# County Meath
# Biodiversity Audit 2024

**Report for *Meath County Council***

**By *FitzGerald Ecology & Flynn Ecology***

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comhairle chontae na mí
meath county council

NPWS
An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra
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An Chomhairle Oidhreachta
The Heritage Council

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## 1. *Introduction*

With funding support from the Heritage Council, Meath County Council commissioned *FitzGerald Ecology* and *Flynn Ecology* to conduct a desk-based audit of biodiversity data for Co. Meath. As the next Meath Biodiversity Action Plan 2025-2030 is currently in preparation, it was considered important to review the county's biodiversity at the present time in order to inform the actions of the forthcoming plan.

The aims of the study are as follows:

1. Identify the current distribution of biodiversity in the county, focussing on rare, threatened and protected species. Important habitats are also a focus.
2. Identify and discuss historical trends in biodiversity including current drivers of decline.
3. Identify opportunities for conservation, including priority actions in the short-, medium- and long-term in the county.
4. Highlight relevant data gaps. These include taxonomic and spatial knowledge gaps.

The project outputs include a summary report as well as mapping data compatible with GIS. This report details all of the findings made during the assessment. An overview of designated sites and habitats precedes a review of individual taxonomic groups. The final section 4 consists of a preliminary analysis of data gaps, threats to biodiversity and recommendations for future work.

A few fieldwork-based 'Biodiversity Audits' have been completed for specific local sites in recent years, such as at Castletown House (JBA Consulting, 2022) in Co. Kildare and Áras an Uachtaráin (Gaughran and Stout, 2020) in Co. Dublin. However, to our knowledge, there has not yet been a desk-based 'Biodiversity Audit' completed for an entire county in Ireland to date. Therefore, this type of assessment is novel within a national context. Indeed, there is currently no national standard for local authority Biodiversity Audits.

## 2. *Methodology*

A search was conducted for data pertaining to rare, threatened and protected species and habitats in the county. The checklists of Nelson *et al.* (2019) and the relevant existing Irish Red Lists for particular taxonomic groups guided this search, with all legally protected and/or Red-listed species reliably recorded from Meath being listed in an Appendix (II).

Nelson *et al.* (2019) provided checklists for the following animal and plant groups:

- Plants
    - Flowering Plants (Angiosperms)
    - Ferns and Fern-allies (Pteridophytes)
    - Hornworts and Liverworts
    - Mosses
    - Algae
    - Lichens
- Vertebrates
    - Mammals

    - Birds
    - Reptiles
    - Amphibians
    - Freshwater Fish
    - Cartilaginous Fish (Sharks, skates, rays and chimaeras)
- Insects
    - Bees (Hymenoptera, Apoidea)
    - Butterflies (Lepidoptera)
    - Damselflies and Dragonflies (Odonata)
    - Macro-moths (Lepidoptera)
    - Mayflies (Ephemeroptera
    - Stoneflies (Plecoptera)
    - Water beetles (Aquatic Coleoptera)
- Invertebrates (other than insects)
    - Crayfish
    - Non-marine Mollusca

Specialist knowledge/records/sources (either individual recorders or relevant recording groups/organisations) were primarily sought in the first instance for each biological group, as these sources generally contain the highest quality and highest resolution data. This was especially true for groups for which no Red List yet exists. Species occurrence records were also gathered from various sources including the National Biodiversity Data Centre and National Biodiversity Network, databases held by non-governmental organisations (NGOs), and the National Parks and Wildlife Service (NPWS). Most of these records required conversion to shapefiles for plotting with GIS. Shapefiles for habitats and species were sourced principally from the NPWS.

For species records, data processing was carried out using the R programming language (R Core Team, 2023). Records for Co. Meath were extracted. The majority of these records used Irish Grid coordinates. Records containing latitude/longitude were converted to Irish Grid. Point coordinates (except those of 1m precision) were converted to polygons, the size of which reflected the spatial precision of the record. The coordinates of the polygon vertices were calculated in R. Python was then used to create the shapefiles with polygon geometry.

Almost all of the acquired shapefiles for this project used Irish Grid coordinates. These were all converted to shapefiles projected with Irish Transverse Mercator (ITM), as this is the standard coordinate reference system for Ireland currently. All of the relevant shapefiles were collated in a single folder and were titled clearly so as to allow ease of searching at a later date.

A range of published and unpublished literature was consulted. Both the literature and results of the mapping have been used to inform the preliminary findings. Place names used in the text are generally as per the Ordnance Survey Ireland Discovery Series (3rd edition) maps, unless otherwise stated.

It must be noted that, for the purposes of biological recording, the vice-county of Meath (v.c. H22) includes the portion of Drogheda which is south of the River Boyne (Webb, 1980), whilst the administrative (OSi) county boundary does not include this area in Meath (as can be seen in Figure 17, which is based on an OSi administrative shapefile). We have included in this audit records from the biological vice-county area of Meath.

# 3. RESULTS

## 3.1 DESIGNATED SITES AND HABITATS

A number of sites in County Meath have been recognised for their unique and/or sensitive biodiversity and have some form of statutory or non-statutory designation. Perhaps the most well-known of these designations is the 'Natura 2000' network (sometimes referred to as 'European Sites'). This comprises Special Areas of Conservation (SAC) under the EU Habitats Directive and Special Protection Areas (SPA) under the EU Birds Directive (see Figure 18 for a map of these sites). In contrast, Natural Heritage Areas (NHAs) are protected under domestic legislation (Wildlife (Amendment) Act, 2000). Proposed Natural Heritage Areas (pNHAs) lack statutory designation although these sites attract enhanced consideration during the planning process nonetheless. All NHAs and pNHAs in the county are mapped in Figure 19. Tables 1-4 provide a summary of designated sites (including pNHAs) within the county. Further information on SPAs in Co. Meath is contained in section 3.2.

*Table 1. Special Areas of Conservation (SACs) within Co. Meath*

| **Site name** | **Site code** |
|---|---|
| Killyconny Bog (Cloghbally) | 000006 |
| Rye Water Valley/Carton | 001398 |
| White Lough, Ben Loughs and Lough Doo | 001810 |
| Boyne Coast and Estuary | 001957 |
| Lough Bane and Lough Glass | 002120 |
| River Boyne and River Blackwater | 002299 |
| Moneybeg and Clareisland Bogs | 002340 |
| Girley (Drewstown) Bog | 002203 |
| Mount Hevey Bog | 002342 |

*Table 2. Special Protection Areas (SPAs) in Co. Meath*

| **Site name** | **Site code** |
|---|---|
| Lough Sheelin | 004065 |
| Boyne Estuary | 004080 |
| River Nanny Estuary and Shore | 004158 |
| River Boyne and River Blackwater | 004232 |

*Table 3. Natural Heritage Areas (NHAs) in Co. Meath*

| **Site name** | **Site code** |
|---|---|
| Jamestown Bog | 001324 |
| Girley Bog | 001580 |
| Molerick Bog | 001582 |

*Table 4. Proposed Natural Heritage Areas (pNHAs) in Co. Meath*

| **Site name** | **Site code** |
|---|---|
| Ballyhoe Lough | 001594 |
| Ballynabarny Fen | 001573 |
| Balrath Woods | 001579 |
| Boyne Coast and Estuary | 001957 |

| | |
|---|---|
| Boyne River Islands | 001862 |
| Boyne Woods | 001592 |
| Breaky Loughs | 001558 |
| Corstown Loughs | 000552 |
| Crewbane Marsh | 000553 |
| Cromwell's Bush Fen | 001576 |
| Dowth Wetland | 001861 |
| Doolystown Bog | 001577 |
| Duleek Commons | 001578 |
| Kilconny Bog (Cloghbally) | 000006 |
| Laytown Dunes/Nanny Estuary | 000554 |
| Lough Naneagh | 001814 |
| Lough Sheelin | 000987 |
| Lough Shesk | 000556 |
| Mentrim Lough | 001587 |
| Mount Hevey Bog | 001584 |
| Rathmolyon Esker | 000557 |
| Rossnaree Riverbank | 001589 |
| Royal Canal | 002103 |
| Rye Water Valley/Carton | 001398 |
| Slane Riverbank | 001591 |
| Thomastown Bog | 001593 |
| Trim Wetlands | 001357 |
| White Lough, Ben Loughs and Lough Doo | 001810 |

The designation of these sites can be traced back to the inventory originally compiled by An Foras Forbartha (Young, 1972). This inventory listed so-called 'Areas of Scientific Interest' (ASIs) in the county. The selection of ASIs were themselves often informed by the voluntary work of experienced naturalists, such as for botanically important sites (Norton, 2024a). As over fifty years have elapsed since the ASI accounts have been published, they form a useful baseline to which the current status of these sites can be compared. Table 5 shows the correspondence between ASIs of 'National' and 'Regional' importance and current designated sites, many of which are now pNHAs. Sites identified for their geological interest have been excluded (as elsewhere in the report). The boundaries of ASIs and designated sites often do not agree totally. Any overlapping areas were included in the table. Notable ASI features may no longer exist. For example, this appears to be the case for the 'Riverbank two miles east of Trim' where *Trifolium fragiferum* (Strawberry Clover) no longer occurs (Synnott, 1982). However, it was often difficult to find detailed information on the current status of these sites, especially proposed Natural Heritage Areas (pNHAs). As expected, deterioration of sites has occurred in the intervening decades. For example, the Lough Shesk Area was host to several notable plant species of fenny calcareous habitats including *Parnassia palustris* (Grass-of-Parnassus), *Carex dioica* (Dioecious Sedge) and *Coeloglossum viride* (Frog Orchid), all of which have not been recorded this century (BSBI, 2024). Moreover, a comparison of recent satellite imagery with the ½ inch to 1 mile OSi map for the area (Sheet 13) reveals the drainage which has occurred over this period. Recent fieldwork completed for the National Fen Survey (2021-2024) has also revealed declines in fen quality and quantity in other areas of Co. Meath, including in SACs, typically due to drainage, eutrophication and land (grazing) abandonment (Alexis FitzGerald, pers. obs., May-September 2023).

*Table 5. Summary of Areas of Scientific Interest (ASIs) in Co. Meath. Site importance follows the criteria in Young (1972). Only those of 'National' and 'Regional' importance are included. Current designations are those areas which at least partially overlap the ASI boundary. Important features are those mentioned in Young (1972) – these may no longer exist. ASIs identified for their geological interest have been excluded.*

| ASI name | ASI importance | Current designation | Important features (ASI) |
|---|---|---|---|
| Lough Shesk Area | National | River Boyne and Blackwater SAC<br>Lough Shesk pNHA | Succession from fen to bog, range of wetland habitats |
| Riverside at Beauparc | National | River Boyne and Blackwater SAC<br>Boyne Woods pNHA | Presence of the grass *Poa palustris* – this is the only confirmed record for the species in the county, (Margaret Norton, pers. comm., October 2024) |
| Riverside at Rossnaree | National | River Boyne and Blackwater SAC<br>Rossnaree Riverbank pNHA | Presence of the rush *Juncus compressus* |
| Riverside at Slane | National | River Boyne and Blackwater SAC<br>Slane Riverbank pNHA | Presence of the rush *Juncus compressus* |
| Newtown Area | Regional | Mentrim Lough pNHA | Presence of the fern *Thelypteris palustris* |
| Mornington dunes | Regional | Boyne Coast and Estuary SAC<br>Boyne Coast and Estuary pNHA | Range of calcareous sand dune habitats including dune slacks |
| Crewbane | Regional | River Boyne and Blackwater SAC<br>Crewbane Marsh pNHA | Unusual woodland community, damp grassland and marsh |
| Corstown Loughs | Regional | Corstown Loughs pNHA | Woodland, lakes, cutover bog. Variation in hydroseres (i.e. areas of plant succession in freshwater environments) |
| Lough Doo Area | Regional | White Lough, Ben Loughs and Lough Doo SAC<br>White Lough, Ben Loughs and Lough Doo pNHA | Ecological variation in adjacent lakes, grassland and wetland habitats. |
| Woodland and bog west of Duleek | Regional | Thomastown Bog pNHA | Mosaic of wet woodland, drier and wetter areas of raised bog |
| Doolystown Bog | Regional | Doolystown Bog pNHA | Hummock/hollow topography on intact raised bog |
| Riverbank two miles east of Trim | Regional | River Boyne and Blackwater SAC<br>Trim pNHA | Inland site for *Trifolium fragiferum* |

Many of the Co. Meath Natura 2000 sites and ASIs discussed above contain within them habitats of local, county, regional, national and international importance. Habitats of international importance are

those which are protected within SACs (or near them) in the county and which are rare at a European Union-wide scale. These generally fall under Annex I of the EU Habitats Directive (all of these habitats occurring in Co. Meath are listed with their current national status assessments in Appendix II). Examples of these which occur in Co. Meath include [*91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae). Alluvial woodland is a priority Annex I habitat which occurs in the River Boyne and River Blackwater SAC and is a Qualifying Interest (QI) habitat for that SAC, along with [7230] Alkaline fens. Alluvial woodland currently has an Overall Trend in Conservation Status in Ireland of '*deteriorating*', according to NPWS (2019b). This SAC has recently been fully designated under S.I. No. 451 of 2024 – European Union Habitats (River Boyne and Blackwater Special Area of Conservation 002299) Regulations 2024. However, it must be noted that the lack of such an S.I. does not confer any less protection for an SAC compared to one with an S.I.

Four separate SACs in Co. Meath have been designated for their raised bog-associated Annex I habitats, namely, Killyconny Bog (Cloghbally) SAC, Mount Hevey Bog SAC, Girley (Drewstown) Bog SAC, and Moneybeg and Clareisland Bogs SAC. QI habitats for these sites include [7110] Active raised bogs, [7120] Degraded raised bogs still capable of natural regeneration, and [7150] Depressions on peat substrates of the Rhynchosporion. All of these sites are in the west of the county, associated with the midlands raised bog complexes of central Ireland, with Co. Westmeath being the closest such area.

Contrasting with these highly acidic bog habitats, Lough Bane and Lough Glass SAC, and White Lough, Ben Loughs and Lough Doo SAC, were both designated (in part) for their calcareous wetland Annex I vegetation, namely, [3140] Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. Both sites occur in the far west of the county, again on the border with Westmeath, not far from Lough Lene.

Coastal dune and salt marsh examples of these Annex I habitats are concentrated within the Boyne Coast and Estuary SAC. These include the three primary Annex I dune habitats in Ireland, [2110] Embryonic shifting dunes, [2120] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) and [2130] Fixed coastal dunes with herbaceous vegetation (grey dunes). Extensive sand dune systems stretch right along the Meath coastline from Mornington south to Laytown, the latter area being well beyond the SAC boundary itself. This SAC is shared with the Co. Louth coastline NE of Drogheda, where sand dunes/salt marsh are also located.

Invasive plant species also deserve some mention here, as certain of their ilk have the capacity to threaten rare native coastal (and other) habitats. One of the chief culprits in this regard in Ireland is *Hippophae rhamnoides* (Sea-buckthorn), which has been noted in scattered locations on sand dunes around the Boyne Estuary area (e.g. near Bettystown Golf Club), in 2021. This species has significant invasive potential on coastal sand dunes, with its far-creeping root system (Invas Biosecurity, 2021). It is listed on the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulations, 2011* and so is of particular concern in terms of invasive potential in the county. Many other Third Schedule invasives are widespread in the county, including *Reynoutria japonica* (Japanese Knotweed), *Rhododendron ponticum* (Rhododendron) and *Impatiens glandulifera* (Himalayan Balsam) (BSBI, 2024).

There are many other notable habitats in the county which are not protected within SACs (or SPAs), and may reside in either Natural Heritage Areas (NHAs), pNHAs, or they may have no protection status whatsoever at present. Some of these sites in the east of the county are discussed by Norton (2024a),

including the 'sandur' coastline between Laytown and Gormanston, calcareous grasslands on railway banks scattered across Duleek and a fen at Greenanstown, amongst other sites.

Detailed habitat mapping data is available from many of the national and (county) surveys completed in previous decades, including the National Survey of Native Woodlands (BEC, 2008). Detailed shapefiles are publicly available for these sites across Co. Meath and provide a useful snapshot of some notable local native woodland sites at that time (see Figure 20 in Appendix I). It must be noted that these original woodland sites have not been re-surveyed in Co. Meath since the original survey period and this represents a gap in the available survey data at the county level. This initial woodland survey was followed up in 2010 with an ancient and long-established woodland survey of Ireland (Perrin and Daly, 2010), which focused on the previous 2008 survey sites and outlined those which appeared on older Irish maps (1830s and previous) and were therefore either long-established or ancient in heritage (see Figure 21 in Appendix I). A further study of ancient and long-established woodlands in Ireland was recently published by Devaney *et al.* (2024). The aim of their study was to assess the current conservation status of the known ancient and long-established woodlands in the Republic of Ireland and to outline the steps necessary for the completion of a national inventory of these woodlands, including smaller such woodlands, less than 5 hectares in size, the latter having not been previously studied by Perrin and Daly (2010). A handful of (undesignated) long-established woodlands identified in Co. Meath from the 2010 survey were later found by Devaney *et al.* (2024) to have suffered from deforestation in the intervening 14 years since the 2010 survey. These were among 75 long-established woodland deforestation events recorded across the country, most of which areas were converted to rural built land (Devaney *et al.* 2024).

Furthermore, the County Meath Tree, Woodland and Hedgerow Survey (Atkins, 2010) was conducted in the late 2000's and was consulted during this Biodiversity Audit, including detailed GIS shapefiles of the hedgerows and woodlands in existence in the county in that time period according to the survey. They found that most surveyed hedgerows in Co. Meath were either overgrown or relict (i.e. lacking in recent management), and most were recorded occurring on banks. The diversity of woodland vegetation types were also outlined in the report, as well as discussing some notable champion trees within the county.

Fen and transition mire habitats occur in the county generally near the border with Co. Westmeath. These areas are mapped in Figure 23 and encompass the three main Annex I fen habitat types found in Ireland, namely, [7230] Alkaline fens, [7210] *Cladium* fen, and [7140] Transition mires. There appears to be a dirth of such wetlands in the east half of Co. Meath generally. These were mapped as part of the 2019 Article 17 reporting period for the Republic of Ireland, and these shapefiles are now publicly available on the National Parks and Wildlife Service website.

The latest National Fen Survey was conducted across the Republic of Ireland between 2021 and 2024, and multiple old and new Meath fen sites were surveyed in detail, particularly in 2023 (by Alexis FitzGerald *et al*.). The data from this project is not currently available as it has not yet been finalised, however, it will be available publicly for the county in the coming years as the next round of Article 17 reporting to the EU on the state of Ireland's Annex I habitats is due in 2025.

*Compass Informatics* in association with *Faith Wilson Ecological Consultant* completed a Wetland and Coastal Survey of County Meath in 2010. This survey highlighted a wide range of wetland sites in the county, from fen to marsh to bog. The county's peatlands were noted as suffering particularly from drainage, infilling, turbary, fertilisation and afforestation (Meath County Council, 2024). Figure 22 in

Appendix I highlights the inventory of wetland and coastal sites recorded in the county during this period. There is clearly a large and widespread stock of such habitats in the county.

Multiple other habitat surveys have been completed in the county in recent decades, including the Irish Semi-natural Grasslands Survey 2007-2012, the National Saltmarsh Monitoring Survey (2006 for Meath surveys) and the Monitoring survey of Annex I sand dune habitats in Ireland (the Boyne Coast and Estuary SAC at Mornington was surveyed in 2011 as part of this). A small number of grassland sites have also been recorded in the River Boyne catchment in Co. Meath in the 2023 Floodplain and Callows Grasslands in Ireland survey (Martin *et al.*, 2023). It must be noted that the original Irish Semi-natural Grasslands Survey sites have not been re-surveyed in Co. Meath since the first survey period and this represents a gap in the available survey data at the county level.

## 3.2 BIRDS

Ireland supports a range of bird species present in various natural, semi-natural, and novel habitats including sea cliffs, blanket/raised bog, woodlands, turloughs, canals, wet grasslands, and callows (Nairn and O'Halloran, 2012). Yet compared to Britain, Ireland has a depauperate avifauna with Britain itself having fewer species compared to mainland Europe. A product of its isolated position at the end of the last glacial period, Ireland has been left with a limited yet unique avifauna (Kelly, 2008). However, past anthropogenic influences on the land have likely also reduced the number of resident bird species, especially woodland birds as a result of historic woodland clearances (Nairn and O'Halloran, 2012). Compared to Britain, Ireland also has some unique subspecies, including of Coal Tit, Jay, and Dipper (Kelly, 2008).

Ireland's birds are made up of resident populations and summer, winter, and passage migrants. Rarer vagrants can also bolster the number of species that have been recorded on the island. Excluding vagrants, 211 species were assessed as part of the fourth review of the status of birds in Ireland. 54 of Ireland's regularly occurring birds are now on the Irish Red List, the highest proportion of these being upland and farmland species (Gilbert *et al.,* 2021).

This account of birds in Co. Meath focuses largely on the results of the Countryside Bird Survey and the Irish Wetland Bird Survey at squares/sites surveyed in the county, with reference to their status according to Gilbert *et al*. (2021). The SCI species for Co. Meath's Special Protection Areas are also listed as well as summaries of the Farmland Bird Hotspot map, the most recent report from the Irish Rare Breeding Bird Panel, and the results of county-wide barn owl and swift surveys.

### Countryside Bird Survey (CBS)

A summary of findings from the Countryside Bird Survey (CBS) in Co. Meath from the 2013-2023 period (Countryside Bird Survey, 2024) is presented below, with Red-listed (according to Gilbert *et al.,* 2021) bird species hectad locations provided:

*Table 6. Red-listed Birds of Conservation Concern in Ireland (BoCCI) recorded in Countryside Bird Survey squares from the 2013-2023 period in Co. Meath*

| Species (Red-listed) | Square (Irish National Grid) |
|---|---|
| Meadow pipit (*Anthus pratensis*) | N6070, N7060, N7070, N7090, N8050, N8080, N9050 |

| | |
|---|---|
| Swift (*Apus apus*) | N5080, N8050, N8080, N8090, N9060, N9070, O0040, O0070, O0080, O1050, O1060, O1070 |
| Snipe (*Gallinago gallinago*) | N5080, N6070, N6080, N7050, N7060, N7070, N8090, O0040, O0050, O0060, O0070, O0080 |
| Yellowhammer (*Emberiza citrinella*) | N6040, N6070, N7050, N7060, N8050, N8060, N8070, N8080, N8090, N9040, N9050, N9060, N9070, N9080, N9090, O0040, O0050, O0060, O1050, O1060, O1070 |
| Woodcock (*Scolopax rusticola*) | N6040 |
| Pochard (*Aythya farina*) | N6070 |
| Stock Dove (*Columba oenas*) | N6070, N7080, N8050, N8080, N8090, N9050, N9080, N9090, O0040, O0050, O0060 |
| Kestrel (*Falco tinnunculus*) | N6070, N7060, N7070, N7090, N8050, N8080, N9050 |
| Golden Plover (*Pluvialis apricaria*) | N6080, N7090, N8070, N8080 |
| Lapwing (*Vanellus vanellus*) | N8050 |
| Grey Wagtail (*Motacilla cinerea*) | N7090, N9060, N9070, O0080, O1050 |
| Curlew (*Numenius arquata*) | N9080, O0040, O0070 |
| Grey Partridge (*Perdix perdix*) | O1050 |
| Red Kite (*Milvus milvus*) | O1050 |

It is clear from Table 6 above that Yellowhammer is by far the most widely recorded Red-listed Irish bird species in Co. Meath, followed by Swift, Snipe and Stock Dove (which are all of similar frequency).

The following Amber listed (according to Gilbert *et al.,* 2021) birds were also recorded during the period 2013-2023 in Co. Meath:

Goldcrest (*Regulus regulus*), Starling (*Sturnus vulgaris*), Swallow (*Hirundo rustica*), Willow Warbler (*Phylloscopus trochilus*), Mallard (*Anas platyrhynchos*), House Sparrow (*Passer domesticus*), Greenfinch (*Chloris chloris*), House Martin (*Delichon urbicum*), Linnet (*Linaria cannabina*), Skylark (*Alauda arvensis*), Lesser Black-backed Gull (*Larus fuscus*), Spotted Flycatcher (*Musciapa striata*), Tree Sparrow (*Passer montanus*), Herring Gull (*Larus argentatus*), Black-headed Gull (*Larus ridibundus*), Teal (*Anas crecca*), Sand Martin (*Riparia riparia*), Cormorant (*Phalacrocorax carbo*), Great Northern Diver (*Gavia immer*), Common Gull (*Larus canus*), Wheatear (*Oenanthe oenanthe*), Kingfisher (*Alcedo atthis*), Coot (*Fulica atra*), and Brambling (*Fringilla montifringilla*).

**A summary of Special Protection Areas (SPAs) in County Meath and their Special Conservation Interest (SCI) species**

River Boyne and River Blackwater SPA

The River Boyne and River Blackwater SPA is a Special Protection Area (SPA) under the EU Birds Directive with the following Special Conservation Interest (SCI) species:

Kingfisher (*Alcedo atthis*) [A229]

A Kingfisher survey carried out in 2010 in the River Boyne and River Blackwater SPA recorded 19 territories there (15 Probable, 4 Possible). This is in comparison to the previous survey carried out in 2008 where 20-22 territories were recorded (Cummins *et al.*, 2010).

As part of the annual Irish Wetland Bird Survey (IWeBS) (Irish Wetland Bird Survey, 2024), sections of the River Boyne are counted for waterbirds every month between September and March (data is available for the last ten years – site locations are mapped in Figure 26). A summary of the species recorded at these sub-sites is presented in Table 7 below with trend data for the site over a 5-, 12, and 23-year period shown in Figure 1:

*Table 7. Species recorded in the River Boyne subsites during IWeBS, their mean number recorded over a 5-season period and their status*

| **Species** | **Mean** | **Status (Annex I, SCI, & BoCCI)** |
|---|---|---|
| Mute Swan | 4 | Amber |
| Whooper Swan | 22 | Annex I, SCI, Amber |
| Greylag Goose | 0 | Amber, SCI |
| Shelduck | 0 | Amber, SCI |
| Wigeon | 174 | Amber |
| Teal | 0 | Amber, SCI |
| Mallard | 71 | Amber, SCI |
| Goosander | 0 | Amber |
| Little Grebe | 2 | SCI |
| Cormorant | 2 | Amber, SCI |
| Little Egret | 1 | Annex I |
| Grey Heron | 2 | SCI |
| Water Rail | 0 | |
| Moorhen | 2 | |
| Oystercatcher | 0 | **Red**, SCI |
| Golden Plover | 119 | Annex I, **Red** |
| Lapwing | 117 | **Red**, SCI |
| Snipe | 8 | **Red** |
| Curlew | 177 | **Red**, SCI |
| Redshank | 15 | **Red**, SCI |
| Green Sandpiper | 0 | |
| Common Sandpiper | 0 | Amber |
| Black-headed Gull | 100 | Amber, SCI |
| Common Gull | 0 | Amber, SCI |
| Lesser Black-backed Gull | 6 | Amber, SCI |
| Herring Gull | 0 | Amber, SCI |
| Great Black-backed Gull | 1 | |
| Mediterranean Gull | 0 | Annex I, Amber |

| Species | Trend (%) River Boyne - 5 Year | River Boyne - 12 Year | River Boyne - 23 Year | Long Term Trend |
|---|---|---|---|---|
| Teal | -99.1 | -79.2 | -85.2 | Large Decline |
| Mallard | -8.2 | -19.8 | 0.0 | Stable or Increasing |
| Lapwing | -73.1 | 18.4 | 22.0 | |
| Curlew | 8.5 | -11.1 | 28.0 | |
| Wigeon | -7.6 | 621.9 | 1343.8 | |

*Figure 1. IWeBS trend data for the River Boyne site in terms of 5-, 12-, and 23-year trends. Only species with sufficient data are presented (Irish Wetland Bird Survey, 2024)*

Boyne Coast and Estuary SPA

The Boyne Coast and Estuary SPA is a Special Protection Area (SPA) under the EU Birds Directive with the following Special Conservation Interest (SCI) species:

Shelduck (*Tadorna tadorna*) [A048]

Oystercatcher (*Haematopus ostralegus*) [A130]

Golden Plover (*Pluvialis apricaria*) [A140]

Grey Plover (*Pluvialis squatarola*) [A141]

Lapwing (*Vanellus vanellus*) [A142]

Knot (*Calidris canutus*) [A143]

Sanderling (*Calidris alba*) [A144]

Black-tailed Godwit (*Limosa limosa*) [A156]

Redshank (*Tringa totanus*) [A162]

Turnstone (*Arenaria interpres*) [A169]

Little Tern (*Sterna albifrons*) [A195]

Wetland and Waterbirds [A999]

As part of the previously mentioned Irish Wetland Bird Survey (IWeBS), this SPA forms part of the Boyne Estuary survey site. Although a large portion of this site is on the Co. Louth side of the estuary (the data is also found in the County Louth site list on the IWeBS website), it is still relevant to the scope of this project. A summary of the species recorded at this site is presented in Table 8 below with trend data for the site over a 5-, 12, and 23-year period shown in Figure 2:

*Table 8. Species recorded in the Boyne Estuary site during IWeBS, their mean number recorded over a 5-season period and their status*

| **Species** | **Mean** | **Status (Annex I, SCI, & BoCCI)** |
|---|---|---|
| Unidentified wader | 0 | |
| Mute Swan | 7 | Amber |
| Whooper Swan | 0 | Annex I, SCI, Amber |
| Barnacle Goose | 0 | Annex I, SCI, Amber |
| Light-bellied Brent Goose | 149 | Amber, SCI |
| Shelduck | 111 | Amber, SCI |
| Wigeon | 382 | Amber, SCI |
| Gadwall | 4 | Amber, SCI |
| Teal | 364 | Amber, SCI |
| Mallard | 90 | Amber, SCI |
| Shoveler | 2 | **Red**, SCI |
| Tufted Duck | 0 | Amber, SCI |
| Common Scoter | 400 | **Red**, SCI |
| Red-breasted Merganser | 5 | Amber, SCI |
| Goosander | 0 | Amber |
| Great Northern Diver | 0 | Annex I, Amber, SCI |
| Little Grebe | 3 | SCI |
| Great Crested Grebe | 0 | Amber, SCI |
| Cormorant | 46 | Amber, SCI |
| Little Egret | 16 | Annex I |
| Grey Heron | 7 | SCI |
| Moorhen | 0 | |
| Coot | 0 | Amber, SCI |
| Oystercatcher | 885 | **Red**, SCI |
| Ringed Plover | 15 | Amber, SCI |
| Golden Plover | 3080 | Annex I, **Red**, SCI |
| Grey Plover | 9 | **Red**, SCI |
| Lapwing | 1278 | **Red**, SCI |
| Knot | 774 | **Red**, SCI |
| Sanderling | 206 | SCI |
| Dunlin | 446 | Annex I, **Red**, SCI |
| Ruff | 0 | Annex I, Amber |
| Jack Snipe | 0 | |
| Snipe | 7 | **Red** |
| Black-tailed Godwit | 348 | **Red**, SCI |
| Bar-tailed Godwit | 13 | Annex I, **Red**, SCI |
| Whimbrel | 0 | |
| Curlew | 211 | **Red**, SCI |
| Redshank | 431 | **Red**, SCI |
| Greenshank | 6 | SCI |
| Common Sandpiper | 0 | Amber |
| Turnstone | 11 | Amber, SCI |
| Kingfisher | 0 | Annex I, Amber, SCI |
| Black-headed Gull | 56 | Amber, SCI |
| Lesser Black-backed Gull | 0 | Amber, SCI |
| Herring Gull | 103 | Amber, SCI |
| Great Black-backed Gull | 11 | |
| Sandwich Tern | 8 | Annex I, Amber, SCI |
| Common Tern | 18 | Annex I, Amber, SCI |

| | | |
|---|---|---|
| Black Swan | 0 | |

| Species | Trend (%) Boyne Estuary - 5 Year | Boyne Estuary - 12 Year | Boyne Estuary - 23 Year | Long Term Trend |
|---|---|---|---|---|
| Turnstone | -35.8 | -74.9 | -82.1 | Large Decline |
| Lapwing | 14.1 | -43.2 | -63.3 | |
| Golden Plover | -36.2 | -72.0 | -61.4 | |
| Ringed Plover | -63.5 | -67.1 | -58.9 | |
| Grey Plover | -78.8 | -71.1 | -54.9 | |
| Bar-tailed Godwit | -71.9 | -15.9 | -51.9 | |
| Mallard | -47.4 | -45.8 | -45.5 | Moderate Decline |
| Wigeon | -2.0 | -6.5 | -23.7 | Intermediate Decline |
| Dunlin | -19.5 | -34.8 | -20.8 | |
| Curlew | 32.8 | -18.2 | -19.0 | |
| Oystercatcher | -22.6 | -37.4 | -18.0 | |
| Cormorant | 17.6 | -26.6 | -0.8 | Stable or Increasing |
| Redshank | 4.3 | -9.0 | 1.7 | |
| Knot | 52.8 | -17.3 | 14.1 | |
| Sanderling | -67.8 | -63.9 | 16.9 | |
| Shelduck | -10.7 | -16.8 | 17.5 | |
| Black-tailed Godwit | 12.8 | 34.7 | 29.3 | |
| Light-bellied Brent Goose | -35.7 | -41.3 | 80.5 | |
| Teal | -40.1 | 25.8 | 143.5 | |

*Figure 2. IWeBS trend data for the Boyne Estuary site in terms of 5-, 12-, and 23-year trends. Only species with sufficient data are presented (Irish Wetland Bird Survey, 2024)*

River Nanny & Shore SPA

The River Nanny & Shore SPA is a Special Protection Area (SPA) under the EU Birds Directive with the following Special Conservation Interest (SCI) species:

Oystercatcher (*Haematopus ostralegus*) [A130]

Ringed Plover (*Charadrius hiaticula*) [A137]

Golden Plover (*Pluvialis apricaria*) [A140]

Knot (*Calidris canutus*) [A143]

Sanderling (*Calidris alba*) [A144]

Herring Gull (*Larus argentatus*) [A184]

Wetland and Waterbirds [A999]

As part of the annual Irish Wetland Bird Survey (IWeBS), the Nanny Estuary and shore is counted for waterbirds every month between September and March. A summary of the species recorded at these sub-sites is presented in Table 9 below with trend data for the site over a 5-, 12, and 23-year period shown in Figure 3:

*Table 9. Species recorded at the Nanny Estuary and shore site during IWeBS, their mean number recorded over a 5-season period and their status*

| **Species** | **Mean** | **Status (Annex I, SCI, & BoCCI)** |
|---|---|---|
| Mute Swan | 0 | Amber |
| Light-bellied Brent Goose | 134 | Amber, SCI |
| Shelduck | 2 | Amber, SCI |
| Wigeon | 30 | Amber, SCI |
| Teal | 126 | Amber, SCI |
| Mallard | 56 | Amber, SCI |
| Pintail | 0 | Amber, SCI |
| Common Scoter | 295 | **Red**, SCI |
| Red-breasted Merganser | 3 | Amber, SCI |
| Red-throated Diver | 0 | Annex I, Amber, SCI |
| Great Northern Diver | 1 | Annex I, Amber, SCI |
| Little Grebe | 2 | SCI |
| Great Crested Grebe | 2 | Amber, SCI |
| Cormorant | 4 | Amber, SCI |
| Little Egret | 5 | Annex I |
| Grey Heron | 3 | SCI |
| Oystercatcher | 549 | **Red**, SCI |
| Ringed Plover | 99 | Amber, SCI |
| Golden Plover | 0 | Annex I, **Red**, SCI |
| Grey Plover | 8 | **Red**, SCI |
| Lapwing | 214 | **Red**, SCI |
| Knot | 1089 | **Red**, SCI |
| Sanderling | 103 | SCI |
| Curlew Sandpiper | 0 | **Red** |
| Dunlin | 142 | Annex I, **Red**, SCI |
| Ruff | 0 | Annex I, Amber |
| Snipe | 6 | **Red** |
| Black-tailed Godwit | 376 | **Red**, SCI |
| Bar-tailed Godwit | 5 | Annex I, **Red**, SCI |
| Curlew | 120 | **Red**, SCI |
| Redshank | 127 | **Red**, SCI |
| Greenshank | 9 | SCI |
| Turnstone | 29 | Amber, SCI |
| Kingfisher | 0 | Annex I, Amber, SCI |
| Black-headed Gull | 45 | Amber, SCI |
| Common Gull | 12 | Amber, SCI |
| Lesser Black-backed Gull | 2 | Amber, SCI |
| Herring Gull | 106 | Amber, SCI |
| Great Black-backed Gull | 13 | |
| Sandwich Tern | 1 | Annex I, Amber, SCI |

| | | |
|---|---|---|
| Common Tern | 0 | Annex I, Amber, SCI |
| Ring-billed Gull | 0 | |

| Species | Trend (%) Nanny Estuary & shore - 5 Year | Nanny Estuary & shore - 12 Year | Nanny Estuary & shore - 23 Year | Long Term Trend |
|---|---|---|---|---|
| Golden Plover | -35.3 | -75.7 | -85.9 | Large Decline |
| Cormorant | -32.1 | -90.6 | -81.1 | |
| Bar-tailed Godwit | -71.6 | -78.8 | -75.9 | |
| Grey Plover | -58.5 | -80.1 | -75.1 | |
| Dunlin | -59.7 | -51.2 | -44.3 | Moderate Decline |
| Turnstone | -50.0 | -74.5 | -43.6 | |
| Sanderling | -75.3 | -71.4 | -29.5 | |
| Lapwing | 118.6 | -11.3 | -29.3 | |
| Ringed Plover | -50.0 | -68.3 | -23.2 | Intermediate Decline |
| Mallard | 34.5 | -35.1 | -6.3 | |
| Oystercatcher | 32.3 | -45.6 | 28.4 | Stable or Increasing |
| Curlew | 9.7 | -32.0 | 47.8 | |
| Knot | 32.1 | -75.2 | 76.2 | |
| Light-bellied Brent Goose | -42.3 | -48.6 | 133.3 | |
| Redshank | -15.7 | -26.3 | 311.8 | |
| Teal | 40.0 | 157.9 | 1533.3 | |
| Black-tailed Godwit | 27.4 | 116.1 | 1916.7 | |

*Figure 3. IWeBS trend data for the Nanny Estuary & shore site in terms of 5-, 12-, and 23-year trends. Only species with sufficient data are presented (Irish Wetland Bird Survey, 2024)*

The Nanny Estuary and shore is also an important site for post-breeding terns, as identified during the Irish post-breeding tern survey carried out between August and September in 2016, 2017, and 2018. The following species counts were recorded at the site: Common Tern (650), Arctic Tern (50), unidentified Common or Arctic Tern (1300), Roseate Tern (30), and Sandwich Tern (250). This highlights the sites importance for post-breeding terns (Burke *et al*., 2020a).

North-West Irish Sea SPA

The North-West Irish Sea SPA is a Special Protection Area (SPA) under the EU Birds Directive with the following Special Conservation Interest (SCI) species:

Red-throated Diver (*Gavia stellata*) [A001]

Great Northern Diver (*Gavia immer*) [A003]

Fulmar (*Fulmarus glacialis*) [A009]

Manx Shearwater (*Puffinus puffinus*) [A013]

Cormorant (*Phalacrocorax carbo*) [A017]

Shag (*Phalacrocorax aristotelis*) [A018]

Common Scoter (*Melanitta nigra*) [A065]

Little Gull (*Larus minutus*) [A177]

Black-headed Gull (*Chroicocephalus ridibundus*) [A179]

Common Gull (*Larus canus*) [A182]

Lesser Black-backed Gull (*Larus fuscus*) [A183]

Herring Gull (*Larus argentatus*) [A184]

Great Black-backed Gull (*Larus marinus*) [A187]

Kittiwake (*Rissa tridactyla*) [A188]

Roseate Tern (*Sterna dougallii*) [A192]

Common Tern (*Sterna hirundo*) [A193]

Arctic Tern (*Sterna paradisaea*) [A194]

Little Tern (*Sterna albifrons*) [A195]

Guillemot (*Uria aalge*) [A199]

Razorbill (*Alca torda*) [A200]

Puffin (*Fratercula arctica*) [A204]

**Other wetland bird sites in County Meath covered by the IWeBS**

For the following sites, the site names relate to particular site codes available on the IWeBS website (Irish Wetland Bird Survey, 2024), for which grid references are available from BirdWatch Ireland. The locations of these sites can be seen in Figure 26.

*Ballyhoe Lakes*

*Table 10. Species recorded at Ballyhoe Lakes during IWeBS, their mean number recorded over a 5-season period and their status*

| Species | Mean | Status (Annex I, SCI, & BoCCI) |
|---|---|---|
| Mute Swan | 28 | Amber |
| Whooper Swan | 0 | Annex I, SCI, Amber |
| Wigeon | 26 | Amber, SCI |

| | | |
|---|---|---|
| Gadwall | 1 | Amber, SCI |
| Teal | 2 | Amber, SCI |
| Mallard | 19 | Amber, SCI |
| Tufted Duck | 43 | Amber, SCI |
| Goldeneye | 0 | **Red**, SCI |
| Little Grebe | 0 | SCI |
| Great Crested Grebe | 0 | Amber, SCI |
| Cormorant | 2 | Amber, SCI |
| Grey Heron | 1 | SCI |
| Moorhen | 2 | |
| Coot | 77 | Amber, SCI |
| Snipe | 0 | **Red** |
| Redshank | 0 | **Red**, SCI |

## Black Lough (Drewstown)

*Table 11. Species recorded at Black Lough (Drewstown) during IWeBS, their mean number recorded over a 5-season period and their status*

| **Species** | **Mean** | **Status (Annex I, SCI, & BoCCI)** |
|---|---|---|
| Mute Swan | 1 | Amber |
| Wigeon | 8 | Amber, SCI |
| Teal | 15 | Amber, SCI |
| Mallard | 16 | Amber, SCI |
| Little Grebe | 0 | SCI |
| Cormorant | 1 | Amber, SCI |
| Shag | 0 | Amber, SCI |
| Grey Heron | 1 | SCI |
| Moorhen | 5 | |
| Lapwing | 87 | **Red**, SCI |

## Breakey Lough

No surveys have been carried out at this site in over five years resulting in a mean of 0 for each species (Table 12).

*Table 12. Species recorded at Breakey Lough during IWeBS, their mean number recorded over a 5-season period and their status*

| **Species** | **Mean** | **Status (Annex I, SCI, & BoCCI)** |
|---|---|---|
| Mute Swan | 0 | Amber |
| Whooper Swan | 0 | Annex I, Amber, SCI |
| Teal | 0 | Amber, SCI |
| Mallard | 0 | Amber, SCI |
| Great Crested Grebe | 0 | Amber, SCI |
| Cormorant | 0 | Amber, SCI |
| Grey Heron | 0 | SCI |
| Moorhen | 0 | |
| Kingfisher | 0 | Annex I, Amber, SCI |

## Croboy Lough & fields

*Table 13. Species recorded at Croboy Lough & fields during IWeBS, their mean number recorded over a 5-season period and their status*

| **Species** | **Mean** | **Status (Annex I, SCI, & BoCCI)** |
|---|---|---|
| Mute Swan | 0 | Amber |
| Whooper Swan | 62 | Annex I, Amber, SCI |
| Greylag Goose | 7 | Amber, SCI |
| Mallard | 0 | Amber, SCI |
| Little Grebe | 3 | SCI |

## Crossakeel

*Table 14. Species recorded at Crossakeel during IWeBS, their mean number recorded over a 5-season period and their status*

| **Species** | **Mean** | **Status (Annex I, SCI, & BoCCI)** |
|---|---|---|
| Whooper Swan | 20 | Annex I, Amber, SCI |

## Donore Bog

*Table 15. Species recorded at Donore Bog during IWeBS, their mean number recorded over a 5-season period and their status*

| **Species** | **Mean** | **Status (Annex I, SCI, & BoCCI)** |
|---|---|---|
| Mute Swan | 0 | Amber |
| Wigeon | 21 | Amber, SCI |
| Gadwall | 0 | Amber, SCI |
| Teal | 48 | Amber, SCI |
| Mallard | 8 | Amber, SCI |
| Shoveler | 0 | **Red**, SCI |
| Little Grebe | 0 | SCI |
| Grey Heron | 1 | SCI |
| Moorhen | 1 | |
| Coot | 7 | Amber, SCI |
| Lapwing | 0 | **Red**, SCI |
| Snipe | 0 | **Red** |

## Lough Bane

*Table 16. Species recorded at Lough Bane during IWeBS, their mean number recorded over a 5-season period and their status*

| **Species** | **Mean** | **Status (Annex I, SCI, & BoCCI)** |
|---|---|---|
| Mute Swan | 3 | Amber |
| Whooper Swan | 1 | Annex I, Amber, SCI |
| Wigeon | 23 | Amber, SCI |
| Teal | 5 | Amber, SCI |
| Mallard | 15 | Amber, SCI |
| Goldeneye | 0 | **Red**, SCI |
| Little Grebe | 3 | SCI |
| Great Crested Grebe | 4 | Amber, SCI |
| Cormorant | 2 | Amber, SCI |
| Grey Heron | 1 | SCI |

| | | |
|---|---|---|
| Moorhen | 1 | |
| Coot | 0 | Amber, SCI |
| Lapwing | 14 | **Red**, SCI |
| Curlew | 15 | **Red**, SCI |
| Black-headed Gull | 1 | Amber, SCI |

Lough Bracken

No surveys have been carried out at this site in over five years resulting in a mean of 0 for each species (Table 17).

*Table 17. Species recorded at Lough Bracken during IWeBS, their mean number recorded over a 5-season period and their status*

| **Species** | **Mean** | **Status (Annex I, SCI, & BoCCI)** |
|---|---|---|
| Mute Swan | 0 | Amber |
| Mallard | 0 | Amber, SCI |
| Tufted Duck | 0 | Amber, SCI |
| Moorhen | 0 | |

Murphy's Quarry, Gormanston

No surveys have been carried out at this site in over five years resulting in a mean of 0 for each species (Table 18).

*Table 18. Species recorded at Murphy's Quarry, Gormanston during IWeBS, their mean number recorded over a 5-season period and their status*

| **Species** | **Mean** | **Status (Annex I, SCI, & BoCCI)** |
|---|---|---|
| Mute Swan | 0 | Amber |
| Shelduck | 0 | Amber, SCI |
| Teal | 0 | Amber, SCI |
| Mallard | 0 | Amber, SCI |
| Pochard | 0 | **Red**, SCI |
| Tufted Duck | 0 | Amber, SCI |
| Little Grebe | 0 | SCI |
| Grey Heron | 0 | SCI |
| Moorhen | 0 | |
| Coot | 0 | Amber, SCI |
| Oystercatcher | 0 | **Red**, SCI |
| Ringed Plover | 0 | Amber, SCI |
| Lapwing | 0 | **Red**, SCI |
| Snipe | 0 | **Red** |
| Black-tailed Godwit | 0 | **Red**, SCI |
| Curlew | 0 | **Red**, SCI |
| Redshank | 0 | **Red**, SCI |
| Kingfisher | 0 | Annex I, Amber, SCI |
| Black-headed Gull | 0 | Amber, SCI |
| Common Gull | 0 | Amber, SCI |
| Herring Gull | 0 | Amber, SCI |

Newcastle Lough

No surveys have been carried out at this site in over five years resulting in a mean of 0 for each species (Table 19)

*Table 19. Species recorded at Newcastle Lough during IWeBS, their mean number recorded over a 5-season period and their status*

| Species | Mean | Status (Annex I, SCI, & BoCCI) |
|---|---|---|
| Mute Swan | 0 | Amber |
| Mallard | 0 | Amber, SCI |
| Little Grebe | 0 | SCI |
| Great Crested Grebe | 0 | Amber, SCI |
| Cormorant | 0 | Amber, SCI |

## Wetlands at Greenan, Garrynabolie

*Table 20. Species recorded at Wetlands at Greenan, Garrybolie during IWeBS, their mean number recorded over a 5-season period and their status*

| Species | Mean | Status (Annex I, SCI, & BoCCI) |
|---|---|---|
| Mute Swan | 11 | Amber |
| Whooper Swan | 21 | Annex I, Amber, SCI |
| Wigeon | 28 | Amber, SCI |
| Teal | 9 | Amber, SCI |
| Mallard | 24 | Amber, SCI |
| Little Grebe | 0 | SCI |
| Cormorant | 0 | Amber, SCI |
| Grey Heron | 2 | SCI |
| Water Rail | 0 | |
| Coot | 0 | Amber, SCI |
| Snipe | 4 | **Red** |
| Woodcock | 0 | **Red** |
| Black-headed Gull | 1 | Amber, SCI |

## White Lough

In other sources, this site is more typically known as 'Annagh Lough' (Margaret Norton, pers. comm., October 2024). It is located on the Meath-Westmeath border in the Upper Boyne catchment.

*Table 21. Species recorded at White Lough during IWeBS, their mean number recorded over a 5-season period and their status*

| Species | Mean | Status (Annex I, SCI, & BoCCI) |
|---|---|---|
| Mute Swan | 2 | Amber |
| Mallard | 0 | Amber, SCI |
| Grey Heron | 1 | SCI |
| Moorhen | 4 | |
| Coot | 1 | Amber, SCI |

## Whitewood Lough

No surveys have been carried out at this site in over five years resulting in a mean of 0 for each species (Table 22).

*Table 22. Species recorded at Whitewood Lough during IWeBS, their mean number recorded over a 5-season period and their status*

| Species | Mean | Status (Annex I, SCI, & BoCCI) |
|---|---|---|
| Mute Swan | 0 | Amber |
| Great Crested Grebe | 0 | Amber, SCI |
| Cormorant | 0 | Amber, SCI |
| Moorhen | 0 | |
| Lapwing | 0 | **Red**, SCI |

**Farmland Bird Hotspot Map**

Under funding from the Heritage Council and the Department of Agriculture, Fisheries and Marine (DAFM), BirdWatch Ireland has developed a nationwide farmland bird hotspot map (BirdWatch Ireland, 2024b). As can be seen in Figure 4, some eastern areas of Co. Meath fall within hotspot 29. BirdWatch Ireland are at this present time unable to share hotspot maps at a 1km level due to a Memorandum of Understanding (MOU) with DAFM and the National Parks and Wildlife Service. If this changes in the future, it will be an excellent resource to view hotspots within the Co. Meath boundary in finer detail.

This project, carried out by BirdWatch Ireland, sought to create maps illustrating important areas for key Red and Amber-listed farmland birds of conservation concern (BoCCI). The hotspots have been derived from a number of scientifically validated datasets, with a scoring system developed by BirdWatch Ireland, to highlight areas of greater significance. Under the MOU, the maps generated from this project would not present information at a greater spatial resolution than that used in Ireland's 2019 Article 12 reporting under the Bird's Directive or the Bird Atlas 2007-2011.

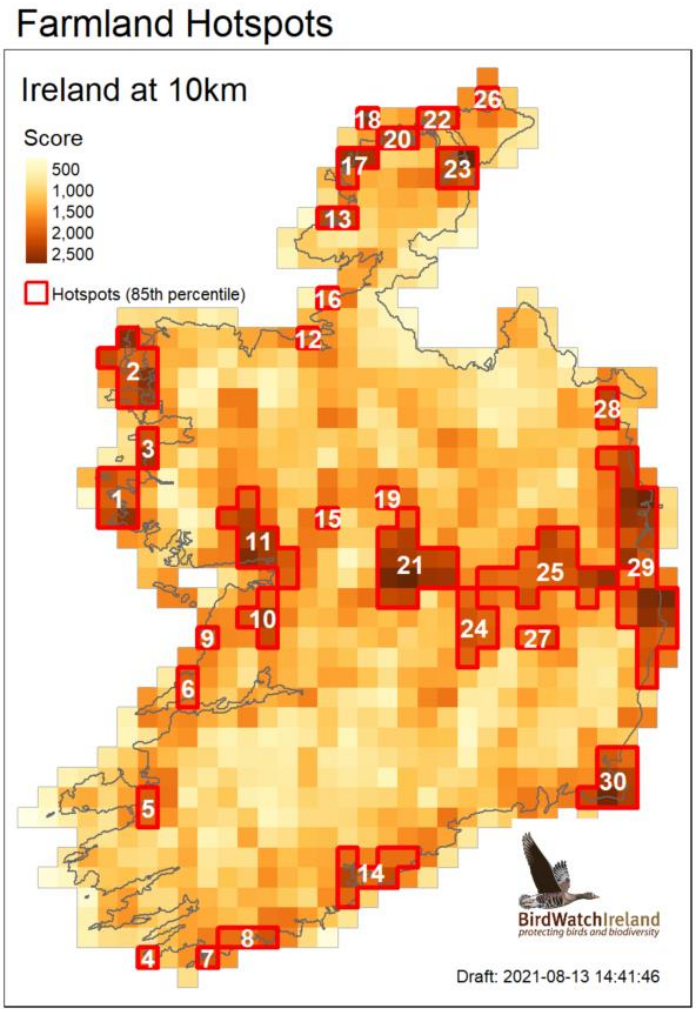


*Figure 4. Draft sample farmland bird hotspot map © BirdWatch Ireland (reproduced from: BirdWatch Ireland, 2024)*

**Rare breeding birds in Co. Meath**

The most recent report from the Irish Rare Breeding Bird Panel identified one rare breeding bird species of note in Co. Meath. Five pairs of Red Kite (*Milvus milvus*) were present in the Meath/North Dublin area (Burke *et al.,* 2020b). Red Kite currently has a Red Conservation Status in Ireland, according to Gilbert *et al.* (2021). From a search of the Irish Rare Breeding Bird Panel's Priority Map, the following species were/are present in County Meath (according to Bird Atlas 2007-2011 data): Mandarin Duck (*Aix galericulata*), Quail (*Coturnix coturnix*), Red-legged Partridge (*Alectoris rufa*), Great Spotted Woodpecker (*Dendrocopus major*), Garden Warbler (*Sylvia borin*), and Whinchat (*Saxicola rubetra*) (Irish Rare Breeding Bird Panel, 2024).

*Plate 1. Red Kite CC-BY Tony Hisgett*

**Barn Owl (*Tyto alba*)**

A barn owl study was carried out in Co. Meath in 2023 (Cully *et al.,* 2023) to assess its status and population trends within the county. Results from the 2023 survey season have shown that the Barn Owl in Co. Meath has increased its range and numbers over the last ten years. They are relatively widespread within the county, occurring in 20 of the 45 10km squares in the county (44% of all squares) (see Figure 5). When compared to the breeding range as defined by the Bird Atlas (2007-2011), the range of Barn Owl in Co. Meath has increased by 43% over the past 10 years. Although the breeding range has increased, it is still 44% less than it was 50 years ago as defined by the Atlas of Breeding Birds in Britain and Ireland (1968-1972).

Surveys in 2023 found nine sites that were occupied by Barn Owl in Co. Meath (see Figure 6) and all of these were in buildings such as ruined mansions, ruined castles, ruined churches, and a ruined mill. A total of 116 sites were assessed for the suitability of Barn Owls during this survey in 2023. Of that, 84 were determined to be suitable, however, evidence for Barn Owl was only confirmed at nine (11%). Due to the number of suitable sites, nest site availability is not considered to be a major factor that is limiting the population in the county. Of the nine occupied sites, six were confirmed breeding sites. Of these six pairs, five were confirmed to have bred successfully. The most common nest site was within chimneys, followed by a cavity, a bell tower, and a ledge. A breeding density survey carried out in two 10km squares determined that the breeding density is 'extremely low' in the county, at least within the two squares surveyed.

The survey also showed that ruined buildings in Co. Meath are important nesting sites for other bird species. Tree Sparrow (Amber listed) was confirmed at six sites, Stock Dove (Red-listed) at three sites, Raven (Green listed) at two sites, Swift (Red-listed) at two sites, Kestrel (Red-listed) at one site, and

Peregrine Falcon (Green listed) at one site. This highlights the importance of built heritage for Barn Owls and other bird species in Meath (Cully *et al*., 2023).

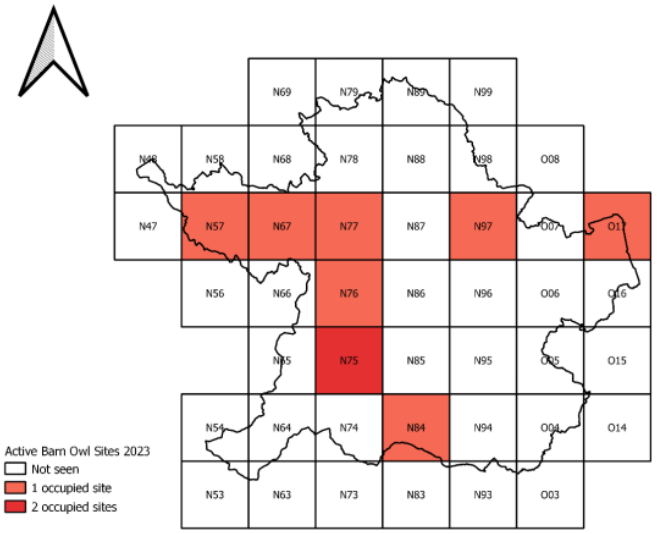


*Figure 5. The distribution and abundance of active Barn Owl nest sites (n = 9) in County Meath per 10km square in 2023. Taken from Cully et al. (2023)*

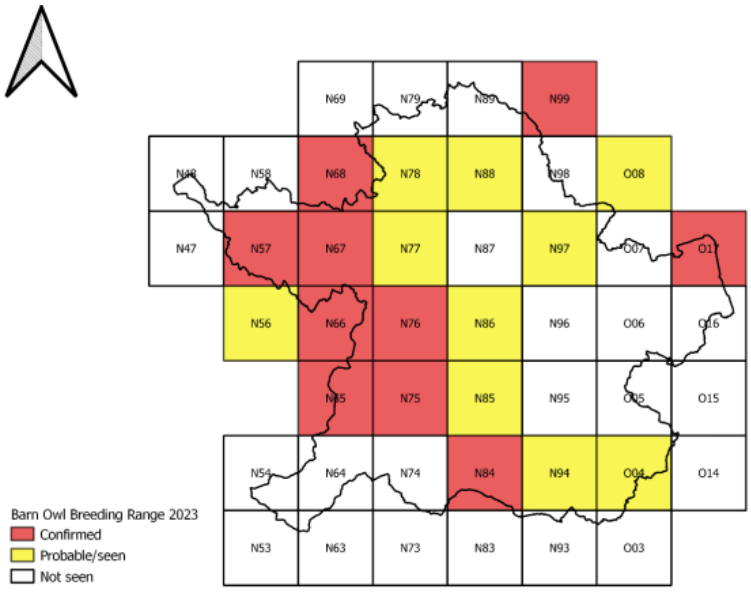


*Figure 6. The breeding range of Barn Owls in County Meath according to breeding status in each 10km square in 2023. Taken from Cully et al. (2023)*

A follow up survey, which was carried out in 2024, provided an update on the status of Barn Owls during the breeding season in the county, and an update on the usage of Barn Owl boxes installed in the county (BirdWatch Ireland, 2024a). The survey identified seven active Barn Owl sites in the county (see Figure 7). Six of these were confirmed as breeding sites.

Of the 20 Barn Owl nest boxes installed by the Meath branch of BirdWatch Ireland, none have to date been used by Barn Owls. However, it can take a number of years for the boxes to be found and occupied by Barn Owls. Two boxes installed by members of the public were in use, increasing the occupancy rate of all nest boxes in the county to 10%'.

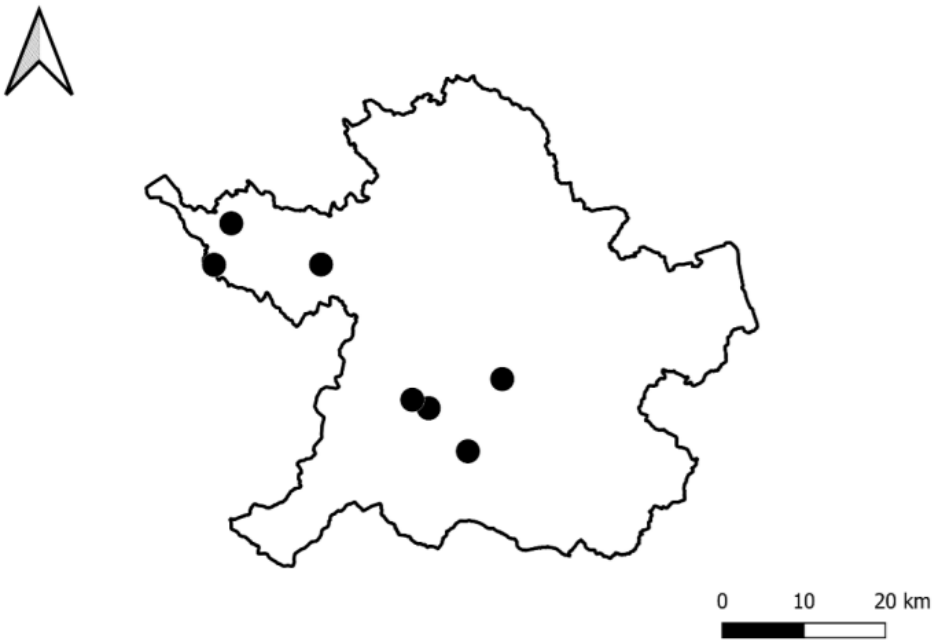


*Figure 7. Active Barn Owl sites in 2024*

A site was recorded as 'active' if the evidence of Barn Owl was confirmed via evidence of fresh signs or a confirmation of one (or both) adult through vocalisation or observation. This could be a breeding site that failed before the survey visits, or a non-breeding site used for roosting.

*Plate 2. Barn owl in Co. Meath – reproduced with permission of Ben Malone*

**Common Swift (*Apus apus*)**

A Meath Swift Survey was carried out in 2019 to establish the baseline level of Swift nesting activity across Co. Meath (Meade and Whelan, 2019). The survey identified nesting locations as well as identifying areas where conservation measures are required. A total of 58 towns/villages were surveyed across Co. Meath. Swifts were recorded in 12 of these, with nests sites confirmed in ten. 260 nests in total were found during the survey, providing a high-quality baseline figure for the county (Meade and Whelan, 2019).

The highest number of nests were recorded in Dunsaughlin (77), followed by Trim (59), then Navan (58), and Nenagh (26). A summary of the survey results can be seen in Table 23, extracted from Meade and Whelan (2019).

*Table 23. Swift data for Co. Meath gathered during the 2019 Meath Swift Survey (Meade and Whelan, 2019)*

| No. | Town/Village | No. of times surveyed | Swifts present | Peak number of Swifts | Nests present | Number of nests |
|---|---|---|---|---|---|---|
| 1 | Dunshaughlin | 10 | Yes | 75 | Yes | 77 |
| 2 | Trim | 10 | Yes | 60 | Yes | 59 |
| 3 | Navan | 10 | Yes | 55 | Yes | 58 |
| 4 | Athboy | 8 | Yes | 30 | Yes | 17 |
| 5 | Kells | 8 | Yes | 22 | Yes | 14 |
| 6 | Dunboyne | 7 | Yes | 14 | Yes | 10 |
| 7 | Oldcastle | 7 | Yes | 12 | Yes | 8 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 8 | Slane | 4 | Yes | 11 | Yes | 8 |
| 9 | Duleek | 4 | Yes | 8 | Yes | 6 |
| 10 | Enfield | 4 | Yes | 7 | Yes | 3 |
| 11 | Kildalkey | 2 | Yes | 2 | Not Found | 0 |
| 12 | Oldbridge | 2 | Yes | 6 | Not Found | 0 |
| 13 | Agher | 1 | No | 0 | No | 0 |
| 14 | Ardcath | 1 | No | 0 | No | 0 |
| 15 | Ashbourne | 2 | No | 0 | No | 0 |
| 16 | Baile Ghib | 1 | No | 0 | No | 0 |
| 17 | Ballivor | 1 | No | 0 | No | 0 |
| 18 | Batterstown | 1 | No | 0 | No | 0 |
| 19 | Bective | 2 | No | 0 | No | 0 |
| 20 | Bellewstown | 1 | No | 0 | No | 0 |
| 21 | Bettystown | 1 | No | 0 | No | 0 |
| 22 | Boyerstown | 1 | No | 0 | No | 0 |
| 23 | Carnaross | 1 | No | 0 | No | 0 |
| 24 | Clonard | 1 | No | 0 | No | 0 |
| 25 | Clonee | 1 | No | 0 | No | 0 |
| 26 | Curraha | 1 | No | 0 | No | 0 |
| 27 | Donacarney | 1 | No | 0 | No | 0 |
| 28 | Donaghpatrick | 1 | No | 0 | No | 0 |
| 29 | Donore | 1 | No | 0 | No | 0 |
| 30 | Drumconrath | 1 | No | 0 | No | 0 |
| 31 | Drumone | 1 | No | 0 | No | 0 |
| 32 | Drumree | 1 | No | 0 | No | 0 |
| 33 | Gormanston | 1 | No | 0 | No | 0 |
| 34 | Julianstown | 2 | No | 0 | No | 0 |
| 35 | Kentstown | 1 | No | 0 | No | 0 |
| 36 | Kilcloon | 1 | No | 0 | No | 0 |
| 37 | Kilmainham wood | 1 | No | 0 | No | 0 |
| 38 | Kilmessan | 1 | No | 0 | No | 0 |
| 39 | Kilskeer | 1 | No | 0 | No | 0 |
| 40 | Kiltale | 1 | No | 0 | No | 0 |
| 41 | Laytown | 1 | No | 0 | No | 0 |
| 42 | Mornington | 1 | No | 0 | No | 0 |
| 43 | Longwood | 2 | No | 0 | No | 0 |
| 44 | Monknewton | 1 | No | 0 | No | 0 |
| 45 | Mornington | 1 | No | 0 | No | 0 |
| 46 | Mosney | 1 | No | 0 | No | 0 |
| 47 | Moylagh, | 1 | No | 0 | No | 0 |
| 48 | Moynalty | 1 | No | 0 | No | 0 |
| 49 | Mulhussey | 1 | No | 0 | No | 0 |
| 50 | Nobber | 1 | No | 0 | No | 0 |
| 51 | Ráth Chairn | 1 | No | 0 | No | 0 |
| 52 | Rathmolyon | 1 | No | 0 | No | 0 |
| 53 | Ratoath | 1 | No | 0 | No | 0 |
| 54 | Rosnaree | 1 | No | 0 | No | 0 |
| 55 | Skryne | 1 | No | 0 | No | 0 |
| 56 | Stamullen | 1 | No | 0 | No | 0 |
| 57 | Summerhill | 3 | No | 0 | No | 0 |
| 58 | Yellow Furze | 1 | No | 0 | No | 0 |
| **Total** | | | | **280** | | **260** |

The vast majority of the nests found were in residential buildings. Meade and Whelan (2019) go into extensive detail on individual locations and addresses of Swift nests in Co. Meath, making it a valuable resource for planners, developers, conservationists, and local authorities.

The 2024 Meath Swift Survey has recently concluded, and this survey will update the knowledge gathered by Meade and Whelan (2019). The 2024 survey showed an increase in the breeding Swift population compared to the 2019 surveys. The report showed that two-thirds of Meath's Swift population is located in only three towns: Trim, Dunshaughlin, and Navan. The report also highlighted that the populations in several towns are considered extremely vulnerable. In towns such as Athboy, Duleek, and Dunboyne, the populations are vulnerable due to their reliance on a very small number of buildings or private residents. The results of the 2024 survey by Finney *et al.* (2024) can be seen in Figure 8.

| No | Town/Village | Number of times surveyed | Swifts present | Peak number of Swifts | Nests present | Number of nests 2024 | Number of nests 2019 | Number increase/ decrease |
|---|---|---|---|---|---|---|---|---|
| 1 | Dunshaughlin | 2 | Yes | 40 | Yes | 86 | 77 | 9 |
| 2 | Trim | 4 | Yes | 68 | Yes | 94 | 59 | 35 |
| 3 | Navan | 8 | Yes | 65 | Yes | 73 | 58 | 15 |
| 4 | Athboy | 5 | Yes | 36 | Yes | 29 | 17 | 12 |
| 5 | Kells | 5 | Yes | 50 | Yes | 24 | 14 | 10 |
| 6 | Dunboyne | 3 | Yes | 22 | Yes | 24 | 10 | 14 |
| 7 | Oldcastle | 3 | Yes | 40 | Yes | 35 | 8 | 27 |
| 8 | Slane | 10 | Yes | 23 | Yes | 9 | 8 | 1 |
| 9 | Duleek | 5 | Yes | 14 | Yes | 9 | 6 | 3 |
| 10 | Enfield | 2 | Yes | 4 | Yes | 2 | 3 | -1 |
| 11 | Kildalkey | 2 | Yes | 4 | Yes | 1 | 0 | 1 |
| 12 | Oldbridge | 2 | No | 0 | No | 0 | 0 | 0 |
| 13 | Ratoath | 3 | Yes | 2 | No | 0 | 0 | 0 |
| **Total No. nests** | | | | | | **386** | **260** | **126** |

*Figure 8. Results from the 2024 swift survey including a comparison between the 2019 survey results. Taken from Finney et al. (2024)*

## 3.3 VASCULAR PLANTS

Vascular plants, which include ferns and fern-allies, conifers (gymnosperms), and the flowering plants (angiosperms), are a fundamental bedrock of Ireland's wild habitats. There are a total of 1,939 species of vascular plant in Ireland (Faulkner, 2023). The variety of habitats represented in Co. Meath support a huge diversity of vascular plants, with almost 1,400 different taxa recorded in the wild within this single county of Ireland (Margaret Norton, pers. comm., November 2024). The county thus contains almost 72% of the total Irish flora.

*Plate 3. Dactylorhiza fuchsii (Common Spotted-orchid) in flower at Jamestown, Co. Meath – reproduced with permission of Colm Byrne*

*Plate 4. Estuary at River Nanny, Ninch, Co. Meath – reproduced with permission of Ben Malone*

This account of vascular plants focuses largely on those currently or previously listed on the Flora (Protection) Order (FPO). Much of the data presented here are based on a draft manuscript by Norton (2024b). Fourteen species currently or previously listed on the FPO have been reported from Meath (see Table 24). Nomenclature follows Stace (2019) for both scientific and common names. Although some species such as *Salvia verbenaca* and *Pyrola rotundifolia* are excluded from the current regulations (FPO 2022), these remain on the Irish Red List (Wyse Jackson *et al.*, 2016) and constitute an important component of the Meath flora.

*Table 24. Species currently or previously listed on the Flora (Protection) Order (FPO) which have been recorded in Co. Meath – adapted from Norton (2024b)*

| **Scientific name** | **Common name** | **FPO 2022** | **FPO 2015** | **FPO 1999** | **FPO 1987** | **FPO 1980** |
|---|---|---|---|---|---|---|
| *Lathyrus palustris* | Marsh Pea | | | | | Yes |
| *Hypericum hirsutum* | Hairy St John's-wort | Yes | Yes | Yes | Yes | |
| *Scleranthus annuus* | Annual Knawel | Yes | Yes | Yes | | |
| *Pyrola minor* | Common Wintergreen | Yes | | | | |
| *Pyrola rotundifolia* | Round-leaved Wintergreen | | | | | Yes |
| *Betonica officinalis* | Betony | Yes | Yes | | Yes | |
| *Galeopsis angustifolia* | Red Hemp-nettle | Yes | Yes | Yes | Yes | |
| *Salvia verbenaca* | Wild Clary | | | | | Yes |
| *Logfia minima* | Small Cudweed | | Yes | Yes | Yes | |
| *Omalotheca sylvatica* | Heath Cudweed | Yes | Yes | Yes | Yes | |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Epipactis phyllanthes* | Green-flowered Helleborine | | | | | Yes |
| *Anacamptis morio* | Green-winged Orchid | | | | Yes | |
| *Juncus compressus* | Round-fruited Rush | Yes | | | | |
| *Hordeum secalinum* | Meadow Barley | Yes | Yes | Yes | Yes | |

No recent (post-1987) records have been made for six of these taxa, namely *Lathyrus palustris*, *Hypericum hirsutum*, *Scleranthus annuus*, *Betonica officinalis*, *Logfia minima* and *Omalotheca sylvatica*. The most recent record at each known site for the remaining species are given below, taken from Norton (2024b). Threat status in Ireland follows Wyse-Jackson *et al.* (2016), in which; LC = Least Concern; NT = Not Threatened; VU = Vulnerable; EN = Endangered; and CR = Critically Endangered (only those status categories relevant to the species below are listed here). In total, there are 17 different plant species in Co. Meath which are either Vulnerable, Endangered or Critically Endangered, according to Wyse Jackson *et al.* (2016): *Buglossoides arvensis* (Field Gromwell) (CR), *Valerianella rimosa* (Broad-fruited Cornsalad) (CR), *Juncus compressus* (CR), *Omalotheca sylvatica* (EN), *Epipactis phyllanthes* (Green-flowered Helleborine) (EN), *Lolium temulentum* (Darnel) (EN), *Anacamptis morio* (VU), *Chaerophyllum temulum* (Rough Chervil) (VU), *Blitum bonus-henricus* (Good-King-Henry) (VU), *Filago germanica* (Common Cudweed) (VU), *Galeopsis angustifolia* (VU), *Hordeum secalinum* (VU), *Hypericum hirsutum* (VU), *Roemeria argemone* (Prickly Poppy) (VU), *Scleranthus annuus* (VU), *Sorbus hibernica* (Irish Whitebeam) (VU), and *Valerianella dentata* (Narrow-fruited Cornsalad) (VU).

*Pyrola minor* (NT):

Flemingstown/Balrath N 9966: Seven plants (2023).

NW of Dunsany Bridge N9054: Hundreds of plants (2023).

*Pyrola rotundifolia* (NT):

SE of Lough Shesk N66: Strong population (2013).

E of Lough Shesk N6268: 2014.

Oldtully, NE of Oldcastle N5681: At least 70 flowering spikes (2018).

*Galeopsis angustifolia* (VU):

Quarried esker NW of Blackshade Bridge N6746: Approximately twenty plants (2024).

*Salvia verbenaca* (LC): Although classified as Least Concern (LC), this species is quite rare nationally and occurs in vulnerable habitats (Wyse Jackson *et al.*, 2016).

S of South Bull, Mornington O1575: Two plants (2019).

*Epipactis phyllanthes* (EN):

Clusker Wood N9357: Several flowering spikes (2023).

*Anacamptis morio* (VU):

Quarried esker NW of Blackshade Bridge N6746: At least ten spikes (2023).

Esker fragment NE of Ballyboggan Bridge N6340: Plentiful (2023).

*Juncus compressus* (CR): this is a particularly notable species as the below site is one of the few sites known to exist in Ireland for this species (Norton, 2018), otherwise with only a few scattered localities also at Lough Ree in central Ireland (BSBI, 2024).

Slane Bridge N9673: A single cluster of approximately 300 plants on bank of R. Boyne (2022).

Rosnaree N9972: Winter-wet, alluvial pasture by R. Boyne (1968).

*Hordeum secalinum* (VU):

Rosnaree, E of Mill House O0071: Less-grazed pasture by riverbank of Boyne (1991).

Although the above-listed species constitute only a subset of the rare species within the county, it provides an insight into some important localities. For example, the esker north-west of Blackshade Bridge hosts *Anacamptis morio* and *Galeopsis angustifolia*. Other notable species typical of well-drained calcareous soils occur here – *Carlina vulgaris* (Carline Thistle), *Antennaria dioica* (Mountain Everlasting) and *Gentianella amarella* (Autumn Gentian).

Another species which merits particular attention is *Calamagrostis purpurea* (Scandinavian Small-reed). It is currently known from only two sites in Ireland, Ballyhoe Lough (N 84 95) and Ervey Lough (N 76 93) (Norton and Roberts, 2020). Both of these sites are in Co. Meath, with some of the Ervey Lough population extending into Co. Cavan, and both populations have been surveyed relatively recently. Thus, these sites will require particular attention regarding future protection.

Annexes II, IV and V of the EU Habitats Directive list certain vascular plant species as being of particular conservation concern and these species are of statutory significance in Ireland, and Co. Meath. However, only one of these species has been recorded in Meath, namely *Huperzia selago* (Fir Clubmoss). This species is listed on Annex V (under the 'Lycopodium group') which means it is a plant whose taking in the wild and exploitation may be subject to management measures (NPWS, 2019a). The species has been recorded at Girley Bog in recent years (BSBI, 2024).

*Zostera marina* (Eelgrass) and *Zostera noltei* (Dwarf Eelgrass) have been historically recorded (importantly as rooted plants) from the east coast of Meath in 1968/1969 in "*large mudflats…in the townland of Mornington on the western side of The Crook [= the point of land where the river turns SE before entering the sea]*" on the east coast (Norton, 2024a). However, no recent records of rooted *Zostera* have been yielded in Meath. *Zostera* beds (although not on Annexes II, IV or V of the EU

Habitats Directive) are recognised as a characteristic component of five separate EU Habitats Directive Annex I habitats (Dale *et al.,* 2007).

## 3.4 Bryophytes (mosses, liverworts and hornworts)

With around 800 species recorded from the island (NBDC, 2024b), Ireland is a true haven for mosses, liverworts and hornworts (collectively known as 'bryophytes''). Many of these thrive in our oceanic climate on the coast of the Atlantic Ocean. They also have a high tolerance for dry and/or free-draining habitats such as walls, rock outcrops and sand dunes, and thus they provide important (and often pioneering) microhabitat which in turn supports a wide range of plant and animal species (Norris, 2009).

Within Co. Meath, there are a wide range of habitats which support different bryophyte species, although the county has been relatively poorly recorded for these species, particularly in recent decades. Focussing in on rare species in the county, a total of twenty Red-listed bryophyte species (Lockhart *et al.*, 2012) have been recorded from the county (Table 25). The nomenclature for these species follows Blockeel *et al.* (2021) and frequently used synonyms are also provided. Of these, six threatened species have been reported including the Critically Endangered moss *Tortula lindbergii* (*T. lanceola*). However, a majority of Red List records date from the mid-20th century, especially during a period of active recording by Donal Synnott. No post-2000 records exist for many taxa including *Racomitrium canescens* and *Pogonatum nanum*. In addition, no Important Bryophyte Areas have been identified in Co. Meath (Lockhart *et al.*, 2012). This does not mean, however, that there are no sites of bryological interest in the county. The sand dunes at Mornington, for example, contain *Pleurochaete squarrosa* and old records for *Racomitrium canescens*. The protection afforded to this site as an SAC contrasts with an undesignated area south of Dromone (N 559 733). The fen species *Tomentypnum nitens* and *Sphagnum teres* are found here. Although only two sites have been highlighted here, other important sites are very likely to occur in the county. Indeed, under-recording is probably a factor. Some of the threatened species without recent records form ephemeral populations, including *Pogonatum nanum*. Such species are especially likely to be over-looked as known colonies rarely persist.

*Table 25. Threatened bryophyte species recorded from Co. Meath. Threat status follows Lockhart et al. (2012). Hamatocaulis vernicosus and Sphagnum teres are listed on Annex II and Annex V of the EU Habitats Directive respectively. H. vernicosus is also scheduled on the Flora (Protection) Order, 2022. See section 3.3 above for explanation of the threat abbreviations.*

| Species name | Synonyms | Status | FPO |
|---|---|---|---|
| *Tortula lindbergii* | *Tortula lanceola* | CR | |
| *Pogonatum nanum* | | EN | |
| *Bartramia ithyphylla* | | VU | |
| *Fissidens exilis* | | VU | |
| *Racomitrium canescens* | | VU | |
| *Tomentypnum nitens* | | VU | |
| *Porella cordaeana* | | NT | |
| *Ricciocarpos natans* | | NT | |
| *Bryum bornholmense* | | NT | |
| *Kandaea elodes* | *Campyliadelphus elodes* | NT | |
| *Dicranella cerviculata* | | NT | |
| *Encalypta vulgaris* | | NT | |
| *Hamatocaulis vernicosus* | | NT, Annex II | Yes |

| | | | |
|---|---|---|---|
| *Heterocladium wulfsbergii* | | NT | |
| *Hygroamblystegium varium* | *Amblystegium varium* | NT | |
| *Oxyrrhynchium speciosum* | *Eurhynchium speciosum* | NT | |
| *Tortella squarrosa* | *Pleurochaete squarrosa* | NT | |
| *Rhizomnium pseudopunctatum* | | NT | |
| *Rhodobryum roseum* | | NT | |
| *Sphagnum teres* | | NT, Annex V | |

Brief accounts of CR/EN/VU and FPO bryophyte species in Co. Meath are presented below. Current vice-county distributions are taken from Pilkington and Hodgetts (2023). Further information on threatened bryophytes can be found in Lockhart *et al.* (2012). A useful, albeit outdated, checklist of all bryophyte species in Meath is contained in Synnott (1982).

*Tortula lindbergii* (CR): The most recent Irish record for this acrocarpous moss appears to be from Co. Meath. It was found growing along a 'path by the R. Boyne below Navan' in 1978 (Lockhart *et al.*, 2012; Synnott, 1982). Pre-1970 records exist for six other vice-counties in the east and south. The extirpation of this species on the Boyne is perhaps a result of eutrophication and consequent competition with taller vegetation (Lockhart *et al.*, 2012).

*Pogonatum nanum* (EN): This species has been reported from five vice-counties since 1970. The sole Meath record was from the summit of 'hill 487' between Stamullen and Bellewstown (1968) – perhaps referring to a spot height of 487 feet on the ½ inch to 1 mile OSi map (Sheet 13). However, no such spot height could be identified. A pioneer of open acidic soils, it remains unclear why this species has declined, although it is likely under-recorded (Lockhart *et al.*, 2012).

*Bartramia ithyphylla* (VU): In contrast to its typical habitat on rocks in the uplands, this species was found on a roadside wall near Moynalty (1978) (Lockhart *et al.*, 2012). The site was 'S.E. of Hill 689' (Synnott, 1982) and probably refers to the road at or near Mullaghreagh (approximate Irish Grid reference N 753 861). Such colonies are often ephemeral (Lockhart *et al.*, 2012) yet the species may still exist in suitable habitat locally.

*Fissidens exilis* (VU): Like *B. ithyphylla*, *F. exilis* populations are often transient. Suitable sites include shaded woodland banks and streamsides with bare acidic to neutral soils (Lockhart *et al.*, 2012). It was found in 1978 on the side of a 'drain in wet woodland, Somerville, Kentstown' (Synnott, 1982). This species has been found in five vice-counties since 1970 although it is likely overlooked in many areas (Lockhart *et al.*, 2012).

*Racomitrium canescens* (VU): A speciality of sand dunes on the east coast, *R. canescens* has only been recorded from three vice-counties: Co. Dublin (H21), Co. Meath (H22) and Co. Down (H38). Donal Synnott recorded a small amount of this moss from 'calcareous dunes, Mornington (near Mayden Tower)' in 1968 (Synnott, 1982). However, targeted searches in 2007 failed to re-find it (Lockhart *et al.*, 2012).

*Tomentypnum nitens* (VU): Unlike the other threatened bryophyte species, the first record of *T. nitens* in the county was quite recent (2014). It occurs at the edge of pools in a fen at Ballintogher, Dromone (T. Finnen & M. Eakin) (Blockeel, 2015). This fen and calcareous flush species is vulnerable to drainage, eutrophication and shading by other vegetation (Lockhart *et al.*, 2012).

*Hamatocaulis vernicosus* (NT) (FPO): A pleurocarpous moss of mineral-rich fens and springs, *H. vernicosus* has only been found at one site in the county. It was recorded from a site 'W of Sl. [Slieve]

Gullion, between L. Bane and Dromone' (1978) (Synnott, 1982). Post-1970 records exist for twelve vice-counties. Threats to the species include eutrophication and drainage (Lockhart *et al.*, 2012).

## 3.5 LICHENS

Lichens are symbiotic organisms formed through a partnership between a fungus, known as the mycobiont, and a photosynthetic partner, algae and/or cyanobacteria, referred to as the photobiont. There may also be a third member of the symbiosis, as non-photosynthetic bacteria and also yeasts have been frequently recorded within the thalli (bodies) of lichens (British Lichen Society, 2024b). This symbiotic relationship is an example of mutualism: the mycobiont offers protection, structural support, and a stable microenvironment, while the photobiont harnesses sunlight to produce organic nutrients through photosynthesis, which both organisms utilize for survival (Nash, 2008).

Lichens play a crucial role in their ecosystems, serving as indicators of environmental health. They are particularly sensitive to changes in air quality, making them valuable bioindicators for monitoring air pollution and other environmental changes over time. Their ability to absorb moisture and nutrients directly from the atmosphere means that they can thrive in a variety of habitats, often colonizing bare substrates and helping to initiate soil formation. In doing so, they contribute to the overall biodiversity and stability of ecosystems (Nash, 2008).

Ireland boasts a rich diversity of lichens, with over 1,100 species identified across the country (NBDC, 2024d). Co. Meath appears to be significantly under recorded in terms of lichens, with only 238 species recorded. Given the county's limited coastline, niches for lichen colonisation are limited when compared to coastal counties such as Donegal, where over 700 species are found (NBDC, 2024d). However, it is clear that 238 species is low even when factoring this in, implying under recording of lichen. The majority of the species recorded are relatively common throughout the country.

The primary threat to lichen populations in Ireland is habitat destruction, which can occur through urban development, agricultural expansion, and changes in land use. Lichens have specific substrate requirements for growth, depending on particular tree species or types of rocks with distinct chemical compositions. Habitat loss can drastically reduce their populations and diversity. Furthermore, climate change poses additional risks by altering the environmental conditions necessary for their survival (Allen *et al*., 2019).

Currently, the lack of comprehensive lichen records for Ireland is a significant barrier to effective conservation efforts. The absence of specialist skills among researchers and conservationists has resulted in a notable absence of a red list for lichens, hindering the understanding of their conservation status and needs. The British Lichen Society has completed a conservation assessment of lichen species in Britain, which provides insight into species of conservation concern within that region (British Lichen Society, 2024a). However, that assessment is not currently applicable in Ireland, or Meath. This section will highlight lichens listed in Annex V of the EU Habitats Directive.

Future conservation efforts for lichens in Co. Meath should form a baseline list of species through surveys of multiple habitats. The data included in this report is likely deficient and needs to be added to in order to ascertain the status of lichen conservation within the county. Lichen conservation often relies on the conservation of microhabitats such as the rough bark of certain trees and the cracks in silica-rich rock. These microhabitats may be conserved through wider habitat protection, though

special consideration should be given to these microhabitats should they host a rare or threatened lichen (Gasparyan *et al*., 2018).

The data used in this report is sourced from the Lichen Ireland Project, an initiative dedicated to cataloguing lichen species in Ireland (Lichen Ireland, 2024), as well as private records from noted Irish lichenologist Paul Whelan, used with his permission. Species listed under Annex V of the EU Habitats Directive are highlighted in red (see Tables 26 and 27). Only the species names confirmed from the county are provided, as no site-specific data was available.

*Table 26. Lichen species recorded in Co. Meath – part 1*

| | | |
|---|---|---|
| *Acarospora fuscata* | *Caloplaca flavovirescens* | *Enchylium tenax* |
| *Acarospora privigna* | *Caloplaca pyracea* | *Enchylium tenax* var. *ceranoides* |
| *Acrocordia conoidea* | *Caloplaca saxicola* | *Enterographa crassa* |
| *Acrocordia gemmata* | *Candelaria concolor* | *Evernia prunastri* |
| *Acrocordia salweyi* | *Candelariella aurella* | *Flavoparmelia caperata* |
| *Agonimia tristicula* | *Candelariella coralliza* | *Flavoparmelia soredians* |
| *Alyxoria culmigena* | *Candelariella medians* | *Fuscidea cyathoides* |
| *Alyxoria ochrocheila* | *Candelariella vitellina* | *Fuscidea lightfootii* |
| *Alyxoria varia* | *Candelariella xanthostigma* | *Glaucomaria rupicola* var. *rupicola* |
| *Amandinea punctata* | *Candelariella xanthostigmoides* | *Graphis elegans* |
| *Anisomeridium biforme* | *Catillaria chalybeia* | *Graphis inustuloides* |
| *Anisomeridium polypori* | *Catillaria lenticularis* | *Graphis scripta* |
| *Arthonia atra* | *Chaenotheca furfuracea* | *Gyalecta derivata* |
| *Arthonia calcarea* | *Chrysothrix candelaris* | *Gyalecta jenensis* |
| *Arthonia didyma* | *Circinaria calcarean* | *Gyrographa gyrocarpa* |
| *Arthonia radiata* | *Circinaria contorta* | *Haematomma ochroleucum* |
| *Arthopyrenia analepta* | *Cladonia chlorophaea* | *Hymenelia prevostii* |
| *Aspicilia grisea* | *Cladonia ciliata* var. *tenuis* | *Hyperphyscia adglutinata* |
| *Bacidia arceutina* | *Cladonia coniocraea* | *Hypogymnia physodes* |
| *Bacidia chloroticula* | *Cladonia crispata* var. *cetrariiformis* | *Hypogymnia tubulosa* |
| *Bacidia inundata* | *Cladonia fimbriata* | *Hypotrachyna revoluta* |
| *Bacidia laurocerasi* | *Cladonia floerkeana* | *Jamesiella anastomosans* |
| *Baeomyces rufus* | *Cladonia furcata* | *Lathagrium auriforme* |
| *Bagliettoa baldensis* | *Cladonia macilenta* | *Lecania cuprea* |
| *Bilimbia sabuletorum* | *Cladonia portentosa* | *Lecania cyrtella* |
| *Blennothallia crispa* | *Cladonia squamosa* var. *squamosa* | *Lecania erysibe* |
| *Botryolepraria lesdainii* | *Cladonia uncialis* subsp. *biuncialis* | *Lecania hutchinsiae* |
| *Bryostigma lapidicola* | *Clathroporinopsis nidarosiensis* | *Lecania naegelii* |
| *Buellia aethalea* | *Clauzadea monticola* | *Lecanora aitema* |
| *Buellia griseovirens* | *Cliostomum griffithii* | *Lecanora barkmaniana* |
| *Buellia ocellata* | *Coenogonium pineti* | *Lecanora campestris* |
| *Buellia stellulata* | *Collema cristatum* | *Lecanora campestris* subsp. *campestris* |
| *Calicium viride* | *Coniocarpon cinnabarinum* | *Lecanora carpinea* |
| *Caloplaca aurantia* | *Dendrographa decolorans* | *Lecanora chlarotera* |
| *Caloplaca cerinella* | *Dermatocarpon miniatum* | *Lecanora conizaeoides* |
| *Caloplaca chlorina* | *Diarthonis spadicea* | *Lecanora expallens* |

| | | |
|---|---|---|
| *Caloplaca citrina* | *Dimerella lutea* | *Lecanora jamesii* |
| *Caloplaca crenularia* | *Diploicia canescens* | *Lecanora orosthea* |
| *Caloplaca flavescens* | *Diplotomma alboatrum* | *Lecanora polytropa* |
| *Caloplaca flavocitrina* | *Dirina massiliensis* f. *sorediata* | *Lecanora pulicaris* |

*Table 27. Lichen species recorded in Co. Meath – part 2*

| | | |
|---|---|---|
| *Lecanora soralifera* | *Pertusaria albescens* var. *corallina* | *Ramalina canariensis* |
| *Lecanora sulphurea* | *Pertusaria hymenea* | *Ramalina farinacea* |
| *Lecanora varia* | *Pertusaria leioplaca* | *Ramalina fastigiata* |
| *Lecidella elaeochroma* | *Pertusaria pertusa* | *Ramalina fraxinea* |
| *Lecidella elaeochroma* f. *elaeochroma* | *Phaeographis dendritica* | *Ramalina lacera* |
| *Lecidella elaeochroma* f. *soralifera* | *Phaeographis smithii* | *Rhizocarpon geographicum* |
| *Lecidella scabra* | *Phaeophyscia nigricans* | *Rhizocarpon petraeum* |
| *Lecidella stigmatea* | *Phaeophyscia orbicularis* | *Rhizocarpon reductum* |
| *Lepra amara* | *Phlyctis agelaea* | *Rinodina oleae* |
| *Lepra corallina* | *Phlyctis argena* | *Rinodina sophodes* |
| *Lepraria finkii* | *Physcia adscendens* | *Sarcogyne regularis* |
| *Leproplaca chrysodeta* | *Physcia aipolia* | *Scoliciosporum chlorococcum* |
| *Leptogium schraderi* | *Physcia caesia* | *Scoliciosporum umbrinum* |
| *Melanelia fuliginosa* subsp. *fuliginosa* | *Physcia leptalea* | *Scytinium gelatinosum* |
| *Melanelixia glabratula* | *Physcia tenella* | *Secoliga jenensis* |
| *Melanelixia subaurifera* | *Physcia tribacia* | *Solenopsora candicans* |
| *Melanohalea exasperatula* | *Physconia distorta* | *Sporodophoron cretaceum* |
| *Micarea prasina* | *Physconia grisea* | *Squamarina cartilaginea var. cartilaginea* |
| *Myriolecis albescens* | *Placopyrenium fuscellum* | *Tephromela atra* |
| *Myriolecis crenulata* | *Placynthiella icmalea* | *Toninia aromatica* |
| *Myriolecis dispersa* | *Placynthiella uliginosa* | *Trapelia coarctata* |
| *Myriolecis persimilis* | *Placynthium nigrum* | *Trapelia placodioides* |
| *Myriolecis sambuci* | *Porina aenea* | *Trapeliopsis flexuosa* |
| *Naetrocymbe punctiformis* | *Porina chlorotica* | *Trapeliopsis granulosa* |
| *Naevia punctiformis* | *Porpidia cinereoatra* | *Usnea subfloridana* |
| *Normandina pulchella* | *Porpidia crustulata* | *Usnea wasmuthii* |
| *Ochrolechia androgyna* | *Porpidia soredizodes* | *Varicellaria hemisphaerica* |
| *Ochrolechia parella* | *Porpidia tuberculosa* | *Verrucaria coerulea* |
| *Ochrolechia subviridis* | *Protoblastenia rupestris* | *Verrucaria hochstetteri* |
| *Opegrapha niveoatra* | *Protoparmelia badia* | *Verrucaria macrostoma* |
| *Opegrapha vermicellifera* | *Protoparmeliopsis muralis* | *Verrucaria muralis* |
| *Opegrapha vulgata* | *Pseudevernia furfuracea* | *Verrucaria nigrescens* |
| *Parmelia saxatilis* | *Psilolechia lucida* | *Verrucaria viridula* |
| *Parmelia sulcata* | *Psoroglaena stigonemoides* | *Xanthoparmelia mougeotii* |
| *Parmelina pastillifera* | *Punctelia jeckeri* | *Xanthoria elegans* |
| *Parmotrema perlatum* | *Punctelia subrudecta* | *Xanthoria parietina* |
| *Peltigera hymenina* | *Pyrenula chlorospila* | *Xanthoria polycarpa* |
| *Peltigera membranacea* | *Pyrenula macrospora* | *Zwackhia sorediifera* |
| *Peltigera rufescens* | *Pyrrhospora quernea* | |

| | | |
|---|---|---|
| *Pertusaria albescens* | *Ramalina calicaris* | |

## 3.6 FUNGI

Fungi play essential roles in ecosystems through their diverse forms and functions. Often existing as independent entities, fungi thrive as decomposers, symbionts, or pathogens. Their primary structure, mycelium—a vast network of hyphae—allows them to efficiently absorb nutrients from their surroundings. By breaking down complex organic matter, fungi recycle essential nutrients back into the soil, supporting plant growth and contributing to nutrient cycling. Additionally, many fungi form mycorrhizal associations with plants, enhancing nutrient uptake and improving overall soil health (Dighton and White, 2017). Thriving in a variety of environments—from damp forest floors to arid grasslands—fungi demonstrate remarkable adaptability and contribute significantly to biodiversity and the stability of ecosystems (Sashika *et al*., 2023).

Within Ireland, a rich diversity of fungi has been documented, with over 5,500 species identified (NBDC, 2024c), ranging from frequent edible mushrooms to rare and unique species. This diversity is supported by the country's varied climatic conditions and rich habitats, which provide numerous niches for fungal growth. However, fungi often remain understudied, overshadowed by more prominent flora and fauna. Habitat destruction, driven by urbanisation and agricultural expansion, poses significant threats to fungal populations. Many fungi have specific habitat requirements, relying on particular tree species or soil types, making them susceptible to habitat loss (Gilbert *et al*. 2008).

Co. Meath seems to be under recorded in terms of fungi, with only 405 taxa recorded. The majority of these records are of mushroom-producing fungi. These fungi are often overrepresented as they are the most noticeable. Other fungi, such as mycorrhizal fungi, rust fungi, downy mildews and powdery mildews, are severely under recorded due to a lack of specialist skills and interest from recorders. Oomycetes (slime moulds), while present in the dataset used by this report, are often misidentified as lichens or other fungi. This group of organisms is not well studied within Ireland more generally.

The conservation of fungi in Co. Meath is restricted by the lack of a national Red List for Fungi. Meaningful conservation efforts rely on the production of such a list. This will allow a targeted effort to conserve rare and threatened taxa. Prior to the production of such a report, education around the ecological role of fungi aimed at landowners could prove beneficial to their protection. Superficially simple actions such as allowing dead trees to decay naturally can improve fungal biodiversity across the county.

The current lack of comprehensive studies on fungi distribution presents challenges for effective conservation efforts. Insufficient data on their distribution and ecological roles hampers our understanding of their conservation status and needs. Due to insufficient data, this report does not attempt to highlight any fungi of high conservation importance. This report uses records from the National Biodiversity Data Centre. No tables from this dataset are reproduced as the data is not licenced for such use.

## 3.7 SEAWEEDS

Marine algae play vital roles in ocean ecosystems through their diverse forms and functions. Found in a variety of aquatic environments, marine algae serve as primary producers, contributing significantly

to the marine food web. Their structure, which includes different forms like microalgae and macroalgae, enables them to efficiently capture sunlight and convert it into energy through photosynthesis. By absorbing carbon dioxide and releasing oxygen, marine algae not only support marine life but also play a crucial role in global carbon cycling (Wiencke *et al*. 2012). Marine algae also serve as important indicators of ocean health, responding sensitively to changes in water quality, temperature, and nutrient levels (Pal Singh *et al*. 2014).

In regions like Ireland, a rich diversity of marine algae has been documented, with over 500 species recorded (NBDC, 2024a), ranging from microscopic phytoplankton to large seaweeds like kelp. This diversity is supported by the country's varied marine environments and nutrient-rich waters, which provide many niches for algal growth. However, marine algae are often overlooked in ecological studies compared to more prominent marine (fauna) species. Habitat degradation, driven by pollution, climate change, and overfishing, poses significant threats to algal populations. Many marine algae have specific habitat requirements, relying on particular water conditions or substrates, making them vulnerable to environmental changes (Mineur, 2015). This report specifically focuses on seaweeds.

County Meath possesses a narrow (approx. 20km) and almost entirely sandy coastline, and therefore it is expected to have a low diversity of seaweeds. Indeed, a notable geological 'sandur' feature (a glacial outwash plain) dominates the southern end of the coastal stretch (Clarke *et al.,* 2007). In total, 21 taxa have been recorded to date (listed in Table 28). These records were all submitted in 1987. Further studies are required to make any meaningful recommendations or conservation efforts concerning seaweeds in Co. Meath.

The current lack of comprehensive studies on seaweed distribution presents challenges for effective conservation efforts. Insufficient data on their distribution hampers our understanding of their conservation status and needs. There is currently no Red List for marine algae in Ireland. This report uses records from the British Phycological Society.

*Table 28. All known seaweed species recorded in Co. Meath*

| | |
|---|---|
| *Ascophyllum nodosum* | *Polysiphonia lanosa* |
| *Blidingia marginata* | *Polysiphonia stricta* |
| *Blidingia minima* | *Porphyra umbilicalis* |
| *Ceramium virgatum* | *Prasiola stipitata* |
| *Enteromorpha linza* | *Pylaiella littoralis* |
| *Enteromorpha prolifera* | *Rhizoclonium riparium* |
| *Fucus ceranoides* | *Ulothrix flacca* |
| *Fucus spiralis* | *Ulva intestinalis* |
| *Fucus vesiculosus* | *Ulva lactuca* |
| *Mastocarpus stellatus* | *Urospora penicilliformis* |
| *Polysiphonia fucoides* | |

## 3.8 BUTTERFLIES

Butterflies are a charismatic group of flying insects in the Order Lepidoptera, of which there are some 34 species in Ireland, either breeding or frequent migrants (Nash *et al.,* 2012). The recording of these species increased greatly in Ireland in the late-20$^{th}$ century in the lead up to the 'Millennium Atlas of Butterflies in Britain and Ireland' (Asher *et al.,* 2001, Nash *et al.,* 2012). There was also a more recent

2017-2021 'Atlas of Butterflies in Ireland' which is available on the National Biodiversity Data Centre website. With many attractive and readily identifiable species, butterflies have been, perhaps unsurprisingly, relatively well-recorded in Co. Meath. Eight Red-listed species (according to Regan *et al.,* 2010) have been reported (Table 29). These have been recorded across the county, although concentrations of records can be seen in extended areas of semi-natural habitat. The locations of these species are mapped in Figure 24.

One notable area for butterflies includes the sand dunes and associated habitats between Mornington and Bettystown. Small Blue, Small Heath and Dark Green Fritillary are all found here. Indeed, this area has been listed as a notable area for butterflies by Harding (2021). Having been introduced at Mornington in 2014, the Small Blue is now abundant at this site (Harding, 2021). However, it has been lost from a gravel pit at Kilbrook, east of Enfield, due to overgrazing (Harding, 2021). Another endangered species, Wall Brown, is undergoing strong declines nationally. Changing agricultural practices appears to be at least partially responsible for these (Harding, 2021). There have only been two records of this species in Co. Meath since 2010 despite a relatively high recording effort.

Girley Bog supports a population of Large Heath – a specialist of raised and blanket bogs. As a result, it is sensitive to damage of these habitats (Harding 2021). Moreover, Marsh Fritillary can be found at the margins of bogs in the county such as at Jamestown Bog. It has also been recorded in Mount Hevey Bog SAC in 2018 by Lorcan Scott, and more recently on the Westmeath side of the Ballivor Bog complex (Bracklin, Carranstown & Ballivor Bogs) (MKO, 2024). It favours grassy areas (particularly on the drier margins of raised bogs) where its foodplant, *Succisa pratensis* (Devil's-bit Scabious), is found. It may also occur in such damp grassy habitats away from raised bogs.

Further information on the biology and status of the Irish butterfly species can be found in Harding (2021) and Nash *et al*. (2012).

*Table 29. Threatened and protected butterfly species recorded from Co. Meath. Conservation status follows Regan et al. (2010). The Marsh Fritillary is also listed on Annex II of the EU Habitats Directive.*

| **Scientific name** | **Common name** | **Status** |
|---|---|---|
| *Coenonympha pamphilus* | Small Heath | NT |
| *Euphydryas aurinia* | Marsh Fritillary | VU, Annex II |
| *Cupido minimus* | Small Blue | EN |
| *Coenonympha tullia* | Large Heath | VU |
| *Erynnis tages* | Dingy Skipper | NT |
| *Lasiommata megera* | Wall (Wall Brown) | EN |
| *Argynnis aglaja* | Dark Green Fritillary | VU |
| *Hipparchia semele* | Grayling | NT |

## 3.9 Mayflies

Mayflies (Ephemeroptera) are an ancient Order of insects closely associated with freshwater habitats, especially during their larval/nymphal stages, where they are solely reliant on these habitats for survival (Kelly-Quinn and Regan, 2012). They emerge into their flying adult stage only for a relatively short time for reproductive purposes. Mayflies are often excellent indicators of high quality rivers and streams with clean waters. There are some 33 different species recorded from Ireland (Kelly-Quinn and Regan, 2012). Out of the eight mayfly species on the current Red List (Kelly-Quinn and Regan, 2012), four have been recorded from Co. Meath (Table 30). However, a large portion of records for these

threatened species are not recent. Examination of the datasets analysed for this audit (from National Biodiversity Data Centre and the Environmental Protection Agency of Ireland) show only eight out of twenty-nine records of Red-listed taxa are post-1970. Within these datasets at least, the most recent record for *Procloeon bifidum* in Meath dates from the period 1935 – 1947. Post-1970 records exist for the other three taxa. Eutrophication and siltation broadly appear to be two key threats to these threatened species nationally (Kelly-Quinn and Regan, 2012).

*Plate 5. Mayfly CC-BY Bob Fox*

Information on the distribution of all Ephemeroptera in Ireland can be found in Kelly-Quinn and Bracken (2000). The Irish Red List (Kelly-Quinn and Regan, 2012) covers the threatened species. There is a current national mayfly recording project underway to create an updated Irish Red List for this group, an interim report having been produced recently by AQUENS Ltd. (2024). This report shows a scattering of mayfly sample sites in the north and extreme south ends of Co. Meath, which have been sampled as part of this national survey to assess the conservation status of the various Irish mayfly species. 396 sites in total were sampled across the Republic of Ireland. Many new records of the previously mentioned 8 threatened status species were made amongst these sample sites. However, there are significant gaps in recording in Co. Meath in particular, which will be addressed by these surveyors in the 2025 field season.

*Table 30. Threatened mayfly species recorded from Co. Meath. Conservation status follows Kelly-Quinn and Regan (2012).*

| **Species** | **Synonym** | **Status** |
|---|---|---|
| *Baetis atrebatinus* | *Labiobaetis atrebatinus* | EN |
| *Ephemerella notata* | | EN |
| *Procloeon bifidum* | | VU |
| *Kageronia fuscogrisea* | | NT |

## 3.10 WATER BEETLES

Approximately 244 species of water beetle have been found in Ireland, as of the most recent Red List (Foster *et al.*, 2009). These aquatic species of the Order Coleoptera are important indicators of high-quality wetland habitats, from lowland fens and lakes to montane habitats. The water beetle database held by the Balfour-Browne Club (which was obtained for this audit with their permission) contains records of thirteen Red-listed species (Foster *et al.*, 2009) in Meath (Table 31). There appears to be a discordance between the locality name and the grid reference for several records. Priority was given to locality name when deciding whether the record referred to Meath or an adjacent county.

Many of these species are found at river and lake edges. Notably, several species found in Meath are associated with calcareous habitats such as fens and marly lakes. These include *Agabus labiatus*, *Helophorus nanus*, *Laccornus oblongus* and *Limnebius nitidus* (Foster *et al.*, 2009). Two coastal species of brackish environments, *Ochthebius auriculatus* and *Ochthebius marinus,* have been reported from the east of the county. However, there appears to have been little recent recording in Meath (Brian Nelson, pers. comm., October 2024) and hence the current status of some of these species is unclear. Future recording should focus on the wetlands in the west of the county as these comprise important sites for water beetles. Indeed, the area around Lough Sheelin has been identified as a specific data gap (Brian Nelson, pers. comm., October 2024).

*Table 31. Threatened water beetle species recorded from Co. Meath. Conservation status follows Foster et al. (2009).*

| **Species** | **Status** |
|---|---|
| *Agabus labiatus* | NT |
| *Gyrinus urinator* | NT |
| *Haliplus lineolatus* | NT |
| *Helophorus nanus* | VU |
| *Hydraena rufipes* | EN |
| *Hygrotus novemlineatus* | VU |
| *Ilybius chalconatus* | VU |
| *Laccophilus hyalinus* | VU |
| *Laccornis oblongus* | NT |
| *Limnebius nitidus* | EN |
| *Macroplea appendiculata* | NT |
| *Ochthebius auriculatus* | NT |
| *Ochthebius marinus* | NT |

## 3.11 FRESHWATER FISH

Ireland's freshwater habitats host a relatively modest but ecologically significant diversity of fish species, reflecting the island's post-glacial history and relative geographic isolation at the western edge of the European continent. The freshwater fish fauna (totalling almost 30 different species) on the island includes both native species, such as Atlantic Salmon (*Salmo salar*), Brown Trout (*Salmo trutta*), and European Eel (*Anguilla anguilla*), and introduced species like pike (*Esox lucius*) and perch (*Perca fluviatilis*) (Inland Fisheries Ireland, 2024).

In County Meath, freshwater fish diversity reflects the county's extensive network of rivers, including the larger Boyne, Blackwater, and Dee, as well as smaller tributaries and loughs. These habitats

commonly support species like Pike, Perch, and Roach (*Rutilus rutilus*), while migratory fish such as Atlantic Salmon and European Eel use the River Boyne as a key corridor (Inland Fisheries Ireland, 2022a). Meath's waterways are vital not only for maintaining our native fish populations but also for supporting angling and conservation efforts, making them an essential part of the county's natural heritage.

The results of electro-fishing surveys in the Boyne Catchment during 2022 were reported by Gordon *et al.* (2023) and are of significant interest regarding the current state of native fish populations in the county. Unlike much biological recording, the authors calculated population density estimates for each species. European Eel (CR), Atlantic Salmon (VU) and Lamprey species (*Lampetra fluviatilis*/*L. planeri*/*Petromyzon marinus*) were recorded. Threat status follows the Irish Red List for freshwater fish by King *et al.* (2011). The distribution of these species in the Boyne sub-catchments (within Co. Meath) are presented in Table 32. Threats include eutrophication, habitat change and obstructions to fish passage (Gordon *et al.*, 2023).

*Table 32. Presence of threatened species (King et al., 2011) in sub-catchments of the Boyne in 2022. Only records from Co. Meath are included here.*

| Sub-catchment | European Eel | Atlantic Salmon | Lamprey species |
|---|---|---|---|
| Blackwater (Kells) | Yes | Yes | Yes |
| Mattock | Yes | | |
| Boyne | | | |
| Deel | | Yes | |
| Stoneyford | | Yes | |
| Athboy | | Yes | |
| Skane | Yes | | |
| Boycetown | | | |
| Knightsbrook | | Yes | |
| Tromman | Yes | | |
| Longwood | Yes | Yes | |

A detailed survey of lamprey in the Boyne Catchment was undertaken in 2005 (O'Connor, 2006). Both Brook Lamprey (*Lampetra planeri*) and River Lamprey (*Lampetra fluviatilis*) likely occur here. The survey did not confirm the presence of Sea Lamprey (*Petromyzon marinus*). The Boyne catchment populations appear to be important nationally, with density estimates higher here than in the Moy (Sligo/Mayo) and Feale (Cork/Limerick/Kerry). However, the arterial drainage scheme carried out in the 1980s appears to have reduced the extent of lamprey nursery habitat (O'Connor, 2006).

The National Fish Counter Programme was first established in Ireland in 1994 and fish counter data have been reported since this time from a range of major Irish river systems. These include the River Boyne, with the Meath fish counters being located at Blackcastle Weir in Navan. These data can be used to monitor local (and national) Salmon and Sea Trout (*Salmo trutta*) populations, without physically interfering with them, although they only represent a partial count at this particular location. The 2023 fish counter report (Inland Fisheries Ireland, 2023) notes that there were 325 Spring salmon, 551 Grilse (a salmon that has returned to freshwater after just one year at sea), 613 Late Summer Salmon and 0 Sea Trout recorded. There were also no recorded Sea Trout in the 2021 and 2022 reports, albeit this location is *c.* 56km inland in hydrological distance from the Meath coast (Inland Fisheries Ireland, 2021, 2022b). Contrastingly, in 2022, there were 1,074 Late Summer Salmon recorded (Inland Fisheries Ireland, 2022b), so the numbers clearly vary quite widely from year to year.

There have also been gill net surveys of fish and/or trout populations in individual larger loughs in Co. Meath, such as at Lough Sheelin (Delanty *et al.,* 2022) and Lough Bane (Bateman *et al.,* 2023), which provide further useful localised data resources. In Lough Sheelin, 81 Brown Trout (*Salmo trutta*) were recorded in 2022 (Delanty *et al.,* 2022). In Lough Bane, Perch (*Perca fluviatilis*) was by far the commonest species in 2022, with no Brown Trout having been recorded in that year (Bateman *et al.,* 2023). Brown Trout were recorded at Lough Bane in a previous survey there in 2013, whilst the miniscule native Irish freshwater fish Nine-spined Stickleback (*Pungitius pungitius*) was also recorded there in 2007, 2010 and 2013 (Bateman *et al.,* 2023).

## 3.12 Mammals

Ireland harbours approximately 60 terrestrial, marine and flying mammal species, and these species reflect the island's diverse habitats and temperate oceanic climate. Notable native mammals include the Irish Hare (*Lepus timidus hibernicus*), Red Deer (*Cervus elaphus*), and the Pine Marten (*Martes martes*), alongside marine species like the Grey Seal (*Halichoerus grypus*), Basking Shark (*Cetorhinus maximus*) and Bottlenose Dolphin (*Tursiops truncatus*). Ireland's early post-glacial isolation limited natural recolonisation by mammal species, so its mammal diversity is less rich than in mainland Europe (Marnell *et al.,* 2009).

County Meath hosts a subset of this Irish diversity, with over 30 species of terrestrial, marine and flying mammals recorded. Its mixture of farmland, woodland, and waterways supports frequent species like Eurasian Badger (Meles meles), Red Fox (*Vulpes vulpes*), and Wood Mouse (*Apodemus sylvaticus*). The River Boyne and its associated wetlands are vital habitats regionally for species such as Otter (*Lutra lutra*), as well as various bat species (see below). The conservation and protection status of the various mammal species recorded in Meath can be found in Appendix II.

### Bats

Landscape Conservation for Bats in Ireland

A bat landscape analysis study was carried out by Queens University Belfast in 2010/11. Based on known records from 2000-2009, they created predictive maps of habitat suitability for all of Ireland's nine bat species (Lundy *et al*., 2011). Analyses were carried out using CORINE landcover, altitudinal, climatic and other datasets (Bat Conservation Ireland, 2012).

The results showed that habitats suitable for most Irish bat species are generally widespread and abundant in Co. Meath. Table 33 shows a summary of findings for each bat species in Co. Meath taken from Bat Conservation Ireland (2012).

*Table 33. The percentage area of County Meath included as part of the core area of bat species and percentage of each species' countrywide core area in the county. Values which are above the mean (for 26 counties in ROI) are marked (*), those counties with significantly higher values, greater than the average plus the standard deviation are marked (**).*

| | **Brown long-eared** | **Common pipistrelle** | **Soprano pipistrelle** | **Nathusius' pipistrelle** | **Lesser horseshoe bat** | **Leisler's bat** | **Daubenton's bat** | **Whiskered bat** | **Natterer's bat** |
|---|---|---|---|---|---|---|---|---|---|
| % of county | 76* | 100* | 96* | 21* | 0 | 97** | 78** | 28 | 92** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| % of all island core range | 4* | 4* | 4* | 4* | 0 | 4* | 4* | 2 | 4 |
| % of county | 76* | 100* | 96* | 21* | 0 | 97** | 78** | 28 | 92** |

The squares with higher rates of occurrence for brown long-eared bat, common pipistrelle, soprano pipistrelle, Leisler's bat, Daubenton's bat, and Natterer's bat, were located in the north of the county, along the Boyne and Blackwater valleys and in the Kilmainham Wood area. Additionally, there were some other squares of high potential occurrence along the border with Dublin/Kildare in the east of Co. Meath. The squares with a high potential occurrence of whiskered bat were present in the east of the county, along the Boyne valley and further south in the Ashbourne area. The squares most suited to Nathusius's pipistrelle occur in the west of the county, particularly along the border with Cavan and also in the Lough Sheelin area, as well as further to the south around Lough Bane and Annagh Lough along the border with Westmeath (Bat Conservation Ireland, 2012).

Figures 9-16 below, taken from Bat Conservation Ireland (2012), highlight the squares most suitable for each bat species in Co. Meath (darker green represents greater suitability).

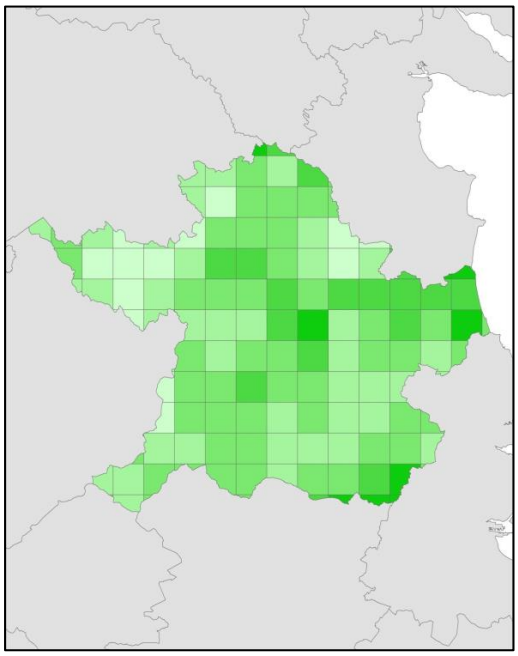

*Figure 9. Habitat suitability for brown long-eared bat (Plecotus auritus)*

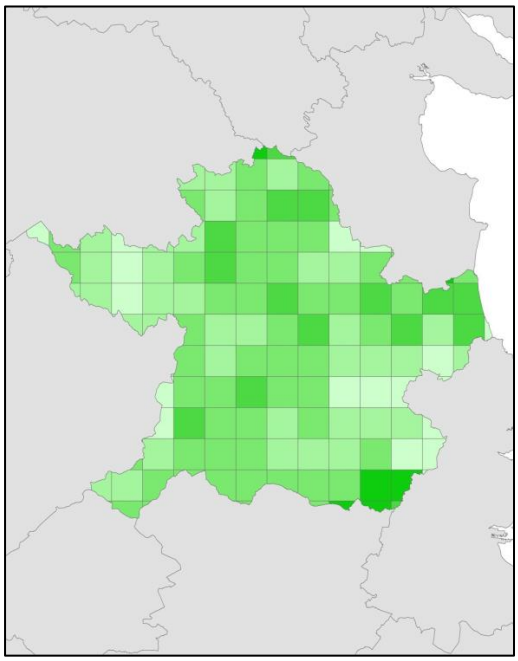

*Figure 10. Habitat suitability for common pipistrelle (Pipistrellus pipistrellus)*

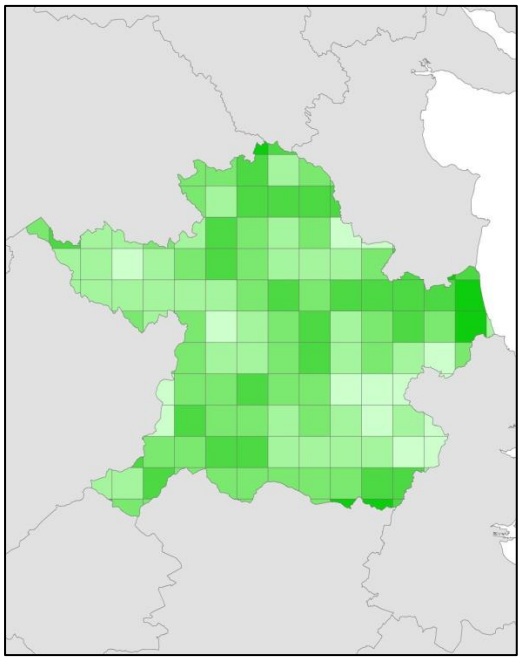

*Figure 11. Habitat suitability for soprano pipistrelle (Pipistrellus pygmaeus)*

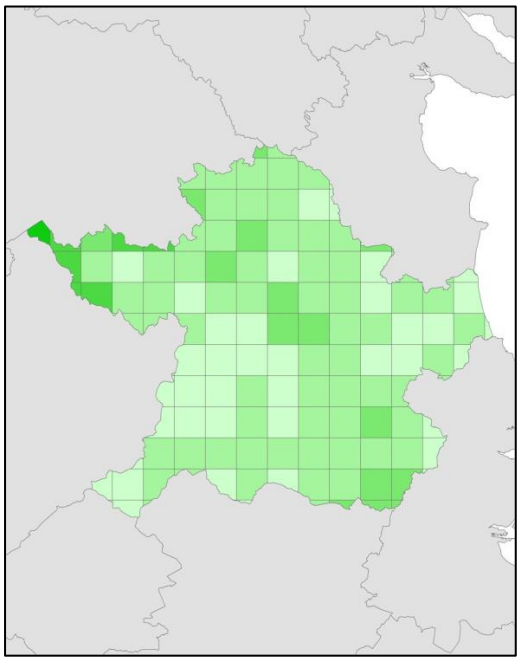

*Figure 12. Habitat suitability for Nathusius' pipistrelle (Pipistrellus nathusii)*

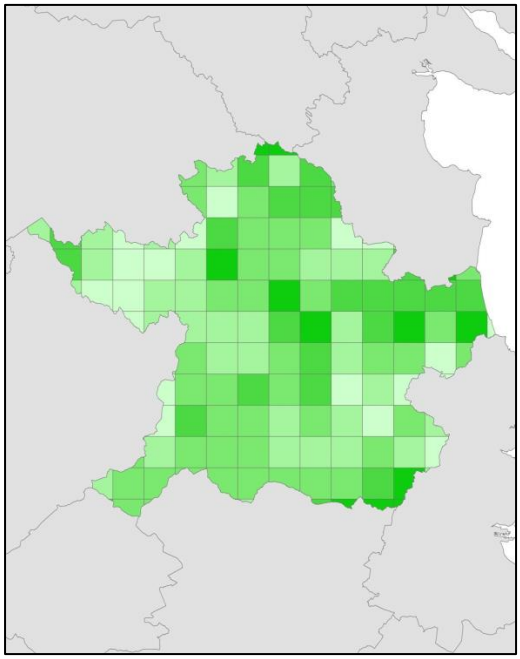

*Figure 13. Habitat suitability for Leisler's bat (Nyctalus leisleri)*

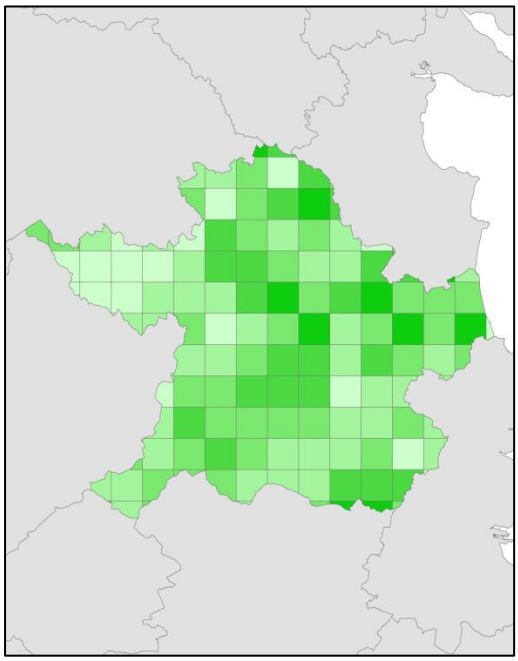

*Figure 14. Habitat suitability for Daubenton's bat (Myotis daubentonii)*

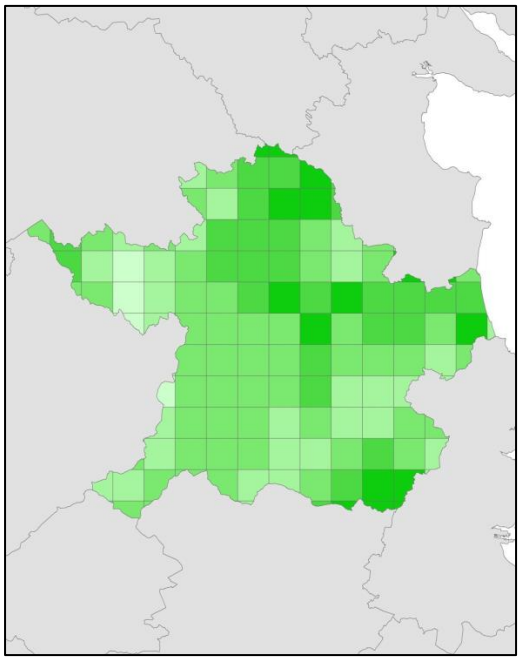

*Figure 15. Habitat suitability for Natterer's bat (Myotis nattereri)*

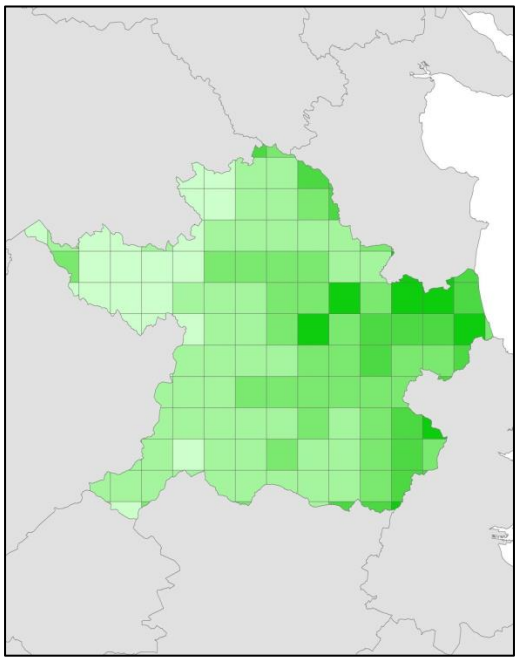

*Figure 16. Habitat suitability for whiskered bat (Myotis mystacinus)*

Irish Bat Monitoring Schemes – Co. Meath

Various Irish bat species have been monitored annually in the Republic of Ireland, beginning with the Car-Based Bat Monitoring Scheme in 2003. The All-Ireland Daubenton's Bat Waterways Monitoring Scheme began in 2007 and still continues to this day, with much volunteer effort. Most of these surveys are currently under the management of Bat Conservation Ireland. Roche *et al.* (2024) reported the 2023 annual findings of the various Irish Bat Monitoring Schemes. These data included records of bat species from multiple squares and waterway survey sites visited in Co. Meath in 2023. In total, 5 waterway sites were surveyed in the county in 2023. Co. Kildare and Co. Cork had the most sites surveyed in that year, with a total of 21 each. Almost half of all Irish bat records in 2023 were of common pipistrelle, followed by soprano pipistrelle and Leisler's bat. Daubenton's bat numbers appear to be generally stable year on year.

The All-Ireland Woodland Bat Monitoring Scheme included Co. Meath in its 2024 survey effort (Clarke, 2024), following an Irish pilot scheme conducted in 2023, which covered one Meath site (Roche *et al.,* 2024). These surveys focussed on the two main woodland bat species in Meath, Natterer's bat (*Myotis nattereri*) and whiskered bat (*Myotis mystacinus*). Littlewood Forest, just north-east of Slane, was chosen as the main site to be surveyed by the Bat Conservation Ireland team in 2024 (Clarke, 2024). The recorded data from the walked transect routes on site are currently being analysed by the team, as of the conclusion of this audit project.

**Eurasian Badger (*Meles meles*)**

The Badger and Habitat Survey of Ireland

The Badger and Habitat Survey of Ireland was carried out between 1989 and 1993, to assess 1% of Ireland's land area for badger setts and habitat composition, on behalf of the National Parks and Wildlife Service and the Department of Agriculture, Food & Forestry. A total of 28 1km squares were

surveyed in Co. Meath. The results of the survey showed that nationwide the number of setts from any one square varied from zero to 35. This latter highest number was recorded from a square in Co. Meath. The results showed that Meath had 'moderately high densities' of badgers with between 0.5 and 1.0 social groups per $km^2$. A total of 122 setts were found in Co. Meath survey squares, with 81 of those being active. From these numbers, the population estimate for Co. Meath as a whole was 2,200 badger groups being present in the county (Smal, 1995). Meath can therefore be considered an important county for the Eurasian badger (*Meles meles*). Indeed, a search run on the National Biodiversity Data Centre database has shown that the species is currently widespread across the county, as seen in Figure 25. A 'Badger Activity App' currently managed by the Department of Agriculture, Food and the Marine has further recent data available on badgers in the county, however, these data were not received as of the conclusion of this project.

**Otter (*Lutra lutra*)**

Otter (*Lutra lutra*) is a Qualifying Interest (QI) of the River Boyne and River Blackwater SAC. The Boyne Catchment was one of the focus areas for the Otter Survey of Ireland 2010/12. The aims of this survey were to provide an update on otter distribution in the country, estimate the adult population size, assess population trends, investigate habitat usage and diet, and to identify any pressures and threats (Reid *et al*., 2013).

5 surveys have been carried out on the Boyne Catchment between 1980/81 to 2010/11. Analysis has shown that otter incidence had declined by 37.3% from 1980/81 to 2004/05. This had later increased by an estimated 42.8% by 2010/11. This figure, however, was not considered statistically significant. The Rapid Assessment Surveys have also shown an increase of 17.7% between the period of 2008 and 2010, but this figure was also not considered statistically significant (Reid *et al*., 2013).

The Boyne Catchment remains an important habitat for otter. As it is a QI of the River Boyne and River Blackwater SAC, it is important that this remains the case in the future. One of the Conservation Objectives for this SAC is '*To maintain the favourable conservation condition of Otter (Lutra lutra) in River Boyne and River Blackwater SAC'* (NPWS, 2021).

It should be noted that, although the Boyne Catchment is the most significant area for otter populations in Meath, populations do occur elsewhere in the county. Indeed, a search run on the National Biodiversity Data Centre database has shown that the species is currently widespread across the county, with the exception of the southern and northern margins of the county, where the species has more thinly scattered recorded occurrences. Otters are known to have quite large territories, through which they roam typically along river/stream corridors in search of food sources, with territories of several kilometres being typical (Vincent Wildlife Trust Ireland, 2024b).

**Irish Stoat (*Mustela erminea hibernica*)**

A search run on the National Biodiversity Data Centre database shows records of Irish Stoat spread widely across Co. Meath. These are a combination of older and newer records. The Irish Stoat Survey is a citizen science survey launched in February 2023, created in partnership with the Vincent Wildlife Trust, the National Biodiversity Data Centre, the Centre for Environmental Data and Recording in Northern Ireland, and University of Galway (Vincent Wildlife Trust, 2024a). These records have been

added to the Irish Stoats of Ireland database, which has recently been created and shared with the public. A search of this map shows six sightings of Irish Stoat in Co. Meath from the 2023/24 period. The results of this survey will collate new records for this species in Co. Meath.

**Red Squirrel (*Sciurus vulgaris*), Grey Squirrel (*Sciurus carolinensis*), and Pine Marten (*Martes martes*)**

The All-Ireland Squirrel and Pine Marten Survey 2019 (Lawton *et al*., 2020) has provided an insight into the populations of Red Squirrel (*Sciurus vulgaris*), Grey Squirrel (*Sciurus carolinensis*), and Pine Marten (*Martes martes*) in Co. Meath. The general trend nationwide is the recovery of Pine Marten and Red Squirrel and a disappearance of Grey Squirrel. The study has shown that Grey Squirrel has functionally disappeared from large parts of Co. Meath since the previous study in 2012. Red Squirrel is still rare in much of the county; however, Pine Marten has been recorded in high numbers. In 2019, there were 4 records of Red Squirrel in the county, 15 records of Grey Squirrel, and 24 records of Pine Marten (Lawton *et al*., 2020).

The study highlighted that there was a gap in the national Red Squirrel distribution in Co. Meath, demonstrating a lag in its recovery after the disappearance of Grey Squirrel. Red Squirrel populations will likely recover further in Co. Meath in the future. The Grey Squirrel control programme carried out in the 1990s at Mountainstown House Estate in Co. Meath acts as a useful demonstration of how the Grey Squirrel populations have changed in the county. 95 Grey Squirrels were removed from the estate in 1996 (Lawton, 1999). However, no Grey Squirrel have been observed at the estate since 2014 (Lawton *et al*., 2020).

**Invasive mammals**

American Mink (*Neovison vison*): A search of the National Biodiversity Data Centre database has shown widespread records of the invasive American Mink across Co. Meath. J. Reynolds (pers. comm., October 2024) considers the species to be widespread across Co. Meath.

Greater White-toothed Shrew (*Crocidura russula*): A search on the National Biodiversity Data Centre database has shown that sightings of Greater White-toothed Shrew in southwest Co. Meath are becoming more frequent. There are abundant records for it in the neighbouring counties to the south and west of Meath. Cully *et al*. (2023) suggest that the south-west to north-east expansion of Greater White-toothed Shrew correlates with the current distribution of Barn Owl within the county, and is likely the reason for the recent population increase of Barn Owls there.

**Atlas of Mammals in Ireland 2010 – 2015**

The Atlas of Mammals in Ireland 2010 – 2015 (Lysaght and Marnell, 2016) was consulted for records of other mammal species in Co. Meath. Table 34 shows mammal species records from Co. Meath according to Lysaght and Marnell (2016).

*Table 34. Mammal species recorded in Co. Meath as part of the Atlas of Mammals in Ireland 2010 – 2015 (Lysaght and Marnell, 2016)*

| **Species** | **Pre-2010** | **2010-2015** |
|---|---|---|
| Wood Mouse (*Apodemus sylvaticus*) | Yes | Yes |
| House Mouse (*Mus domesticus*) | Yes | Yes |
| Brown Rat (*Rattus norvegicus*) | Yes | Yes |
| Rabbit (*Oryctolagus cuniculus*) | Yes | Yes |
| Irish Hare (*Lepus timidus hibernicus*) | Yes | Yes |
| Hedgehog (*Erinaceus europaeus*) | Yes | Yes |
| Pygmy Shrew (*Sorex minutus*) | Yes | Yes |
| Red Fox (*Vulpes vulpes*) | Yes | Yes |
| Feral Ferret (*Mustela furo*) | Yes | |
| Feral Pig (*Sus scrofa*) | | Yes |
| Muntjac (*Muntiacus reevesi*) | Yes | |
| Red Deer (*Cervus elaphus*) | Yes | Yes |
| Sika Deer (*Cervus nippon*) | Yes | |
| Fallow Deer (*Dama dama*) | Yes | Yes |
| Feral Goat (*Capra hircus*) | Yes | |
| Harbour Seal (*Phoca vitulina*) | Yes | Yes |
| Grey Seal (*Halichoerus grypus*) | Yes | Yes |

## 3.13 OTHER TAXA

This section discusses other biological groups for which brief accounts have been prepared. The groups included here are those for which there is limited or no data available (e.g. data requests for the groups are still in progress as of the conclusion of this project) on them, and/or there is no Red list available for them, and/or the group consists of only one or a few species. The various groups are presented in alphabetical order below.

**Amphipoda (amphipods)**: *Gammarus duebeni* is common in rivers in Meath, whilst *G. lacustris* is common in lakes (Julian Reynolds, pers. comm., October 2024). The alien *Gammarus pulex* is spreading and endangering the native *G. duebeni* in the River Boyne, having spread to the Boyne most likely from the River Blackwater (McLoughlin and Reynolds, 2001). The alien *Crangonyx pseudogracilis* is likely present and spreading in Meath (Julian Reynolds, pers. comm., October 2024) as it is now widespread across Ireland (Baars *et al.,* 2021).

**Arachnida (spiders)**: there is currently no national Red List for the Order Arachnida or any of its families. Nolan (2016) recorded some notable Irish spider species from Girley Bog in Co. Meath, including *Centromerus levitarsis*, which is very rare in Ireland, being only recorded elsewhere at Pollardstown Fen in County Kildare and at Clara Bog in County Offaly. Nolan (2016) elaborates on how this discovery "*provides evidence that despite extensive drainage the bog* [Girley Bog] *has retained some significant components of an expected wetland fauna*".

**Diptera (flies)**: there is currently no national Red List for Diptera or any of its families. Murray (2015) published the discovery of a new Chironomidae fly for Ireland from Co. Meath, *Rheotanytarsus reissi*, which he collected from the River Skane (at a bridge approximately 1km upstream of its confluence with the River Boyne). Murray (2016) later produced an annotated inventory of the Chironomidae flies of Co. Meath. Furthermore, there are multiple cranefly records from Meath sites verified by James P. O'Connor available on the National Biodiversity Data Centre database. These include *Tipula pagana, Tipula obsolete, Cheilotrichia imbuta, Cheilotrichia cinerascens, Tipula oleracea, Erioptera griseipennis, Symplecta stictica, Molophilus obscurus, Molophilus pleuralis, Erioconopa trivialis, Dicranomyia morio, Dicranomyia omissinervis, Austrolimnophila ochracea Dicranomyia modesta* and *Dicranomyia morio*. For further research on craneflies and other Diptera taxa in Ireland, with reference to Meath, see O'Connor (2023) and other scientific publications of the Irish Biogeographical Society. There are no records of Anisopodidae and Thaumaleidae flies (Nematocera) from Meath on the National Biodiversity Data Centre database, as of the conclusion of this report.

**Hymenoptera (bees, ants, wasps and sawflies):** A species-rich Order, Hymenoptera includes bees, ants, wasps and sawflies. Much of this diversity is contained within Ichneumonidae, a family of parasitoids which still requires much taxonomic work (O'Connor *et al.* 2009). Hence, this family has been excluded from the audit. The only Hymenopteran group with a published Irish Red List are the bees (Fitzpatrick *et al*., 2006) with one for wasps currently in preparation. Sixteen Red-listed bumblebee and solitary bee species have been reported from Co. Meath according to the National Biodiversity Data Centre (Table 35). A large proportion of these available bee records are for the widespread *Bombus lapidarius*. This conspicuous and easily identified species is likely to decline further due to habitat loss (Fitzpatrick *et al*., 2006). Although not captured in this dataset, it seems likely that the sand dunes at Mornington are an important habitat for bees. Here, the abundance and diversity of flowering plants relative to improved agricultural areas inland provides an important refugium for populations. Moreover, specialist species may occur here. For example, *Osmia aurulenta* is found on the northern side of the Boyne estuary in the sand dunes of Baltray, Co. Louth (Ronayne and O'Connor, 2003). Given the very short distance, it seems likely that *O. aurulenta* will be discovered in Co. Meath. This Near Threatened species is restricted to the east coast in Ireland and nests in empty shells (Falk, 2015). Habitat loss via agricultural intensification appears to be the most significant threat nationally (Fitzpatrick *et al.*, 2007). However, species-specific threats must also be considered. *Osmia aurulenta*, for instance, is susceptible to trampling due to its nesting habits (Fitzpatrick *et al*., 2006).

*Table 35. Red-listed bee species recorded from Co. Meath. Threat status follows Fitzpatrick et al. (2006).*

| **Species name** | **Status** |
|---|---|
| *Andrena fucata* | NT |
| *Andrena barbilabris* | NT |

| | |
|---|---|
| *Andrena nigroaenea* | VU |
| *Andrena semilaevis* | VU |
| *Bombus barbutellus* | EN |
| *Bombus bohemicus* | NT |
| *Bombus campestris* | VU |
| *Bombus rupestris* | EN |
| *Bombus distinguendus* | EN |
| *Bombus muscorum* | NT |
| *Bombus lapidarius* | NT |
| *Halictus tumulorum* | NT |
| *Lasioglossum nitidiusculum* | VU |
| *Megachile willughbiella* | NT |
| *Megachile centuncularis* | NT |
| *Nomada goodeniana* | EN |

In contrast to bees, the other three groups (wasps, ants, sawflies) have relatively little coverage in the county. Records are available from across the county yet there appears to be a concentration in areas of semi-natural habitat including the coast and peatland sites. This could simply reflect where sampling has occurred in these under-recorded groups. However, it seems likely that such areas are important for Hymenoptera and that this is not merely an artefact of under-recording. A useful next step could involve linking Hymenoptera records to particular sites. This would be useful more broadly for invertebrate groups which are rarely used to justify site designation. For example, the uncommon wasp *Spilomena differens* (*S. curraca*) has been found at Thomastown Bog (Ronayne and O'Connor, 2003). However, the invertebrate assemblage at Thomastown Bog pNHA is not mentioned in the site synopsis.

**Isopoda (isopods)**: Doogue and Harding (1982) produced a *Distribution Atlas of Woodlice in Ireland*, containing 10x10 km$^2$ records for various terrestrial isopods (woodlice) in Meath (as in other counties), mostly resulting from intensive recording completed from 1975 to 1980. Such detailed recording work has not yet been replicated in recent decades in Ireland. Nonetheless, some more recent Meath isopod records of interest have come to light from correspondence with relevant experts. For example, the small freshwater crustacean isopod *Asellus aquaticus* is now considered to be widespread in the River Boyne (Julian Reynolds, pers. comm., October 2024). Furthermore, a substantial colony of the terrestrial isopod, *Armadillidium pulchellum,* has been recorded by Declan Doogue (pers. comm., November 2024) in an important ecological site at Blackshade Bridge. This species is "*closely associated with vegetated gravels deposited by deglaciation processes. It was always a rare species in Ireland and has become rarer now because of intensive exploitation of sand and gravel features such as eskers and the widespread use of worked-out gravel pits as landfill*". Yet another rare terrestrial isopod species recorded from Meath is *Oritoniscus flavus*. This species was until recent years "*not known from Britain but occurred widely in humid sites in SE Ireland. It is well known from France. It has*

*since been found in a small number of sites in Britain. Its occurrence in Meath is of interest as it is here approaching its northern limit and may be gradually expanding its range in semi-natural wet woodland habitats. It is known from a number of sites along the Boyne, especially west of Slane*" (Declan Doogue, pers. comm., November 2024).

**Macromoths**: A request for the MothsIreland dataset for Meath was in process as of the conclusion of this project. Approximately ten Red-listed macromoth species occur in the county – the most notable being Crescent Striped (*Apamea oblonga*) (EN) (threat status follows Allen *et al.*, 2016). This occurs in saltmarsh at Mornington within the Boyne Coast and Estuary SAC.

**Non-marine molluscs:** Records within the All-Ireland Non-Marine Molluscan Database were analysed for the audit. 11 Red-listed (Byrne *et al.*, 2009) species have been found in Co. Meath (see Table 36). Noticeably, these records are quite old with very few post-2000 records. This could be a product of recent under-recording and/or reflect a decline in such threatened species. It could also potentially signify a decline in recorders who study these more specialist groups. Another consequence of old records is their low spatial resolution which inhibits the localisation of records to particular sites. Indeed, a majority of the records are only at hectad (10km) resolution. Nonetheless, *Succinella oblonga* and *Myxas glutinosa*, both endangered species, have been reported since 2000. The dunes at Mornington are also host to *Theba pisana* (*Helix pisana*). This snail is most common in the Mediterranean. Within Ireland, it is restricted to a small stretch of the east coast between south Co. Louth and north Co. Dublin (Young, 1972). Finally, the zebra mussel (*Dreissena polymorpha*) is an invasive freshwater bivalve mollusc species which occurs in Co. Meath. It was first noted in Lough Sheelin in the early 2000s and is invasive there today (Delanty *et al.,* 2022).

*Table 36. Red-listed non-marine mollusc species recorded from Co. Meath. Threat status follows Byrne et al. (2009).*

| **Species name** | **Status** |
|---|---|
| *Acanthinula aculeata* | NT |
| *Acicula fusca* | VU |
| *Aplexa hypnorum* | VU |
| *Helicella itala* | VU |
| *Merdigera obscura* | EN |
| *Myxas glutinosa* | EN |
| *Pisidium hibernicum* | NT |
| *Pisidium pulchellum* | EN |
| *Radix auricularia* | VU |
| *Succinella oblonga* | EN |
| *Vallonia pulchella* | VU |

**Odonata (dragonflies and damselflies)**: the Dragonfly Ireland dataset for Co. Meath was successfully received from the Centre for Data and Environmental Recording (CEDaR). The conservation status of Odonata follows Nelson *et al.* (2011). The threatened Irish Damselfly (*Coenagrion lunulatum*) (VU), Scarce Blue-tailed Damselfly (*Ischnura pumilio*) (VU) and Robust Spreadwing/Scarce Emerald Damselfly (*Lestes dryas*) have all been recorded from the county.

**Plecoptera (stoneflies)**: No Red-listed species of stonefly have been found for Co. Meath. Detailed information on Irish stoneflies can be found in Feeley *et al.* (2016).

**Reptiles and amphibians**: Common Frog (*Rana temporaria*), Smooth Newt (*Lissotriton vulgaris*) and Common Lizard (*Zootoca vivipara*) occur in Co. Meath. All three species are protected under the Wildlife Acts. In addition, the Common Frog is listed under Annex V of the EU Habitats Directive. None of these species are considered to be threatened in Ireland currently (King *et al.*, 2011). The Common Frog is widespread in the county, whilst the Smooth Newt has been recorded from several sites. In contrast, records for the Common Lizard are mostly confined to Girley and Jamestown Bogs.

**Trichoptera (caddisflies)**: A request for a key caddisfly dataset for Meath from James P. O'Connor was in process as of the conclusion of this report.

**White-clawed crayfish (*Austropotamobius pallipes*)**: the crustacean species White-clawed Crayfish is designated under Annex II and Annex V of the EU Habitats Directive. It is also afforded protection under the Wildlife Acts. An analysis of records collected by the EPA show the species to be widespread in Co. Meath with a notable gap along the River Boyne. Although a contraction in range has been observed nationally, the species still appears to be widespread in the Midlands. However, a large reduction has occurred in the Boyne catchment since around 1980, probably due to outbreaks of crayfish plague (*Aphanomyces astaci*) (Demers, 2005). Crayfish plague has wiped out white-clawed crayfish populations in most Irish catchments but apparently not in the River Boyne (Julian Reynolds, pers. comm., October 2024). Despite having the capacity to tolerate moderately polluted waters, it is still typically found in unpolluted environments (Demers, 2005).

*Plate 6. White-clawed crayfish from Mountain Water, Emyvale, Co. Monaghan – reproduced with permission of Ben Malone*

## 4. ANALYSIS: THREATS, DATA GAPS, OPPORTUNITIES, PRIORITY ACTIONS AND BARRIERS

**Threats, Data Gaps and Opportunities**

Data gaps can be considered a threat to biodiversity in the county, as well as a barrier to carrying out local conservation actions. Significant sites are at risk of deterioration in the absence of knowledge of their full importance. Indeed, comprehensive data on sites and their integration into the planning system is perhaps the most effective way of protecting notable habitats and threatened species reliant on the specialised conditions found at these sites. As highlighted in section 3.1, there appears to be little up-to-date information on the status of many designated sites. This is especially so for pNHAs which constitute the majority of designated sites in the county. Therefore, a detailed inventory of sites with recent data on their status is necessary. This will require further field surveys targeted towards these important localities. Undesignated sites of interest should also be included, such as the fen south of Dromone with the threatened bryophytes *Tomentypnum nitens* and *Sphagnum teres*, as discussed in section 3.4. Even before the commencement of surveys, such undesignated sites as are thus far established should be included and highlighted within the forthcoming Meath Biodiversity Action Plan 2025-2030, including a commitment to their protection. This would confer them with some protection by highlighting their nature conservation value in the absence of current designation. Future fieldwork should cover the habitats and vascular plants of these sites in detail. It is also imperative that data for other taxa such as invertebrates are utilised to form a full account of any given site.

Data gaps for individual taxa are discussed in their specific sections. However, there appears to be a *lack of data* for certain taxa as well as *data access gaps*. For example, there appears to have been little recording of water beetles in Co. Meath recently. Moreover, lichens and seaweeds are generally under-

recorded. Data access issues were relevant to lichens, moths and some other groups. Similarly, the Farmland Bird Hotspot Map created by BirdWatch Ireland cannot be accessed currently. Where data are available, the spatial resolution of records are sometimes poor. Records may be at hectad (10km) resolution due to insufficient locality information (this is the case for many older records) or when more precise coordinates are masked before uploading to a database. This inhibits the localisation of a record to a particular site, and in turn makes the development of a detailed site inventory for the county (and other counties) more challenging. Fostering ongoing relationships with specialist fieldworkers and researchers of many sub-disciplines will be indispensable in allowing such site inventories to develop. These inventories must also be eventually available in an online searchable geodatabase so that planners and ecologists can utilise the information readily and easily when needed.

This draft report has only covered a subset of the data available for the taxa considered, with a particular focus being on rare or protected taxa. Many more sources of data remain to be gathered and analysed. It must be stressed that this audit is merely a foundation upon which future work should build. Furthermore, the project's scope has mostly been restricted to rare, threatened and protected species, which are naturally of immediate concern regarding action plans and protection measures. Without the requisite knowledge of certain taxa, it has been necessary to resort to national evaluations of conservation status within the Irish Red Lists. Notwithstanding the importance of conserving nationally threatened species in the county, this method will lead to other notable sites and species being overlooked. Many habitats and species may be of county or regional importance yet have a relatively secure conservation status nationally. Future work should focus on habitats and species of county/regional biogeographical importance. For taxa which lack an Irish Red List and which the authors are not sufficiently familiar with, we have refrained from providing a conservation assessment of those groups, beyond providing the key data that were available. This applies to lichens, fungi and seaweeds, for example. Other speciose taxa such as Hymenoptera and Coleoptera lack a Red List for the vast majority of the group. Input by relevant experts should be considered to broaden the taxonomic coverage of any future audit.

Many of the threats to biodiversity in Co. Meath, as in other counties in Ireland, are site and taxon-specific. These have been discussed in more detail in the individual group sections. Some examples include: drainage of wetlands; eutrophication of lakes, waterways and terrestrial habitats; direct habitat removal such as the quarrying of eskers and urban sprawl; conifer afforestation; animal/plant diseases; invasive species spread; overgrazing and re-seeding of grasslands; and, land abandonment. These threats are generally well-known and recognised nationally. The next step is to direct attention and efforts towards the most important sites and species in the county to avoid any deterioration of their local or national conservation status.

**Priority Actions**

A key output of this Biodiversity Audit is to identify priority actions in the short, medium and long-term with the aim of helping to protect and restore County Meath's biodiversity. Many of these actions will also be suitable as recommendations for actions/projects to be included in the ensuing County Meath Biodiversity Action Plan 2025 – 2030. These actions are presented below.

*Short-term Actions:*

1) The findings of this Biodiversity Audit should be fully incorporated within the forthcoming Meath Biodiversity Action Plan 2025-2030, with inclusion of this report as an Appendix.

2) The GIS shapefiles generated in this Biodiversity Audit should be made available to Meath County Council staff. Use of these shapefiles should be made routine when assessing future planning applications, designing and developing projects and undertaking physical works within Co. Meath.
3) Create a **detailed geodatabased 'Site Inventory'**, to ultimately include all designated and non-designated sites of biodiversity importance within County Meath. The development of such a Site Inventory will be an iterative process and this audit is a baseline from which such an inventory can be developed.
4) Work to identify Locally Important Biodiversity Sites (LIBS) in County Meath and ensure these are mapped and protected through inclusion of policies in the County Development Plan – these sites should focus particularly on those hosting regionally/nationally/internationally rare species, such as the vascular plant *Calamagrostis purpurea* (Scandinavian Small-reed) (see section 3.3 for discussion of this species), threatened bryophytes (see section 3.4), rare fauna, including invertebrate species, and rare habitats. It will be particularly important to highlight rare invertebrate species as key elements of the diversity of each site of interest, as invertebrates are all too rarely used to justify site designation.

*Medium-term Actions:*

1) Commission surveys of species and biological groups which are either entirely under-recorded in Co. Meath, or which are under-recorded in recent decades. Examples of the former include lichens, fungi, Diptera, and other invertebrate groups, whilst examples of the latter include bryophytes, water beetles and mayflies.
2) Commission ecological surveys of Meath Natura 2000 network sites in order to inform future Site-specific Conservation Objectives for their Qualifying Interests.
3) Commission repeat surveys of the 'National Survey of Native Woodlands' and 'Irish Semi-natural Grasslands Survey' sites across Co. Meath, in order to fill in these gaps in the available survey data at a county level.

*Long-term Actions:*

1) Commission extensive ecological surveys of NHAs, pNHAs and non-designated sites in Co. Meath, to update our knowledge of these often under-studied sites – fieldwork should include habitat, flora and fauna surveys to attain a full context for the current state of these sites. The results of these surveys should be included for each site in the county Site Inventory.
2) Commission a Biodiversity Audit to focus on enhancing knowledge of habitats and species of county or regional importance in Meath, whilst also providing an update on threatened/rare/legally protected species. A biodiversity audit should be repeated (at a minimum) in the year before every new Biodiversity Action Plan is published.

**Barriers**

Barriers to the success of the proposed actions and projects as laid out above must also be considered. Such barriers may include funding issues related to the relevant proposed future surveys and projects. An increasing lack of specialist field skills/knowledge amongst active biologists/ecologists may present a challenge in terms of accounting for data gaps in more specialist groups, e.g. invertebrates, lichens, etc. Difficulties in the site designation process (both nationally and international) may also hamper the goal of designating new sites in the county and also allowing the Site Inventory to be maximally effective for nature conservation.

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## *APPENDIX I: ILLUSTRATIVE MAPS OF MEATH BIODIVERSITY*

Below is presented a series of illustrative maps of Meath biodiversity. Note that the county boundary shapefile used is © Ordnance Survey Ireland, and the satellite imagery used is © Google Satellite:

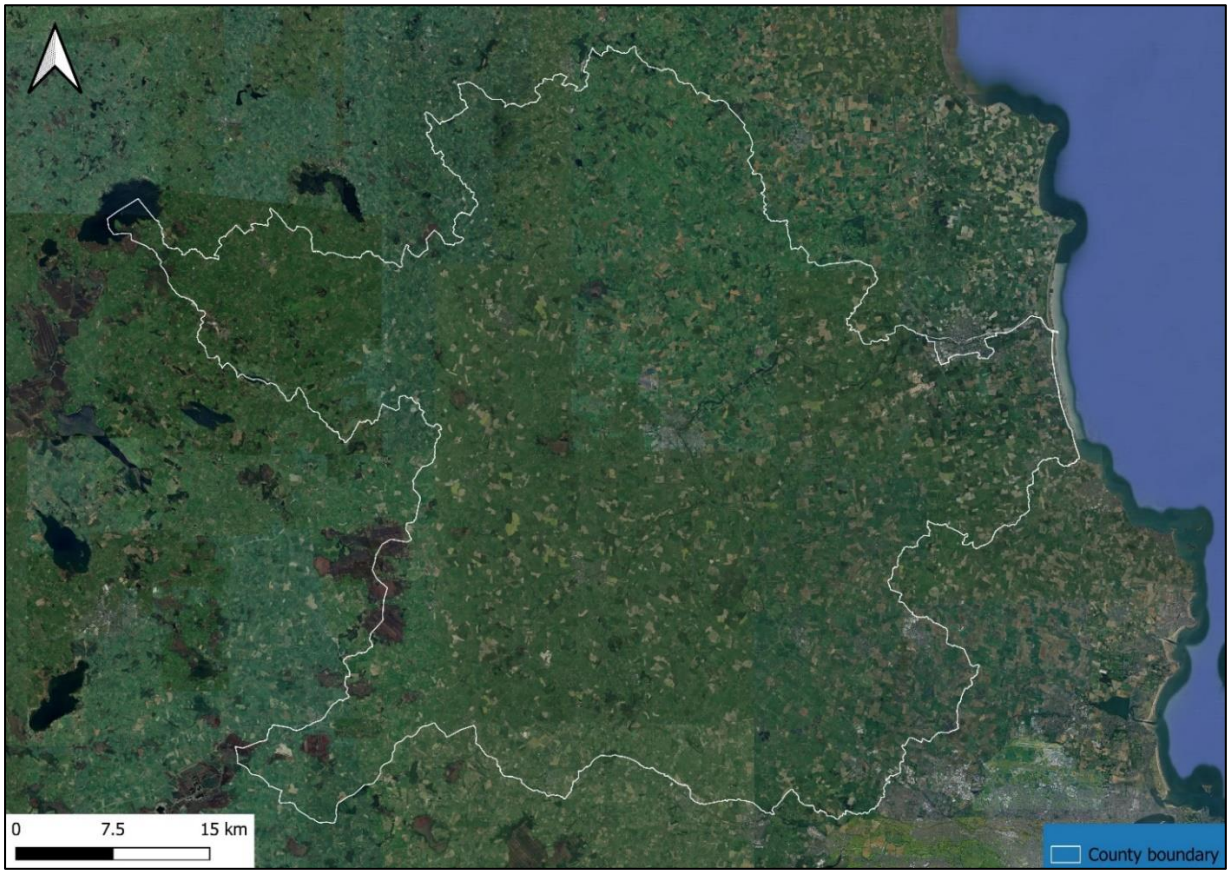


*Figure 17. County Meath boundary, the study area for this biodiversity audit – note that the area shown here is the administrative county boundary, however, the biological vice-county of Meath includes Drogheda south of the River Boyne (see section 2 for explanation)*

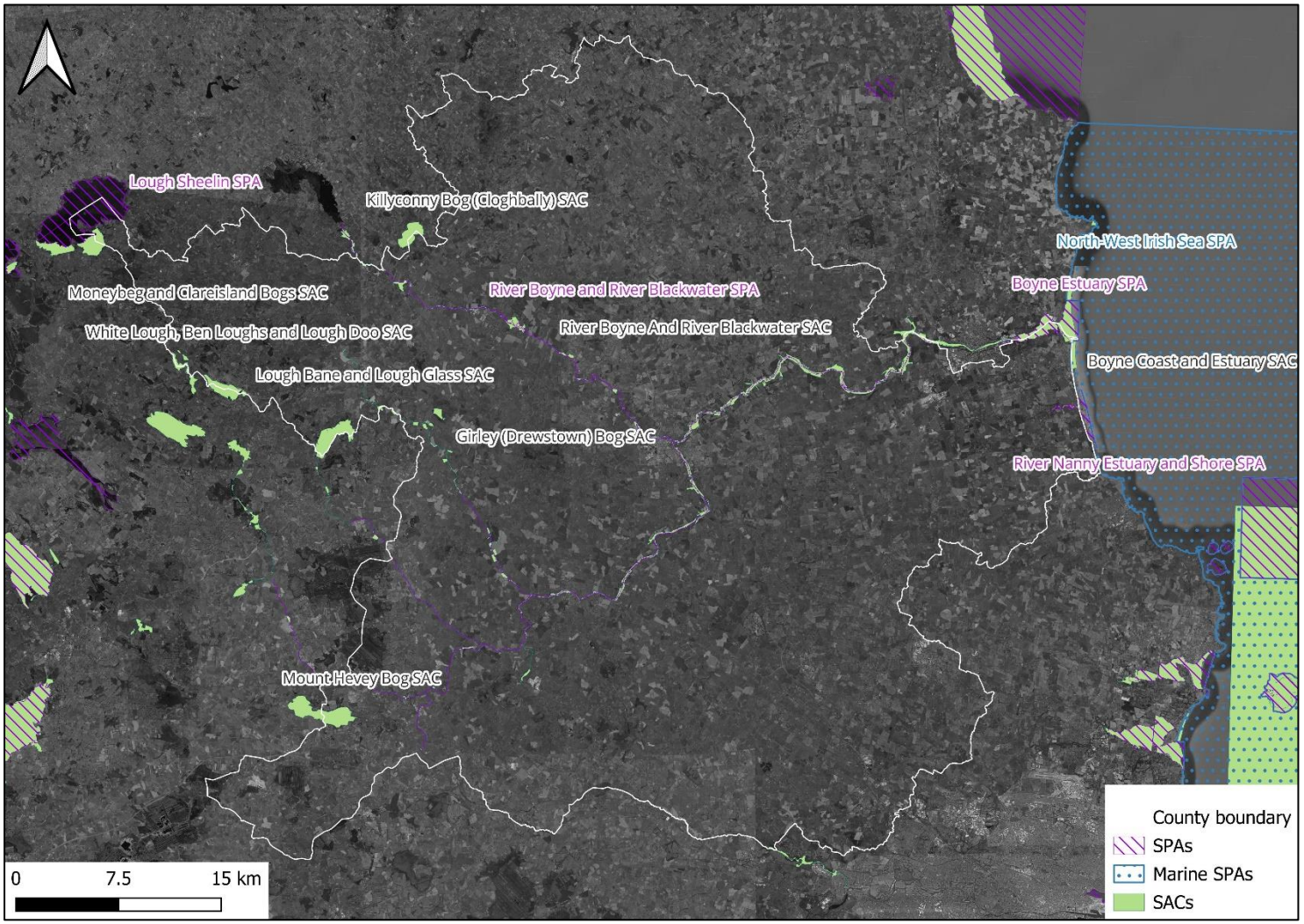


*Figure 18. Special Areas of Conservation (SACs) (NPWS shapefile version: 15/05/2024) and Special Protection Areas (SPAs) (terrestrial and marine) (NPWS shapefile version: 15/05/2023 for terrestrial, 11/01/2024 for marine) in County Meath*

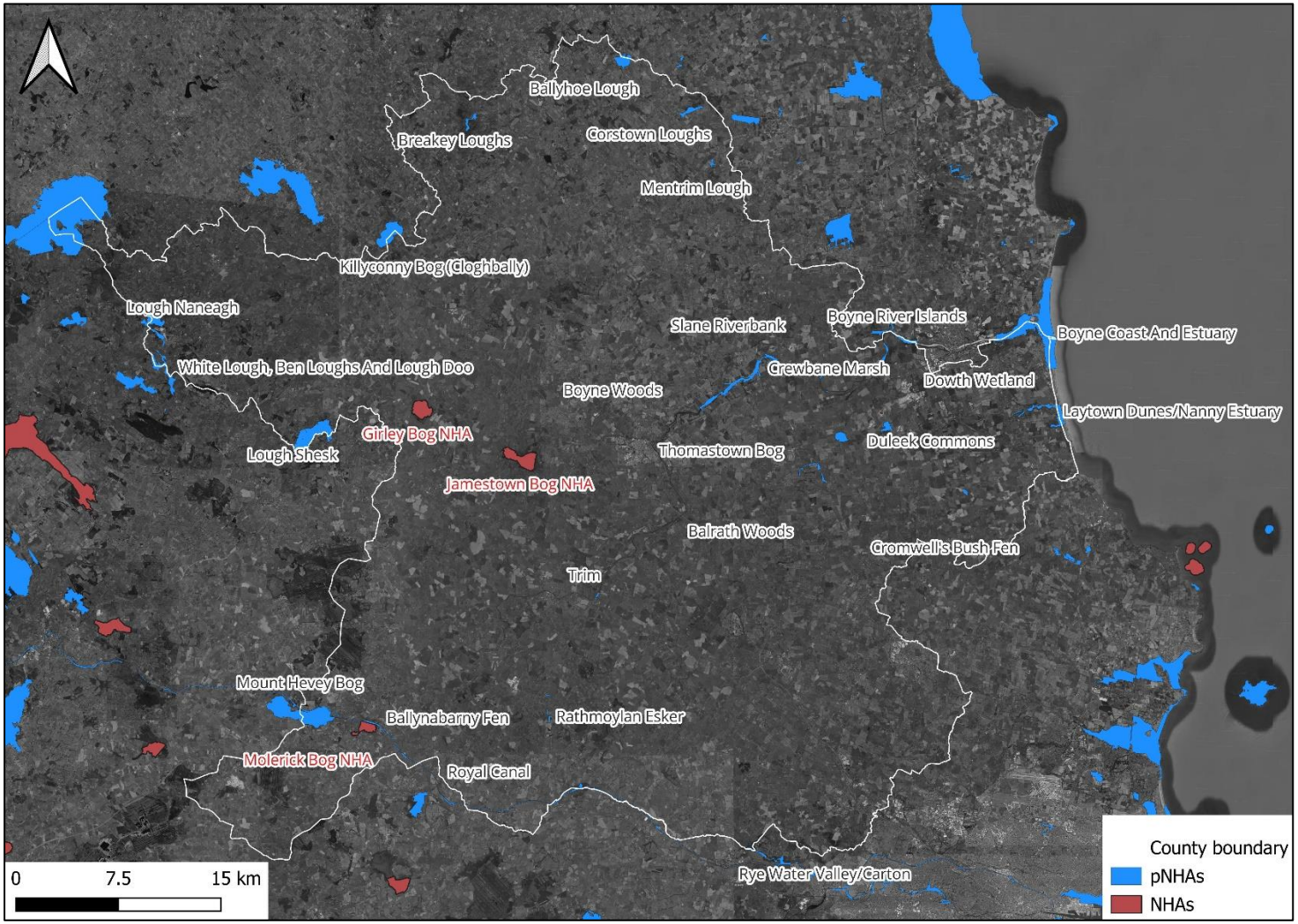


*Figure 19. Natural Heritage Areas (NHAs) (NPWS shapefile version: 28/06/2019) and proposed Natural Heritage Areas (pNHAs) (NPWS shapefile version: 01/11/2015) in County Meath – note that Doolystown Bog (Site Code: 001577) is on the pNHA list but has been accidentally omitted from the pNHA shapefile from NPWS*

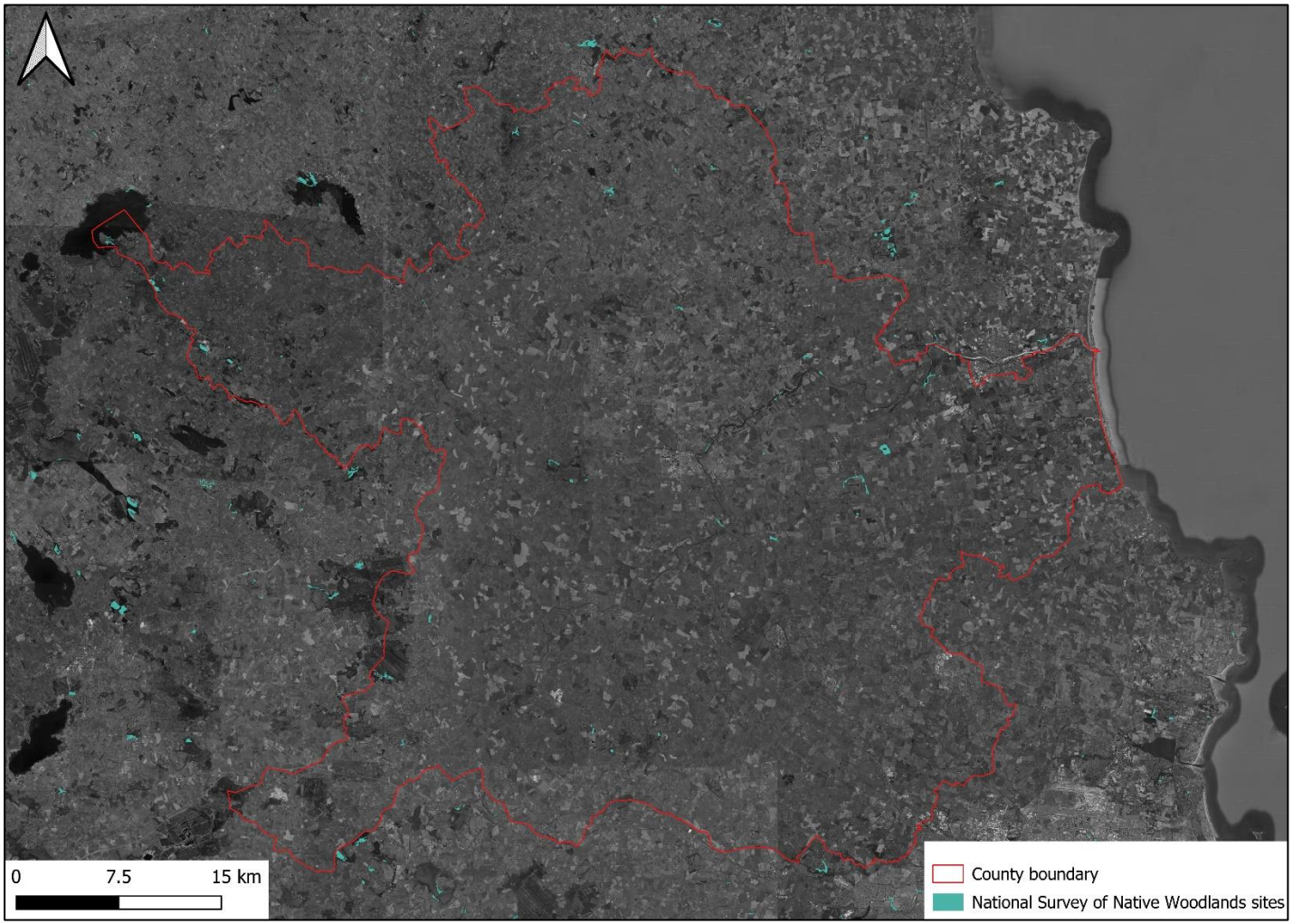


*Figure 20. National Survey of Native Woodlands sites within Co. Meath*

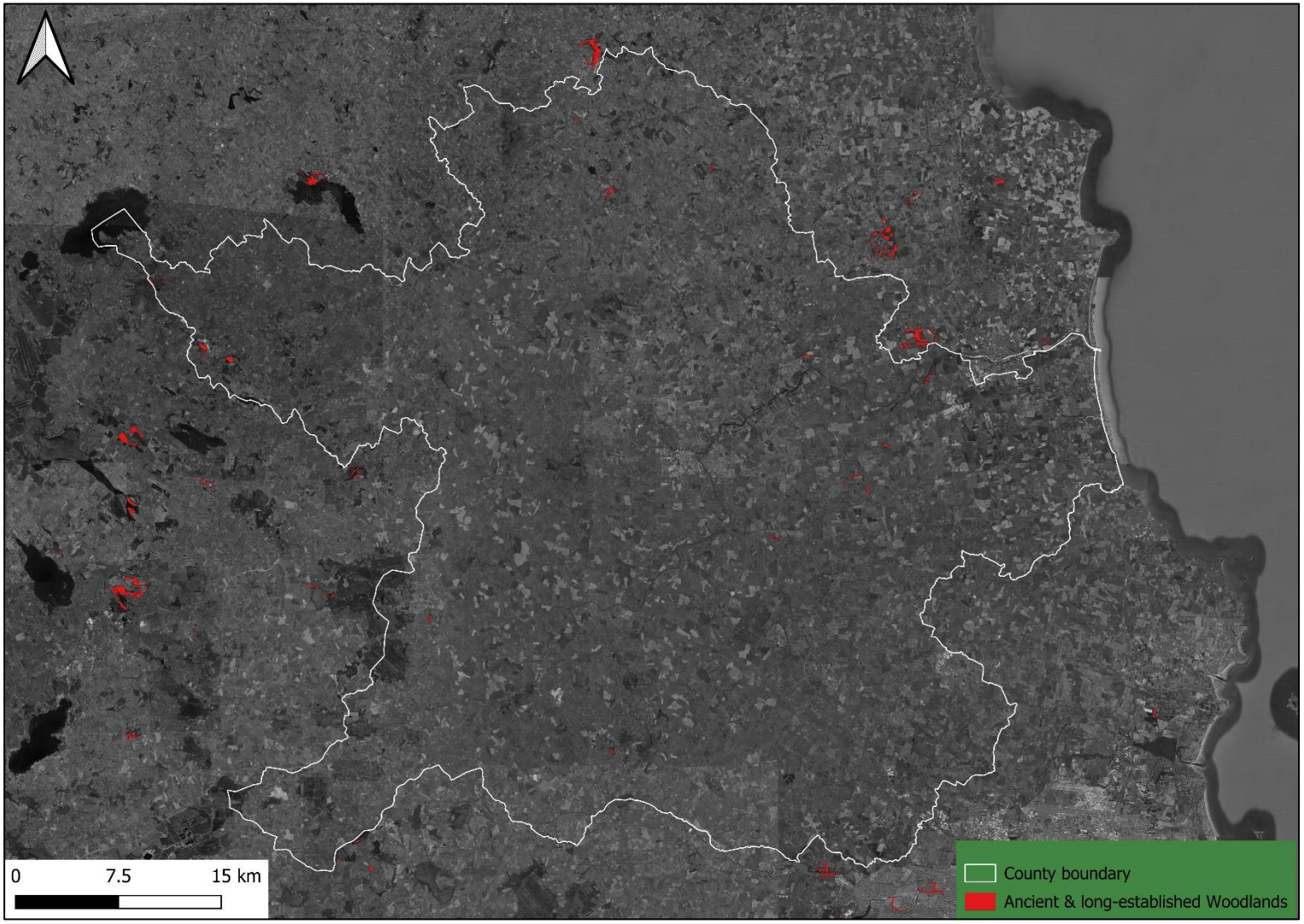


*Figure 21. Ancient and long-established woodland sites within Co. Meath*

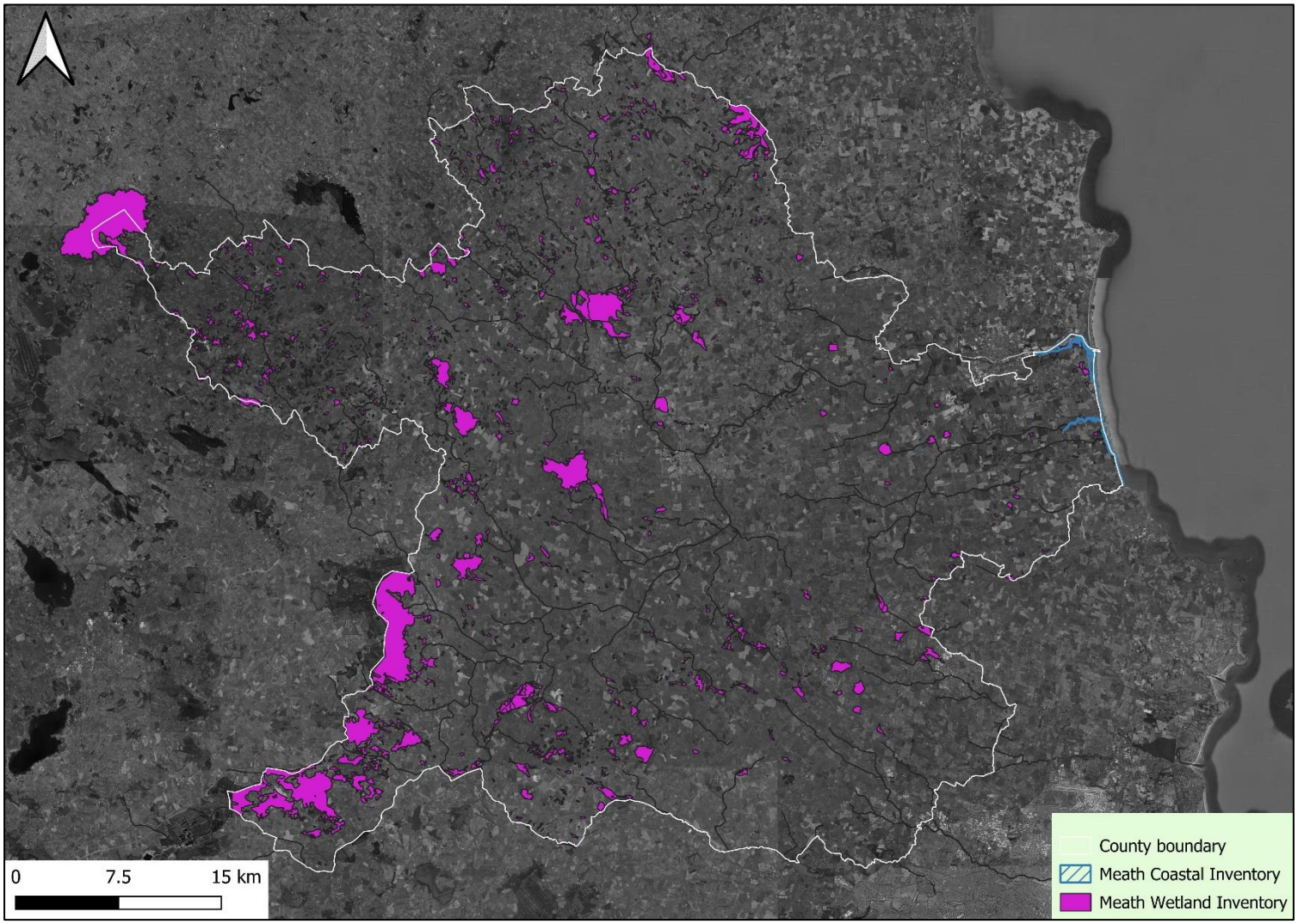


*Figure 22. Wetland and Coastal inventory sites within Co. Meath*

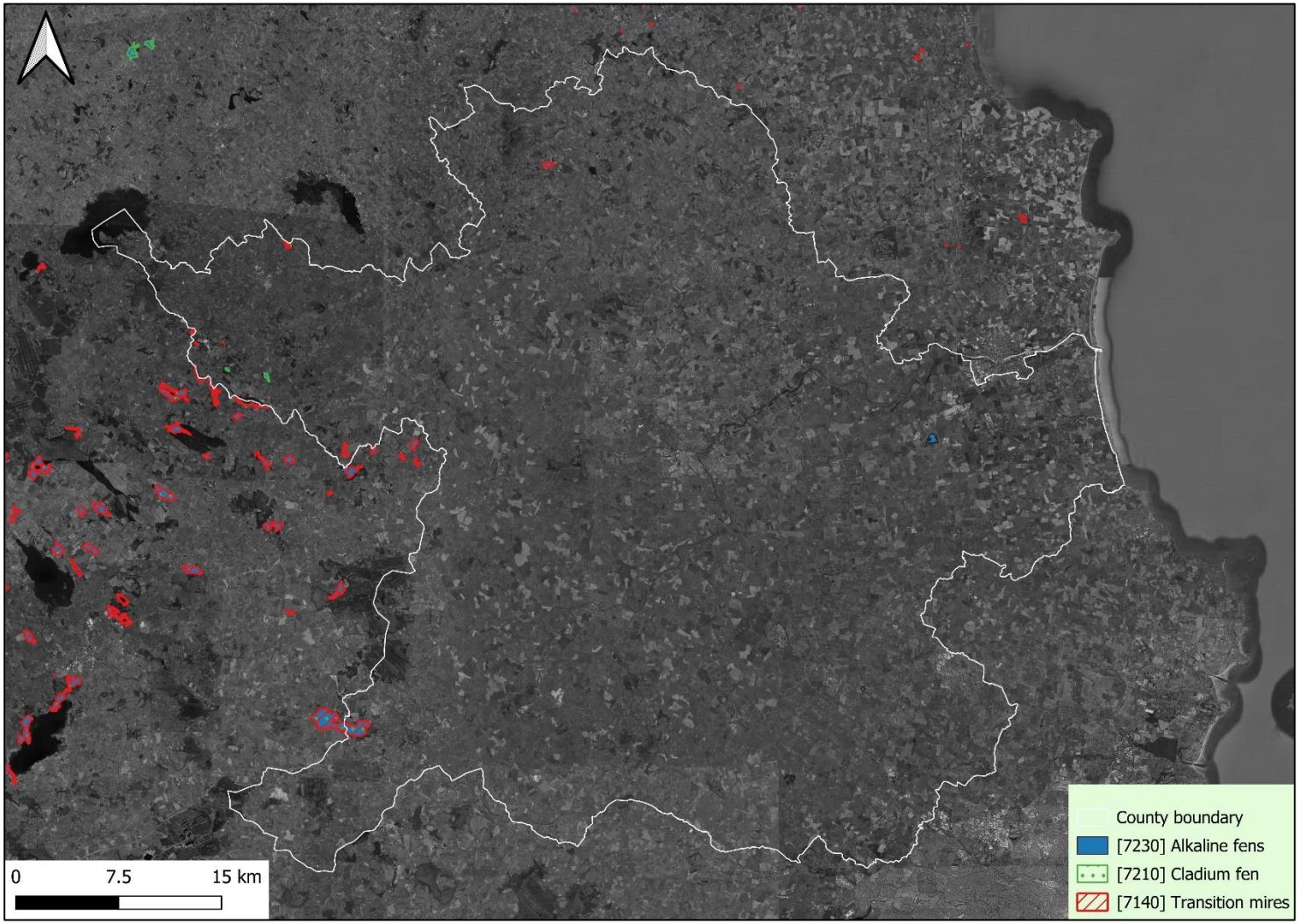


*Figure 23. Fen sites within Co. Meath; fen habitat tends to be more prevalent in the west of the county near the border with Co. Westmeath – polygons are from National Parks and Wildlife Service website*

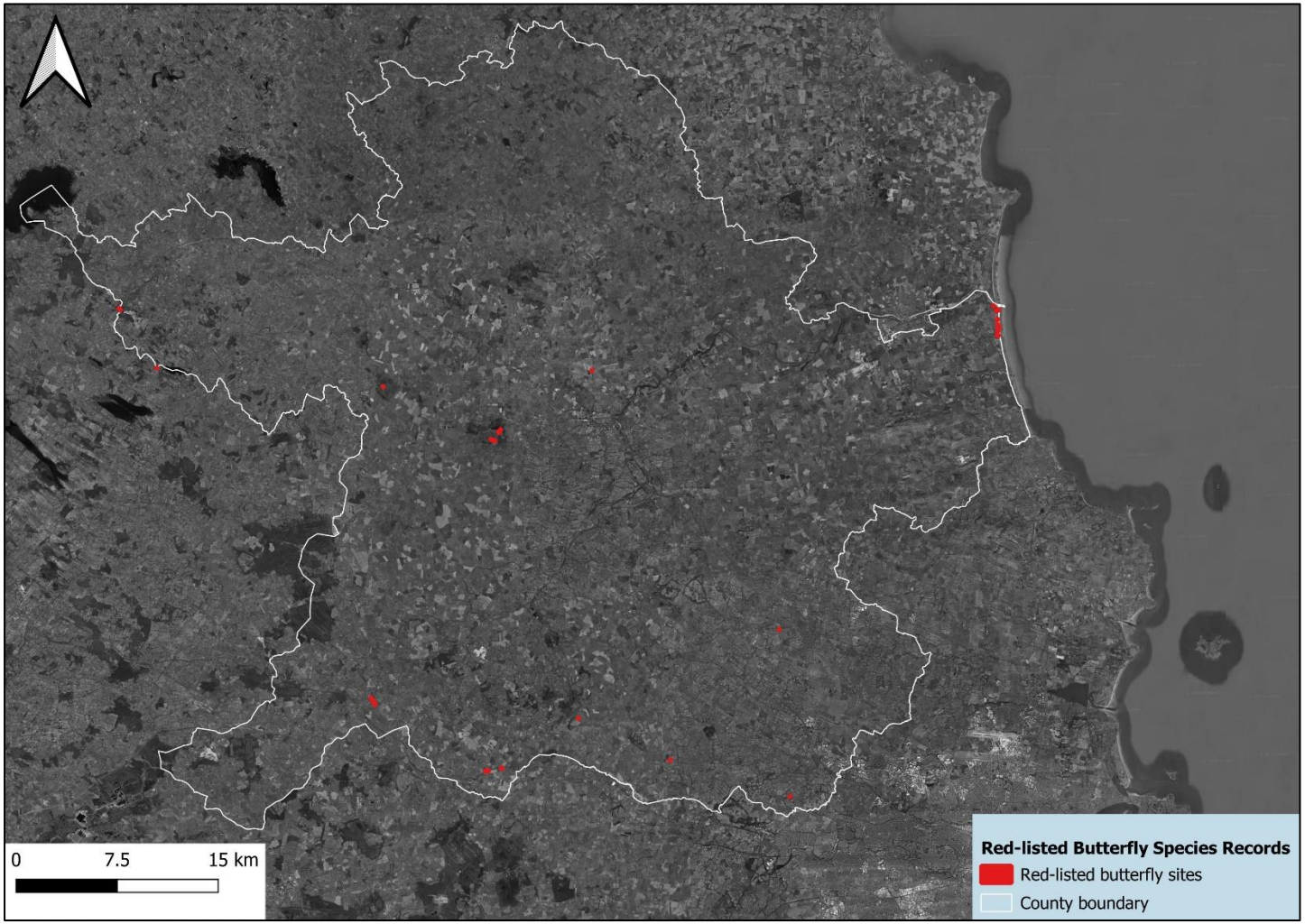


*Figure 24. Red-listed butterfly species locations historically recorded within Co. Meath (according to NBDC datasets) – these species have been recorded largely from coastal sites in the east, raised bog sites in the west and in scattered sites along the southern margins of the county*

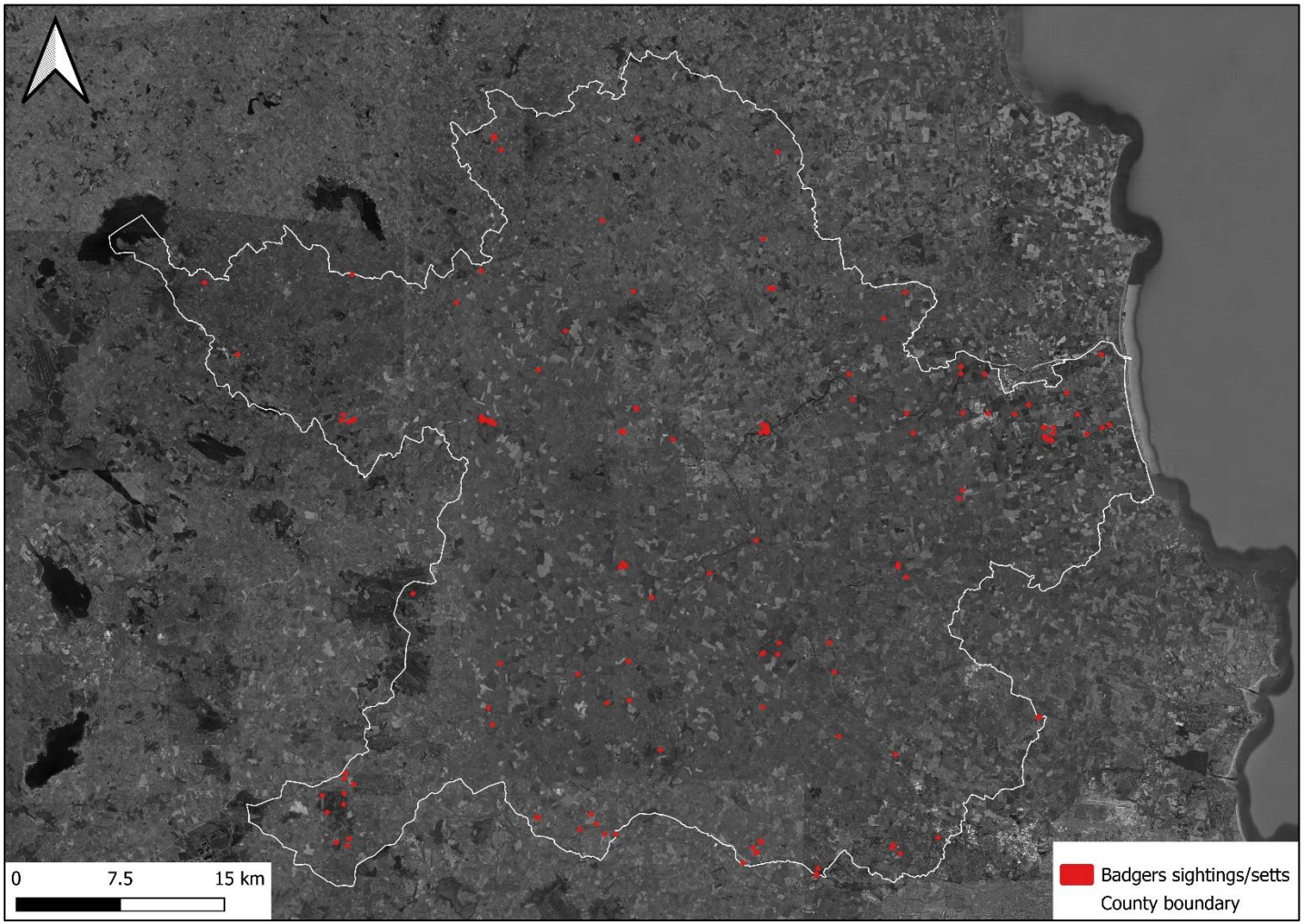


*Figure 25. Badger sighting and sett locations in Co. Meath amalgamated from publicly available National Biodiversity Data Centre data – this mammal species is clearly widely distributed throughout the county currently*

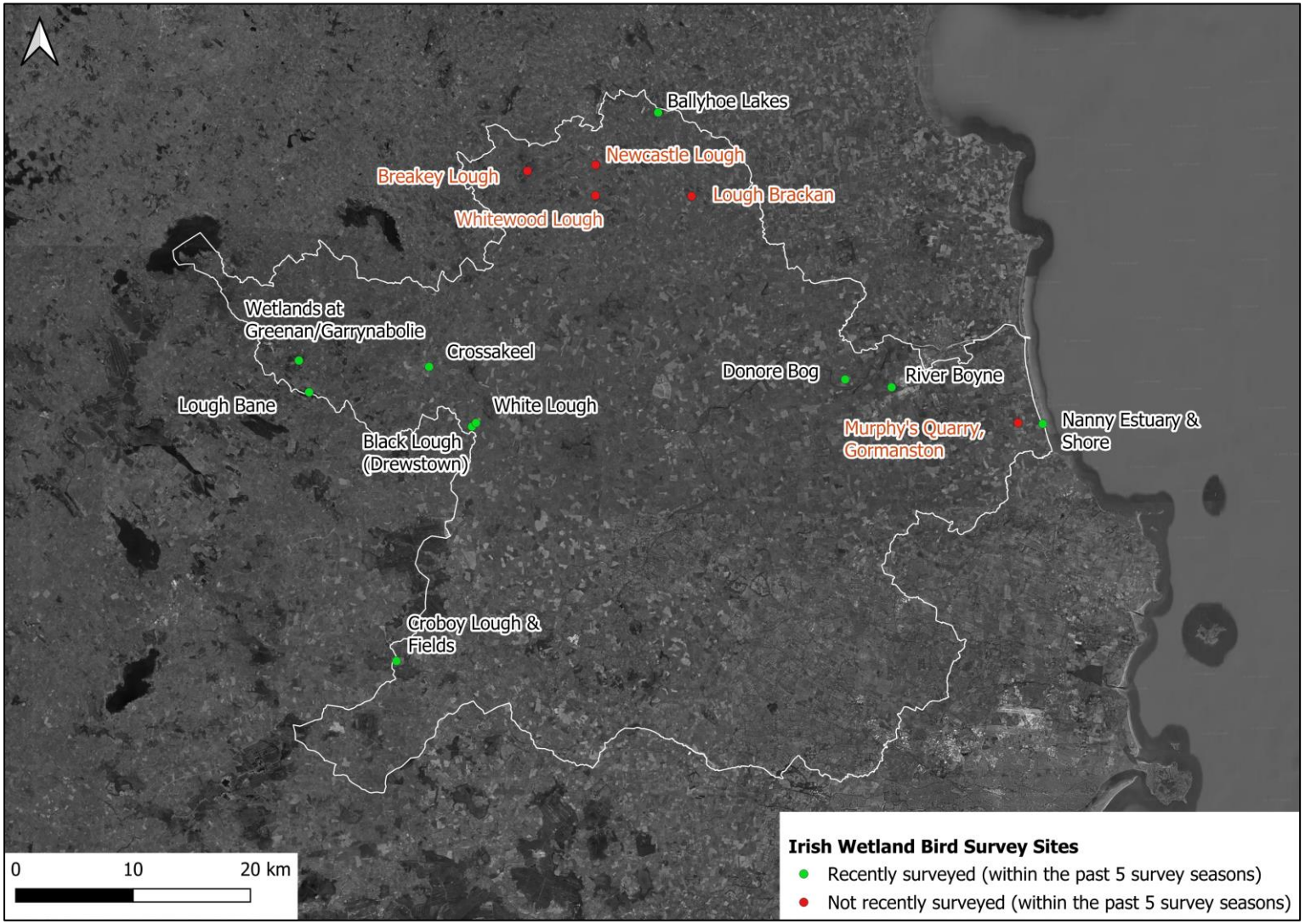


*Figure 26. Sites surveyed as part of the Irish Wetland Bird Survey in Co. Meath, highlighting areas that have not been surveyed for at least 5 survey seasons*

## *APPENDIX II: PROTECTED/RED LISTED SPECIES CHECKLISTS*

Below is presented a series of checklists of legally protected (nationally/internationally) and/or Red Listed (Not Evaluated (NE); Least Concern (LC); Near Threatened (NT); Vulnerable (VU); Endangered (EN); Critically Endangered (CR)) species in Co. Meath. Bird species are categorised as per Gilbert *et al.* (2021) (BoCCI).

**Checklist of Birds**

| Species name | Common name | EU Birds Directive (Annex) | BoCCI |
|---|---|---|---|
| *Actitis hypoleucos* | Common Sandpiper | | Amber |
| *Alauda arvensis* | Skylark | | Amber |
| *Alcedo atthis* | Kingfisher | I | Amber |
| *Anas acuta* | Pintail | | Amber |
| *Anas crecca* | Teal | | Amber |
| *Anas platyrhynchos* | Mallard | | Amber |
| *Anser anser* | Greylag Goose | | Amber |
| *Anthus pratensis* | Meadow pipit | | Red |
| *Apus apus* | Swift | | Red |
| *Arenaria interpres* | Turnstone | | Amber |
| *Aythya farina* | Pochard | | Red |
| *Aythya fuligula* | Tufted Duck | | Amber |
| *Branta bernicla* | Light-bellied Brent Goose | | Amber |
| *Branta leucopsis* | Barnacle Goose | I | Amber |
| *Bucephala clangula* | Goldeneye | | Red |
| *Calidris alpina* | Dunlin | I | Red |
| *Calidris canutus* | Knot | | Red |
| *Calidris ferruginea* | Curlew Sandpiper | | Red |
| *Calidris pugnax* | Ruff | I | Amber |
| *Charadrius hiaticula* | Ringed Plover | | Amber |
| *Chloris chloris* | Greenfinch | | Amber |
| *Chroicocephalus ridibundus* | Black-headed Gull | | Amber |
| *Columba oenas* | Stock Dove | | Red |
| *Coturnix coturnix* | Quail | | Red |
| *Cygnus cygnus* | Whooper Swan | I | Amber |
| *Cygnus olor* | Mute Swan | | Amber |
| *Delichon urbicum* | House Martin | | Amber |
| *Egretta garzetta* | Little Egret | I | Green |
| *Emberiza citrinella* | Yellowhammer | | Red |
| *Falco tinnunculus* | Kestrel | | Red |
| *Fringilla montifringilla* | Brambling | | Amber |
| *Fulica atra* | Coot | | Amber |
| *Gallinago gallinago* | Snipe | | Red |
| *Gavia immer* | Great Northern Diver | | Amber |
| *Gavia stellata* | Red-throated Diver | I | Amber |
| *Haematopus ostralegus* | Oystercatcher | | Red |
| *Hirundo rustica* | Swallow | | Amber |
| *Ichthyaetus melanocephalus* | Mediterranean Gull | I | Amber |
| *Larus argentatus* | Herring Gull | | Amber |
| *Larus argentatus* | Herring Gull | | Amber |
| *Larus canus* | Common Gull | | Amber |
| *Larus canus* | Common Gull | | Amber |

| | | | |
|---|---|---|---|
| *Larus fuscus* | Lesser Black-backed Gull | | Amber |
| *Larus ridibundus* | Black-headed Gull | | Amber |
| *Limosa lapponica* | Bar-tailed Godwit | I | Red |
| *Limosa limosa* | Black-tailed Godwit | | Red |
| *Linaria cannabina* | Linnet | | Amber |
| *Mareca penelope* | Wigeon | | Amber |
| *Mareca strepera* | Gadwall | | Amber |
| *Melanitta nigra* | Common Scoter | | Red |
| *Mergus merganser* | Goosander | | Amber |
| *Mergus serrator* | Red-breasted Merganser | | Amber |
| *Milvus milvus* | Red Kite | | Red |
| *Motacilla cinerea* | Grey Wagtail | | Red |
| *Musciapa striata* | Spotted flycatcher | | Amber |
| *Numenius arquata* | Curlew | | Red |
| *Oenanthe oenanthe* | Wheatear | | Amber |
| *Passer domesticus* | House sparrow | | Amber |
| *Passer montanus* | Tree Sparrow | | Amber |
| *Perdix perdix* | Grey Partridge | | Red |
| *Phalacrocorax aristotelis* | Shag | | Amber |
| *Phalacrocorax carbo* | Cormorant | | Amber |
| *Phylloscopus trochilus* | Willow warbler | | Amber |
| *Pluvialis apricaria* | Golden Plover | I | Red |
| *Pluvialis squatarola* | Grey Plover | | Red |
| *Podiceps cristatus* | Great Crested Grebe | | Amber |
| *Regulus regulus* | Goldcrest | | Amber |
| *Riparia riparia* | Sand Martin | | Amber |
| *Saxicola rubetra* | Whinchat | | Red |
| *Scolopax rusticola* | Woodcock | | Red |
| *Spatula clypeata* | Shoveler | | Red |
| *Sterna hirundo* | Common Tern | I | Amber |
| *Sturnus vulgaris* | Brambling | | Amber |
| *Tadorna tadorna* | Shelduck | | Amber |
| *Thalasseus sandvicensis* | Sandwich Tern | I | Amber |
| *Tringa totanus* | Redshank | | Red |
| *Tyto alba* | Barn Owl | | Red |
| *Vanellus vanellus* | Lapwing | | Red |

**Checklist of Flowering Plants, Ferns and Fern Allies (Pteridophytes)**

| Species name | Common name | Flora (Protection) Order (Most recent) | Red List status | EU Habitats Directive (Annex) |
|---|---|---|---|---|
| *Anacamptis morio* | Green-winged Orchid | 1987 | VU | |
| *Antennaria dioica* | Mountain Everlasting | | LC | |
| *Betonica officinalis* | Betony | 2022 | NT | |
| *Blitum bonus-henricus* | Good-King-Henry | | VU | |
| *Buglossoides arvensis* | Field Gromwell | | CR | |
| *Carlina vulgaris* | Carline Thistle | | LC | |
| *Chaerophyllum temulum* | Rough Chervil | | VU | |
| *Epipactis phyllanthes* | Green-flowered Helleborine | 1980 | EN | |

| | | | | |
|---|---|---|---|---|
| *Filago germanica* | Common Cudweed | | VU | |
| *Galeopsis angustifolia* | Red Hemp-nettle | 2022 | VU | |
| *Gentianella amarella* | Autumn Gentian | | NT | |
| *Hordeum secalinum* | Meadow Barley | 2022 | VU | |
| *Huperzia selago* | Fir Clubmoss | | LC | V |
| *Hypericum hirsutum* | Hairy St John's-wort | 2022 | VU | |
| *Juncus compressus* | Round-fruited Rush | 2022 | CR | |
| *Lathyrus palustris* | Marsh Pea | 1980 | LC | |
| *Logfia minima* | Small Cudweed | 2015 | NT | |
| *Lolium temulentum* | Darnel | | EN | |
| *Omalotheca sylvatica* | Heath Cudweed | 2022 | EN | |
| *Pyrola minor* | Common Wintergreen | 2022 | NT | |
| *Pyrola rotundifolia* | Round-leaved Wintergreen | 1980 | NT | |
| *Roemeria argemone* | Prickly Poppy | | VU | |
| *Salvia verbenaca* | Wild Clary | 1980 | LC | |
| *Scleranthus annuus* | Annual Knawel | 2022 | VU | |
| *Sorbus hibernica* | Irish Whitebeam | | VU | |
| *Valerianella dentata* | Narrow-fruited Cornsalad | | VU | |
| *Valerianella rimosa* | Broad-fruited Cornsalad | | CR | |

**Checklist of Bryophytes**

| Species name | Synonyms | Flora (Protection) Order | Red List status | EU Habitats Directive (Annex) |
|---|---|---|---|---|
| *Bartramia ithyphylla* | | | VU | |
| *Bryum bornholmense* | | | NT | |
| *Dicranella cerviculata* | | | NT | |
| *Encalypta vulgaris* | | | NT | |
| *Fissidens exilis* | | | VU | |
| *Hamatocaulis vernicosus* | | Yes | NT | II |
| *Heterocladium wulfsbergii* | | | NT | |
| *Hygroamblystegium varium* | *Amblystegium varium* | | NT | |
| *Kandaea elodes* | *Campyliadelphus elodes* | | NT | |
| *Oxyrrhynchium speciosum* | *Eurhynchium speciosum* | | NT | |
| *Pogonatum nanum* | | | EN | |
| *Porella cordaeana* | | | NT | |
| *Racomitrium canescens* | | | VU | |
| *Rhizomnium pseudopunctatum* | | | NT | |
| *Rhodobryum roseum* | | | NT | |
| *Ricciocarpos natans* | | | NT | |
| *Sphagnum teres* | | | NT | V |
| *Tomentypnum nitens* | | | VU | |
| *Tortella squarrosa* | *Pleurochaete squarrosa* | | NT | |
| *Tortula lindbergii* | *Tortula lanceola* | | CR | |

**Checklist of Lichens**

| Species name | EU Habitats Directive (Annex) |
|---|---|
| *Cladonia ciliata* var. *tenuis* | V |
| *Cladonia portentosa* | V |

**Checklist of Butterflies**

| Species name | Common name | Red List status | EU Habitats Directive (Annex) |
|---|---|---|---|
| *Argynnis aglaja* | Dark Green Fritillary | VU | |
| *Coenonympha pamphilus* | Small Heath | NT | |
| *Coenonympha tullia* | Large Heath | VU | |
| *Cupido minimus* | Small Blue | EN | |
| *Erynnis tages* | Dingy Skipper | NT | |
| *Euphydryas aurinia* | Marsh Fritillary | VU | II |
| *Hipparchia semele* | Grayling | NT | |
| *Lasiommata megera* | Wall (Wall Brown) | EN | |

**Checklist of Mayflies**

| Species name | Synonym | Red List status |
|---|---|---|
| *Baetis atrebatinus* | *Labiobaetis atrebatinus* | EN |
| *Ephemerella notata* | | EN |
| *Procloeon bifidum* | | VU |
| *Kageronia fuscogrisea* | | NT |

**Checklist of Water Beetles**

| Species name | Red List status |
|---|---|
| *Agabus labiatus* | NT |
| *Gyrinus urinator* | NT |
| *Haliplus lineolatus* | NT |
| *Helophorus nanus* | VU |
| *Hydraena rufipes* | EN |
| *Hygrotus novemlineatus* | VU |
| *Ilybius chalconatus* | VU |
| *Laccophilus hyalinus* | VU |
| *Laccornis oblongus* | NT |
| *Limnebius nitidus* | EN |
| *Macroplea appendiculata* | NT |
| *Ochthebius auriculatus* | NT |
| *Ochthebius marinus* | NT |

**Checklist of Fish**

| Species name | Common name | Red List status |
|---|---|---|
| *Anguilla anguilla* | European Eel | CR |
| *Lampetra fluviatilis/L. planeri/Petromyzon marinus* | Lamprey spp. | LC |
| *Salmo salar* | Atlantic Salmon | VU |

**Checklist of Mammals**

| Species name | Common name | EU Habitats Directive (Annex) | Wildife Acts (WA) | Red List status |
|---|---|---|---|---|
| *Cervus elaphus* | Red Deer | | WA | LC |
| *Cervus nippon* | Sika Deer | | WA | LC |
| *Dama dama* | Fallow Deer | | WA | LC |
| *Erinaceus europaeus* | Hedgehog | | WA | LC |
| *Halichoerus grypus* | Grey Seal | II/V | WA | LC |
| *Lepus timidus* | Irish/Mountain Hare | V | WA | LC |
| *Lutra lutra* | Otter | II/IV | WA | LC |
| *Martes martes* | Pine Marten | V | WA | LC |
| *Meles meles* | Badger | | WA | LC |
| *Mustela erminea* | Stoat | | WA | LC |
| *Myotis daubentoni* | Daubenton's Bat | IV | WA | LC |
| *Myotis mystacinus* | Whiskered Bat | IV | WA | LC |
| *Myotis nattereri* | Natterer's Bat | IV | WA | LC |
| *Nyctalus leisleri* | Leisler's Bat | IV | WA | LC |
| *Phoca vitulina* | Harbour Seal | II/V | WA | NE |
| *Pipistrellus nathusii* | Nathusius' Pipistrelle | IV | WA | LC |
| *Pipistrellus pipistrellus* | Common Pipistrelle | IV | WA | LC |
| *Pipistrellus pygmaeus* | Soprano Pipistrelle | IV | WA | LC |
| *Plecotus auritus* | Brown Long-eared Bat | IV | WA | LC |
| *Sciurus vulgaris* | Red Squirrel | | WA | LC |
| *Sorex minutus* | Pygmy shrew | | WA | LC |

**Checklist of Bees**

| Species name | Red List status |
|---|---|
| *Andrena barbilabris* | NT |
| *Andrena fucata* | NT |
| *Andrena nigroaenea* | VU |
| *Andrena semilaevis* | VU |
| *Bombus barbutellus* | EN |
| *Bombus bohemicus* | NT |
| *Bombus campestris* | VU |
| *Bombus rupestris* | EN |
| *Bombus distinguendus* | EN |
| *Bombus muscorum* | NT |
| *Bombus lapidarius* | NT |
| *Halictus tumulorum* | NT |
| *Lasioglossum nitidiusculum* | VU |
| *Megachile willughbiella* | NT |
| *Megachile centuncularis* | NT |
| *Nomada goodeniana* | EN |

**Checklist of Macromoths**

| Species name | Red List status |
|---|---|
| *Apamea oblonga* | EN |

**Checklist of Non-marine Molluscs**

| Species name | Red List status |
|---|---|
| *Acanthinula aculeata* | NT |
| *Acicula fusca* | VU |
| *Aplexa hypnorum* | VU |
| *Helicella itala* | VU |
| *Merdigera obscura* | EN |
| *Myxas glutinosa* | EN |
| *Pisidium hibernicum* | NT |
| *Pisidium pulchellum* | EN |
| *Radix auricularia* | VU |
| *Succinella oblonga* | EN |
| *Vallonia pulchella* | VU |

**Checklist of Damselflies**

| Species name | Common name | Red List status |
|---|---|---|
| *Coenagrion lunulatum* | Irish Damselfly | VU |
| *Ischnura pumilio* | Scarce Blue-tailed Damselfly | VU |
| *Lestes dryas* | Robust Spreadwing/Scarce Emerald Damselfly | NT |

**Checklist of Amphibians and Reptiles**

| Species name | Common name | EU Habitats Directive (Annex) | Wildlife Acts (WA) | Red List status |
|---|---|---|---|---|
| *Rana temporaria* | Common Frog | V | WA | LC |
| *Lissotriton vulgaris* | Smooth Newt | | WA | LC |
| *Zootoca vivipara* | Common lizard | | WA | LC |

**Checklist of Other Invertebrates**

| Species name | Common name | EU Habitats Directive (Annex) | Wildlife Acts (WA) |
|---|---|---|---|
| *Austropotamobius pallipes* | White-clawed Crayfish | II/V | WA |

**National status of each Annex I habitat found within Co. Meath based on 2019 Article 17 reporting (NPWS, 2019a)**

| Habitat | Habitat Code | Overall Status | Co. Meath SACs |
|---|---|---|---|
| Active raised bogs | 7110 | Bad | 002342, 002340, 000006 |
| Degraded raised bogs still capable of natural regeneration | 7120 | Bad | 002343, 002203, 002340, 000006 |
| Depressions on peat substrates of the *Rhynchosporion* | 7150 | Bad | 002344, 002340 |
| Alkaline fens | 7230 | Bad | 002299 |

| | | | |
|---|---|---|---|
| Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) | 91E0 | Bad | 002299 |
| Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. | 3140 | Bad | 002120, 001810 |
| Estuaries | 1130 | Inadequate | 001957 |
| Mudflats and sandflats not covered by seawater at low tide | 1140 | Inadequate | 001957 |
| Annual vegetation of drift lines | 1210 | Inadequate | 001957 |
| *Salicornia* and other annuals colonising mud and sand | 1310 | Favourable | 001957 |
| Atlantic salt meadows (Glauco-Puccinellietalia maritimae) | 1330 | Inadequate | 001957 |
| Embryonic shifting dunes | 2110 | Inadequate | 001957 |
| Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) | 2120 | Inadequate | 001957 |
| Fixed coastal dunes with herbaceous vegetation (grey dunes) | 2130 | Bad | 001957 |
| Petrifying springs with tufa formation (Cratoneurion) | 7220 | Inadequate | 001398 |