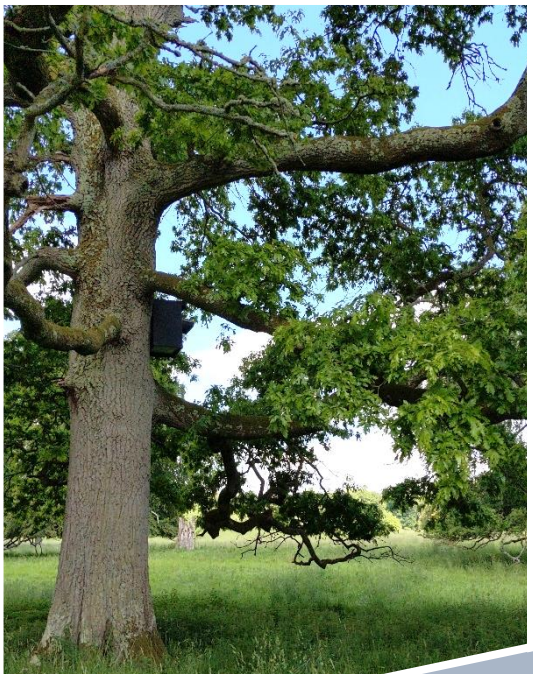
PRELIMINARY HABITAT AND BAT SURVEYS OF DUNSANY NATURE RESERVE, DUNSANY, CO. MEATH



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1 Introduction

1.1 Background

Forest, Environmental Research and Services (FERS) Ltd. were commissioned by Randal Plunkett to provide a baseline assessment of the habitats/flora and bat fauna present within the Dunsany Nature Reserve. In 2014 Randall decided to convert part of his 647 hectares (ha) estate to “rewilding”. Dunsany Nature Reserve was consequently founded by Randal Plunkett and is Ireland’s largest privately owned nature reserve.

The study area at Dunsany Nature Reserve comprises several blocks totalling approximately 220ha. The main block comprises land surrounding Dunsany Castle (See Figure 1) along with the Railway Wood, Cricket Field Duck Pond Wood and Moore’s Hill Wood to the west of the L2207. This core block covers an area of approximately 170 hectares containing mainly grassland, mixed woodland habitats, sections of the River Skane and built structures. The remainder of the land totals 50ha and is found to the north and south of the main grounds along the L2207. These lands comprise primarily mixed deciduous woodland along with small areas of grassland, marsh and arable land.

Figure 1: Overview of habitats surrounding Dunsany Castle.

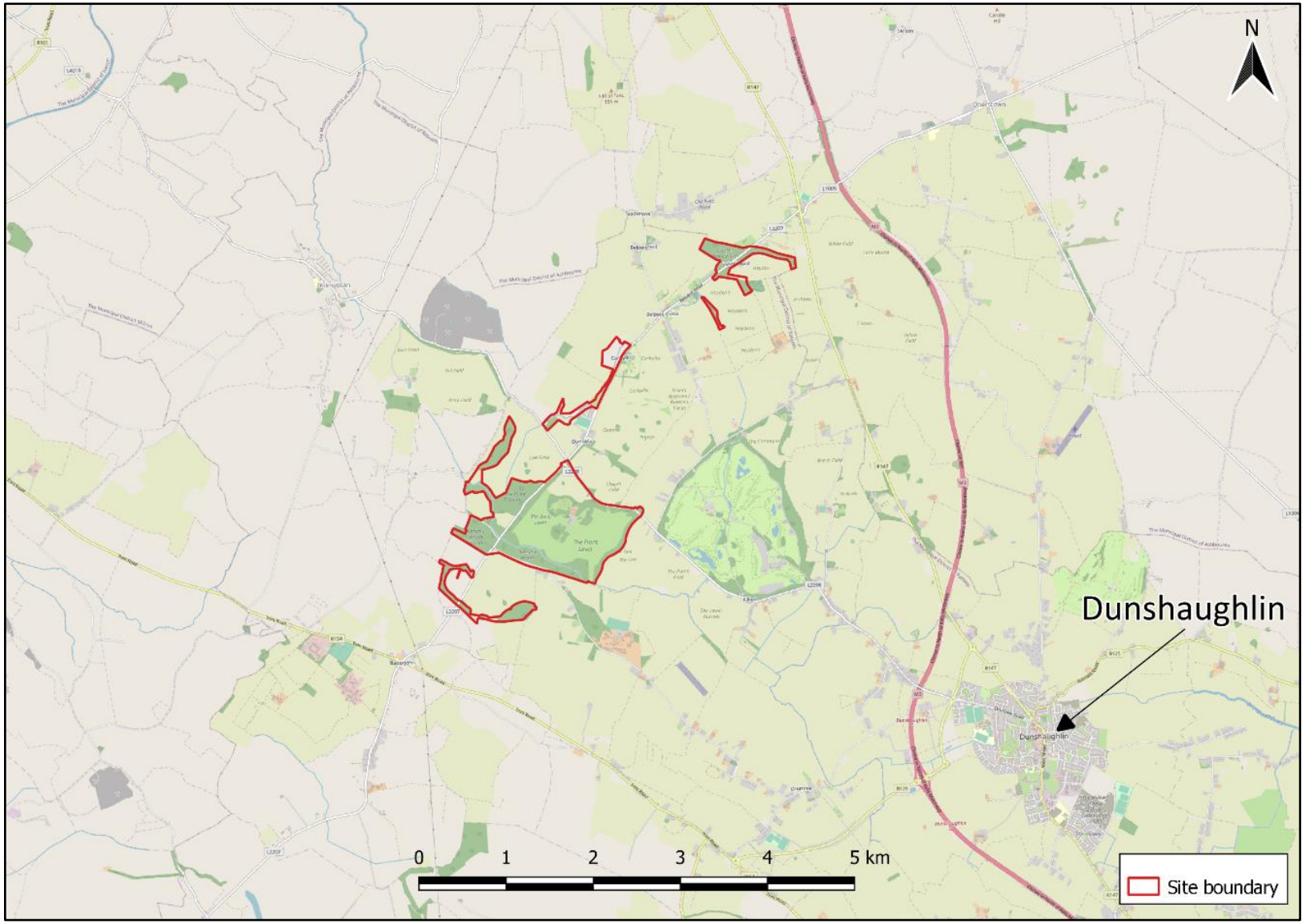


Figure 2: Dunsany Nature Reserve study area (1:50,000).

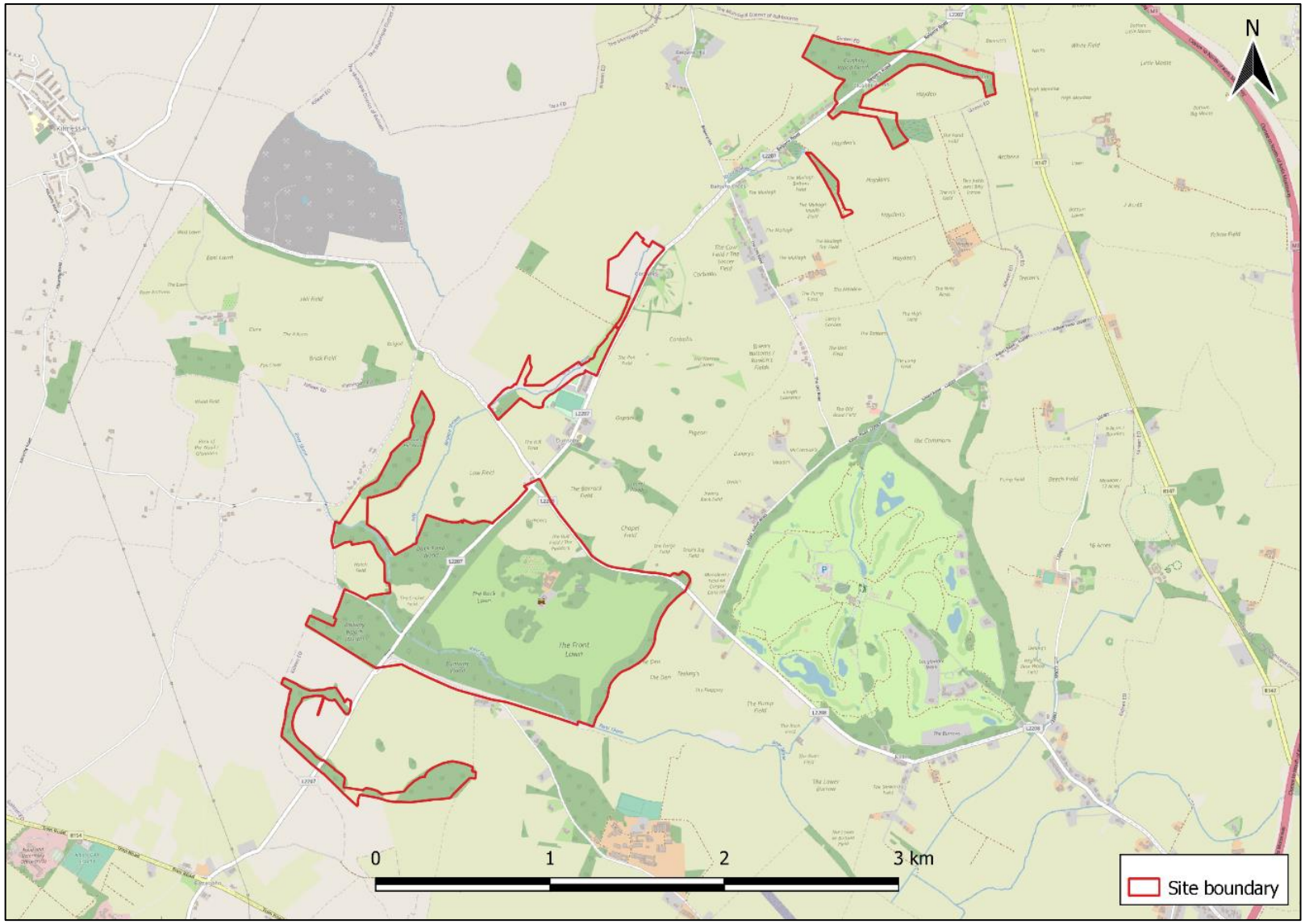


Figure 3: Dunsany Nature Reserve study area (1:25,000).

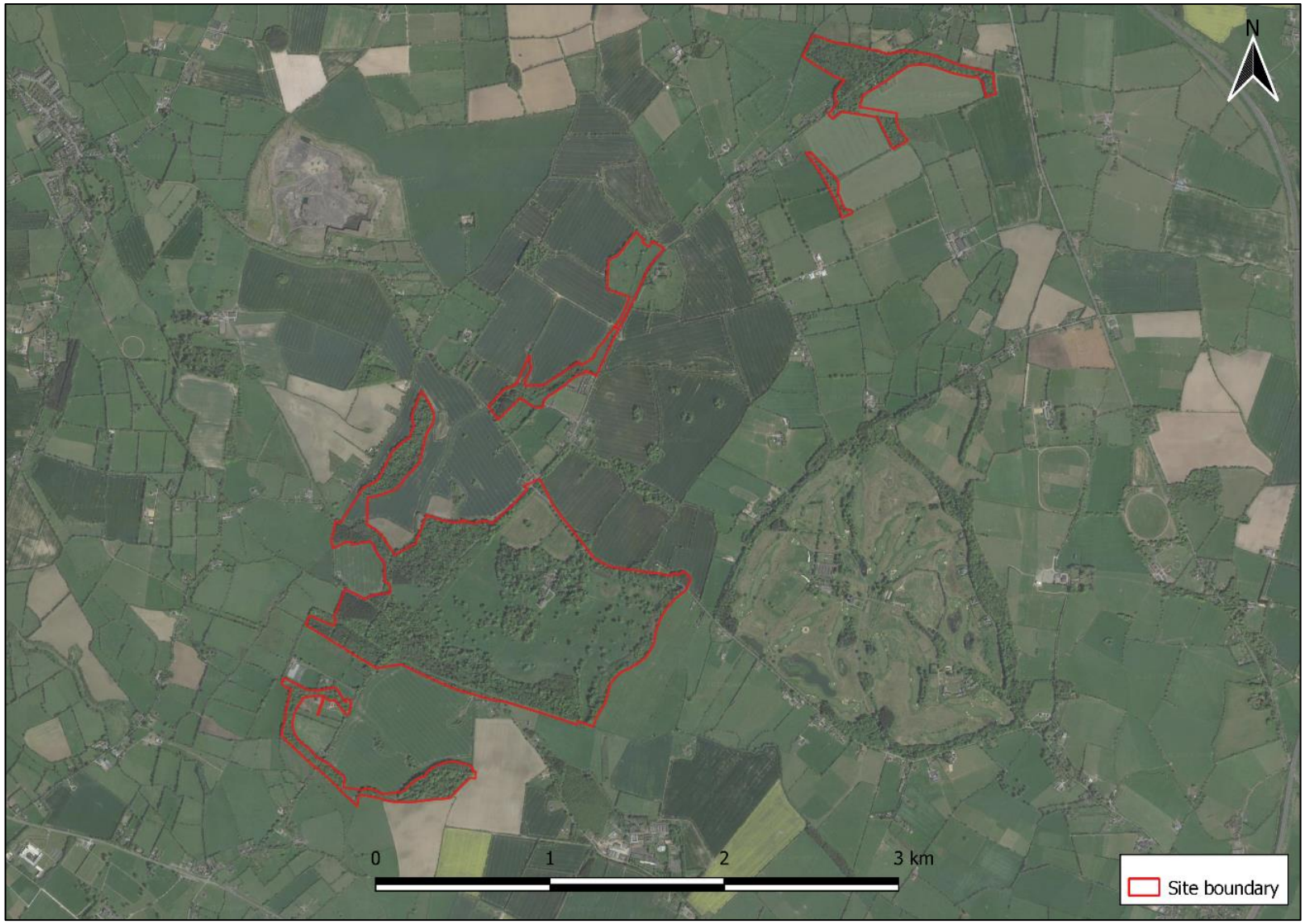


Figure 4: Dunsany Nature Reserve study area (1:25,000).

1.2 FERS Ltd. company background

FERS Ltd. have been conducting ecological surveys and research since the company's formation in 2005 by Dr. Patrick Moran and Dr. Kevin Black. Dr. Moran, principal ecologist 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) and a M.Sc. in Geographical Information Systems and Remote Sensing (University of Ulster, Coleraine). Patrick has in excess of 20 years of experience in carrying out ecological surveys on both an academic and a professional basis. Dr. Emma Reeves, senior ecologist with FERS holds a 1st class honours degree in Botany (UCD) and a Ph.D. in Botany. Emma has in excess of 15 years of experience in undertaking ecological surveys on an academic and professional basis. Ciarán Byrne, a 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 5 years in undertaking ecological surveys on both an academic and a professional basis. FERS client list includes National Parks and Wildlife Service, An Bord Pleanála, various County Councils, the Heritage Council, Teagasc, University College Dublin, the Environmental Protection Agency, Inland Waterways Association of Ireland, the Department of Agriculture, the Office of Public Works and Coillte in addition to numerous private individuals and companies.

1.3 Project aims

The primary objective of the study is to provide a baseline assessment of the habitats/flora and bat fauna present within the study area of the Dunsany Nature Reserve. This was achieved by undertaking the following study elements:

- Preliminary surveys of the habitats, flora and bat fauna occurring within the study area;
- Production of baseline GIS information on the presence, distribution and conservation status of ecological habitats and recorded species within the study area;
- Production of a digital habitat map for the study area;
- Identification of elements or particular areas of specific potential for biodiversity or conservation interest;
- Identification of the potential presence and effectiveness of ecological corridors within the study area, linking the study area to adjoining areas of potential biodiversity interest; and
- Assessment and recommendations on conservation priorities regarding the identified biodiversity resource of the site.

2 Methods

2.1 Desk Study & Consultations

A desk study to collate relevant environmental information was undertaken to determine nature conservation designations, protected species and biodiversity data pertaining to the study area and environs. Consultations were also made with knowledgeable local individuals and community groups/organisations, who provided additional biodiversity data pertaining to the study area and environs. The following indicative list of sources was consulted:

- NPWS boundary data shapefiles for SACs (SAC_ITM_2019_12), SPAs (SPA_ITM_2019_12), NHAs (NHA_ITM_2019_06) and pNHAs (pNHA_ITM_2015_11).
- NPWS habitat/species datasets e.g. National Survey of Native Woodlands (2003-2008), Ancient and Long-established Woodland, Irish Semi-natural Grassland Survey.
- National Biodiversity Data Centre (NBDC) mapping of species of conservation concern, available from https://maps.biodiversityireland.ie/
- Site documents for relevant Natura 2000 sites including Site Synopses, Conservation Objectives and Natura 2000 Standard Data forms.
- Information outlined in NPWS (2019a) and NPWS (2019b) Article 17 reporting on the conservation status of habitats (Annex I) and species (Annex II, IV and V).
- EPA online mapping data including surface and groundwater quality, water features, river catchment boundaries, groundwater bodies, wastewater/IPPC/waste emission points, pressures on rivers/lakes/groundwater, rivers/groundwater in SAC habitats, rivers/surface waters in SPA habitats, drinking water – rivers/lakes/groundwater, etc.
- OSI Geohive online mapping data including historic 6-inch mapping (1837-1842), satellite imagery (1995, 2000, 2005, 2005-2012, Aerial Premium), contours, soils, geology etc.

2.2 Field Surveys

2.2.1 Botanical/Habitat Survey

Botanical and habitat surveys were carried out during the period June-September 2021 by Ciarán Byrne and Emma Reeves. The purpose of the botanical and habitat surveys was to record all species of flora and all habitats occurring within the study area and produce a digitized habitat map within ArcGIS 10.2. The nomenclature of vascular plants in this report follows Stace (2019) and nomenclature of bryophytes follows Atherton et al (2010). The flora survey placed particular emphasis on rare, protected or annexed species by reference to:

a) Irish Red List No. 10: Vascular Plants (Wyse Jackson et al, 2016);
b) Habitats listed on Annex I of the EU Habitats Directive (92/43/EEC);
c) Species listed on Annex II and Annex IV of the EU Habitats Directive (92/43/EEC).

Habitats were classified to Fossitt (2000) level 3 classification. The Fossitt classification identifies 11 broad habitat groups at level 1 (e.g. W - Woodland and scrub), 30 habitat subgroups at level 2 (e.g. WS – Scrub/transitional woodland), and 117 separate habitats at level 3 (e.g. WS1 - Scrub) in Ireland. Descriptions of habitats including species composition and structure were compiled and representative photos of habitats were taken. An evaluation of the ecological significance of flora and habitats occurring within the site relative to surrounding habitats was also undertaken. Ecological, conservation and other data was recorded on prepared datasheets. An organised approach to data collection ensured all relevant data was collected and easily entered into a database on return to the office. Information recorded on field data sheets included field surveyor's name, survey date, habitat parcel number corresponding to the field-annotated map, plant species composition and structure, habitat type and detailed target notes.

Minimum habitat size thresholds for habitat survey followed Smith et al (2011) and are outlined in Table 1. Habitat features below this size were either mapped as point features or subsumed as variation in a wider habitat type. Intimate mosaics of different habitats were recorded and mapped using habitat codes separated by a slash (e.g. GS2/WS1), with habitats listed in decreasing order of total cover. Habitats were mapped utilising, primarily, the OSI 1:5000 (or, if available, 1:1000) vector boundaries as a base-map. The deliverable of this survey is a baseline of botanical species and vegetation communities occurring within the study area and a detailed digitised habitat map.

Table 1: Recommended minimum habitat size thresholds (Smith et al, 2011).

Threshold	Recommended minimum size
Polygon v. polyline	>4 metre width
Mappable polygon	400 m^2
Mappable polyline	20 m

2.2.2 Survey of Alien Invasive Plant Species

There are more than 30 species of invasive plant species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 as amended by SI 355/2015 (see Table 2). A field survey of third schedule plant species was undertaken in tandem with habitat surveys during the period June/July 2022, comprising walk-over surveys through the study area.

Table 2: Species listed on Part (1) of the Third Schedule as amended by SI 355/2015.

Common Name	Latin Name
American skunk-cabbage	*Lysichiton americanus*
Red alga	*Grateloupia doryphora*
Brazilian giant-rhubarb	*Gunnera manicata*
Broad-leaved rush	*Juncus planifolius*
Cape pondweed	*Aponogeton distachyos*
Cord-grasses	*Spartina (all species hybrids)*
Curly waterweed	*Lagarosiphon major*
Dwarf eel-grass	*Zostera japonica*
Fanwort	*Cabomba caroliniana*
Floating pennywort	*Hydrocotyle ranunculoides*
Fringed water-lily	*Nymphoides peltata*
Giant hogweed	*Heracleum mantegazzianum*
Giant knotweed	*Fallopia sachalinensis*
Giant-rhubarb	*Gunnera tinctoria*
Giant salvinia	*Salvinia molesta*
Himalayan balsam	*Impatiens glandulifera*
Himalayan knotweed	*Persicaria wallichii*
Hottentot-fig	*Carpobrotus edulis*
Japanese knotweed	*Fallopia japonica*
Large-flowered waterweed	*Egeria densa*
Mile-a-minute weed	*Persicaria perfoliata*
New Zealand pigmyweed	*Crassula helmsii*
Parrot's feather	*Myriophyllum aquaticum*
Rhododendron	*Rhododendron ponticum*
Salmonberry	*Rubus spectabilis*
Sea-buckthorn	*Hippophae rhamnoides*
Spanish bluebell	*Hyacinthoides hispanica*
Three-cornered leek	*Allium triquetrum*
Wakame	*Undaria pinnatifida*
Water chestnut	*Trapa natans*
Water fern	*Azolla filiculoides*
Water-primrose	*Ludwigia (all species)*
Waterweeds	*Elodea (all species except E. canadensis)*
Wireweed	*Sargassum muticum*

2.2.3 Bat Survey

The preliminary bat surveys undertaken aimed to provide an analysis of the use of the primary buildings as roosting habitats. Buildings were assessed using Passive Ultrasound Monitors (Pettersson D500x units).

2.2.3.1 Summer survey

The purpose of this survey was to assess the use by bats of primary buildings at Dunsany Castle as roosting sites during the summer season.

A site visit was undertaken by Dr Patrick Moran on the morning of the 22nd of July 2022 in order to assess the buildings occurring on site as regards Bat Roost Potential (BRP) survey. Having undertaken the BRP survey, optimal locations for the deployment of Passive Ultrasound Monitors (PAM) were identified in order to assess bat activity. Having identified suitable locations, 18 Pettersson D500x PAM units were deployed to assess bat activity within the study area during the period 22/07/22 -28/07/22.

The Pettersson D500x units were placed primarily within the castle itself and associated farm out-buildings.

The triggering system of the Pettersson D500X allows the device to start recording as a sound is detected. The D500X detects the full spectrum of ultrasound and records in real time, providing much more detailed data than either frequency division or time expansion detectors.

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”.

2.2.3.2 Winter survey

The purpose of this survey was to assess the use by bats of primary buildings at Dunsany Castle as hibernating sites during the winter season.

A site visit was undertaken by Dr Patrick Moran and Dr Emma Reeves on the morning of the 22nd of February 2023 in order to assess the buildings occurring on site as regards hibernating Bat Roost Potential (BRP). Having undertaken the BRP survey, optimal locations for the deployment of Passive Ultrasound Monitors (PAM) were identified in order to assess bat activity. Having identified suitable locations, 10 Pettersson D500x PAM units were deployed to assess bat activity within the study area during the period 22/02/23 -22/03/23. The extended period was required because during the winter months bats enter a state of torpor, from which they wake periodically in order to relieve themselves and, if possible feed. Deploying the units for an extended period increases the likelihood of recording the bats when they wake.

The Pettersson D500x units for the winter survey were placed within the castle itself, associated farm out-buildings, the Icehouse, Tower and Sunken House.

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”.

3 Biodiversity of Dunsany Nature Reserve

3.1 Desk Study

3.1.1 National Biodiversity Data Centre notable records

The NBDC database was accessed on 06/05/2021 in order to query records of species of "conservation concern (including invasive species)" occurring within the vicinity of Dunsany Nature Reserve. Records were queried at a spatial scale of the 2km square (N85X, N95B, N95C, N95D, N95H, N95I, N95J & N95N). The location of the queried 2km squares is indicated in Figure 5. The species of conservation concern as recorded within the queried 2km squares are illustrated in Table 3.

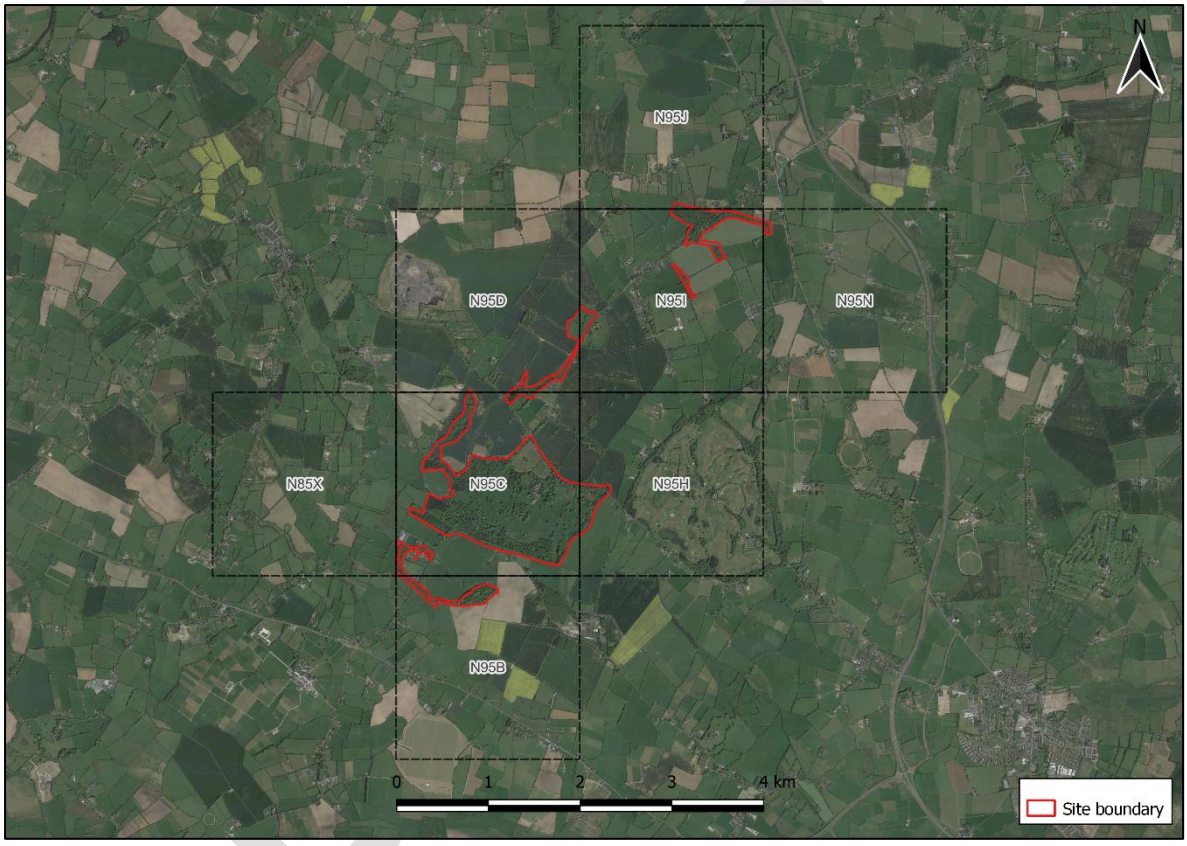


Figure 5: Location of 2km squares queried (N85X, N95B, N95C, N95D, N95H, N95I, N95J & N95N) in relation to site boundary.

Table 3: Summary of species of conservation concern (including invasive species) in queried 2km squares (N85X, N95B, N95C, N95D, N95H, N95I, N95J & N95N).

Grid square	Group	Species	Date of last record	EU Birds Directive Annex I	EU Habitats Directive Annex II	EU Habitats Directive Annex IV	EU Habitats Directive Annex V	Flora Protection Order	Wildlife Acts	Red List Status	BOCCI status	Invasive designation
N85X	Mammals	Pine Marten Martes martes	04/06/2020				V		WA	LC		
N95B	Bees	Red-tailed Bumblebee Bombus lapidarius	30/04/2021							NT		
N95B	Birds	Starling Sturnus vulgaris	31/12/2011								Amber	
N95B	Invasive	Grey Squirrel Sciurus carolinensis	31/12/2012									Third Schedule | EU Reg. 1143/2014 | High Impact
N95B	Mammals	Irish/Mountain Hare Lepus timidus	05/11/2015				V		WA	LC		
N95B	Mammals	Otter Lutra lutra	15/11/2018		II	IV			WA	LC		
N95C	Amphibians	Common Newt Lissotriton vulgaris	15/03/2012						WA	LC		
N95C	Birds	Goldcrest Regulus regulus	31/12/2011								Amber	
N95C	Birds	Greenfinch Chloris chloris	31/12/2011								Amber	
N95C	Birds	Grey Wagtail Motacilla cinerea	31/07/1991								Red	
N95C	Birds	House Sparrow Passer domesticus	31/12/2011								Amber	
N95C	Birds	Kestrel Falco tinnunculus	31/12/2011								Red	
N95C	Birds	Snipe Gallinago gallinago	12/03/2016								Red	
N95C	Birds	Starling Sturnus vulgaris	31/12/2011								Amber	
N95C	Birds	Swallow Hirundo rustica	31/07/1991								Amber	
N95C	Birds	Willow Warbler Phylloscopus trochilus	31/07/1991								Amber	
N95C	Birds	Yellowhammer Emberiza citrinella	31/12/2011								Red	
N95C	Invasive	Brown Rat Rattus norvegicus	28/01/2014									High Impact
N95C	Invasive	Cherry Laurel Prunus laurocerasus	12/03/2016									High Impact
N95C	Invasive	Grey Squirrel Sciurus carolinensis	23/07/2013									Third Schedule | EU Reg. 1143/2014

Grid square	Group	Species	Date of last record	EU Birds Directive Annex I	EU Habitats Directive Annex II	EU Habitats Directive Annex IV	EU Habitats Directive Annex V	Flora Protection Order	Wildlife Acts	Red List Status	BOCCI status	Invasive designation
												| High Impact
N95C	Invasive	Jenkins's spire snail Potamopyrgus antipodarum	17/08/2015									Medium Impact
N95C	Invasive	Sycamore Acer pseudoplatanus	30/07/2009									Medium Impact
N95C	Mammals	Badger Meles meles	05/11/2015						WA	LC		
N95C	Mammals	Common Pipistrelle Pipistrellus pipistrellus	13/08/2014			IV			WA	LC		
N95C	Mammals	Hedgehog Erinaceus europaeus	08/05/2014						WA	LC		
N95C	Mammals	Leisler's Bat Nyctalus leisleri	22/08/2013			IV			WA	LC		
N95C	Mammals	Otter Lutra lutra	07/05/2013		II	IV			WA	LC		
N95C	Mammals	Red Deer Cervus elaphus	05/11/2015						WA	LC		
N95C	Mammals	Soprano Pipistrelle Pipistrellus pygmaeus	29/07/2011			IV			WA	LC		
N95C	Other invertebrates	White-clawed Crayfish Austropotamobius pallipes	09/08/2018		II		V		WA			
N95H	Birds	Coot Fulica atra	31/12/2011								Amber	
N95H	Birds	Goldcrest Regulus regulus	31/12/2011								Amber	
N95H	Birds	House Martin Delichon urbicum	31/12/2011								Amber	
N95H	Birds	House Sparrow Passer domesticus	31/12/2011								Amber	
N95H	Birds	Kestrel Falco tinnunculus	31/07/1991								Red	
N95H	Birds	Mallard Anas platyrhynchos	31/12/2011								Amber	
N95H	Birds	Mute Swan Cygnus olor	31/12/2011								Amber	
N95H	Birds	Redwing Turdus iliacus	31/12/2011								Red	
N95H	Birds	Spotted Flycatcher Muscicapa striata	31/07/1991								Amber	
N95H	Birds	Starling Sturnus vulgaris	31/07/1991								Amber	
N95H	Birds	Stock Dove Columba oenas	31/07/1991								Red	
N95H	Birds	Swallow Hirundo rustica	31/07/1991								Amber	

Grid square	Group	Species	Date of last record	EU Birds Directive Annex I	EU Habitats Directive Annex II	EU Habitats Directive Annex IV	EU Habitats Directive Annex V	Flora Protection Order	Wildlife Acts	Red List Status	BOCCI status	Invasive designation
N95H	Birds	Teal Anas crecca	31/12/2011								Amber	
N95H	Birds	Tufted Duck Aythya fuligula	31/12/2011								Amber	
N95H	Birds	Willow Warbler Phylloscopus trochilus	31/07/1991								Amber	
N95H	Invasive	Budapest slug Tandonia budapestensis	13/04/1982									Medium Impact
N95H	Invasive	Canadian-fleabane Conyza canadensis	25/09/2013									Medium Impact
N95H	Invasive	Grey Squirrel Sciurus carolinensis	26/07/2013									Third Schedule | EU Reg. 1143/2014 | High Impact
N95H	Invasive	Sycamore Acer pseudoplatanus	25/09/2013									Medium Impact
N95H	Mammals	Badger Meles meles	10/04/2010						WA	LC		
N95H	Mammals	Irish/Mountain Hare Lepus timidus	23/01/2013				V		WA	LC		
N95H	Mammals	Otter Lutra lutra	14/02/1980		II	IV			WA	LC		
N95J	Bees	Red-tailed Bumblebee Bombus lapidarius	28/06/2022							NT		
N95J	Birds	Goldcrest Regulus regulus	31/07/1991								Amber	
N95J	Birds	House Martin Delichon urbicum	31/07/1991								Amber	
N95J	Birds	House Sparrow Passer domesticus	31/07/1991								Amber	
N95J	Birds	Skylark Alauda arvensis	01/11/2020								Amber	
N95J	Birds	Spotted Flycatcher Muscicapa striata	31/07/1991								Amber	
N95J	Birds	Stock Dove Columba oenas	31/07/1991								Red	
N95J	Birds	Swallow Hirundo rustica	31/07/1991								Amber	
N95J	Birds	Willow Warbler Phylloscopus trochilus	31/07/1991								Amber	
N95J	Birds	Yellowhammer Emberiza citrinella	14/06/2020								Red	
N95J	Invasive	Sycamore Acer pseudoplatanus	03/01/2021									Medium Impact
N95J	Mammals	Brown Long-eared Bat Plecotus auritus	13/06/1998			IV			WA	LC		

Grid square	Group	Species	Date of last record	EU Birds Directive Annex I	EU Habitats Directive Annex II	EU Habitats Directive Annex IV	EU Habitats Directive Annex V	Flora Protection Order	Wildlife Acts	Red List Status	BOCCI status	Invasive designation
N95N	Birds	House Martin Delichon urbicum	31/12/2011								Amber	
N95N	Birds	House Sparrow Passer domesticus	31/12/2011								Amber	
N95N	Birds	Starling Sturnus vulgaris	31/12/2011								Amber	
N95N	Birds	Swallow Hirundo rustica	31/12/2011								Amber	

3.1.2 Designated sites within 5km of Dunsany Nature Reserve

There are no sites designated for conservation within 5km of Dunsany Nature Reserve. The River Boyne and River Blackwater SAC and SPA are the nearest (c.5.7km to the north-west) sites designated for conservation. These sites are hydrologically connected to Dunsany Nature Reserve through the River Skane (See Figure 6).

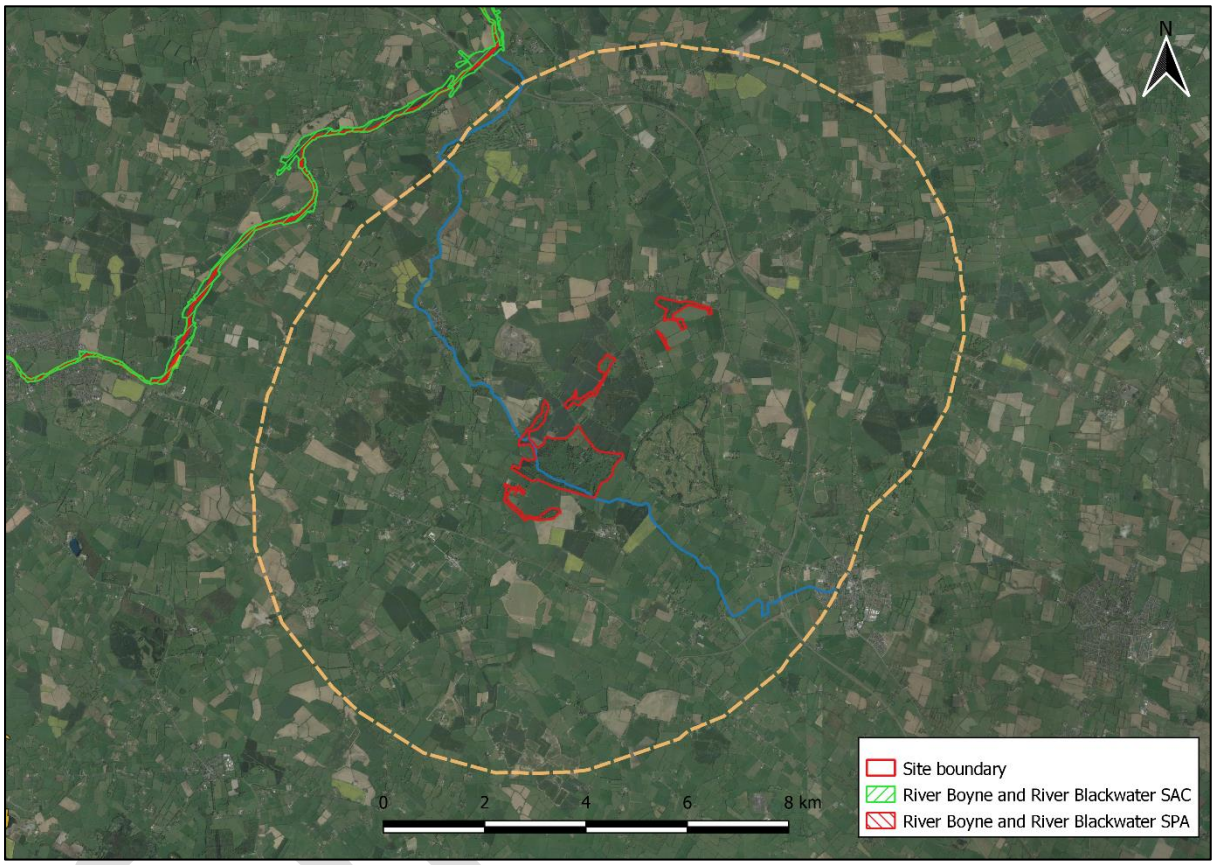


Figure 6: Designated sites within 5km of the proposed Dunsany Nature Reserve and connectivity of River Skane to the same (1:80,000).

This River Boyne and River Blackwater SAC comprises most of the freshwater element of the River Boyne from upriver of the Boyne Aqueduct at Drogheda, the Blackwater River as far as Lough Ramor and the principal Boyne tributaries, notably the Deel, Stoneyford and Tremblestown Rivers. This system drains a considerable area of counties Meath and Westmeath and smaller areas of Cavan and Louth. The underlying geology is Carboniferous Limestone for the most part with areas of Upper, Lower and Middle well represented. In the vicinity of Kells Silurian Quartzite is present while close to Trim are Carboniferous Shales and Sandstones. The rivers flow through a landscape dominated by intensive agriculture, mostly of improved grassland but also cereals. Much of the river channels were subject to arterial drainage schemes in the past. Natural flood-plains now exist along only limited stretches of river, though often there is a fringe of reed swamp, freshwater marsh, wet grassland or

deciduous wet woodland. Along some parts, notably between Drogheda and Slane, are stands of tall, mature mixed woodland. Substantial areas of improved grassland and arable land are included in site for water quality reasons. There are many medium to large sized towns adjacent to but not within the site.

The main channel of the Boyne contains a good example of alluvial woodland of the Salicetum albo fragilis type which has developed on three alluvium islands. Alkaline fen vegetation is well represented at Lough Shesk, where there is a very fine example of habitat succession from open water to raised bog. The Boyne and its tributaries is one of Ireland's premier game fisheries and offers a wide range of angling, from fishing for spring salmon and grilse to sea trout fishing and extensive brown trout fishing. The site is one of the most important in eastern Ireland for Salmon (*Salmo salar*) and has very extensive spawning grounds. The site also has an important population of River Lamprey (*Lampetra fluviatilis*), though the distribution or abundance of this species is not well known. Otter (*Lutra lutra*) is widespread throughout the site. Some of the grassland areas along the Boyne and Blackwater are used by a nationally important winter flock of Whooper Swan (*Cygnus cygnus*). Several Red Data Book plants occur within the site, with Round-leaved Wintergreen (*Pyrola rotundifolia*), Swamp Meadow-grass (*Poa palustris*) and Round-fruited Rush (*Juncus compressus*). Also occurring are a number of Red Data Book animals, notably Badger (*Meles meles*), Pine Marten (*Martes martes*) and Common Frog (*Rana temporaria*). The River Boyne is a designated Salmonid Water under the EU Freshwater Fish Directive.

The River Boyne and River Blackwater SPA is a long linear site that comprises stretches of the River Boyne and several of its tributaries: most of the site is in Co. Meath but it extends also into counties Cavan, Louth and Westmeath. It includes the following river sections: The River Boyne from the M1 motorway bridge, west of Drogheda, to the junction with the Royal Canal, west of Longwood, Co Meath; the River Blackwater from its junction with the River Boyne in Navan to the junction with Lough Ramor in Co Cavan; the Tremblestown River (and Athboy River) from the junction with the River Boyne at Kilnagross Bridge to the bridge in Athboy, Co Meath; the Stoneyford River from its junction with the River Boyne to Stonestone Bridge in Co. Westmeath; the River Deel from its junction with the River Boyne to Cummer Bridge, Co. Westmeath. The site includes the river channel and marginal vegetation.

The River Boyne and River Blackwater SPA supports nationally important numbers of Kingfisher (*Alcedo atthis*). Other species which occur within the site include Mute Swan (*Cygnus olor*), Teal (*Anas crecca*), Mallard (*Anas platyrhynchos*), Cormorant (*Phalacrocorax carbo*), Grey Heron (*Ardea cinerea*), Moorhen (*Gallinula chloropus*), Snipe (*Gallinago gallinago*) and Sand Martin (*Riparia riparia*).

3.2 Field Surveys

3.2.1 Botanical/Habitat Survey

196 species of vascular plant were recorded within the study area. No invasive third schedule plant species were identified on site during surveys. A full species list of all species of flora recorded to date is presented in Appendix I – Complete list of plant species observed during surveys. A description of the habitats observed, and the dominant species present within habitat types are presented in the following sections, along with photographs of representative areas of habitats.

15 habitat types were identified on site following Fossitt (2000) classification. Habitat types identified on site are detailed below in Table 4. A small scale (1:14,000) map along more detailed large scale (1:4,000) maps of habitats present within the study area are presented in **Error! Reference source not found.**.

Table 4: Fossitt Habitat types identified at Dunsany Nature Reserve.

Fossitt Level 1	Fossitt Level 2	Fossitt Level 3
Freshwater	FW - Watercourses	FW2 – Depositing/lowland rivers
Grassland & marsh	GA – Improved grassland	GA2 – Amenity grassland
	GS – Semi-natural grassland	GS2 – Dry meadows & grassy verges
		GS4 – Wet grassland
	GM – Freshwater marsh	GM1 - Marsh
Woodland & scrub	WN – Semi-natural woodland	WN2 – Oak-ash-hazel woodland
	WD – Highly modified/non-native woodland	WD1 – Mixed broadleaf woodland
		WD2 – Mixed broadleaved/conifer woodland
		WD4 – Conifer plantation
	WS – Scrub/transitional woodland	WS1 – Scrub
	WL – Linear woodland/scrub	WL2 – Treelines
Exposed rock & disturbed ground	ED – Disturbed ground	ED3 – Recolonising bare ground
Cultivated & built land	BC – Cultivated land	BC1 – Arable crops
	BL – Built land	BL1 – Stone walls & other stonework
		BL3 – Buildings & artificial surfaces

3.2.1.1 FW2 – Depositing/lowland rivers

The River Skane enters the Dunsany estate as the south-east corner of the main castle ground. The river flows westwards through WD2 mixed broadleaf/conifer woodland towards the L2207. The river then changes direction towards the north-west and is joined by the Arlonstown/Belpere Stream at the Duck Pond Wood and the Athronan stream in an area of WD4 conifer woodland.

EPA Q-value monitoring stations are located at SKANE - Dunsany Br and Athronan Bridge (See Figure 7). The Dunsany Br station was last monitored in 1991 and received a Q-value of 2 “Bad” status. The Athronan Bridge station downstream was last monitored in 2020 and received a Q-value of 3 “Poor” status.

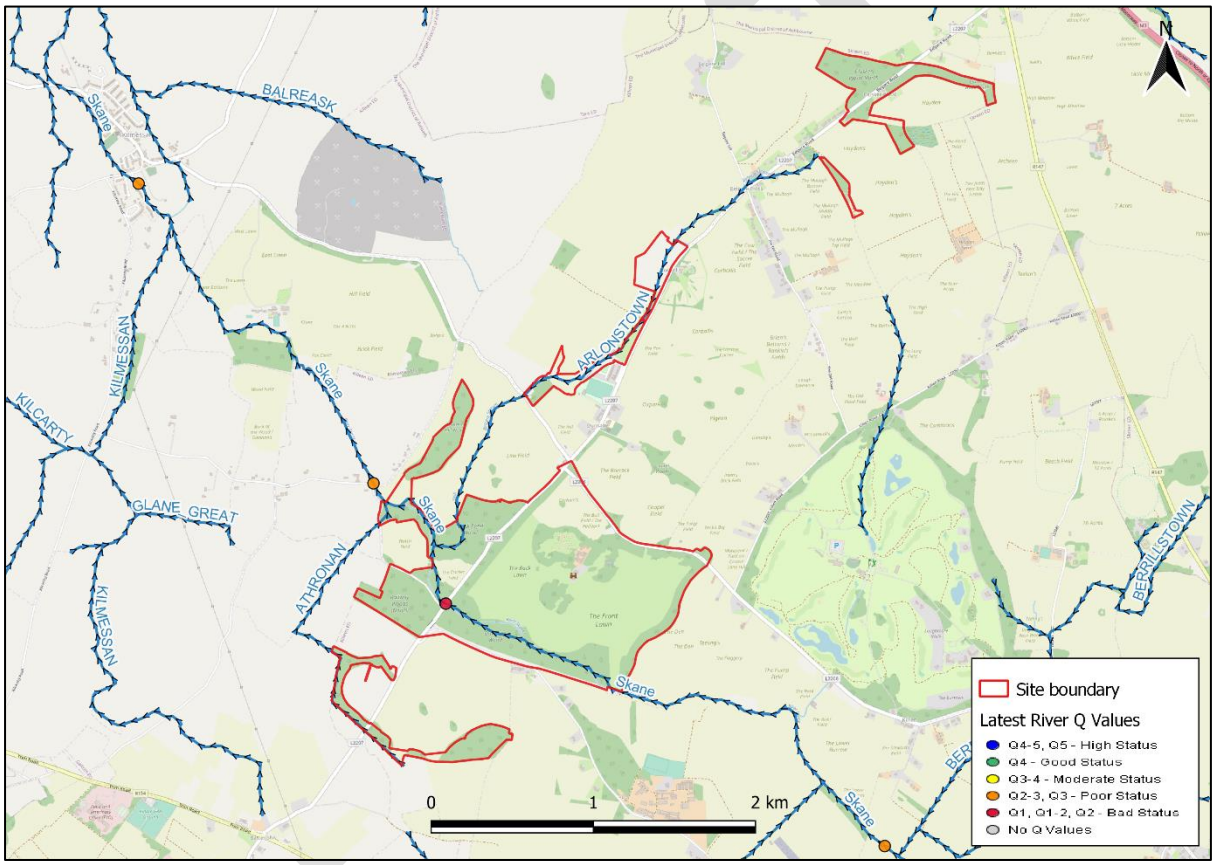


Figure 7: Watercourses of Dunsany showing flow direction & Q-values (1:25,000).

3.2.1.2 GA2 – Amenity grassland

Amenity grassland, improved grassland managed for purposes other than grass production is confined to a small area at the front of Dunsany Castle. Subject to a regular mowing regime, species diversity is relatively low with a limited suite of species. This habitat type also occurs to the rear of the sunken house

Figure 8: GA2 grassland adjoining Dunsany Castle.

Figure 9: Mown GA2 grassland adjoining Dunsany Castle.

3.2.1.3 GS2 – Dry meadows & grassy verges

The Castle itself is surrounded by what may best be categorised as Parkland (Fossitt XXX) owing to the horticultural style of Capability Brown with clumps of trees and shelterbelts dotted around an undulating grassy landscape. The presence of Haw haws and a ceramic drainage system are indicative of this. Ecologically, however the area is best considered grassland and equates with Fositt code GS2,

dry meadow and grassy verge. The grassland immediately surrounding the castle has not been interfered with for at least a decade (personal communication with the client). It shows considerable evidence of this with very poor species diversity in terms of both grasses and herbaceous species. The grasses present are clump or tussock forming such as Meadowgrass, *Alopecuris pratensis,* Cock's foot *Dactylis glomerata,* False Oat Grass *Ahrenatrum elatius* with dense swards of Yorkshire fog, *Holcus lanatus* and Creeping bent-grass *Agrostis stolonifera* The dense sward limits species diversity to those which are tall such as Knapweed (*Centaurea nigra*) or scambling in habit such as the vetches (*Viccia* sp), vetchlings (*Lathyrus*) and Silverweed (*Potentilla anserina*). In low-lying areas wetter grassland habitats have developed and are identifiable by the presence of rushes (*Juncus effusus, J. inflexus and .J, conglomeratus*), Horsetails and certain grasses associated with wetland conditions such as Floating Sweetgrass (*Glyceria fluitans*). Such habitats are most notable in front of the Castle and at the easterly edges of the grassland. These wet habitats are often quite small and form an intimate mosaic with the GS2 habitat.

The grasslands are bounded by woodland (WD1 and WD2), the margins underneath the woodlands are often quite degraded and exhibit large areas of bare soil and extensive nettle patches. Walking through the habitat one notices an impressive layer of dead litter or 'thatch'. Despite the abundance of trees within the grassland there is very little tree regeneration.

Where paths occur within the GS2 habitat, it is noteworthy that there is a greater species diversity and frequency with species such as Lady's bedstraw (Gallium?) Tufted vetch (*Vicia cracca),* Bird's foot trefoil (*Lotus corniculatus*) and Red bartsia (*Odentities vernum*).

Those fields to the North West of the castle which run parallel to the main avenue,were formally arable land but were left to revegetate (personal communication with client). A slightly more species rich GS2 habitat occurs with swathes of creeping thistle(*Cirsium arvense)*, large areas of soft rush (*Juncus effusus)* with Hairy willowherb *(Epilobium hirsuitum*) numerous sedge species such as *Carex hirta* and *Carx nigra.*White clover was very dominant in this GS2 habitat. *Elytriga repens* or common couch grass with Bindweed (*Calystegia sepium)* and Meadowsweet (*Filipendula ulmaria*), a typical rough GS2 species assemblage was recorded. Most notable is the amount of natural tree regeneration in these two fields particularly of Willows or *Salix* sp. Oak (*Quercus sp*) and Ash (*Fraxinus excelsior*) seedlings were also noted. This habitat runs alongside the WD1 habitat on the North, North-western boundary of the site. It is borderline scrub habitat.

3.2.1.4 GS4 – Wet grassland

GS4 grassland is found primarily along the former railway line in the southern half of the site. This grassland type occurs along the corridor of the former railway and a firebreak also at the end of a WD4 conifer plantation adjoining the railway. The grassland is dry underfoot but floristically contains elements typical of wet grassland. The primary species include Hard Rush (*Juncus inflexus*), Water Figwort (*Scrophularia auriculata*) and Wild Angelica (*Angelica sylvestris*). A section of GS4 along a firebreak is dominated by Great Horsetail (*Equisetum telmateia*).

The grassland is bordered by WD2 mixed broadleaf/conifer woodland to the north and WL2 treelines to the south. Freely draining embankments along the railway show greater diversity with a range of

neutral-calcareous species including Lady's Bedstraw (*Galium verum*), Crested Dog's-tail (*Cynosurus cristatus*), Common Bird's-foot-trefoil (*Lotus corniculatus*) and Selfheal (*Prunella vulgaris*). Butterfly-bush (*Buddleja davidii*) is very frequent along sections of the railway line.

Figure 10: GS4 wet grassland along the former railway line.

Figure 11: GS4 wet grassland along former railway line.

Figure 12: Cryptic Wood White (*Leptidea juvernica*) along railway section.

3.2.1.5 GM1 – Marsh

GM1 marsh is found along the Arlonstown/Belpere stream to the rear of Dunsany GAA pitch. A review of first edition 6-inch mapping for this area indicates that there was formerly a mill at the location. Mapping indicates built structures and placenames including “Corn Mill” and “Mill Pond”, suggesting that the marsh may have arisen from these past activities. The stream that exists today appears to have been dammed historically and a result a marsh has developed upstream (See Figure 13).

Figure 13: Dam structure along the Arlonstown/Belpere stream that has resulted in marsh development upstream.

The marsh is largely vegetated and dominated by one species, Water-cress (*Nasturtium officinale*). Great Willowherb (*Epilobium hirsutum*) is abundant along with Floating Sweet-grass (*Glyceria fluitans*). Towards the edges of the marsh Yellow Iris (*Iris pseudacorus*) is abundant, forming dense stands. Bulrush (*Typha latifolia*), Meadowsweet (*Filipendula ulmaria*), Fool's-water-cress (*Apium nodiflorum*) and Common Nettle (*Urtica dioica*) are occasional throughout.

In area of open water along the Arlonstown/Belpere stream Common Duckweed (*Lemna minor*) is frequent along with Wild Angelica (*Angelica sylvestris*). Dogwood (*Cornus sanguinea*) is abundant in areas around the fringes of the marsh.

Figure 14: GM1 marsh along the Arlonstown/Belpere stream.

Figure 15: GM1 marsh with abundant Watercress and Great Willowherb.

3.2.1.6 WN2 – Oak-ash-hazel woodland

WN2 woodland is found in the north of the site at Clusker Woods South along the L2207. WN2 woodland covers an area of 4.67ha. Sessile Oak (*Quercus petraea*) is the main canopy species with Hazel (*Corylus avellana*) the main shrub layer species. Ash (*Fraxinus excelsior*) is frequent throughout the wood along with Beech (*Fagus sylvatica*). Scots Pine (*Pinus sylvestris*) occurs patchily and is locally frequent in certain sections. Although beech is frequent, the ground flora is typical of WN2 woodland with abundant Enchanter's-nightshade (*Circaea lutetiana*) and frequent Wood Avens (*Geum urbanum*), Soft Shield-fern (*Polystichum setiferum*), Sanicle (*Sanicula europaea*), Herb-Robert (*Geranium robertianum*) and False-brome (*Brachypodium sylvaticum*). Other elements include Common Dog-violet (*Viola riviniana*), Broad Buckler-fern (*Dryopteris dilatata*) and Wood-sedge (*Carex sylvatica*). Pathways are evident and well used through the woodland along with open areas where Bramble (*Rubus fruticosus* agg.) is abundant.

Green-flowered Helleborine (*Epipactis phyllanthes*), a woodland orchid was found within this section of Clusker Woods South. This was the first record of the species in county Meath. Four flowering spikes of the orchid were seen on the 21st of July 2022. The orchid is found within a section of the wood adjoining the L2207. The area was relatively open with canopy species including Ash (*Fraxinus excelsior)* and Scots Pine (*Pinus sylvestris*) with Hazel (Corylus avellana) in the shrub layer. Other ground flora in the area of the orchids included Wood Avens (*Geum urbanum*), Wood-sedge (*Carex sylvatica*), Herb-Robert (*Geranium robertianum*) and Hogweed (*Heracleum sphondylium*). The orchid along with illustrative habitat images are included below in Figure 17.

Figure 16: WN2 woodland at Clusker Wood South.

Figure 17: Green-flowered Helleborine (*Epipactis phyllanthes*), a county first record for Meath at Clusker Wood South.

3.2.1.7 WD1 – Mixed broadleaf woodland

WD1 mixed broadleaf woodland is frequent throughout the Dunsany Nature Reserve and accounts for approximately 106ha. WD1 woodland is found primarily in the following areas:

- Main castle grounds, surrounding castle buildings and along the eastern and western peripheries. These areas comprise both mature and more recently planted WD1 blocks.
- Railway woods, blocks of mature WD1.
- Moore's Hill Wood.
- Clusker Wood North.
- Clusker Wood South.
- The Pond Wood.
- Horseshoe wood and adjoining blocks to the east of L2207.

WD1 woodland in front of the castle (See Figure 19) comprises mature Horse-chestnut (*Aesculus hippocastanum*), Pedunculate Oak (*Quercus robur*), Beech (*Fagus sylvatica*), Lime (*Tilia x europaea*) and Yew (*Taxus baccata*). Cherry Laurel (*Prunus laurocerasus*) is frequent in the understorey and the shrub layer comprises mainly Holly (*Ilex aquifolium*) and Elder (*Sambucus nigra*). Moderate deer browsing pressure was evident in this area with Cherry Laurel showing signs of browsing. The herb layer is poorly developed and comprises mainly Herb-robert (*Geranium robertianum*), Nettle (*Urtica dioica*), Remote Sedge (*Carex remota*) and Wood Sedge (*Carex sylvatica*). In some areas Ground-elder (*Aegopodium podagraria*) dominates the field layer. The ground layer is dominated by Atlantic Ivy (*Hedera hibernica*).

Of note, Deadly Nightshade (*Atropa belladonna*) (See Figure 18) occurs within WD1 woodland near the castle. This bushy perennial is a relatively scare plant in Ireland and is the first time the plant has been recorded in county Meath. The plant is a member of the Solanaceae (Nightshade family) and is highly poisonous.

Figure 18: Deadly Nighshade (*Atropa belladonna*) within WD1 woodland in front of the castle.

Figure 19: WD1 and WD2 woodland blocks in front of Dunsany Castle.

WD1 woodland to the north of the Church of St. Nicholas comprises mainly mature Lime (*Tilia x europaea*) along with some Sycamore (*Acer pseudoplatanus*) and multi-stemmed Beech (*Fagus sylvatic*a). The shrub layer here is poorly developed with the main shrub species being the non-native Snowberry (*Symphoricarpos albus*). The field layer is poorly developed with the main elements including Wood Avens (*Geum urbanum*) and Enchanter's-nightshade (*Circaea lutetiana*). Sycamore (*Acer pseudoplatanus*) seedlings were frequent in this section of woodland.

WD1 woodland around the periphery of the main castle grounds includes linear blocks of both mature and more recently planted broadleaf woodland. Mature Pedunculate Oak (*Quercus robur*), Beech (*Fagus sylvatica*) and Sycamore (*Acer pseudoplatanus*) are the most frequent trees around the periphery. Along the eastern boundary of the main grounds these areas of mature WD1 woodland are interspersed with more recent plantings of a mix of Pedunculate Oak (*Quercus robur*)/Alder (*Alnus glutinosa*) and Ash (*Fraxinus excelsior*). Badger activity was noted within a block of oak/alder in this section, including a sett. The trees in these plantings are approximately 20-25 years old and don't seem to have undergone management in the form of thinning. As a result, the trees are in regularly spaced rows with a field layer lacking in woodland herbs. The main herb layer species are Cleavers (*Galium aparine*), Nettle (*Urtica dioica*), Bramble (*Rubus fruticosus* agg.) and Herb-robert (*Geranium robertianum*). Ash dieback (*Hymenoscyphus fraxineus)* was observed to be affecting ash trees within pure ash plantings in this section. Ash regeneration was frequent in this section.

Figure 20: WD1 woodland along eastern boundary of main grounds. Oak/alder planting in foreground, ash planting in background showing signs of Ash dieback.

Other linear strips of WD1 woodland are found along the western boundary of the main grounds, along the L2207. This area comprises a strip of more recent plantings of similar age along with more mature WD1 woodland in the north-eastern corner.

Figure 21: WD1 woodland along the L2207 comprising a large section of broadleaf plantings.

Mature woodland at the Railway Woods comprises three main blocks totalling approximately 6.67ha. Non-natives Beech (*Fagus sylvatica*) and Sycamore (*Acer pseudoplatanus*) are the main canopy trees with Wych Elm (*Ulmus glabra*) frequent in the understorey. Non-native shrubs including Cherry Laurel (*Prunus laurocerasus*), Snowberry (*Symphoricarpos albus*), Wild Privet (*Ligustrum vulgare*) and Rhododendron (*Rhododendron ponticum*) are frequent throughout. Hazel (*Corylus avellana*) and Hawthorn (*Crataegus monogyna*) are the main native shrubs and occur occasionally throughout. Regeneration of ash was frequent throughout this section. Standing deadwood was abundant and badger activity was observed in several sections. A small block of WD1 adjoining the Cricket field had a relatively open canopy with mature Sessile Oak (*Quercus petraea*), Beech (*Fagus sylvatica*), Ash (*Fraxinus excelsior*), and Sitka Spruce (*Picea sitchensis*). The ground flora in this more open stand was dominated by graminoids with occasional forbs including Enchanter's-nightshade (*Circaea lutetiana*) and Common Dog-violet (*Viola riviniana*).

Figure 22: Open WD1 adjoining the Cricket filed with a grassy field layer.

Moore's Hill Wood to the north covers an area of approximately 7.76ha and is surrounded by arable land (See Figure 23). The main canopy species in this woodland is Sycamore (*Acer pseudoplatanus*) along with frequent Pedunculate Oak (*Quercus robur*) and Ash (*Fraxinus excelsior*). Other canopy species include occasional Wych Elm (*Ulmus glabra*), Sweet Chesnut (*Castanea sativa*), Scot's Pine (*Pinus sylvestris*) and Larch (Larix decidua). The canopy is relatively open with Bramble (*Rubus fruticosus* agg.) dominant in more open areas. The shrub layer is poorly developed. The primary elements of the herb layer include Nettle (*Urtica dioca*), Herb-robert (*Geranium robertianum*), Wood Speedwell (*Veronica montana*), Wood Dock (*Rumex sanguinea*), Wood Avens (*Geum urbanum*) and Enchanter's nightshade (*Circaea lutetiana*). Hedge Woundwort (*Stachys sylvatica*) and Nettle (*Urtica dioic*a) are locally dominant in areas. Mature sycamore/oak are found mainly along the woodland edges and regeneration of sycamore was frequent throughout. Regeneration of ash was observed throughout the woodland and was locally dominant in some areas. Deer browsing pressure was low and large-diameter deadwood was frequent throughout. Badger activity within the woodland was high with a number of setts identified (See Figure 24).

Figure 23: Moore's Hill WD1 woodland surrounded by arable land.

Figure 24: Badger sett within Moore's Hill woodland.

In the northernmost section of the site three blocks of mature WD1 woodland are found; Clusker Wood North, Clusker Wood South and The Pond Wood. The largest of these blocks is Clusker Wood North, covering an area of approximately 9.29ha along the L2207. The primary canopy species are Horse-chestnut (*Aesculus hippocastanum*) and Sycamore (*Acer pseudoplatanus*) along with areas of locally abundant Silver Birch (*Betula pendula*) and Ash (*Fraxinus excelsior*). Other occasional species within this area of woodland include Beech (*Fagus sylvatica*), Sessile Oak (*Quercus petraea*), Lawson's Cypress (*Cupressus lawsoniana*), European Silver-fir (*Abies alba*), Scots Pine (*Pinus sylvestris*) and Sitka Spruce (*Picea sitchensis*). Cherry Laurel (*Prunus laurocerasus*) is locally abundant and in some areas creates and impenetrable understorey. Ash (*Fraxinus excelsior*) is abundant in more open stretches where Bramble (*Rubus fruticosus* agg.) and Enchanter's-nightshade (*Circaea lutetiana*) are the main elements of the shrub/ground flora. Snowberry (*Symphoricarpos albus*) is abundant in sections of the wood adjoining the L2207. Dumping of garden waste was evident adjoining the road with species such as Montbretia (*Crocosmia x crocosmiiflora*) naturalised.

Figure 25: Clusker Wood North WD1 woodland along L2207.

A small section of WD1 woodland (1.27ha) at Clusker Woods South occurs on the opposite side of the L2207. In this section Beech (*Fagus sylvatica*), Sycamore (*Acer pseudoplatanus*) and Wych Elm (*Ulmus glabra*) are the main components of the canopy. Pedunculate Oak (*Quercus robur*) is occasional. Young Wych Elm (*Ulmus glabra*) and Ash (*Fraxinus excelsior*) form and understorey along with Hazel (*Corylus avellana*). The ground flora includes many species typical of WN2 woodland with Enchanter's-nightshade (*Circaea lutetiana*), Broad Buckler-fern (*Dryopteris dilatata*), Wood Avens (*Geum urbanum*) along with frequent Soft Shield-fern (*Polystichum setiferum*). Bramble (*Rubus fruticosus*

agg.) and Atlantic Ivy (*Hedera hibernica*) are abundant. Regeneration of beech, ash and sycamore were frequently observed. Cherry Laurel (*Prunus laurocerasus*) occurs within this block but does not form the dense understory as seen in Clusker Wood North.

Figure 26: Hazel understorey within WD1 woodland block at Clusker Wood South along the L2207.

The Pond wood is another small WD1 block (1.52ha), located approximately 100m to the east of the aforementioned Clusker Wood South WD1 block. The main canopy species are Ash (*Fraxinus excelsior*) and Sycamore (*Acer pseudoplatanus*) along with occasional Sessile Oak (*Quercus petraea*) and Horse-chestnut (*Aesculus hippocastanum*). Hazel (*Corylus avellana*) and Hawthorn (*Crataegus monogyna*) form a well developed shrub layer. Bramble (*Rubus fruticosus* agg.) is dominant in areas along with frequent Hogweed (*Heracleum sphondylium*), Herb-Robert (*Geranium robertianum*) and Enchanter's-nightshade (*Circaea lutetiana*). Montbretia (*Crocosmia x crocosmiiflora*) was found in sections adjoining arable land in the north-western corner of the woodland.

Figure 27: The Pond Wood, WD1 woodland adjoining arable land.

Figure 28: WD1 woodland at The Pond Wood.

Four blocks of WD1 are found in the southernmost section of the site covering an area of 12.24ha either side of the L2207. The horseshoe wood to the west of the road covers 4.73ha, while three blocks along the boundary of arable land cover 7.51ha to the east of the road.

Figure 29: Horseshoe wood in the south of the site along the L2207.

Figure 30: One of three WD1 blocks to the east of horseshoe wood along the L2207.

3.2.1.8 WD2 – Mixed broadleaf/conifer woodland

WD2 woodland at Dunsany is found is the southern half of the site and covers an area of approximately 48ha. WD2 woodland blocks range in size from a large 19ha block along the former railway to small blocks around the castle of 0.12ha. WD2 woodland largely consists of mature broadleaf/conifer stands but also some younger planted blocks. The primary areas where WD2 woodland is found includes:

- Large block (19.69ha) along the former railway line/River Skane.
- Large block (14.96ha) at the Duck Pond Wood.
- Two small blocks totalling 3ha at the Railway Woods.
- Small blocks totalling 6.66ha around Dunsany Castle main grounds.
- Two small blocks totalling 3.79ha along the Arlonstown/Belpere stream.

The largest continuous block of WD2 woodland is found along the former railway line and River Skane along the southern boundary of the main grounds. This linear woodland runs parallel to the railway line and River Skane for approximately 1.1km.

Figure 31: WD2 woodland along the former railway/River Skane.

The broadleaf component of this woodland includes primarily Sessile Oak (*Quercus petraea*), Wych Elm (*Ulmus glabra*) and Ash (*Fraxinus excelsior*) with occasional Copper Beech (*Fagus sylvatica* 'Purpurea') and Horse-chestnut (*Aesculus hippocastanum*). The primary conifer species are Scots Pine (*Pinus sylvestris*) and Sitka Spruce (*Picea sitchensis*) along with occasional Monterey Cypress (*Cupressus macrocarpa*) and European Larch (*Larix europaea*).

The shrub layer is well developed and contains primarily Hawthorn (*Crataegus monogyna*). Cherry Laurel (*Prunus laurocerasus*) is locally dominant along with Box (*Buxus sempervirens*). The woodland canopy is relatively open and in more open areas Bramble (*Rubus fruticosus* agg.) is dominant. Standing deadwood is frequent in this section. Regeneration of Ash (*Fraxinus excelsior*) is frequent throughout. Deer browsing pressure was high, evidenced with grazing of regeneration saplings and canopy trees.

Figure 32: Area of WD2 woodland along the River Skane with abundant Box (*Buxus sempervirens*) in the shrub layer.

The Duck Pond wood covers approximately 14.96ha and runs along the L2207. The Arlonstown stream runs through the woodland in the eastern section. The species composition of this woodland is similar to the aforementioned block along the former railway line. Non-native shrubs Cherry Laurel (*Prunus laurocerasus*) and Snowberry (*Symphoricarpos albus*) are frequent in the shrub layer and in some areas locally dominant. Canopy cover of conifers is proportionally higher in this section with frequent Scots Pine (*Pinus sylvestris*) and European Larch (*Larix europaea*). Sections of the Duck Pond wood have a high water table and in these areas wetland herbs predominate. Ash dieback (*Hymenoscyphus fraxineus)* was observed to be affecting ash trees within this section. In these areas of dieback the canopy is very open.

Figure 33: WD2 mixed broadleaf/conifer woodland at the Duck Pond.

Two small blocks of WD2 woodland totalling 3ha occur at the Railway Woods. These woodlands comprise primarily Beech (*Fagus sylvatica*), Scots Pine (*Pinus sylvestris*) and Silver Birch (*Betula pendula*). Hazel (*Corylus avellana*) is frequent in the shrub layer. Herb-Robert (*Geranium robertianum*) and Sanicle (*Sanicula europaea*) are the main broadleaf herbs and Atlantic Ivy (*Hedera hibernica*) dominates the ground floor.

Figure 34: WD2 woodland at the Railway Woods with pine and birch.

Mature blocks of WD2 are found around the castle and associated buildings. The main trees in these areas include Sessile Oak (*Quercus petraea*), Beech (*Fagus sylvatica*), Ash (*Fraxinus excelsior*), Scots Pine (*Pinus sylvestris*), Sitka Spruce (*Picea sitchensis*), Lime (*Tilia x europaea*) and European Larch (*Larix europaea*). Other occasional trees include Monterey Cypress (*Cupressus macrocarpa*), Copper Beech (*Fagus sylvatica* 'Purpurea') and Western Red-cedar (*Thuja plicata*). A small block of WD2 woodland comprising planted Sessile Oak (*Quercus petraea*), Alder (*Alnus glutinosa*) and Scots Pine (*Pinus sylvestris*) is found to the east of the castle. The trees are regularly spaced and show no signs of thinning management. As a result, the canopy is dense and the ground flora underneath is poorly developed. The main species include Herb-Robert (*Geranium robertianum*), Wood Avens (*Geum urbanum*), Cleavers (*Galium aparine*) and Bramble (*Rubus fruticosus* agg.).

Figure 35: WD2 block with oak, pine and alder that was planted along the boundary of the grounds.

The remaining WD2 woodland is found at Ganzey Wood and a section upstream along the Arlonstown/Belpere stream. The main canopy species are Ash (*Fraxinus excelsior*), Wych Elm (*Ulmus glabra*), Scots Pine (*Pinus sylvestris*), Sessile Oak (*Quercus petraea*) and European Larch (*Larix europaea*). Upstream sections of WD2 are quite wet with wetland herbs including Yellow Iris (*Iris pseudacorus*), Common Nettle (*Urtica dioica*), Meadowsweet (*Filipendula ulmaria*) and Great Willowherb (*Epilobium hirsutum*). Beech (*Fagus sylvatica*) and Sycamore (*Acer pseudoplatanus*) become increasingly frequent in the Ganzey Wood downstream with Hazel (*Corylus avellana*) and Elder (*Sambucus nigra*) frequent in the shrub layer. The ground layer is dominated by Atlantic Ivy (*Hedera hibernica*), covering extensive areas of the woodland floor. The ground flora is relatively diverse with species including Hart's-tongue (*Asplenium scolopendrium*), Soft Shield-fern (*Polystichum*

setiferum), Broad Buckler-fern (*Dryopteris dilatata*), Wood-sedge (*Carex sylvatica*), Wood Avens (*Geum urbanum*), Enchanter's-nightshade (*Circaea lutetiana*) and Herb-Robert (*Geranium robertianum*). In the bottom section of the wood adjoining the road Snowberry (*Symphoricarpos albus*) and Wilson's Honeysuckle (*Lonicera nitida*) are abundant. Regeneration of ash is frequent in these sections with seedlings and saplings observed throughout.

Figure 36: Sloping section of Ganzey Wood with ivy dominated ground layer.

3.2.1.9 WD4 – Conifer plantation

WD4 woodland on sites comprises 3 blocks totalling an area of 4.48ha in the south-east of the site. WD4 woodland on site comprises mainly mature Sitka Spruce (*Picea sitchensis*) and European Larch (*Larix europaea*). The herb layer is limited but contains Hogweed (*Heracleum sphondylium*), Sanicle (*Sanicula europaea*) and Herb-Robert (*Geranium robertianum*). The trees don't appear to have undergone any thinning management and many have reached an age suitable for commercial timber production. Regeneration of ash was abundant in blocks of WD4 woodland on site.

Figure 37: WD4 woodland adjoining the Cricket Field.

Figure 38: WD4 woodland block adjoining the River Skane.

3.2.1.10 WS1 – Scrub

WS1 scrub is found primarily at the Railway Woods in an area that covers 1.34ha, adjoining blocks of WD4 and WD1 woodland. The primary species are Grey Willow (Salix cinerea) and Ash (*Fraxinus excelsior*). The species form a dense stand with limited ground flora underneath.

Figure 39: Block of WS1 scrub between WD4 and WD1 woodland.

3.2.1.11 WL2 - Treelines

WL2 treelines on site are mainly found along boundaries and are limited in extent at Dunsany Castle. The primary species found include Ash (*Fraxinus excelsior*), Beech (*Fagus sylvatica*), Sycamore (*Acer pseudoplatanus*), and Sessile Oak (*Quercus petraea*).

3.2.1.12 BC1 – Arable crops

BC1 arable crops at Dunsany cover an area of approximately 4.66ha and include areas of land that are cultivated and managed for the production of cereals. These areas are relatively small and range in size from 1.73 to 0.07ha in area. At the time of survey the majority of cereal crops had been harvested and comprised the remaining stubble.

In the north of the site two blocks of arable are found adjoining woodland habitats. The larger block (0.9ha) runs between WD1 woodland of Clusker Woods south and The Pond Wood. A further small block of 0.07ha is found in a corner of the same field adjoining WN2 woodland portion of Clusker Woods south. Two further small blocks totalling 0.78ha are found to the north of Belpere Stream near The Glen/Phildie's Field. These blocks adjoin areas of WD2 woodland and a mosaic of GS2/WD1. The largest block (1.73ha) of BC1 is found to the south of Moore's Hill Wood. This section joins WD1 woodland to the north and WD2/WD4 woodland to the south. The Skane River flows in a westward direction along the bottom of the field, separating the field from adjoining WD habitats. The remaining blocks of BC1 are found to the east of the L2207 and horseshoe woods. Two small blocks totalling 1.15ha are found along the field boundary, separating two blocks of WD1 woodland (See Figure 40 below).

Figure 40: BC1 arable crops adjoining WD1 woodland at the southern end of the site.

3.2.1.13 BL1 – Stone walls & other stonework

BL1 habitat at Dunsany comprises mainly old mortar walls associated with the castle and associated buildings within the grounds. Stone walls are found widely at Dunsany and include the castle, farmyard complex buildings, railway bridge and gate lodges. Stone walls provide demanding conditions for colonists due to factors including exposure, drought and limited soil development, leading to a suite of specialised plants adapted to these conditions.

Old mortar walls at Dunsany support a suite of species with flowering plants such as Ivy-leaved Toadflax (*Cymbalaria muralis*), Wall Speedwell (*Veronica arvensis*) and Common Whitlowgrass (*Erophila verna*), along with ferns such as Maidenhair Spleenwort (*Asplenium trichomanes*), Wall Rue *(Asplenium ruta-muraria*) and Common Polypody (*Polypodium vulgare*).

Figure 41: Gate lodge and stone wall along the L2208 and associated wall flora.

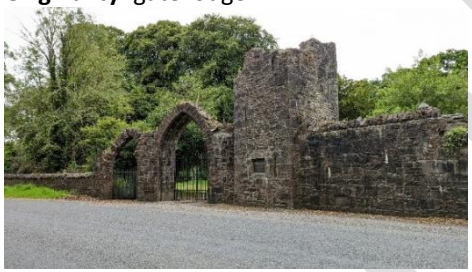
3.2.1.14 BL3 – Buildings & artificial surfaces

This habitat includes all built structures and various areas of hard-standing that are covered with artificial surfaces at Dunsany. Dunsany Castle is one of the oldest surviving country houses in Ireland and probably the oldest one in Ireland associated with a single family. Built structures include the castle, farmyard complex, stables, steward's house, railway bridge, walled garden, church, graveyard and gate lodges. The site is formally designated as an Architectural Conservation Area (ACA). An ACA is a place, area, group of structures or townscapes that is of special interest and that has been afforded statutory protection by the planning authority in accordance with Section 81 of the Planning & Development Act.

The rich built heritage of Dunsany has been documented and assessed in national inventories of architectural and archaeological heritage. National Inventory of Architectural Heritage (NIAH) structures within the study area are outlined below in Table 5. Details including period, value, originality and descriptions are reproduced from the NIAH inventory accounts. A map of NIAH structures within the study area is illustrated in Figure 43. National Monuments Service sites and monuments located within the study area are outlined in Table 6 and locations illustrated in Figure 44. Descriptions of sites and monuments are reproduced from the Architectural Survey of Ireland (ASI) Sites and Monuments Record (SMR) accounts.

Figure 42: Dunsany Castle and associated farmyard complex buildings.

Table 5: National Inventory of Architectural Heritage sites within the study area.

Reg_no.	Assessment	Description
14403701	**Period:** 1830 - 1850 **Value:** Regional **Originality:** gate lodge	Detached single-bay two-stage gate lodge with castellations parapet, built c.1840, now vacant. Dressed limestone walls with ashlar string courses. Paired gun loop openings with ashlar dressings and label mouldings. Ashlar limestone entrance gate with castellated parapet to north-west, with Tudor arch opening having a single and a pair of cast-iron gates. Carved stone crest over main gate. Set in roughly dressed limestone boundary walls with castellated parapet.
14403702	**Period:** 1800 - 1840 **Value:** Regional **Originality:** gate lodge 	Detached three-bay single-storey gate lodge, built c.1820, with central breakfront. Now in ruins. Rendered walls. Square-headed openings set in recessed blind arches. Rubble stone boundary walls to site with ashlar dressings to gate.
14403703	**Period:** 1830 - 1850 **Value:** Regional **Originality:** gate lodge 	Pair of pointed-arch entrance gates, built c.1840, with mock ruined stone tower having gun loops to the north-west. Three-bay single-storey stone gate lodge to site. Ashlar voussoirs and dressings to main entrance, rusticated arch to pedestrian entrance. Some paired timber sash windows to gate lodge.
14403708	**Period:** 1830 - 1850 **Value:** Regional **Originality:** gate lodge	Detached single-bay two-stage castellated entrance gate tower, built c.1840, with single-storey gate lodge set behind flanking by castellated walls. Rock-faced stone walls set on ashlar plinths with piers, ashlar string courses and carved stone crest. Segmental-arched carriage opening with pair of studded timber gates having cast-iron portcullis gate above. Gun loops and square-headed openings with ashlar dressings.

Reg_no.	Assessment	Description
14403709	**Period:** 1840 - 1860 **Value:** Regional **Originality:** bridge	Single-arch rock-faced limestone railway bridge with string courses and copings, built c.1850, carrying the road over the former railway track which is now disused.
14403711	**Period:** 1770 - 1790 **Value:** National **Originality:** country house 	Detached ten-bay three-storey country house, commenced c.1200, with several phases of construction. Remodelled and renovated c.1780 and c.1840. Rubble stone walls. Rendered and ashlar limestone castellations and rendered chimneystacks. Ashlar limestone dressings with hood and label mouldings to square-headed and pointed-arched openings. Paired timber sash windows. Studded timber doors set in pointed-arched openings with hood mouldings. Port-cochere addition to north-east.
14403712	**Period:** 1830 - 1870 **Value:** Regional **Originality:** stables	Detached stable courtyard, built c.1850, comprising an entrance screen wall, with two perpendicular ranges of stables, set around a courtyard. Range of corrugated-iron outbuildings, c.1900 to north-west side. Tudor-arched integral carriagearch set in screen wall, flanked by pedestrian gates, with canted terminating bays having pedimented breakfronts. Pitched and hipped slate roofs with gablets and finials. Dressed stone walls with castellated parapets, string courses and ashlar dressings. Timber sash and timber casements windows set in openings with ashlar dressings.
14403713	**Period:** 1760 - 1800 **Value:** Regional **Originality:** farmyard complex	Farmyard complex, built c.1780, comprising of four ranges of single- and two-storey outbuildings set around a central courtyard, with detached outbuildings set within the courtyard. Pitched slate roofs, with gabled central bays to north-western and south-western ranges, and with bellcote to north-eastern range. Dressed stone walls with ashlar limestone dressings to segmental-arched and square-headed openings. Remains of walled gardens and outbuildings to site.
14403714	**Period:** 1890 - 1910 **Value:** Regional **Originality:** steward's house	Detached four-bay single-storey over basement former estate manager's house, built c.1900, now vacant. Comprising a stepped gabled breakfront, flanked by single bays, with an angled terminating bay having canted bay window to the west gable. Pitched slate roof with curved gables and ashlar limestone chimneystacks. Snecked limestone walls with string course between floors. Timber sash windows set in openings with ashlar limestone dressings.

Figure 43: National Inventory of Architectural Heritage (1:6,000).

Table 6: National Monuments Service sites and monuments located within Dunsany Nature Reserve.

ENTITY_ID	CLASSDESC	DESCRIPTION
ME01680	Cross - Wayside cross	Situated on the NE side of the Dunshaughlin to Kilmessan road opposite the entrance avenue to Dunsany castle (ME037-018----) and c. 200m N of Dunsany church (ME037-019----). The cross (H 2.35m) was thought to be a fossiliferous limestone but is probably granite. It is rectangular in cross-section and consists of a shaft (dims 0.25m x 0.17m; H 1.22m), collar (dims 0.31m x 0.16m; H 0.29m) and upper shaft (dims 0.21m x 0.13m; H 0.84m) set in a rectangular base (dims 0.92m x 0.88m; H 0.14m) that also has two basins of a bullaun stone (ME037-044----). The base is on a plinth of three steps. The edges of the shaft are chamfered and the narrow sides taper. The upper shaft is a Latin cross decorated on the W side in false relief with a crucifixion at the crux and a winged ox, a symbol of St Luke, in the panel above. There is a small mortice on the top of the upper shaft. A date of c. 1600 is suggested (King 1984, 108). This cross was badly vandalised on 1 June 2013 when the shaft was broken just above the base and the head was fractured into three large pieces. The cross was conserved by Laurent Madelmont for the Dunsany estate and re-erected in August 2014 (Meath Chronicle c. 14/08/2014). (Westropp 1894, 227-9; Moore 1987, no. 1535)
ME01681	Castle - unclassified	Situated on a low-lying landscape. Hugh de Lacy granted the barony of Skreen to Adam de Feipo in 1172 but the details of the sub-infeudation are not known. However, Dunsany is likely to be an early manor in the possession of the Cussack family, but with what form of castle is not known. In 1401 Sir Christopher Plunket of Rathregan, first Lord Killeen, married Joan Cussack, heiress to Killeen and Dunsany, and Dunsany has remained in the Plunket family ever since. Their eldest son John inherited Killeen and his descendants became Earls of Fingal, while Dunsany was left to their second son, Christopher who became the first baron Dunsany. In 1641 the entire parish of Dunsany amounting to 240 acres was owned by Patrick Plunket, ninth Baron Dunsany, but he also owned most of the land in the Meath parishes of Kentstown and Oldcastle as well as other land in the county amounting to over 1000 acres (Simington 1940, 70-1, 122-3, 145, 268, 270, 273). The first Lord Dunsany or his descendants many have built a masonry castle here, the form of which is now completely obscured by remodelling in a neo-gothic style in the 1780s, and again c. 1840. The castle is described (Bence-Jones 1978, 117) as: 'two tall blocks, each with a pair of square corner-towers, joined by a hall range so as to enclose a shallow 3-sided court. The 13th Lord Dunsay restored and modernized the old castle 1780s, filling in the old court between the projecting tower-blocks to form a spacious staircase hall, putting in pointed Georgian Gothic windows..' Some of what could have been a tower house could survive in the square projecting corner towers. (Bence-Jones 1978, 117). The above description is derived from the published 'Archaeological Inventory of County Meath' (Dublin: Stationery Office, 1987). In certain instances the entries have been revised and updated in the light of recent research. Compiled by: Michael Moore Date of revision: 21 August 2019
ME01682	Church	Located on a fairly level landscape at the N side of a natural knoll (dims of base c. 100m NE-SW; c. 50m NW-SE; max. H c. 10m at SW). A church at Dunsany is listed in the ecclesiastical taxation (1302-06) of Pope Nicholas IV (Cal. doc. Ire., 5,

ENTITY_ID	CLASSDESC	DESCRIPTION
		255). Ussher (1622) describes the church and chancel as being reasonably well repaired (Erlington 1847-64, 1, lxxiii). According to Dopping (1682-5) the church of St Nicholas was ruined since 1641 but the graveyard was enclosed (Ellison 1972, 7). The church was probably built by the second Sir Christopher Plunkett, the first baron of Dunsany, before his death in 1461, and it was probably extant by c. 1450 (Leask 1960, 14). He was the second son of Sir Christopher Plunkett and Joan Cussack, whose marriage in 1403 created a dynasty that would rule at Dunsany, Killeen, Rathmore and Loughcrew, and produce a saint in St Oliver Plunkett (1625-81). Sir Christopher's will itemises arras, crosiers, chalices, missals, psalters and hymnals together with copes of gold and satin for the church and the statue of the Blessed Virgin. There was to be a chantry chapel of priests to pray his soul and those of his wives, Anne FitzGerald and Elizabeth Preston. This is a fortified parish church which has been fully described (Westropp 1894, 222-29), on the site of an older parish church, of which there is no trace. It consists of a nave (int. dims 16.6m E-W; 6.5m N-S) and chancel (int. dims 15.3m E-W; 6.6m N-S), which survives complete as a conserved National Monument, although within the Dunsany estate (Harbison 1970, 184). It is within a D-shaped graveyard (dims 68m E-W; 41m N-S) with the straight side at S where it is defined by an inner fosse (Wth 5.3m; int. D 0.5m; ext. D 0.5-1m) and outer bank (Wth c. 5m; ext. H 0.2m). The perimeter is defined by an outer scarp at W (Wth 2m; H 1.4m), which decreases around to N (Wth 5.5m; H 0.7m) and fades away on the E side. The headstones date generally from c. 1720 to c. 1950 with a few later inscriptions. The nave is entered through reconstructed doorways at N (Wth 1.8m) and S (Wth 1.25m). The nave has single large pointed windows in the S (destroyed) and N walls, placed E of the doorways. That on the N wall probably had three multi-cusped lights with two smaller cusped lights above. It may have been a similar design to the W window, of which only two mullions partially survive. There is a recess (L 3.77m; D 0.53m) towards the E end of the S wall, which provides two, two-light, cusped windows, one above the other for the rood loft. The stairs to the loft is in the N pier of the round chancel arch (Wth 2.97m) and it leads to a space in a projection (ext. dims 6.25m E-W; 2.25m N-S; int. dims 4m E-W; 2.45m N-S) at the E end of the N nave wall. The large rectangular window on the N wall of this chapel on the ground floor is robbed, but at the loft level there is a simple ogee-headed light. The chancel arch may be rebuilt as the footing of the N pier suggest a narrower original arch (Wth 2.2m), more centrally placed on the main axis of the church. The chancel has one decorated window at the W end of the N wall, and three two-light cusped windows with very little tracery remaining on the S wall. There is a triple sedelia with multi-cusped openings under a square hood between the E and central windows of the S wall. The E window is a reconstruction of a three-light cusped window that is based on the E window at Killeen (ME038-013----). Large beam-holes placed high in the N and S walls would have divided the chancel in two, providing a chantry at the W end. A dais (Wth 2.7m; H 0.2m) at the E end supports the base of an altar (dims 2.95m x 0.9m), which is against the E wall. A pointed doorway (Wth 0.82m; H 1.85m) in the N wall leads to the vaulted sacristy on the ground floor of the NE tower (ext. dims 7.4m E-W; 5.85m N-S) that is kept permanently locked. A blocked round-headed doorway (Wth 1m) in the E wall leads to the sacristy from the outside and there is a rectangular chamfered light in the N wall. The doorway from the chancel also leads to a mural stairs in the W wall to the first floor over the vault,

ENTITY_ID	CLASSDESC	DESCRIPTION
		which has lights in the N and E walls, and a hagioscope in the S wall that allows a view of the high altar below in the chancel. A mural stairs in the W wall leads to the second floor with lights on the N and E walls. The NE is the largest of four towers at each angle of the church, but the SE tower (ext. dims 2.07m E-W; 2.05m N-S), although it has a small chamber with square window in the S wall, is inaccessible, and its only function is to provide a newel stairs rising from the wall-walk on the S wall to the E wall. A passage over the chancel arch wall also connects the N and S wall-walks, which do not survive anywhere. From the nave a lintelled doorway at the S end of the W wall leads to a newel stairs in the SW tower (ext. dims 3.3m E-W; 3.25m N-S) that permits access to the wall-walk on the S wall of the nave. The stairs continues upwards and at the top a lintelled doorway leads to a destroyed passage over the W gable to the belfry stage of the NW tower. This tower (ext. dims 3.4m N-S; 3.3m E-W) is entered at the ground floor by a lintelled doorway at the N end of the W nave wall. There are small lights in the W and N walls, but access to the first and second floors and the belfry stage above, if it was present, was by internal ladders. The belfry stage has a corbelled roof, two tall ogee-headed openings on the N and W sides, and single openings on the S and E sides. The fragmentary double effigy tomb of a lady and her knight is now reconstructed in the N chapel off the nave. The table (dims 2.16m x 1.24m; T 0.11m; H over base 0.82m) has a chamfered edge and is carved in relief. The end-panels show ecclesiastics (E) and the scourging of Christ (W), while the long sides have crests including Plunkett, FitzGerald, Fleming, and FitzEustace, amongst others. Although there is no inscription, the tomb may have been prepared for Sir Christopher, who died in 1461, and his first wife, Anne Fitzgerald, or possibly for his son, Richard, who died c. 1470-72. (FitzGerald 1915; Hunt 1974, 1, 205-06). The decorated font (FitzGerald 1915) is now kept in the Castle (ME037-018----) for safe-keeping. The basin is octagonal (ext. dim. 0.68m; H 033m), has a circular basin (int. diam. 0.5m;D 0.2m) and rests on a separate piece (H 0.17m) with slightly chamfered under-panels. The upper panels have images of two apostles in separate ogee-headed niches on each side, together with panels devoted to the Crucifixion and the symbols of the Passion. The octagonal shaft is attached to an octagonal, pyramidal base with four mouldings, but the decoration on the under-panels and shaft are all geometric, apart from four heraldic shields held by angels. These include the arms of Plunkett and FitzGerald, a plain latin cross, and a heart pierced by two swords, which is a symbol of the Blessed Virgin. (Roe 1968, 49-55) Outside the N doorway is the surviving fragment of the shaft of a cross (dims 0.23m x 0.14m; H 0. 47m) with chamfered edges. Each side has a figure in false relief representing St Peter (W), St Andrew (N), St James of Compostella (E), and St. John (S). A date of c. 1480 has been suggested (King 1984, 98-9). The above description is derived from the published 'Archaeological Inventory of County Meath' (Dublin: Stationery Office, 1987). In certain instances the entries have been revised and updated in the light of recent research. Compiled by: Michael Moore Date of revised upload: 10 March, 2015
ME03301	Bullaun stone	Located on the roadside, opposite the entrance to Dunsany castle. On the limestone base of the Dunsany cross (ME037-017----), which is a rectilinear slab (L 0.86m, Wth 0.80m, T 0.08m) are a number of regular hollows. These form a cluster

ENTITY_ID	CLASSDESC	DESCRIPTION
		on the upper surface of the slab to the S of the cross shaft. There are three main circular, rounded, hollows, in the E (diam. 0.15m, D 0.09m); in the W (diam, 0.17m, D 0.09m); the S example is smaller (diam. 0.03m, D 0.01m). To the S and E of these are a series of smaller shallow, artificial, cavities. Compiled by: Geraldine Stout Date of upload: 02 December 2013
ME03728	Font	The decorated font that was kept in the nave of Dunsany church (ME037-019----) is now kept in the Castle (ME037-018----) for safe-keeping. The top is octagonal (ext. dim. 0.68m; H 033m), has a circular basin (int. diam. 0.5m; D 0.2m), and rests on a separate piece (H 0.17m) with slightly chamfered under-panels. The upper panels have images of two apostles in separate ogee-headed niches, together with panels devoted to the Crucifixion and the symbols of the Passion. The octagonal shaft is attached to an octagonal, pyramidal base with four mouldings, but the decoration on the under-panels and shaft are all geometric, apart from four heraldic shields held by angels. These include the arms of Plunkett and FitzGerald, a plain latin cross, and a heart pierced by two swords, which is a symbol of the Blessed Virgin. (Roe 1968, 49-55) Compiled by: Michael Moore Date of upload: 10 March, 2015
ME03729	Graveyard	The fortified parish church (ME037-019----) of Dunsany is within a D-shaped graveyard (dims 68m E-W; 41m N-S) with the straight side at S where it is defined by an inner fosse (Wth 5.3m; int. D 0.5m; ext. D 0.5-1m) and outer bank (Wth c. 5m; ext. H 0.2m). Elsewhere the perimeter is defined by an outer scarp at W (Wth 2m; H 1.4m), which decreases around to N (Wth 5.5m; H 0.7m) and fades away on the E side. The headstones date generally from c. 1720 to c. 1950 with a few later inscriptions. The churchyard cross (ME037-019003-) is in the graveyard outside the N doorway of the church. Compiled by: Michael Moore Date of upload: 10 March, 2015
ME03730	Cross - Churchyard cross	Outside the N doorway of the fortified parish church of Dunsany (ME037-019----) is the surviving fragment of the shaft of a cross (dims 0.23m x 0.14m; H 0. 47m) with chamfered edges. Each side has a figure in false relief representing St Peter (W), St Andrew (N), St James of Compostella (E), and St. John (S). A date of c. 1480 has been suggested (King 1984, 98-9). It is described by King as: Close to the N wall of the medieval church in the grounds of Dunsany Castle. Set on a concrete shaft 1959. Material: Limestone. H 0.48m; Wth 0.22m; D 0.15m. A shaft fragment, rectangular in section with chamfered edges, decorated I false relief. Each face has a figure set in an ogee-headed niche above which are floral and architectural designs. The shaft edges have a trellis pattern on three sides and four marigolds on the N-W bevel. No inscriptions. W: St. Peter with a large out-turned key. His tunic, like that of the other figures, is pleated. Above is an ivy-leaf design. E: St James of Compostella wearing a pilgrim's hat and carrying a staff. A bird-inhabited fruiting vine above. N: St Andrew with a large saltire cross under a two-stage pattern of pierce

ENTITY_ID	CLASSDESC	DESCRIPTION
		perpendicular tracery. S: St John, clean-shaven, holding the poisoned goblet, and a book (?). Above is a stiff laurel-leaf design. A date c. 1480 is suggested. Date of upload: 10 March, 2015
ME03736	Tomb - effigial	The fragmentary double effigy tomb of a lady and her knight is now reconstructed in the N chapel off the nave. The table (dims 2.16m x 1.24m; T 0.11m; H over base 0.82m) has a chamfered edge and is carved in relief. The end-panels show ecclesiastics (E) and the scourging of Christ (W), while the long sides have crests including the Plunkett, FitzGerlad, Fleming, and FitzEsutace arms, amongst others. Although there is no inscription, the tomb may have been prepared for Sir Christopher, who died in 1462, and his first wife, Anne Fitzgerald, or possibly for his son, Richard, who died c. 1470-72. (FitzGerald 1915, 338-9; Hunt 1974, 1, 205-06). The tomb is described by FitzGerald as: This altar-tomb is uninscribed. The covering slab bears the effigies of a knight and his wife in the horned head-dress of the period; the feet of the knight rest on a dog, and those of his wife on a cushion embroidered with two eagles between which is a (?) cat's head. One end-slab of the sides has a representation of the chastisement of our Lord in a central panel, with an angel swinging a censor in the panels on either side; in the opposite end a bishop or saint occupies each of the three panels. The two longer sides are each divided into five niches, richly floriated, and, though empty, coats-of-arms on shields occupy the spaces between the nice-heads. On one side appear, from left to right, the arms of Plunkett, Fleming (?), Castlemartin (three towers), and Plunkett, impaling FitzGerald or FitzEustace. On the other side are shields bearing the arms of Plunkett, on another FitzGerald or FitzEustace, on the third a heart pierced by two swords saltire-wide, and on the fifth a cross and some emblems of the Crucifixion. Possibly the knight represents Sir Christopher Plunkett, Kt. (second son of Sir Christopher of Killeen), who is generally considered to have been the first Baron of Dunsany, and who died in 1462. He was twice married – first to Anne FitzGerald, daughter to Richard FitzGerald, of Ballyshannon, a younger son of Maurice, 4th Earl of Kldare; and secondly to Elizabeth Preston, daughter of Roger, first Viscount Gormanston. He left issue by his first wife. As the altar-tomb bears no inscription, and the Preston arms do not appear on it, it strikes one that it may have been erected during the lifetime of Sir Christopher. Yet, as Sir Christopher Plunkett in his will desires his body to be buried in the chancel of the church at Killeen, it is just possible that the Dunsany tomb may belong to his son and successor, Richard Plunkett, 2nd Lord Dunsany, who died between 1474 and 1482; his wife was Joan, daughter of Sir Rowland FitzEustace, Baron of Portlester, whose family arms are: "Or, a saltire gules"; and when sculptured on a stone are identical with the FitzGerald arms: "Argent, a saltire gules"; hence the shield on the side of the tomb may be either the FitzGerald or the FitzEustace arms. Of the two, it is more probable that the tomb belongs to the latter Lord Dunsany. Date of upload: 11 March, 2015

Figure 44: National Monuments Service sites and monuments located within Dunsany Nature Reserve (1:2,000).

3.2.2 Bat Survey

3.2.2.1 Summer survey

The purpose of this survey was to assess the use by bats of primary buildings at Dunsany Castle as roosting sites during the summer season. The habitats present are utilised to some extent by all species that might be expected to occur –

- Common Pipistrelle (CP);
- Soprano Pipistrelle (SP);
- Nathusius' Pipistrelle (NP);
- Leisler's Bat (LB);
- Brown Long-eared Bat (BLE);
- Natterer's Bat (NB);
- Daubenton's Bat (DB); and
- Whiskered Bat (WB).

Of primary importance are the Castle itself, which hosts a significant Brown Long-eared Bat Maternity Roost (in addition to serving as a day roost/temporary roost for all species) and the Coach house, which hosts a significant mixed *Myotis* species maternity roost. The results of the summer surveys are presented in Table 7.

An oscillogram and sonogram of a Brown Long-eared Bat recorded on Unit 7 at the base of the attic ladder is presented in Figure 45.

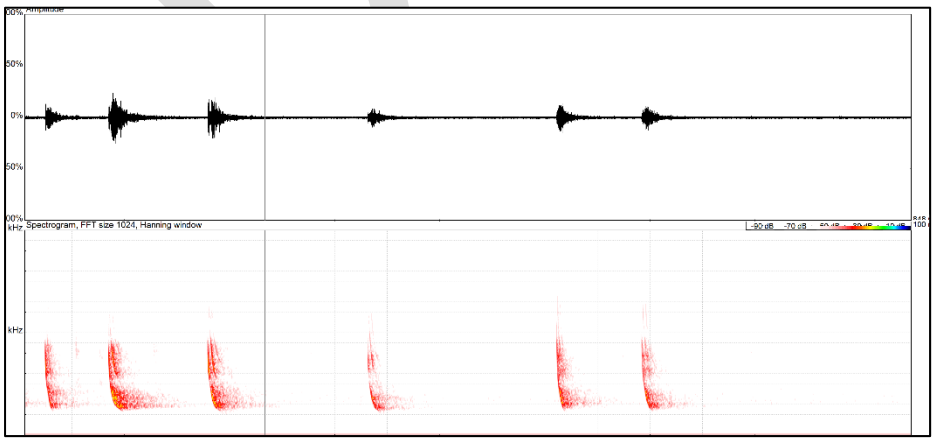


Figure 45: Oscillogram and Sonogram of Brown Long-eared Bat

Table 7: Location, bat species recorded and activity type during summer survey

LOCATION	CP	SP	NP	LB	BLE	NB	DB	WB	ACTIVITY TYPE
SHED									NO ACTIVITY DETECTED
ROOM OVERLOOKING KITCHEN					X			X	DAY ROOST
ON STAIRS	X	X	X	X	X	X	X	X	DAY ROOST ALL, MATERNITY ROOST BLE
IN UNUSED ROOM	X			X					DAY ROOST
ON WINDOWSILL OUTSIDE CASTLE	X	X	X	X	X	X	X	X	OUTSIDE
BASCK SHED									NO ACTIVITY DETECTED
BOTTOM OF LADDER	X	X	X	X	X	X	X	X	DAY ROOST ALL, MATERNITY ROOST BLE
OUTSIDE FARM BUILDINGS	X	X	X	X	X	X	X	X	OUTSIDE
OUTSIDE FARM BUILDINGS	X	X	X	X	X	X	X	X	OUTSIDE
COACHYARD BUILDING					X				DAY ROOST
OUTSIDE FARM BUILDINGS	X	X	X	X	X	X	X	X	OUTSIDE
ON FLAT ROOF IN CASTLE	X	X		X	X	X		X	DAY ROOST ALL

LOCATION	CP	SP	NP	LB	BLE	NB	DB	WB	ACTIVITY TYPE
OUTSIDE FARM BUILDINGS	X	X	X	X	X	X	X	X	OUTSIDE
OUTSIDE FARM BUILDINGS	X	X	X	X	X	X	X	X	OUTSIDE
MAIN ATTIC SPACE	X	X	X	X	X	X	X	X	DAY ROOST ALL, MATERNITY ROOST BLE
OUTSIDE FARM BUILDINGS	X	X	X	X	X	X	X		OUTSIDE
COACHHOUSE RIGHT	X	X	X	X	X	X	X	X	DAY ROOST ALL,MIXED MYOTIS MATERNITY ROOST
COACHHOUSE LEFT	X	X	X	X	X	X	X	X	DAY ROOST ALL,MIXED MYOTIS MATERNITY ROOST

3.2.2.2 Winter survey

The purpose of this survey was to assess the use by bats of primary buildings at Dunsany Castle as hibernating sites during the winter season. A site visit was undertaken by Dr Patrick Moran and Dr Emma Reeves on the morning of the 22nd of February 2023 in order to assess the buildings occurring on site as regards hibernating Bat Roost Potential (BRP). Having undertaken the BRP survey, optimal locations for the deployment of Passive Ultrasound Monitors (PAM) were identified in order to assess bat activity. Having identified suitable locations, 10 Pettersson D500x PAM units were deployed to assess bat activity within the study area during the period 22/02/23 -22/03/23.

The Pettersson D500x units were placed primarily within the castle itself and associated farm out-buildings but also the Icehouse, Tower and Sunken House. 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 the same as those for the summer surveys

While there was no winter roost activity in the main attic, there was winter roosting activity of a minimum of five species, with the Castle being especially important as a Brown Long-eared Bat winter roost.

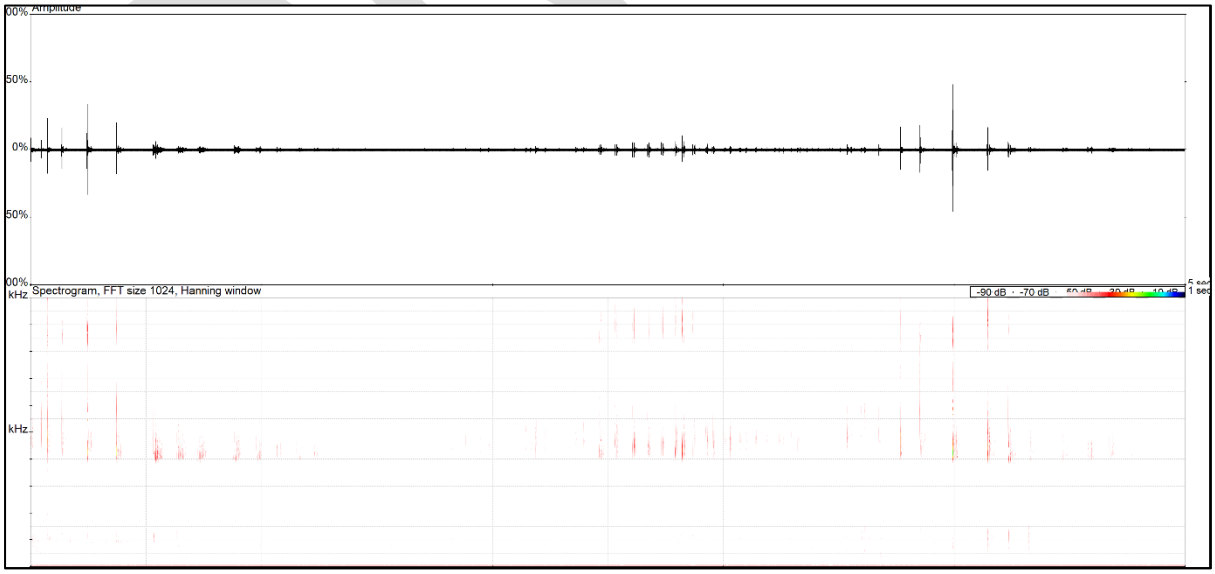


Figure 46: Oscillogram and Sonogram recorded of Whiskered Bat

Table 8: Location, bat species recorded and activity type during summer survey

LOCATION	CP	SP	NP	LB	BLE	NB	DB	WB	ACTIVITY TYPE
ROOM WITH TABLE			X		X			X	WINTER ROOST
BASE OF LADDER					X				WINTER ROOST
TOP OF LADDER									NO ACTIVITY
MAIN ATTIC									NO ACTIVITY
FLAT ROOF AREA	X				X				WINTER ROOST
COACH HOUSE RIGHT	X				X			X	WINTER ROOST
COACH HOUSE LEFT	X				X				WINTER ROOST
TOWER						X			WINTER ROOST
ICE HOUSE						X			WINTER ROOST
SUNKEN HOUSE									NO ACTIVITY

4 Conclusions

The conclusions of the preliminary habitat, flora and bat surveys undertaken at Dunsany Castle and Estate indicate that it is a site of National significance as regards habitats and flora (almost 200 species identified during preliminary surveys alone) and is of International importance as regards the bat population supported (eight of Ireland's nine species were found to utilise Dunsany Castle and associated buildings as a roosting site

The lack of any pesticides for over a decade has resulted in an abundance of invertebrate prey as is reflected in the high number of species present and both maternity and hibernation roosts.

A quantitative assessment of the vegetation occurring, in addition to the associated fauna is required and will inform the optimal management (or lack thereof) at the site for the maintenance and enhancement of biodiversity.

5 Appendices

5.1 Appendix I – Complete list of plant species observed during surveys

Species name	Common name
Abies grandis	Giant Fir
Acer pseudoplatanus	Sycamore
Achillea millefolium	Yarrow
Aegopodium podagraria	Ground-elder
Aesculus hippocastanum	Horse-chestnut
Agrostis stolonifera	Creeping Bent
Alliaria petiolata	Garlic Mustard
Alnus cordata	Italian Alder
Alnus glutinosa	Alder
Alopecurus geniculatus	Marsh Foxtail
Alopecurus pratensis	Meadow Foxtail
Angelica sylvestris	Wild Angelica
Anthoxanthum odoratum	Sweet Vernal-grass
Anthriscus sylvestris	Cow Parsley
Apium nodiflorum	Fool's-water-cress
Arctium minus	Lesser Burdock
Arrhenatherum elatius	False Oat-Grass
Asplenium adiantum-nigrum	Black Spleenwort
Asplenium ruta-muraria	Wall Rue
Asplenium scolopendrium	Hart's-tongue
Asplenium trichomanes	Maidenhair Spleenwort
Atropa belladonna	Deadly Nightshade
Bellis perennis	Daisy
Betula pendula	Silver Birch
Brachypodium sylvaticum	False-brome
Briza media	Quaking-grass
Buddleja davidii	Butterfly-bush
Buxus sempervirens	Box
Calystegia sepium	Hedge Bindweed
Cardamine flexuosa	Wavy Bitter-cress
Cardamine hirsuta	Hairy Bitter-cress
Carex flacca	Glaucous Sedge
Carex hirta	Hairy Sedge
Carex leporina	Oval Sedge
Carex nigra	Common Sedge
Carex otrubae	False Fox-sedge
Carex pendula	Pendulous Sedge

Species name	Common name
Carex remota	Remote Sedge
Carex sylvatica	Wood-sedge
Castanea sativa	Sweet Chestnut
Cedrus atlantica	Atlas Cedar
Centaurea nigra	Common Knapweed
Cerastium fontanum	Common Mouse-ear
Cerastium glomeratum	Sticky Mouse-ear
Chamerion angustifolium	Rosebay Willowherb
Chrysosplenium oppositifolium	Opposite-leaved Golden-saxifrage
Circaea lutetiana	Enchanter's-nightshade
Cirsium arvense	Creeping Thistle
Cirsium palustre	Marsh Thistle
Cirsium vulgare	Spear Thistle
Cornus sanguinea	Dogwood
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Crepis capillaris	Smooth Hawk's-beard
Crocosmia x crocosmiiflora	Montbretia (C. aurea x pottsii)
Cymbalaria muralis	Ivy-leaved Toadflax
Cynosurus cristatus	Crested Dog's-tail
Dactylis glomerata	Cock's-foot
Dactylorhiza fuchsii	Common Spotted-orchid
Deschampsia cespitosa	Tufted Hair-grass
Dryopteris affinis agg.	Scaly Male-fern
Eleocharis palustris	Common Spike-rush
Elytrigia repens	Common Couch
Epilobium ciliatum	American Willowherb
Epilobium hirsutum	Great Willowherb
Epilobium parviflorum	Hoary Willowherb
Epipactis phyllanthes	Green-flowered Helleborine
Equisetum arvense	Field Horsetail
Equisetum telmateia	Great Horsetail
Erophila verna	Common Whitlowgrass
Fagus sylvatica	Beech
Filipendula ulmaria	Meadowsweet
Fragaria vesca	Wild Strawberry
Fraxinus excelsior	Ash
Galium aparine	Cleavers
Galium palustre	Marsh-bedstraw
Galium verum	Lady's Bedstraw
Geranium robertianum	Herb-Robert
Geum urbanum	Wood Avens

Species name	Common name
Glechoma hederacea	Ground-ivy
Glyceria fluitans	Floating Sweet-grass
Hedera Hibernica	Atlantic Ivy
Heracleum sphondylium	Hogweed
Hesperis matronalis	Dame's-violet
Holcus lanatus	Yorkshire-fog
Holcus mollis	Creeping Soft-grass
Hordeum distichon	Two-rowed Barley
Hyacinthoides non-scripta	Bluebell
Hypericum tetrapterum	Square-stalked St John's-wort
Hypochaeris radicata	Cat's-ear
Ilex aquifolium	Holly
Iris pseudacorus	Yellow Iris
Juglans regia	Walnut
Juncus acutiflorus	Sharp-flowered Rush
Juncus conglomeratus	Compact Rush
Juncus effusus	Soft-rush
Juncus inflexus	Hard Rush
Lactuca serriola	Prickly Lettuce
Lamiastrum galeobdolon subsp. argentatum	Garden Yellow-archangel
Lapsana communis	Nipplewort
Larix decidua	European Larch
Lathyrus pratensis	Meadow Vetchling
Lemna minor	Common Duckweed
Leucanthemum vulgare	Oxeye Daisy
Lolium perenne	Perennial Rye-grass
Lonicera nitida	Wilson's Honeysuckle
Lonicera periclymenum	Honeysuckle
Lotus corniculatus	Common Bird's-foot-trefoil
Lotus pedunculatus	Greater Bird's-foot-trefoil
Mahonia aquifolium	Oregon-grape
Medicago lupulina	Black Medick
Mentha aquatica	Water Mint
Moehringia trinervia	Three-nerved Sandwort
Myosotis arvensis	Field Forget-me-not
Nasturtium officinale	Water-cress
Odontites vernus	Red Bartsia
Oxalis acetosella	Wood-sorrel
Papaver rhoeas	Common Poppy
Parietaria judaica	Pellitory-of-the-Wall
Persicaria hydropiper	Water-pepper
Petasites hybridus	Butterbur

Species name	Common name
Phalaris arundinacea	Reed Canary-grass
Phleum pratense	Timothy
Picea abies	Norway Spruce
Picea sitchensis	Sitka Spruce
Pinus sylvestris	Scots Pine
Plantago lanceolata	Ribwort Plantain
Plantago major	Greater Plantain
Poa annua	Annual Meadow-grass
Poa trivialis	Rough Meadow-grass
Polypodium vulgare	Polypody
Polystichum setiferum	Soft Shield-fern
Potentilla anserina	Silverweed
Potentilla reptans	Creeping Cinquefoil
Primula vulgaris	Primrose
Prunella vulgaris	Selfheal
Prunus laurocerasus	Cherry Laurel
Prunus lusitanica	Portugal Laurel
Pseudotsuga menziesii	Douglas Fir
Quercus robur	Pedunculate Oak
Ranunculus acris	Meadow Buttercup
Ranunculus repens	Creeping Buttercup
Rhododendron ponticum	Rhododendron
Ribes uva-crispa	Gooseberry
Rorippa palustris	Marsh Yellow-cress
Rosa canina	Dog-rose
Rubus fruticosus agg.	Bramble
Rubus idaeus	Raspberry
Rumex acetosa	Common Sorrel
Rumex crispus	Curled Dock
Rumex obtusifolius	Broad-leaved Dock
Rumex sanguineus	Wood Dock
Sagina procumbens	Procumbent Pearlwort
Salix caprea	Goat Willow
Salix cinerea	Grey Willow
Sambucus nigra	Elder
Sanicula europaea	Sanicle
Schedonorus arundinaceus	Tall Fescue
Schedonorus giganteus	Giant Fescue
Scrophularia auriculata	Water Figwort
Scrophularia nodosa	Common Figwort
Senecio aquaticus	Marsh Ragwort
Senecio vulgaris	Groundsel

Species name	Common name
Solanum dulcamara	Bittersweet
Sonchus asper	Prickly Sow-thistle
Sonchus oleraceus	Smooth Sow-thistle
Sparganium erectum	Branched Bur-reed
Stachys palustris	Marsh Woundwort
Stachys sylvatica	Hedge Woundwort
Stellaria graminea	Lesser Stitchwort
Stellaria holostea	Greater Stitchwort
Symphoricarpos albus	Snowberry
Tanacetum vulgare	Tansy
Taraxacum agg.	Dandelion
Taxus baccata	Yew
Tellima grandiflora	Fringecups
Thuja plicata	Western Red-cedar
Tilia platyphyllos	Large-leaved Lime
Tilia x europaea	Lime
Trifolium dubium	Lesser Trefoil
Trifolium pratense	Red Clover
Trifolium repens	White Clover
Tussilago farfara	Colt's-foot
Ulex europaeus	Gorse
Ulmus glabra	Wych Elm
Urtica dioica	Common Nettle
Valeriana officinalis	Common Valerian
Veronica arvensis	Wall Speedwell
Veronica beccabunga	Brooklime
Veronica chamaedrys	Germander Speedwell
Veronica montana	Wood Speedwell
Veronica serpyllifolia	Thyme-leaved Speedwell
Viburnum opulus	Guelder-rose
Vicia cracca	Tufted Vetch
Vicia sepium	Bush Vetch
Viola riviniana	Common Dog-violet

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