diversity of the canopy, to increase deadwood and the number of veteran trees. Prior to the CCF operation in Belleek, a biodiversity area management plan will be developed to determine the CCF thinning intensity and approach across the site.

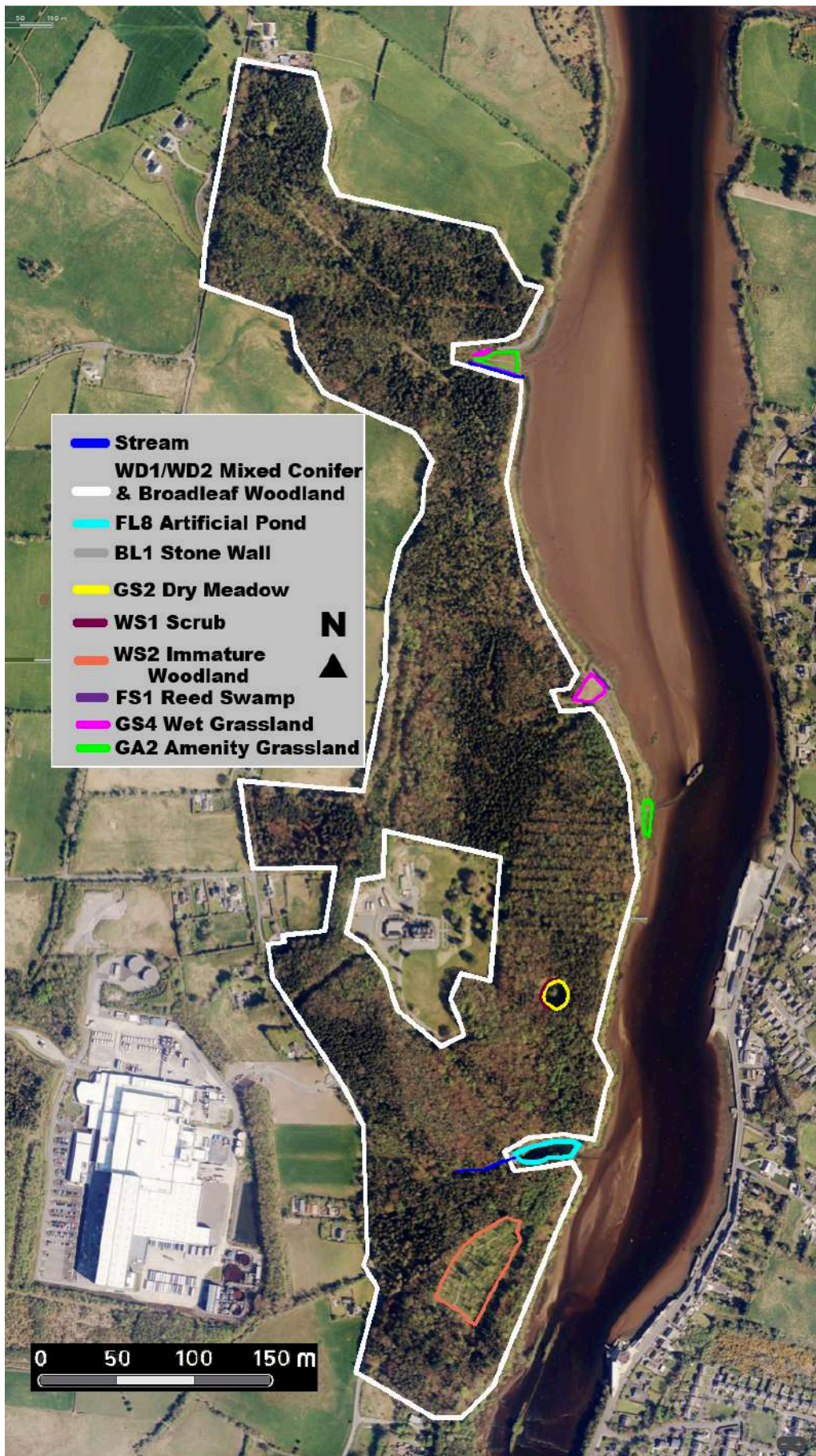


Figure 6: Satellite image showing the extent of the wooded areas and the various habitats identified in Belleek Woods, Co. Mayo. Photo:©: applemaps, modified C. O'Connell

Management of the woods is the responsibility of Coillte. They engage extensively with local groups including River Moy Search and Rescue Ballina and the Belleek Woods Enhancement Committee. Their work includes controlling the spread of cherry laurel and other invasive plants in the woods, carrying out thinning of conifers from the woods in rotation and after damaging events, planting deciduous trees, providing quality habitat and refuge for Red Squirrel and providing and maintaining visitor facilities including trails, walkways, car parks, picnic sites and signage.

Habitats Present

Mixed Broadleaved/Conifer Woodland WD2/Mixed Broadleaved Woodland WD1

Using Fossitt's (2000) Guide to Habitats of Ireland, the wooded areas of Belleek Woods form a mosaic of two woodland habitat categories: Mixed Broadleaved/Conifer Woodland WD2 and Mixed Broadleaved Woodland WD1. These cover an area of 60ha and their distribution is mapped in Figure 6. The ground beneath the trees is not flat in Belleek Woods. Moving from the River Moy to the western margin of the woods there is an elevation of 25m. There are low hills, depressions, slopes, embankments and terraces throughout. In general the woodland structure is simple consisting of a very tall canopy layer of beech with various conifers and woodland shrub and herb layers with ferns, ivy and brambles. There were many seedlings observed throughout the woods of ash, sycamore and beech suggesting a good potential to regenerate should the canopy open up naturally or in response to thinning intervention. The most biodiverse part of the woods occurs north of Belleek Castle, with the extreme north currently being the most structurally complex in terms of the age of the trees, the species mix and the complexity of woodland layers. This richness corresponds with a network of tufa streams flowing through the woods and identified by Dr Joanne Denyer in her survey of 2021 (see Table 3) in the area.

A number of distinct areas are described in detail within the woodland working from the main car park/forest entrance to the south to the Knockatinole car park in the north:

Immediately north of the southern main visitor car park the woodland is dominated by tall beech trees and Scot's pine reaching heights of 25-30m and forming a closed canopy overhead in summer. Ferns, brambles and ivy covered fallen tree logs occur in the ground layer in the woods. Ash and sycamore seedlings were observed in the leaf litter. There is a large mound in the woodland here (Plate 1) and a depression (Plate 2), both occurring adjacent to a Limekiln. Around the depression beech trees were very dominant and there was a more diverse flora forming a herb layer on the woodland floor with lesser celendine, lords and ladies, opposite leaved golden saxifrage and wood avens. Woodpigeon and starling were observed in this part of the woods.

Between the duck pond and the Knox Gore monument there is a fairy door trail for part of the woodland path. The ground rises to a mound in part of this area. There are tall conifers here with beech in the canopy and beech also formed an understorey with holly. In the ground layer over part of this area there is an impressive display of Spanish blue bell and lesser celendine flowering in spring. Enchanter's nightshade, hart's tongue fern and ivy were also abundant together with ash seedlings. Bullfinch were observed in this part of the woods (Plate 3).

On the southern perimeter of Belleek Castle grounds following Lawson Avenue north west to the heronry the trail is planted either side with Lawson pine (Plate 5). On one side is a steep embankment dropping to the tufa stream feeding the duck pond (Plate 4) and on the opposite side the land is flat. Broadleaved trees including beech, ash and sycamore form the woodland canopy above the stream. Beech stands and Lawson pine stands are common in the woodland along the northern portion of this trail. The ground layer is well developed with ferns such as hart's tongue, broad buckler and male fern with ivy. Holly was seen occasionally suggesting the beginning of the development of an understorey layer in the woodland.



Plate 1: The mound area with mixed conifer and broadleaf woodland immediately north of the main car park in the southern tip of Belleek Woods near Ballina town, Co. Mayo. The mounded area can be enhanced for biodiversity by planting with woodland bulbs in liaison with the Coillte Ecologist (see Action 7.1.6 in Table 7). Photo: © C. O'Connell.



Plate 2: The depression adjacent to the Limekiln in which a beautiful beech dominated deciduous woodland has developed. Photo: © C. O'Connell.



Plate 3: The mound in the woods mid way along the fairy door trail. The mounded area can be enhanced for biodiversity by planting with woodland bulbs in liaison with the local Coillte Ecologist (see Action 7.1.6 in Table 7). Photo: © C. O'Connell.



Plate 4: Looking south from Lawson Avenue into the ravine containing the stream that feeds the duck pond in Belleek Woods. The ground flora is well developed and the woodland canopy is largely deciduous. Bamboo, pheasant bush and winter heliotrope were growing in the undergrowth here and these require removal in the interests of protecting the native woodland flora (Action 7.1.3 in Table 7). Photo: © C. O'Connell.



Plate 5: Lawson Avenue in Belleek Woods runs along the western margin of the woods south of Belleek Castle. Where light penetrates to the ground there is a rich flora, in this area dominated by ivy (one of the top plants for biodiversity). Photo: © C. O'Connell.

The elm trail runs through the woodland area along the northern boundary of Belleek Castle and is accessed from the minor road on the western margin of the woods. Norway spruce may have been the dominant species here in the past but many trees have fallen over. Their stumps are lying across the woodland floor slowly decaying. These measured up to 20m long. Beech trees have regenerated to form a canopy in the areas opened up in the woods. Again there was a well developed ground layer of ferns, ivy and brambles (Plate 6).



Plate 6: Belleek woods along Elm Trail. In the past conifers fell over in this part of the woods and beech trees filled the opening in the woods to form a deciduous woodland. The fallen tree trunks and standing dead wood are an important habitat providing water, food and shelter for many of the creatures involved in decay. These should be left in position (Action 7.1.11 in Table 7). Photo: © C. O'Connell.

Adjacent to this area in 2001 there has been extensive planting to create a beech grove. The beech trees were densely planted, their trunk girth measuring 5-25cm diameter and their height is 10-15m. There is an impressive herb layer with enchanter's nightshade, hart's tongue fern, opposite-leaved golden saxifrage, broad buckler fern, male fern, ivy and bluebell beneath the young trees. Blue tits were active in this woodland (Plate 7).



Plate 7: the young beech plantation in Belleek Woods which can be accessed along the Elm trail close to the western boundary of Belleek Castle. The presence of young trees within the woodland diversifies the age structure of the woodland, an important consideration in the longevity and future of Belleek Woods. The deciduous woodland ground flora is rich in species as light penetrates to the ground layer over winter and early spring. Photo: © C. O'Connell.

Along the northern and eastern boundaries of Belleek Castle is the oak trail. In this area oak trees have been planted to create a deciduous woodland. The trees are 8-10m tall, densely planted, their girth diameter is between 5 and 25cm. The trees occur on a raised area 25m above the River Moy. In addition to the oak trees, beech, elderberry, ash, hazel and sycamore were noted. As the trail descends to the river there are mature trees of ash, sycamore, Scot's pine and Norway spruce. There is an understorey of beech trees in the woodland that will expand with future thinning of the conifers. A large log pile has been created along this woodland trail to encourage wildlife (Plate 8).



Plate 8: A log pile occurs in a prominent position on the oak trail where the trail bends downhill towards the River Moy. Log piles enhance woodland biodiversity and their creation is an action recommended (see Action 7.1.11 in Table 7). Continuous Cover Forestry management creates deadwood habitat.
Photo: © C. O'Connell.

Plate 9: The 12m wide avenue running from Belleek Castle to the River Moy. The woods here could be enhanced through the planting of bulbs for a spring display in liaison with the local Coillte Ecologist (see Action 7.1.6 in Table 7).
Photo: © C. O'Connell.

The back gates of the castle open onto a 12m wide avenue which runs to the river Moy and a granite glacial erratic. The woods are mixed with conifer trees including Monterey pine and beech trees casting deep shade in mid summer. There is plenty of dead wood material on the woodland floor here which may in time be colonised by mosses and ferns, species that can withstand shade and cool conditions.



The upper trail along the the western margin of the woods is at a height of 20-25m above the River Moy. The oak trail merges with the so called, pine, lime and spruce trails. This trail runs close to the western margin of Belleek woods where the woodland is adjacent to farmland. There was evidence of more tree planting of oak on the western boundary. The young plantation has been invaded by montbretia. As the trail approaches the ring fort there is an impressive stand of Monterey pine but the woodland is predominantly of mature beech trees with Scot's pine. In places where pine dominated the high canopy there was a well developed beech understory which can expand should the canopy open up. With the extra light along the edge of this trail the flora was more diverse with self heal, plantain, primrose, bracken, bramble, water figwort, hog weed, *Thuidium tamariscinum* (common tamarisk moss), *Rhytidiadelphus triquetrus* (rough goose neck moss), violet, hard fern, lords and ladies, enchanter's nightshade, strawberry, wood avens, herb robert, ivy, tutsan and honeysuckle. Speckled wood butterfly and goldcrest were also observed here. As the trail moved northwards, the ground in the woodland became obviously wetter and eventually close to the mound of the ring fort, tufa streams were a feature of the woodland (Plate 10).



Plate 10: A tufa stream in the northern part of Belleek Woods on Pine avenue. This area was located close to the western margin of the woods and was bright. The ground flora was well developed and lush. Photo: © C. O'Connell.



Plate 11: At the northern end of Belleek woods the character changes. The atmosphere is moist due to the presence of many small streams. Mosses are abundant even growing up the stems of the tiny deciduous trees. Photo: © C. O'Connell.



Plate 12: Mixed conifer and deciduous woodland to the north of Belleek woods. The long term management plan for the woods aims to shift the woods so that deciduous or broadleaf trees become more dominant. Photo: © C. O'Connell.



Plate 13: one of the network of streams occurring in Belleek Woods to the north. This stream had tufa formations and is of high conservation value as a rare occurrence. Photo: © C. O'Connell.

South of the Knox Gore picnic area, along Cyril's way, Norway spruce trees reaching 25m tall are dominant in the canopy. However there is a strong deciduous tree component with beech, birch, ash, alder, sycamore and yew (Plate 13). The ground flora is well developed with bugle, bramble, lords and ladies, pendulous sedge, hart's tongue fern, germander speedwell, vetch, daisy, bracken, herb robert and ivy. Birds such as blackbird and rook were active in this area. There were abundant mosses in the damp conditions (Plate 12) created by shading and streams. *Thuidium tamariscinum* (common tamarisk moss) and *Rhytidiadelphus triquetrus* (rough goose neck moss) were recorded (Plate 11).

Continuing northwards on Cyril's Way to the Knockatinnole Car Park the woods have a very different character. The ground is flat, just a few metres above the River Moy. While there are still very tall spruce conifers forming a high canopy in this area there is abundant growth of deciduous trees of beech, ash, hawthorn, sycamore, alder, birch and willow. The age structure is diverse and the structure of the woodland is more complex with up to five layers of plants including canopy, understorey, dwarf shrub, herb and moss layers. The area is damp with many tiny streams all with a significant variety of tufa covered structures (Denyer 2021). A kick sample from one stream yielded an abundance of freshwater shrimp, flatworm and mayfly larvae. Mosses were on the ground and growing up the stems of the young trees. The herb layer was well developed with a mixture of wetland and woodland species including bugle, meadow sweet, water figwort, vetch, germander speedwell, broad buckler fern, *Rhytidiadelphus triquetrus* (rough goose neck moss), buttercup and wood avens. Chiffchaff were active here.



Plate 14 (left): A complex woodland structure has developed in the far north of Belleek Woods near the Knockatinnole car park. Although the trees are still a mixture of conifer and broadleaves, the species diversity and the age structure are greater, due to the dominance of the deciduous trees. Photo: © C. O'Connell

Plate 15 (right): The edge of Cyril's Way path in the far north of Belleek Woods near the Knockatinnole car park showing the abundance of bugle with blue flowers and mosses. Light is penetrating onto the woodland floor here and there is a greater diversity of flowering plants which are visited by butterflies and other insects. Photo: © C. O'Connell

Paths/Roads BL3

There is an extensive network of tarmacked roads and unsealed roads within Belleek woods which provide access to every part of the woods and which are well used by visitors. There is a tarmacked road leading to Belleek Castle, curving through the centre of the woods in the southern half. Cars and other vehicles use this road. Another tarmacked walkway is known as Cyril's Way and this runs from the very northern car park at Knockatinnole along the banks of the River Moy to the main visitor car park in the south. There are numerous gravel paths criss-crossing the woods, all of which are named after trees. All of these tracks are maintained weed free.

Invasive Species

Cherry laurel is widespread within Belleek Woods and there is evidence that a programme of eradication is underway (Plate 16). Spraying of the foliage has left brown dead leaves throughout and this has been used in combination with cutting larger shrubs. This work needs to be continued and there are some areas containing cherry laurel where no control is in evidence and there is also regrowth of sprayed shrubs. In particular cherry laurel was abundant along the shared boundary with Belleek Castle where there was no obvious intervention or removal.



Plate 16: The range of invasive or potentially invasive plants and shrubs noted in Belleek Woods. A full survey and mapping of the distribution of invasives in the woods is a biodiversity action recommended in this plan (see Action 7.1.1 in Table 7). Once this information is available appropriate eradication should follow (see Actions 7.1.2-7.1.4 in Table 7). Clockwise from the top left: cherry laurel, *Rhododendron*, snowberry, Japanese knot weed, winter heliotrope, bamboo and pheasant bush. Photos: © C. O'Connell.

Rhododendron ponticum was noted in at least two locations within the woods, near the wildflower meadow area and on Cyril's way near the junction with the Moy trail.

Winter heliotrope was observed extensively along one bank of the duck pond and along both banks of the stream feeding the duck pond to the west. It was also observed north of Belleek Castle on the oak trail.

Snowberry was observed adjacent to Cyril's Way near the southern car park. This shrub spreads by producing suckers. There was no evidence of any control on this species.

Japanese Knot Weed was observed on the Moy River bank adjacent to the wildflower meadow and also on the east side of Cyril's way adjacent to the southern main car park. In this latter area there was a sign in place indicating that the removal of this plant is underway.

Pheasant bush or Himalyan honeysuckle (*Leycesteria formosa*) was noted in the woods adjacent to the path beside the wildflower area, at the pedestrian entrance to Belleek woods on Lawson Avenue opposite the walled garden and along the stream feeding the duck pond. This shrub can become invasive as its seeds are spread by birds.

Montbretia has been widely planted within Belleek Woods. This is not a woodland species and is regarded as invasive. It was noted on the avenue from the castle to the river, on Cyril's Way as far north as the boat house and extensively in a newly planted oak wood on the upper trail.

Bamboo was observed along the banks of the feeder stream to the duck pond and on the Lawson trail on the southern boundary with Belleek Castle.

Ash Die Back

Ash dieback, caused by the fungal pathogen *Hymenoscyphus fraxineus* is present in Belleek Woods (Plate 17). A survey to estimate the extent of the problem should be undertaken in the woods. Tolerant trees should be noted. In addition any trees that may cause a public health and safety issue need to be identified and monitored.

The spores of this fungus reproduce on dead leaves of ash which fall to the woodland floor in autumn. Woodland management can help stop the local spread of ash dieback and would involve collecting the fallen ash leaves and burning, burying or deep composting them. This disrupts the fungus's lifecycle. Further information for forest managers from <https://www.forestresearch.gov.uk/tools-and-resources/fthr/pest-and-disease-resources/ash-dieback-hymenoscyphus-fraxineus/chalara-manual-2-managing-ash-trees-and-woodland-including-logs-and-firewood/>.

A public awareness campaign about ash die back and how it spreads should be launched encouraging users of the woods to:



- Clean their shoes before and after visiting Belleek wood especially if they stray off tarmacked tracks and walk on the woodland floor where ash trees grow and where their leaves have fallen.
- Avoid taking cuttings or plant material from the woods.
- Wash car or bike wheels to remove mud or plant matter picked up in the woodland car parks.

Plate 17: An ash tree in the canopy of Belleek Woods showing signs of ash die back disease. A targeted survey of Belleek Woods needs to be undertaken to identify trees with and without this disease (see Action 7.1.10 in Table 7).

Photo: © C. O'Connell.

Biodiversity Actions

Table 7 outlines a number of biodiversity enhancement actions for Belleek Woods

Table 7: Biodiversity enhancement actions for the mature woodland areas in Belleek woods, Mayo.

Action Number	Action	Notes
7.1.1	Invasive species survey and mapping	The distribution of invasive and potentially invasive species within Belleek Woods needs to be surveyed and mapped to facilitate the management of their eradication. Species to include are cherry laurel, <i>Rhododendron</i> , pheasant bush, bamboo, Japanese knot weed, snowberry, montbretia and winter heliotrope.
7.1.2	Continue and expand programme of eradication of Cherry Laurel (Plate 16)	Cherry laurel is widespread in all areas of the forest. Evidence of treatment and eradication was seen in some areas, but regrowth needs to be monitored and treatment continued. This action is an absolute priority in the interests of managing Belleek woods for biodiversity and to ensure its long-term survival.
7.1.3	Invasive Species eradication: Pheasant bush, <i>Rhododendron</i>, bamboo, montbretia, snowberry and winter heliotrope (Plate 16)	Pheasant bush, <i>Rhododendron</i> , snowberry, bamboo and montbretia were observed in the undergrowth of Belleek Woods. All of these species are invasive or have the potential to be invasive and need to be eradicated from the woods in the interests of biodiversity enhancement.
7.1.4	Continue with Japanese Knot Weed eradication	Japanese Knot Weed is being treated in its location on Cyril's Way close to the main southern car park. This treatment needs to be continued until the species is eliminated totally.
7.1.5	Discontinue planting of exotics in the woodland and remove where possible	Throughout Belleek Woods, particularly along Cyril's way there were many exotic plants, typical of gardens planted in the past presumably in an honest attempt to enhance the woodland flora. Species such as <i>Fuchsia</i> , montbretia, pheasant bush, <i>Astilbe</i> , <i>Geranium</i> , lady's bonnet and many others should be removed where possible and disposed in a compost heap. The practice of planting exotics in the woods should be discouraged.
7.1.6	Enhance woodland floor biodiversity by planting native Irish spring bulbs and allow them to spread naturally	<p>The woodland flora in Belleek woods south of Belleek Castle could be enhanced for biodiversity with a spring display of native wild flowers that grow from bulbs and with a summer display of plants that grow from seeds. Species ideal for naturalizing include: bluebell (<i>Hyacinthoides non-scripta</i>), wood anemone (<i>Anemone nemorosa</i>), ramson (<i>Allium ursinum</i>), lords and ladies (<i>Arum maculatum</i>) and lesser celendine (<i>Ficaria verna ssp verna</i>).</p> <p>Biennials and perennials to consider planting from seed (or plugs) are wood sorrel (<i>Oxalis acetosella</i>), primrose (<i>Primula veris</i>), foxglove (<i>Digitalis purpurea</i>) and dog violet (<i>Viola riviniana</i>).</p> <p>Target areas for bulb planting are mounds located adjacent to the southern visitor car park and along the fairy door trail, Cyril's Way path edges south of Belleek Castle, path from Belleek Castle to Cyril's Way/River Moy and the newly landscaped car park at Knockatinhole in the north. Any planting within Belleek woods needs to be undertaken in liaison with the local Coillte Ecologist.</p>

Action Number	Action	Notes
7.1.7	Monitor transition to deciduous woodland in the woods south of Belleek Castle and enhance when opportunity arises with species other than beech	Throughout Belleek Woods there was an abundance of beech, ash and sycamore seedlings observed in the ground layer. Should openings in the canopy occur whereby conifers fall over or have to be thinned, these young seedlings will naturally expand in response to enhanced light levels. However as beech is very dominant in the woods, some planting with different native deciduous trees may be desirable to increase species diversity in the woods. Oak, hawthorn, holly, alder, hazel, rowan, whitebeam and blackthorn are recommended. In terms of conifers Scot's pine is recommended as it has a value for Red Squirrel. Be aware that the location and timing of any forestry work is important in optimising woodland management for red squirrels, such as avoiding any felling whilst young squirrels are still present in their nests or dreys from February to September.
7.1.8	Allow woodland to continue to develop naturally north of Belleek Castle	The northern portion of Belleek Woods is of high conservation value and should be allowed to continue its natural succession to deciduous woodland with the minimum of intervention. The network of streams in this part of the woods and the associated flora and fauna are of high biodiversity value and this needs to be protected while still being used as a low impact amenity.
7.1.9	Managing Belleek Woods for Red Squirrel	Belleek woods are a hot spot for red squirrel. To enhance population numbers requires careful woodland management that principally ensures providing a healthy food supply year round. Red squirrel will naturally survive on seeds with low calorific value from trees such as Scot's pine and alder - such a food source is unattractive to grey squirrel and helps to ensure they do not invade the woodland. They prefer to have continuous high canopy cover to allow them to move throughout the woodland and to build their dreys. Forestry works should not take place in the woods while newborn or kits are located in dreys from February to September.
7.1.10	Ash die back monitoring, management and public awareness campaign (Plate 17)	<p>Ash dieback, caused by the fungal pathogen <i>Hymenoscyphus fraxineus</i> is present in Belleek Woods. A survey to estimate the extent of the problem should be undertaken in the woods. Tolerant trees should be noted. In addition any trees that may cause a public health and safety issue need to be identified and monitored.</p> <p>The spores of this fungus reproduce on dead leaves of ash which fall to the woodland floor in autumn. Woodland management can help stop the local spread of ash dieback and would involve collecting the fallen ash leaves and burning, burying or deep composting them. This disrupts the fungus's lifecycle. Further information for forest managers from https://www.forestresearch.gov.uk/tools-and-resources/fthr/pest-and-disease-resources/ash-dieback-hymenoscyphus-fraxineus/chalara-manual-2-managing-ash-trees-and-woodland-including-logs-and-firewood/</p> <p>A public awareness campaign about ash die back and how it spreads should be launched encouraging users of the woods to:</p> <ul style="list-style-type: none"> • Clean their shoes before and after visiting Belleek wood especially if they stray off tarmacked tracks and walk on the woodland floor where ash trees grow and where their leaves have fallen. • Avoid taking cuttings or plant material from the woods. • Wash car or bike wheels to remove mud or plant matter picked up in the woodland car parks. <p>Thinning of dying trees may be a consideration as part of the Continuous Cover Forestry management plan to be developed by Coillte.</p>

Action Number	Action	Notes
7.1.11	Leave logs, and other dead wood in place to decompose, including standing dead wood where possible (see Plate 8).	<p>A log pile is a complex home and food source for all sorts of beneficial creepy crawlies and invertebrates. They can even be used by larger animals such as frogs and hedgehogs for hibernation. Large logs give a more stable environment but every log counts. Stack them up randomly leaving some space between them. Partly bury some logs into the ground to create the cool moist conditions loved by ground dwelling invertebrates including woodlice, centipedes, ground beetles and the devil's coach horse. Log piles are not static. Continue to add to the pile as it rots down. This will ensure that you have fresh dense wood at the top and brittle, soft decomposing wood at the bottom. A log pile is a wildlife sanctuary and will enhance the wildlife value of Belleek Woods with very little effort. Such features are a great sign to the community that biodiversity enhancement is a priority.</p> <p>Continuous Cover Forestry management also creates deadwood habitat.</p>
7.1.12	Replace broken bird nest boxes and install bat boxes	<p>Throughout Belleek Woods, particularly along Cyril's way there were many bird nesting boxes observed that have rotted over time. Bird boxes are a valuable resource encouraging birds to nest in the woods. Even in winter when birds are not breeding they use the boxes as a roost. Include boxes with letterbox style opening for robin or with a circular hole for tits. Install a terrace of nest boxes to attract sparrows. Larger boxes for owls can also be installed. Bat boxes should also be installed to attract summer roosting bats.</p>
7.1.13	Turn a selection of standing tree stumps into insect hotels, see Plate 18.	<p>Throughout Belleek woods there are trunks of cut trees remaining in the woods where trees once grew which have potential to be turned into insect hotels. By drilling holes in a small selection of the stumps in situ, a large feature insect hotel can be constructed. The ancient stump of the chestnut tree on the fairy door trail can be managed in this way as can another stump observed on the oak trail leading from Cyril's way to the upper trail.</p>
7.1.14	Identify and monitor older trees that may become veterans see Plate 19.	<p>Some of the trees in Belleek woods have been identified as having been planted in the 19th century by the Knox Gore Family. These trees should be monitored and managed to become veterans. Veteran trees are old for their species, usually have hollowed out trunks, rot sites, sap runs, a wide girth for their species and their crowns may have died back. Veteran trees are vital for specialist assemblages of wildlife, many of which survive on the features of the tree that are determined by old age and growth rate. Potential veteran trees are located at the following stops on the Heritage Trail through Belleek Woods: beech trees stops 2 and 15, lime trees stops 4 and 25, oak trees stops 8 and 16, yew stop 18, Spanish chestnut stop 19 and Monterey pine stops 29 and 34.</p>
7.1.15	Continue with litter monitoring and removal	<p>Belleek woods is a hot spot for community recreation and all credit is due to those who maintain the woods litter free. Nevertheless this work needs to continue with regular litter walks and removal from the woods.</p>



Plate 18: A tree stump on oak avenue that could be developed into an insect hotel. Drilling holes of different sizes into the stump can encourage solitary bees to nest. Such an action undertaken in a few select areas only raises public awareness and enhances biodiversity (see Action 7.1.13 in Table 7). Photo: © C. O'Connell.

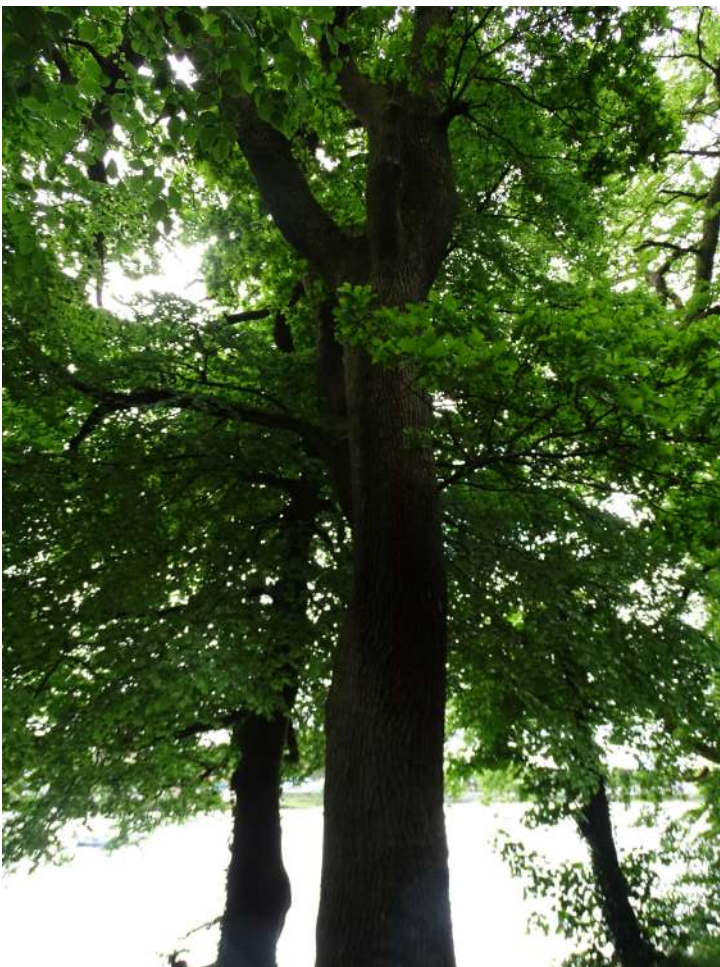


Plate 19: This large oak tree on Cyril's way is one of a number of trees that survive in Belleek Woods from the earliest planting in the 19th century. The location and monitoring of older trees of different species within the woods is recommended as they may continue to thrive and eventually become veteran trees. Veteran trees display a number of characteristics including crown die back, hollowing of trunks, sap runs, rot sites, a wide girth and a long life (see Action 7.1.14 in Table 7). Photo: © C. O'Connell.

7.2 Belleek Woods Duck Pond - Location 54.130288, -9.141512

Description

This is a small waterbody or ornamental pond located within Belleek Woods adjacent to the River Moy which flows on its east side. The pond lies south east of the grounds of Belleek Castle (see Figure 7). On the south eastern margin of the pond there is an Ice House which historically was used for the refrigeration of fish for Belleek Castle.



Plate 20: The duck pond in Belleek Woods, Co. Mayo. The water is filled with blanket weed, a problem that is to be addressed in the near future. The invasive winter heliotrope plant can be seen on the bank to the left hand side. This plant needs to be removed (see Action 7.2.3 in Table 7). An island in the pond is to be removed. Photo: © C. O'Connell.

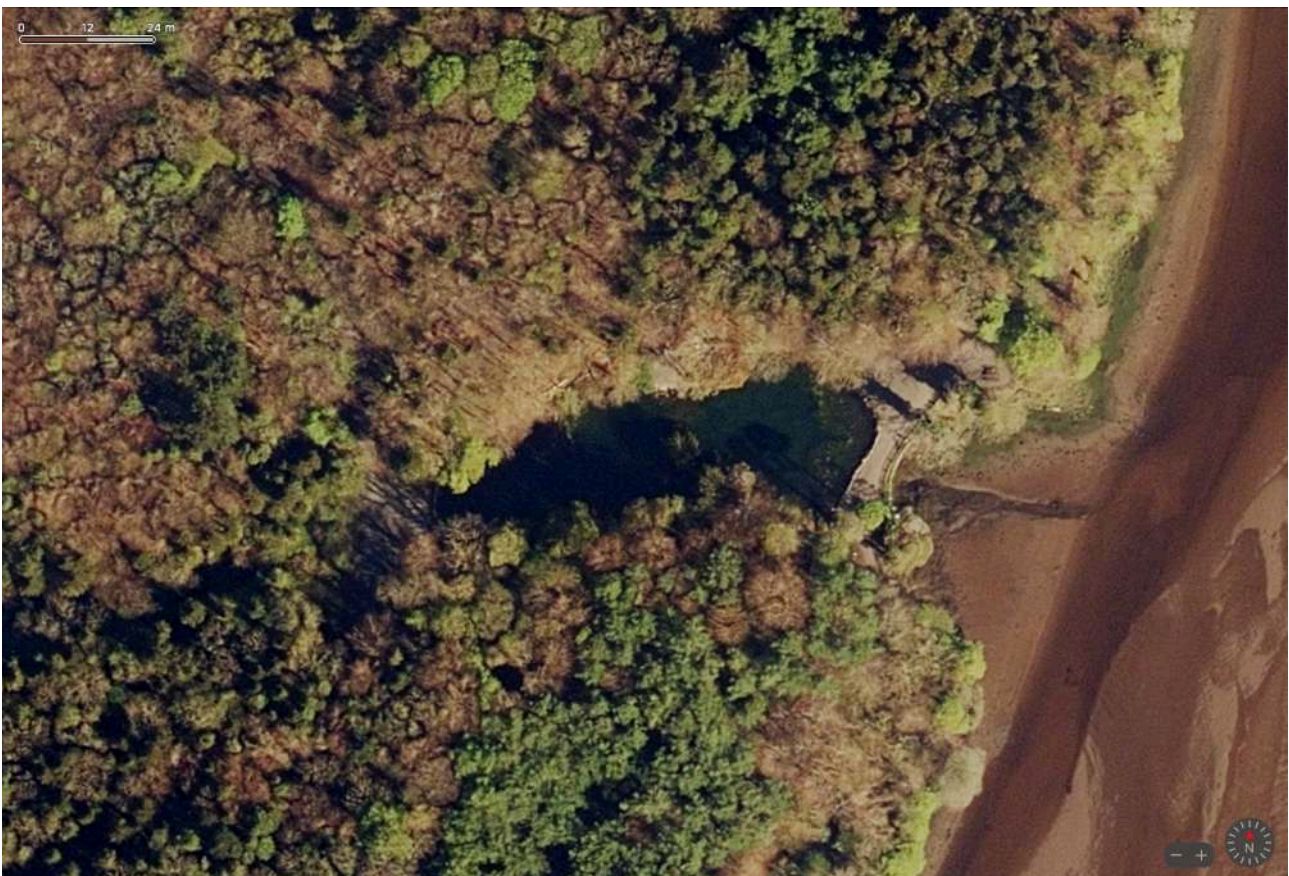


Figure 7: Duck Pond in Belleek Woods, Co. Mayo. Photo: applemaps.

The duck pond is surrounded by woodland on three sides and is open on the fourth River Moy side to the east with an amenity path (Cyril's Way) and picnic tables. Cyril's Way is fenced off from the river at the pond with a wooden post and rail fence. This structure is very obvious from the eastern bank of the river. There is a path on the northern boundary of the pond within the woods and some seating. On the western boundary there is a road leading to Belleek Castle. A feeder stream with tufa passes under a concrete bridge and wooden fence on this road. There is also a parking area at the bridge. The woods slope down to the pond on the southern bank. This margin of the pond is overgrown with the invasive plant winter heliotrope (*Petasites pyrenaicus*). Behind this bank in the woods cherry laurel (*Prunus laurocerasus*), another invasive species, occurred in the undergrowth and there was evidence that this shrub is being treated and is dying.

A tufa spring fed stream flows into the pond on its western boundary and flows out of the pond at the south eastern corner across a low cascade into the River Moy. When there is a high tide in the River Moy salt water can enter the pond. Brown trout from the River Moy get trapped in the pond at this time until the subsequent high tide. There is a small island in the pond.

Management

Litter is removed from the pond on a regular basis as this is a visitor destination within Belleek Woods and a very attractive addition to the park. As spring moves into summer and water evaporates from the pond and the feeder stream reduces in volume, an algal bloom develops over 50% of the pond particularly in the eastern half. As the pond is surrounded by woodland containing different deciduous trees, in autumn their leaves fall into the water and this organic material is left to breakdown and rot causing eutrophication. River Moy Search and Rescue Ballina have commissioned a project to examine the algal bloom issue with a view to alleviating the problem and creating a natural self-sustaining aquatic habitat. Actions proposed by JBA Consulting include dredging of the organic material from the pond, installation of sediment traps, removal of the island, creating marginal wetland habitat and cascades to increase water turbulence. A management plan for the new pond structure is being put in place that will be used going forward. Figure 8 presents draft plans for the pond that will go to planning permission in 2023.



Figure 8: Draft proposal of 4.4.22 from JBA in relation to the pond re-development in Belleek Woods, Co. Mayo. Once reset, the pond maintenance will be in relation to a management plan developed by JBA as part of the planning application.

Invasive Species

The woods slope down to the pond on the southern bank. This margin of the pond is overgrown with the invasive plant winter heliotrope (*Petasites pyrenaicus*). In the woods directly behind the southern bank cherry laurel (*Prunus laurocerasus*) was observed. Cherry laurel had been treated and its foliage was brown and rotting. Both of these species are regarded as invasive and need to be removed as part of the on-going management of the woods and the pond.

Habitats Present

The habitats present at the duck pond are mapped in Figure 6 and a description of each follows.

Artificial Lakes and Pond FL8

The duck pond is classified as a man-made ornamental pond. It is classified as FL8 habitat by Fossitt (2000). It is fed by a small stream which flows into the pond at its western end. Water was also seen flowing into the pond from a pipe beneath the path on the with a treed island in its centre. In May there was a strong algal bloom in the water and an abundance of organic material particularly around the northern and eastern portions of the pond is silting up the water. *Lemna minor* or duck weed was floating on the water surface. Brown trout were observed in the open water. Mallard ducks and black-headed gull were using the pond with 11 ducks and 14 gull counted swimming in the water and perching on exposed mud and tree trunks in the pond. In addition four grey wagtail (*Motacilla cinerea*) were utilising the pond and perching near the bridge where the stream feeding the pond flowed (see Plate 21). The presence of grey wagtail and black-headed



gull (*Larus ridibundus*) are noteworthy as both are included on the red list of Birds of Conservation Concern in Ireland. The numbers of these birds are declining in Ireland due to loss of habitat. The grey wagtail is a resident of fast flowing streams. It feeds on insects caught on the ground or in flight. It breeds along a stream, frequently building its nest under a bridge. This bird requires quality river habitat for its survival.

Plate 21: The grey wagtail is a red-listed bird of conservation concern in Ireland and is a resident in the duck pond in Belleek Woods. Photo © C. O'Connell

Fringing vegetation around the margins of the duck pond was absent as paths and other artificial surfaces have been constructed to the edge of the pond. A variety of species typical of grassland and wet ground were recorded including dandelion, plantain, daisy, pendulous sedge, water figwort, three-cornered garlic, strawberry and wood avens growing at the edge of paths and among rocks.

Mixed Broad-leaved Conifer Woodland WD2

The woodland surrounding the duck pond consisted of a mix of both broad-leaved trees and conifers which is classified as WD2 habitat by Fossitt (2000). The canopy height of the conifers was up to 23m (measured from a fallen tree) and included a mix of planted Norway spruce, Japanese larch, Scot's pine, Monterey pine and silver fir. Broad-leaved trees included wych elm, beech, ash, holly, oak and sycamore. On the woodland floor there was *Asplenium scolopendrium*, bramble and the invasive cherry laurel.

Concrete Bridge BL1

A stone bridge reinforced with concrete has been built over the stream feeding the duck pond. This is classified as BL1 habitat by Fossitt (2000). This structure was partially covered with ivy on the sides. *Asplenium scolopendrium* was found growing in crevices and on the top of the structure together with plantain, wood avens and willow herb. The stone bridge wall is topped with a wooden post and rail fencing.

Biodiversity Actions

The duck pond is a highly utilised area by visitors to Belleek Woods and as such provides an opportunity for River Moy Search and Rescue Ballina to showcase their biodiversity work particularly through the creation of a riparian zone along the southern and northern margins of the pond. Riparian zones can add beauty to the pond's edge, particularly if they are well designed. They also attract a range of biodiversity, improve bank stabilization, and help with the overall water cleanliness and clarity.

Please see biodiversity enhancement recommendations for the duck pond in Table 8.

Table 7: Biodiversity enhancement actions for the duck pond, Belleek Woods.

Action Number	Action	Notes
7.2.1	Litter Removal	Continue to remove litter from the pond regularly as it is unsightly and represents a threat to wildlife.
7.2.2	Create a wildlife friendly riparian zone or marsh habitat along the shore of the pond using native plants only	<p>There is an opportunity during the renovation of the duck pond to create riparian zone around the perimeter of the pond. The riparian zone is the area where terrestrial and aquatic ecosystems converge and is a valuable habitat for wildlife. Marginal plants are the main component of the riparian zone and include: Self-heal (<i>Prunella vulgaris</i>), Meadow buttercup (<i>Ranunculus acris</i>), Valerian (<i>Valeriana officinale</i>), marsh bird's foot trefoil (<i>Lotus pedunculatus</i>), purple loosestrife (<i>Lythrum salicaria</i>), bugle (<i>Ajuga reptans</i>), flag iris (<i>Iris pseudacorus</i>), yellow loosestrife (<i>Lysimachia vulgaris</i>), marsh thistle (<i>Cirsium palustre</i>), creeping Jenny (<i>Lysimachia nummularia</i>), water figwort (<i>Scrophularia auriculata</i>), cuckoo flower or lady's smock (<i>Cardamine pratensis</i>), water plantain (<i>Alisma plantago-aquatica</i>), Angelica (<i>Angelica sylvestris</i>), common comfrey (<i>Symphytum officinale</i>), grass of Parnassus (<i>Parnassia palustris</i>), water violet (<i>Hottonia palustris</i>), water avens (<i>Geum rivale</i>), meadow sweet (<i>Filipendula ulmaria</i>), hemp agrimony (<i>Eupatorium cannabinum</i>), greater spearwort (<i>Ranunculus lingua</i>), ragged robin (<i>Lychnis flos-cuculi</i>) and brooklime (<i>Veronica beccabunga</i>). Sedges to include in the marginal mix that are not rapid spreaders are the evergreen corkscrew rush (<i>Juncus effusus</i> var. <i>spiralis</i>), branched bur reed (<i>Sparganium erectum</i>) and flowering rush (<i>Butomus umbellatus</i>).</p> <p>Small native marginal plants that thrive in water include marsh marigold (<i>Caltha palustris</i>), water mint (<i>Mentha aquatica</i>), water forget-me-not (<i>Myosotis scorpioides</i>), broad-leaved pondweed (<i>Potamogeton natans</i>), bog bean (<i>Menyanthes trifoliata</i>) and bog pimpernel (<i>Anagallis tenella</i>).</p>

Action Number	Action	Notes
7.2.3	Invasive species removal - winter heliotrope	The woods slope down to the pond on the southern bank. This margin of the pond is overgrown with the invasive plant winter heliotrope (<i>Petasites pyrenaicus</i>). This plant forms dense stands excluding native vegetation. It spreads vegetatively. It needs to be removed from the pond bank as part of the renovation plans. Coillte needs to be informed about the presence of this species. See National Biodiversity Data Centre (https://invasives.ie) for further information.
7.2.4	Invasive species removal - cherry laurel	Cherry laurel (<i>Prunus laurocerasus</i>) occurs in the woods behind the southern margin of the pond. Cherry laurel is an invasive species of woodlands. Its leaves are thick and laurel-like and are poisonous with cyanide. The white flowers are produced on upright spikes and are succeeded in autumn by blackish cherry-like fruits that should not be eaten. This plant casts shade in woodlands preventing natural germination and growth of trees. There is treatment of cherry laurel in the area but it must be continued to stem any regrowth. Coillte needs to be informed. See National Biodiversity Data Centre (https://invasives.ie) for further information.
7.2.5	Woodland enhancement	The fringing woodland habitat around the pond could be enhanced with the addition of native broad-leaved trees typical of wetland such as willow and alder. These are valuable species for biodiversity.
7.2.6	Screening of Bridge	The bridge over the stream entering the pond needs screening with plants to encourage more biodiversity. Ivy is already in place spreading from the earthen banks on either side. <i>Clematis</i> , wild rose and honeysuckle could be planted on each side to encourage wildlife and enhance the view of this man-made structure from Cyril's Way.
7.2.7	Screening of post and rail fencing on banks of River Moy (see Plate 22)	A post and rail fence on the banks of the River Moy to the east of the pond is a very obvious man-made structure particularly from the eastern bank of the river. This should be screened with climbing plants so that it blends in with the woodland environment. Species to consider are honeysuckle, wild rose, <i>Clematis</i> and ivy.
7.2.8	Specimen Trees	Specimen trees providing colour in the woods surrounding the pond could be considered such as <i>Corylus avellana 'Purpurea'</i> - the purple leaved hazel. The nuts on this trees would also be of benefit to Red Squirrel.
7.2.9	Pond Management Plan	A pond management plan needs to be followed to maintain the pond as a natural self-sustaining aquatic habitat that supports birds of conservation concern and rare habitats.



Plate 22: the post and rail fence erected to protect visitors to Belleek Woods is a very obvious man-made structure on the shore line of the River Moy and the woodland. Action 7.2.7 in Table 8 suggests screening of this fence with climbing plants such as wild rose, honeysuckle, ivy and *Clematis*.

Photo: © C. O'Connell.

7.3 Belleek Woods Mausoleum - Location 54.132483, -9.141861

Description

This is a small open area in Belleek Woods containing a mausoleum built as a burial to Baronet Francis Knox Gore who died in 1873. The structure is located east of Belleek Castle and west of the River Moy. It consists of an earthen mound on top of which is a built structure which resembles the spire on St Giles Cathedral in Edinburgh (see Figure 9). The mound is circular with a diameter of 23m at the base and 10m at the top. It is 3.7m high. The mound is enclosed at its base by a 4m wide trench or fosse and an external bank up to 3m high. Steps have been cut into the slope of the mound providing access to the built structure on top (Source: <https://maps.archaeology.ie/HistoricEnvironment/>). It is a registered historic monument. The whole structure is surrounded by beech woodland on all sides. The mound and fosse are covered with wild flower grassland habitat enhanced with woodland ferns. The Mausoleum is accessed from Cyril's Way which runs along the external bank on its eastern side. The walkway is partially fenced off from the Mausoleum.

This open area within the woodland is warm, bright and sheltered and an abundance of wildlife was observed here including speckled wood butterfly, housefly, honey bee, great tit, dragonfly, blue tit, carder bee, various hoverflies, thrush and robin.

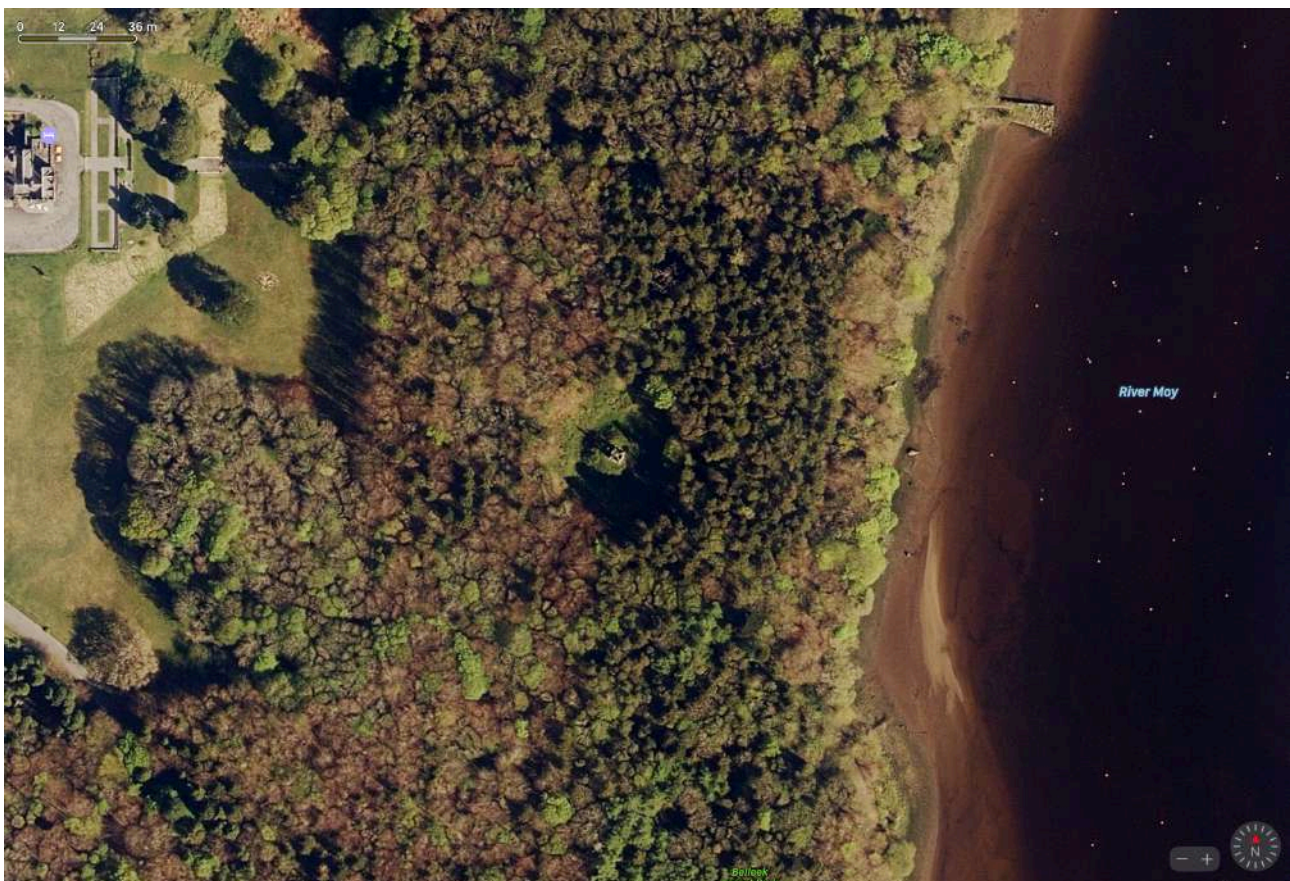


Figure 9: Air photograph showing the location of the Mausoleum in Belleek Woods, Co. Mayo (the open area in centre of photograph). Belleek Castle can be seen on the left hand side and the River Moy on the right. Photo: applemaps.

Management

The grassland covering the mound and fosse is managed for wildflowers. While most of the area is kept free from trees however there is evidence of scrub invasion of willow and bramble onto part of the fosse structure on the western side. The scrub includes pheasant bush (*Leycesteria formosa*), a species that can become invasive as its seeds are spread by birds.



Plate 23: The Mausoleum built as a burial to Baronet Francis Knox Gore who died in 1873. Grassland habitat enriched with wild flowers and ferns covers the mound. The fosse structure is partially infilling with brambles and pheasant bush to the rear. In Table 8 there are biodiversity recommendations in relation to managing the grassland habitat so that wild flowers dominate. In addition recommendations are made regarding the scrub so as to retain an open area for wildlife. Photo: © C. O'Connell.

Habitats Present

The habitats present at the Mausoleum are mapped in Figure 6 and a description of each follows.

Dry Meadow and Grassy Verge GS2

The mound grassland area appears to be cut only once or twice per year and as a result wild flowers, grasses and ferns flourish. This is classified as GS2 habitat by Fossitt (2000). Species present included lady's smock (*Cardamine pratense*), daisy, Spanish blue bell, Irish blue bell, buttercup, lords and ladies, bracken, strawberry, self heal, herb robert, dock, figwort, dandelion, ragwort, enchanter's nightshade, plantain, Yorkshire fog grass and germander speedwell.

Scrub WS1

The western part of the trench contained scrub of willow, raspberry, bramble and pheasant bush. This formed a boundary with the high forest of beech which surrounds the mausoleum. Besides providing natural blackberry fruit, bramble are home to many creatures. In spring moth larvae feed on its leaves, in summer bees enjoy the rich nectar and pollen in its flowers, many birds nest in the thickets it forms safe from predators. Bramble is one of nature's survivors. Trying to eliminate it completely is a waste of time, however it should be cut back from the fosse structure of the mausoleum to form a natural scrub boundary with the high forest. Better to embrace the plant and manage it to enhance its many wildlife benefits. See Action 7.3.7 in Table 9.

Invasive Species

Cherry Laurel was noted on the western boundary of the woodland surrounding the Mausoleum site. This species is invasive and needs to be treated and removed from this site.

Pheasant Bush, also known as Himalayan honeysuckle (*Leycesteria formosa*), was identified on the western side of the mound. This is a species that can become invasive as its seeds are spread by birds and it is best removed from this location in the interests of biodiversity.

Biodiversity Actions

The Mausoleum is one of the few open areas within Belleek Woods. As the sun penetrates to the ground here, it is warm. The surrounding trees provide shelter from the winds. There was an abundance of insects and birds in this area which form the basis for a hotspot of biodiversity.

Please see biodiversity enhancement recommendations for the Knox Gore Mausoleum in Table 9.

Table 9: Biodiversity enhancement actions for the Knox Gore Mausoleum, Belleek Woods, Mayo.

Action Number	Action	Notes
7.3.1	Control scrub	Ensure that scrub does not invade the open area by removal. Manage the cleared area as a wild flower meadow or glade (see 7.3.2)
7.3.2	Maintain existing mowing regime to encourage wildflower meadow on the monument	<p>The grassland habitat of the Mausoleum should be retained through the current management regime. This will allow the continued development of the wildflower element of the habitat.</p> <p>Reduce or maintain mowing to once a year. In autumn cut the meadow to a very short sward, collect the cuttings for compost and scarify the ground surface to create bare soil using a metal rake. Leave to overwinter. This action will help to keep grasses under control by removing nutrient and will allow wild flowers to naturally seed into the area. Consider planting the wildflower maker, <i>Rhinanthus minor</i> or hen rattle which naturally reduces the vigour of grasses by parasitizing their roots.</p>
7.3.3	Replace Spanish bluebells with native Irish bluebells	<p>Spanish bluebells on the mound may have been planted. These should be removed and replaced with native Irish bluebell (<i>Hyacinthoides non-scripta</i>).</p> <p>Dig out the Spanish bluebells while they are in leaf, as the bulbs are almost impossible to find when the plants are dormant. Loosen soil around the bulbs to a good depth and remove all the bulbs and underground parts. Leave for one year before planting native bluebells to capture any regrowth.</p>
7.3.4	Create woodland edge habitat	Beyond the archaeological structure of the mound and fosse, create a natural woodland edge habitat of shrubs which transition to the high forest. This action increases the range of habitats available for wildlife and provides shelter.

Action Number	Action	Notes
7.3.5	Invasive species removal - cherry laurel	Cherry laurel (<i>Prunus laurocerasus</i>) occurs on the western woodland boundary surrounding the Mausoleum. Cherry laurel is an invasive species of woodlands. Its leaves are thick and laurel-like and are poisonous with cyanide. The white flowers are produced on upright spikes and are succeeded in autumn by blackish cherry-like fruits that should not be eaten. This plant casts shade in woodlands preventing natural germination and growth of trees. Inform Coillte to extend their programme of eradication of cherry laurel within the woods to this site. See National Biodiversity Data Centre (https://invasives.ie) for further information.
7.3.6	Remove potentially invasive Pheasant bush (<i>Leycesteria formosa</i>)	Pheasant bush or Himalayan honeysuckle is a native of China and in Belleek Woods is potentially invasive as it produces masses of seeds that are eaten by birds which spread them to other areas. This occurs to the western side of the Mausoleum mound and as wild flower meadow is the preferred habitat on this structure, this species should be removed.
7.3.7	Manage brambles	<p>Brambles are one of the top 5 plants for biodiversity and be of great benefit provided they are managed properly. Clear back brambles on the Mausoleum structure so that they form a natural scrub layer at the surrounding high forest edge.</p> <p>To encourage wildlife diversity manage the bramble patches on rotation by cutting back one third in any year to achieve a habitat mosaic. This creates new growth favoured by some species while leaving old growth to provide shelter and nesting sites. The flowers are a rich source of nectar and pollen for honeybees and other insects. The fruit is abundant and valuable to birds and mammals.</p>

7.4 Immature Woodland (Recently Felled Woodland Clearing) - Location 54.128562, -9.143473

Description

This is an area of 1.3ha in the southern part of Belleek Woods that was felled between 2009 and 2019 by Coillte (see Figure 10). It was a formerly a stand of Japanese larch that had become unstable and for health and safety reasons it had to be felled. This action was flagged in the Long Term Forest Management Plan 2009-2040. It is located between Cyril's Way and the minor road leading to Belleek Castle. A tarmacked trail leads the visitor through the area which ultimately leads in a northerly direction to the duck pond. Along this trail there are a number of tree stumps of felled conifers.



Figure 10: Air photograph showing the location 2009-2019 cleared area in Belleek Woods, Co. Mayo (in centre of photograph). The driving route to Belleek Castle can be seen on the left hand side and the River Moy on the right. Photo: applemaps.

Management

The long term management plan for Belleek Woods 2009-2040 highlighted this area in particular for 75% thinning of Japanese larch which was regarded as overly mature and subject to windthrow. The work was carried out prior to 2019. In the Continuous Cover Forestry approach, mature broadleaf trees were not felled. Following the felling there was public outcry and Belleek Woods Enhancement Committee liaised with Coillte to replant the area with hazel, oak and horse chestnut. The visitor guide to the woods indicates that Mr Michael Ring TD planted a hazel tree on the site during National Tree Week 2019 to begin the process of replanting. As the management plan stressed the replanting with native broadleaf trees and that the woodland's natural climax community is oak-ash-hazel, horse chestnut should not have been planted in this area.

The exposure of the forest floor to light has resulted in a luxurious growth of wild flowers, brambles and ferns and the spread of sycamore through natural re-seeding. The stumps of the felled trees have been left along the forest trail together with brush material from the felling. This herb and shrub layer is strimmed once a year to reduce competition with the planted immature trees.

Invasive Species

The invasive *Rhododendron ponticum* was noted in the undergrowth at the edge of the immature woodland area. This is a harmful invasive species in woodland habitats and it needs to be treated and removed.

Habitats Present

The immature woodland habitat is mapped in Figure 6 and this habitat is described below.

Immature Woodland WS2

The tree species planted include hazel, oak, ash and horse chestnut. These were up to 3m tall. Sycamore, ash and hawthorn have naturally seeded into the clearing. The open area is surrounded by Scot's pine and spruce trees and it is likely these too will seed into the clearing. This habitat is classified as WS2 immature woodland by Fossitt (2000).

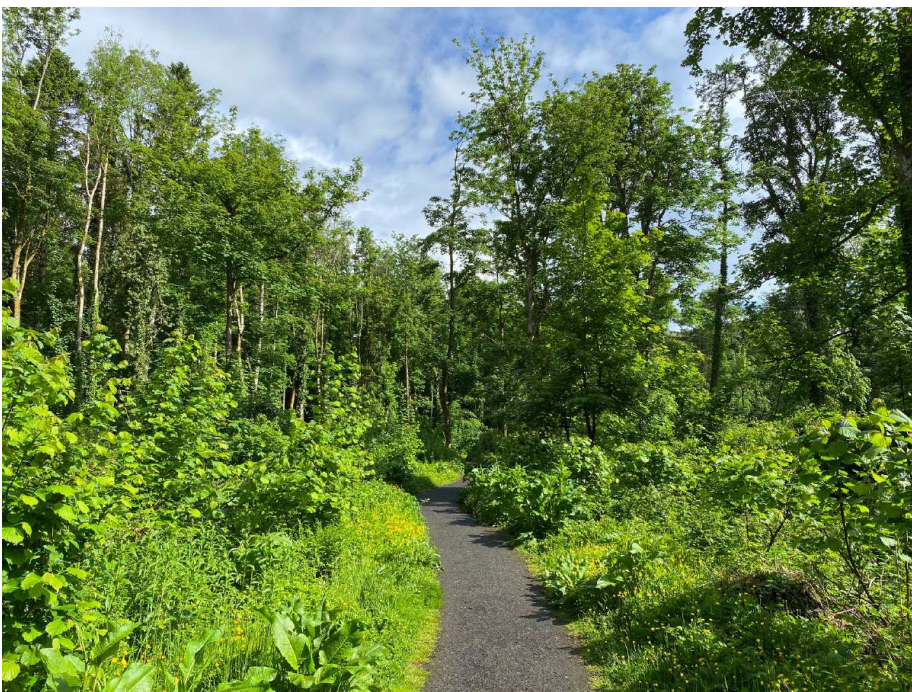


Plate 24: A view across the recently felled woodland showing the open area in which there is an abundance of growth among the planted hazel trees. The tall forest mature trees can also be seen. Open areas in the woods can be hot spots for biodiversity. Photo: © J. FitzGerald.

In the herb layer there was a rich cover of species including male fern, broad-buckler fern, dock, buttercup, ragweed, water figwort, nettle, germander speedwell, daisy, dandelion and opposite-leaved golden saxifrage. There were large stands of bramble and of willowherb.

Some of the dead tree branches were examined and found to have a rich covering of lichens including *Evernia prunastri*, *Usnea subfloridana* and *Ramalina fastigiata*. Woodpigeon were utilising this area of the woodland.

Biodiversity Actions

Tree thinning is an on-going management activity that will be undertaken by Coillte going forward



in order to achieve the management goal of shifting Belleek Woods from a conifer dominated woodland to a more natural mixed conifer and broad-leaved woodland. It is vital that any replanting is only achieved with native species either through natural colonisation or through planting. In terms of conifers, Scot's pine may be planted to provide habitat for red squirrel as part of targeted species management being undertaken by Coillte. Please see biodiversity enhancement recommendations for the recently felled woodland clearing and the developing immature woodland in Table 10.

Plate 25: The stump of a conifer tree in the immature woodland can be turned into an insect hotel creating more habitat for wildlife (see Action 7.4.2 in Table 10). Photo: © C. O'Connell.

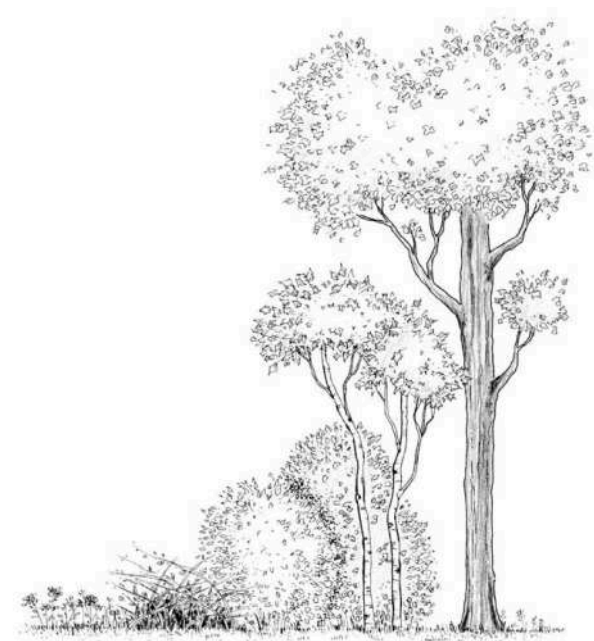


Figure 11: Profile of a structurally diverse, graduated woodland edge found along woodland paths, glades and rides. Action 7.4.4 in Table 10 suggests developing this structure along the path through the immature woodland to enhance biodiversity and to retain an open area that is drenched with light and warmth. Image: © T. Blakesley, <https://www.woodlands.co.uk/owning-a-wood/managing-your-woodland-for-wildlife/>.

Table 10: Biodiversity enhancement actions for the Immature Woodland, Belleek Woods, Mayo.

Action Number	Action	Notes
7.4.1	Replace non-native horse chestnut trees with native broad-leaved trees such as ash or oak	In the immature woodland habitat, horse chestnut has been planted in the mix of broad-leaved trees. These are not native Irish trees and they should be removed while still immature and replaced with oak trees. An understorey of blackthorn, hawthorn, crab apple and guelder rose should be considered. The horse chestnut trees could also be targeted for removal under Continuous Cover Forestry management programme for this area.
7.4.2	Create insect hotels out of the tree stumps left along the woodland walkway to enhance biodiversity (Plate 25)	A number of tree stumps have been left in situ along the access path from felled conifers. These present an ideal opportunity to create insect hotels, habitat for invertebrates.
7.4.3	Disposal of trimmings from herbaceous layer management	Once a year, the herbaceous layer within this area is mowed. Because the trimmings are not being removed but dumped within the area, this is creating a nutrient rich compost suitable for nettle growth. The correct management of herbaceous growth within this immature woodland is to remove trimmings from the site and allow other more desirable species to flourish. Please see 7.7.4 for a suggested management of this area with biodiversity enhancement as a goal.
7.4.4	Path Edge Management as a Forest Ride (see Figure 11)	<p>The path through the immature woodland presents an opportunity to manage the developing woodland as an open forest ride. A three zone management system is recommended which includes a mosaic of the following habitats:</p> <ul style="list-style-type: none"> • a central zone of short turf on either side of the path mown once or twice a year in August to maintain a species-rich sward • swards of tall herbs and grasses bordering the central zone, cutting a 25% portion in rotation to create different aged vegetation • an outer zone of scrub, allowed to develop into dense thickets in places, grading into the high forest. This habitat can be cut less frequently, once every few years to create structural diversity and habitat for wildlife. <p>This type of management creates a graduated edge allowing light to penetrate to the ground and into the canopy. See https://www.woodlands.co.uk/owning-a-wood/managing-your-woodland-for-wildlife/ for more details particularly Chapter 4.</p>
7.4.5	Invasive <i>Rhododendron ponticum</i> removal	<i>Rhododendron ponticum</i> was observed in the immature woodland habitat. This is a long-lived (up to 130 years) shrub, that can form dense thickets in native woodland habitats. It is a multi-stemmed evergreen shrub that grows up to 10m in height and it is a copious seed producer. <i>Rhododendron</i> casts dense shade over the woodland floor preventing tree seedlings from germinating. it needs to be treated and removed by competent authorities. Please liaise with Coillte, https://biodiversityireland.ie/top10/10-most-unwanted-species/ , Mayo County Council and River Moy Search and Rescue Ballina in the removal of this species.

7.5 Wildflower Meadow Area - Location 54.136763, -9.140823

Description

The area is bounded by the River Moy SAC/pNHA/SPA on its north-eastern side, a car park and picnic area to the south east, the Belleek Woods greenway/Cyril's Way to the west and Belleek Woods to the west and north west (see Figure 12). The site extends southwards along the river bank to another green area with good views of the wrecks of the Florette and the Crete Boom.

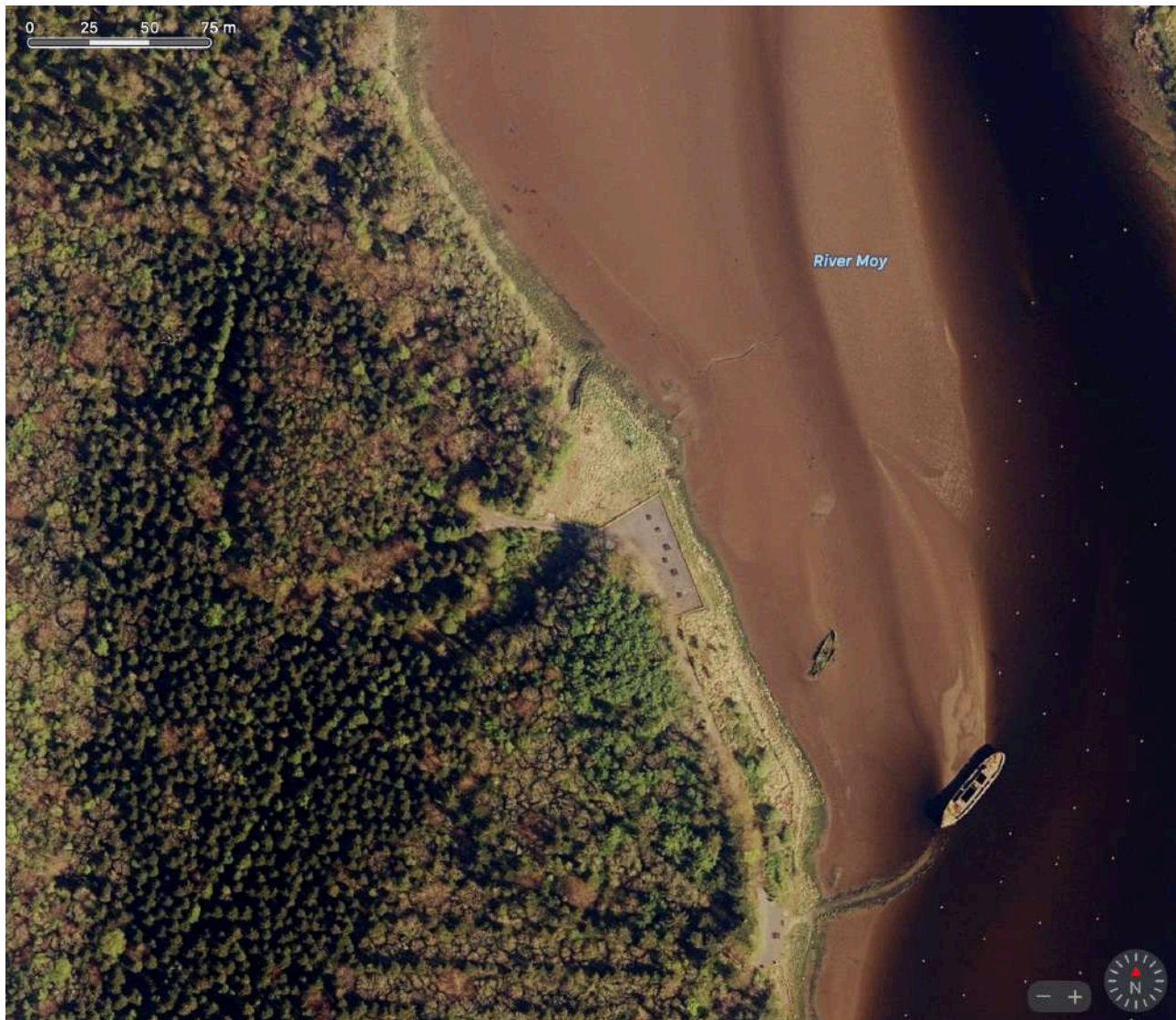


Figure 12: Air photograph showing the location of the proposed wildflower area on the banks of the River Moy which is surrounded by Belleek Woods. In the river the remains of the Florette Boat and the Crete Boom can be seen.

Management

This area was created through the spreading of builders rubble in the past. The ground is uneven under foot and is saturated in places with water. The area is fenced off from the public greenway and path and there is an access farm gate to the land. In the past seed planting of wild flowers into this area was undertaken by the Belleek Woods Enhancement Committee with the goal of creating a wildflower meadow. Coillte strim the area at least once each year as part of the management of the adjacent public picnic area and river bank. River Moy Search and Rescue Ballina contracted JBA Consulting asking them to draw up a plan to develop a wild flower meadow in this location. As

the site is on the banks of the River Moy SAC the plan is subject to assessment and planning



permission. The draft plan is shown in Figure 13.

Figure 13: Draft proposal of 11.5.22 from JBA in relation to the wildflower meadow development in Belleek Woods, Co. Mayo.

Invasive Species

The invasive *Rhododendron ponticum* was noted at the edge of the wildflower area as was pheasant bush. In addition Japanese Knotweed was noted on the river bank in one location opposite the car park. These are invasive species or potentially invasive in wildlife habitats and need to be treated and removed in liaison with competent authorities.

Habitats Present

The habitats present in this area are mapped in Figure 6 and a description of each follows.

FS1 Reed and Large Sedge Swamp

There is a bank of sweet reed grass (*Glyceria maxima*) up to 2m tall running parallel to the river along with a single willow tree of *Salix alba*. This is an exposed part of the site.

GS4 Wet Grassland

Between the reed habitat and the woodland wet grassland habitat was noted. This occurred in a more sheltered area and had a good variety of wet grassland flowers occurring which may have been enhanced in the past through seed planting by the Belleek Woods Enhancement Committee. Species recorded included meadowsweet, fleabane, lesser celandine, silverweed, bramble, pendulous sedge, plantain, black medick, ragged robin, wood rush, common rush, sweet vernal

grass, common vetch, Yorkshire fog, nettle, slender St John's wort, purple loosestrife, cat's ear, bird's foot trefoil, clover, meadow buttercup, bush vetch, pointed spear moss, brooklime and ox eye daisy. Also in this area there were young trees of sycamore, hawthorn birch, grey willow and rowan up to 3m tall.

This habitat was rich in insect and invertebrate life including crane fly, beetle, wolf spider, spit bug, carder bee and the dangling marsh lover hover fly (*Helophilus pendulus*) (see Plate 26).

The area is relatively species rich but its natural succession is to go to scrub woodland and already looking over the site there are quite a number of young willow trees present which were up to 3m tall.

Amenity (Improved) Grassland GA2

This habitat occurred along the banks of the River Moy adjacent to a small picnic area overlooking the wrecks of the Crete Boon and the Florette. Frequent mowing means that the area is species poor. This area can be enhanced if the mowing regime is changed in favour of creating a pollinator friendly wildflower meadow (see action 7.5.6 in Table 11).



Plate 26: Species diversity of the wet meadow area in Belleek Woods which is located along the banks of the River Moy. Top row clockwise from the left: View across the proposed meadow project area towards the river Moy; dangling marsh lover hover fly (*Helophilus pendulus*) sunning on a sycamore leaf; common vetch, a plant attractive to pollinators; female wolf spider with egg ball; red clover - one of the top 5 plants for pollinators and beetle on the leaf of willow. Photos: © C. O'Connell.



Plate 27: With a change of mowing regime this amenity grassland can be turned into an attractive pollinator friendly zone (Action 7.5.6 in Table 11). Photo: © C. O'Connell.

Biodiversity Actions

Please see biodiversity enhancement recommendations for the wildflower area in Table 11.

Table 11: Biodiversity enhancement actions for the Wildflower Meadow, Belleek Woods, Mayo.

Action Number	Action	Notes
7.5.1	Wet grassland species enhancement	<p>In a natural wet grassland/marsh the proportion of flowering herbs is usually higher than grasses. The area should be enhanced with the addition of common marsh plants using native seeds or plugs. Species to include are: water plantain (<i>Alisma plantago-aquatica</i>), Angelica (<i>Angelica sylvestris</i>), water forget me knot (<i>Myosotis scorpioides</i>), brooklime (<i>Veronica beccabunga</i>), common comfrey (<i>Symphytum officinale</i>), grass of Parnassus (<i>Parnassia palustris</i>), purple loosestrife (<i>Lythrum salicaria</i>), yellow loosestrife (<i>Lysimachia vulgaris</i>), creeping Jenny (<i>Lysimachia nummularia</i>), flag iris (<i>Iris pseudacorus</i>), water violet (<i>Hottonia palustris</i>), water avens (<i>Geum rivale</i>), meadow sweet (<i>Filipendula ulmaria</i>), marsh bedstraw (<i>Galium palustre</i>), marsh pennywort (<i>Hydrocotyle vulgaris</i>), lesser spearwort (<i>Ranunculus flammula</i>), hemp agrimony (<i>Eupatorium cannabinum</i>), greater spearwort (<i>Ranunculus lingua</i>), marsh cinquefoil (<i>Potentilla palustris</i>), ragged robin (<i>Lychnis flos-cuculi</i>), cuckoo flower or lady's smock (<i>Cardamine pratensis</i>), bugle (<i>Ajuga reptans</i>), marsh thistle (<i>Cirsium palustre</i>), fen thistle (<i>Cirsium dissectum</i>), water figwort (<i>Scrophularia auriculata</i>), Self-heal (<i>Prunella vulgaris</i>), Meadow buttercup (<i>Ranunculus acris</i>), Valerian (<i>Valeriana officinale</i>) and marsh bird's foot trefoil (<i>Lotus pedunculatus</i>).</p> <p>Sedges to include in the mix that are not rapid spreaders are the evergreen corkscrew rush (<i>Juncus effusus</i> var. <i>spiralis</i>), branched bur reed (<i>Sparganium erectum</i>) and flowering rush (<i>Butomus umbellatus</i>).</p>
7.5.2	Wet grassland habitat management	Management of this area going forward will require a different approach. The wet grassland should be cut once a year in autumn and after a day or so the cuttings need to be removed so as to ensure the fertility level of the soil stays poor.
7.5.3	Invasive <i>Rhododendron ponticum</i> removal	<i>Rhododendron ponticum</i> was observed at the edge of the wet grassland habitat. This is a long-lived (up to 130 years), that can form dense thickets in native woodland habitats. It is a multi-stemmed evergreen shrub that grows up to 10m in height and it is a copious seed producer. <i>Rhododendron</i> casts dense shade over the woodland floor preventing tree seedlings from germinating. It needs to be treated and removed by competent authorities. Please liaise with Coillte, https://biodiversityireland.ie/top10/10-most-unwanted-species/ , Mayo County Council and River Moy Search and Rescue Ballina in the removal of this species.
7.5.4	Remove potentially invasive Pheasant bush (<i>Leycesteria formosa</i>)	Pheasant bush or Himalayan honeysuckle is a native of China and in Belleek Woods is potentially invasive as it produces masses of seeds that are eaten by birds which spread them to other areas. This shrub was observed at the woodland edge adjacent to the meadow. This species is potentially invasive and should be removed in liaison with Coillte, the National Biodiversity Data Centre, National Parks and Wildlife Service, Mayo County Council and River Moy Search and Rescue Ballina. Please see https://invasives.ie .
7.5.5	Invasive Japanese Knotweed removal	Japanese knotweed was observed on the river bank opposite the car park. This plant is tolerant of a wide range of conditions including high salinity. It is found near water sources, such as along river banks and can colonise coastal shores and islands. Its presence on the River Moy bank poses a risk to the habitats being protected within the SAC. It needs to be removed in liaison with Coillte, the National Biodiversity Data Centre, National Parks and Wildlife Service, Mayo County Council and River Moy Search and Rescue Ballina. Please see https://invasives.ie .
7.5.6	Manage grassland area overlooking ship wrecks as a pollinator friendly zone (Plate 27)	The green area overlooking the wrecks of the Florette and the Crete Boom should be managed as a pollinator friendly wildflower meadow. See https://pollinators.ie/wordpress/wp-content/uploads/2018/04/How-to-guide-Wildflower-Meadows-2018-WEB.pdf for details.

7.6 Knox Gore Picnic Area - Location 54.141265, -9.143104

Description

This is an open area of 0.25ha located at the northern end of the woods on the banks of the River Moy (see Figure 14). Traditionally this was the area used by the Knox Gore Family to have picnics.

On the northern margin of the site, a famine wall of limestone has been built which extends up along the river bank for approximately 400m. The wall was constructed during the Famine from 1845-1852. A post and wire fence on the southern boundary separates the site from a stream with tufa formation which enters the Moy River. On the east is the Moy River separated from the site by an erosion protecting layer of large limestone boulders and on the western boundary is woodland with an access path from the Cyril's Way walking route. A tarmac walkway runs down the centre of the site towards the river. There are four picnic tables positioned at the site. During high tides, the river floods into this site as evidenced by a tideline of plant material located on the grass and path at a distance of 15m from the river bank.

Management

This picnic site is maintained as amenity grassland through regular mowing to maintain a short sward. On the north western boundary there were four planted trees in memory of local persons, each one with a small plaque while on the southern boundary there were 10 additional trees planted in memory. These included cherry blossom, hazel and oak planted in 2001.

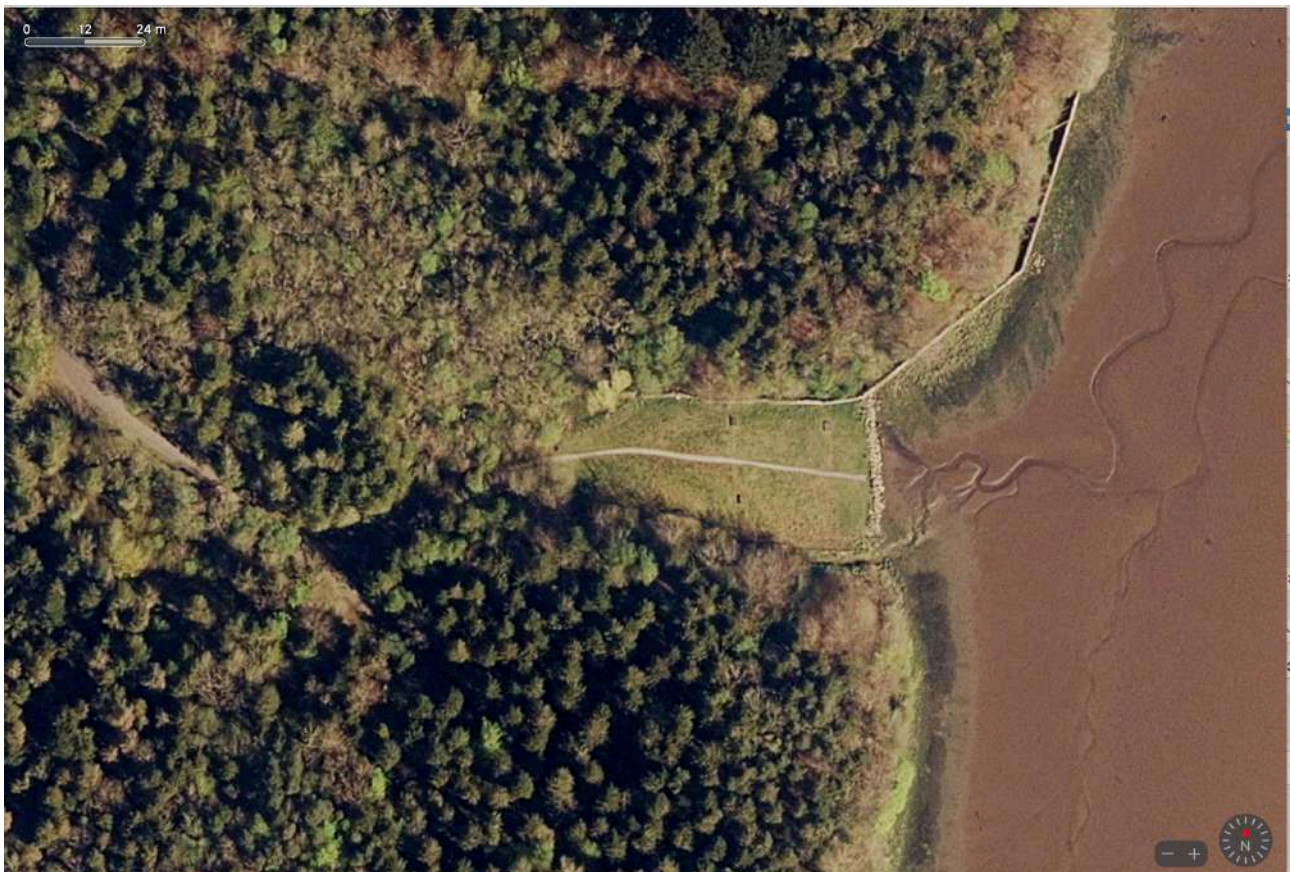


Figure 14: Knox Gore Picnic Area in Belleek Woods, Co. Mayo. The central access path can be seen, together with the boulders re-inforcing the bank and the Famine Wall to the north. Photo ©: applemaps.

Habitats Present

The habitats present at the Knox Gore picnic site are mapped in Figure 6 and a description of each follows.

Amenity Grassland (Improved) GA2



This is a species poor grassland due to the management regime which does not permit flowering of grasses and herbaceous plants (Plate 28). The soil is wet and there is an abundance of the moss *Calliergonella cuspidata*. Flowering plants noted in the area were daisy, dandelion, white and red clovers and buttercups.

Plate 28: A view of the Knox Gore picnic area from the River Moy. The mowed grass is a species poor habitat. Action 7.6.1 in Table 12 proposes developing a species rich wet meadow habitat here which compliments existing wet grassland habitat associated with the streams in the area. Photo: © C. O'Connell

Wet Grassland GS4



Towards the north western margin with the forest and along the banks of the stream to the south of the site wetland plants were noted including meadowsweet, water mint, silverweed, meadow vetchling, knapweed, tufted vetch, willow and flag iris (Plate 29).

Plate 29: A small wetland habitat in the north western corner of the Knox Gore picnic area with flag iris, mint and willow. This habitat should be retained and allowed to naturally expand in the interests of biodiversity. Photo: © C. O'Connell

Stone Wall BL1

The famine wall forms the northern boundary of the picnic area. It is approximately 400m long and measures 2m tall. The wall has become overgrown in part with woodland and wild flowers including blackthorn (sloe), polypody fern, *Xanthoria parietina* (orange lichen) and maidenhair spleenwort.

Invasive Species

Cherry laurel was noted in the woods along the short access route from Cyril's Way to the picnic area. This should be removed as part of the eradication programme underway in the woods.

Biodiversity Actions

Access to the picnic site is on foot from the Knockatinole car park to the north. It is under-utilised and as such presents an opportunity to manage the area for biodiversity in addition to retaining its picnic function. Please see recommendation 7.6.1 in Table 12.

Table 12: Biodiversity enhancement actions for the Knox Gore picnic area, Belleek Woods, Mayo.


Action Number	Action	Notes
7.6.1	Change mowing regime and create a pollinator friendly wild flower meadow enhanced with bulbs. Introduce appropriate management of the area going forward	<p>The grassland habitat of this picnic area should be managed as a wild flower meadow. The simplest action is to create a meadow habitat by leaving grass and wildflowers already in this area to grow, flower and set seed. Mow once a year in autumn and remove all of the cut material to reduce soil fertility.</p> <p>Additional options are to enhance species composition by planting and naturalizing bulbs. Choose a limited colour palette of bulbs for this project as it looks more natural. Species ideal for naturalizing include: wild daffodil (<i>Narcissus pseudonarcissus</i>), snowdrop (<i>Galanthus elwesii/nivalis</i>), bluebell (<i>Hyacinthoides non-scripta</i>), wood anemone (<i>Anemone nemorosa</i>), <i>Crocus</i> species and squill (<i>Scilla bifolia</i>). The bulbs are tossed gently onto the ground and planted where they land to a depth of 3-4 times the height of the bulb. Cut the area in autumn. This allows the bulbs to ripen in the ground and ensures they divide and flower in subsequent years.</p> <p>Further details on how to create wildflower meadows by reseeding a prepared area of bare soil with annual and perennial flowers can be found in this resource from the National Biodiversity Data Centre (https://pollinators.ie/wordpress/wp-content/uploads/2018/04/How-to-guide-Wildflower-Meadows-2018-WEB.pdf) which provides management recommendations depending on the route taken.</p> <p>Critical to meadow creation is the reduction of mowing to once a year. In autumn cut the grass to a very short sward, collect the cuttings for compost and scarify the ground surface to create bare soil using a metal rake. Leave to overwinter. This action will help to keep grasses under control by removing nutrient and will allow wild flowers to naturally seed into the area. An additional task to undertake when the ground is bare is to sow seeds of <i>Rhinanthus minor</i> or hen rattle. This flower has roots that are parasitic on grass roots and this helps to weaken grasses allowing for more wild flowers in the meadow. Hen rattle is known as the meadow maker.</p>
7.6.2	Woodland edge	Develop the woodland edge surrounding the wildflower meadow creating a transition with shrubby woodland between the meadow and the high canopy woodland.
7.6.3	Cherry Laurel	Cherry laurel was noted in the woods along the access route to the picnic area. This should be treated and removed as part of the eradication programme already underway in the woods.
7.6.4	Riparian Zone	Allow the vegetation of wet grassland to develop along the banks of the stream on the southern margin of the picnic area to stabilise the stream bank, to protect the tufa formations on the stream bed and banks and to provide cover for wildlife migrating between the river Moy and the woodland.
7.6.5	Mow grass paths to provide access to picnic tables	Mow grass to a short sward to provide access routes for visitors to the four picnic tables on site.

8 Funding Biodiversity Actions

The following groups provide funding for different aspects of biodiversity enhancement. Further information for each scheme can be found on the relevant organisation's web site.


- Heritage Council Grants Schemes for buildings and management works.
- Waterways and Communities Grant Schemes (see <https://www.waterwaysireland.org/heritage-grant>)
- Community Foundation of Ireland
- Mayo County Council Ballina General Municipal Allocation (GMA) Funding (<https://www.mayo.ie/ballinamd/gmagrant>)
- Mayo County Council Heritage Grant Scheme (<https://www.mayo.ie/heritage/funding>)
- Department of Agriculture, Food and the Marine have a number of funding streams available to local communities including Common Agricultural Policy (CAP) Post 2020: Pillar 2 Infrastructure, Environment and Development Support (The main schemes include GLAS, EIP-AGRI and TAMS).
- Mayo Leader Programme for Community and Integrated Development (see <https://www.mayo.ie/community/development/leader>)
- Ireland Funds Community Development Grants (see <https://www.irelandfunds.org/our-impact/focus-areas/community-development/>)
- Department of Rural and Community Development (see <https://www.gov.ie/en/organisation/departement-of-rural-and-community-development/>)
- Environmental Protection Agency Research and Event Grants (see <https://www.epa.ie/our-services/research/epa--research-funding/>)

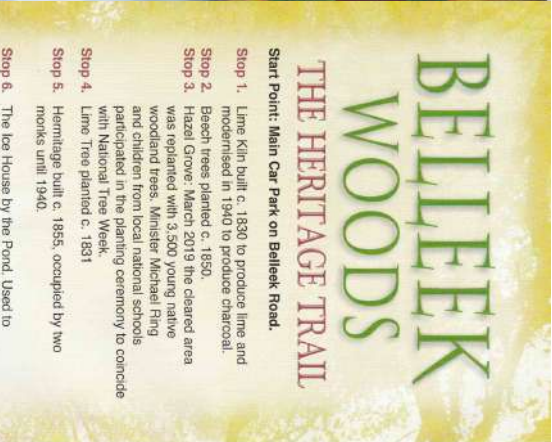
Appendix 1



BELLEEK WOODS

Treasure of North Antrim





THE HERITAGE TRAIL

Start Point: Main Car Park on Belleek Road.

Stop 1. Line Kiln built c. 1830 to produce lime and modernised in 1940 to produce charcoal.

Stop 2. Beech trees planted c. 1830.

Stop 3. Hazel Grove: March 2019 the cleared area was replanted with 3,500 young native woodland trees. Minister Michael Ring and children from local national schools participated in the planting ceremony to coincide with National Tree Week.

Stop 4. Lime Tree planted c. 1831

Stop 5. Hermitage built c. 1855, occupied by two monks until 1940.

Stop 6. The Ice House by the Pond. Used to store ice throughout the year for the preservation of foodstuffs for Belleek Castle, prior to the invention of refrigeration.

Stop 7. The River Moy is regarded as the finest Salmon and Trout River in Ireland. It rises in County Sligo and after a journey of 150 miles enters the sea at Killybegs.

Stop 8. Oak Tree planted c.1720. Tree surgery was carried out in 1986 for safety reasons.

Stop 9. Sycamore tree.

Stop 10. The Fairy Trail: The Fairies were delighted to take up residence in Belleek Woods in 2018 with the assistance of Ballina Men's Shed!

Stop 11. Beech trees planted c. 1975.

Stop 12. Scots Pine planted c. 1950.

Stop 13. This trunk of a chestnut tree gives an idea of the massive trees which once grew here.

Stop 14. Mausoleum over the grave of Baronet Francis Knox Gore who died in 1873. Designed by English architect - P.J. Fuller. It resembles the spire of St. Giles Cathedral in Edinburgh.

Stop 15. Beech tree c. 1831.

Stop 16. Oak tree planted around 1831.

Stop 17. A boulder from the Ice Age.

Stop 18. Yew Tree (Taxus Baccata) planted in 1831. The Gaelic for Co. Mayo - Maighéo, derives from its name - "The Plant of the Yew Tree".

Stop 19. Two Spanish chestnut trees planted c. 1800.

Stop 20. The concrete 'Crestoboon', built in England in 1917 lodged here in 1937. 125 feet long, 27 feet wide and weighs 885 tons. Used by the British Navy for a time.

Stop 21. The Pirate boat is an oak built boat and is resting here since 1937.

Stop 22. Sweet Chestnut Trees, 500 in number, planted in 2001.

Stop 23. Graves of Sir Charles Knox Gore who died in December 1890 and his pet dog Prizette who died in June of the same year.

Stop 24. Ruins of an old boathouse erected c. 1831.

Stop 25. Three Lime Trees planted c. 1830.

Stop 26. Oak Trees planted c. 2001.

Stop 27. The Knox Gore Picnic Area used by the family for over two hundred years.

Stop 28. The Farmine Wall built during the famine 1945 - 1852 to provide employment for locals. The labourers received a bowl of Indian meal for their day's work. This gesture by the landlord helped alleviate suffering and saved lives.

Stop 29. Monterey Pines planted c. 1840 (Upper Trail)

Stop 30. Ring Fort (Upper Trail) Ring Forts are the remains of protected enclosures, dating from the Bronze Age up to early Christian Times.


Stop 31. Oak Trees: 6,000 planted c. 2001 (Upper Trail) Supported by Dep. of Marine and Natural Resources and former Minister Hugh Byrne.

Stop 32. Beech Trees: 4,000 planted 2001 (Upper Trail) Supported by the Tree Council of Ireland.

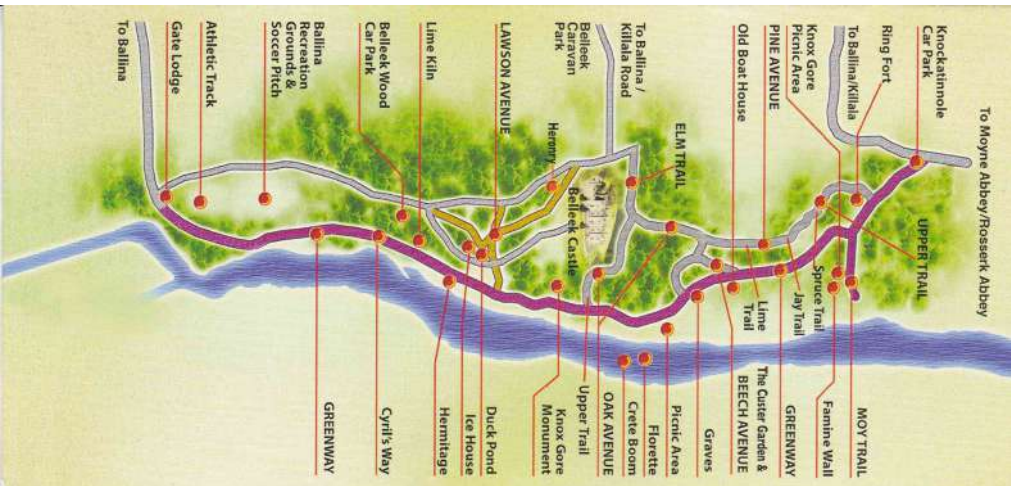
Stop 33. Jack Fern Caille located in the courtyard at Belleek Castle: access from Upper Trail, also the Castle museum is a must see.

Stop 34. Monterey Pine Tree planted c. 1820 near Mausoleum and in view of Belleek Castle.

Visit the beautiful walled heritage garden at the Jackie Clarke Collection on Pearse Street, winner of three International Green Flags.



Wildlife photography by Michelle Macdonald



Founding Chairperson Cyrill Collins with Minister Michael Ring in 2013.

Cyrill sadly passed away in 2020. All who enjoy the beautiful Belleek Woods owe Cyrill and his fellow Belleek Woods Enhancement Committee members a great debt of gratitude for their initiative and commitment in enabling the development and improvement of this wonderful amenity in association with Coillte Teoranta. Cyrill unselfishly devoted endless time and energy to the enhancement of the beautiful woodlands of Belleek and he certainly left the world a better place than he found it. May he Rest in Peace.

Future Planned Developments:

- Renovation and upgrade of the Duck Pond.
- Stabilisation of the Hermitage and Boat House.
- Stabilisation of Coillte's Cottage and replanting of Coillte's Garden adjacent to the graves.
- Replanting of the Wild Flower Meadow.



Belleek or Bael-Liaco. "The Mouth of the Flagstones", was the main crossing point of the downstream River Moy and is still clearly discernible at low tide. The name probably pre-dated that of the settlement established nearby called "Beal Atha An Feadra". "The Ford-Mouth of the Wood". On the West Bank of the River Moy, the remains of the original Castle are still evident.

Belleek Woods was at one time part of the Knox Gore Estate, property of the Knox Gore family (Landlords).

In 1831 Baron Arthur Knox Gore erected Belleek Castle and during his period of ownership of the estate he was responsible for planting over two million trees, mostly Oak, Beech, Ash, Sycamore, Chestnut, Lime, Willow and Yew, many of which are still growing. When the Baron died in 1873, he was at his own request buried in the woodland. His son, Sir Charles, had a finely-carved high monument erected over his grave, now known as the Knox Gore Monument. Sir Charles died in 1890 and he too was buried in the woodland close to the River Moy. His pet dog Phizze was buried beside him. In 1940 a local lumber merchant purchased the estate and harvested most of the giant, hardwoods growing there. The Dept. of Forestry purchased the woodland in 1950 and re-planted it mainly with conifers. Coillte Teoranta took over the running of State Forestry in 1989.

Giant Oak, Beech, Lime, Sycamore, Chestnut, Elm and Yew trees are still to be seen and admired. The decaying wind-blown trees left on the woodland floor provide food and shelter for insect and wildlife. Bluebells, lily, Foxglove, Primrose, Anem, Helleborum (Garden Plant), Lonicera, Hestium (Summer Snow), Wild Garlic, Snowdrops and many other plants. Wildlife in the woodland and along the meadows includes - Foxes, Hares, Rabbits, Pine Martins, Red Squirrels and Otters, etc. Birdlife includes - Grey Herons, Ducks, Cormorants, Sparrowhawks, Magpies, Robins, Kingfishers, Chiffchaffs, Wood Pigeons, Owls, Jays and Thrushes etc. Bats are to be seen at dusk. In 2007 fifteen Red Squirrels were translocated into the Belleek Woodland monitored by Dr. Colin Lawson, Lecturer in Zoology at U.I., Galway.



Belleek Woods is now considered by Coillte Teo as an amenity area. It is expected that within the next 25 years it will become a semi-native woodland.

Since 2007 the Bad Squirrels have increased, and some have now moved on to the other woodlands. Twelve Mallard Ducks released in the woodland pond have increased in number.

Wheelchair access and parking facilities are available at the Belleek Woods.

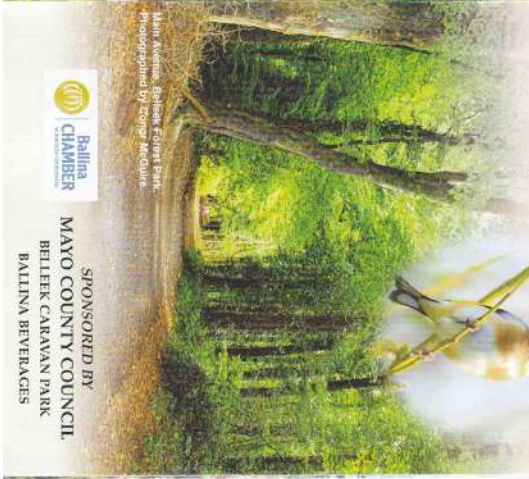
FOR FURTHER INFORMATION CONTACT -

Coillte Teoranta, Monken Castlebar.
Tel: 094 90 29444

Parks Superintendent, Mayo County Council, Ballina.
Tel: 096 78100

Belleek Woods Enhancement Committee.
Tel: 096 79783, 098 8565252, 097 6674483

Awards: 2001 - Winner of the Royal Dublin Society Forestry Service Award.
2013 - Winner of the BODSFS Comraught & Provincial Award.
2015 - Finalist in the LAMA & Council Awards.
Belleek Woodland is an integral part of the Macraorbey Park of the Moy Greenway Project.



Main entrance, Belleek Woods Park, photographed by Seamus MacRiada.

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BELLEEK CAMAAN PARK
BALLINA BEVERAGES



Appendix 2

Belleek Woods Survey Sheet Biodiversity Plan 2022

Site Name

#

Location GPS

Description (Recorders)

Date

Habitats Present and Location

Management

Biodiversity Actions

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Species Name/Sample #													
Acer pseudoplatanus													
Aquilegia vulgaris													
Adjugata reptans													
Aesculus hippocastanum													
Allium triquetrum													
Allium ursinum													
Alnus glutinosa													
Angelica sylvestris													
Anthoxanthum odoratum													
Anthriscus sylvestris													
Arum maculatum													
Asplenium ceterach													
Asplenium scolopendrium													
Asplenium turchomanes													
Bellis perennis													
Betula pubescens													
Brassica rapa													
Buddleja davidii													
Buxus sempervirens													
Calliergonella cuspidata													
Calystegia sepium													
Cardamine pratensis													
Carex nigra													
Carex pendula													
Carpinus betulus													
Choisya ternata													
Chrysosplenium oppositifolium													
Circaea lutetiana													
Cirsium arvense													
Cirsium vulgare													
Conopodium majus													
Corylus avellana													
Crataegus monogyna													
Crocodymia x crocosmiflora													
Cymbalaria muralis													
Dactylus glomerata													
Dryopteris dilatata													
Dryopteris felix-mas													
Epilobium hirsutum													
Equisetum arvense													
Evernia prunastri													
Fagus sylvatica													
Ficaria verna ssp verna													
Filipendula ulmaria													
Fragaria vesca													
Fraxinus excelsior													
Fuchsia magellanica													
Galium aparine													
Geranium robertianum													
Glechoma hederacea													
Geum urbanum													
Geranium lucidum													
Glechoma hederacea													
Glyceria maxima													
Hedera helix													
Heracleum sphondylium													
Holcus lanatus													
Hyacinthoides hispanica													
Hyacinthoides non scripta													
Hypericum androsaemum													
Ilex aquifolium													
Iris pseudacorus													
Jacobaea vulgaris													
Juncus effusus													
Larix decidua													
Lemna minor													
Leucanthemum vulgare													
Lonicera periclymenum													
Luzula multiflora													
Lychnis flos-flocculi													
Lysimachia punctata													
Malus sylvestris													

<i>Medicago lupulina</i>										
<i>Oxalis acetosella</i>										
<i>Parmelia caperata</i>										
<i>Petasites pyrenaicus</i> (I)										
<i>Picea abies</i>										
<i>Pinus lawsonii</i>										
<i>Pinus sylvestris</i>										
<i>Plantago lanceolata</i>										
<i>Plantago major</i>										
<i>Poa annua</i>										
<i>Polypodium vulgare</i>										
<i>Potentilla anserina</i>										
<i>Primula vulgaris</i>										
<i>Prunella vulgaris</i>										
<i>Prunus laurocerasus</i>										
<i>Prunus padua</i>										
<i>Prunus serrulata</i>										
<i>Pteridium aquilinum</i>										
<i>Quercus robur</i>										
<i>Ramalina fastigiata</i>										
<i>Ranunculus acris</i>										
<i>Ranunculus repens</i>										
<i>Reynoutria japonica</i> (I)										
<i>Rhododendron ponticum</i> (I)										
<i>Rhytiadelphus triquetrus</i>										
<i>Rosa canina</i>										
<i>Rubus fruticosus</i> agg										
<i>Rubus idaeus</i>										
<i>Rosa rugosa</i>										
<i>Rumex obtusifolius</i>										
<i>Salix alba</i>										
<i>Salix cinerea</i>										
<i>Sambucus nigra</i>										
<i>Scrophularia auriculata</i>										
<i>Senecio vulgaris</i>										
<i>Silene dioica</i>										
<i>Sonchus oleraceus</i>										
<i>Sorbus aucuparia</i>										
<i>Sorbus hibernica</i>										
<i>Symphoricarpos albus</i> (I)										
<i>Syringa vulgaris</i>										
<i>Tanacetum parthenium</i>										
<i>Taraxacum officinale</i>										
<i>Taxus baccata</i>										
<i>Thuidium tamariscinum</i>										
<i>Tilia cordata</i>										
<i>Trifolium pratense</i>										
<i>Trifolium repens</i>										
<i>Ulex europaeus</i>										
<i>Ulmus glabra</i>										
<i>Urtica dioica</i>										
<i>Usnea subfloridana</i>										
<i>Veronica beccabunga</i>										
<i>Veronica chamaedrys</i>										
<i>Viburnum opulus</i>										
<i>Vicia sepium</i>										
<i>Vinca major</i>										
<i>Viola riviniana</i>										
<i>Xanthoria parietina</i>										

Appendix 3 Biodiversity Enhancement for the greenway and grassland habitat to the north and south of Belleek Woods

A. Ballina to Killala Greenway at the northern entrance to Belleek Woods

Construction works have recently been completed on the greenway cycle route from Ballina to Killala which can be picked up from the Knockatinnole car park in Belleek Woods (see Plate A).



Plate A: view of the new cycle route adjacent to Belleek woods. The agricultural land to the left has been fenced off as has the hedgerow to the right hand side in the photograph. The sides of the route are dressed with loose stones onto which grasses are colonising. Photo: © C. O'Connell.

Current Status and Biodiversity Present: agricultural land and an existing hedgerow and wet ditch have been fenced off to the west and east of the greenway respectively to enable the construction of a safe cycling route from Ballina to Killala. The fence posts are wooden and measure 2m tall. Between each fence post there is wire mesh. The sides of the route are dressed with loose stones onto which grasses are colonising. Table A makes suggestions on how this area can be enhanced for biodiversity through the retention of existing features such as the hedgerow and the wetland plants occurring in the ditch associated with the hedgerow. These actions will make the greenway an attractive place for both cyclists and wildlife and will help to offset the footprint made by this amenity project on the landscape.

Table A: Biodiversity Enhancement measures for the Ballina to Killala Greenway

Number	Biodiversity Action	Notes
A1	Wild flower meadow development on the greenway margin adjacent to the agricultural land	Typically loose stones can provide an infertile habitat ideally suited to the development of a pollinator friendly wild flower meadow. The National Biodiversity Data Centre have a guide on how to achieve a thriving wild flower meadow which can be accessed from this link: (https://www.biodiversityireland.ie/wordpress/wp-content/uploads/Pollinator-friendly-planting-code-temporary-draft.pdf).
A2	Screening of post and wire mesh fencing	The post and wire mesh fencing provides a framework for climbing plants which would provide screening for this necessary structure which is not very attractive. The following species could be used: <i>Clematis montana</i> , <i>Lonicera periclymenum</i> (honeysuckle), <i>Rosa canina</i> (wild rose), <i>Rubus fruticosus</i> (bramble), <i>Rubus idaeus</i> (raspberry) and <i>Hedera helix</i> (ivy). In addition the following shrubs may be considered although they are not regarded as native: <i>Pyracantha coccinea</i> (red berries) and Cotoneaster.
A3	Maintain existing hedgerow	The hedgerow occurring on the eastern side of the greenway is a great biodiversity asset and should be retained. Some of the hedgerow shrubs have matured to form trees. These should be retained as they provide food and nesting sites for birds.
A4	Hedgerow management best practice	Where hedges are planted or being managed along the greenway please note the following advice from a biodiversity perspective. The ideal hedgerow for wildlife is tall, wide and dense at the base, with a wide, uncultivated, grassy margin. Trim all existing hedges to an “A” shape, wide at the bottom and narrow at the top. Allow the upper part of the hedge to produce flowers and fruit for wildlife. Encourage some trees within the hedge to mature so as to create an attractive tree line along the greenway. Please note that hedge cutting between 1st March and 31st August is prohibited under the Wildlife Act as this is the bird nesting season. Avoid cutting all of the hedgerows at once, consider a 3-5 year rotation to allow flowers and berries to grow in alternate sections. Gradually reduce cutting intensity each year to allow your hedgerow to expand and diversify. This is especially relevant for young hedges which are just getting established. For more advice on the frequency of hedgerow trimming please visit https://www.farmingfornature.ie/resources/best-practice-guides/hedgerow-management/ .
A5	Wetland/marsh plant pockets associated with the ditch in the hedgerow.	The ditch associated with the hedgerow to the east of the greenway is a valuable asset and a habitat for species that prefer wet conditions. This feature should be protected and retained. It is a naturally sustainable feature that does not require regular mowing or other measures.

B: Grassland habitat south of Belleek Woods between the River Moy and the Soccer Pitch

Ballina Town Council have expressed an interest in planting a new area of woodland adjacent to Belleek Woods in the interest of biodiversity (see Plate B).



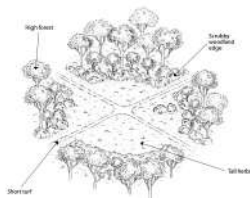

Plate B: Meadow habitat along the banks of the Moy River owned and maintained by Ballina Town Council. This area has the potential to be developed as a wet Alder Woodland. A grass strip is mowed along the path edge and there are paths through the long grass. In the past oak trees have been planted. Photo: © C. O'Connell.

Current Status and Biodiversity Present: the site was walked over on the 5th of September 2022 to determine its species and habitat composition. The habitat present is wet grassland on the slopes grading into willow scrub and reed beds along the banks of the river. Young alder trees were noted in the area that have naturally colonised this habitat. The species composition of the grassland was typical of wet soils and included a variety of mosses, rushes and sedges as well as plants typical of damp grassland such as silverweed, birds foot trefoil, red clover, slender St John's Wort, self heal, water figwort, dock and devil's bit scabious.

A wet woodland dominated by Alder (*Alnus glutinosa*) with birch (*Betula pubescens*) is proposed for this site. Wet woodlands are rare in Ireland and the site and soil here may be suited to such a development. However this does not mean planting rows upon rows of alder trees to form a plantation style woodland. Rather it is recommended that the following guidelines be followed: see <https://www.woodlands.co.uk/owning-a-wood/managing-your-woodland-for-wildlife/>. As well as tree planting, open areas must also be included which are sheltered and warm and which can greatly enhance wildlife within the wet woodland.

Table B suggests a number of recommendations for the structure of the proposed Alder woodland.

Table B: wet woodland development proposals for the meadow south of Belleek Woods

Number	Biodiversity Action	Photo	Notes
B1	Create open glade areas surrounded by wet woodland habitat		The existing wet grassland habitat is valuable for biodiversity and at least 20% of the space should be retained as open glade areas for wildlife. Open areas within the wood are valuable for wildlife providing warm and sheltered conditions. The image shows a large glade created at the intersection of two forest paths
B2	Plant native Irish alder (<i>Alnus glutinosa</i>) and birch (<i>Betula pubescens</i>) trees of different ages to create an un-even aged woodland structure		Avoid planting all trees of similar age. Better to purchase some mature trees in addition to younger trees. Retain young alder seedlings that are already colonising the area.
B3	Create woodland edge habitat along woodland paths		Create woodland access paths and plant and manage the edges of the paths so that there are 3 or more wildlife zones e.g. short grass, long flowering meadow, dwarf shrub and mature trees.
B4	Retain willow and reed bed habitat along river margin		Willow and reeds occur as a natural barrier along the river. These should be retained and allowed to spread naturally.

See <https://www.woodlands.co.uk/owning-a-wood/managing-your-woodland-for-wildlife/> for more information

Appendix 4: Birds, Wildlife and Plant Life Recorded in Belleek Woods during the development of the Community Biodiversity Plan 2022-2026

Recorder Name	Species Name	Coordinates Latitude	Coordinates Longitude	Location Name	Date	Abundance	Habitat (Fossitt where possible)	Comment	Determiner Name
Catherine O'Connell	Anas platyrhynchos	54.130288	-9.141512	Belleek Woods, Co. Mayo	23/05/2022	11	FL8		Catherine O'Connell
Catherine O'Connell	Bombus pascuorum	54.141265	-9.143104	Belleek Woods, Co. Mayo	04/09/2022	1	GS2		Catherine O'Connell
Catherine O'Connell	Bombus pascuorum	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022	1	GS4		Catherine O'Connell
Catherine O'Connell	Corvus cornix	54.141265	-9.143104	Belleek Woods, Co. Mayo	23/05/2022	3	GA2		Catherine O'Connell
Catherine O'Connell	Corvus monedula	54.130288	-9.141512	Belleek Woods, Co. Mayo	23/05/2022	1	FL8		Catherine O'Connell
Catherine O'Connell	Columba palumbus	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022	1	WS2		Catherine O'Connell
Catherine O'Connell	Columba palumbus	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022	3 birds flew over	GS4		Catherine O'Connell
Catherine O'Connell	Columba palumbus	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022	1	WD2/WD3		Catherine O'Connell
Catherine O'Connell	Cyanistes caeruleus	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022	1	WD2/WD3		Catherine O'Connell
Catherine O'Connell	Cyanistes caeruleus	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022	1	WS1		Catherine O'Connell
Catherine O'Connell	Erithacus rubecula	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022	1	WD2/WD3		Catherine O'Connell
Catherine O'Connell	Helophilus pendulus	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022	1	GS4		Catherine O'Connell
Catherine O'Connell	Larus ridibundus	54.130288	-9.141512	Belleek Woods, Co. Mayo	23/05/2022	14	FL8		Catherine O'Connell
Catherine O'Connell	Motacilla cinerea	54.130288	-9.141512	Belleek Woods, Co. Mayo	23/05/2022	4	FL8		Catherine O'Connell
Catherine O'Connell	Parage aegeria	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022	4	WD2/WD3		Catherine O'Connell
Catherine O'Connell	Pardosa lugubris	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022	2, 1 with egg ba	GS4		Catherine O'Connell
Catherine O'Connell	Parus major	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022	1	WD2/WD3		Catherine O'Connell
Catherine O'Connell	Parus major	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022	1	WS1		Catherine O'Connell
Catherine O'Connell	Philaenus spumarius	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022	1	GS4		Catherine O'Connell
Catherine O'Connell	Phylloscopus collybita	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022	1 heard	WD2/WD3		Catherine O'Connell
Catherine O'Connell	Pyrrhosoma nymphula	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022	1	FP1		Catherine O'Connell
Catherine O'Connell	Pyrrhula pyrrhula	54.749998	-9.832352	Belleek Woods, Co. Mayo	23/05/2022	2	WD2/WD3		Catherine O'Connell
Catherine O'Connell	Regulus regulus	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Salmo trutta	54.130288	-9.141512	Belleek Woods, Co. Mayo	23/05/2022	4	FL8		Catherine O'Connell
Catherine O'Connell	Sturnus vulgaris	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022	4	WD2/WD3		Catherine O'Connell
Catherine O'Connell	Turdus merula	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Turdus merula	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022	1	GS2		Catherine O'Connell
Catherine O'Connell	Turdus philomelos	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022	1	GS2		Catherine O'Connell
Catherine O'Connell	Troglodytes troglodytes	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022	1	WS2		Catherine O'Connell
Catherine O'Connell	Acer pseudoplatanus	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Acer pseudoplatanus	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Acer pseudoplatanus	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Acer pseudoplatanus	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Acer pseudoplatanus	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Aquilegia vulgaris	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Adjug reptans	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Aesculus hippocastanum	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Aesculus hippocastanum	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Allium ursinum	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Alnus glutinosa	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Alnus glutinosa	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Anthoxanthum odoratum	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Arum maculatum	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Arum maculatum	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Arum maculatum	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Asplenium scolopendrium	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Asplenium scolopendrium	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell

Catherine O'Connell	Asplenium scolopendrium	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Asplenium scolopendrium	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		GS2		Catherine O'Connell
Catherine O'Connell	Asplenium turchomanes	54.141399	-9.142818	Belleek Woods, Co. Mayo	04/09/2022		BL1		Catherine O'Connell
Catherine O'Connell	Bellis perennis	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Bellis perennis	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Betula pubescens	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Betula pubescens	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Blechnum spicant	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Buddleja davidii	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Calliergonella cuspidata	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Calliergonella cuspidata	54.141265	-9.143104	Belleek Woods, Co. Mayo	04/09/2022		GA2		Catherine O'Connell
Catherine O'Connell	Calystegia sepium	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Cardamine pratensis	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		GS2		Catherine O'Connell
Catherine O'Connell	Carex nigra	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Carex pendula	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Carex pendula	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Centaurea nigra	54.141265	-9.143104	Belleek Woods, Co. Mayo	04/09/2022		GS2		Catherine O'Connell
Catherine O'Connell	Chrysosplenium oppositifolium	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Chrysosplenium oppositifolium	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Chrysosplenium oppositifolium	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Chrysosplenium oppositifolium	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Circaea lutetiana	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Circaea lutetiana	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Circaea lutetiana	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		GS2		Catherine O'Connell
Catherine O'Connell	Cirsium arvense	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Conopodium majus	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Corylus avellana	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		WS1		Catherine O'Connell
Catherine O'Connell	Corylus avellana	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Corylus avellana	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Crataegus monogyna	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Crataegus monogyna	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Crataegus monogyna	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Crataegus monogyna	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Crococsmia x crocosmiiflora	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Crococsmia x crocosmiiflora	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Dactylus glomerata	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Dactylus glomerata	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Dryopteris dilatata	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Dryopteris dilatata	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Dryopteris dilatata	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		GS2		Catherine O'Connell
Catherine O'Connell	Dryopteris dilatata	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Dryopteris dilatata	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Dryopteris felix-mas	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Dryopteris felix-mas	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Dryopteris felix-mas	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Dryopteris felix-mas	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Equisetum arvense	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Evernia prunastri	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022	Epiphytic	WS2		Catherine O'Connell
Catherine O'Connell	Fagus sylvatica	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell

Catherine O'Connell	<i>Fagus sylvatica</i>	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Fagus sylvatica</i>	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Ficaria verna ssp verna</i>	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Ficaria verna ssp verna</i>	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	<i>Filipendula ulmaria</i>	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Filipendula ulmaria</i>	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	<i>Filipendula ulmaria</i>	54.141265	-9.143104	Belleek Woods, Co. Mayo	04/09/2022		GS4		Catherine O'Connell
Catherine O'Connell	<i>Fragaria vesca</i>	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Fragaria vesca</i>	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		GS2		Catherine O'Connell
Catherine O'Connell	<i>Fraxinus excelsior</i>	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Fraxinus excelsior</i>	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Fraxinus excelsior</i>	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022	Infected with ash	WS2		Catherine O'Connell
Catherine O'Connell	<i>Frullania dilatata</i>	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Frullania dilatata</i>	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Fuchsia magellanica</i>	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Galium aparine</i>	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Geranium robertianum</i>	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Geranium robertianum</i>	54.141265	-9.143104	Belleek Woods, Co. Mayo	23/05/2022		GA2		Catherine O'Connell
Catherine O'Connell	<i>Geranium robertianum</i>	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		GS2		Catherine O'Connell
Catherine O'Connell	<i>Geum urbanum</i>	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Geum urbanum</i>	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Geum urbanum</i>	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		GS2		Catherine O'Connell
Catherine O'Connell	<i>Geum urbanum</i>	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Glechoma hederacea</i>	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Glyceria maxima</i>	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		FS1		Catherine O'Connell
Catherine O'Connell	<i>Hedera helix</i>	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Hedera helix</i>	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Hedera helix</i>	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Hedera helix</i>	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	<i>Heracleum spondylium</i>	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Holcus lanatus</i>	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	<i>Holcus lanatus</i>	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		GS2		Catherine O'Connell
Catherine O'Connell	<i>Holcus lanatus</i>	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	<i>Hyacinthoides non scripta</i>	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Hypericum androseum</i>	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Ilex aquifolium</i>	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Ilex aquifolium</i>	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Ilex aquifolium</i>	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Iris pseudacorus</i>	54.141265	-9.143104	Belleek Woods, Co. Mayo	23/05/2022		GA2		Catherine O'Connell
Catherine O'Connell	<i>Jacobaea vulgaris</i>	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	<i>Jacobaea vulgaris</i>	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		GS2		Catherine O'Connell
Catherine O'Connell	<i>Juncus effusus</i>	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	<i>Juncus effusus</i>	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	<i>Juncus effusus</i>	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	<i>Larix decidua</i>	54.131476	-9.144691	Belleek Woods, Co. Mayo	23/05/2022				Catherine O'Connell
Catherine O'Connell	<i>Lathyrus pratensis</i>	54.141265	-9.143104	Belleek Woods, Co. Mayo	04/09/2022		GS2		Catherine O'Connell
Catherine O'Connell	<i>Lemna minor</i>	54.130288	-9.141512	Belleek Woods, Co. Mayo	23/05/2022		FL8		Catherine O'Connell
Catherine O'Connell	<i>Leucanthemum vulgare</i>	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	<i>Leycesteria formosa</i>	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		WS1	Potentially Invasive	Catherine O'Connell

Catherine O'Connell	Leycesteria formosa	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3	Potentially Invasive	Catherine O'Connell
Catherine O'Connell	Lonicera periclymenum	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Luzula multiflora	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Lychnis flos-flocculi	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Lysimachia punctata	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Medicago lupulina	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Mentha aquatica	54.141265	-9.143104	Belleek Woods, Co. Mayo	04/09/2022		GS2		Catherine O'Connell
Catherine O'Connell	Oxalis acetosella	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2		Catherine O'Connell
Catherine O'Connell	Parmelia caperata	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Petasites pyrenaicus	54.749091	-9.830912	Belleek Woods, Co. Mayo	23/05/2022	pond edge	FL8		Catherine O'Connell
Catherine O'Connell	Petasites pyrenaicus	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Picea abies	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Picea abies	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Picea abies	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Pinus lawsonii	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Pinus sylvestris	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Pinus sylvestris	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Pinus sylvestris	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Plantago lanceolata	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Plantago lanceolata	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Plantago lanceolata	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		GS2		Catherine O'Connell
Catherine O'Connell	Polypodium vulgare	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Polypodium vulgare	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Polypodium vulgare	54.141399	-9.142818	Belleek Woods, Co. Mayo	04/09/2022		BL1		Catherine O'Connell
Catherine O'Connell	Potentilla anserina	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Potentilla anserina	54.141265	-9.143104	Belleek Woods, Co. Mayo	04/09/2022		GA2		Catherine O'Connell
Catherine O'Connell	Primula vulgaris	54.141265	-9.143104	Belleek Woods, Co. Mayo	23/05/2022		GA2		Catherine O'Connell
Catherine O'Connell	Prunella vulgaris	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		GS2		Catherine O'Connell
Catherine O'Connell	Prunella vulgaris	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Prunus laurocerasus	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Prunus laurocerasus	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Prunus laurocerasus	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		WS1		Catherine O'Connell
Catherine O'Connell	Prunus laurocerasus	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Prunus spinosa	54.141399	-9.142818	Belleek Woods, Co. Mayo	04/09/2022		BL1		Catherine O'Connell
Catherine O'Connell	Pteridium aquilinum	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Pulicaria dysenterica	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Quercus robur	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Quercus robur	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Ramalina fastigiata	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022	Epiphytic	WS2		Catherine O'Connell
Catherine O'Connell	Ranunculus acris	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Ranunculus repens	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Ranunculus repens	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		GS2		Catherine O'Connell
Catherine O'Connell	Ranunculus repens	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Ranunculus repens	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Reynoutria japonica	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Reynoutria japonica	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022	Invasive	GS4		Catherine O'Connell
Catherine O'Connell	Rhododendron ponticum	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022	Invasive	GS4		Catherine O'Connell
Catherine O'Connell	Rhododendron ponticum	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022	Invasive	WD2/WD3		Catherine O'Connell
Catherine O'Connell	Rhododendron ponticum	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022	Invasive	WD2/WD3		Catherine O'Connell

Catherine O'Connell	Rhynchospora alba	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Rubus fruticosus agg	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Rubus fruticosus agg	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Rubus fruticosus agg	54.739263	-9.840763	Belleek Woods, Co. Mayo	24/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Rubus fruticosus agg	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Rubus fruticosus agg	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		WS1		Catherine O'Connell
Catherine O'Connell	Rubus fruticosus agg	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Rubus idaeus	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		WS1		Catherine O'Connell
Catherine O'Connell	Rubus idaeus	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Rumex obtusifolius	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Rumex obtusifolius	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Rumex obtusifolius	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		GS2		Catherine O'Connell
Catherine O'Connell	Salix alba	54.136763	9.140823	Belleek Woods, Co. Mayo	23/05/2022		FS1		Catherine O'Connell
Catherine O'Connell	Salix cinerea	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Salix cinerea	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Salix cinerea	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Sambucus nigra	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Scrophularia auriculata	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Scrophularia auriculata	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Scrophularia auriculata	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		GS2		Catherine O'Connell
Catherine O'Connell	Silene dioica	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Sorbus aucuparia	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Tanacetum parthenium	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Taraxacum officinale	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Taraxacum officinale	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Taraxacum officinale	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Taraxacum officinale	54.132483	-9.141861	Belleek Woods, Co. Mayo	23/05/2022		GS2		Catherine O'Connell
Catherine O'Connell	Taxus baccata	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Thuidium tamariscinum	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Tilia cordata	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Trifolium pratense	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Trifolium repens	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Ulmus glabra	54.131476	-9.144691	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Urtica dioica	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Urtica dioica	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Usnea subfloridana	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022	Epiphytic	WS2		Catherine O'Connell
Catherine O'Connell	Veronica beccabunga	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		FP1		Catherine O'Connell
Catherine O'Connell	Veronica beccabunga	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		FS1		Catherine O'Connell
Catherine O'Connell	Veronica chamaedrys	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Veronica chamaedrys	54.128562	-9.143473	Belleek Woods, Co. Mayo	24/05/2022		WS2		Catherine O'Connell
Catherine O'Connell	Vicia cracca	54.141265	-9.143104	Belleek Woods, Co. Mayo	04/09/2022		GS2		Catherine O'Connell
Catherine O'Connell	Vicia sepium	54.833143	-9.846721	Belleek Woods, Co. Mayo	23/05/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Vicia sepium	54.136763	-9.140823	Belleek Woods, Co. Mayo	23/05/2022		GS4		Catherine O'Connell
Catherine O'Connell	Viola riviniana	54.833143	-9.846721	Belleek Woods, Co. Mayo	04/09/2022		WD2/WD3		Catherine O'Connell
Catherine O'Connell	Xanthoria parietina	54.141399	-9.142818	Belleek Woods, Co. Mayo	04/09/2022		BL1		Catherine O'Connell