Biodiversity Survey
and
Biodiversity and Habitat Management Plan for Balrath Woods, Navan, Co. Meath

September 2025



Tree Council of Ireland

comhairle chontae na mí
meath county council

COILLTE

Finalised September 2025 by:



Forest, Environmental Research and Services Ltd. (www.fers.ie)
Sillogue,
Kilberry,
Navan
Co. Meath

Dr. Emma Reeves, Senior Ecologist

emma.reeves@fers.ie

Executive Summary

Although referred to as Balrath Woods, the survey area is traditionally known as Knockcomra Wood and is located in the townland of Burtonstown, which distinguishes it from the areas of woodland in the neighbouring townlands of Danestown and Flemingstown. Collectively these three woodlands are referred to as the Balrath Woods or Somerville Woods. The woodland comprises an area of approximately 22 Ha, the majority of which is Mixed Broadleaved Woodland (WD1) and Mixed Broadleaved/Conifer Woodland (WD2) with some elements of Oak-Ash-Hazel woodland (WN2) and Wet Willow-Alder-Ash woodland (WN6) occurring where conditions allow. Much of the area characterised as Immature Woodland (WS2) in the 2007 survey has developed into WN2 also, although this habitat is now at some risk, owing to an apparent widespread infection with Ash dieback.

The woodland ride habitat has been replaced by scrub owing to the lack of regular management and maintenance activity. There is also a prevalence of naturalised and exotic species present which can negatively impact woodland biodiversity and habitat. One of the primary threats to the ecological integrity of the woodland is over-use of the habitat by both humans and dogs, with a large number of desire lines pervasive throughout the habitat and considerable disturbance of the ground and field layers reducing the stratification needed for a fully functioning woodland ecosystem. The degree of disturbance is reflected in the relatively poor faunal and avifaunal diversity and the lack of sufficient ride and glade habitats are almost certainly impacting negatively overall biodiversity.

The key recommendations relate to:

- Maintaining and managing a broadleaved woodland onsite in perpetuity (as set out in the lease agreement with Coillte) with the goal to enhance biodiversity overall.
- Reinstating and maintaining ride habitats to enhance invertebrate, floral and avifaunal diversity.
- Investigating the possibility of creating a functioning wetland system.
- Ensuring members of the public are restricted to the designated walking areas – i.e., the network of pathways.
- Prohibition of dogs from the woodland in order to remove the disturbance pressure on wildlife caused by dogs and the associated health and safety risks.

Contents

1 Introduction 5
1.1 FERS Company Background 5
1.2 Aims of this report 5
1.3 Ecosystem services provided by Balrath Woods 6
1.3.1 Carbon storage 6
1.3.2 Human Health and well-being 6
1.3.3 Timber 6
1.3.4 Non-timber forest products 7
2 Baseline Biodiversity Survey 7
2.1 Methodology 7
2.1.1 Desk study 7
2.1.2 History 7
2.1.3 Existing data 10
2.1.4 General description of existing conditions on site 15
2.1.5 Field Surveys 19
2.1.6 Avifauna Surveys 21
2.1.7 Amphibian Survey 23
2.1.8 General (non-volant) Mammal surveys 23
2.1.9 Bat Surveys 24
2.1.10 Incidental records 26
2.2 Results - Field Surveys 27
2.2.1 Botanical/Habitat surveys 27
2.3 Invasive Species surveys 36
2.4 Bird Surveys 37
2.4.1 General (breeding) bird surveys 37
2.4.2 Songmeter Micro recordings (SMM) – August/September 40
2.5 Amphibian survey 44
2.6 General (non-volant) Mammal surveys 45
2.7 Bat surveys 48
2.7.1 Emergence/dawn survey 48
2.7.2 Passive Ultrasound Monitors 48
2.8 Incidental Observations 49
3 Habitat Management and Recommendations 53

3.1 The Mixed broadleaved woodland habitat (WD1) 53
3.2 The Mixed broadleaved/conifer woodland (WD2) 54
3.3 The Oak-Ash-Hazel woodland (WN2) 54
3.4 The Wet Willow-Alder-Ash woodland (WN6) 55
3.5 The Ride habitat, Dry meadow and Grassy Verge (GS2) 55
3.6 The Artificial Pond (FL8) 56
3.7 The Wet Drains and Ditches (FL8) 57
3.8 Desire lines 57
3.9 Connectivity 57
3.10 Invasive species 58
3.11 Dogs 58
3.12 Veteran Tree 59
3.13 Future Monitoring 60
3.14 Tree Nursery 60
3.15 Climate resilience 61
3.16 Changing behaviour 61
4 References and Bibliography 64
5 Appendices 66
5.1 List of species recorded in NBDC database within Burtonstown townland 66
5.2 List of plant species recorded in Balrath woods during the survey period 71
5.3 List of plant species appearing on the Third Schedule (as amended by SI 355/2015) . 74
5.4 Reléves 76

1 Introduction

1.1 FERS Company Background

Forest, Environmental Research and Services have been conducting ecological surveys and research since the company's formation in 2005 by Dr Patrick Moran and Dr Kevin Black. Dr Moran, the principal ecologist and GIS analyst with FERS, holds a 1st class honours degree in Environmental Biology (UCD), a Ph.D. in Ecology (UCD), a Diploma in EIA and SEA management (UCD), a Diploma in Environmental and Planning Law (King's Inn), a M.Sc. in Geographical Information Systems (University of Ulster, Coleraine) and a M.Sc. in Environmental and Climate Law (UCD). Patrick has in excess of 20 years of experience undertaking ecological surveys on both an academic and a professional basis. Dr Kevin Black, Principal Forest Ecologist and GIS analyst with FERS has an honours degree in Biology (University of Durban, South Africa), a Ph.D. in ecology (UCD) and a M.Sc. in Geographical Information Systems (GIS) (University of Ulster, Coleraine). Dr Emma Reeves, senior ecologist with FERS holds a 1st class honours degree in Botany, and a Ph.D. in Botany. She has recently completed an Advanced Diploma in Planning and Environmental Law with Kings Inns. Emma has in excess of 15 years of experience in undertaking ecological surveys on an academic and professional basis. Ciarán Byrne, senior ecologist with FERS holds a 1st class honours degree in Environmental Management (DIT) and a M.Sc. in Applied Science/Ecological Assessment (UCC). Ciarán has in excess of 10 years of experience in undertaking ecological surveys on both an academic and a professional basis. Senan Clynch joined the company in early 2024 as Junior Ecologist. Senan holds an Honours degree in Environmental Science from TCD and an Advanced Diploma in Planning and Environmental Law (Kings Inns).

1.2 Aims of this report

The primary aim of this report is to provide baseline ecological data for Balrath Woods, Navan, Co. Meath. Following a comprehensive assessment of the biodiversity of the site the findings of which will inform a Biodiversity Management Plan and an Overall Woodland Management Plan. The Biodiversity Management Plan will guide future works and projects on site to achieve the greatest biodiversity net gains.

The primary aims of the Baseline Biodiversity Survey were:

- To survey habitats, flora, and fauna within the study area;
- To assess the potential presence, distribution and conservation status of ecological habitats and species of flora/fauna within the study area;
- To highlight elements of specific potential for biodiversity or conservation interest.
- To highlight elements with the potential to damage the ecological integrity of the study area, such as Alien Invasive Plant Species.

- To identify the potential presence and effectiveness of ecological corridors within the study area and linking the study area to adjoining areas of potential biodiversity interest that can inform the development of any Green Infrastructure Network.
- To assess and make recommendations on conservation priorities regarding the identified biodiversity resource of the site.
- To make recommendations regarding further surveys required, future habitat management and ecological monitoring at the site; and
- Where potential impacts are identified, detailed and comprehensive mitigation measures will be proposed, which will include avoidance of an element(s) if, and where deemed necessary.

1.3 Ecosystem services provided by Balrath Woods

There are several ecosystem services offered by Balrath wood and each has its own importance in terms of natural capital. Management for multiple ecosystem services can be challenging; trade-offs and compromises are often required to achieve a practicable and feasible biodiversity management plan.

1.3.1 Carbon storage

Balrath woods contains several different woodland habitats including native, mixed broadleaf and conifer woods. Through photosynthesis, carbon is trapped in the timber as a natural carbon sink, as leaves fall and trees die carbon is sequestered, long term, into the woodland soils, maintaining the woodland ecosystem. Continued tree planting (as outlined in the future management procedures) will enhance this ecosystem service if appropriate trees are allowed to regenerate in the correct areas of the woods. Planting non-native conifers in wet areas can lead to greater soil carbon emissions. Continued woodland habitat on-site ultimately contributes affirmatively to the Ireland's goal to reduce carbon emissions. From 2001 to 2022, Meath has lost 922 ha of tree cover, which underlines the importance of Balrath woods in the Meath context.

1.3.2 Human Health and well-being

Balrath woods is a very popular destination for walkers. Woods are very popular places for walkers as they offer shade and shelter from the elements, trees cut down noise and are often quieter than open habitats. Well-being is induced by responses to species traits (Fisher *et. al,* 2023) such as the awe that is inspired by the veteran Beech tree or by the croaking of mating frogs in the pond in late February.

1.3.3 Timber

Timber production at Balrath is not done on a commercial basis. Natural capital cannot be determined via production rates but rather must be determined through the trees' contribution to biodiversity at the woods. It is unlikely that many of the species of plant, invertebrate, mammal or bird would exist on site were it not for the trees. Ravens and Jays frequent the tallest conifers and migratory Fieldfare and Redwing rely on the fruit produced by Hawthorn and Blackthorn. Preserving the woods is key to maintain biodiversity at Balrath woods.

1.3.4 Non-timber forest products

The woodland produces fruits and nuts such as Hazelnuts, Chestnut, Blackberry and Raspberries but being a small wood these are probably best left to the wildlife. The woods' most accessible product is education. The wood provides all the resources required to educate a range of age groups on the importance of biodiversity and the respect it should be given in terms of our future.

2 Baseline Biodiversity Survey

2.1 Methodology

2.1.1 Desk study

2.1.1.1 General background information

Balrath Woods has no formal designation and is not a part of the nearby Balrath woods proposed Natural Heritage Area (Site code 001579). Although there is very limited protection associated with this designation, the proposed Natural Heritage Area (pNHA) network of sites provides a ready-built database of sites of natural heritage interest that could contribute to the target of 30% land territory being protected. This is evidenced in the recent designation of a National Park at Dowth, contained within which is a pNHA (Dowth Wetlands pNHA). A future designation of Balrath Woods (the portion studied here) as a pNHA could highlight and strengthen the potential importance of this site as regards not only biodiversity, but also in terms of Climate Action. The site is owned by Coillte and leased to the Tree Council of Ireland and Meath County Council.

2.1.2 History

An examination of historic mapping (1st Edition OSI, 2nd Edition OSI and 25") indicates the extent of the woodland since the 1830s making it a long-established woodland. The 1st Edition OSI mapping indicates that the forest present at this time was primarily coniferous (see Figure 1) and only covered approximately two-thirds of what is there area today.

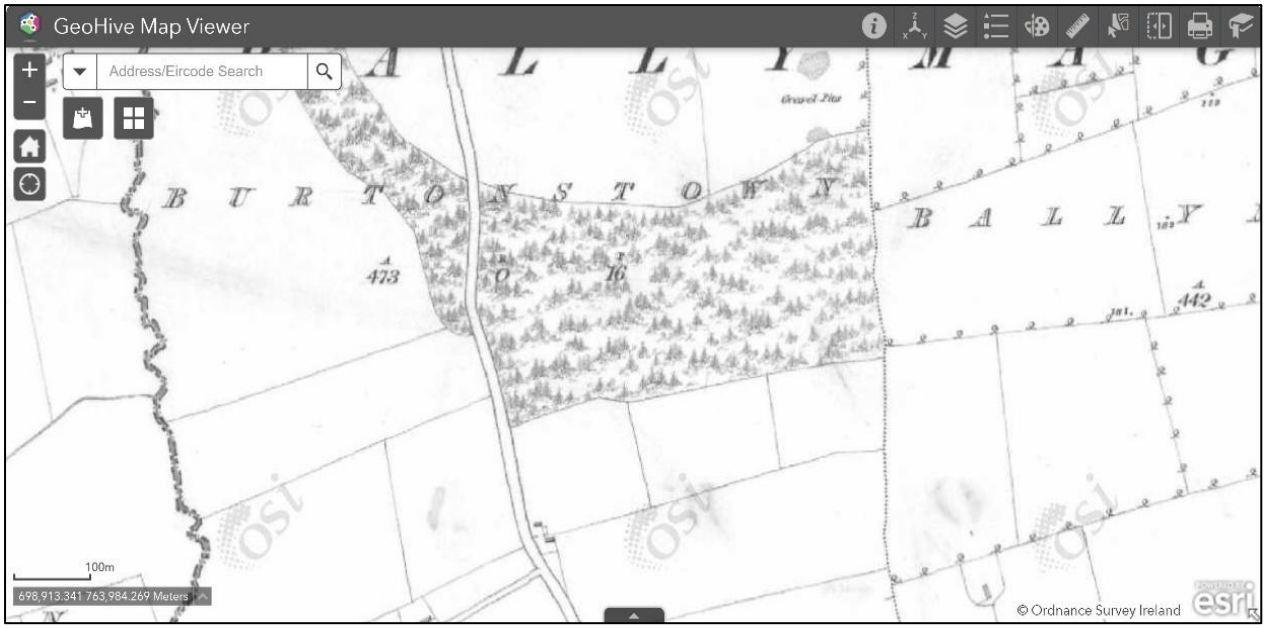


Figure 1: 1st Edition OSI Mapping

By the time of the 2nd Edition OSI mapping, the extent of the woodland was much the same as it is at present, with little difference between the 2nd Edition and the 25" mapping (see Figure 2 and Figure 3).

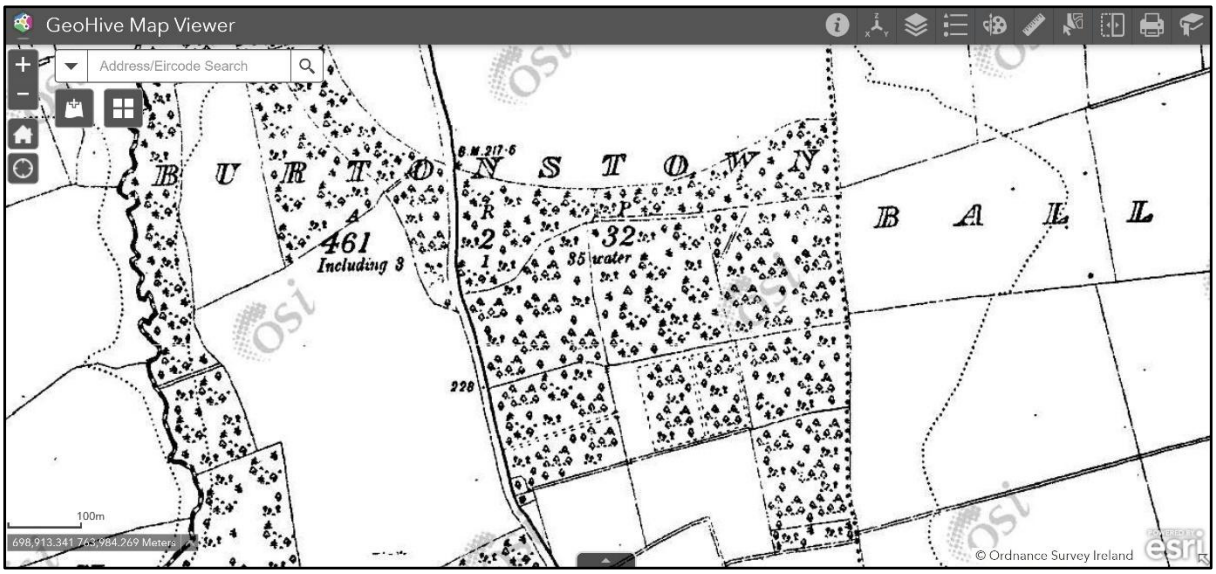


Figure 2: Last Edition 6" OSI



Figure 3: 25" OSI Mapping

It is important to note, however, that on the last version of the 6" mapping, the woodland as it currently exists was a component of a larger more or less contiguous network of woodlands connecting the habitat to other similar habitats in the vicinity. This highlights the "Island" nature of the woodland currently present (see Figure 4).



Figure 4: Comparison of modern satellite imagery of the vicinity and the last 6" OSI mapping

2.1.3 Existing data

2.1.3.1 BEC Consultants Management Report (2007)

According to the 2007 BEC report

'*...Following the dissolution of the Somerville estate, the wood, together with the other nearby woodlands, was handed over to the Forest and Wildlife Service in March 1966. At that stage, much of the old broadleaved woodland had been cleared and the site was prepared for replanting, although some mature broadleaf trees, including a range of non-natives remained. In 1969, the site was replanted with a mixture of Norway spruce and oak. The objective was to develop a broadleaved stand of high quality timber by using the conifers as a nurse crop which would be gradually removed. However, following establishment of these trees management of the site was essentially neglected resulting in the nurse crop suppressing the oaks with widespread squirrel damage further reducing timber quality (Society of Irish Foresters 1993).... In 1971-1972, four broad rides were established, converging in the centre of the site. These permitted future access throughout the site for timber removal. They also provided open areas for wildlife within the woodland and increased the amount of edge habitat available. The rides were culverted and sown with grass, which was harvested annually by a local grass meal factory during the 1970s and 1980s (Society of Irish Foresters 1993).... Upon its creation in 1989, Coillte Teoranta took over ownership of the woodland and subsequently leased it to the Tree Council of Ireland. In 1993, the Society of Irish Foresters produced a management plan for the wood. The main objective of this plan was again the production of high quality broadleaved woodland, i.e. wood production. Wildlife, recreation and education were included as areas of secondary importance. The plan laid down a schedule of operations for a two year period only. Subsequent to this plan some felling appears to have occurred, evident today from the substantial areas of regenerating native broadleaves...".*

2.1.3.2 Google Earth

In recent times, lack of planned maintenance has resulted in the loss of glade and ride habitats best illustrated by a comparison of Google Earth images from 2009 and 2022. Although the 2009 image is in black and white, the disappearance of the main rides is clearly evidenced (see Figure 5).



Figure 5: Google Earth Image from 2009 (left) and 2022 (right) illustrating closing-in of rides

2.1.3.3 Survey of Avifauna (2007)

Of note, the importance of the rideline habitat for avifauna was highlighted in an avifaunal study of the habitats present undertaken in 2007[1], which found that "...*current management practices including ride management have been successful in maintaining and enhancing avian diversity at Balrath Wood. Continued management of rides is essential to preserve their conservation value as the effects of forest management on bird communities are often short in duration...*".

[1] Roycroft, D., Irwin, S., Wilson, M., Kelly, T. and O'Halloran, J. (2008) "The breeding bird community of Balrath Wood in 2007.", Irish Forestry

2.1.3.4 National Biodiversity Data Centre database

A query of the National Biodiversity Data Centre dataset was undertaken on 10/09/25 with regard to the local townland of Burtonstown (see Figure 6). The species of conservation concern recorded within this area are listed in Section 5.1. There are a number of species of conservation concern recorded, including 28 bird species.



Figure 6: Map indicating location of polygon queried

2.1.3.5 Map of Irish Wetlands

The online “Map of Irish Wetlands” resource was queried on 18/09/25 (See Figure 7). Although there is a recorded area of wet woodland, there is no record of the pond present in the centre of the woodland area, which has been of importance in the past as a breeding ground for Common Frog.

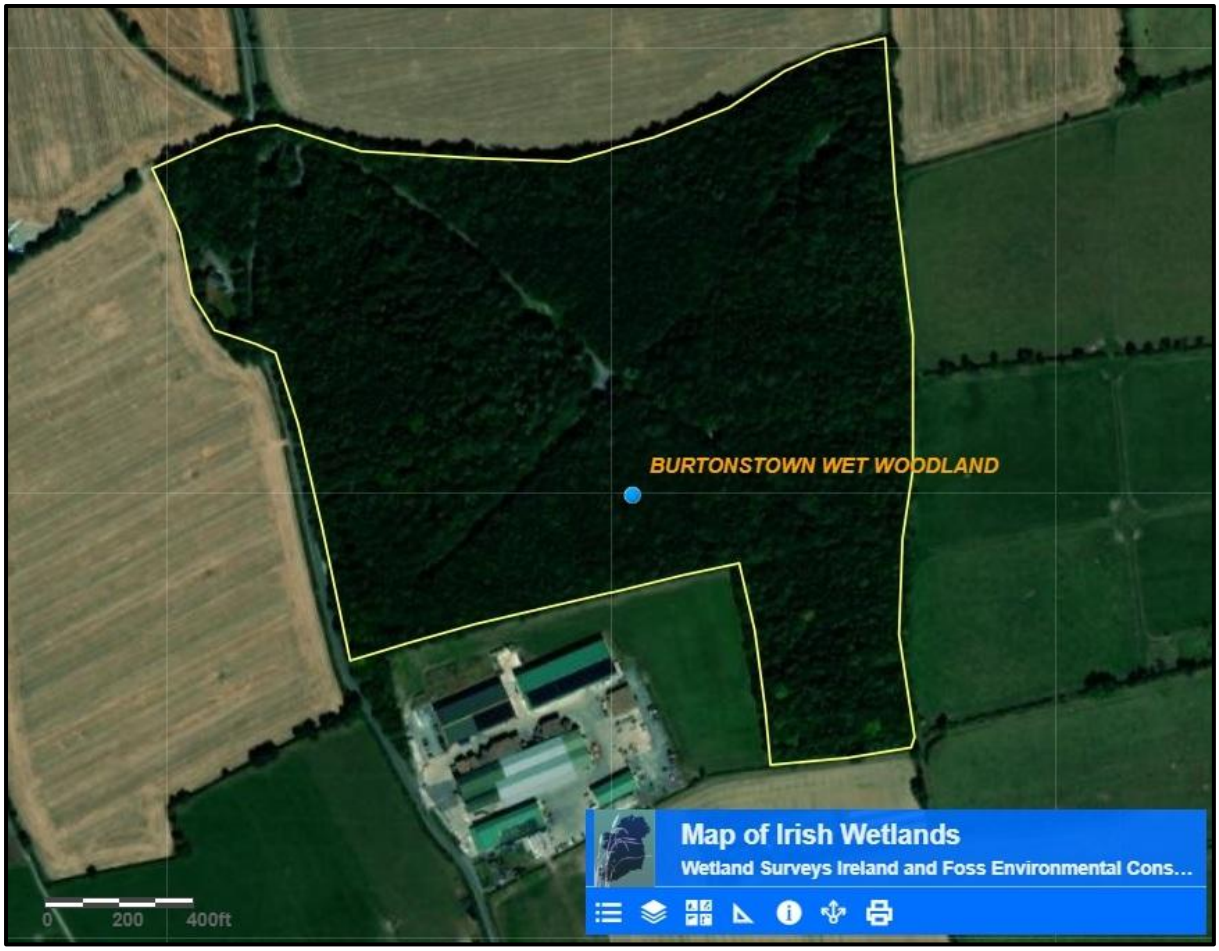


Figure 7: Excerpt from map of Irish Wetlands

2.1.3.6 Other GIS datasets

Below in Figure 8, the location of Balrath woods is shown relative to its surrounding landscape in rural Meath. A number of GIS data sets available from NPWS, including the Irish Semi-Natural Grasslands Survey (ISGS) and National Survey of Native Woodlands (NSNW) were reviewed in relations to the woods. The NSNW included an area of Wet woodland (WN6) within Balrath wood. The surveyors deemed the wood to be of low quality, it must be noted that at the time of survey, the area of woodland was at an immature stage of development. An aerial image illustrating the location of the relevé is illustrated in Figure 9. No other records from other datasets were found.



Figure 8. Satellite imagery of Balrath wood relative to surrounding habitats and landscape (1:10,000)



Figure 9: Location of WN6 relevé recorded in NSNW

2.1.4 General description of existing conditions on site

This report includes the findings of the ecological surveys undertaken during the period March–September 2023. Site visits were undertaken within the optimal window for undertaking ecological assessments, for the purposes of identifying the potential presence of Annex I Habitats or Annex II/IV species (habitats directive), Annex I Bird Species (EU Birds Directive) or species of conservation concern.

Balrath Woodland comprises a number of identifiable woodland types – largely WD1 and WD2 with some areas of developing WN2 and WN6. The woodland is still separated by the four rides established in 1971/72, converging in the centre of the site. These rides primarily comprise pathways with scrub/woodland encroachment with little or no true grassland ride habitat remaining. These rides in addition to providing access, originally provided open areas for wildlife within the woodland and increased the amount of edge habitat available. The rides were originally grasslands which were harvested annually. This management has not taken place in the recent past and there is minimal open habitat associated with the pathways present. Aerial images depicting the general habitats present are illustrated in Figures 10 – 14.



Figure 10: Aerial image (March 2023) illustrating an area of mixed broad-leaved and conifer woodland

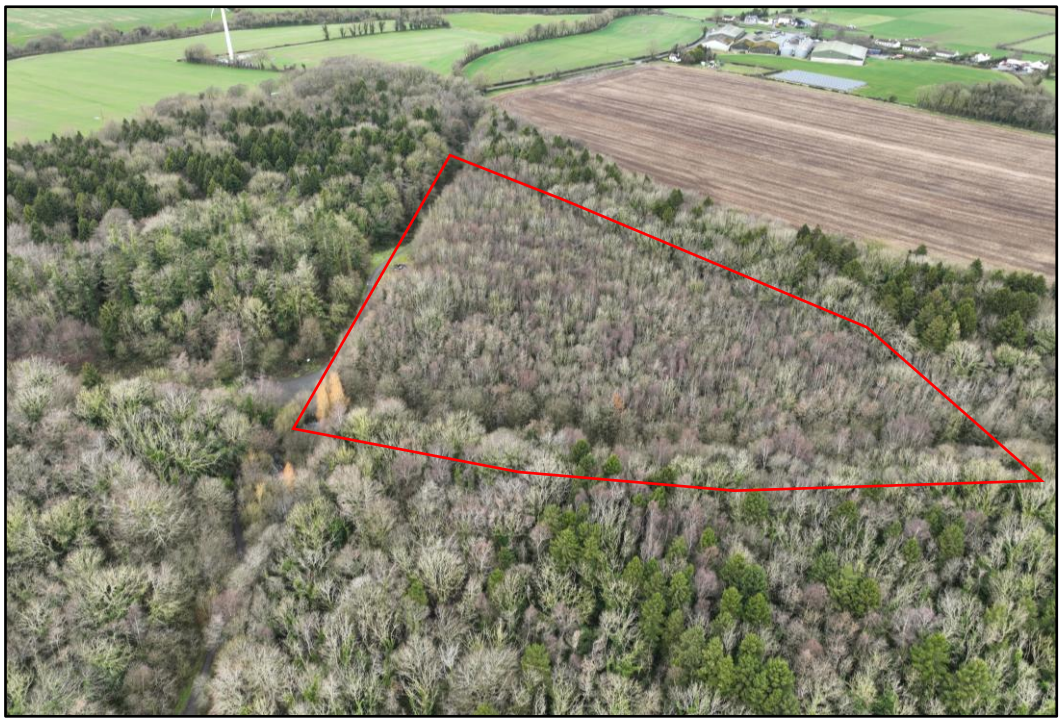


Figure 11: Aerial image (March 2023) illustrating area entirely dominated by broadleaved, deciduous species



Figure 12: Aerial image (September 2023) illustrating Balrath wood



Figure 13: Image recorded at canopy level (September 2023)



Figure 14: Image illustrating ongoing closure of "rides"

The woodland has become a very heavily utilised amenity. Many parts of the wood have become meeting areas for various groups of people, and which has led to intense erosion of certain habitats, most notably around the Veteran Beech Tree. The ground layer and litter component of the woodland floor has vanished in many areas due to continuous footfall. Dead wood has been removed for hut building and compaction of the woodland floor has resulted in eroded, exposed earth in large areas.

The existing conditions on site could be much improved with regards to both habitat and overall biodiversity through a small number of cost-effective management practices. The fouling, by dogs of the pathways and verges is ubiquitous, with plastic “poo-bags” a common sight along the edges of the pathways. Of note was the discovery by local walkers of a “Finch Trap” in September of 2023 (see Figure 15). This trap demonstrates the degree of unsavoury activity present within the area and is an indication of the need for changes in visitor behaviour.



Figure 15: Finch trap discovered in site

2.1.5 Field Surveys

2.1.5.1 Habitat and vegetation

The botanical survey placed particular emphasis on rare, protected, or annexed habitats/species by reference to -

a) Irish Plant Red Data Book;
b) Habitats listed on Annex I of the EU Habitats Directive;
c) Species listed on Annex II of the EU Habitats Directive; and
d) Ecological steppingstones and ecological corridors (as covered under Article 10 of the EU Habitats Directive.
e) Third schedule invasive species

A written description of habitats within the receiving environment was recorded, to include the dominant species occurring. Photographs of representative areas of habitat are presented. An evaluation of the ecological significance of flora and habitats occurring within the site relative to surrounding habitats was also undertaken.

2.1.5.2 Qualitative and Quantitative assessment of habitats/vegetation

Vegetation at Balrath woods was assessed using qualitative and quantitative means. Qualitative assessment of the Woods was carried out by use of a condition assessment of individual habitats based on

- Size
- Health
- Connectivity to other habitats
- Damage and threats
- Species diversity
- Surveyor experience

Habitats were scored as very poor, poor, moderate, high or very high.

Following a walk over site assessment, relevés of representative habitat were undertaken. This involves characterising recognisable units in the vegetation of a region by the description of the vegetation in a single representative plot -a relevé- within each unit. The relevés from many units are then analysed to develop descriptions and classifications of the vegetation in the study area. Relevés offer a practical and relatively fast means of collecting information on vegetation. Vegetation assessments are crucial in developing an understanding biodiversity of a region both in terms of floristic composition, structure, development and distribution. Relevé data will be a useful tool in the future monitoring of habitats within Balrath Wood in terms of their biodiversity potential and importance. Changes in structure and composition for instance can be monitored over time and the overall biodiversity value of the wood enhanced. Habitats at Balrath were almost entirely that of woodland with smaller adjacent habitats such as scrub and grassland.

Relevé assessment of the vegetation at Balrath Woods was achieved through subjective plot placement following a qualitative assessment of the habitats present. On Monday the 27th March and Tuesday March 28th 2023, the site was visited by Emma Reeves and an overall impression of the main habitat types present on site (pre-canopy closure) was achieved - informing the placement of plots subjectively within the woodland habitat and compiling a species list of those species present pre-canopy closure that may be difficult to detect later in the season. Tree age and bramble cover were two key factors which greatly influenced where plots were located. Subjective plots require that they are deliberately placed away from field edges, clearcuts, roadsides and other anthropogenically disturbed vegetation. This results in a faithful assessment of the full variation of the vegetation in a habitat. Eight relevé plots were chosen as being the most representative of the woodland habitats found on-site.

On the 22nd June 2023 the Balrath Woods were visited by Ciaran Byrne and Emma Reeves and 10mx10m relevés were undertaken within the eight woodland plots. Assessments were carried out on species composition, vegetation structure, physical attributes of the plot, current management, hydrological features, topographical features and various other features which could contribute to vegetation classification. The condition of each of the habitats surveyed was assessed. This qualitative assessment was based on combined experience of the surveyors.

Cover of each species within the relevé plot was achieved through ocular assessment using the Braun-Blanquet scale to determine species abundance and cover. As with the qualitative assessment, this quantitative assessment was undertaken by the surveyors with over 30 years of combined experience in vegetation assessment – consensus between the ecologists ensured confidence in the assessment. The use of photography validates ocular assessment of species cover and interpretation of structural data. Smart phones were used to capture photographic images of the relevés, adjacent habitats, the woodland in general while the GPS coordinates of each plot was recorded also.

2.1.5.3 Species of Invasive Alien Plants listed on Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended)

The human introduction of alien plant species into ecosystems (intentionally or unintentionally) is historically a common-place occurrence. The vast majority of these alien plant species, when introduced into a foreign ecosystem for which they are not adapted, will die without specific care. In a small number of cases, however, these plants can come to dominate the ecosystem into which they have been introduced and become “Invasive”. There is presently a great deal of concern regarding the potential for invasive plant species to threaten the species composition, community structure and overall biodiversity of native Irish habitats. Invasive species can change the character and/or condition of an ecosystem over an extensive area through several mechanisms, depending on the species of plant and the nature of the habitat. There are more than 30 species on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended). Aquatic systems are particularly vulnerable to plant invasions owing largely to the naturally high disturbance frequencies within aquatic habitats and the

rapidity with which an invasive can spread utilising the medium of water. In addition, there has been an historic tendency for people to plant "ornamental" species beside water. As a result, the vast majority of the species listed on the Third Schedule are associated broadly with aquatic systems (see Section 5.3). Surveys for Alien Invasive Plant Species were undertaken in tandem with the general botanical surveys.

2.1.6 Avifauna Surveys

2.1.6.1 Breeding birds surveys

Bird Watch Ireland and the RSPB NI have agreed a list of priority bird species for conservation action on the island of Ireland. These Birds of Conservation Concern in Ireland are published in a list known as the BoCCI List. In this BoCCI List, birds are classified into three separate lists (Red, Amber and Green), based on the conservation status of the bird and hence conservation priority. The Red List birds are of high conservation concern, the Amber List birds are of medium conservation concern, and the Green List birds are not considered threatened.

Avifaunal surveys of Balrath comprised two elements:

- Breeding bird surveys were undertaken in April (12/04/23) and May (22/05/23) based on the Countryside Bird Survey. The survey methodology entailed walking a transect through the study area and noting all species (heard or seen) present within the study area. Mckinnon lists were constructed to assess frequency. A crepuscular bird survey was undertaken in August using a thermal imaging camera (Pulsar Helion XP50).

- Deployment of Passive Acoustic Monitors (PAMs). In April (12/04/23 – 20/04/23) and again in May (22/05/23 – 27/05/23) PAMs were deployed on site (see Figure 16). These units recorded bird song for an hour pre and post sunrise and sunset (four hours per day) allowing for a comprehensive assessment of species present, including crepuscular species (for example breeding Long Eared Owl). In August 2023 (11/08/23 – 04/09/23) six PAMs were deployed and recorded bird song for an hour pre and post sunrise and sunset during this period.



Figure 16: Location of PAMs (Song Meter Micro Units)



Figure 17: Song Meter Micro PAM in place in Balrath

2.1.7 Amphibian Survey

Within Balrath wood there is a man-made pond and associated wetland habitat that in previous years has supported a large population of breeding Common Frog (*Rana temporaria*). This pond habitat and associated wetland was surveyed for the presence of frogspawn on a number of dates in 2023, including March 13th, March 21st, March 28th and April 12th.

2.1.8 General (non-volant) Mammal surveys

General mammal surveys, and crepuscular surveys were undertaken within Balrath woods by Dr Patrick Moran and Dr Emma Reeves on various dates between March and September 2023. In addition to surveys of the woodland through direct observations, observation of faeces, prey remains, shelters, hair, etc., infrared trail cameras (Bushnell Core DS No Glow, Bushnell Aggressor No Glow) were deployed on site. An initial camera was deployed in the vicinity of a badger sett to establish use of the set during the period 22/05/23 – 25/05/23. Having established an understanding of non-volant mammals within the woodland, six Bushnell Core DS No Glow trail cameras were deployed at optimal locations between the 11th of August and the 4th of September 2023.



Figure 18: Trail camera *in situ* in Balrath wood

2.1.9 Bat Surveys

In the cooler climate of Ireland and many other temperate countries, bats eat exclusively invertebrates (insects, spiders, etc.), which they actively hunt by catching them in flight or plucking them from foliage or off the ground/water. Different species of bat may specialise in catching different types of invertebrates (for example the relatively large Leisler's Bat (Nyctalus leisleri) feeds on larger invertebrates while the Common Pipistrelle (Pipistrellus pipistrellus) concentrates on smaller prey, such as midges). Bats gather to feed wherever there are large invertebrate populations. During the winter in Ireland, when there are few invertebrates available for feeding bats, they hibernate. Under Irish law (the Wildlife Act 1976 and Wildlife (amendment) Act 2000) it is a criminal offence to harm or disturb a bat in its place of rest. Bats are at their most vulnerable when roosting and form different roost types at different times of the year (see Figure 19, taken from Irish Wildlife Manuals No. 25, Bat Mitigation Guidelines for Ireland). Owing to their metabolic and social requirements, which vary throughout the year, most bats will utilise a variety of roost types depending on the time of year.

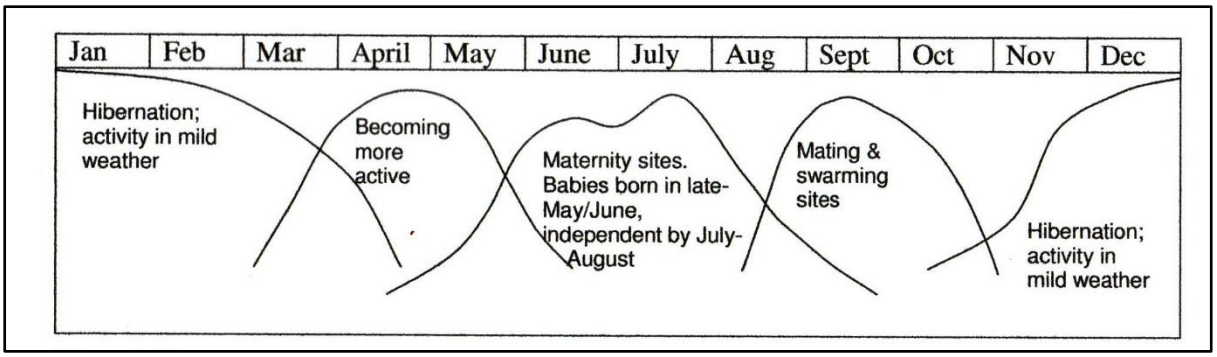


Figure 19: The "Bat Year" activity

Bats occurring within the study area were assessed using two methodologies. It was planned initially to undertake these surveys in July in order to undertake the surveys during the period of maximum bat activity (peak of bat maternity roost activity). The profoundly wet conditions throughout the month of July delayed these surveys, however. Two types of survey methodology were employed.

2.1.9.1 Emergence and dawn survey

An emergence and dawn survey was undertaken on the night/morning of the 9th/10th of August 2023. This entailed walking through Balrath wood along pathways with a hand-held ultrasound recorder (Anabat Walkabout) in order to identify any potential bat roosts within the woodland. The emergence survey began 30 minutes before sunset and finished approximately 100 minutes after sunset. The dawn survey commenced at 90 minutes pre sunrise and finished approximately 20 minutes after sunrise. Weather conditions were optimal during the survey with a starting temperature in excess of 10˚C, no rain and very little wind. The emergence and dawn survey informed the deployment of Passive Ultrasound Monitors.

2.1.9.2 Passive Ultrasound (Static) monitors

The units used were Pettersson D500x units (see Figure 20). These are ultrasound recording units, intended for long-term recording of bat calls. The triggering system allows the device to start recording as a sound is detected. The D500X detects the full spectrum of ultrasound and records in real time. It provides much more detailed data than either frequency division or time expansion detectors.

Six units were deployed such as to maximise the coverage within the woodland habitat and at the woodland/farmland interface (see Figure 21). The units were deployed on the 11th of August and retrieved on the 4th of September. The Pettersson D500X units were programmed to record all bat activity between 30 minutes pre-sunset and 30 minutes post-sunrise. The recording settings utilised were:

- Input Gain – 45;
- Trigger Level – 30; and
- Interval – 5.

Trigger sensitivity was set to "Medium".



Figure 20: Pettersson D500x (Mark II) Unit in place

- Unit (14) was deployed in interior woodland habitat adjacent to a drainage ditch;
- Unit (13) was deployed in woodland habitat at woodland edge with agricultural land;
- Unit (21) was deployed in interior woodland habitat adjacent to the artificial pond habitat;
- Unit (20) was deployed in woodland habitat at woodland edge with agricultural habitat;
- Unit (28) was deployed in woodland habitat at woodland edge with agricultural habitat; and
- Unit (19) was deployed in interior woodland habitat with a high level of immature trees.



Figure 21: Location of D500X units deployed

2.1.10 Incidental records

In addition to the targeted surveys as described, incidental observations of note were recorded.

2.2 Results - Field Surveys

2.2.1 Botanical/Habitat surveys

2.2.1.1 Qualitative surveys

Botanical and habitat surveys were undertaken during the period (including noting incidental species) March – September 2023. Both qualitative and quantitative analysis of the primary habitats of ecological interest, Mixed Broadleaf and Conifer Woodland (WD2), and Mixed Broadleaf Woodland (WD1) were undertaken. Relevés were not carried out within the grassland habitat, within drainage ditches or within the pond area as these were deemed to be too small in area. Rather, descriptions are included below.

A list of all higher plants, ferns and mosses recorded is presented in the Appendix (section 5.2). Approximately 89 species of plant and bryophyte were recorded. A condition assessment of the onsite habitats was produced through combined analysis of quantitative data and interpretation of the habitats by the surveyor. A habitat map was constructed using photogrammetric imagery from a DJI Mavic 3 Enterprise coupled with Arc Pro software (see Figure 22).



Figure 22: Map of the habitats found at Balrath wood

Table 1: The habitats identified in Balrath woods. Some habitats are below the required 20x20m area required to be mapped and do not occur in the associated habitat map.

Habitat Type	Fossitt Code	Condition Assessment	Interventions needed
Mixed broadleaved woodland (Young)	WD1	This habitat is typified by excellent cover of mosses and a good herb diversity. The trees are young, but the canopy has closed. Structurally it is diverse with multispecies regeneration. **Condition score:** *Very high*	**Yes:** Interventions to limit competition with exotic/naturalised species and increase light to the woodland floor where appropriate.
Mixed broadleaved woodland (Old)	WD1	This habitat type is characterised by very mature beech trees with little understory component. This habitat lacks a field layer, herb layer or moss layer and is typified by severe soil erosion. **Condition score:** *Very Poor*	**Yes:** Interventions to restrict access
Mixed broad leaved and conifer woodland	WD2	Areas of this woodland habitat type are characterised by very mature trees, mostly conifers with naturalised species such as Sycamore and Beech with natives such as Ash and Oak. The ground flora is quite depauperate being dominated by ivy. The shrub layer is very patchy. This woodland habitat is easy to get around and as a result is well traversed by visitors. **Condition score**: *Poor*	**Yes:** Interventions to restrict access

Scrub	WS1	Scrub onsite occurs in what was once the ride habitat. It is largely composed of bramble. **Condition score:** *Low*	**Yes:** Interventions to manage scrub encroachment
Oak-Ash-Hazel woodland	WN2	This habitat type is represented by young trees with some mature trees and significant amounts of native regeneration. A Good structural complexity with a good cover of moss, ferns and typical woodland flora is notable. **Condition score:** *High*	**Yes:** Interventions to limit competition with naturalised species such as Sycamore and the exotic dogwood.
Wet Willow-Alder-Ash woodland	WN6	This woodland is quite young and demonstrates a rather open canopy leading to increased growth of bramble. This habitat shows good species diversity especially of moss and fern elements was combined with good structural heterogeneity. **Condition score**: *High*	**Yes:** Interventions to reduce egress into the habitat.
Dry meadow and grassy verge	GS2	Very small patches of this grassland occur along what once was the "X" shaped rideline through the woods. Where it occurs it is quite species rich containing a species assemblage similar to that referred to as a long flowering meadow by the All Ireland Pollinator Plan, including Ribwort plantain, Self-heal, Yarrow and Germander speedwell. This habitat is very fragmented and threatened by scrub encroachment. **Condition score:** *Poor*	**Yes:** Interventions to increase overall habitat area and species diversity.

Drainage ditches	FW4	Many drainage ditches throughout the site contain very little vegetation, the ditches were created to improve drainage for the forestry onsite and are isolated from other hydrological features in the area. They demonstrate no connectivity. **Condition score:** *Poor*	**Yes:** The nearest waterbodies to the site are a tributary to the River Nanny (404m to the East) and tributary of the same (698m to the West). A clean water source should be established within the woods. Inventions to the drainage systems (exclusive of those adjacent to roads) include blocking with brash etc.
Buildings and artificial surfaces	BL3	Paths and other artificial surfaces **Condition score:** None	**N/A**
Artificial pond	FL8	Small man-made pond at the centre of the site. **Condition score:** *Very Poor*	**Yes:** This is the only clean, fresh water source available for wildlife for some distance around the woods. Interventions should be made to support it as a permanent pond habitat

2.2.1.2 Quantitative surveys– relevés within woodland habitats occurring onsite

Relevés were recorded from the representative woodland habitats occurring at Balrath (8 relevés in total – see Figure 23). These are presented in Section 5.4. Habitat descriptions of the dominant features of each woodland habitat type follow.



Figure 23: Approximate locations of relevés conducted.

2.2.1.2.1 Description of Mixed Broadleaved/Conifer Woodland in Balrath (WD2)

Three relevés were conducted in this habitat type, these were relevés 1, 4 and 6, see map above for the relevant locations of each. This habitat type best represents the bulk of the woodland onsite. It is largely flat and free draining; some areas exhibit very large internal drains. It is dominated by mature trees in excess of 80 years. Trees include of Sitka Spruce, Norway spruce with some Ash, Oak and Beech of a similar age (80 years). These mature trees are distant from one another (6m) it is probable that they were thinned at some point and now at least two tree age classes have developed. The shrub layer is not well developed but where it occurs it is dominated by regenerating Ash, Holly, Hazel and Sycamore. Sycamore and Ash are the most frequently found regenerating species. The canopy is completely closed, and very little light reaches the woodland floor. This has resulted in restriction of bramble growth. The herb component consists almost entirely of Ivy within areas good moss and fern cover. No invasive species (occurring on the Third schedule) are found in this woodland habitat; however, significant amounts of privet are notable, particularly along internal drainage ditches. The high canopy and lack of dense shrub layer coupled with limited bramble growth makes this woodland type very attractive to dogs and their walkers. It is suffering intense visitor traffic and exhibits significant desire lines throughout with accompanying dog waste.

2.2.1.2.2 Description of Mixed Broadleaf Woodland in Balrath (WD1)

Two relevés were carried out in Mixed broadleaf woodland (relevés 2 and 5). This woodland type onsite is represented by two very different habitat types depending on the levels of human/dog use. One example which exhibits low levels of use is typified by young trees (~25 years) which are very densely planted. This woodland type is represented on site by trees that are about 8m in height and include Hawthorn, Hazel and Beech. There is 100% canopy cover. There is a good diversity in the herb layer including Herb Robert and Primrose, Ivy dominates, however. Moss cover is reasonably high and the shrub component of the wood is good with high levels of natural regeneration throughout. The relevé was conducted on a disused badger sett. There does not seem to be evidence of grazing within this habitat type. Sycamore seedlings are abundant but there is no evidence of invasive species occurring in this habitat. Deadwood was a notable feature, the majority of it being over 10cm. Natural regeneration was noted of Hazel, Hawthorn, Holly and of Sitka. This form broadleaved woodland is dense and hard to get through and this feature inhibits use by dogs and their walkers.

Relevé 5 was conducted in an area where human impact on the woods at Balrath is most evident, adjacent to the veteran beech tree. Desire lines within the woodland away from designated tarmac paths are commonplace and have created an undulating forest floor devoid of plants, mosses, and ferns. Without the biological component of the ground layer, the brown earth soils are exposed and are liable to erode, limiting natural regeneration and overall biodiversity.

2.2.1.2.3 Description of Wet Willow-Alder-Ash woodland at Balrath (WN6)

This relevé (3) was conducted in an area of wet woodland and was dominated by species typical of this habitat type (WN6), Alder and Downy Birch were the most dominant tree species with some Ash and Oak present. Naturalised and exotic trees were also present including Red Oak and Horse chestnut. This stand of trees was quite young and was estimated at about 25 years old, the canopy being approximately 12m in height. The canopy of this woodland was quite open owing to the age of the stand and has resulted in greater light interception at field level and therefore an abundance of bramble throughout. Water levels within this woodland appear to fluctuate greatly, early surveys and those following heavy rainfall events indicated standing water on soils slow to drain. The abundance of bramble coupled with the wet substrate is likely to deter most people or dogs from entering this habitat type. Trails and desire lines are far less obvious in this habitat type.

2.2.1.2.4 Description of Oak-Ash-Hazel woodland at Balrath (WN2)

Oak-Ash-Hazel woodland (WN2) is represented by two relevés (7 and 8). The first was conducted in an area of native woodland, recently planted into with Oak and Spindle. The second was carried out in an area of young Alder plantation. Both relevés sites exhibit wet soils where drainage is impeded. Wet soils are evidenced also by the presence of Grey willow. Ash regeneration is extensive with very young saplings throughout. Owing to the more open habitat there is a good fern diversity with an abundance of Soft shield fern in particular. Unfortunately, greater light levels have resulted in a proliferation of bramble. Bramble growth will be curtailed as the recently planted trees fill out. The Alder plantation was at one point invaded by Dogwood, efforts were made to remove this plant and have been very successful (Elizabeth McArdle, personal communication) with only small patches remain within the woodland.

2.2.1.2.5 Description of other non-woodland habitats on site

Scrub (WS1): This habitat occurs throughout the site but dominates the rideline which bisects the woodland. It is largely composed of bramble, nettle and thistle. It is deep and tall (3mx2m) in some areas along the rideline. Although bramble is a keystone species in the development of woodland this habitat type is limiting other habitats through encroachment.

Artificial Pond: A small man-made pond occurs in the centre of the woodland. Water levels fluctuate terribly as it is not lined and is not fed by any other water source. It is characterised by a low diversity of emergent vegetation including Yellow flag iris, Pendulous sedge, Rushes and Reed canary grass (see Figure 24)

Dry Meadow and Grassy verge (GS2): Very small patches of this grassland occur along what once was the “X” shaped rideline through the woods. Where it occurs it is quite species rich containing a species assemblage similar to that referred to as a long flowering meadow by the All-Ireland Pollinator Plan, including Ribwort plantain, Selfheal, Yarrow and Germander speedwell. Fine leaved grasses are also characteristic of this habitat including Crested dog’s tail, Sweet vernal

grass and Red fescue. This generally narrow habitat runs along the tarmac pathways (BL3).This habitat is very fragmented owing to scrub encroachment; it does not occur in areas large enough to map with accuracy.

Drainage ditches (FW4): The ditches were created to improve drainage for the forestry onsite and are isolated from and demonstrate no connectivity to other hydrological features in the area (see Figure 25 for photographic examples). The ditches contain little or no emergent or floating vegetation and are subject to disturbance (dogs).



Figure 24: The pond habitat onsite, adjacent to wet woodland



Figure 25: Some of the many ecologically unconnected drains within Balrath woods

2.3 Invasive Species surveys

There are many species on site which might be considered invasive in the future but as yet these have not been included as Third schedule species, these include Cherry laurel, Dogwood, Sycamore and Privet. For the purposes of this report, these species will be termed nuisance species, and their presence will be considered separately to those listed on the Third schedule. One Third Schedule Species was observed on site - Spanish Bluebell (*Hyacinthoides hispanica*).



Figure 26: Spanish bluebell is abundant along the main pathway adjacent to the carpark

2.4 Bird Surveys

2.4.1 General (breeding) bird surveys

On site breeding bird surveys were undertaken on the 12th of April and the 22nd of May with a transect being slowly walked through the entirety of the site and all bird species observed and heard were recorded. (McKinnon lists of 10 birds were constructed as the transect was walked). A total of 29 species were observed during the April and May surveys. Birds observed and their conservation status are indicated in Table 2.

2.4.1.1 Conservation status and frequency

Only one species recorded onsite is considered of Red conservation concern the Yellowhammer. This species was only recorded once during the survey period. Those of Amber conservation concern included Goldcrest, Greenfinch, Willow warbler and Swallow. Goldcrest and Willow warbler were recorded onsite quite frequently indicating the suitability of the habitat available. Of the 29 species recorded, Woodpigeon, Wren and Blackbird were the most frequently recorded (frequencies were determined by a combination of PAM data and data collected during field survey). Great Spotted Woodpecker, Peregrine Falcon and Jay were observed outside the survey period but bring the total number of bird species frequenting Balrath woods to 32. The majority of the 32 species are resident. Oddly there was a distinct lack of ground nesting birds recorded. It was anticipated that Pheasant and Woodcock would be recorded. Despite this, the diversity of bird species on site has increased by 9 from 23 in 2007 to 32 in 2025.

Table 2: Birds observed in the vicinity of proposed works and BOCCI-list status (2020 - 2026)* indicates those species noted outside the survey period

Common name	Latin name	Frequency %	Activity	BoCCI
Buzzard	*Buteo buteo*	50	Flying overhead	Green
Song Thrush	*Turdus philomelos*	90	Holding territory	Green
Mistle thrush	*Turdus viscivorus*	10	Holding a territory	Green
Chaffinch	*Fringilla coelebs*	90	Holding a territory	Green
Collared dove	*Streptopelia decaocto*	50	Holding a territory	Green
Goldcrest	*Regulus regulus*	70	Holding a territory	Amber

Coal tit	*Periparus ater*	40	Holding a territory	Green
Wood pigeon	*Columba palumbus*	100	Nesting/Breeding	Green
Greenfinch	*Chloris chloris*	10	Holding a territory	Amber
Wren	*Troglodytes troglodytes*	100	Holding a territory	Green
Blackbird	*Terdus merula*	100	Nesting/Breeding	Green
Tree creeper	*Certhia familiaris*	10	Holding a territory	Green
Hooded crow	*Corvus cornix*	50	Holding territory	Green
Jackdaw	*Coloeus monedula*	60	Flying over	Green
Rook	*Corvus frugilegus*	70	Flying over	Green
Raven	*Corvus corax*	60	Holding territory	Green
Magpie	*Pica pica*	30	Nesting/Breeding	Green
Blue tit	*Cyanistes caeruleus*	60	Nesting/Breeding	Green
Robin	*Erithacus rubecula*	70	Nesting/Breeding	Green
Great tit	*Parus major*	70	Holding a territory	Green
Bullfinch	*Pyrrhula pyrrhula*	10	Holding a territory	Green
Long tailed tit	*Aegithalus caudatus*	20	Feeding	Green
Swallow	*Hirundo rustica*	20	Flying over	Amber

Willow warbler	*Phylloscopus trochilus*	40	Holding a territory	Amber
Black cap	*Sylvia atricapilla*	60	Holding a territory	Green
Dunnock	*Prunella modularis*	80	Holding a territory	Green
Chiffchaff	*Phylloscopus collybita*	60	Holding a territory	Green
Long eared owl	*Asio otus*	10	Hunting	Green
Yellow hammer	*Emberiza citrinella*	10	Holding a territory	Red
Sparrowhawk	*Accipiter nisus*	20	Holding a territory	Green
*Jay	*Garrulus glandarius*			Green
*Great spotted woodpecker	*Dendrocopus major*			Green
*Peregrine falcon	*Falco peregrinus*			Green

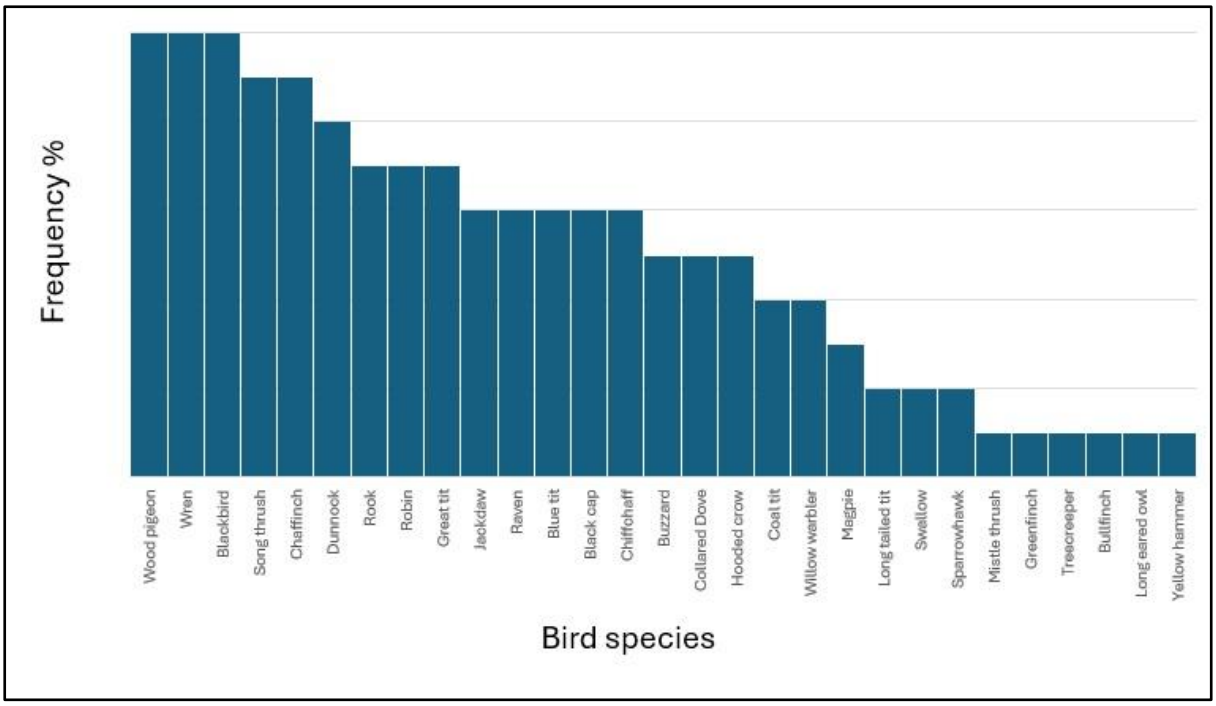


Figure 27: Frequency of each bird species observed onsite during breeding bird surveys

2.4.2 Songmeter Micro recordings (SMM) – August/September

In general, the results of the SMM recordings are in agreement with the visual observations. There was relatively little difference observed in SMM units placed at woodland edge or woodland interior. There were a small number of additional species picked up by the SMM units, which recorded bird song every dawn and dusk for almost a month, for example Treecreeper (*Certhia familiaris*) was not noted during observational surveys but was picked up on two of the six SMM units. The SMM units did not record any evidence of crepuscular birds such as Barn Owl (*Tyto alba*) or Long-eared Owl (*Asio otis*). However, A Long Eared Owl was observed during a crepuscular survey additionally, 3-4 Long Eared Owl chicks were noted by Ben Malone, the Meath County Council Biodiversity Officer in 2025. Photographic examples of some of the bird species observed at Balrath are presented in Figure 28 and Figure 29. Examples of sonograms are presented in Figure 30, Figure 31 and Figure 32.



Figure 28: Robin, Dunnock, Willow warbler, Chaffinch and long tailed tit were observed onsite



Figure 29: A male blackcap a

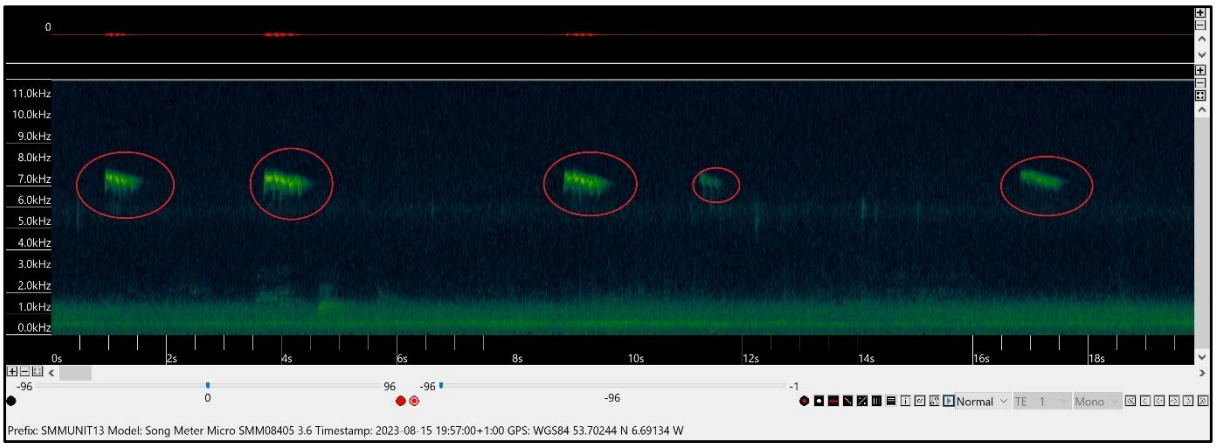


Figure 30: Sonogram of Treecreeper – recorded on two of six SMM units

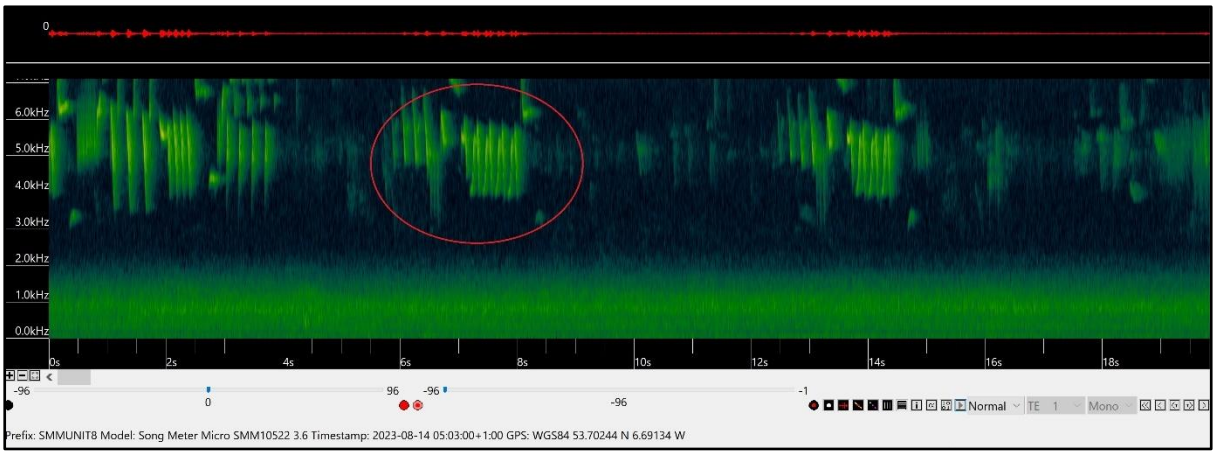


Figure 31: Sonogram of Wren song, the most frequently recorded species on all six SMM units

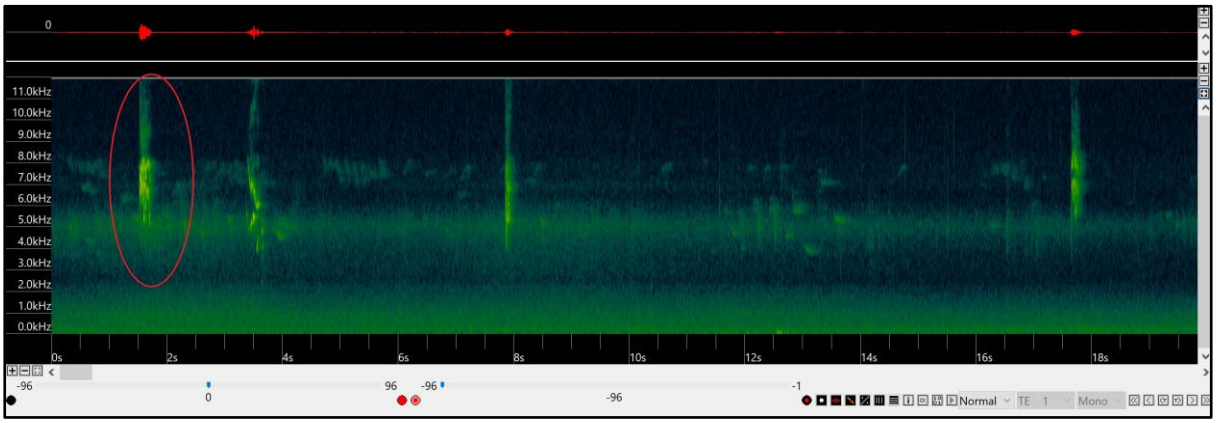


Figure 32: Long-tail Tit anxiety call

2.5 Amphibian survey

Although the man-made pond and associated wet woodland has supported a large population of Common Frog (*Rana temporaria*) in years gone by, little evidence was observed for a large population in comparison with the cacophony of mating frogs in years gone by. On a survey on the 20th of April, a small quantity of developing frogspawn was identified within the pond, which by this stage, had greatly decreased as regards the volume of water present. Anecdotal evidence would appear to indicate that the pond may be drying out earlier in the year and is no longer capable of supporting Frogs for their full life-cycle. No evidence for breeding frogs was observed in any of the drainage ditch habitat investigated. The pond had dried up before the frogspawn pictured here would have produced froglets.



Figure 33: Close up of developing frogspawn in rapidly dwindling pond in April 2023

2.6 General (non-volant) Mammal surveys

General mammal surveys of Balrath were undertaken by Dr Patrick Moran and Dr Emma Reeves on numerous occasions over the period March - September 2023. It is evident that Balrath wood is a heavily utilised amenity, especially by dogs and their walkers and these were noted off lead frequently. Daylight sightings of undomesticated mammals were limited to a Brown Rat observed in the vicinity of the carpark. There was little evidence in the form of faeces, hair, prey items etc. observed, although Pine Marten faeces was spotted frequently during site visits.



Figure 34: Pine marten scat

The following species were observed at the six trail cameras, which recorded continuously during the period 11th of August - 4th of September 2023.Unit (4) recorded the greatest degree of activity, primarily of Brown Rat, but also numerous domestic cats and birds.

- Wood mouse
- Fox
- Pine marten
- Brown Rat



Figure 35: A brown rat captured by a trail camera



Figure 36: Wood mouse were also very common triggers

The degree of rat activity is likely associated with agricultural premises in the vicinity. The overwhelming dominance of this species indicates that there is likely a paucity of predators. A Fox hunting was observed carrying a dead rat (Figure 37).



Figure 37: Fox triggering camera at location (3) with a large rat

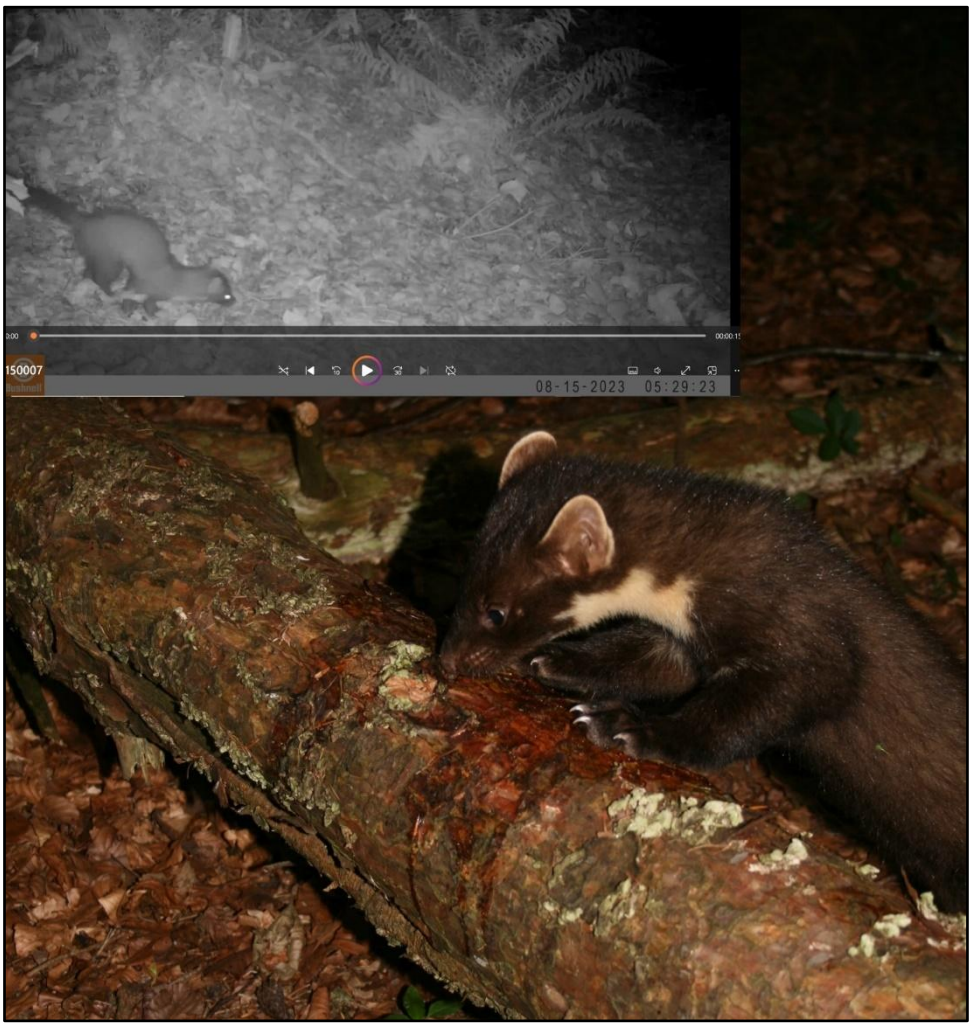


Figure 38: Pine Marten triggered the camera at location (6)

2.7 Bat surveys

A comprehensive assessment of the utilisation of the area by bats was undertaken using both emergence and dawn walk over survey and Passive Ultrasound Monitors (PAMs).

2.7.1 Emergence/dawn survey

During the emergence and dawn survey, there was very limited bat activity (29 bat passes in total), albeit of five species (Common Pipistrelle (3), Soprano Pipistrelle (8), Leisler's Bat (16), Brown Long-eared Bat (1) and Natterer's Bat (1)). The most numerous bat observed by far was Leisler's Bat, with each pass representing an individual passing over, while the 11 Pipistrelle passes were comprised of a small number of individuals hunting and passing multiple times. There was no evidence of a roost present within the woodland, or indeed the immediate vicinity of the woodland. In order to gain a comprehensive assessment of the bats present, it was deemed necessary to deploy six PAM units to record bat activity over a prolonged period.

2.7.2 Passive Ultrasound Monitors

The results from the six Static monitors are presented below:

2.7.2.1 Unit (13)

Between 11/08/23 and 19/08/23 there were 143 Bat Passes of five species (Common Pipistrelle (20), Soprano Pipistrelle (20), Leisler's Bat (95), Natterer's Bat (3) and Brown Long-eared Bat (5)).The vast majority of bat passes recorded were of one bat species Leisler's Bat. Of note is the detection of Brown Long-eared Bat on a number of different nights, indicating that the woodland is utilised for foraging by this gleaning species.

2.7.2.2 Unit (14)

Between 11/08/23 and 18/08/23 there were 204 Bat Passes of five species (Common Pipistrelle (6), Soprano Pipistrelle (175), Leisler's Bat (1), Natterer's Bat (6) and Brown Long-eared Bat (10)).The vast majority of bat passes recorded were of one bat species – Soprano Pipistrelle. Of note is the detection of Brown Long-eared Bat on a number of different nights, indicating that the woodland is utilised for foraging by this gleaning species.

2.7.2.3 Unit (19)

Between 11/08/23 and 18/08/23 there were 16 Bat Passes of two species (Common Pipistrelle (1), and Leisler's Bat (15)). Bat activity at this location was very limited.

2.7.2.4 Unit (20)

Between 11/08/23 and 18/08/23 there were 57 Bat Passes of five species (Common Pipistrelle (52), Soprano Pipistrelle (1), Leisler's Bat (1), Natterer's Bat (2) and Brown Long-eared Bat (1)).The vast majority of bat passes recorded were of one bat species – Common Pipistrelle and likely represent only a small number of individuals hunting. One Brown Long-eared Bat was detected.

2.7.2.5 Unit (21)

Between 11/08/23 and 18/08/23 there were only 10 Bat Passes of three species (Common Pipistrelle (1), Soprano Pipistrelle (2) and Leisler's Bat (7)). Bat activity at this location was very limited.

2.7.2.6 Unit (28)

Between 11/08/23 and 18/08/23 there was one Bat Passes recorded, a single Leisler's Bat. Bat activity at this location was very limited.



Figure 39: Example of a Brown Long-eared Bat.

2.8 Incidental Observations

Although targeted surveys were not undertaken on the invertebrate diversity of Balrath woods, where they were noted they were recorded. Table 3 below contains a list of many of the species observed onsite Figure 40 and Figure 41 detail some of the more obvious members of *Hymenoptera* and *Lepidoptera* observed and photographed onsite. Many fungal species were observed during the survey period, however due to limitations, only charismatic species were documented (see Figure 42).

Table 3: Invertebrates recorded incidentally during the survey period

Scientific name	Common name
Aglais urticae	Small tortoiseshell
Aphantopus hyperantus	Ringlet
Araneus diadematus	European garden spider
Armadillidium vulgare	Pill bug
Bombus hypnorum	Tree Bee
Bombus pratorum	Early bumble bee
Bombus terrestris	Buff tailed bumble bee
Coccinella septempunctata	7 Spot ladybird
Eristalis pertinax	Hoverfly
Eristalis tenax	Drone fly
Forficula auricularia	Common earwig
Lycaena phlaeas	Small copper
Metatropis rufescens	Stiltbug
Muscina stabulans	False stable fly
Oniscus asellus	Common shiny woodlouse
Pararge aegeria	Speckled wood
Philaenus spumarius	Common frog hopper
Pieris brassicae	Large white butterfly
Polygonia c-album	Comma Butterfly
Polyommatus icarus	Common Blue

Porcellio scaber	Common rough woodlouse
Psyllobora vigintiduopunctata	22 Spot lady bird
Sinodendron cylindricum	Rhinocerous beetle
Vanessa Atalanta	Red admiral
Anthophila fabricana	Nettle tap moth

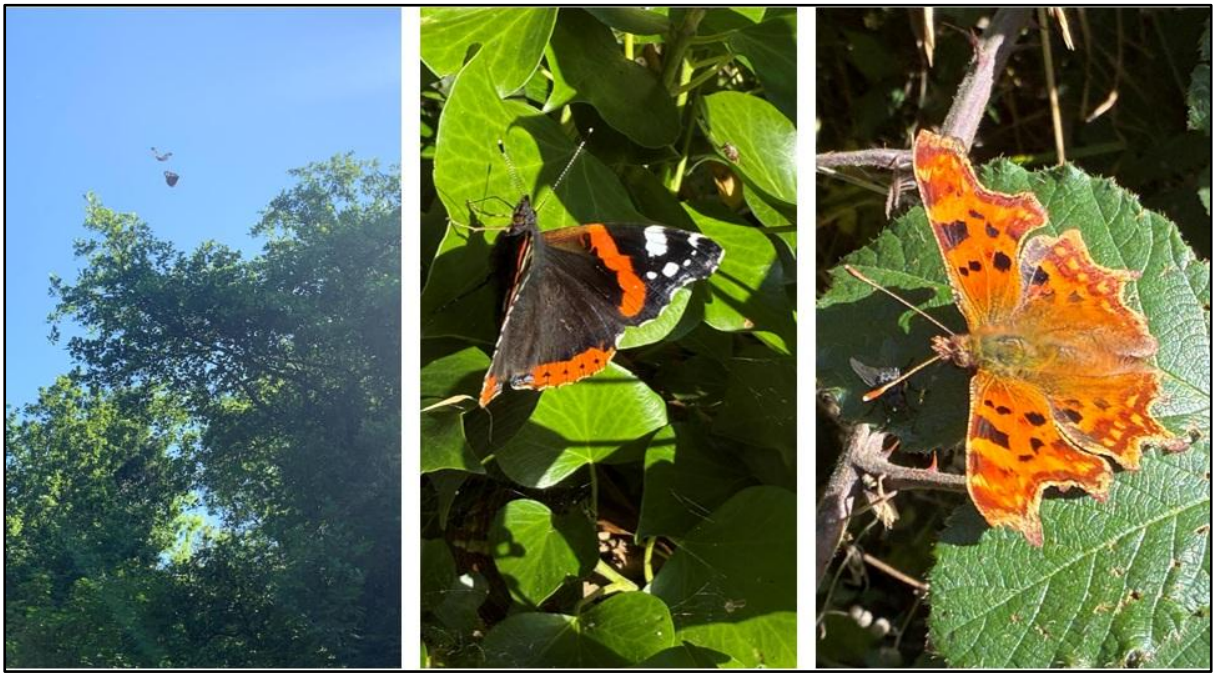


Figure 40: Speckled wood *Pararge aegeria* (left), Red admiral *Vanessa Atalanta* (centre) and the Comma *Polygonia c-album* (right).



Figure 41: A collection of the *Hymenoptera* found within the wood, Buff tailed bumblebee *Bombus terrestris* (left), a male Early bumble bee *Bombus pratorum* (centre), *Eristalis pertinax* a Hoverfly (top right) and the False stable fly *Muscina stabulans* (bottom right).



Figure 42: A collection of the vast diversity of Fungi in the woods including Scarlet elf cup (*Sarcoscypha coccineal*) top left, Stink horn (*Phallus impudicus*) top right and bracket fungi, (bottom left).

3 Habitat Management and Recommendations

3.1 The Mixed broadleaved woodland habitat (WD1)

According to Fossitt, this category of woodland "*...includes woodland areas with 75-100% cover of broadleaved trees, and 0-25% cover of conifers. It should be used in situations where woodland stands cannot be classified as semi-natural on the basis of the criteria outlined above. Trees may include native and non-native species. Plantations of broadleaved trees are included if the canopy height is greater than 5 m, or 4 m in the case of wetland areas...*". This is one of the primary woodland categories present within the survey area, with a wide variety of broad-leaved species, both native and naturalised present. The dominance in some areas of species such as Beech and Sycamore has resulted in a depauperate ground, field and shrub layer – decreasing the overall biodiversity value of the habitat and enhancing the speed at which erosion occurs. Unfortunately, many of the areas dominated by beech were observed to be severely eroded.

Much of the WD1 habitat within Balrath Wood has not undergone much management in recent years. In terms of biodiversity enhancement there are some ecological issues that can be resolved;

- Disturbance to wildlife and woodland habitats caused by visitor footfall, although an important amenity, desire lines, dens and huts and evidence of disruption of the woodland system are present throughout the habitat. A key recommendation is to encourage the use of trails as much as possible.
- Footfall away from the recreational paths led to poor natural regeneration of the habitat in many areas. To facilitate the natural regeneration of the woodland some measures to maintain footfall on the footpaths is required.
- The symptoms of Ash dieback were noted throughout the entire woodland in all woodland habitat types and in all age classes. Disturbance associated with this disease is very difficult to predict and could be a prolonged process as trees become sick over time. Measures will be taken to appropriately manage deadwood within areas of the WD1 habitat type using the guidelines produced by the UK Forestry Commission.
- There has been extensive colonisation of the woodland by Sycamore, a naturalised tree in Ireland. This species is able to out compete native tree species in suitable conditions and form a monoculture woodland, which is undesirable from a biodiversity point of view. Appropriate silvicultural measures will be taken to reduce and control the amount of Sycamore present within the woodland habitats.

3.2 The Mixed broadleaved/conifer woodland (WD2)

According to Fossitt, this category of woodland "*...includes woodland areas with mixed stands of broadleaved trees and conifers, where both types have a minimum cover of 25%, and a maximum of 75%. Trees may be either native or 'non-native' species. Mixed broadleaved/conifer plantations are included if the canopy height is greater than 5 m, or 4 m in the case of wetland areas...*". This is the predominant habitat occurring at Balrath Woodland. The habitat is strongly dominated by naturalised and exotic species. The silvicultural plan contained in the Woodland Management Plan will consider whether to retain this habitat type or revert to a more natural woodland habitat, which is the preferable option with regards to biodiversity and climate change, with long-lived, native and naturalised broadleaved trees acting as a carbon sink supporting a much larger biodiversity of flora and fauna.

The conservation priorities for the mixed broadleaved/conifer woodland habitat are broadly the same as those for mixed broadleaved woodland. Given the suitability of the WD2 habitat for both Pine Marten and Red squirrel perhaps some should be retained in the long term.

Pine Marten are present in Balrath woods. The results of the Irish Squirrel Survey 2007 indicated that Red Squirrels "*... have disappeared from a number of counties - Meath, Westmeath, Carlow and Kilkenny - and are under threat elsewhere because of the presence of the grey squirrel...*". However, Grey squirrel were not recorded during the survey period. Recent research (Sheehy *et al* 2018) has indicated a negative impact of Pine marten on grey squirrel occupancy while having a positive effect on Red squirrel occupancy. Red Squirrel has recently become re-established in Meath and there are records within 10 km of Balrath Woodland.

3.3 The Oak-Ash-Hazel woodland (WN2)

This woodland habitat is categorised in Fossitt as "*...Native, semi-natural woodland that occurs on base-rich or calcareous soils that are generally dry or well-drained, or on rocky limestone terrain. This type of woodland is typically dominated by Pedunculate Oak (Quercus robur), Ash (Fraxinus excelsior) or Hazel (Corylus avellana), or by various mixtures of some or all of these trees...*".

There is a sizeable area of WN2 habitat, dominated by Ash but with a strong component of Oak and Alder in wetter areas. Typically, the primary threat to semi-natural woodland (apart from felling) is invasion by more vigorous, exotic or naturalised tree species, in particular Sycamore. When the cover of exotic or naturalised species increases, there is a tendency toward homogeneity in both species' composition and structural diversity. Unfortunately, the prevalence of Ash and indications of the widespread presence of Ash dieback would indicate that this disease and subsequent recolonisation by Sycamore is the primary threat to this habitat. Semi-natural woodland likely supports more invertebrates than any other habitat in Ireland. This is owing to the high degree of structural diversity and consequently large number of habitat niches for invertebrates – for example:

- Wood-borers supported by living wood;
- Specialist invertebrates supported by decaying wood on living trees;
- Specialist invertebrates supported by fallen deadwood;
- Specialist invertebrates supported by leaf-litter and associated fauna;
- Large numbers of mature and larval stages of invertebrates supported by foliage;
- Large numbers of specialist bugs supported by sap;
- Large numbers of insects supported by flowers for both nectar and pollen;

High invertebrate diversity is associated with a high diversity of fauna in general, with many species of mammals (and particularly bats) and birds dependent on invertebrates either directly (feeding on the invertebrates themselves) or indirectly (feeding on mammals/birds that feed on invertebrates. Allowing for semi-natural woodland to regenerate and thrive (through the removal of exotic species) is a priority measure for this habitat. Secondary to this is the monitoring of the situation as regards Ash Dieback and intervention planting if there is not a large enough seed-bank of native tree species present. The approach to Ash dieback, Sycamore and deadwood will be dealt with in the Woodland Management Plan.

3.4 The Wet Willow-Alder-Ash woodland (WN6)

This woodland habitat is categorised in Fossitt as '*...permanently waterlogged sites that are dominated by willows (Salix spp.), Alder (Alnus glutinosa) or Ash (Fraxinus excelsior), or by various combinations of some or all of these trees. It includes woodlands of lakeshores, stagnant waters and fens, known as carr, in addition to woodlands of spring-fed or flushed sites*'. There are numerous areas of WN6 habitat in wet areas, including in the vicinity of the pond and this habitat is associated with many of the drains, especially proximate to pathways where Willow and Birch have quickly regenerated. This habitat is of very high importance as regards invertebrates and avifauna. This habitat has developed naturally where environmental conditions are suitable. The priority here is therefore, to allow these areas of habitat to develop naturally (the exception where this habitat is developing at the expense of ride habitat. The only active management in this woodland type is to limit Sycamore regeneration.

3.5 The Ride habitat, Dry meadow and Grassy Verge (GS2)

During the 1970's two ridelines were established in Balrath wood to enhance plant, invertebrate and avifaunal species diversity. The canopy reduction associated with the ridelines allowed the development of a grassland habitat akin to the Fossitt GS2 category. Roycroft *et al* (2007) suggested that 'Continued management of rides is essential to preserve their conservation value'. The image below (see Figure 43) illustrates scrub encroachment into this grassland habitat. It is predicted that by reinstating these rides there will be a positive impact on species diversity of birds, invertebrates and flora. To achieve the grassland habitat that was once in this area all vegetation must be removed and used elsewhere on site (dead hedges etc). The resulting vegetation must be cut and removed twice a year in early Spring and again in autumn for the first

four years, removing all clippings. Gradually, this mowing regimes will reduce soil nutrients allowing target species (Knapweed, Yarrow, Vetches, Selfheal, Bird's foot trefoil and fine leaved grasses) to flourish. Following this transitioning period the resultant meadow should be cut in a staggered fashion in September with one side cut one year and the other the next. This will limit the catastrophic impacts of mowing on the invertebrate population. The positioning of a rock pile (in the position of the old outdoor classroom) will encourage a suite of crevice requiring invertebrates, viviparous lizard and create a plucking area for the local sparrowhawk population.



Figure 43: Images of the ridelines as they are to day (left) and as they were in the 1970's (right). Image on right taken from Roycroft *et al* (2008).

3.6 The Artificial Pond (FL8)

The pond habitat on site is unfortunately drying out. In recent years it is noted to contain some water, particularly in Winter/Spring, by early summer the pond is gone. In a landscape context this is important as, other than the drains (which contain both agricultural and road runoff) there is no other clean water source for nature as a whole onsite or within a half a kilometre around this isolated site. It is necessary to ameliorate this situation. Hedgehogs were not identified onsite and have been missing for some time according to members of the Balrath Preservation Group. It is likely that their absence could be partly due to the lack of a reliable water source. As an island of habitat in a monotonous agricultural landscape adjacent to roads Balrath must contain all the requirements for nature, including water, if it is to be successful. Botanically the pond is very limited due to dense vegetation around it which should be reduced. Additionally, it contains significant amounts of Pendulous sedge an exotic plant with questionable invasiveness. Restoring water to the pond could be achieved by lining with puddling clay and allowing it to refill with rainwater. Planting the pond up may be necessary as there are no sources for natural colonisation in the vicinity. Donor sites for native plants should be identified in the Meath region. Garden centres should never be used to source aquatic/emergent plants, this is a known mechanism of spreading invasive aquatics such as Water fern and New Zealand Pygmy weed.

Marginal plants such as Meadowsweet (already onsite), Water mint and Purple loosestrife combined with emergent species such as Bulrush (Typha latifolia) and the Common reed would create cover and increase overall diversity. Reinstatement of the pond as a reliable resource to nature is predicted to attract wildlife and enhance diversity of aquatic plants, invertebrates, amphibians and mammals (particularly bat species such as Daubenton's bat).

3.7 The Wet Drains and Ditches (FL8)

The wet drains and ditches on site are a relict of the initial planting of the forestry. They hold very little ecological function being almost devoid of riparian vegetation and contain water containing run off from adjacent roads and agricultural land. Additionally, they do not form part of the ecologically network of the area, they are blind, leading to no other freshwater sources. They are subject to constant disturbance, particularly the larger ones as dogs are encouraged to leap over and into them, this had led to erosion of the drain banks and bare soil. Brash and branches resulting from silvicultural practices could be used to naturally block the now redundant drains with the exception functioning roadside drains.

3.8 Desire lines

There are a large number of desire lines exiting the designated pathways leading to trails throughout all woodland types found onsite. Several methods to prevent this are suggested;

- Dead hedges could be erected
- Split chestnut fencing
- Filling points of egress with Holly

3.9 Connectivity

Balrath occurs in the rural Meath landscape as an island habitat cut off hydrologically and spatially from surrounding natural habitats by agriculture and transport routes. Landowners neighbouring the site could be approached with an aim to resolve this ecological problem. By targeting the farms adjacent to the wood, resources could be provided to strengthen the hedgerow network in the locality.

Improving the hedgerow network will improve connectivity to other key biodiversity areas in the locality thereby increasing species richness and abundance. This action may facilitate the colonisation of the native Red Squirrel of Balrath Woods. Additionally, land owners adjacent to Balrath woods, with pockets of native woodland could be encouraged to take part in the Native Woodlands Conservation Scheme which supports the restoration, conservation and enhancement of existing native woodlands. Such endeavours would greatly enhance connectivity in the landscape surrounding Balrath.

3.10 Invasive species

There is one species of plant listed on Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended) – Spanish Bluebell. These ornamental plants were introduced to Balrath around the car park. Spanish Bluebell is considered as a low risk invasive species. The plants invasiveness is based on how it interbreeds with the native Bluebell rather than on its impacts on habitats. There are no native Bluebells onsite. However, the plant should be removed to protect native Bluebell populations in the surrounding locality. Plants should be dug up in late Spring before they flower. They can be disposed of in a facility licenced to take invasive species. Otherwise, the bulbs can be destroyed onsite by maceration. Care must be taken as the sap contains toxic glycosides which are known to cause dermatitis and skin irritation.

3.11 Dogs

The presence of dog, especially those off lead, in the wood appears to be a causative factor in limiting onsite biodiversity. Additionally, there is a serious issue from a health and safety point of view with the discarding of plastic bags filled with dog excrement into the habitat adjacent to the path. On numerous occasions and locations throughout the woodland plastic bags filled with dog faeces were observed. The material within presents a threat to any persons undertaking work such as strimming, litter picking etc. All habitats on site are subject to disturbance by dogs leading to some noteworthy absences in the recorded flora including Woodcock, Pheasant and Hedgehog as well as erosion of habitats and the production of bare woodland floors. The presence of dogs in the wood should be questioned considering the overriding objective of the woods is to support wildlife.



Figure 44: Examples of bagged dog waste in Balrath.

3.12 **Veteran Tree**

Veteran trees are rare in the Irish landscape, at Balrath, the Veteran Beech tree stands at the heart of the forest along the 'long-walk' is possibly the greatest attraction to those visiting the woods. It's notoriety being key to its veteran status. It is estimated to be approximately 225-250 years old and exhibits several characteristics of a veteran Beech including;

- Diameter at breast height of over three meters (estimated at over 5m),
- The presence of brown and white rot,
- Hollowing of the trunk
- Crevices filled with humus
- Abundant crevices
- Fungal growth including *Ganoderma* species
- Dry deadwood still attached to the tree in the uppermost branches
- It supports other plant species including Hart's tongue fern and several moss species
- Hollowing at the base of the tree between roots
- Potential nesting/roosting site for birds
- Potential roosting site for bats

As it stands, the tree is not old enough to be labelled an ancient tree, and its naturalised status prevents this. However, it should be managed appropriately to ensure its veteran status into the future. Currently access to the tree is unhindered. This has resulted in damage to the roots system much of which is exposed. This is likely in part due to the original planting of the tree as part of the Summerville Estate, on top of an earth and rock mound. The tree's admirers have clambered over the root system over the centuries evidenced in extreme root exposure. The level of footfall surrounding the tree at Balrath woods is extremely high. The litter component of the woodland floor has vanished due to continuous footfall. Dead wood has been removed for hut building and compaction of the woodland floor has resulted in raw exposed earth in large areas. Best practice for prolonging the life of veteran trees is to provide an exclusion zone around trees to avoid ground compaction (Teagasc). To maintain the tree into the future fencing off this area of the wood would be pertinent. The overall Woodland Management Plan will include a prognosis for the veteran into the future with any prescriptive procedures it requires.



Figure 45: The veteran 250 year Old, Beech Tree at the centre of the woods

3.13 Future Monitoring

To assess the success of the recommendations laid out in this report, monitoring should be conducted in five years to assess biodiversity using a similar methodology to that utilised in the baseline Biodiversity Assessment section. An assessment of biodiversity net gain may then be produced by reassessing habitat condition scores for each habitat.

3.14 Tree Nursery

Action 36 of the Draft Meath Biodiversity Action Plan 2025-20130 is to assess the feasibility of developing a native tree nursery and outdoor classroom space on a local authority owned site with a view to rearing stock of local provenance that can supply local projects and initiatives. The aim of this action is to support efforts to reduce the risk of importing invasive alien species and emergent plant diseases, maintain the genetic integrity of native flora and help build capacity in County Meath to rear tree stock of local provenance. Balrath woods is not a potential site for the establishment of a native tree nursery, but it is a site that would benefit greatly from having a reliable supply of Irish grown stock.

3.15 Climate resilience

The overall woodland management plan will include silvicultural procedures in the woodland habitats described to allow for greater climate resilience in the future ensuring long term health and functionality of Balrath woods.

3.16 Changing behaviour

Presently Balrath woods is a destination for recreational users dog walkers rather than a place where the nature and ecology is paramount. The concepts of eliciting behavioural change in the public and altering people's conservation related behaviours is beyond the scope of this report and involves the disciplines of sociology, education and psychology. Increased awareness is essential and could be achieved through:

- Partnering with local schools
- Using the arts for conservation
- Citizen science projects
- Social media

Table 4: Summary of actions associated with recommendations made and their potential outcomes

Habitat	Fossitt code	Actions to maintain/enhance biodiversity	Outcomes
Mixed Broadleaved woodland	WD1	Remove Sycamore seedlings by cutting or pulling. Ring bark or cut out individual Sycamore at pole stage. Obscure and block desire lines with Chestnut fencing, dead hedging or with spinose plants such as Holly and Blackthorn.	Natural regeneration of native and naturalised tree species without an overabundance of Sycamore. Improved woodland structural diversity. Reduction in exposed and eroded soil. Reduced disturbance to ground flora and ground nesting birds.
Mixed broadleaf and Conifer woodland	WD2	Remove Sycamore seedlings by cutting or pulling. Ring bark or cut out individual Sycamore at pole stage. Obscure and block desire lines with Chestnut fencing, dead hedging or with spinose plants such as Holly and Blackthorn	Natural regeneration of native and naturalised tree species without an overabundance of Sycamore. Improved woodland structural diversity. Improved woodland structural diversity. Reduction in exposed and eroded soil. Reduced disturbance to ground flora and ground nesting birds.
Oak, Ash, Hazel Woodland	WN2	Remove Sycamore seedlings by cutting or pulling. Ring bark or cut out individual Sycamore at pole stage. Obscure and block desire lines with Chestnut fencing, dead	Natural regeneration of native and naturalised tree species without an overabundance of Sycamore. Improved woodland structural diversity.

		hedging or with spinose plants such as Holly and Blackthorn.	Reduction in exposed and eroded soil. Reduced disturbance to ground flora and ground nesting birds.
Wet Willow, Alder, Ash Woodland	WN6	Remove Sycamore seedlings by cutting or pulling. Ring bark or cut out individual Sycamore at pole stage. Obscure and block desire lines with Chestnut fencing, dead hedging or with spinose plants such as Holly and Blackthorn.	Natural regeneration of native and naturalised tree species without an overabundance of Sycamore. Improved woodland structural diversity. Reduction in exposed and eroded soil. Reduced disturbance to ground flora and ground nesting birds.
Reinstatement of Ride habitat, conversion of poor-quality scrub to dry meadow/grassy verge	GS2	Remove scrub and implement a cutting regime which reduces soil nutrient levels.	Production of woodland edge habitat with a more diverse flora benefiting invertebrates and avifauna.
Artificial pond restoration	FL8	Redeveloping the pond to create a reliable wetland habitat which will act as a water source for mammals utilising the wood.	Increase in diversity of invertebrates and plants. A reliable resource for frogs to carry out their entire lifecycle. A foraging area to encourage Daubenton's bat.
Blocking Drainage ditches	FW4	Block the drains physically with brash and other vegetative material arising from silvicultural processes onsite. This measure would not include functioning drains associated with adjacent roadways.	Create a more natural wet woodland habitat.

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www.npws.ie – National Parks and Wildlife Service, source of information for data regarding Natura 2000 sites and Article 17 Conservation Assessments.

www.europa.eu – official website of the European Union, source of information on EU Directives.

5 Appendices

5.1 List of species recorded in NBDC database within Burtonstown townland

Scientific Name	Common Name	Date of last record
Abraxas grossulariata	Magpie	06/08/2010
Accipiter nisus	Eurasian Sparrowhawk	04/01/2018
Acer pseudoplatanus	Sycamore	29/08/2022
Acleris emargana	Notch Wing Tortix	06/08/2010
Acleris laterana	Acleris laterana	06/08/2010
Acrocercops brongniardella	Acrocercops brongniardella	28/10/2019
Aesculus hippocastanum	Horse-chestnut	09/05/2023
Agriphila straminella	Straw Grass-veneer	06/08/2010
Agriphila tristella	Common Grass-veneer	06/08/2010
Agrostis stolonifera	Creeping Bent	11/04/2005
Alcis repandata	Mottled Beauty	19/07/2008
Alnus glutinosa	Alder	29/08/2022
Amphipyra pyramidea	Copper Underwing	06/08/2010
Angelica sylvestris	Wild Angelica	11/04/2005
Apamea monoglypha	Dark Arches	06/08/2010
Apeira syringaria	Lilac Beauty	19/07/2008
Arum maculatum	Lords-and-Ladies	25/04/2023
Betula pubescens	Downy Birch	04/03/2022
Blastobasis adustella	Furness Dowd	06/08/2010
Bombus	Bombus	31/03/2019
Cabera exanthemata	Common Wave	06/08/2010
Calliteara pudibunda	Pale Tussock	23/06/2008
Caltha palustris	Marsh-marigold	03/04/2022
Cardamine flexuosa	Wavy Bitter-cress	11/04/2005
Cardamine pratensis	Cuckooflower	09/05/2023
Carduelis carduelis	European Goldfinch	04/01/2018
Carduelis chloris	European Greenfinch	04/01/2018
Carex flacca	Glaucous Sedge	11/04/2005
Carex pendula	Pendulous Sedge	25/03/2022
Carex sylvatica	Wood-sedge	08/04/2022
Celaena leucostigma	Crescent	19/07/2008
Certhia familiaris	Eurasian Treecreeper	17/05/2021
Chamerion angustifolium	Rosebay Willowherb	06/07/2020
Chloroclysta citrata	Dark Marbled Carpet	06/08/2010
Chloroclysta truncata	Common Marbled Carpet	16/09/2008
Chrysosplenium oppositifolium	Opposite-leaved Golden-saxifrage	03/02/2023
Circaea lutetiana	Enchanter's-nightshade	29/08/2020
Cirsium palustre	Marsh Thistle	11/04/2005
Coleophora serratella	Coleophora serratella	08/06/2014
Cornus sericea	Red-osier Dogwood	11/04/2005
Corvus corax	Common Raven	03/02/2023

Corvus cornix	Hooded Crow	04/01/2018
Corvus frugilegus	Rook	31/03/2019
Corvus monedula	Eurasian Jackdaw	04/01/2018
Corylus avellana	Hazel	29/08/2022
Cosmia trapezina	Dun-bar	06/08/2010
Crataegus monogyna	Hawthorn	09/05/2023
Crocallis elinguaria	Scalloped Oak	06/08/2010
Cyanistes caeruleus	Blue Tit	03/02/2023
Cymbalaria muralis	Ivy-leaved Toadflax	29/05/2021
Diarsia mendica	Ingrailed Clay	23/06/2008
Diarsia rubi	Small Square-spot	06/08/2010
Dryopteris affinis	Scaly Male-fern	05/02/2022
Dryopteris dilatata	Broad Buckler-fern	11/04/2005
Ecliptopera silaceata	Small Phoenix	06/08/2010
Eilema depressa	Buff Footman	06/08/2010
Eilema lurideola	Common Footman	19/07/2008
Ennomos alniaria	Canary-shouldered Thorn	16/09/2008
Ennomos quercinaria	August Thorn	06/08/2010
Epilobium hirsutum	Great Willowherb	28/08/2020
Epinotia subocellana	Epinotia subocellana	07/05/2011
Epione repandaria	Bordered Beauty	06/08/2010
Epirrhoe alternata	Common Carpet	06/08/2010
Erinaceus europaeus	West European Hedgehog	08/07/2011
Eriocrania salopiella	Eriocrania salopiella	08/06/2014
Eristalis pertinax	Eristalis pertinax	24/03/2023
Eulithis prunata	Eulithis prunata	14/08/2008
Euphorbia helioscopia	Sun Spurge	25/03/2022
Eupithecia virgaureata	Golden-rod Pug	06/08/2010
Euproctis similis	Yellow-tail	06/08/2010
Euthrix potatoria	Drinker	06/08/2010
Fagus sylvatica	Beech	29/08/2022
Filipendula ulmaria	Meadowsweet	25/03/2022
Fraxinus excelsior	Ash	29/08/2022
Fringilla coelebs	Chaffinch	31/03/2019
Galium aparine	Cleavers	04/03/2022
Gallinula chloropus	Common Moorhen	04/01/2018
Garrulus glandarius	Eurasian Jay	03/02/2023
Geometra papilionaria	Large Emerald	19/07/2008
Geranium robertianum	Herb-Robert	29/08/2022
Geum urbanum	Wood Avens	11/04/2005
Glyceria fluitans	Floating Sweet-grass	11/04/2005
Hedera helix	Ivy	04/03/2022
Hepialus fusconebulosa form	Map-winged Swift	23/06/2008
Heracleum sphondylium	Hogweed	25/03/2022
Holcus lanatus	Yorkshire-fog	11/04/2005
Hyacinthoides hispanica	Spanish Bluebell	08/04/2022
Hyacinthoides non-scripta	Bluebell	18/05/2022

Hydriomena furcata	July Highflyer	06/08/2010
Hypena proboscidalis	Snout	06/08/2010
Hypericum tetrapterum	Square-stalked St John's-wort	11/04/2005
Idaea aversata	Riband Wave	06/08/2010
Idaea biselata	Small Fan-footed Wave	06/08/2010
Idaea dimidiata	Single-dotted Wave	06/08/2010
Ilex aquifolium	Holly	08/04/2022
Incurvaria masculella	Incurvaria masculella	03/05/2015
Jodis lactearia	Little Emerald	19/07/2008
Juncus effusus	Soft-rush	11/04/2005
Juncus inflexus	Hard Rush	11/04/2005
Laothoe populi	Poplar Hawk-moth	06/08/2010
Larus ridibundus	Black-headed Gull	04/01/2018
Lathyrus pratensis	Meadow Vetchling	06/07/2020
Lithophane hepatica	Pale Pinion	16/09/2008
Lomaspilis marginata	Clouded Border	19/07/2008
Lonicera periclymenum	Honeysuckle	14/03/2022
Meles meles	Eurasian Badger	23/02/2012
Mompha terminella	Mompha terminella	13/07/2016
Mythimna pallens	Common Wainscot	19/07/2008
Noctua janthe	Lesser Broad-bordered Yellow	06/08/2010
Noctua pronuba	Large Yellow Underwing	06/08/2010
Notodonta ziczac	Pebble Prominent	19/07/2008
Opisthograptis luteolata	Brimstone Moth	19/07/2008
Orthosia gothica	Hebrew Character	14/05/2008
Pandemis corylana	Chequered Fruit-tree Tortrix	06/08/2010
Pandemis heparana	Dark Fruit-tree Tortrix	06/08/2010
Parornix devoniella	Parornix devoniella	28/10/2019
Parus major	Great Tit	03/02/2023
Passer domesticus	House Sparrow	04/01/2018
Passer montanus	Eurasian Tree Sparrow	04/01/2018
Peribatodes rhomboidaria	Willow Beauty	06/08/2010
Periparus ater	Coal Tit	31/03/2019
Phasianus colchicus	Common Pheasant	04/01/2018
Pheosia gnoma	Lesser Swallow Prominent	19/07/2008
Phyllitis scolopendrium	Hart's-tongue	03/02/2023
Phyllonorycter heegeriella	Phyllonorycter heegeriella	07/05/2011
Phyllonorycter maestingella	Phyllonorycter maestingella	28/10/2019
Phyllonorycter quercifoliella	Phyllonorycter quercifoliella	15/06/2014
Pica pica	Black-billed Magpie	04/01/2018
Plantago lanceolata	Ribwort Plantain	09/05/2023
Pleuroptya ruralis	Mother of Pearl	06/08/2010
Polystichum setiferum	Soft Shield-fern	03/02/2023
Primula vulgaris	Primrose	16/04/2023
Prunella modularis	Hedge Accentor	04/01/2018
Prunella vulgaris	Selfheal	11/04/2005
Prunus laurocerasus	Cherry Laurel	08/04/2022

Ptilodon capucina	Coxcomb Prominent	19/07/2008
Pyrobombus) pratorum	Early Bumble Bee (Bombus	22/03/2022
Pyrrhula pyrrhula	Common Bullfinch	04/01/2018
Quercus robur	Pedunculate Oak	16/06/2021
Rana temporaria	Common Frog	13/02/2018
Ranunculus acris	Meadow Buttercup	04/03/2022
Ranunculus ficaria	Lesser Celandine	24/03/2023
Ranunculus repens	Creeping Buttercup	09/05/2023
Regulus regulus	Goldcrest	04/01/2018
Rivula sericealis	Straw Dot	06/08/2010
Rosa canina	Dog-rose	25/03/2022
Rubus fruticosus agg.	Bramble	04/03/2022
Rubus idaeus	Raspberry	25/03/2022
Rumex acetosella	Sheep's Sorrel	25/03/2022
Rumex obtusifolius	Broad-leaved Dock	08/04/2022
Rumex sanguineus	Rumex sanguineus	11/04/2005
Salix cinerea	Salix cinerea	11/04/2005
Sambucus nigra	Elder	29/08/2022
Scotopteryx chenopodiata	Shaded Broad-bar	06/08/2010
Scrophularia nodosa	Common Figwort	25/03/2022
Selenia dentaria	Early Thorn	06/08/2010
Senecio aquaticus	Marsh Ragwort	11/04/2005
Silene dioica	Red Campion	26/04/2023
Solanum dulcamara	Bittersweet	29/08/2022
Spilosoma lubricipeda	White Ermine	23/06/2008
Stachys sylvatica	Hedge Woundwort	06/07/2020
Stigmella hemargyrella	Stigmella hemargyrella	28/10/2019
Stigmella lapponica	Stigmella lapponica	08/06/2014
Stigmella microtheriella	Stigmella microtheriella	07/08/2014
Stigmella tityrella	Stigmella tityrella	28/10/2019
Sturnus vulgaris	Common Starling	04/01/2018
Sylvia atricapilla	Blackcap	06/07/2020
Taraxacum aggregate	Taraxacum aggregate	14/03/2022
Thoracombus) pascuorum	Common Carder Bee (Bombus	31/03/2019
Thyatira batis	Peach Blossom	23/06/2008
Trifolium repens	White Clover	25/03/2022
Troglodytes troglodytes	Winter Wren	31/03/2019
Turdus philomelos	Song Thrush	04/01/2018
Turdus pilaris	Fieldfare	03/02/2023
Turdus viscivorus	Mistle Thrush	04/01/2018
Udea lutealis	Udea lutealis	06/08/2010
Udea prunalis	Dusky Pearl	06/08/2010
Ulex europaeus	Gorse	25/03/2022
Urtica dioica	Common Nettle	25/03/2022
Veronica chamaedrys	Germander Speedwell	25/03/2022
Veronica persica	Common Field-speedwell	04/03/2022
Viburnum opulus	Guelder-rose	25/03/2022

Vicia sepium	Bush Vetch	25/03/2022
Viola riviniana	Common Dog-violet	02/04/2023
Vulpes vulpes	Red Fox	29/08/2010
Xanthorhoe designata	Flame Carpet	06/08/2010
Xanthorhoe montanata	Silver-ground Carpet	23/06/2008
Zanclognatha tarsipennalis	Fan-foot	06/08/2010

5.2 List of plant species recorded in Balrath woods during the survey period

Common Name	Latin name
Alder	*Alnus glutinosa*
Barren strawberry	*Potentilla sterilis*
Beech	*Fagus sylvatica*
Birch	*Betula pubescens*
Bird cherry	*Prunus padus*
Black currant	*Ribes nigrum*
Blackthorn	*Prunus spinosa*
Bramble	*Rubus fructicosus*
Broad buckler fern	*Dryopteris dilitata*
Bush vetch	*Vicia sepium*
Cherry laurel	*Prunus laurocerasus*
Cleavers	*Gallium aparine*
Cock's foot grass	*Dactylis glomerata*
Common feather moss	*Kindbergia praelonga*
Common smooth cap	*Atricum undulatum*
Creeping bent grass	*Agrostis stonifera*
Creeping buttercup	*Ranunculus repens*
Crested dog's tail	*Cynosurus cristata*
Curled dock	*Rumex crispus*
Cut leaved crane's-bill	*Geranium dissectum*
Cypress-leaved plait moss	*Hypnum cupressiforme*
Dandelion	*Taraxacum agg.*
Dog rose	*Rosa canina*
Dogwood	*Cornus sericea*

Elderberry	*Sambucus nigra*
Enchanter's nightshade	*Circaea lutetiana*
European aspen	*Populus tremula*
False brome	*Brachypodium sylvaticum*
Figwort	*Scrophularia nodosa*
Fox-tail feather moss	*Thamnobryum alopecurum*
Germander speedwell	*Veronica chamaedrys*
Glittering wood moss	*Hylocomnium splendens*
Gorse or Whin	*Ulex europeaus*
Green ribbed sedge	*Carex binervis*
Grey willow	*Salix cinerea*
Ground elder	*Aegopodium podargraria*
Hard rush	*Juncus inflexus*
Hart's tongue fern	*Asplenium scolopendrium*
Hawthorn	*Polystichum setiferum*
Hay scented buckler fern	*Dryopteris aemula*
Hazel	*Corylus avellana*
Herb bennet	*Geum urbanum*
Herb robert	*Geranium robertiana*
Hogweed	*Heracleum sphondylium*
Holly	*Ilex aquifolium*
Honeysuckle	*Lonicera periclymenun*
Horse chestnut	*Aesculus hippocastanum*
Ivy	*Hedera helix*
Juicy lucy moss	*Pseudoscleropodium purum*
Lady fern	*Athyrium filix-femina*

Lanky moss	*Rhytidiadelphus loreus*
Long stalked sedge	*Carex pendiculata*
Male fern	*Dryopteris filix-mas*
Marsh marigold	*Caltha palustris*
Meadow foxtail	*Alopecurus pratensis*
Meadowsweet	*Filipendula ulmaria*
Nettle	*Urtica dioica*
Nipplewort	*Lapsana communis*
Northern red oak	*Quercus rubra*
Norway spruce	*Picea abies*
Obtuse dock	*Rumex obtusifolia*
Opposite leaved Golden saxifrage	*Chryosplenium oppositifolium*
Pearlwort	*Sagina procumbens*
Perennial ryegrass	*Lolium perenne*
Pilewort	*Ficaria verna*
Primrose	*Primula vulgaris*
Privet	*Ligustrum ovalifolium*
Raspberry	*Rubus idaeus*
Red campion	*Silene dioica*
Remote sedge	*Carex remota*
Ribwort plantain	*Plantago lanceolata*
Rosebay willowherb	*Chamaenerion angustifolium*
Rough stalked feather moss	*Brachythecium rutabulum*
Rowan	*Sorbus acuparia*
Sessile Oak	*Quercus pertaea*
Sitka spruce	*Picea sitchensis*

Soft shield fern	*Polystichium sitiferum*
Spanish bluebell	*Hyacinthoides hispanica*
Spindle	*Euonymus europaeus*
Square stemmed St John's wort	*Hypericum tetrapterum*
Sycamore	*Acer pseudoplatanus*
Tamarisk feather moss	*Thuidium tamariscinum*
Tree moss	*Climacium dendroides*
Wavy bittercress	*Cardamine flexuosa*
White Clover	*Trifolium repens*
Wood dock	*Rumex sanguineus*
Wood speedwell	*Veronica montana*
Yarrow	*Achillia millifolium*
Yellow flag iris	*Iris pseudoacorus*
Yorkshire fog	*Holcus lanatus*

5.3 List of plant species appearing on the Third Schedule (as amended by SI 355/2015)

Common Name	Latin Name	Associated with freshwater
American skunk-cabbage	*Lysichiton americanus*	*Yes*
Red alga	*Grateloupia doryphora*	*No*
Brazilian giant-rhubarb	*Gunnera manicata*	*Yes*
Broad-leaved rush	*Juncus planifolius*	*Yes*
Cape pondweed	*Aponogeton distachyos*	*Yes*
Cord-grasses	*Spartina (all species hybrids)*	*No*
Curly waterweed	*Lagarosiphon major*	*Yes*
Dwarf eel-grass	*Zostera japonica*	*No*
Fanwort	*Cabomba caroliniana*	*Yes*
Floating pennywort	*Hydrocotyle ranunculoides*	*Yes*
Fringed water-lily	*Nymphoides peltata*	*Yes*
Giant hogweed	*Heracleum mantegazzianum*	*Yes*
Giant knotweed	*Fallopia sachalinensis*	*Yes*
Giant-rhubarb	*Gunnera tinctoria*	*Yes*
Giant salvinia	*Salvinia molesta*	*Yes*
Himalayan balsam	*Impatiens glandulifera*	*Yes*
Himalayan knotweed	*Persicaria wallichii*	*Yes*
Hottentot-fig	*Carpobrotus edulis*	*No*
Japanese knotweed	*Fallopia japonica*	*Yes*
Large-flowered waterweed	*Egeria densa*	*Yes*

Mile-a-minute weed	*Persicaria perfoliata*	*Yes*
New Zealand pigmyweed	*Crassula helmsii*	*Yes*
Parrot's feather	*Myriophyllum aquaticum*	*Yes*
Rhododendron	*Rhododendron ponticum*	*No*
Salmonberry	*Rubus spectabilis*	*Yes*
Sea-buckthorn	*Hippophae rhamnoides*	*No*
Spanish bluebell	*Hyacinthoides hispanica*	*No*
Three-cornered leek	*Allium triquetrum*	*No*
Wakame	*Undaria pinnatifida*	*No*
Water chestnut	*Trapa natans*	*Yes*
Water fern	*Azolla filiculoides*	*Yes*
Water-primrose	*Ludwigia (all species)*	*Yes*
Waterweeds	*Elodea (all species except E. canadensis)*	*Yes*
Wireweed	*Sargassum muticum*	*Marine/transition*

5.4 Reléves

Relevé 1	
	Relevé size: 10M X 10M Habitat type: WD2 Slope: 0 degrees Bare earth: 0% Bare rock – 0% Litter – 20% Bryophyte Cover: 15% Herb height: 20cm Ground layer: 100% Field Layer 30 % Shrub Layer: 15% **Canopy** 90% **Topography**: Flat **Soil Moisture regime**: free draining

Species	% COVER
Acer pseudoplatanus	15
Corylus avellana	3
Fagus sylvatica	20
Quercus petraea	10
Hedera helix	100
Rubus fruticosus agg.	50
Dryopteris dilatata	5
Phly scolopendrium	2
Polystichum setiferum	6
Ilex aquifolium	3
Fraxinus excelsior	20
Picea abies	50
Thuidium tamariscinum	7
Hylocomium splendens	8

Relevé 2



Relevé size: 10M X 10M

Habitat type: WD1

Slope:5 degrees

Bare earth: 10%

Bare rock – 0%

Litter – 5%

Bryophyte Cover: 30%

Herb height: 20cm

Low woody species cover: 80

Ground layer: 85%

Field Layer 20 %

Shrub Layer: 20%

Canopy 85%

Topography: Flat

Soil moisture regime: free draining

Species	% COVER
Acer pseudoplatanus	+
Betula pubescens	60
Corylus avellana	50
Crataegus monogyna	7
Fagus sylvatica	5
Fraxinus excelsior	15
Ilex aquifolium	2
Picea sitchensis	+
Hedera helix	80
Rubus fruiticosus agg.	10
Geum urbanum	+
Heracleum sphondyllium	4
Primula vulgaris	15
Polystichum setifera	5
Dryopteris aemula	2
Dryopteris affinis	+
Asplenium scolopendrium	3
Rumex crispus	1
Thuidium tamariscinum	15
Hylocomium splendens	15

Relevé 3



Relevé size: 10M X 10M
Habitat type: WN6
Slope:0 degrees
Bare earth:10 %
Bare rock – 0%
Litter – 35%
Bryophyte Cover: 35%
Herb height: 30cm
Low woody species cover: 80%
Ground layer: 90%
Field Layer 50 %
Shrub Layer: 20%
Canopy 85%
Topography: Flat
Soil Moisture regime: Strongly impeded

Species	%	Notes/com
Aesculus hippocastanum	40	
Alnus glutinosa	5	
Betula pubescens	20	
Fraxinus excelsior	20	
Quercus petraea	95	
Salix cinerea	1	
Hedera helix	80	
Rubus fruticosus agg.	50	
Quercus rubra	15	
Circaea lutetiana	3	
Geum urbanum	2	
Hypericum tetrapterum	+	
Ranunculus repens	+	
Rumex sanguineus	+	
Scrophularia nodosa	1	
Veronica montana	+	
Carex remota	4	
Holcus lanatus	10	
Dryopteris affinis	2	
Dryopteris dilitata	2	
Atrichum undulatum	5	
Hylocomium splendens	10	

Rhytidiadelphus loreus	10	
Thuidium tamariscinum	10	
Polystichum setiferum	2	

Relevé 4



Relevé size: 10M X 10M

Habitat type: WD2

Slope:0 degrees

Bare earth:0%

Bare rock – 0%

Litter – 100%

Bryophyte Cover: 60%

Herb height: 25cm

Low woody species cover: 100%

Ground layer: 95%

Field Layer 30 %

Shrub Layer: 5%

Canopy 85%

Topography: flat

Soil moisture regime: Free draining

Species	%	Notes/com
Acer pseudoplatanus	50	
Fraxinus excelsior	80	
Hedera helix	100	
Rubus fruticosus agg.	15	
Geum urbanum	+	
Dryopteris affinis	4	
Dryopteris dilitata	5	
Asplenium scolopendrium	2	
Thuidium tamariscinum	20	
Polystichum setiferum	8	
Cinclidotus fontinaloides	10	
Hylocomium splendens	10	
Hypnum cupresiforme	20	

Relevé 5



Relevé size: 10M X 10M

Habitat type: WD1

Slope:0 degrees

Bare earth:60%

Bare rock – 0%

Litter – 50%

Bryophyte Cover: 1%

Herb height: 25cm

Low woody species cover: 20%

Ground layer: 0%

Field Layer 0 %

Shrub Layer: 0%

Canopy 80%

Topography: undulating

Soil Moisture regime: Soil compacted but free-draining

Species	%	Notes/com
Corylus avellana	25	
Fagus sylvatica	80	
Fraxinus excelsior	20	
Hedera helix	25	
Asplenium scolopendrium	+	
Polystichum setiferum	+	

Relevé 6		
	Relevé size: 10M X 10M Habitat type: WD2 Slope:0 degrees Bare earth:0% Bare rock – 0% Litter – 50% Bryophyte Cover: 80% Herb height: 25cm Low woody species cover: 20% Ground layer: 0% Field Layer 0 % Shrub Layer: 0% **Canopy** 90% **Topography:** flat **Soil Moisture Regime:** Free draining	
Species	%	Notes/com
Corylus avellana	5	
Fraxinus excelsior	20	
Sambucus nigra	1	
Hedera helix	85	
Dryopteris dilitata	35	
Asplenium scolopendrium	8	
Picea abies	90	
Polystichum setiferum		

Relevé 7		
	Relevé size: 10M X 10M Habitat type: WN2 Slope:0 degrees Bare earth:0% Bare rock – 0% Litter – 50% Bryophyte Cover: 80% Herb height: 25cm Low woody species cover: 20% Ground layer: 0% Field Layer 0 % Shrub Layer: 0% **Canopy** 60% **Topography**: slight depression **Soil moisture regime:** Impeded	
Species	%	Notes/com
Euonymus europeaus	10	
Fraxinus excelsior	15	
Quercus petrea	90	
Salix cinerea	20	
Hedera helix	80	
Rubus idaeus	10	
Rubus fruticosus	20	
Circaea lutetiana	8	
Geum urbanum	8	
Rumex obtusifolius	8	
Urtica dioica	2	
Holcus lanatus	3	
Asplenium scolopendrium	4	
Polystichum setiferum	30	

Relevé 8



Relevé size: 10M X 10M

Habitat type: WN2

Slope:0 degrees

Bare earth:0%

Bare rock – 0%

Litter – 50%

Bryophyte Cover: 80%

Herb height: 25cm

Low woody species cover: 20%

Ground layer: 0%

Field Layer 0 %

Shrub Layer: 0%

Canopy 60%

Topography: flat

Soil moisture regime: Impeded

Species	%	Notes/com
Alnus glutinosa	15	
Crataegus monogyna	+	
Fraxinus excelsior	50	
Quercus petraea	10	
Salix cinerea	10	
Cornus sericea	+	
Hedera helix	85	
Rubus fruticosus agg	80	
Cardamine hirsuta	+	
Circaea lutetiana	15	
Heracleum sphondylium	+	
Dryopteris dilatata	5	
Polystichium setiferium	5	
Cinclidotus fontinaloides	10	
Hylocomium splendens	10	
Hypunm cupresiforme	10	
Rhytidiadelpus loreus	5	
Thuidium tamariscinum	5	