Laois Habitats Survey 2007

St Peter's Church Monaferrick with Curraclone wood in the Background

Report prepared for Laois Heritage Forum:

An Action of the Laois Heritage Plan 2007-2011

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September 2007

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Acknowledgements

We would like to acknowledge the valuable assistance provided by the following individuals and organisations:

- The landowners who allowed their land to be surveyed
- The IFA who invited us to a meeting of the county executive and committee members of IFA branches in Stradbally, Vicarstown, Emo and the Heath who met us at the start of the survey.
- The Laois County Council Information Technology section, which prepared maps and photos for use in fieldwork.
- John Prior Coillte Teoranta and Coillte's Portarlington Office for providing details of forest tree species and wood history in Coillte owned forests in the survey area.
- Dr Evelyn Moorkens, plant recorder for Laois for the Botanical Society of the British Isles for providing BSBI records for the surveyed areas
- Members of the County Laois Heritage Forum, particularly members of the Habitats Working Group.
- Ciara Flynn and Jim Moore of the NPWS who provided information on designated sites in the study area.

Funding was provided for this study by Laois County Council and the Heritage Council

Summary

The report contains the results of habitat mapping carried out in 2005, 2006 and 2007 in County Laois. Parts of the north east and south west of the county were mapped. The land is typical of lowland Laois and includes the town of Portarlington.

Information for the map was gathered through fieldwork assisted by colour aerial photographs (2000 and 2005).

Habitats were mapped principally through fieldwork. In the summers of 2005, 2006 and 2007 ecologists examined habitats field by field within the survey area. A total of 150 townlands were surveyed over three years in an area covering 230.27 sq km. Permission was always sought before survey work took place and a series of discussions took place with the IFA in 2005 to assist in informing landowners about the purpose of the survey.

Habitats were examined and mapped using methodologies promoted by the Heritage Council in 'A Guide to Habitats of Ireland' (Fossitt 2000) and Draft Habitat Survey Guidelines: A standard methodology for habitat survey and mapping in Ireland (The Heritage Council 2002). Each field or habitat was given a code on a field map. Lists were compiled of flowering plants associated with habitats and notes were compiled of noteworthy features.

Results from the marked up maps were digitised to produce computerised versions of the final maps. To date digitising has been carried out on all the land surveyed. Target notes (made in 2006 and 2007) have been linked to the digital data base.
Principal findings are:

A total of 56 habitats are present in the area of Laois surveyed. Forty two habitats were found in 2005 whilst in 2006 an additional twelve habitats were recorded with an additional two in 2007. They include four new types to describe either different types of garden habitats and land under development which are not contained in the original classification (Fossitt 2000).

Most of the land is covered in two habitats; improved grassland and arable land which are typical of intensive farming systems and which are of relatively low biodiversity value. Within such intensively farmed areas, habitats of greater biodiversity interest are found, such as hedgerows and drainage ditches. Field mapping confirmed the presence of 6.56 km of hedgerow per square kilometre.

Semi-natural habitats, some of which are of high biodiversity value, account for less than 5% the total area surveyed. These include limestone/marl lakes, scrub, old grasslands, woodland, wetlands, bogs and fen and flush. Some habitats are only found at one or two sites. The hums (upstanding outcrops of limestone which resemble small steep hills) north of Stradbally are particularly associated with oak-ash-hazel woodland.

The 56 habitats which have been identified support 444 plant species. In the first year (2005), 349 species were found with a further 38 species being added in 2006 while in 2007, 57 further species were added to the total. Species diversity varies greatly between habitats. The most valuable habitats for plants are wet grassland (>160 species) and scrub with >153 species. Those with the lowest number of native species include amenity grassland, set aside land, spoil and bare ground, garden shrubberies and some types of woodland. A bee orchid found in a derelict quarry is a

protected species under the Wildlife Act. Several other plants found are rare in the region and in Laois.

The habitat survey provides an essential report on biodiversity for parts of Laois. The map and associated statistics provide a baseline against which change can be benchmarked. Its contents can be used to inform the public about their local biodiversity and guide decisions on land use options and strategic planning. The Laois Biodiversity Action Plan requires to be informed by this survey. The vast majority of habitats in the countryside have developed as a result of some form of local development. In future local development will be required to take greater regard for biodiversity. The survey should be expanded to all parts of the county. This would increase the value of the information which has been gathered and enable informed decision making on biodiversity on a county wide basis.

The report concludes with a number of suggestions on how the results of the mapping exercise can be used to generate greater awareness of habitats and their management needs.

1 Introduction

1.1 Brief

The brief requested that the study address the following tasks on each of the three years:

- Carry out a detailed field survey of habitats in selected parts of County Laois.
- Liaise with the public and landowners in the areas surveyed and to ensure public awareness of the project being undertaken.
- Use data collected to make recommendations on conservation priorities and any future work that should be carried out.
- Collate and make this information available for future research, through a detailed survey report and a set of raw data (including maps) as appendices.

1.2 Background

A habitat is a defined area, which supports a collection of typical plants and animals. By mapping habitats information can be gathered about the plants and animals which are associated with an area. Habitats can vary in naturalness, depending on the extent to which they have been modified by development. They may be associated with land, freshwater or marine environments.
The Heritage Council has promoted methodologies to map habitats. A guide produced by the Heritage Council (Fossitt, 2000) lists habitats found in Ireland and a methodology has been developed to carry out mapping exercises.

The list includes 89 types associated with terrestrial and 28 with the marine environment. Habitat mapping is an important tool to identify areas of biodiversity interest. Identification of habitats is particularly important to the implementation of the most important piece of wildlife legislation which applies in Ireland; the Habitats Directive (92/43/EEC). The Habitats Directive was brought into force in Ireland through the European Communities (Natural Habitats) regulations 1997 (SI /97/094) and The Planning and Development Regulations 2001 (S.I. 600 of 2001) made under the Planning and Development Act, 2000.

Under this Directive there is a legal obligation on Ireland to protect particular habitats, so called priority and non-priority types, and species listed in annexes to this directive. Table 1 lists habitats, which require protection under the Habitats Directive. Priority types include raised bogs, alkaline fen, and orchid rich grasslands. They might expect to be found in Laois. Non priority types of relevance to this study area are various types of wetlands. While their protection is of lesser priority internationally they may be of national, regional and certainly of local importance.

Table 1 Habitats listed in the Habitats Directive

Priority type habitats are in bold. Reference numbers refer to numbering system in EU (2003)

Types of freshwater habitats
Natural dystrophic lakes and ponds (3160)
Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) (3160)
Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoteo-Nanojuncetea (3130)

Hard oligo-mesotrophic waters with benthic vegetation of Chara sp. (3140)
Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation (3150)
Turloughs (3180)
Watercourses of plain to montane levels with the Ranunculion-fluitanitis and Callitochio-Batrachion vegetation (3260)
Rivers with muddy banks with Chenopodium rubri p.p. and Bidention p.p. vegetation (3270)
Petrifying springs with tufa formation (Cratoneurion) (7220)
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (6430)
Habitats associated with grasslands and marsh
Semi-natural dry grassland and scrubland facies on calcareous substrates (Festuco-Brometea) (*important orchid sites) (6210)
Juniperus communis formations on heaths or calcareous grasslands (5130)
Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) (6510)
Species rich Nardus grasslands on siliceous substrates in mountain areas (and submountane areas in continental Europe) (6230)
Calaminarian grasslands of the Violetaria calaminariae (6130)
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleaea)
(6410)
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (6430)
Habitats in areas dominated by heathers
European dry heaths (4030)
Juniperus communis formations on heaths or calcareous grasslands (5130)
Northern Atlantic wet heaths with Erica tetralix (4010)
Alpine and boreal heaths (4060)
Habitats associated with peatlands (or boglands)
Active raised bogs (7110)
Degraded raised bogs still capable of natural regeneration (7120)
Blanket bog (*if active bog) (7130)
Depressions on peat substrates of the Rhynchosporion (7150)
Calcareous fens with Cladium mariscus and species of the Caricion davallianae (7120)
Alkaline fens (7230)
Transition mires and quaking bogs (7140)

Woodland type habitats
Old sessile woods with Ilex and Blechnum in the British Isles (91AO)
Taxus baccata woods in the British Isles (91JO)
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-padion, Alnion incarae, Salicion albae) (91EO)
Bog woodland (91DO)
Habitats associated with exposed rock
Siliceous rocky slopes with chasmophytic vegetation (8220)
Calcareous rocky slopes with chasmophytic vegetaion (821))
Limestone pavements (8240)
Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Caleopsietalia ladani) (8110)
Calcareous and calcshist screes of the montane to Alpine levels (Thlaspietea rotundifolii (8120)
Caves not open to the public (8310)

While the emphasis in the Habitats Directive is on specific habitats and species it also recognises the need for management of the wider countryside. The preamble recognises that "land use planning and development policies should encourage the management of features of the landscape which are of major importance to flora and fauna".

The Habitats Directive states (Article 3) that there are obligations on member states to maintain features of the landscape, which will improve the ecological coherence of the network of designated sites (Special Areas of Conservation or Special Protection Areas) which contain the best examples of the these priority and non priority habitats. The obligations and the type of features are highlighted in Article 10 as follows:

"Such features are those which by virtue of their linear and continuous structure (such as rivers with their banks or traditional systems for marking field boundaries (i.e. hedgerows) or their function as stepping stones (such as ponds or small woods) are essential for the migration, dispersal and genetic exchange of wild species."
As habitat mapping provides comprehensive maps of biodiversity; the location of priority and non-priority sites, linking features such as rivers and hedgerows and all types of habitats even less natural types will be shown.

Global awareness of the decline in biodiversity has led to a greater focus on managing biodiversity at the local level. The Convention on Biological Diversity (CBD) drawn up in 1992 defined biodiversity as "the variability among living organisms including inter alia marine, terrestrial and aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems". It can be expressed at different levels; landscape, habitats, ecosystems, species and genes.

Ireland ratified the CBD in 1996. Under Article 6 all signatories are obliged to develop a national strategy for biodiversity and to integrate the conservation and sustainable use of biological diversity with relevant sectoral or cross-sectoral plans, programmes and policies. The CBD represents a shift

away from preservation of rare species and habitats. It is concerned with biodiversity in all its forms and with integrating biodiversity with development. Arising from its ratification of the CBD Ireland drew up a National Biodiversity Plan in 2002 (Department of Arts, Heritage, Gaeltacht and the Islands). This stated the need for both sectoral biodiversity action plans and plans for local areas such as Local Biodiversity Action Plans for which responsibility was given to Local Authorities.

The wildlife, habitats, flora and fauna found in County Laois are unique to it and thus are a valuable part of its heritage. A Local Biodiversity Action plan will suggest how this heritage will be managed and developed.

To date there has never been a comprehensive and detailed survey carried out of the natural environment in County Laois. Survey work has focussed on designated areas, particular habitats and areas for which development is proposed. Little is known about the general distribution of habitats within the country including man-made habitats such as those found in urban areas, along roadsides and even among the ruins of old buildings. Habitat mapping being carried out in Laois will provide the first account of the location and nature of habitat diversity in the county.

The preparation of habitat maps provides baseline information to support the preparation of the local biodiversity action plan. The map should raise awareness among landowners and the public of the usefulness of biodiversity. The information gathered can be used to inform spatial planning, specific local development initiatives such as agri-environmental measures, forestry development, the location of infrastructure, environmental education and special interest or eco-tourism.

The habitat map produced in 2005 provided the first account of habitat diversity in the county. Habitat mapping in 2006 provided information on a section of the county adjacent to the land surveyed in 2005. In 2007 habitat mapping continued to expand those areas and for the first time mapping covered designated sites of biodiversity value. While most of the habitat maps produced in 2005 were only digitised later, the results of mapping exercises in 2006 and 2007 will be digitised. In 2007, target notes prepared for particular sites of interest surveyed in 2006 and 2007 will be linked to this data base.

The three surveys should provide a comprehensive account of biodiversity in a bigger sample of the entire county. By creating a digital data base it will be possible to update and integrate its results with those from other sources of habitat mapping. An important indirect result of habitat mapping which is generated solely through field work is the opportunity it offers for contacts between ecologists and landowners.

2 Methodology

2.1 Approach

The approach used for the County Laois Habitats Survey was based on the Heritage Council Guidelines (Fossitt, 2000 and Heritage Council 2002), and drew on the experience of the surveyors in Dublin, Westmeath and Carlow.

While the brief for the survey specified that it would be carried out within parishes, this was reconsidered for the following reasons and townlands were selected as survey units. There are three types of parish – Civil, Church of Ireland and Roman Catholic. The Civil seemed the most appropriate but it proved difficult to find clear information regarding their boundaries. Few people identify with Civil Parishes. It was difficult to find suitable maps for the other two types of Parish and choosing an area based on religious criteria could be seen as favouring one section of the population over another. Consequently, it was decided to abandon the parish as a gross survey unit and to use town-land unit instead. The townland is an old mapping unit. Within rural areas townlands are important to locate households and farms and the boundaries of townlands often run along features of biodiversity interest such as hedgerows or streams.

2.2 Survey area

The selection of townlands was made principally by members of the County Laois Heritage Forum. Selection was based on the requirement to survey a geographic spread of townlands, which would contain both typical and unique Laois habitats. Designated areas such as Natural Heritage Areas (NHA's) and cSACs (Special Areas of Conservation) were omitted from the survey in 2005 and 2006, as it was considered that the biodiversity value of these areas was known and their habitats would be mapped to inform their management plans. This policy was reviewed and thus the survey in 2007 included designated areas when parts of the Barrow SAC, including a section within Portarlington, were surveyed.

In 2005, 2006 and 2007 blocks of townlands were surveyed in the north east and south west of the country (Fig. 1a and Table 2). In 2005 townlands around Emo, Portarlington & Stradbally, were surveyed. This area was extended to the county boundary including Portarlington in 2006. In 2007 surveying continued in townlands around Ballybrittas and Stradbally. In the south west of the county habitat mapping focussed on the Aghaboe Roman Catholic Parish. Towlands within that parish were mapped in 2005 and a further set were examined in 2006 and 2007. During the three years (2005, 2006 and 2007), the survey mapped habitats in 150 townlands. This included 109 in the area to the north east of the county and 41 in the south west, covering 230 km2 of County Laois.

The habitat mapping rate and methodology was informed by trial surveys in 2005 in the townland of Moret, in 2006 around Portarlington and in 2007 in the townland of Clonanny and along the River Barrow SAC where it flows through Portarlington. These trials tested the survey methodology, clarified the requirements for mapping and allowed for the resolution in differences in interpretation between surveyors.

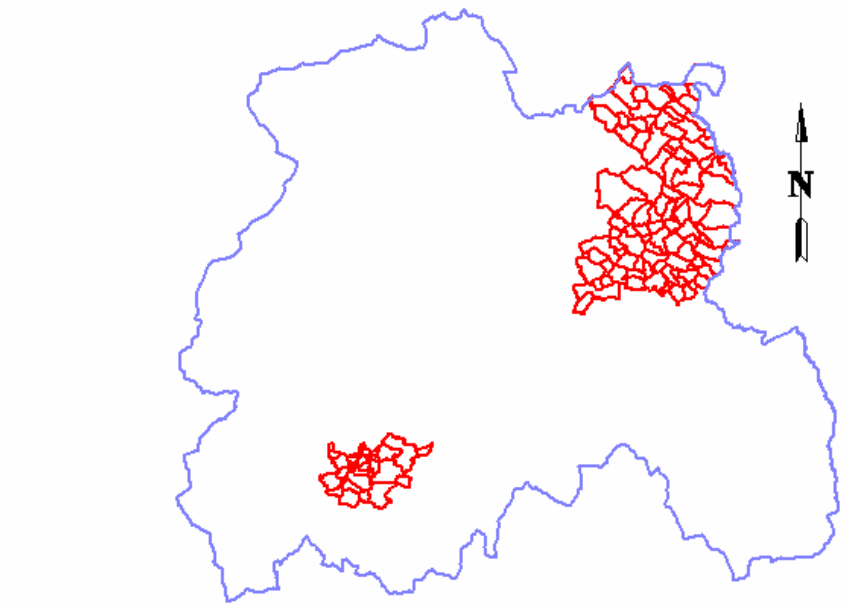


Fig. 1. Areas surveyed and digitised in Laois 2005-2007.

Table 2. Townlands surveyed and digitised in 2005, 2006 and 2007.

Year and region	Townland	
North east 2005	Aghnahilly	Killone
	Aghnahilly Bog	Kilmurry
	Ballinlough	Kilteale
	Ballycarroll	Kylespiddogge
	Ballyduff (Ed Kilmurry)	Lamberton Demesne
	Ballymaddock	Loughakeo
	Ballythomas	Morett
	Bellegrove	Park Lower
	Cappakeel	Park or Dunamase
	Carigeen (Ed Kilmurry)	Park Upper
	Coolnacarrick	Powelstown
	Dysart	Raheen
	Garryduff	Raheenahown South
	Garrymaddock	Raheenahown North
	Grange Lower	Raheenanisky
	Grange Upper	Rathcrea
	Hophall	Rossmore
	Killenny	Tonafarna
North east 2006	Ballymorris	Kilbracken

Year and region	Townland	
	Belan	Kilbride
	Bracklone	Lough
	Belan	Portree
	Bracklone	Rathleash
	Coolagh	Rathronshin
	Coolroe	Rossmullan
	Cooltederry	Tierhogar
	Courtwood	Vicarstown (Dodd)
	Doolough	Vicarstown (Cosby
	Droghhill	
North East 2007	Ballintogher	Inchacooly
	Ballyading	Jamestown or Ballyteigueduff
	Ballybrittas	Killaglish
	Ballycarroll	Killeen
	Ballyduff (ed Curraclone)	Killinure
	Ballykilcavan	Kilmullen
	Ballymanus	Kilrory
	Ballynowlan	Knocknambraher
	Ballyrider	Knockphilip
	Ballyshaneduff or The Derries	Kylebeg (ed Curraclone)
	Bawn	Kylebeg (ed Stradbally)
	Binbawn	Lea
	Blackford	Loughmansland Glebe
	Bolnagree	Mill land
	Brockley park	Monaferrick
	Carricksallagh	Moyanna
	Clonanny	Newtown
	Closeland or Cloneen	Oughaval
	Correel (ed Moyanna)	Park
	Correel (ed Vicarstown)	Raheenaniska
	Curraclone	Raheenduff
	Derrybrock	Rathmore
	Derrynafunshin	Stradbally
	Garrans	Tullaghan
	Graigueavern	Tursalla
	Inch	Ullard or Controversyland
South west 2005	Ballygowdan	Garryniska
	Ballyhinod	Grantstown

Year and region	Townland	
	Bordwell Big	Kilbreedy
	Bordwell Little	Leap
	Brocka	Middlemount
	Chapelhill	Middlemount or Ballyvoghlaun
	Coolacurragh	Oldglass (Part of)
	Coolbally	Rhahandrick Lower
	Court	Rhahandrick Upper
	Curragh	Shanvaghey
	Farranville	Tinnaragh
	Garryduff	Tooreagh
South west 2006	Anster	Kilminfoyle
	Ballycolla	Legaun
	Dairyhill	Oldglass
	Fearagh	
South west 2007	Ballycolla heath	Kyle
	Ballygauge more	Kylebeg
	Cool	Moyne
	Coolderry	Rathmakelly glebe
	Killermogh	Tinnaraheen

2.3 Ancillary data

Ancillary sources of data are listed in Table 3.

Table 3. Ancillary data

Data source	Information	Usefulness/value of information
Vicarstown Village Residents Association	A study of the ecology of the Grand Canal Bank at Vicarstown, Co. Laois – with a view to sensitive development (Behan, 2002)	While the Grand Canal, as a Natural Heritage Area does not come under the remit of the study the report decribes relevant adjacent habitats and has good lists of flora and fauna.
Coillte	Biodiversity Areas in the Mid Tipp/Rossmore Plateau, FMU 403, 2004	No surveyed sites listed in this report fell within the survey area.

Data source	Information	Usefulness/value of information
Coillte	Biodiversity Areas in the Slieve Bloom Forest Management Units 705 (FMU).	During 2005 and 2006 there was one forest area (Area no. 21, Rossmore) from the FMU report in the areas surveyed. It provided useful information about biodiversity of River Glasha. In 2007 there were two forest areas (Area no. 31, The Derries and Area no 19, Garrans) from the FMU report in the areas surveyed.
Coillte	Maps of different forest blocks in survey area.	These maps were useful as they provided clear information as to the extent and layout of the forests as well as details about forest tree species and wood history.
National Roads Design Office, Kildare County Council	EIS for M7 Heath-Mayfield Motorway	Habitat descriptions for some of townlands surveyed along motorway near Portlaoise.
Dr Evelyn Moorkens	BSBI records for Laois	The presence of species records for the following townlands: Tirhogar Level Crossing N5710 Ballymorris N5410 Carrick Hill; Cooltederry N5410 Railway bridge and part of Portarlington town N5410 ; Lea Castle N5712 provide an indication of areas of particular interest.
NPWS	Site synopsis of designated areas in study area	Site synopsis of the following areas were examined; Grantstown wood and Lough Site code 000417; Coolacurragh woods site code 000862; Kilteale Hill 000867; Dunamase woods 001494; Rock of Dunamase 001494 – Barrow cSAC. No. 002162, Provided two extra species - Catapodium rigidum, Hedgerow Crane's bill
NRA report for Laois County Council (ARUP Consulting Engineers)	Environmental Impact Statement M7 Portlaoise – Castletown, M8 Portlaoise – Cullahill Road scheme.	Habitat information for the townlands of Coolnacurragh pNHA Wet willow-alder-ash woodland (WN6); Curragh (Mixed) broadleaved woodland (WD1); Ballyhinode WD1; Clogh Oak-ash-hazel woodland (WN2) and Leap (Mixed) conifer plantation (WD3), surveyed in the Aghaboe region. Some descriptions of habitats. Some information on aquatic and riparian habitats – Erkina river

Data source	Information	Usefulness/value of information
Royal Haskoning and JBA (2006) Portarlington Strategic Flood Risk Management Constraints Study	Habitat mapping using UK system in the immediate environs of the River Barrow and two small tributaries (Cemetery Stream and Blackstick Stream) near Portarlington. Field work focussed on river in SAC.	No species added to those already recorded. Habitats mapped in area outside the scope of this study.

2.4 Consultations

Consultations were held with landowners, the Laois Heritage Forum and farming organisations. Leaflets were produced providing information about the project (see Appendix 1 for that used in 2007). This was given to landowners, libraries, to members of the public encountered by surveyors and left in local authority offices and libraries.

Regular consultations were held with the Heritage Officer and Heritage Forum to discuss areas to be surveyed, local contacts, and mapping requirements. After the pilot area was mapped in 2005 a further meeting took place to discuss the results and agree on the form and scale of the field maps that would be used during the survey.

On June 29th 2005 a meeting took place with most members of the Laois Heritage Forum during which progress on the survey was outlined. There was another meeting with the Heritage Forum on July 12th 2005 where issues regarding the digitisation of the maps were discussed with the IT department in Laois County Council. This meeting provided an opportunity to meet with Neil Foulkes and Anja Murray who were working on the Laois Hedgerow survey (Foulkes and Murray 2005).

Facilitated by the IFA's representative on the Heritage Forum a presentation was made to County Executive of the IFA in the Heritage Hotel, Portlaoise on May 3rd 2005 when the aims and purpose of the habitat study were outlined and help and permission to access private land were sought from farmers and landowners. Following on from the presentation to the County Executive of the IFA a meeting was held on 2nd June 2005 with local representatives of the IFA in the proposed survey areas.

During Heritage Week 2005 and in 2006 presentations were made to the public as part of an annual seminar on Laois Heritage.

Consultations principally took place with landowners. During these contacts information was gathered on past and current land management practices, their aspirations for further development and whether they would be interested in obtaining information about the results of the survey. A list was compiled of landowners contacted (Appendix 2).

2.5 Fieldwork

Habitats were principally mapped through fieldwork assisted by colour aerial photographs (2000), 6-inch OS raster maps (Ordnance Survey, 1906 edition) and vector maps (1:6,000). Fieldwork was carried out principally by Betsy Hickey assisted by Mary Tubridy and Mark Mc Corry in 2005 and principally by Betsy Hickey assisted by Mary Tubridy and Fiona MacGowan in 2006. In 2007 field

work was carried out principally by Betsy Hickey and assisted by Mark Mc Corry and Mary Tubridy.

During 2006 and 2007 maps and aerial photographs for use in the field were produced at A4 size. These were gridded according to the Discovery map. As the map or photo covered 2/3 of the page, there was adequate space on each sheet to include notes, surveyor's name (s), date etc. A scale box size 50m X 50m was also shown (See Appendix 3 for a sample photograph).

Before the surveyors reached the area to be examined aerial photographs were examined carefully. Areas of improved grassland were usually obvious. Less improved areas were then targeted for detailed field examination. Examination of the OS map sometimes indicated the presence of features of habitat interest which if then obvious on the aerial photograph were also marked on the vector map for more intensive examination in the field.

On reaching the area to be examined and before starting fieldwork, landowners were located by identifying the nearest farmhouse. They were appraised about the purpose of the survey and asked for permission to survey their land. If time allowed they were engaged in a discussion on land management practices. If the landowner could not be located and their land could not be surveyed, habitats on their land were assigned using aerial photographs or/and visual inspection from the nearest accessible area.

The land was surveyed by walking along public roads or through fields. Habitat codes were added to the vector map on a field by field basis. If the habitat being mapped was not bounded by a field boundary, its limits were identified using a combination of aerial photography and field inspection.

Lists of plant species were compiled for each habitat type. Where particularly interesting species or habitats were found, a target note was taken and the area marked with a unique number on the map. Target notes were compiled on the sites of invasive exotic species. Photographs were taken of features of interest and habitats.

Species identification and nomenclature was based on Hubbard (1992), Jermy et al (1982), Mitchell (1978), Rose (1991), Rose (1989) and Webb et al (1996).

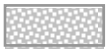
Surveying took place over a period of 71 days during June, July and August in 2005, 2007 and 2007. The land was surveyed at an average rate of 3 km2 per day, however this varied according to the location, terrain and habitat diversity. Cover varied from approximately 1–2 km2 per day in areas where there was a high diversity of habitats in both rural and urban areas to 5-6 km2 per day in areas that were predominantly improved agricultural grassland.

2.6 Modifications to published methodology

Changes to the methodology were required to describe habitat types not considered by Fossitt (2000). These were:

- BL3D land being developed
- BL3 1 big gardens
- BL3 2 medium gardens
- BL3 3 small gardens
- ED6 setaside.

All are man-made habitats. The first four occur primarily in urban areas and were identified in 2006 around Portarlington. The fifth habitat ED6 setaside was found in 2005.

 BL3D Land being developed (tiny grey squares on a white background)
Land being developed refers to areas that are being developed for residential or industrial use and are temporarily in a state of flux.

Currently garden habitats can fit into one of two categories depending on whether they are a) predominately (GA2) amenity grassland (improved) or b) predominantly ornamental/non-native shrub. These habitat designations are appropriate when the gardens being surveyed are in rural areas and/or they are sparsely distributed, in urban areas however where houses are closely packed together it is not feasible to assess each garden individually. Subsequently, it was decided to divide urban gardens and housing estate developments in rural areas into categories depending on the size of garden.

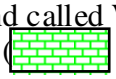
The three garden types were principally distinguished by size; big gardens BL3 1 (> than 500 m2), medium gardens BL3 2 (250 and 500 m2) and small gardens BL3 3 (<250 m2).

BL3 1 Big Gardens (small crosses outlined () by the colour olive green.

BL3 2 Medium gardens (wavy horizontal lines () and the colour olive green.

BL3 3 Small gardens (squares ()with olive green lines on a white background

ED6 Setaside (tiny red squares () on a white background.

An additional symbol was developed for ornamental hedgerows which is a sub category of the habitat ornamental trees and shrubs (WS3). Ornamental hedgerows are linear in character and the existing symbol/pattern for WS3 is area based; subsequently a dark green hatched line () was used for hedgerows of non-native species and called WS3 A, whilst ornamental trees and shrubs became WS3 B maintained the original pattern ().

New one-off houses that were not represented on the vector maps were drawn in, in their approximate location and given a different colour () but same pattern and code letters to Buildings and artificial surfaces BL3.

The location of target notes was shown on vector maps instead of GPS readings and given a 4-figure grid reference.

2.7 Constraints

Timing affected the completeness of plant lists in surveyed habitats. While habitat types can be identified in all seasons, plants in woodlands were under recorded as these flower early in the season. As the surveyors could not access all parts of waterways the flora of areas of open water was similarly under recorded. Access was an issue in a few areas. In 2005 the size of maps made fieldwork difficult as A0 size was difficult to manage in the field. This problem was rectified in 2006 thus making fieldwork more efficient.

2.8 Processing and presentation of results

During fieldwork, a large amount of information was gathered. This included species lists, digital photographs, annotated vector maps and target notes on individual sites. The species lists, as well as a checklist of habitat types and any landowner details, were compiled into an Excel spreadsheet within one or two days of fieldwork.

Hand-coloured maps showing habitats in the townlands were produced to accompany the report of the survey in 2005. During the early part of 2006 approximately half of the townlands surveyed in 2005 were digitised using MAPINFO. All the habitat information was digitised in 2006. This was more cost effective and efficient as the maps were produced by the principal surveyor soon after fieldwork was finished. All undigitised maps from 2005 were digitised at the same time as those for 2007 and now all townlands surveyed to date have been digitised. By linking target notes to habitats all can be directly accessed by clicking on the relevant point in the digital habitat map.
This report contains the results of the mapping projects in 2005, 2006 and 2007. It is accompanied by a hard copy of the habitat map, an excel file with target notes for both years and a CD containing digitised results and photos.

3 Results

3.1 Summary

The principal results of the survey are summarised in Tables 4, 5, 6 and 7. Appendix 4 contains a complete species list of plants recorded in both years Appendices 5/6 and 7 list uncommon species and Appendix 8 contains information about plant species in all habitats surveyed.

3.1.1 Habitat and species diversity

Table 4 identified habitats in the area surveyed and total number of species recorded from these habitats.

Table 4 Habitats and associated species numbers.

Habitats with an asterisk were found in 2006 and those with two asterisks were found in 2007.

Level 1 Habitat	Level 2 Habitat	Level 3 Habitat	No. of species recorded per habitat
F Fresh water	FL Lakes and ponds	FL3 Limestone/marl lakes	20
		FL4 Mesotrophic lakes*	19
		FL5 Eutrophic lakes	37
		FL8 Other artificial lakes and ponds	10
	FW Watercourses	FW2 Depositing lowland rivers	47
		FW3 Canals*	34
		FW4 Drainage ditches	72
	FP Springs	FP2 Non-calcareous springs	17
	FS Swamps	FS1 Reed and large sedge swamp**	47
		FS2 Tall-herb swamp**	3
G Grassland and marsh	GA Improved grassland	GA1 Improved agricultural grassland	40
		GA2 Amenity grassland (improved)	13
	GS Semi-natural grassland	GS1 Dry calcareous and neutral grassland	146
		GS2 Dry meadows and grassy verges	122
		GS3 Dry-humid acid grassland	26
		GS4 Wet grassland	161
		GM1 Marsh	41
H Heath and dense bracken	HH Heath	HH3 Wet heath	18

Level 1 Habitat	Level 2 Habitat	Level 3 Habitat	No. of species recorded per habitat
	HD Dense bracken	HD1 Dense bracken	22
P Peatlands	PB Bogs	PB1 Raised bog*	32
		PB4 Cutover bog	48
	PF Fens and flushes	PF1 Rich fen and flush	24
		PF2 Poor fen and flush	14
W Woodland and scrub	WN Semi-natural woodland	WN1 Oak-birch-holly woodland	4
		WN2 Oak-ash-hazel woodland	152
		WN6 Wet willow-alder-ash woodland	51
		WN7 Bog woodland	43
	WD Highly modified /non-native woodland	WD1 (Mixed) broadleaved woodland	132
		WD2 Mixed broadleaved/ conifer woodland	51
		WD3 (Mixed) conifer woodland	4
		WD4 Conifer plantation	8
		WD5 Scattered trees and parkland	20
	WS Scrub/transitional woodland	WS1 Scrub	153
		WS2 Immature woodland	37
		WS3 Ornamental/non native shrub	10
		WS5 Recently felled woodland	85
	WL Linear woodland/scrub	WL1 Hedgerows	114
		WL2 Tree line	18
E Exposed rock and disturbed ground	ER Exposed ground	ER2 Exposed calcareous rock	32
	ED Disturbed ground	ED1 Exposed sand, gravel or till	10
		ED2 Spoil and bare ground	4
		ED3 Re-colonising bare ground	66
		ED4 Active quarries and mines*	1
		ED6 Set-aside	1
B Cultivated and built land	BC Cultivated land	BC1 Arable crops	37

Level 1 Habitat	Level 2 Habitat	Level 3 Habitat	No. of species recorded per habitat
		BC2 Horticultural land	4
		BC3 Tilled land	-
		BC4 Flower beds and borders	19
		BL1A Stone wall	27
		BLIB Other stone-works	9
		BL2 Earth banks	55
		BL3 Building and artificial surfaces	10
		BL3 D Land being developed*	-
		BL3 1 Big gardens*	-
		BL3 2 Medium gardens*	-
		BL3 3 Small gardens*	-

A total of 56 different habitats have been identified in the area surveyed in Laois. Forty two habitats were found in 2005, an additional twelve habitats were recorded in 2006 and a further two in 2007. These included three garden types found around Portarlington (2006) and two new freshwater swamp habitats. Some of these are priority and non priority habitats recognised under the Habitats Directive.

In these habitats 444 plant species are found. The most species rich habitats (with >100 species) include dry and wet grasslands, oak ash hazel woodland, scrub, hedgerows and (mixed) broadleaved woodland. All of these except (mixed) broadleaved woodland are semi natural types. Those with the highest number of species, wet grassland, scrub and oak ash hazel woodland, tend to be diverse and are usually present within mosaics of other habitats in which either wet grassland or scrub is dominant.

Among the 444 species, 33 (listed in Appendix 5) are rare regionally and locally. These include the protected bee orchid (Fig. 2); the Red Data Book species (Curtis and McGough, 1988) marsh helleborine and the regionally rare lesser butterfly-orchid, greater butterfly-orchid and mountain everlasting. The Irish Branch of the Botanical Society of the British Isles (Appendix 6) recorded an additional 75 species in the study area and records compiled by the Dublin Naturalist's Field Club during an outing to Hewson Hill, Coolnacarrick provide an additional 3 species (Appendix 7).

In contrast to the presence of native plant species which are rare, reflect local ecological conditions and are under threat two non-native plants Japanese knotweed and rhododendron are spreading into semi natural habitats in Laois and thus threatening the local flora and fauna.

Japanese knotweed is now growing actively at nine locations in the surveyed area:

- Lamberton Demesne S5195 Target note 4 at which a stand about 5 m wide was seen on a road verge beside a lay by;
- Tinnarragh S3281 Target note 3, in hedge and garden of derelict house;
- Courtwood N6103 Target note 4, beside a derelict house adjacent to canal.

- Grantstown S3379 Target note 1, 10 -15 m long strip on roadway verge adjacent to Coolnacurragh wood.
- Vicarstown (Dodd) N6101 Target note 1, where 4 or 5 stands are growing on the western side of the Grand Canal.
- Cool S3881 Target note 2, growing in a topographical hollow with mosaics of reed and large sedge swamp and recently planted broadleaved woodland.
- Lea N5711 Target note 1, growing on left hand side of laneway leading to Lea graveyard. It is also spreading into the field adjacent to laneway.
- Brockley park S5897 Target note 1
- Ballykilcavan S5996 Target note 5, area 6 mx 2m growing at the border of riparian woodland with reed and large sedge swamp

Fig. 2 Dry calcareous and neutral grassland with the rare bee orchid

(protected under the Wildlife Act 1976) growing in association with quaking grass and bird's-foot-trefoil in a disused quarry, Kilbride, Co. Laois (GS1, grid square N5209, target note 7).

Rhododendron was found growing in Garryvacum N5507 Target note 8 on cutover bog and it was also recorded by the BSBI in Grantstown S3380. Unless unchecked both these plants will quickly dominate the ecology of the habitats where they are now found.

3.1.2 Cover of habitats (measured by area)

Table 5 provides information on the relative cover of principal habitats. Table 6 lists high value semi-natural types

Table 5 Cover of principal habitats

Habitat	Area (ha)	% total area surveyed
Improved agricultural grassland	10,993.39	47.74
Arable crops	5,708.69	24.79
Conifer plantation	642.14	2.79
Amenity grassland (improved)	396.51	1.72
(Mixed) broadleaved woodland	335.3	1.46
Wet grassland	314.14	1.36
Buildings and artificial surfaces	278.78	1.21
Immature woodland	273.92	1.19
Scrub	207.13	0.90
Scattered trees and parkland	137.89	0.60
Oak-ash-hazel woodland	135.07	0.59
Mixed conifer/broadleaved woodland	102.2	0.44
Setaside	98.25	0.43
Dry meadows and grassy verges	79.50	0.35
Cutover bog	71.11	0.31
Large gardens	56.75	0.25
Medium gardens	51.31	0.22
Wet pedunculate oak-ash woodland	48.83	0.21
Small gardens	48.68	0.21
Land under development	44.08	0.19
Dry calcareous and neutral grassland	38.70	0.17
Recently-felled woodland	38.45	0.17
Horticultural land	35.68	0.15
Ornamental/non-native shrub	35.05	0.15
Recolonising bare ground	31.13	0.14
(Mixed) conifer woodland	30.09	0.13
Wet-willow-alder-ash woodland	29.14	0.13
Tilled land	26.09	0.11
Active quarries and mines	22.50	0.10
Spoil and bare ground	16.80	0.07
Marsh	13.44	0.06
Bog woodland	10.01	0.04
Raised bog	9.31	0.04
Eutrophic lakes	6.98	0.03
Dry-humid acid grassland	5.96	0.03
Reed and large sedge swamp	4.98	0.02

Habitat	Area (ha)	% total area surveyed
Dense bracken	4.79	0.02
Wet heath	4.07	0.02
Table 5. (contd) Cover of principal habitats		
Mesotrophic lakes	3.11	0.01
Other artificial lakes and ponds	1.96	0.01
Oak-birch-holly woodland	1.82	0.01
Other stonework	1.57	0.01
Tall-herb swamp	1.40	0.01
Rich fen and flush	1.04	0.00
Exposed calcareous rock	0.97	0.00
Limestone/marl lakes	0.64	0.00
Exposed sand, gravel or till	0.28	0.00
Poor fen and flush	0.00	0.00
Non-calcareous springs	0.00	0.00

Linear habitats such as roads, rivers, canals, hedgerows, treelines and stone wallls, which cover 11% of the survey area, are not included in this table. The presence of hedgerows, treelines and stone walls is recorded by length. Roads have also been omitted, as these were not digitised. It is likely that roads account for most of the remaining 11%.

Table 6 Status of semi-natural habitats

Those with * are priority or non priority types listed in the Habitats Directive

Habitat	**Area (ha)**	**% of total area surveyed**
Wet Grassland	314.14	1.364
Scrub	207.13	0.900
Oak-Ash-Hazel Woodland	135.07	0.587
Dry Meadows and Grassy Verges	79.5	0.345
Wet pedunculate oak-ash woodland	48.83	0.212
Dry Calcareous and Neutral Grassland*	38.7	0.168
Wet Willow-Alder-Ash Woodland	29.14	0.127
Marsh	13.44	0.058
Bog woodland	10.01	0.043
Raised Bog*	9.31	0.040
Dry Humid Acid Grassland	5.96	0.026
Reed and large sedge swamp	4.98	0.022
Dense Bracken	4.79	0.021
Wet Heath*	4.07	0.018
Mesotrophic Lakes	3.11	0.014

Habitat	Area (ha)	% of total area surveyed
Oak-Birch-Holly Woodland*	1.82	0.008
Tall-herb swamp*	1.4	0.006
Rich Fen and Flush*	1.04	0.005
Exposed Calcareous Rock*	0.97	0.004
Limestone Marl Lakes*	0.64	0.003
Poor fen and flush	0.00	0.000
Non-calcareous springs	0.00	0.000
Total area/% of semi-natural habitats	*914*	*4.48*

Semi-natural habitats take up a small proportion of the area surveyed c. 5%. Improved agricultural grassland and arable land together account for almost 73% of the habitats based measured by area. This is not surprising as the principal land use in this area is farming, leaving few areas unmanaged apart from very wet, inaccesible sites and or areas where the underlying calcareous rocks lie too close to the surface to warrant cultivation or other intervention such as fertiliser application.

Almost all of these semi-natural habitats are rare nationally, regionally, locally as this survey shows and some are listed for protection under the Habitats Directive.

Wet grassland and scrub are the two largest semi-natural habitats sharing over half the total semi-natural habitat area between them with 1.36 % and 0.9 % respectively). These are also among the most species rich habitats. Wet grassland habitat was the largest of all the semi-natural habitats whilst calcareous springs and poor fen and flush were the smallest. The presence of wet grassland is an indicator of particular types of local drainage conditions.

Areas of semi-natural woodland and scrub account for 1.0% and 0.9% of the total digitised. In contrast planted non-native woodland makes up 6% of the total area. The most common type of semi-natural woodland in the area surveyed is oak-ash-hazel woodland. This is found principally on the hums.

Scrub was found throughout the area surveyed in out of the way corners on farms, in disused quarries or on forts and other monument sites.

3.1.3 Status of linear habitats

The status of these habitats was measured by length and results are shown in Table 7.

Table 7 Status of linear habitats

Habitat	Length (km)	% of total area digitised
Hedgerows	1,807.07	79.10
Drainage Ditches	191.85	8.40
Depositing Lowland Rivers	118.44	5.18
Tree line	73.37	3.21
Ornamental Non-Native Shrubs	61.85	2.71
Stone Walls	19.32	0.85
Canals	7.03	0.31
Earth Banks	5.51	0.24

The survey area contained 1,807 kilometers of hedgerows accounting for 79 % of the total digitised linear habitats. If these hedgerows average 2 m in width their approximate area is 3,614 ha. This makes them the most extensive semi natural habitat in the surveyed area approximately c. 12 times greater than the cover of wet grassland. The average length of hedgerow /square km is 6.56 for this survey and compares with 7.28 for the figure provided by Foulkes and Murray (2005). The difference may be due to the particular characteristics of the two study areas. The area covered by the habitats survey may represent relatively more intensively managed land compared to the average type of land in the county.

Drainage ditches comprise the next most significant linear habitat.These are traditionally associated with hedgerows. It is likely however that drainage ditches are underrecorded as it is not always easy to detect drainage ditches from aerial photgraphs, nor was it possible to check all those outlined on the vector maps.

Depositing lowland rivers are also under recorded particularly as some of the River Barrow was excluded from the survey in 2006 as it is within a designated area.

The remaining linear habitats in the survey (ornamental non-native srubs, treelines, stonewalls, canals, earth banks collectively accounted for just over 7% of the linear habitats with ornamental-non native shrubs (2.71 km) and tree lines (3.21 km) virtually the same.

3.2 Habitat accounts

3.2.1 Introduction

Summary descriptions and preliminary assessments of the principal habitats of biodiversity interest are complemented by species lists in Appendix 7 and target notes contained in an an Excel data base which are referenced in Appendix 8.

3.2.2 Wetlands

FL3 Limestone/marl lakes(sky-blue or light blue squares on a white background). Limestone/marl lakes are found mostly in Bellegrove (Grid square N5905, target notes 3 and 4), Ballinlough (Grid square S5399, target note 1), and in Kilbride (Grid square N5209, target note 4, Fig. 3) in the north east of Laois. The overall area of this habitat category is small. Ballinlough Lake is the largest of those surveyed (~ 0.25 ha). Few floating species were growing in the water but tall herb swamp vegetation (FS2, grid square S5399, target note 3) encircled the lake. This was undisturbed and dominated by yellow iris with water mint, sweet grass sp. and branched bur-reed. Two small lakes were found in Kilbride in a disused quarry (Fig. 3), and these contained an additional 6 species. Most of the lake and pond habitats (FL4, FL5 eutrophic lakes and FL8 other artificial lakes and ponds) that were surveyed were quite small (< 0.25 ha), and most were in a degraded condition having either become overgrown through neglect or considerably altered through the planting of exotic species within and around the perimeter or parts had been filled in for safety reasons. Others were eutrophic due to unrestricted access to them by livestock. In general there were few plant species associated with these lakes/ponds.

FW2 Depositing lowland river (sky blue solid line).

118 km of depositing lowland rivers were recorded, this excludes much of the River Barrow because it is a designated SAC and was not included in the survey until 2007 (Table 7). Townlands with depositing lowland rivers include Garryvacum (Grid square N5506, target note 1), Courtwood (Grid squares N6002 and N6102 and target notes 1 and 2 respectively,) Vicarstown (Dodd, Grid square N6001, target note 2) and Derrybrock (Grid square S6199, target note 1, Fig. 4). Depositing lowland rivers range in size from small shallow streams (Garryvacum), to medium seized rivers such as The Stradbally River (Fig. 4), to larger rivers such as the Barrow. The Glasha river (Courtwood Grid square N6102, target note 2) although small was free flowing with a substrate of sand and gravel and contained some small fish, whilst in Vicarstown (Dodd, Grid square N6001, target note 2) a kingfisher was observed chasing water hens along the stream.

Fig. 4. The Stradbally River (FW2) and the Camac aqueduct for the Grand Canal (FW3) at Ballymanus Bridge in Derrybrock, Co. Laois (Grid square S6199, target note 1).

FW3 Canals(sky blue dotted line).

The Grand Canal which flows through Co. Laois is a designated NHA and originally did not fall under the remit of the survey until 2007. In 2006 canal type habitats were surveyed along the Mountmellick branch of the canal between Portarlington and Mountmellick. The natural and cultural heritage of this canal is the subject of a more detailed survey (Hammond and Feehan, 2006) for Laois Heritage Forum. Sections containing water were found in Bracklone (Grid square N511, target note 3, fig. 5) and in Kilbride (Grid square N 5210, target note 2). Both areas were fringed with scrubby habitats and evidence of wildlife was apparent in each with bird prints showing in soft mud at the edges of the canal in Bracklone. Ducks are frequent in the canal at Kilbride (personal communication with landowner). However waterfilled sections were rare. Most of the canal is now infilled or no longer contains water.

During 2007 parts of the Grand canal that flowed through the townlands of Ballintogher (Grid square N6008, target note 1), Jamestown or Ballyteigueduff (Gride square N6106, target note 4) and Derrybrock were surveyed. Species present in the canal included common water plantain,

bulrush, common reedmace, yellow waterlily and Canadian pondweed. Young fish were observed at each of the three locations surveyed.

FW4 Drainage ditches(indigo dotted line).

Drainages ditches are typically found forming field boundaries, adjacent to field boundaries or in low-lying wet areas in fields. Drainage ditches that are not subject to shading from adjacent hedgerows are common in both of the two survey areas, but particularly in townlands off the R422 such as Raheenahown North, Garrymaddock and Rathcrea. These drainage ditches appear to be more species rich than those associated with hedgerows or woodland margins e.g. in the drainage ditch examined in Raheenahown North (Grid square N5802, target note 2), 29 different species were recorded compared to a drainage ditch dominated by horsetails in Morett, that was associated with a woodland margin of grey willow (Grid square N5404, target note 14). A total of 72 different species were found in the drainage ditches surveyed (Table 4), including heath spotted and southern marsh orchid, hemp agrimony, marsh arrowgrass, marsh cinquefoil, marsh marigold, meadowsweet and sharp-flowered and soft rush. The drainage ditch at Kearney's Lough in Cooltederry (Grid square N5311, target note 2) was dominated by reed canary-grass. The condition of the ditches range from being open with a constant flow of water to those covered with vegetation. The drainage ditch examined in Raheenahown North (Grid square N5802, target note 2), was covered in vegetation. In Ballymorris (Grid square N5211, target note 4,) a double ditch was found separated by a dense hedgerow. Both drains contained water but were choked with vegetation.

Common valerian and grey willow were among the species in a drainage ditch in Rathmakelly Glebe (Grid square S3778, target note 2, Fig. 6).

FS1 Reed and large sedge swamps (indigo diagonal lines slanting to the right).
Reed and large sedge swamp was found in a number of locations in 2007, mainly in the north east survey area, along the Grand canal (Derrybrock Grid square S6199 target note 1, Jamestown or Ballyteigueduff N6106 target note 3), at the edge of the Stradbally River at Curraclone (Grid square S6098 target note 2) and in Ballykilcavan (Grid square S5996 target note 4, near the Stradbally River) where it was dominated by reed-canary grass. It was also found in a newly constructed wetland for treating waste water coming from the motorway at Killaglish (Grid square N6107 target note 2). It was found in one locationin the south west area of survey in Cool (Grid square S3881 target note 2, Fig. 7) and was dominated by reed-canary grass. Species diversity tends to be low in reed and large herb swamp but 24 species were recorded growing along the canal at Jamestown/Ballyteigueduff where species such as bulrush, grey willow, common reed mace and purple loosestrife were found. In all reed and large herb swamp covered an area of almost 5 ha.

FS2 Tall-herb swamp (indigo diagonal lines slanting to the left).
Tall-herb swamp covered an area of 1.4 ha and was found in the north east part of the survey area only. It was growing in two areas, in Stradbally (Grid square S5695 target note 1), where it was dominated by yellow flag iris and meadowsweet and in Garrans (Grid square S5997 target note 3, fig. 8), where the main species were meadowsweet and willowherb). Species diversity is usually greater in tall-herb swamps with the main species being tall and strong growing for example brooklime, gipsywort and iris.

Fig. 8. Tall-herb swamp (FS2) in Stradbally (Grid square S5695 target note 1).

The swamp was dominated by flag iris and meadowsweet. Intermingled with the tall herb swamp were small areas of dry calcareous and neutral grassland.

3.3.3 Grasslands

GS1 Dry calcareous and neutral grassland (yellow squares on white background).
Dry calcareous and neutral grassland was found in both of the survey areas encompassing an area of 28.2 ha (Table 5), however there were more examples of this habitat type in the north east of the county than in the south west. Although dry calcareous and neutral grassland occurred on its own, it also formed mosaics with wet grassland, particularly, in fields with uneven topography such as those found in Garrymaddock and Rathcrea.

Dry calcareous and neutral grassland tended to be species rich and a total of 104 different species were recorded (Table 4). Typical species found in the majority of sites included oxeye daisy, quaking grass, yellow-wort, false-oat grass, yarrow, common knapweed and red clover. Five uncommon species were recorded in dry calcareous grassland; mountain everlasting was recorded in one site in Middlemount or Ballyvoghlaun (Grid square S3278 N2 GS1), whilst adder's tongue was recorded in 2 locations (Rathcrea grid square N5902 N2 GS1 and in Garrymaddock Grid square N5702 N13 GS1), fragrant orchid was also recorded in the Garrymaddock site while bee

orchid was recorded in a disused quarry in Kilbride (Grid square N5209, target note 6, Fig. 2). The dry calcareous and neutral grassland in the quarry (Kilbride, Fig. 9) contained at least 65 different species and in addition to bee orchid species included carline thistle, kidney vetch, downy oat grass, yellow oat grass and marsh helleborine. Even though species numbers were high in dry calcareous and neutral grassland nearly all of the areas in which it occurs are degraded due to disturbance, some of which has been caused by land reclamation. The dry calcareous and neutral grassland in Kilbride was an exception as it was relatively undisturbed and was not in receipt of fertiliser.

Fig. 9. Broad–leaved marsh orchid growing in species rich dry calcareous and neutral grassland (GS1) adjacent to the River Barrow SAC Cooltederry, Co. Laois, N5312, target note 5.

GS2 Dry meadows and grassy verge (yellow diagonal lines slanting to the right).
Dry meadows and grassy verges were found in at least 13 townlands, beside roads (Killone, grid square N5402, target note 3), along laneways (Rathcrea, grid square N5801, target note 9), in graveyards (Tirhogar, grid square N5510, target note 1), overlying small outcrops of limestone in Coolnacarrick (Grid square S5296, target note 1) and beside a section of disused Mountmellick Branch of the Grand Canal in Kilbride (Fig.10).

Fig. 10. A dry meadow and grassy verge habitat (GS2) growing in an old graveyard in Killermogh Co. Laois (Grid square S3980, target note 1).

Ninety four species were recorded from an area of 43.6 ha of dry meadows and grassy verge habitats (Tables 4 and 6) including false oat-grass, cock's-foot, crested dog's-tail, common bent-grass, Yorkshire fog, quaking grass and downy oat-grass which was found in Coolnacarrick growing on an outcrop of limestone where the habitat was not being actively managed, other than some light grazing. Forty-six species including glaucous sedge, lady's bedstraw and fairy flax were recorded from the roadside grassy verge in Killone that had been disturbed due to road realignment in the past, however many of the road side verges were species poor.

GS3 Dry-humid acid grassland (yellow diagonal lines slanting to the left).
A total of 26 species were recorded in dry-humid acid grassland habitats (Table 4), which were found in the townlands of Morett, Cappakeel, Garrymaddock and Hophall all in the north east of County Laois. In Morett (Grid square N5404, target notes 1 and 9, Fig 11) tussocks of the grass cock's-foot dominated while other species included purple moor-grass, silverweed and yarrow.

In Cappakeel (Grid square N5604, target note 2) Yorkshire fog, bent grasses, sweet vernal and crested dog's-tail were among the main species present. In Morett dry-humid acid grassland was in poor condition, as bramble and gorse dominated scrub, were encroaching into the fields. One of the fields appeared abandoned whilst horses grazed in the other field at the time of the survey. Dry-humid acid grassland also occurs as a mosaic with GS4 in Hophall (Grid square S5015, target note 10) in what appears to be abandoned farmland.

GS4 Wet grassland (yellow diamonds on a white background).

After improved grassland (GA1), Wet grassland (GS4) is the commonest type of grassland. It is found in 22 of the townlands surveyed most of which are in the north east section of County Laois. Not only was wet grassland the most species rich habitat surveyed with a total of 131 different plant species it also covered the largest area (152 ha) for a semi-natural habitat (Table 4 and Table 5). Species composition was not the same in the different wet grassland sites, for example, in Rathcrea (Grid square N5901, target note 4) common spike-rush is dominant, in Hophall (Grid square S5905, target note 1) sharp-flowered rush is the most abundant species while in Garryduff (Grid square S3182, target note 14) the grassland is dominated by jointed rush and meadowsweet while purple moor-grass, Yorkshire fog and purple loosestrife were species with a frequent occurrence. Garryvacum (Grid square N5507, target note 7) has the most species diverse wet grassland of the areas surveyed with 55 different species counted from the site which was adjacent to an area of cutover bog and scrub. The rare species columbine (Appendix 5) was also recorded from this area in Garryvacum along with marsh arrowgrass, rough hawkbit and common cotton-grass. Dairyhill and Ballymorris were also species rich with 34 and 33 species respectively (Table 4, fig. 12). There are also some particularly good examples of wet grassland in Garrymaddock (Grid square N5703 target note 4); Park or Dunamase (Grid square S5198 target note 7); Rathcrea (Grid square N5901 target note 4); Garryduff (Grid square S3182 target note 14) and Curragh (Grid square S3481 target note 2).

In 2007, 32 additional species were recorded from wet grassland. These included broad-leaved marsh orchid, brown sedge, false-fox sedge, greater tussock sedge, tall fescue, wild angelica and common flea bane in Inch (Grid square S5997, target note 1, fig.12). Tall sedge dominated wet grassland in Jamestown or Ballyteigueduff (Grid square N5907, target note1), were it grew in association with purple moor grass and tufted hair grass. In Coolderry (Grid square N5312, target note 1), parts of the broad-leaved herb component dominated the grassland and contained abundant Marsh Orchids. Purple Moor-grass and black bog-rush also occurred but were generally restricted to areas adjacent to drains that divided the fields.

Fig. 12. Wet grassland (GS4) in Inch, Co. Laois (Grid square S5997, target note 1)

At least 49 species were recorded in this wet grassland meadow including wild angelica, greater tussock sedge, tall fescue and meadowsweet

GM1 Marsh (yellow infill).

Marsh habitats are found in 4 townlands two of which, Aghnahily bog (Grid square S5198, target note 7) and the Rock of Dunamase (Grid square S5198, target note 3) are adjacent to each other. The other 2 townlands are Tintore /Ballacolla (Grid square S3581, target note 1, fig 13) and Cooltederry (Grid square N5412, target note 4). Collectively the total area of marsh habitat is quite small (13.4 ha) accounting for only 0.14% of the total area digitised to date (Table 5).
Standing water is characteristic of Aghnahily bog and the Rock of Dunamase. The marsh in Aghnahily, which is quaking, appears to be in transition between marsh and cutover bog. This is a species rich habitat with 35 different plant species.

Fig. 13. Common species found in Marsh (GM1) habitat (meadowsweet, purple loosestrife and common reed) in Tintore and Ballacolla (Grid square S35818, target note 1).

In Park or Dunamase, reed canary-grass, marsh willowherb, reedmace and meadowsweet are the dominant species whilst in Aghnahily Bog meadowsweet and wild angelica dominate. Both areas of marsh are bounded by a strip of bog woodland, which is encroaching along their edges. Neither of the sites appeared to be disturbed or grazed to any extent. Past attempts to reclaim the marsh in Tintore/Ballacolla (Fig. 13) were unsuccessful and the marsh currently has great fen sedge, common reed, black bog rush and purple loosestrife among its species.

3.3 4 Heath and Bog

HH3 Wet heath (brown squares on white background).

Wet heath habitats are found in Morett and Garrymaddock where a total of 18 different plant species were recorded. In Morett wet heath is found in 3 areas and on one of the sites (Gird square N5404, target note 2), the heath appeared to have developed on cutover bog that had previously been reclaimed for grass but now seems to be abandoned as there were no signs of grazing or other disturbance. Shrub species typically associated with wet heath such as ling and cross-leaved heath were absent, but the vegetation is dominated by purple moor-grass with frequent black bog rush, however, brambles and gorse were encroaching (Fig. 14). In Garrymaddock (Grid square N5404, target note 11) wet heath is found forming a mosaic with WN2 (oak-ash-hazel woodland) on the wetter parts of the site, near the river Glasha, where birch, willow and ash scrub were frequent. The overall area of heath is however small with the 4 areas comprising only about 1 ha.

Fig. 14. Wet heath (HH3) habitat in Morett (Grid square N5404, target note 3), dominated by purple moor-grass, which is being invaded by brambles and gorse scrub.

PB1 Raised bog (violet horizontal lines).

aised bog occurred only in Garryvacum (Grid square N5507, target note 10, fig. 15). It covered an area of 9.3 ha which came to 0.1% of the total area currently digitised (Table 6). It was adjacent to cutover bog (PB4) which was about 2 - 3m lower than it. There was a conifer plantation growing to the south west of the bog while the cutover bog was almost surrounded it to the north and east. The surface of the bog was fairly dry and peat was exposed in places but no rain had fallen for a considerable time. Ling heather dominated the vegetation which was growing in association with deer grass, bog asphodel, bog rosemary and horsetail cotton-grass. Downy birch was scattered over the bog which is being grazed by deer (Fig. 15).

Fig. 15. Raised bog (PB1) habitat in Garryvacum (Grid square N5507 target note 10), with ling and deergrass among the species found there.

PB4 Cutover bog (violet diagonal lines slanting to the right).
Examples of cutover bog are found in the townlands of Aghnahily Bog (Grid square S5198, target notes 1, 3, 4 and 5), the adjacent townland of Dysart (Grid square S5197, target note 1) in Garryvacum (Grid square N5507, target note 8, fig. 14) and in Clonanny (Grid square N6010, target note 3, Fig. 16). In Aghnahily Bog and Dysart the cutover bog was adjoining small sections of uncut bog. This site has been modified through drainage and burning which has occurred in the last 5 years. Consequently the bog is very dry. Although there are wet hollows in places, sphagnum cover is poor and parts of the surface are covered in bare peat. Around the perimeter there are very small areas of naturally regenerating birch woodland within areas of scrub. While there is a fence line running through the bog there were no signs of grazing, nor were there any signs of cutting. Twenty-eight species were found in this habitat including typical raised bog species such as bog rosemary, ling, cross leaved heath, cotton-grasses, purple moor-grass, royal fern and bog asphodel, while in the pools the bog forming mosses, Sphagnum imbricatum and S. cuspidatum occurred. Aghnahilly bog is within a few kilometres of Portlaoise town. The entrance to the bog (an area of recolonising bare ground ED3, Dysart grid square S5198, target note 1) is being used as a dumping area for old cars and garden rubbish.

A total area of 71 ha of cut over bog was surveyed accounting for 0.31% of the total area surveyed to date (Table 5). In Garryvacum the surface of the cut over bog was dry to walk on but had not dried out. Forty eight species were recorded from cut over bog which was dominated by common cotton-grass (Table 4). In Clonanny 7 additional species for cut over bog were recorded including water avens, marsh bedstraw and carnation sedge.

Fig. 16. Cutover bog (PB4) in Clonanny (Grid square N6010, target note 3), showing a recently cut bank.

PF1 Rich fen and flush (violet diamonds on a white background).
Two examples of this habitat is found in the townland of Morett (Grid square N5404, target note 6,) and in Kyle (Grid square S5082, target note 3, Fig. 17). In Moret the rich fen and flush was waterlogged and most of the vegetation formed tussocks. Two different groups of plants could be distinguished and they naturally formed 2 distinct zones. On the southern side a large area was covered in common reed and purple moor grass, while to the north, black bog rush was common. The site was bordered on 3 sides by woodland and on the fourth by a drainage ditch. The overall area was small (1 .04 ha, Table 6) and total of 24 species were recorded (Table 4) from the two areas and in addition to those mentioned above were carnation sedge, water mint and devil's-bit scabious.

Fig. 17. Rich fen and flush (PF1)

A narrow strip of fen vegetation was located in Kyle (Grid square S4082, target note 3) perhaps indicating some ground water movement. Quaking grass, purple moor grass and heath spotted orchid were included

PF2 Poor fen and flush (lilac infill).
The area of poor fen and flush surveyed was very small and was not marked on the map as a separate habitat but is identified by a target note. In all 14 different species were noted including marsh cinquefoil which was abundant (Table 4, fig. 18), as was deer grass, bog asphodel, devil's-bit scabious, cross-leaved heath and round-leaved sundew were also present.

Fig. 18. A small area of poor fen and flush (PF2) within cutover bog in Garryvacum
(Grid square N5507, target note 11). Marsh cinquefoil, sphagnum mosses and round-leaved sundew were common

3.3.5 Woodland and scrub

 *WN2 Oak-ash-hazel woodland (green vertical parallel lines).*
Oak-ash-hazel woodland is found throughout the survey area in both the north east and the south west of County Laois. It is typically found on base-rich sites where drainage is good or on limestone outcrops. It is particularly associated with the hums (upstanding limestone outcrops that form steep rounded hills) which occur in the Stradbally area. A total of 135 ha of oak-ash-hazel woodland were surveyed which was just over half a percent of the total area surveyed (Table 6). Two of the largest areas of oak-ash-hazel woodland were in Kilteale/Park Upper and in Park or Dunamase (Grid squares S5498/S5498 and S5198 respectively, and target notes N3/N3 and N6 respectively), whilst the smallest is in Kilbride (< 0.5 ha, grid square N5210, target note 3), in general the majority were less than 5 ha in size.

Oak-ash-hazel woodland is species rich (152 species, table 4). Hazel is the dominant tree and/or shrub species and is present in almost all the woodlands surveyed. Pedunculate oak is rare and it was only found in 7 woodlands, in the townland of Park or Dunamase (Grid squares S5198, S5298 and S5398), in Courtwood (Grid square N6102, target note 1,) but not in great numbers, in Kylebeg (Grid square S5896 , target note 2), in Garrans (Grid square S5997, target note 1, fig. 19), and in Park (Grid square S6096, target note1). Mature oak dominated the woodland in Park which is a semi-natural woodland managed commerically in the Native Woodland Scheme. It is also part of the Stradbally Hills pNHA (1800). Several large patches have been replanted and contain immature conifer plantation and there are several other sections that are mixed and contain mature conifers and non-native braodleaves (Beech, Sycamore and Sweet Chestnut). A total of 63 species were recorded from the woodland in Park including hawthorn and spindle.
Oak, beech and sycamore were also found in oak-ash-hazel woodlands. Ash and hawthorn are found in most sites, and spindle is fairly common. Yew was present in the wood in Courtwood, not far from the Fort of Dunrally. At least 8 different ferns were seen including lady fern, hart's-tongue fern, soft and hard shield ferns, black spleenwort and common polypody. Other ground flora species included herb robert, herb bennet, bluebell, wood sanicle, arum lily, enchanters nightshade, wood sedge and false brome.

The Oak-ash-hazel woodland in Kilteale/Park Upper and the 3 woods in Park or Dunamase are designated NHA's. These have fences around their perimeters to prevent farm animals from gaining entry, and as a result there is no excessive grazing pressure. The three woods in Park or Dunamase all contain mature trees of ash, beech, sycamore and oak and most are over 30 m tall. These woodlands are quite old and a number of beech have fallen in recent years, (Grid square S5198, target note 6). There were some signs of regeneration in all three but mainly of ash and sycamore with the latter being the most prolific.

In Kilteale/Park Upper, hazel was the main tree/shrub species present along with hawthorn, willow, ash, blackthorn and the occasional holly, seedlings of mountain ash were also found. Growth of scrubby species in particular bramble and blackthorn are beginning to take over parts of the wood making access difficult.Wood sorrel, enchanter's nightshade, woodruff and bugle were among the species (31 in all) present.

Although not an NHA, the wood on Killone hill (townlands of Killone, Kilmurray and Ballythomas) is species rich (34) and overall shows few signs of disturbance. Hazel was the main tree/shrub species while ash and hawthorn were frequent. Other woody species included beech, spindle, holly, blackthorn and dog rose but only in small numbers. There was very little bare ground in this wood as there were no farm animals present, however deer are known to browse here but grazing pressure is low. Wood sanicle and bluebells were abundant on the woodland floor,

while woodruff and soft shield fern were also frequently found. The grass wood melick was also found though only occasionally.

Fig. 19. Oak-ash-hazel woodland (WN2) located inGarrans (Grid square S5997, target note 2).

Hewson's Hill in Coolnacarrick is another oak-ash-hazel woodland worth noting. Forty-nine species of higher plants (8 were different to those recorded for the County Laois survey) were recorded during a field trip to the wood by Dublin Naturalist's Field Club led by Dr Howard Fox in April 1997 (Appendix 5), as well as 79 lower plants. A record of the fauna present on the hill was also made which included 3 snails (rounded snail, white lipped snail and the common door snail), several butterflies and moths, 10 different bird species including blue and grey tit, skylark and wren, and mammals including the hare, badger and pygmy shrew.
Ash dominated woodland was found in Ballybrittas (Grid square N5808, target note 1, which had some mature beech in the canopy. Other species included holly and hazel and the ground flora was dominated by ivy. This woodland had also been surveyed as part of the Native Woodland Scheme.

WS1 Scrub (bright green diamonds on a white background).
Scrub is found throughout the survey area in Co. Laois, including dry sites such as outcrops of limestone and disused quarries, in wet areas, in corners of improved agricultural grassland and abandoned houses. In Morett (Grid square N5402, target note 1) scrub can be found growing around the edge of what probably was an old ring fort as well as in a number of other locations. The main woody species found in scrub habitats included gorse, hawthorn, blackthorn, willows, bramble, hazel and birch. In some sites single species dominated while in others various combinations of species existed. Species diversity in scrub habitats was considerable with at least 153 species recorded (Table 4) including species found in shaded woodland type habitats such as arum lily, broad buckler fern, great wood rush and herb robert to those found in wetter open sites such as cotton grass, horsetails, meadowsweet, purple moor-grass and wild angelica. Scrub habitat accounted for 0.9 % (207.13 ha) of the total area of habitats surveyed to date and is the second largest area of semi-natural habitat recorded so far in the survey (Table 4). Heath spotted orchid and fragrant orchid were among the thirty two species recorded from wet scrub in Kilrory (Grid square S5798, target note 1, fig 20), that was dominated by grey willow, downy birch and gorse. Ringlet butterflies were also recorded.

Fig. 20. Scrub (WS1) in Kilrory (Grid square S5798, target note 1)

Dominated by grey willow, downy birch and gorse this area of wet scrub was orchid rich.

WL1 Hedgerows (green horizontal line).

Between the 2 survey areas 114 plant species were recorded in hedgerows (Table 4). At least 37 different woody species were noted down including pear, a rare species, ash, wych elm, English elm, yew, hazel, hawthorn, blackthorn, holly, spindle, honeysuckle, guelder rose, gorse, and several willows.

In general the hedgerows appeared to be wide and bushy with few gaps or weak areas. This was particularly evident in the townlands in the north east of the county, where a common feature of the hedgerows was the strong presence of hazel. Not only did hazel occur in the majority of the hedgerows surveyed it was often the dominant species. Although hazel was found in many of the hedgerows in the south west it did not dominate nor occur abundantly.

In Ballyrider (Grid square S5899, target note 2, fig. 21), ash and elm dominated the hedgerow which also contained hawthorn, honeysuckle and common privet.

Hedgerows are found along road sides, forming field boundaries and quite often form townland boundaries. A fine example of a roadside hedgerow can be found in Vicarstown (Dodd) (Grid square N6301, target note 2). A total of fourteen woody species including pear, crab, yew and holly were found in this dense tall hedgerow.

Fig. 21. Hedgerows (WL1). This hedgerow in Ballyrider (Grid square S5899, target note 2) was dominated by ash and elm.

In addition to growing directly from ground level, hedgerows can also be found on top of stonewalls, and earth banks such as in Ballymaddock (Grid square S5599, target note 8), where of the seven woody species, hazel dominated while hawthorn was frequent. Forty-two herbaceous species were also recorded including field scabious, meadow vetchling, downy oat-grass, knapweed and bird's-foot-trefoil. Other notable hedgerows occurred in Rathronshin (Grid square N5906, target note 2) and in Fisherstown (Grid square N6205, target note 1).

A detailed account of the hedgerows in County Laois can be found in the Laois/Offaly Hedgerow Survey (Foulkes and Murray, 2005).

3.3.6 Exposed rock

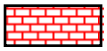
ER2 Exposed calcareous rock (red vertical parallel lines).
This habitat type is found in a number of townlands including Killone, Kilmurry, Ballycarroll and Oughaval where the underlying bedrock is close to the surface, however, it covers only a fraction (0.01%) of the original area of habitats that have been to date digitised. One of most interesting site with exposed calcareous rock was a limestone quarry in Kilmurry where quarrying had ceased in the 1950's (Grid square N5501, target note 5). It is now being used as feeding or holding area for cattle and the floor of the quarry is showing signs of enrichment due to this usage. Sixty-nine different species were recorded, with the majority growing on the cliff face itself (Table 4). They include wild strawberry, salad burnet, pale flax, biting stonecrop, cut-leaved crane's-bill, quaking grass, cock's-foot and oxeye daisy. The outer edges of the quarry are overgrown with blackthorn-dominated scrub.

In Oughaval (Grid square S5895, target note 3, Fig. 22) the exposed calcareous rock was part of a quarry that has now been filled in with builder's rubble and garden waste.

Fig. 22. Exposed calcareous rock (ER2), at the southern end of an old quarry that has been filled in, in Oughaval

(Grid square S5895, target note 3). Most of the species growing on the rock are typical of those found in dry calcareous grassland such as cut-leaved crane's-bill and yellow oat-grass.

3.3.7 Bare Ground

 *ED3 Recolonising bare ground (red brick work pattern).*

A species rich and diverse example of recolonising bare ground was surveyed in a disused and filled in quarry in Oughaval (Grid square S5895, target note 2, Fig. 23). At least 52 different species were recorded, with teasel AND ragwort dominating the vegetation. While most of the species were perennials including as knapweed, tufted vetch and wild mignonette the annual common poppy was present. At least 5 species of butterflies were identified included the common blue and peacock. Bumblebees and honey bees were also abundant.

Fig. 23. Recolonising bare ground (ED3) in Oughaval (Grid square S5895, target note 2

3.2.7 Cultivated and built land

BC4 Flower beds and borders (grey diagonal lines slanting to the right).

Habitats within the category cultivated and built land are completely man-made and in general not as interesting or as species diverse as natural or semi-natural habitats. Nonetheless, many provide reasonable habitats for a wide array of species, in particular small vertebrates and invertebrates. An interesting French style kitchen garden with an assortment of fruit, vegetables, ornamental shrubs and herbaceous species was surveyed in Ballymorris (Grid square N5310, target note 7, fig. 24).

Fig. 24. Flower beds and borders (BC4) in the garden of Lily Champ, Ballymorris, Co. Laois

(Grid square N6301, target note 2). A first-rate example of a French style kitchen garden known as a jardin potager, in which flowers, fruit and vegetables grow together.

4 Management guidelines

4.1 Management issues

4.1.1 Management priorities

Information from the survey is principally of value in revealing the nature of the biodiversity interest in the county. The results can be used to compare the status of biodiversity with other areas where such surveys have taken place, provide a baseline to inform discussion and policy making on biodiversity or/ and inform future research on other aspects of biodiversity. Any discussion or review should be informed by a comprehensive habitat map of the entire county.

Fieldwork in Laois has revealed the presence of 56 habitats (including four not included in Fossitt, 2000) and 444 species. A similar survey in part of County Carlow revealed 45 habitats and 374 species in an area of 74 sq km. However the survey in Carlow included uplands.

Marsh was found in both counties and occupied about 8 ha of land in County Carlow compared to approximately 13 ha in County Laois. The main species found in marsh habitats in Laois were yellow iris, marsh willowherb, angelica and meadowsweet. In Carlow all the marsh areas were associated with the Barrow River and the annual invasive species Himalayan balsam tended to dominate. In most instances the drainage ditches in County Carlow occurred in association with hedgerows or other boundaries types, whereas in Laois in addition to those occurring next to boundaries there were several drainage ditches in open fields and these tended to have a greater diversity of species.

All of the semi-natural grassland habitats described in Fossit (2000) are found in Laois. In both counties wet grassland was recorded as the dominant semi-natural habitat covering 134 ha in Carlow and approximately 314 ha in Laois. Species diversity was also high in the two counties but there were 53 species in wet grassland in Carlow compared to 163 in Laois. Marsh arrowgrass, fragrant orchid, and quaking grass were found in wet grassland in Laois but not in Carlow and marsh violet, common figwort and bog pimpernel were among the species found in Carlow but not in Laois.

Heath and bog habitats are scarce in the area surveyed in Laois compared to Carlow where wet and dry heath can be found on the slopes of the Blackstairs Mountains. Raised bog type habitats are rare in Carlow but there is small area of cutover bog (Red Bog) in the survey area in Carlow. However this is in danger of drying out due to drainage channels around the perimeter. Although the area of bog which was surveyed in Laois is small it is considered that it is not representative of the county where bog habitats are more common.

Four types of semi-natural woodland are found in County Laois (oak-birch-holly woodland, oak-ash-hazel woodland, wet willow-alder-ash woodland and bog woodland) whilst in Carlow 3 types of semi-natural woodland was found (riparian woodland, wet-willow-alder-ash-woodland and bog woodland). The presence of oak ash hazel woodland reflects the presence of more alkaline soils.

Scrub habitat is found in both counties and in similar locations such as abandoned corners of fields and beside derelict buildings etc.

County Carlow had slightly less species in its hedgerows (100) compared to County Laois, which had 116 plant species. Hawthorn, hazel, gorse, ash, holly, sycamore, elder, ivy, honeysuckle, dog rose, bramble, mountain ash, willow and spindle were among the species present in hedgerows in

both counties, but there were more species of willow in Laois, also guelder rose occurred frequently in the hedgerows of Laois but not in Carlow. However oak was found in Carlow but not the hedgerows of Laois.

Within Laois further comparisions could be made between habitat diversity in townlands, planning areas or regions as statistics can be easily generated on the cover of any of the mapped habitats by interrogating the habitat data base.

The addition of Portarlington to the area surveyed in 2006 revealed the presence of large areas of gardens (120ha) which have potential for management for biodiversity. The area covered by gardens is far greater than all semi-natural habitats with the exception of hedgerows, scrub and wet grassland. This suggests that policies should be developed to make garden management more compatible with biodiversity.

Information on the current cover of habitats could be used as a baseline against which future policies or plans could be benchmarked. For example discussions could take place between stakeholders regarding the desired cover of particular habitat types in particular areas or the maintenance of links between them. Unless habitat mapping is available for the entire county these discussions can only focus on particular areas.

The information in the baseline survey provides an evaluation of the status of biodiversity in the surveyed area. The findings that 1) there is a relatively small cover of semi-natural habitats in the wider countryside and 2) linear features such as hedgerows and drainage ditches are important habitats and linking features should be communicated to the public, landowners and policy makers. It vindicates the priority given to research on habitats, hedgerows, eskers and derelict wetlands by the Laois Heritage Forum and the urgent need to extend the survey to other parts of the county and initiate action projects to appropriately manage surviving good quality examples of these rare types of habitats.

4.1.2 Information service for landowners and householders

Among the farming community the recent introduction of the Rural Environment Protection Scheme (REPS2), has raised the profile of biodiversity.
While only a minority of farmers are in REPS (c. 30% in County Laois) the new scheme obliges participants to actively manage some part of their land for biodiversity. Habitat mapping should inform REPS plans, suggest priorities for habitat creation and improvement and assist in the evaluation of the impact of REPS on biodiversity. Wet grassland (Rhahandrick Upper and Raheenahown North (Grid square S3181, target note 1 and grid square N5802, target note 2 respectively) and scrub (Rhahandrick Upper Grid square S3181, target note 2) were among the habitats that are managed under REPS. However it is apparent from meeting with landowners that few are aware of the rarity value of semi-natural habitats on their lands and their management requirements. This lack of knowledge may reflect the lack of information which is available on local habitats.

Many of the ponds that were surveyed were eutrophic (due to fertilizer run off or cattle) with the exception of Ballinlough Lake (FL3, Grid square S5399, note 1), two small ponds in a disused quarry in Kilbride (FL3, Grid square N5209, target note 8), two ponds in Carrigeen (FL8, Grid square N5500, target note 4) where the farmer was in REPS and a smallish pond in Bellegrove (FL3, Grid square N5905, note 4). In most cases the water is extremely dirty and churned up. Very

[2] Rural Environment Protection Scheme is a scheme whereby farmers are rewarded for farming in an environmentally friendly manner and for carrying out environmental improvement to existing farms

little emergent or transitional zone is present due to unlimited access by cattle and other livestock throughout the year.

The habitat quality of rivers and streams is better. Problems arise due to the damming of streams by vegetation and shading by encroaching vegetation. Drainage ditches fare similarly to rivers and streams, excess vegetation and shading is greater in particular where the ditches were adjacent to hedgerows. There is a particularly good example of a drainage ditch in Raheenahown North (Grid square N5802, note 2), in the middle of a field, which has some interesting species such as lesser butterfly orchid, bog bean and marsh arrowgrass. This requires careful management to preserve these rare species.

Although species diversity is good in the majority of the semi-natural grasslands (dry calcareous and neutral grasslands, wet grasslands and marshes), require improved management, for example, a number of dry calcareous and neutral grassland habitats were damaged or degraded. In both Garrymaddock (Grid square N5702, target note 13) and Rathcrea (Grid square N5902, target note 2) the habitats showed signs of considerable disturbance, but the causes were different. In Garrymaddock the ground was all humps and hollows due to land reclamation of scrub. In Rathcrea severe poaching from cattle had churned up the ground also resulting in a series of humps and hollows and a lot of exposed soil. Good quality semi-natural grassland is found in a few areas; in Curragh (GS4, Grid square S3481, note 2), Rathcrea (GS4, Grid square N5901, note 4), Park or Dunamase (GS1, Grid square S5398, note 2) and in Coolnacarrick (GS1, Grid square S5296, note 1). However some of these sites e.g. Coolnacarrick and Park or Dunamase are threatened by scrub invasion due to under grazing.

While hedgerows were healthy and dense many of the examples of woodland or scrub were very degraded, mainly through poaching by cattle and or sheep. In contrast to the general condition of woodlands, the oak-ash-hazel woodland on Killone Hill is of particularly good quality. A conservation management plan should be prepared for this site in conjunction with the landowner.

The distribution of land of biodiversity value is spread over a wide area and a targeted information service may be needed. The mapping project has identified the location of good examples of rarer habitats. It has also suggested that there is potential to focus on gardens. As a follow up to this project pilot actions should be initiated to protect and manage appropriately good examples of particular habitat types among both landowners and householders

4.2 Guidelines

4.2.1 Role of Laois Heritage Forum

The role of the Heritage Forum is to provide a local network to support interested individuals and relevant agencies with a direct or indirect role in heritage management. The network needs information as a basis for informing discussions and policy making. The results of this project provides up to date maps and statistics on the status of biodiversity in lowland Laois.

In the short term the priority is to highlight the results of the mapping project to the general public and to stakeholders (landowners and planners) who are making decisions on land use. The secondary priority is to continue to gather such information on other parts of the county, particularly areas under pressure from development. The initiatives suggested here should be used as a basis for discussion. While some could be initiated directly by the Heritage Forum, their active promotion by other organizations even independently of the Heritage Forum should be pursued.

4.2.2 Information and awareness raising

Target audience: the public/landowners/householders

- In the short term organise a demonstration of the digital and hard copy habitat map to landowners who allowed their land to be surveyed and local IFA. This should be done before launching a countywide campaign. A limited demonstration could be provided at the annual Heritage Seminar. A public information campaign, initiated and promoted by the Heritage Forum could include some or all of the following:
- Production of a leaflet highlighting low cover of semi natural habitats, listing towns and townlands surveyed, and stating where maps can be viewed.
- Promotion of the principal results in local newspapers.
- A display of hardcopy maps in relevant local libraries in a temporary exhibition.
- Put maps and report on council web site.
- Use the results of this and other relevant studies to start the process of setting up a local Biological Records Centre. This could be web based or developed through the library service (section on local biodiversity in the Local Studies Section of the Library).
- The habitat maps should be publicised to relevant Tidy Towns groups, groups entering the Golden Mile project and other community/development organisations operating within or adjacent to survey areas.
- Provide brief summary guidelines for farmers on appropriate management of habitats.
- Provide brief summary guidelines for gardeners

Target audience: schoolchildren

- Brief locally based specialists who go into schools as part of the Heritage Council/INTO 'Heritage in Schools Scheme' to encourage them to incorporate the results in their educational programmes in local schools.
- Liaise with geography teachers (through the Laois Education Centre) to use the habitat map as a teaching tool to explore local habitats.

Target audience: advanced students/specialists/advisors/Local Authority staff e.g. planners

- Expand habitat mapping exercise to other parts of the county.
- Develop a training programme targeting planners to enable them use the habitat map and associated information as an aid to strategic planning and development control. This may involve manipulation of the data base or further interpretation to make it useful to planners.
- Provide a presentation to REPS planners, organised in conjunction with Teagasc to inform them of its value to their REPS advisory service.
- Ensure results of habitat mapping are fully integrated with councils own GIS.
- Promote additional survey work (for fauna, breeding birds) in townlands examined for this survey. Following habitat mapping in 2007 there is potential for research on ecological corridors linking habitat areas of importance inside and outside designated areas. As digital data sets are used increasingly by researchers to locate survey sites there will be greater interest in the Laois data set.
- Ensure that surveyors observe similar protocols when contacting landowners and all results are provided in an appropriate form for local usage.

- Promote research to utilise and add value to habitats database i.e. integrate with FIPS/EPA soils/subsoils data base, local geology (from GSI) and 1st edition OS mapping.
- Continue to liaise with environmental NGO's and all interested members of the public to exchange information on biodiversity.

4.2.3 Managing change

Suggested initiatives include:

- Support Teagasc and REPS planners to provide a targeted advisory service for landowners who have good examples of semi-natural habitats. The priority of identifying hedgerows for retention and enhancement on farms by REPS and Heritage Forum should be maintained.
- Development of a list of good examples of semi--natural habitats in the county, starting with woodlands, after informing owners individually of the proposal to develop such a list.
- Support Teagasc to develop training materials for REPS courses which are relevant to Laois habitats.
- Organise for the removal of invasive species such as Japanese knotweed and rhododendron starting with one site in 2007.
- Carry out habitat mapping in areas which are the subject of strategic plans (Local Plans, Development Plans etc) and use the results to inform an SEA (Strategic Environmental Assessment) of the draft plans which are produced.
- Encourage the Council's Roads Department to cease the practise of spraying grass verges and banks and consider trimming, which is equally effective and less harmful to biodiversity.

4.2.4 Partnership with the statutory authorities

Suggested initiatives include:

- Encouragement to NPWS to provide habitat mapping for the lands which have been designated by NPWS, thus expanding the coverage of habitat mapping in the county.
- Promotion of the Native Woodland Scheme with Woodlands of Ireland and the Forest Service.
- Promotion of wetland management with the Fisheries Board in the context of the Water Framework Directive
- A policy statement on biodiversity and habitat biodiversity in the County Development Plan which recognises the current low level of cover of semi-natural habitats and objectives to maintain habitat diversity, manage habitats owned by the Local Authority sustainably, provide information and ensure that development has regard for biodiversity values.
- Preparation of a County Biodiversity Plan in association with the Heritage Forum.
- Survey council owned land to develop management guidelines for habitats under its direct control.

5 Conclusions

The study provides a unique snapshot of the natural heritage in representative areas of lowland Laois. An impressive diversity of habitats and flowering plants is present. While most of the land is covered in habitats of low biodiversity value, the survey work has revealed that almost 5% of the land is covered in habitats of relatively high biodiversity value. Most townlands have habitats of some biodiversity value. Some have habitats which are rare locally, nationally and even internationally. However the overall cover of semi-natural habitats of particular value for biodiversity is low.

The survey results are a resource, which will assist all stakeholders to make informed decisions. The role of the Heritage Forum is to publicise this resource to all relevant individuals and agencies to inform local strategic planning and the preparation of a County Biodiversity Action Plan. It also has potential to inform the preparation of Strategic Environmental Assessments of plans and programmes which is required under EU legislation. As more of the county is surveyed researchers will be increasingly interested in obtaining access to results.

The survey should be expanded to all parts of the county. This would increase the value of the information which has been gathered and enable informed decision making on biodiversity on a county wide basis.

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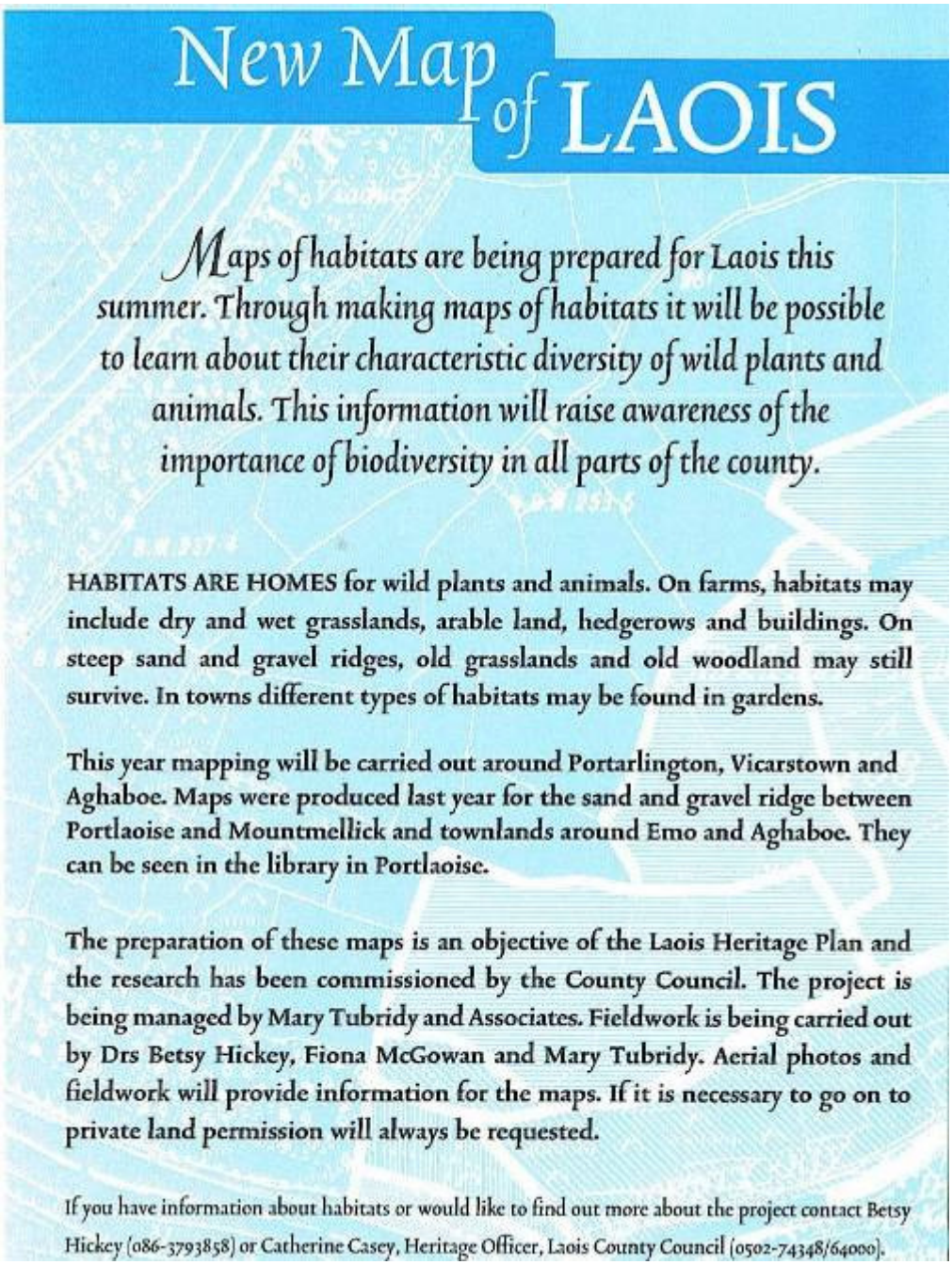
Appendix 1 Information leaflet



New Map of LAOIS

Maps of habitats are being prepared for Laois this summer. Through making maps of habitats it will be possible to learn about their characteristic diversity of wild plants and animals. This information will raise awareness of the importance of biodiversity in all parts of the county.

HABITATS ARE HOMES for wild plants and animals. On farms, habitats may include dry and wet grasslands, arable land, hedgerows and buildings. On steep sand and gravel ridges, old grasslands and old woodland may still survive. In towns different types of habitats may be found in gardens.

This year mapping will be carried out around Portarlington, Vicarstown and Aghaboe. Maps were produced last year for the sand and gravel ridge between Portlaoise and Mountmellick and townlands around Emo and Aghaboe. They can be seen in the library in Portlaoise.

The preparation of these maps is an objective of the Laois Heritage Plan and the research has been commissioned by the County Council. The project is being managed by Mary Tubridy and Associates. Fieldwork is being carried out by Drs Betsy Hickey, Fiona McGowan and Mary Tubridy. Aerial photos and fieldwork will provide information for the maps. If it is necessary to go on to private land permission will always be requested.

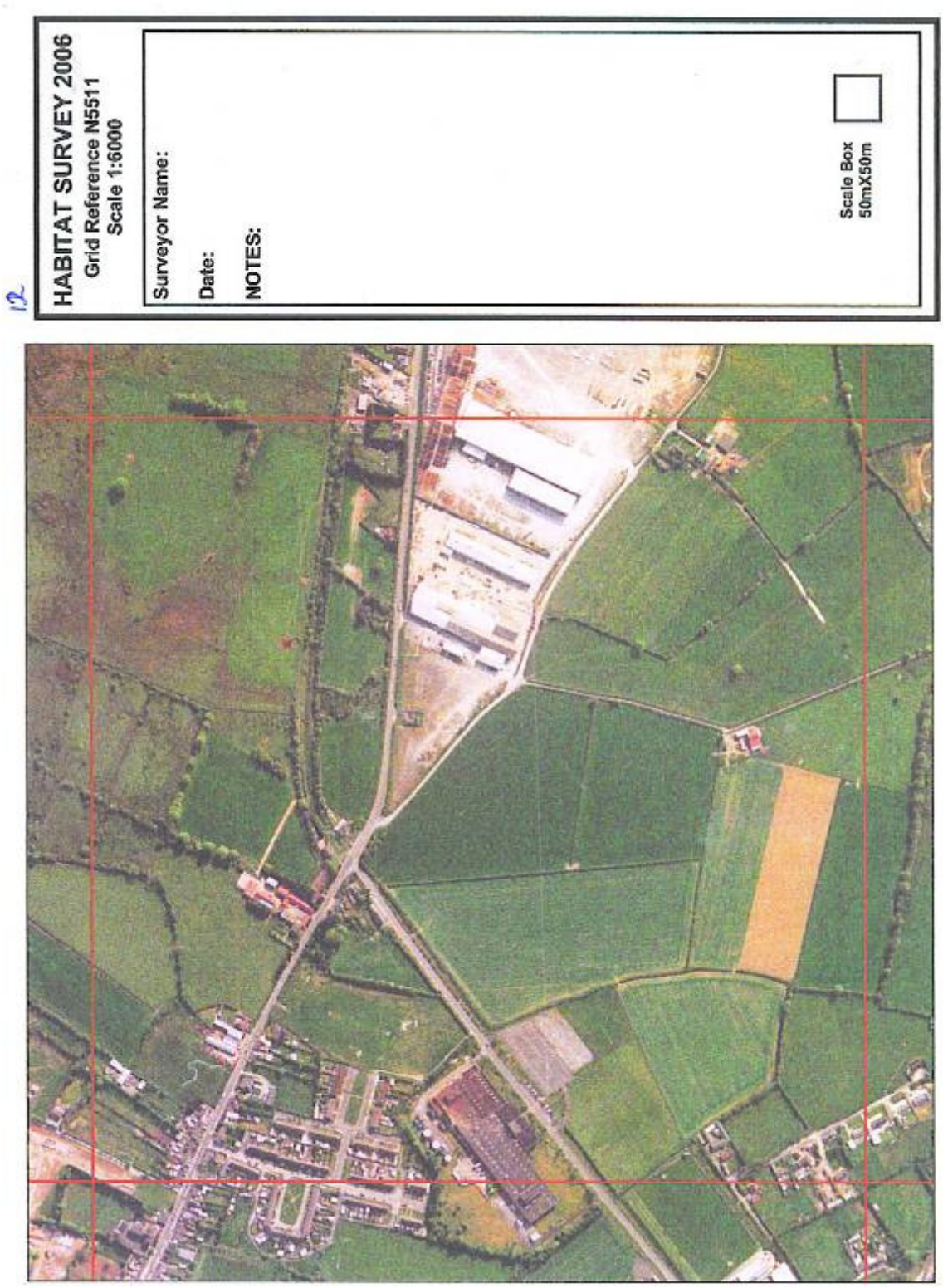
If you have information about habitats or would like to find out more about the project contact Betsy Hickey (086-3793858) or Catherine Casey, Heritage Officer, Laois County Council (0502-74348/64000).

Appendix 2 List of Landowners

Many thanks to the landowners listed below and sincere apologies and thanks to those we unwittingly omitted, all of who gave freely of their time and knowledge while the survey was being carried out.

Names of landowners			
B. Cushen	Bridie Scully	Brigit Cushen	Thomas Nerney
Carter Family	Crowley Family	Dan Scully	Eddie Mulhall
Eddie Fitzgerald	Ellen Conroy	Frank Maloney	Ger Baldwin
Gerry Byrne	Hugh Ryan	Iassc and Robert Dobson	Jackie Hyland
James Gleeson	James Murphy	Jim Brennon	John Delaney
John Dunne	John Lacy	John Nurney	Lewis Family
Margaret Cushen	Michael and Sheila Cushen	Mrs. Browne	Robert and Chris Miller
Paddy Doherty	Paddy Lawlor	Pat and Peggy Drennan	Johnny Kane
Peter Ging	Séan Conroy	Séan Scully	Thomas Conroy
Tom Bond	Tom Cushen	Tom Fingleton	Terry O' Connell
Tom Mulhall	Whelan Family	John Fletcher	Joe Kane
Winnie Champ	Lily Champ	Mary Dunne	Colette Manley
Brian Walsh	Mrs. Fitspatrick	Geraldine O' Reilly	Pat Hyland
Molly and Liam Kavanagh	Michael Milner	Liam Bennet	Ray Cobb
Irwin Cobb	Martin Whelan	Mrs. Cobb	Peter Lutral
Paddy Behan	Julie Murray	Maureen Nerney	Paddy Sheridan
Frank Nerney	Michael Whelehan	John Kenny	Cathy and Pat Nolan
Robin and Ann Talbot	Tom Donoher	Tony Connell	Mrs Boland
Jim Scully	Joe Brophy	Alice McCormack	Anthony Bennet
Tony Miller	Dan Miller	Ann and Robin Talbet	Moyne estate
Martin Stapleton	Helen Shortall	Martin Pillin	Slevin Family
Brian Nolan	Helen Shortall	Ann and Frank Handy	Paddy Moore
Liam McNamara	Jim Moloney	Eddie Fitzpatrick	Dooley Family
John Donoher	Chris and Owen Mullans	David Lawlor	

Appendix 3 Layout used in field survey (for photographs and maps)



Appendix 4 Checklist of all species

Checklist of all species recorded during 2005, 2006 and 2007.
Species are listed alphabetically by Latin name, species followed by an asterisk are additional species recorded in 2006, and those followed by a double asterisk are additional species recorded in 2007.

Scientific name	English name
Abies sp.	Fir
*Acer campestre***	Field maple
*Acer platanoides Crimson King***	Norway maple
Acer pseudoplatanus	Sycamore
Achillea millefolium	Yarrow
Aesculus hippocastanum	Velvet bent grass
Agrostis canina	Common bent
Agrostis capillaris	Common bent grass
Agrostis stolonifera	Creeping bent grass
Ajuga reptans	Bugle
*Alisma plantago-aquatica***	Common water-plantain
Alliaria petiolata	Garlic mustard
*Allium ampiloprasum**	Leeks
Allium cepa	Onions
*Allium ursinum**	Ramsons
Alnus glutinosa	Alder
Alopecurus geniculatus	Marsh foxtail
Alopecurus pratensis	Meadow foxtail
Anagallis arvensis	Scarlet pimpernel
Andromeda polifolia	Bog rosemary
*Anemone nemorosa**	Wood anemone
Angelica sylvestris	Wild angelica
Antennaria dioica	Mountain everlasting
Anthoxanthum odoratum	Sweet vernal grass
Anthriscus sylvestris	Cow parsley
*Anthyllis vulgaris**	Kidney vetch
*Antirrhinum majus***	Snapdragon
*Aquilega vulgaris**	Columbine
*Arabis hirsuta***	Hairy rock-cress
Arctium minor	Lesser burdock
Arrhenatherum elatius	False oat grass
Arum maculatum	Arum lily

Scientific name	English name
Asplenium adiantum nigrum	Black spleenwort
*Asplenium ruta-muraria**	Wall-rue
*Asplenium trichomanes**	Maidenhair spleenwort
Athyrium filix-femina	Lady fern
*Aucuba japonica***	Japanese laurel
*Avena fatua***	Oat
Baldellia ranunculoides	Lesser water plantain
Bellis perennis	Daisy
Beta vulgaris	Sugar beet
*Betula pendula**	Weeping birch
Betula pubescens	Downy birch
Blackstonia perfoliata	Yellow-wort
Brachypodium sylvaticum	False brome
*Brassica oleracea var. capitata**	Cabbage
Briza media	Quaking grass
*Bromus sp.***	Brome
*Buddleja davidii***	Butterfly bush
*Buxus sempervirens***	Box
Callitriche stagnalis	Common water starwort
Calluna vulgaris	Ling heather
Caltha palustris	Marsh marigold
Caltha palustris	Marsh marigold
Calystegia sepium	Hedge bindweed
*Capsella bursa-pastoris***	Shepherd's-purse
Cardamine flexuosa	Wavy bittercress
*Cardamine hirsuta***	Hairy bitter-cress
Cardamine pratensis	Lady's smock
Carex acutiformis	Lesser pond sedge
*Carex distichia***	Brown sedge
Carex divulsa	Grey sedge
Carex echinata	Star sedge
Carex flacca	Glaucous sedge
Carex hirta	Hairy sedge
Carex hostiana	Tawny sedge
Carex nigra	Common sedge
*Carex otrubae***	False fox sedge
Carex ovalis	Oval sedge
Carex panicea	Carnation sedge
*Carex paniculata***	Greater tussock sedge

Scientific name	English name
*Carex pendula***	Pendulous sedge
Carex pulicaris	Flea sedge
Carex remota	Remote sedge
Carex rostrata	Bottle sedge
Carex sylvatica	Wood sedge
Carex vesicaria	Bladder sedge
Carex viridula	Yellow sedge
Carex viridula ssp. demissa	Common yellow sedge
*Carlina vulgaris**	Carline thistle
Castanea sativa	Spanish chestnut
*Ceanothus sp.***	Californian lilac
Centaurea nigra	Black knapweed
Centaurium erythraea	Common centaury
*Centranthus ruber***	Red valerian
Cerastium fontanum	Mouse ear chickweed
Chamaecyparis sp.	Lawson cypress
Chenopodium album	Fat hen
Chrysosplenium oppositifolium	Opposite-leaved golden saxifrage
Circaea lutetiana	Enchanter's nightshade
Cirsium arvense	Creeping thistle
Cirsium dissectum	Meadow thistle
Cirsium palustre	Marsh thistle
Cirsium sp.	Thistle
Cirsium vulgare	Spear thistle
*Cladium mariscus**	Great fen sedge
*Cladonia foerkiana***	Match stick lichen
*Cladonia portentosa**	Lichen
Cladophera sp.	Green algae
*Clematis vitalba**	Traveller's joy
Conopodium majus	Pignut
*Cornus sp.***	Dogwood
Corylus avellana	Hazel
*Cotoneaster horizontalis***	Horizontal rockspray
Cotoneaster sp.	Cotoneaster
Crataegus monogyna	Hawthorn
Crepis capillaris	Smooth hawk's-beard
Crocosmia x crocosmiflora	Montbretia
*Cymbalaria muralis***	Ivy-leaved toadflax
Cynosurus cristatus	Crested dog's-tail

Scientific name	English name
Dactylis glomerata	Cock's-foot
Dactylorhiza incarnata	Early marsh orchid
Dactylorhiza maculata	Heath spotted orchid
Dactylorhiza maculata fuchsii	Common spotted orchid
Dactylorhiza majalis	Southern marsh orchid
Daucus carota	Wild carrot
Deschampsia cespitosa	Tufted hair-grass
Dianthus sp.	Carnation
Digitalis purpurea	Foxglove
*Dipsacus fullonum***	Teasel
Drosera rotundifolia	Round-leaved sundew
Dryopteris affinis	Scaly male fern
Dryopteris dilatata	Broad buckler fern
Dryopteris filix-mas	Male fern
Eleocharis sp.	Spike-rush
Elocharis palustris	Common spike-rush
*Elodea canadensis***	Canadian pond weed
Elymus repens	Couch grass
Epilobium angustifolium	Rosebay willow herb
Epilobium hirsutum	Great willowherb
Epilobium montanum	Broad-leaved willowherb
*Epilobium obscurum**	Short-fruited willowherb
Epilobium palustre	Marsh willowherb
Epilobium parviflorum	Hoary willowherb
Epilobium sp.	Willowherb
Epipactis palustris	Marsh helleborine
Equisetum arvense	Field horsetail
Equisetum fluviatile	Water horsetail
*Equisetum palustre**	Marsh horsetail
Equisetum sp.	Horsetail
Equisetum sylvaticum	Wood horsetail
*Equisetum x littoral***	Horsetail
*Erica cinerea***	Bell heather
Erica tetralix	Cross-leaved heath
Eriophorum angustifolium	Common cotton-sedge
Eriophorum vaginatum	Hare's-tail cotton-sedge
Euonymus europaeus	Spindle
*Euonymus fortunei Emerald and Gold***	Wintercreeper
Eupatorium cannabinum	Hemp agrimony

Scientific name	English name
*Euphorbia helioscopia***	Sun spurge
*Euphorbia peplus***	Petty spurge
Euphrasia rostkoviana	Eyebright
Euphrasia sp.	Eyebright
Fagus sylvatica	Beech
*Fagus sylvatica Purpurea***	Weeping copper beech
Festuca arundinacea	Tall fescue
Festuca gigantea	Giant fescue
Festuca ovina	Sheep's fescue
*Festuca pratensis**	Meadow fescue
Festuca rubra	Red fescue
Festuca sp.	Fescue
Filipendula ulmaria	Meadowsweet
*Fontinalis sp.**	Moss
Fragaria vesca	Wild strawberry
Fraxinus excelsior	Ash
Fraxinus excelsior pendula	Weeping ash
*Fumaria officinale***	Fumitory
Galium aparine	Cleavers
Galium odoratum	Woodruff
Galium palustre	Marsh bedstraw
*Galium saxatile***	Heath bedstraw
Galium verum	Lady's bedstraw
Geranium dissectum	Cut-leaved crane's-bill
Geranium molle	Dove's-foot crane's-bill
Geranium robertianum	Herb robert
Geranium sp.	Cranesbill
*Geum rivale***	Water avens
Geum urbanum	Herb bennet
Glechoma hederacea	Ground ivy
Glyceria fluitans	Floating sweet-grass
Glyceria maxima	Reed sweet-grass
Glyceria notata	Plicate sweet-grass
Glyceria sp.	Sweet-grass
Grisilina littoralis	Grisilina
Gymnadenia conopsea	Fragrant orchid
*Hebe sp.***	Veronica
Hedera helix	Ivy
Helictotrichon pubescens	Downy oat-grass

Scientific name	English name
Heracleum sphondylium	Hogweed
Hieracium sp.	Hawkweed
*Hippuris vulgaris**	Marestail
Holcus lanatus	Yorkshire fog
Hordeum vulgare	Barley
Hyacinthoides non-scriptus	Bluebell
Hydrocotyle vulgaris	Navelwort
Hypericum androsaemum	Tutsan
Hypericum humifusum	Trailing St. John's-wort
Hypericum maculatum	Imperforate St. John's-wort
Hypericum perforatum	Perforate St. John's-wort
Hypericum pulchrum	Slender St. John's-wort
Hypericum sp.	St. John's-wort
Hypericum tetrapterum	Square-stalked St. John's-wort
Hypochoeris radicata	Car's-ear
Ilex aquifolium	Holly
*Iris foetidissima***	Stinking iris
Iris pseudacorus	Flag iris
Juncus acutiflorus	Sharp-flowered rush
Juncus articulatus	Jointed rush
Juncus bufonius	Toad rush
Juncus conglomeratus	Compact rush
Juncus effusus	Soft rush
Juncus inflexus	Hard rush
Juncus sp.	Rush
Juniperus squamata sp.	Flaky juniper
Knautia arvensis	Field scabious
Kniphofia sp.	Red hot poker
*Lamium purpureum***	Red dead-nettle
Lapsana communis	Nipplewort
Larix decidua	European larch
Lathyrus montanus	Bitter-vetch
Lathyrus pratensis	Meadow vetchling
*Latuca sativa**	Lettuce
Lemma minor	Common duckweed
Leontodon autumnalis	Autumn hawkbit
*Leontodon hispidus**	Rough hawkbit
Leucanthemum vulgare	Ox-eye daisy
Ligustrum ovalifolium	Privet

Scientific name	English name
Ligustrum vulgare	Common privet
Linum bienne	Pale flax
Linum catharticum	Fairy flax
Listeria ovata	Common twayblade
*Littorella uniflora**	Shore-weed
Lolium perenne	Perennial ryegrass
Lonicera nitida	Wilson's honeysuckle
Lonicera periclymenum	Honeysuckle
Lotus corniculatus	Bird's-foot-trefoil
Lupinus sp.	Lupin
Luzula campestris	Field woodrush
Luzula multiflorum	Heath woodrush
Luzula sylvatica	Wood rush
Lychnis flos-cuculi	Ragged robin
Lysimachia nemorum	Yellow pimpernel
Lythrum salicaria	Purple loosestrife
Malus domestica var.	Apple trees
Malus sp.	Crab
*Malva sylvestris***	Common mallow
Matricaria discoidea	Pineapple weed
Medicago lupulina	Black medick
Melica uniflora	Wood melick
Mentha aquatica	Water mint
Mentha sp.	Mint
Mentha spicata	Spear mint
Menyanthes trifoliata	Bogbean
*Molinia caerulea**	Purple moor-grass
*Myosotis arvensis***	Field for-get-me-not
Myosotis discolor	Changing forget-me-not
Myosotis scorpiodes	Water forget-me-not
Narthecium ossifragum	Bog asphodel
Nasturtium officinale	Water-cress
Nasturtium sp.	Water-cress
*Nuphar lutea***	Yellow water lily
Odondites vernus	Red bartsia
Ophioglossum vulgatum	Adder's tongue
*Ophrys apifera**	Bee orchid
*Origanum vulgare**	Marjoram
Osmunda regalis	Royal fern

Scientific name	English name
Oxalis acetosella	Wood sorrel
Paeonia sp.	Peony rose
Papaver orientalis	Oriental poppy
*Papaver rhoeas***	Common poppy
*Parentucellia viscosa***	Yellow bartsia
*Parietaria diffusa**	Pellitory of the wall
Pedicularis sp.	Lousewort
Pedicularis sylvatica	Lousewort
Phalaris arundinacea	Reed canary-grass
*Phleum bertolini***	Small cat's-tail
Phleum pratensis	Timothy
Phragmites australis	Common reed
Phyllitis scolopendrium	Hart's-tongue fern
Picea abies	Norway spruce
Picea sitchensis	Sitka spruce
*Pinguicula vulgaris**	Common butterwort
Pinus contorta	Lodgepole pine
Pinus sylvestris	Scot's pine
Plantago lanceolata	Narrow leaved plantain
Plantago major	Broad leaved plantain
Platanthera bifolia	Lesser butterfly orchid
Platanthera clorantha	Greater butterfly orchid
Poa annua	Annual meadow-grass
*Poa pratensis**	Smooth meadow-grass
Poa sp.	Meadow-grass
Poa trivialis	Rough meadow-grass
Polygala vulgaris	Common milkwort
Polygonum amphibium	Amphibious bistwort
*Polygonum aviculare***	Common knotgrass
Polygonum persicaria	Redshank
Polypodium vulgare	Common polypody fern
Polystichum aculeatum	Hard shield fern
Polystichum setiferum	Soft shield fern
*Polytrichum commune**	Moss
Populus sp.	Poplar
Populus tremula	Aspen
Potamogeton sp.	Pondweed
Potentilla anserina	Silverweed
Potentilla erecta	Tormentil

Scientific name	English name
Potentilla palustre	Marsh cinquefoil
Potentilla reptans	Creeping cinquefoil
Potentilla sterilis	Barren strawberry
Primula veris	Cowslip
Primula vulgaris	Primrose
Prunus avium	Wild cherry
Prunus domestica	Wild plum
Prunus kanzan	Flowering cherry
*Prunus laurocerasus Otto Luyken***	English laurel
*Prunus laurocerasus**	English laurel
Prunus sp.	Cherry
Prunus spinosa	Blackthorn
Pseudosuga menzeii	Douglas fir
Pteridium aquilinum	Bracken
Pulicaria dysenterica	Common fleabane
Pyrus pyraster	Pear
Quercus robur	Pedunculate oak
Ranunculus acris	Meadow buttercup
Ranunculus auricomus	Goldilocks buttercup
*Ranunculus bulbosus**	Bulbous buttercup
Ranunculus ficaria	Lesser celandine
Ranunculus flammula	Lesser spearwort
Ranunculus lingua	Greater spearwort
Ranunculus peltatus	Pond water-crowfoot
Ranunculus repens	Creeping buttercup
*Reseda luteola***	Wild mignonette
Reynoutria japonica	Japanese knotweed
Rheum rhabarbarum	Rhubarb
Rhinanthus minor	Yellow rattle
Rhododendron ponticum	Rhodendron
*Rhus typhina***	Stag's-horn sumach
Rhynchospora alba	White-beaked sedge
Ribes rubrum	White or red currant
Ribes sp.	Currant
*Ribes uva-crispa***	Gooseberry
Rosa arvense	Field rose
Rosa canina	Dog rose
Rosa sp.	Wild rose
Rosmarinus officinalis	Rosemary

Scientific name	English name
Rubus caesius	Dewberry
Rubus fruticosus agg.	Bramble
*Rubus idaeus***	Raspberry
*Rumex acetosa**	Common sorrel
Rumex acetosella	Sheep's sorrel
Rumex conglomeratus	Clustered dock
Rumex crispus	Curled dock
Rumex obtusifolius	Broad leaved dock
Rumex sanguineus	Wood dock
Rumex sp.	Dock
Sagina procumbens	Procumbent pearlwort
Salix alba	White willow
Salix aurita	Eared willow
Salix caprea	Goat willow
Salix cinerea	Grey willow
Salix fragilis	Crack willow
Salix sp.	Willow
Salix viminalis	Osier
Salix x multinervis	Willow hybrid
Sambucus nigra	Elder
Sanguisorba minor	Salad burnet
Sanicula europaea	Wood sanicle
Saponaria officinalis	Soapwort
Schoenplectus lacustris	Club-rush
Schoenus nigricans	Black bog-rush
Scrophularia nodosa	Common figwort
Sedum acre	Biting stonecrop
*Sedum album***	White stonecrop
Senecio aquaticus	Marsh ragwort
Senecio jacobaea	Common ragwort
Senecio vulgaris	Groundsel
*Sherardia arvensis***	Field madder
*Silene alba***	White campion
Silene dioica	Red campion
Silene latifolia	White campion
Sisymbrium officinale	Hedge mustard
Solanum dulcamara	Bittersweet
*Solanum tuberosum**	Potato
*Solidago virgaurea***	Goldenrod

Scientific name	English name
Sonchus arvensis	Perennial sow-thistle
Sonchus asper	Prickly sow-thistle
Sonchus oleraceus	Smooth sow-thistle
*Sorbaria sp.***	False spiraea
Sorbus aria	Whitebeam
Sorbus aucuparia	Mountain ash
Sparganium erectum	Branched bur-reed
Sphagnum capillifolium	Sphagnum moss
Sphagnum cuspidatum	Sphagnum moss
Sphagnum imbricatum	Sphagnum moss
Sphagnum papillosum	Sphagnum moss
Stachys byzantina	Lamb's ears
Stachys palustris	Marsh woundwort
Stachys sylvatica	Hedge woundwort
Stellaria graminea	Lesser stitchwort
Stellaria holostea	Greater stitchwort
Stellaria media	Common chickweed
Stellaria uliginosa	Bog stitchwort
Succisa pratensis	Devil's-bit scabious
*Symphoricarpos orbiculatus**	Snowberry
Symphytum sp.	Comfrey
Taraxacum officinale	Dandelion
*Taxus baccata**	Yew
Teucrium scorodonia	Woodsage
*Thymus praecox***	Wild thyme
Tilia cordata	Small leaved lime
*Tilia x europaea**	Common lime
Torilis japonica	Upright hedge parsley
Tragopogon pratensis	Goat's-beard
Trichophorum caespitosum	Deer-sedge
Trifolium campestre	Hop trefoil
Trifolium dubium	Lesser trefoil
Trifolium pratense	Red clover
Trifolium repens	White clover
Triglochin palustris	Marsh arrowgrass
*Trisetum flavescens**	Yellow oat-grass
Triticum aestivum	Wheat
Tussilago farfara	Colt's-foot
Typha latifolia	Common reedmace

Scientific name	English name
Ulex europaeus	Gorse
Ulmus glabra	Wych elm
Ulmus procera	English elm
Urtica dioica	Stinging nettle
Valeriana officinalis	Common valerian
Veronica beccabunga	Brooklime
Veronica chamaedrys	Germander speedwell
Veronica montana	Wood speedwell
Veronica officinalis	Heath speedwell
Veronica sp.	Speedwell
Viburnum opulus	Guelder rose
Vicia cracca	Tufted vetch
*Vicia hirsuta***	Hairy tare
Vicia sativa	Common vetch
Vicia sepium	Bush vetch
Vicia sp.	Vetch
*Viola arvensis***	Field pansy
*Viola reichenbackiana**	Wood dog violet
Viola riviniana	Common dog violet
Viola sp.	Violet
x Cupressocyparis leylandii	Leyland cypress
*x Cupressus macrocarpa**	Macrocarpa

Appendix 5. Rare or occasional plant species.

Species followed by an asterisk were identified in 2006 and those followed by two asterisks were identified in 2007.

Scientific name	Common name
Andromeda polifolia	Bog rosemary
Antennaria dioica	Mountain everlasting
*Anthyllis vulneraria**	Kidney vetch
*Aquilega vulgaris**	Columbine
Artemisia vulgaris	Mugwort
Blackstonia perfoliata	Yellow-wort
Bromus racemosus	Smooth brome
Centaurium erythraea	Common centaury
Clinopodium vulgare	Wild basil
Epipactis palustris	Marsh helleborine
Gymnadenia conopsea	Fragrant orchid
Helictotrichon pubescens	Downy oat-grass
Lathyrus montanus	Bitter vetch
Linum bienne	Pale flax
*Littorella uniflora**	Shore weed
Ophioglossum vulgatum	Adder's tongue
*Ophrys apifera**	Bee orchid
Origanum vulgare	Marjoram
*Parentucellia viscosa***	Yellow Bartsia
Platanthera bifolia	Lesser butterfly-orchid
Platanthera clorantha	Greater butterfly-orchid
Polystichum aculeatum	Hard shield fern
Pulicaria dysenterica	Fleabane
*Pyrus pyraster**	Pear
Rhynchospora alba	White beaked sedge
*Ribes uva-crispa***	Gooseberry
Rubus caesius	Dewberry
Sanguisorba minor	Salad burnet
*Sherardia arvensis***	Field madder
Smyrnium olusatrum	Alexanders
*Taxus baccata**	Yew
Tragopogon pratensis	Goatsbeard
Trisetum flavescens	Yellow oat grass

Appendix 6. Additional species recorded in study area by BSB1

Scientific name	Common name
= *M. x rotundifolia*	False apple-mint
Achillea ptarmica	Sneezewort
Aegopodium podagraria	Ground elder
Aethusa cynapium	Fool's parsley
Agrimonia eupatoria	Agrimony
Agrimonia procera	Fragrant Agrimony
Anisantha sterilis	Barren brome
Aphanes arvensis	Parsley-piert
Arenaria serpyllifolia	Thyme-leaved sandwort
Artemisia vulgaris	Mugwort
Atriplex laciniata	Frosted orache
Atriplex patua	Common orache
Barbarea vulgaris	Winter cress
Bromopsis ramosa	Hairy-brome
Calystegia silvatica	Large bindweed
Carex demissa	Common yellow sedge
Carex pseudocyperus	Cyperus Sedge
Catapodium rigidum	Fern grass
Ceterach officinarum	Rusty-back
Chaenorhinum minus	Small toadflax
Clinopodium vulgare	Wild Basil
Conium maculatum	Hemlock
Epilobium ciliatum	American willowherb
Euphrasia officinalis agg.	Eyebright
Fallopia convolvulus	Black-bindweed
Fumaria muralis	Common Ramping-fumitory
Fumaria officinalis	Common Fumitory
Galeopsis bifida	Bifid hemp nettle
Geranium lucidum	Shining cranesbill
Hieracium murorum agg.	Hawkweed
Juncus bulbosus	Bulbous Rush
Lamium album	White-dead-nettle
Lamium hybridum	Cut-leaved dead-nettle
Lamium purpureum	Red Dead-nettle
Lathyrus montanus	Bitter-vetch

Leontodon saxatilis	Lesser Hawkbit
Lycopus europaeus	Gypsywort
Mentha arvensis	Corn Mint
Mentha suaveolens x longifolia	
Nymphaea alba	White Water-lily
Papaver dubium ssp. dubium	Long-headed Poppy
Persicaria amphibium	Amphibious bistort
Persicaria hydropiper	Water-pepper
Persicaria lapathifolia	Pale Persicaria
Persicaria maculosa	Redshank
Petasites fragrans	Winter Heliotrope
Petasites hybridus	Butterbur
Pimpinella saxifraga	Burnet-saxifrage
Polygonum cognatum	Indian Knotgrass
Potamogeton natans	Broad-leaved Pondweed
Potentilla anglica	Trailing tormentil
Quercus petraea	Sessile Oak
Ranunculus trichophyllus	Thread-leaved Water-crowfoot
Reseda luteola	Weld
Rosa agrestis	Small-leaved sweetbriar
Rosa canina x R. caesia	
Rosa mollis	Northern downy rose
Rosa sherardii	Sherard's Downy-rose
Rubus ulmifolius	Elm-leaf blackberry
Salix purpurea	Purple osier
Salix repens	Creeping Willow
Silene vulgaris ssp. Vulgaris	Bladder campion
Sinapis arvensis	Charlock
Smyrnium olusatrum	Alexanders
Spergula arvensis	Corn Spurrey
Tanacetum parthenium	Feverfew
Thymus vulgaris	Garden Thyme
Trisetum flavescens	Yellow Oat-grass
Veronica anagallis-aquatica	Blue Water-Speedwell
Veronica arvensis	Wall speedwell
Veronica hederifoila ssp. Hederifolia	Ivy-leaved speedwell
Veronica persica	Common field speedwell
Veronica scutellata	Marsh speedwell
Vinca major	Greater Periwinkle
Viola odorata	Sweet Violet

Appendix 7. Additional species recorded by the Dublin Naturalist's Field Club on Hewson Hill, Coolnacarrick, Co. Laois

Scientific name	Common name
Aira praecox	Early hair-grass
Cotoneaster microphyllus auct.	Cotoneaster
Polypodium cambricum	Southern polypody

Appendix 8. Species recorded in each habitat

Additional species per habitat recorded in 2006 are indicated by an asterisk following the name, and those in 2007 by 2 asterisks .

FL3 Limestone/marl lakes

Epilobium palustre
*Equisetum fluviatile**
Eupatorium cannabinum
Galium palustris
Glyceria sp.
*Hippuris vulgaris**
Hydrocotyle vulgaris
Iris pseudacorus
Juncus acutiflorus
Juncus effusus
*Juncus inflexus**
*Littorella uniflora**
Mentha aquatica
Potentilla anserina

FL4 Mesotrophic lakes

*Agrostis stolonifera***

FL4 Mesotrophic lakes

*Anagallis tenella**
*Calystegia sepium***
*Carex flacca**
*Carex rostrata**
*Epilobium parviflorum***
*Filipendula ulmaria***
*Galium palustre***
*Glyceria fluitans***
*Iris pseudacorus***
*Juncus acutiflorus**
*Juncus effusus***
*Lolium perenne***
*Lythrum salicaria***
*Mentha aquatica**
*Phalaris arundinacea***
*Potamogeton sp.**
*Ranunculus sp. crowfoot***
*Sparganium emersum***

FL5 Eutrophic lakes

Acer pseudoplatanus
Aesculus hippocastanum
*Betula pendula**
Cardamine pratensis

FL5 Eutrophic lakes

Cladophera algae
Corylus avellana
Crataegus monogyna
Croscosmia x croscosmia
Eleocharis sp.
Equisetum fluviatile
Equisetum sp.
Fagus sylvatica
Fraxinus excelsior
Glyceria fluitans
Iris pseudacorus
Juncus effusus
Juncus inflexus
Juncus sp.
*Mentha sp.***
Molinia caerulea
*Myosotis scorpiodes***
Nasturtium sp.
*Phalaris arundinacea***
Populus tremula
Prunus sp.
Prunus spinosa
*Ranunculus repens***
Ranunculus sp. crowfoot

FL5 Eutrophic lakes

Rubus fruticosus agg.
*Rumex crispus***
Salix caprea
Salix cinerea
Sambucus nigra
*Sparganium erectum***
Typha latifolia
Urtica dioica
Veronica beccabunga

FL8 Other artificial lakes and ponds

*Agrostis stolonifera***
*Alnus glutinosa***
*Carex viridula***
*Cirsium arvense***
Juncus effusus
Polygonum amphibium
Potamogeton sp.
*Potentilla anserina***
*Salix cinerea***
*Urtica dioica***

FW2 Depositing/lowland rivers

Callitriche sp.
Callitriche stagnalis
*Caltha palustris***
Calystegia sepium
Cladophora sp.
Epilobium hirsutum
*Epilobium palustre**
*Equisetum fluviatile***
*Filipendula ulmaria***
*Fontinalis sp.**
Glyceria fluitans
Glyceria maxima
Glyceria notata
Iris pseudacorus
*Juncus inflexus***
Lemma minor
*Lemna sp.***
*Lythrum salicaria***
Mentha aquatica
*Mentha sp.***
Myosotis scorpioides
Nasturtium officinale
*Oenanthe sp.***

FW2 Depositing/lowland rivers

Phalaris arundinacea
Phragmites australis
Polygonum persicaria
Potamogeton sp.
Potentilla anserina
Prunella vulgaris
Ranunculus peltatus
*Ranunculus repens***
*Ranunculus sp.**
*Rumex crispus***
*Rumex obtusifolius***
Salix alba
Salix caprea
*Salix cinerea***
Salix fragilis
Schoenplectus lacustris
Scrophularia nodosa
Senecio aquaticus
*Stachys sylvatica***
Ulex europaeus
Ulmus glabra
Urtica dioica
*Valerianella officinalis***
*Vicia cracca***

FW3 Canals

Algae**
*Alisma plantago-aquatica***
*Angelica sylvestris**
*Arum maculatum**
*Caltha palustris**
*Carex vesicaria***
*Corylus avellana**
*Crataegus monogyna**
*Elodea canadensis***
*Equisetum fluviatile**
*Filipendula ulmaria**
*Fraxinus excelsior**
*Galium aparine**
*Glyceria maxima**
*Hedera helix**
*Heracleum sphondylium**
*Iris pseudacorus**
*Ligustrum vulgaris**
*Lonicera periclymenum**
*Nasturtium officinale**
*Nuphar lutea***
*Phalaris arundinacea**
*Poa sp.**
*Potamogeton sp.***

FW3 Canals

*Prunus domestica**
*Prunus spinosa**
*Rosa sp.**
*Rubus fruticosus agg.**
*Salix sp.**
*Schoenplectus lacustris***
*Typha latifolia**
*Urtica dioica**
*Valerianella officinalis***
*Veronica beccabunga**

FW4 Drainage ditches

Agrostis stolonifera
*Alisma plantago-aquatica***
Angelica sylvestris
Anthoxanthum odoratum

Briza media
*Callitriche sp.***
Caltha palustre
*Calystegia sepium***
Cardamine pratensis
Carex acutiformis
Carex nigra
Carex panicea
Carex rostrata
Carex sp.
*Cirsium arvensis***
Cirsium palustre
Crataegus monogyna
*Cynosurus cristatus***
Dactylorhiza maculata
Dactylorhiza majalis
*Epilobium angustifolium***
Epilobium hirsutum
*Epilobium obtusifolium**
Epilobium palustre
Epilobium sp.
Equisetum arvense
*Equisetum fluviatile***
Equisetum sp.
Eriophorum angustifolium
Eupatorium cannabinum
Festuca rubra
Filipendula ulmaria
Galium palustre
Glyceria fluitans
Holcus lanatus
*Hydrocotyle vulgaris***
Hypericum pulchrum
*Iris pseudacorus***
Juncus acutiflorus
Juncus articulatus
Juncus effusus
*Juncus inflexus***
Lolium perenne
Lotus corniculatus
Lythrum salicaria
Mentha aquatica
Mentha sp.
Menyanthes trifoliata
*Myosotis scorpiodes***
Nasturtium officinale
Phalaris arundinacea
Phragmites australis
Platanthera bifolia
Polygala vulgaris
*Potamogeton sp.***
*Potentilla anserina***
Potentilla erecta
Potentilla palustre
Ranunculus flammula
*Rumex crispus***
*Rumex obtusifolius***
Salix cinerea
*Schoenplectus lacustris***
*Sparganium sp.***
Succisa pratensis
Trifolium pratense
Trifolium repens
Triglochin palustris
Typha latifolia
Urtica dioica
*Valeriana officinalis***
Vicia cracca

FP2 Non-calcareous springs

Agrostis stolonifera
Cirsium palustre
Crataegus monogyna
Fraxinus excelsior
Glyceria sp.
Holcus lanatus
Juncus acutiflorus
Mentha sp.
Nasturtium officinale
Phragmites australis
Plantago major
Ranunculus acris
Ranunculus repens
Rumex obtusifolius
Salix sp.
Trifolium pratense
Urtica dioica

FS1 Reed and large sedge swamp

*Alnus glutinosa***
*Anthoxanthum odoratum***
*Arrhenatherum elatius***
*Calystegia sepium***
*Carex hirta***
*Carex ovalis***
*Carex paniculata***
*Carex pendula***
*Carex vesicaria***
*Centaurea nigra***
*Corylus avellana***
*Crataegus monogyna***
*Dactylis glomerata***
*Elymus repens***
*Epilobium angustifolium***
*Epilobium hirsutum***
*Equisetum x littoral***
*Eupatorium cannabinum***
*Filipendula ulmaria***
*Fraxinus excelsior***
*Galium palustre***
*Galium verum***
*Holcus lanatus***
*Iris pseudacorus***
*Juncus effusus***
Juncus inflexus
*Lolium perenne***
Lythrum salicaria
*Mentha sp. ***
*Molinia caerulea***
*Phalaris arundinacea***
*Phleum pratense***
*Potentilla anserina***
*Prunus spinosa***
*Pteridium aquilinum***
*Ranunculus flammula***
*Ranunculus repens*****
Rubus fruticosus agg.
*Rumex crispus***
*Salix caprea***
*Salix cinerea***
*Schoenplectus lacustris***

*Typha latifolia*** *Valeriana officinale*** *Vicia sepium***
*Urtica dioica*** *Vicia cracca***

FS2 Tall-herb swamp
*Epilobium sp.*** *Filipendula ulmaria*** *Iris pseudacorus***

GA1 Improved agricultural grassland
Agrostis canina *Festuca rubra** *Rumex acetosa*
Alopecurus geniculatus *Galium odoratum* *Rumex conglomeratus*
Alopecurus pratensis *Heracleum sphondylium* *Rumex obtusifolius*
Anthoxanthum odoratum *Holcus lanatus* *Rumex sp. **
Arrhenatherum elatius *Juncus effusus** *Salix sp. **
Bellis perennis *Lolium perenne* *Senecio jacobaea*
Carex sp. *Plantago lanceolata* *Stellaria graminea*
*Centaurea nigra** *Plantago major* *Taraxacum officinale*
Cerastium fontanum *Poa annua* *Trifolium pratense**
Cirsium arvense *Poa* sp. *Trifolium repens*
*Cirsium vulgare** *Poa trivialis* *Ulex europaeus**
*Cynosurus cristatus** *Ranunculus acris* *Urtica dioica*
Dactylis glomerata *Ranunculus repens*
Elymus repens *Rubus fruticosus* agg.

GA2 Amenity grassland (improved)
Bellis perennis *Plantago lanceolata* *Taraxacum officinalis*
Cirsium arvense *Poa annua* *Trifolium repens*
Dactylis glomerata *Prunella vulgaris* *Veronica chamaedrys*
Festuca rubra *Ranunculus repens*
Lolium perenne *Rumex obtusifolius*

GS1 Dry calcareous and neutral grassland
Achillea millefolium *Briza media* *Dactylorhiza fuchsii**
*Agrimonia eupatorium*** *Calystegia sepium** *Dactylorhiza maculata*
Agrostis capillaris *Cardamine flexuosa*** *Dactylorhiza majalis**
Agrostis stolonifera *Carex flacca* *Daucus carota*
*Alnus glutinosa** *Carex hirta*** *Dryopteris filix-mas***
*Alopecurus pratensis*** *Carex otrubae*** *Elymus repens*
*Anagallis arvensis*** *Carex panicea* *Epilobium angustifolium***
Antennaria dioica *Carex viridula* *Epilobium ciliatum***
Anthoxanthum odoratum *Carlina vulgaris** *Epilobium obscurum***
*Anthyllis vulgaris** *Centaurea nigra* *Epipactis palustris***
*Arabis hirsuta*** *Centaurium erythraea** *Epipactis sp. **
Arrhenatherum elatius *Cerastium fontanum* *Equisetum arvense**
*Bellis perennis*** *Cirsium arvense* *Eupatorium cannabinum*
*Betula pubescens** *Cirsium vulgare* *Euphorbia helioscopia***
Blackstonia perfoliata *Crataegus monogyna* *Euphrasia sp.*
*Brachypodium sylvaticum** *Cynosurus cristatus** *Festuca rubra*
*Brassica sp. ** *Dactylis glomerata* *Filipendula ulmaria*

*Fraxinus excelsior**
*Galium aparine***
Galium verum
*Geranium dissectum***
*Gymnadenia conopsea***
*Helictotrichon pubescens**
Heracleum sphondylium
Holcus lanatus
*Hypericum maculatum***
*Hypericum perforatum***
*Hypericum pulchrum**
Hypericum sp. **
*Hypericum tetrapterum***
*Hypochoeris radicata**
*Ilex aquifolium**
*Juncus inflexus***
Knautia arvensis
Lathyrus pratensis
Leontodon autumnalis
Leucanthemum vulgare
Linum catharticum
Listeria ovata
Lolium perenne
Lotus corniculatus
*Luzula campestris**
*Luzula multiflorus***
Lythrum salicaria
*Malus domestica***
*Malva sylvestris***
*Matricaria discoidea***
*Medicago lupulina***
Mentha sp.
Molinia caerulea
*Myosotis sp. ***
Nasturtium officinale
Odontites vernus
Ophioglossum vulgatum
*Ophrys apifera**
*Origanum vulgare**
Orobanche sp. **
*Papaver rhoeas***
*Phleum pratensis***
*Pillosella officinalis**
Plantago lanceolata
*Plantago major***
*Poa pratensis**
Poa sp.
Poa trivialis
Polygala vulgaris
*Polygonum sp. ***
*Potentilla anserina**
Potentilla erecta
*Potentilla reptans**
Primula veris
Prunella vulgaris
*Prunus spinosa***
Pteridium aquilinum
*Quercus robur **
Ranunculus acris
*Ranunculus bulbosus**
Ranunculus repens
Rhinanthus minor
*Rosa canina**
Rosa sp. **
Rubus fruticosus agg.
Rumex crispus
*Rumex obtusifolius***
*Rumex sp. ***
Salix caprea
Salix cinerea
*Sanguisorba minor***
*Scrophularia nodosa***
Senecio jacobaea
*Silene alba***
Sonchus oleraceus
Stellaria graminea
Stellaria uliginosa
*Succisa pratensis**
Taraxacum officinale
*Torilis japonica**
*Trifolium dubium**
*Trifolium pratense**
Trifolium repens
*Trisetum flavescens**
Ulex europaeus
*Ulmus glabra***
Urtica dioica
*Valerianella officinale***
*Veronica chamaedrys**
*Veronica serpyllifolia***
Vicia cracca
*Vicia hirsuta***
*Vicia sativa***
Vicia sepium
Vicia sp.

GS2 Dry meadows and grassy verges

Achillea millefolium
Agrostis capillaris
Agrostis sp.
*Agrostis stolonifera**
*Alopecurus pratensis**
*Angelica sylvestris***
Anthoxanthum odoratum
Anthriscus sylvestris
Arrhenatherum elatius
*Arum maculatum**
Bellis perennis
*Brachypodium sylvaticum**
Briza media
*Calystegia sepium***
Carex flacca
*Carex hirta**
*Carex panicea**
*Carex paniculata***
*Carex pulicaris**
Centaurea nigra
Cerastium fontanum
Cirsium arvense
*Cirsium dissectum**
*Cirsium palustre***
Cirsium vulgaris
*Corylus avellana***
*Crataegus monogyna***
Crepis capillaris
Cynosurus cristatus
Dactylis glomerata
*Dactylorhiza fuchsii**
*Dactylorhiza maculata***
Daucus carota
*Deschampsia cespitosa**
*Elymus repens***
*Epilobium angustifolium**
*Epilobium hirsutum***
Equisetum arvense
*Equisetum fluviatile***
*Equisetum sp.***
*Euonymus europaeus**
Euphrasia rostkoviana
Euphrasia sp.
*Festuca arundinacea***
Festuca ovina
*Festuca pratensis**
Festuca rubra
*Filipendula ulmaria**

Galium aparine
*Galium palustre***
Galium saxatile
Galium verum
Geranium molle
Geranium robertianum
Helictotrichon pubescens
Hieracium sp.
Holcus lanatus
*Hyacinthoides-non-scriptus**
Hypericum maculatum
*Hypericum pulchrum***
*Hypochoeris radicata***
*Ilex aquifolium **
*Iris pseudacorus**
*Juncus acutiflorus**
*Juncus conglomeratus**
*Juncus effusus**
*Juncus inflexus***
*Juncus sp. **
*Knautia arvensis***
Lapsana communis
Lathyrus pratensis
Leontodon autumnalis
*Leontodon hispidus**
Leucanthemum vulgare
Linum catharticum
Lolium perenne
Lotus corniculatus
Luzula campestris
*Lysimachia vulgaris***
*Lythrum salicaria***
Medicago lupulina
*Mentha sp. ***
*Origanum vulgare***
*Phalaris arundinacea***
*Phleum pratense***
Plantago lanceolata
*Plantago major**
Poa annua
Polygala vulgare
*Polystichum setiferum***
Potentilla anserina
*Potentilla reptans**
Potentilla sterilis
Primula veris
Prunella vulgaris
Prunus sp.
*Prunus spinosa***
*Ranunculus acris**
Ranunculus repens
Rhinanthus minor
*Rosa arvensis***
Rosa sp.
Rubus fruticosus agg.
Rumex acetosa
Rumex crispus
*Salix alba***
Salix cinerea
*Salix sp. **
Senecio jacobaea
Silene alba
*Succisa pratensis**
Taraxacum officinale
Trifolium campestris
Trifolium pratense
Trifolium repens
*Ulmus glabra***
Urtica dioica
*Valeriana officinalis***
Veronica chamaedrys
Vicia cracca
Vicia sepium
*Viola rivinana**

GS3 Dry-humid acid grassland

Achillea millefolium
Agrostis stolonifera
Anthoxanthum odoratum
Bryophytes
Centaurea nigra
Cirsium sp.
Cynosurus cristatus
Dactylis glomerata
Galium aparine
Galium palustris
Galium verum
Glyceria fluitans
Holcus lanatus
Lathyrus pratensis
Molinia caerulea
Orchid
Plantago lanceolata
Poa sp.
Potentilla anserina
Potentilla reptans
Ranunculus repens
Rubus fruticosus agg.
Rumex obtusifolius
Rumex sp.
Taraxacum officinale
Vicia sepium

GS4 Wet grassland

*Achillea millefolium***
Agrostis canina
Agrostis capillaris
Agrostis stolonifera
Alopecurus geniculatus
*Alopecurus pratensis**
*Anagallis tenella**
Angelica sylvestris
Anthoxanthum odoratum
*Aquilega vulgaris**
Arrhenatherum elatius
*Bellis perennis***
*Betula pubescens***
*Brachypodium sylvaticum**
Briza media
Calluna vulgaris
Caltha palustris
*Calystegia sepium***
Calystegia sp. *
Cardamine pratensis
*Carex distichia***
Carex flacca
Carex hirta
Carex nigra
*Carex otrubae***
Carex panicea
*Carex paniculata***
Carex pulicaris
Carex rostrata
Carex viridula

Centaurea nigra
Cerastium fontanum
Cirsium arvense
Cirsium dissectum
Cirsium palustre
Cirsium vulgare
Corylus avellana
Crataegus monogyna
Cynosurus cristatus
Dactylis glomerata
*Dactylorhiza majalis***
Dactylorhiza fuchsii
Dactylorhiza incarnata
Dactylorhiza maculata
Deschampsia caespitosa
Deschampsia flexuosa
Eleocharis palustris
*Elymus repens**
*Epilobium montanum**
*Epilobium angustifolium***
Epilobium hirsutum
Epilobium parviflorum
Epilobium sp.
Equisetum arvense
*Equisetum fluviatile**
*Equisetum palustre**
Equisetum sp.
Erica tetralix
*Eriophorum angustifolium**
Eriophorum vaginatum
Eupatorium cannabinum
*Festuca arundinacea***
Festuca gigantea
*Festuca pratensis***
Festuca rubra
Filipendula ulmaria
*Galium aparine**
Galium palustre
*Galium saxatile***
*Galium verum**
Glyceria fluitans
*Glyceria maxima**
Gymnadenia conopsea
*Helictotrichon pubescens**
*Heracleum sphondylium***
Holcus lanatus
Hydrolyte vulgaris
Hypericum pulchrum
Hypericum tetrapterum
Hypochoeris radicata
Iris pseudacorus
Juncus acutiflorus
Juncus articulatus
Juncus conglomeratus
Juncus effusus
Juncus inflexus
*Knautia arvensis***
*Lapsana communis***
Lathyrus pratensis
Leontodon autumnalis
*Leontodon hispidus**
*Leucanthemum vulgare***
Linum catharticum
Lolium perenne
Lotus corniculatus
*Lotus uliginosa**
Luzula campestris
*Luzula multiflora***
Lychnis flos-cuculi
*Lysimachia vulgaris***
Lythrum salicaria
Mentha aquatica
Mentha sp.
Menyanthes trifoliata
Molinia caerulea
*Origanum vulgare***
*Parentucellia viscosa***
Pedicularis sylvatica
Phalaris arundinacea
*Phleum bertolini***
Phleum pratense
Phragmites australis
*Picea sitchensis***
Plantago lanceolata
*Platanthera bifolia**
Poa sp.
Poa trivialis
Polygala vulgaris
Potamogeton sp.
Potentilla anserina
Potentilla erecta
*Potentilla palustris***
Potentilla reptans
Primula veris
Prunella vulgaris
*Pulicaria dysenterica***
*Quercus robur***
Ranunculus acris
Ranunculus flammula
Ranunculus lingua
Ranunculus repens
*Rhinanthus minor**
*Rosa canina**
Rubus fruticosus agg.
Rumex acetosa
*Rumex conglomeratus***
Rumex crispus
*Rumex obtusifolius***
Sagina procumbens
*Salix alba***
*Salix caprea**
Salix cinerea
*Schoenus nigricans***
Senecio aquatica
Senecio jacobaea
*Silene dioica***
Sonchus asper
*Sonchus oleraceus***
Stachys palustris
Stellaria aparine
Stellaria graminea
Triglochin palustre
Ulex europaeus
*Urtica dioica***
Valeriana officinalis
Veronica beccabunga
Veronica chamaedrys
*Viburnum opulus**
Vicia cracca
Vicia sepium
Vicia sp.

GM1 Marsh

Agrostis capillaris
*Agrostis stolonifera**
Angelica sylvestris
Anthoxanthum odoratum
Caltha palustre
Carex nigra
Carex vesicaria
*Centaurea nigra**
Cirsium palustre

*Cladium mariscus**
*Crataegus monogyna**
Epilobium palustre
Equisetum sp.
Filipendula ulmaria
*Fraxinus excelsior**
Gallium palustre
Holcus lanatus
Iris pseudacorus
Juncus acutiflorus
Juncus effusus
Juncus effusus
Lathyrus pratensis
Lolium perenne
Lythrum salicaria
Lythrum salicaria
Mentha aquatica
Molina caerulea
Myosotis palustris
Phleum pratensis
*Phragmites australis**
Potentilla anserina
Potentilla anserina
Potentilla erecta
Potentilla palustre
Ranunculus acris
Ranunculus repens
Rubus fruticosus agg.
Rumex sp.
Salix aurita
Salix cinerea
*Schoenus nigricans**
Silene dioica
*Valeriana officinalis**
Vicia cracca

HH3 Wet heath

Angelica sylvestris
Anthoxanthum odoratum
Bryophytes
Carex panicea
Cirsium palustre
Dactylis glomerata
Festuca ovina
Festuca rubra
Filipendula ulmaria
Holcus lanatus
Luzula campestris
Molinia caerulea
Populus sp.
Potentilla erecta
Ribes sp.
Rubus fruticosus agg.
Schoenus nigricans
Succisa pratensis

HD1 Dense bracken

Agrostis canina
Anthoxanthum odoratum
Carex echinata
Carex flacca
Cirsium vulgare
Dactylorhiza fuchsii
Deschampsia cespitosa
Festuca arundinacea
Holcus lanatus
Hypericum sp.
Juncus acutiflorus
Juncus effusus
Luzula multiflorum
Pedicularis sp.
Plantago lanceolata
Potentilla erecta
Prunella vulgaris
Pteridium aquilinum
Ranunculus acris
Rubus fruticosus agg.
Succisa pratensis
*Trifolium pratens*e

PB1 Raised bog

*Andromeda polifolia**
Angelica sylvestris
Anthoxanthum odoratum
Betula pubescens
Calluna vulgaris
*Carex rostrata**
*Cladonia portentosa**
Dactylorhiza fuchsii
Drosera rotundifolia
Dryopteris dilatata
Epilobium angustifolium
Equisetum sp.
Erica tetralix
Eriophorum angustifolium
Eriophorum vaginatum
*Juncus bufonius**
Luzula multiflora
Molina caerulea
Narthecium ossifragum
Osmunda regalis
*Pinguicula vulgaris**
Potentilla erecta
Pteridium aquilinum
Rhynchospora alba
Salix aurita
Sphagnum capillifolium
Sphagnum cuspidatum
Sphagnum imbricatum
Sphagnum papillosum
Succisa pratensis
Trichophorum caespitosum
Ulex europaeus

PB4 Cutover bog

Andromeda polifolia
Angelica sylvestris
Anthoxanthum odoratum
Betula pubescens
*Callitriche sp.***
Calluna vulgaris
*Carex nigra**
*Carex panicea***
*Carex rostrata**
*Cladonia portentosa**
Dactylorhiza fuchsii
Drosera rotundifolia
Dryopteris dilatata
Epilobium angustifolium
Equisetum sp.
Erica tetralix
Eriophorum angustifolium
Eriophorum vaginatum
*Galium palustre***
*Geum rivale***
*Iris pseudacorus**
*Juncus effusus***
*Lonicera periclymenum**
Luzula multiflora
Molina caerulea
Narthecium ossifragum
Osmunda regalis
*Polystichum commune**
*Potamogeton sp. ***
Potentilla erecta
*Potentilla palustre**
*Potentilla reptans**
Pteridium aquilinum
*Rhododendron ponticum**
Rhynchospora alba
*Rumex acetosa***
Salix aurita
*Salix cinerea**
*Sorbus aucuparia **
Sphagnum capillifolium
Sphagnum cuspidatum

PF1 Rich fen and flush

Alnus glutinosa
*Angelica sylvestris***
*Briza media***
*Calluna vulgaris***
*Carex flacca***
Carex panicea
*Carex pulicaris***
*Carex viridula***
*Cirsium palustre***
*Dactylorhiza maculata***
Equisetum sp.
*Erica cinerea***
Filipendula ulmaria
*Galium palustre***
Holcus lanatus
*Juncus effusus***
Mentha aquatica
Molina caerulea
Phragmites australis
Pinus sp.
*Polygala vulgaris***
Potentilla erecta
Schoenus nigricans
Succisa pratensis
Ulex europaeus

WN1 Oak-birch-holly woodland

Betula pubescens
Fraxinus excelsior
Hedera helix
Salix sp.

WN2 Oak-ash-hazel woodland

Acer pseudoplatanus
*Aesculus hippocastanum***
*Agrostis capillaris***
Agrostis stolonifera
Ajuga reptans
Alliara petiolata
*Allium ursinum**
*Alnus glutinosa***
*Anemone nemorosa**
Angelica sylvestris
*Anthriscus sylvestris***
*Arctium minor***
Arrhenatherum elatius
Arum maculatum
Asplenium adiantum-nigrum
Athyrium filix-femina
*Aucuba japonica var. ***
Bellis perennis
*Betula pubescens***
Brachypodium sylvaticum
*Bromus sp. ***
*Buxus sp. ***
Caltha palustris
*Calystegia sepium***
*Carex divisula***
*Carex flacca***
*Carex pendula***
*Carex remota***
Carex sp.
Carex sylvatica
Castanea sativa
*Centaurea nigra***
Cerastium fontanum
Circaea lutetiana
Cirsium dissectum
Cirsium vulgare
*Clematis vitalba**
Corylus avellana
Crataegus monogyna
Dactylis glomerata
Deschampsia cespitosa
Dryopteris affinis
Dryopteris dilatata
Dryopteris filix-mas
*Epilobium angustifolium***
*Epilobium hirsutum***
*Epilobium montanum***

Epilobium sp.
Equisetum arvense
*Equisetum fluviatile***
Equisetum sp.
Euonymus europaeus
Fagus sylvatica
*Festuca rubra***
Filipendula ulmaria
*Fragaria vesca***
Fraxinus excelsior
Galium aparine
Galium odoratum
*Galium palustre***
Geranium robertianum
Geum urbanum
Glechoma hederacea
Hedera helix
Heracleum sphondylium
Holcus lanatus
Hyacinthoides non-scriptus
*Hypericum pulchrum***
*Hypericum tetrapterum***
*Hypochoeris radicata***
Ilex aquifolium
*Iris pseudacorus***
*Juncus effusus***
Juncus inflexus
Juncus sp.
Lapsana communis
*Ligustrum vulgare***
Listeria ovata
Lonicera periclymenum
Lysimachia nemorum
*Malus domestica***
Melica uniflora
Mentha aquatica
Mentha sp.
Oxalis acetosa
*Phalaris arundinacea***
Phragmites australis
Phyllitis scolopendrium
*Picea abies***
Picea sitchensis
Pinus sp.
*Pinus sylvestris***
*Plantago lanceolata***
*Plantago major***
Poa annua
*Poa trivialis**
*Polygonatum sp. ***
Polypodium vulgare
Polystichum setiferum
Populus tremula
Potentilla erecta
*Potentilla reptans***
Potentilla setiferum
Potentilla sterilis
*Primula veris**
Primula vulgaris
*Prunus avium***
Prunus sp.
Prunus spinosa
*Pseudosuga menziesii***
*Pteridium aquilinum ***
Quercus robur
*Ranunculus acris**
Ranunculus ficaria
Ranunculus repens
Ribes rubrum
*Rosa arvensis***
Rosa canina
Rosa sp.
Rubus fruticosus agg.
*Rubus idaeus***
Rumex crispus
Rumex sanguineus
Rumex sp.
Salix caprea
Salix cinerea
Salix sp.
Sambucus nigra
Sanicula europaeus
*Scrophularia nodosa***
*Senecio jacobaea***
*Sobaria sp. ***
Sonchus asper
*Sonchus oleraceus***
Sorbus aucuparia
Stachys sylvatica
Stellaria holostea
*Succisa pratensis***
Taraxacum officinale
*Taxus baccata**
Teucrium scorodonia
Ulex europaeus
Ulmus glabra
Urtica dioica
Veronica beccabunga
Veronica chamaedrys
Veronica montana
Veronica sp.
Viburnum opulus
Vicia sepium
Viola riviniana
Viola sp

WN6 Wet willow-alder-ash woodland

Acer pseudoplatanus
Alnus glutinosa
Arum maculatum
Betula pubescens
Brachypodium sylvaticum
Carex flacca
Carex remota
Chrysosplenium oppositifolium
Circaea lutetiana
Corylus avellana
Crataegus monogyna
Deschampsia cespitosa
Dryopteris dilatata
Epilobium hirsutum
Epilobium montanum
Equisetum sylvaticum
*Euonymus europaeus***
*Eupatorium cannabinum***
Fagus sylvatica
Filipendula ulmaria
Fraxinus excelsior
Galium aparine
Geranium robertianum
Geum urbanum
Glechoma hederacea
Glyceria fluitans
*Hedera helix***
Heracleum sphondylium
*Holcus lanatus***
*Ilex aquifolium***
Iris pseudacorus
Lonicera periclymenum
Mentha aquatica
*Phragmites australis***
Quercus robur

Ranunculus flammula
*Rosa canina***
Rubus fruticosus agg.
Salix cinerea
Sambucus nigra
Sanicula europaea
*Schoenplectus lacustris***
Solanum dulcamara
Stachys sylvatica
Ulex europaeus
Ulmus glabra
*Ulmus procera***
Urtica dioica
*Valeriana officinalis***
*Vicia cracca***
Viola sp.

WN7 Bog woodland
*Agrostis stolonifera***
Alnus glutinosa
*Anthoxanthum odoratum***
Betula pubescens
*Brachypodium sylvaticum***
*Calluna vulgaris***
*Carex sp. ***
*Corylus avellana***
Crataegus monogyna
*Dactylis glomerata***
*Dryopteris affinis***
*Dryopteris dilatata***
*Epilobium hirsutum***
*Epilobium montanum***
*Filipendula ulmaria***
Fraxinus excelsior
*Galium aparine***
*Geranium robertianum***
*Hedera helix***
*Heracleum sphondylium***
*Holcus lanatus***
*Ilex aquifolium***
*Ligustrum vulgare***
*Lonicera periclymenum***
*Molinia caerulea***
Prunus avium
Prunus spinosa
*Pteridium aquilinum***
*Ranunculus acris***
*Ranunculus repens***
*Rosa arvensis***
Rubus fruticosus agg.
*Rumex obtusifolius***
*Salix alba***
Salix aurita
Salix cinerea
*Salix sp. ***
Sambucus nigra
*Solidago virgaurea***
*Sonchus oleraceus***
*Urtica dioica***
*Veronica beccabunga***
*Vicia sepium***

WD1 (Mixed) broadleaved woodland
Acer pseudoplatanus
Aesculus hippocastanum
*Agrostis stolonifera***
*Alliara petiolaria**
*Allium ursinum**
*Alnus glutinosa**
*Anthoxanthum odoratum***
Anthriscus sylvestris
Arctium minor
*Arrhenatherum elatius***
Arum maculatum
*Betula pubescens***
Brachypodium sylvaticum
*Briza media***
*Buxus sempervirens***
*Calluna vulgaris***
Cardamine flexuosa
*Carex panicea***
Carex sylvatica
*Centaurea erythraea***
*Centaurea nigra***
Cerastium fontanum
Circaea lutetiana
*Cirsium palustre***
Cirsium vulgare
Conopodium majus
Corylus avellana
Crataegus monogyna
*Cynosurus cristatus***
Dactylis glomerata
*Dactylorhiza maculata***
*Deschampsia caespitosa***
*Dryopteris affinis***
*Dryopteris dilatata***
*Dryopteris filix-mas***
*Epilobium angustifolium***
*Epilobium hirsutum***
*Epilobium parviflorum***
Epilobium sp.
*Equisetum fluviatile***
*Euonymus europaeus***
*Euphrasia sp. ***
Fagus sylvatica
*Fagus sylvatica Purpurea***
*Festuca rubra ***
*Filipendula ulmaria**
*Fragaria vesca***
Fraxinus excelsior
Galium aparine
*Galium odoratum***
*Galium palustre***
Geranium robertianum
Geum urbanum
*Glechoma hederacea***
Hedera helix
Heracleum sphondylium
*Holcus lanatus***
Hyacinthoides non-scriptus
*Hypericum androsaemum***
*Hypericum sp. ***

Ilex aquifolium
*Iris pseudacorus***
*Juncus effusus***
*Lapsana communis**
*Laurus nobilis**
*Leontodon autumnalis***
*Leucanthemum vulgare***
Ligustrum sp.
*Ligustrum vulgaris***
*Linum catharticum***
Lonicera periclymenum
Lysimachia nemorum
*Medicago lupulina***
*Origanum vulgare***
*Oxalis acetosella***
*Phyllitis scolopendrium***
*Picea abies**
*Picea sitchensis***
*Pinus sylvestris***
Poa sp.
*Polystichum aculeatum **
Polystichum setiferum
Potentilla sterilis
Primula vulgaris
*Prunus laurocerasus**
Prunus spinosa
*Pteridium aquilinum ***
Quercus robur
Ranunculus auricomus
Ranunculus ficaria
*Ranunculus repens**
*Rosa canina***
*Rosa sp. **
Rubus fruticosus agg.
*Rumex crispus**
Rumex obtusifolius
Rumex sanguineus
Rumex sp.
*Salix caprea***
*Salix cinerea***
Salix sp.
Sambucus nigra
*Sanguisorba minor***
*Sanicula europaea***
*Scrophularia nodosa***
*Senecio jacobaea**
*Sonchus oleraceus***
*Sorbus aucuparia***
Stachys sylvatica
Stellaria media
*Symphoricarpos orbiculatus**
Taraxacum officinale
*Thymus vulgaris***
Tilia cordata
*Tilia sp. ***
*Tilia x europaea**
*Torilis japonica***
*Trifolium pratense***
*Trifolium repens***
*Ulex europaeus***
Ulmus glabra
Ulmus procera
Urtica dioica
*Veronica chamaedrys***
Veronica montana
Veronica officinalis
*Veronica serpyllifolia***
*Viburnum opulus**
*Vicia sepium***
Vicia sp.
*Viola reichenbackiana**
Viola sp.

WD2 Mixed broadleaved/conifer woodland

Abies sp.
Acer pseudoplatanus
Alnus glutinosa
Arum maculatum
Betula pubescens
Brachypodium sylvaticum
*Calystegia sepium***
Circaea lutetiana
*Clematis vitalba***
*Cornus sp. ***
Corylus avellana
Crataegus monogyna
Dryopteris affinis
Dryopteris dilatata
Dryopteris filix-mas
*Epilobium hirsutum***
Euonymus europaeus
Fagus sylvatica
Fraxinus excelsior
Geranium robertianum
Geum urbanum
Hedera helix
Hypericum humifusum
Ilex aquifolium
*Larix decidua***
*Ligustrum vulgare***
Lonicera periclymenum
*Phalaris arundinacea***
Phragmites australis
*Picea abies**
Picea sitchensis
Pinus sylvestris
Prunus domestica
Prunus kanzan
Prunus spinosa
Pseudosuga menzessi
Quercus robur
Rosa sp.
Rubus fruticosus agg.
Salix caprea
Salix cinerea
*Salix fragilis***
Sambucus nigra
Sanicula europaea
*Sparganium emersum***
*Taxus baccata***
Ulex europaeus
Urtica dioica
Veronica chamaedrys
Viburnum opulus
Viola sp.

WD3 (Mixed) conifer woodland

*Larix decidua**
*Picea abies**
Picea sitchensis
*Pinus sylvestris***

WD4 Conifer plantation

Abies sp.
Larix sp.
Norway spruce
Picea abies
Picea sitchensis
Pinus contorta
Pinus sylvestris
Pseudosuga menziesii

WD5 Scattered trees and parkland

*Acer pseudoplatanus**
Aesculus hippocastanum
*Agrostis stolonifera***
*Cerastium fontanum***
*Cirsium arvense***
*Dactylis glomerata***
Fagus sylvatica
Fraxinus excelsior
Fraxinus excelsior pendula
*Galium aparine***
*Geranium robertianum***
*Geum urbanum***
*Lapsana communis***
*Lolium perenne***
*Quercus robur***
*Ranunculus repens***
*Rumex crispus***
*Ulmus procera**
*Urtica dioica***
*Viola sp. ***

WS1 Scrub

Acer pseudoplatanus
Achillea millefolium
*Agrostis capillaris***
Agrostis stolonifera
Alnus glutinosa
Andromeda polifolia
Angelica sylvestris
Anthoxanthum odoratum
*Arctium minor**
Arum maculatum
Bellis perennis
Betula pubescens
Brachypodium sylvaticum
Briza media
Calluna vulgaris
Cardamine pratensis
*Carex flacca***
Carex panicea
Carex pilulifera
*Carex sylvatica***
Centaurea nigra
Cerastium fontanum
*Circaea lutetiana***
*Cirsium arvense***
Cirsium dissectum
Cirsium vulgare
Corylus avellana
Crataegus monogyna
Cynosurus cristatus
Dactylis glomerata
Dactylorhiza fuchsii
Dactylorhiza maculata
Dactylorhiza majalis
*Daucus carota***
Deschampsia cespitosa
Drosera rotundifolia
Dryopteris dilatata
Dryopteris filix-mas
Epilobium angustifolium
*Epilobium hirsutum***
Epilobium palustre
*Equisetum fluviatile***
Equisetum sp.
Erica cinerea
Erica tetralix
Eriophorum angustifolium
Eriophorum vaginatum
*Euonymus europaeus ***
*Eupatorium cannabinum***
Euphrasia sp.
Fagus sylvatica
*Festuca rubra***
Filipendula ulmaria
Fraxinus excelsior
Galium aparine
*Galium palustre***
Galium verum
Geranium molle
Geranium robertianum
*Geum urbanum***
Glechoma hederacea
*Gymnadenia conopsea***
Hedera helix
Heracleum sphondylium
Holcus lanatus
Hyacinthoides non-scriptus
Hypericum humifusum
*Hypericum pulchrum***
Ilex aquifolium
Juncus acutiflorus
*Juncus articulatus***
*Juncus inflexus***
Larix decidua
Leontodon autumnalis
*Leucanthemum vulgare***
Ligustrum sp.
Ligustrum vulgare
Listeria ovata
Lolium perenne
Lonicera periclymenum
Lotus corniculatus
Luzula multiflora
Luzula sylvatica
Malus sp.
Mentha arvensis
*Mentha sp. ***
Molina caerulea

Narthecium ossifragum
Osmunda regalis
Pedicularis sylvatica
*Phalaris arundinacea***
Phragmites australis
*Phyllitis scolopendrium***
Plantago lanceolata
*Poa annua***
Poa sp.
Polygala vulgaris
*Polypodium vulgare***
Polystichum aculeatum
Populus sp.
Potentilla anserina
Potentilla erecta
Potentilla reptans
*Potentilla sterilis***
Primula vulgaris
Prunus avium
*Prunus domestica**
Prunus spinosa
Pteridium aquilinum
Quercus robur
Ranunculus ficaria
Ranunculus flammula
Ranunculus repens
Rhynchospora alba
*Rosa canina**
Rosa sp.
Rubus fruticosus agg.
*Rumex crispus**
*Rumex sanguineus***
Salix aurita
Salix caprea
Salix cinerea
*Salix fragilis**
Salix sp.
Sambucus nigra
Schoenus nigricans
*Senecio jacobaea***
Silene dioica
Sorbus aucuparia
Sphagnum capillifolium
Sphagnum cuspidatum
Sphagnum imbricatum
Sphagnum papillosum
*Stellaria media***
Succisa pratensis
Taraxacum officinale
*Taxus baccata***
*Torilis japonica***
Trichophorum caespitosum
Trifolium dubium
Trifolium pratense
Trifolium repens
Ulex europaeus
Ulmus glabra
Ulmus procera
Urtica dioica
*Valeriana officinalis **
Veronica chamaedrys
Viburnum opulus
Vicia cracca
*Vicia sepium***
Viola riviniana
*Viola sp. ***

WS2 Immature woodland

*Abies sp.***
Acer pseudoplatanus
Agrostis stolonifera
Alnus glutinosa
Arrhenatherum elatius
Betula pubescens
Cirsium arvense
Cirsium palustre
*Corylus avellana***
Digitalis purpurea
Epilobium angustifolium
Epilobium sp.
Fagus sylvatica
Fraxinus excelsior
Holcus lanatus
Hypericum pulchrum
Juncus acutiflorus
Juncus effusus
Lathyrus pratensis
Luzula multiflora
*Picea sp. ***
*Populus sp. ***
Potamogeton sp.
Potentilla reptans
*Quercus cerris***
Quercus robur
Ranunculus flammula
*Reynoutria japonica***
Rubus fruticosus agg.
Rumex acetosella
*Salix cinerea***
Salix sp.
Senecio jacobaea
Silene dioica
Taraxacum officinalis
Trifolium pratense
Ulex europaeus

WS3 Ornamental/non-native shrub

*Chamaecyparis lawsoniana***
*Cotoneaster horizontalis***
Fagus sylvatica
Grisilina littoralis
*Hypericum hidcote***
Leylandii
Ligustrum ovalifolium
Lonicera nitida
*Pyracantha sp. ***
x Cupressocyparis leylandii

WS5 Recently felled woodland

*Acer pseudoplatanus***
*Agrostis stolonifera***
Anthoxanthum odoratum
Arrhenatherum elatius
*Arum maculatum***
Athyrium filix-femina
Betula pubescens
*Brachypodium sylvaticum***
Calluna vulgaris
Calystegia sepium
Carex flacca
*Carex sylvatica***
Cirsium arvense
Cirsium vulgare
*Corylus avellana***
*Crataegus monogyna***
Dactylis glomerata
Dryopteris dilatata
*Dryopteris filix-mas***
Epilobium angustifolium
*Epilobium hirsutum***
Epilobium parviflorum
*Fagus sylvatica***
Festuca gigantea
*Festuca rubra***
Filipendula ulmaria
Fraxinus excelsior
*Galium aparine***
Galium palustris
Geranium robertianum
*Geum urbanum***
*Hedera helix***
*Heracleum sphondylium***
Holcus lanatus
*Hypericum perforatum***
Hypericum repens
Hypericum tetrapterum
*Hypochoeris radicata***
*Ilex aquifolium***
Juncus acutiflorus
Juncus effusus
Juncus inflexus
*Lapsana communis***
Lonicera periclymenum
Luzula multiflora
Lythrum salicaria
Medicago lupulina
Odontites vernus
Oxalis acetosella
Phleum pratensis
*Phyllitis scolopendrium***
*Picea sitchensis***
*Plantago lanceolata***
*Plantago major***
Polygonum persicaria
Potentilla anserina
Potentilla erecta
Potentilla reptans
*Primula vulgaris***
Prunella vulgaris
*Quercus robur***
*Ranunculus acris***
Ranunculus flammula
Ranunculus repens
Ribes rubrum
Rubus fruticosus agg.
Salix cinerea
*Scrophularia nodosa***
Senecio jacobaea
*Senecio vulgaris***
Sisymbrium officinale
Solanum dulcamara
Sonchus arvensis
*Sonchus asper***
Stachys sylvatica
Taraxacum officinale
Trifolium repens
Ulex europaeus
*Ulmus glabra***
Urtica dioica
Veronica beccabunga
*Veronica chamaedrys***
Vicia cracca
Vicia sepium
*Viola sp. ***

WL1 Hedgerows

Acer pseudoplatanus
Achillea millefolium
Aesculus hippocastanum
Agrostis capillaris
Agrostis stolonifera
*Alnus glutinosa**
*Alopecurus pratensis**
Anthoxanthum odoratum
*Anthriscus sylvestris***
Arrhenatherum elatius
Asplenium adiantum-nigrum
*Betula pendula**
*Betula pubescens***
Brachypodium sylvaticum
Carex divulsa
Centaurea nigra
Centaurium erythraea
Cerastium fontanum
Cirsium arvensis
Cirsium vulgare
*Clematis vitalba**
Corylus avellana
Crataegus monogyna
Dactylis glomerata
Daucus carota
Epilobium hirsutum
Epilobium parviflorum
Equisetum arvense
Euonymus europaeus
Fagus sylvatica
Festuca rubra
Filipendula ulmaria
Fraxinus excelsior
*Galium aparine***
Galium palustris
Galium verum
Geranium robertianum
Glechoma hederacea
Glyceria fluitans
Hedera helix
Helictotrichon pubescens
Heracleum sphondylium
Holcus lanatus
Hypericum androsaemum
Hypericum maculatum
Hypericum perforatum
Ilex aquifolium
Iris pseudacorus
Knautia arvensis
Larix decidua
Lathyrus pratensis
Leontodon autumnalis
Ligustrum sp.

*Ligustrum vulgaris**
Lolium perenne
Lonicera periclymenum
Lotus corniculatus
Lythrum salicaria
*Malus domestica**
Medicago lupulina
Mentha spicata
Myosotis discolor
Myosotis palustris
Phleum pratensis
Phyllitis scolopendrium
*Pinus sylvestris***
Plantago lanceolata
Plantago major
Polystichum setiferum
Potentilla anserina
Potentilla reptans
Primula vulgaris
Prunus domestica
Prunus spinosa
Pteridium aquilinum
*Pyrus pyraster**
*Quercus robur**
*Ranunculus repens***
Reynoutria japonica
Rosa arvense
Rosa canina
Rosa sp.
Rubus fruticosus agg.
Rumex obtusifolius
*Rumex sanguineus***
Rumex sp.
Salix aurita
Salix caprea
Salix cinerea
Salix sp.
Salix viminalis
Salix x multinervis
Sambucus nigra
Schoenplectus lacustris
Senecio jacobaea
Silene latifolia
Sonchus oleraceus
Sorbus aria
Sorbus aucuparia
Stellaria holostea
Symphytum sp.
Taraxacum officinale
*Taxus baccata**
*Tilia x europaea**
Torilis japonica
Ulex europaeus
Ulmus glabra
Ulmus procera
Urtica dioica
Veronica chamaedrys
Veronica officinalis
Viburnum opulus
Vicia sepium
Viola sp.

WL2 Treelines
Acer pseudoplatanus
Aesculus hippocastanum
Chamaecyparis sp.
Corylus avellana
Crataegus monogyna
Fagus sylvatica
Fraxinus excelsior
Hedera helix
Larix decidua
Lonicera periclymenum
Pinus sylvestris
Populus sp.
*Quercus robur**
Rosa canina
Salix cinerea
Sorbus aucuparia
*Tilia sp.***
Ulmus sp.

ER2 Exposed calcareous rock
Briza media
Centaurea nigra
Cerastium fontanum
Cirsium vulgare
Crataegus monogyna
Dactylis glomerata
Festuca sp.
Fragaria vesca
Geranium dissectum
Geranium robertianum
Geum urbanum
Hedera helix
Leucanthemum vulgare
Linum bienne
Lotus corniculatus

ER2 Exposed calcareous rock
Medicago lupulina
Orchid
Orchid withered
Plantago lanceolata
Potentilla reptans
Potentilla sterilis
Prunus spinosa
Rosa canina
Rubus fruticosus agg.
Sanguisorba minor
Sedum acre
Senecio jacobaea
Stachys sylvatica
Trifolium dubium
Trifolium repens
Ulex europaeus
Vicia sativa

ED1 Exposed sand, gravel or till

Callitriche stagnalis
Epilobium palustre
Glyceria maxima
Glyceria notata
Nasturtium officinale
Phragmites australis
Ranunculus peltatus
*Rumex crispus**
Salix fragilis
Scrophularia nodosa

ED2 Spoil and bare ground

*Poa annua**
*Salix sp. **
*Senecio vulgaris**
*Taraxacum officinale**

ED3 Recolonising bare ground

*Achillea millefolium***
Agrostis stolonifera
Anagallis arvensis
Anthoxanthum odoratum
*Anthriscus sylvestris***
*Arctium minor***
Arrhenatherum elatius
Calystegia sepium
Centaurea nigra
*Cerastium fontanum***
Chenopodium alba
Cirsium arvense
Cirsium vulgare
Cotoneaster sp.
Dactylis glomerata
Daucus carota
*Dipsacus fullonum***
Epilobium angustifolium
Epilobium hirsutum
Epilobium parviflorum
Equisetum arvense
Fraxinus excelsior
*Fumaria officinalis***
*Geranium robertianum***
Hedera helix
Helictotrichon pubescens
Heracleum sphondylium
Holcus lanatus
Hypericum sp.
Juncus acutiflorus
Juncus bufonius
*Lamium purpureum***
Lathyrus pratensis
*Leontodon autumnalis***
*Leucanthemum vulgare***
*Lonicera periclymenum***
Matricaria discoidea
Medicago lupulina
Odontites vernus
*Papaver rhoeas***
Plantago lanceolata
Plantago major
*Potentilla anserina***
*Potentilla reptans***
*Ranunculus repens***
*Reseda lutetiana***
*Rhus typhina***
*Rubus fruticosus agg. ***
Rumex conglomeratus
*Rumex obtusifolius***
Salix cinerea
Senecio jacobaea
Senecio vulgaris
Sonchus oleraceus
*Stachys sylvatica***
Taraxacum officinale
*Torilis japonica***
Trifolium pratensis
Trifolium repens
Tussilago farfara
*Ulex europaeus***
Urtica dioica
*Veronica chamaedrys***
Vicia cracca
Vicia sepium
*Yellow Brassica***

ED6 Set-aside

Agrostis stolonifera
*Chenopodium sp.***
*Cirsium arvensis***
Cirsium sp.
*Cirsium vulgare***
*Dactylis glomerata***
Galium aparine
*Heracleum sphondylium***
Lolium perenne
*Lythrum salicaria***
*Papaver rhoeas***
Rumex conglomeratus
*Rumex crispus***
*Sonchus oleraceus***
Taraxacum officinale
*Urtica dioica***

BC1 Arable crops

*Acer pseudoplatanus***
*Anagallis arvensis***
*Avena fatua***
Beta vulgaris
*Calystegia sepium***
*Capsella bursa-pastoris***
*Cerastium fontanum***
*Cirsium vulgare***
*Crataegus monogyna***
*Euphrasia sp. ***
*Galium aparine***
*Holcus lanatus***
Hordeum vulgare
*Lamium purpureum***
*Lapsana communis***
*Lolium perenne***
*Matricaria discoidea***
*Miscanthus giganteus***
*Myosotis arvensis***
*Papaver rhoeas***
*Plantago major***
*Poa sp. ***
*Polygonum aviculare***
*Polygonum persicaria***
*Ranunculus repens***
*Rosa sp. ***
*Rumex crispus***
*Rumex obtusifolius***
*Senecio vulgaris***
*Sherardia arvensis***
*Sonchus oleraceus***
Triticum sp.
*Urtica dioica***
*veronica chamaedrys***
*Vicia sativa***
*Viola arvensis***
Zea mays

BC2 Horticultural land

Allium cepa
Brassica oleracea
Daucus carota subsp. sativus
Malus domestica
Solanum tuberosum

BC4 Flower beds and borders

Allium schoenoprasum
Malus domestica
Brassica oleracea
Chrysanthemum rubellum sp.
Dianthus sp.
Digitalis purpureus
Geranium sp.
Juniperus squamata sp.
Kniphofia sp.
Allium ampeloprasum var. porrum
Lactuca sativa
Lupinus sp.
Allium cepa
Paeonia sp.
Papaver orientalis
Solanum tubersoum
Rosmarinus officinalis
Stachys byzantina
x Cupressus macrocarpa

BL1A Stone walls

*Antirrhinum majus***
*Arrhenatherum elatius***
*Arum maculatum***
*Asplenium ruta-muraria**
*Asplenium trichomanes**
*Blechnum spicant***
*Brachypodium sylvaticum**
Bryophytes
Calystegia sepium
Cardamine flexuosa
*Cerastium fontanum***
*Dactylis glomerata***
Epilobium sp.
*Festuca rubra**
Galium aparine
*Geranium robertianum**
Hedera helix
*Leucanthemum vulgare***
*Lichens**
*Lolium perenne***
*Parietaria diffusa**
*Phyllitis scolopendrium**
*Potentilla sterilis**
*Rubus fruticosus agg. ***
*Sambucus niger***
*Sonchus oleraceus***
*Taraxacum officinale**

BL1B Other stonework

*Bryophytes***
*Festuca rubra***
*Hedera helix**
*Lichens***
*Lonicera periclymenum***
*Poa annua**
*Rubus fruticosus agg. **
*Sambucus nigra**
*Senecio jacobaea***

BL2 Earth banks

Achillea millefolium
Anthriscus sylvestris
Arrhenatherum elatius
*Bellis perennis***
Brachypodium sylvaticum
Calystegia sepium
*Carex sp. ***
Centaurea nigra
*Cerastium fontanum***
Cirsium arvensis
*Cirsium vulgare***
Corylus avellana
Crataegus monogyna
Dactylis glomerata
Elymus repens
*Epilobium sp. ***
Equisetum arvense
*Euphorbia peplus***
*Festuca rubra***
Filipendula ulmaria
Fraxinus excelsior
Galium aparine
*Galium verum***
*Geranium robertianum***
Glechoma hederacea
Hedera helix
Heracleum sphondylium
*Hypochoeris radicata***
Lathyrus pratensis
*Ligustrum vulgare***
Lonicera periclymenum
*Myosotis arvensis***
Phyllitis scolopendrium
*Plantago lanceolata***
*Plantago major***
Poa trivialis
Potentilla anserina
Potentilla reptans
*Potentilla sterilis***
Prunus spinosa
Pteridium aquilinum
*Ranunculus repens***
Rosa canina
Rubus fruticosus agg.
*Rumex acetosa***
*Sambucus nigra***
*Senecio jacobaea***
*Sonchus oleraceus***
*Taraxacum officinale***
*Trifolium repens***
*Ulmus procera***
*Urtica dioica***
*Veronica chamaedrys***
Vicia cracca
Vicia sepium

BL3 Buildings and artificial surfaces

Asplenium scolopendrium
*Bellis perenis***
*Buddleia davidii***
Fraxinus excelsior
*Lolium perenne***
*Poa annua***
Rubus fruticosus agg.
Sambucus nigra
*Senecio jacobaea***
*Senecio vulgaris***

BL3D Land being developed
No species recorded

BL3 1 Large urban gardens
No species recorded

BL3 2 Medium urban gardens
No species recorded

BL3 3 Small urban gardens
No species recorded

Appendix 9. Target Notes

Townland, grid-square and target note numbers for different habitats in County Laois Parish Habitat Survey during 2005, 2006 and 2007.

Limestone/marl lakes (FL3)

Townland	Grid square	Target note number
Ballinlough	S5399	N1
Bellegrove	N5905	N3
Bellegrove	N5905	N4
Bellegrove	N5905	N5
Kilbride	N5209	N4

Depositing lakes and rivers (FW2)

Townland	Grid square	Target note number
Courtwood	N6002	N1
Courtwood	N6102	N2
Garryvacum	N5506	N1
Vicarstown (Dodd)	N6001	N2

Canals (FW3)

Townland	Grid square	Target note number
Bracklone	N5511	N3
Kilbride	N5210	N2

Drainage ditches (FW4)

Townland	Grid square	Target note number
Ballymorris	N5211	N4
Cappakeel	N5604	N5
Coolnacurragh	S3378	N4
Coolroe	N5903	N2
Cooltederry	N5412	N5
Cooltederry	N5311	N2
Doolough	N5409	N4
Droughill	N5413	N3
Garrymaddock	N5703	N5
Morett	N5404	N7
Rahenahown North	N5802	N2
Rosnamullane	N5901	N1
Tinnaragh	S3282	N1

Dry calcareous and neutral grassland (GS1)

An asterisk after townland name indicates that it's worth considering as a priority grassland.

Townland	Grid square	Target note number
Carrigeen	N5500	N11
Carrigeen	N5500	N12
Carrigeen	N5500	N16
Coolnacarrick	S5296	N1
Dairyhill	S3483	N1
Garryduff	S5282	N3
Garrymaddock	N5702	N13
Grange Upper	S5396	N2
Kilbride	N5209	N6
Kilbride*	N5209	N7
Middlemount or Ballyvoghlaun	S3278	N2
Park or Dunamase	N5298	N12
Park or Dunamase	N5398	N2

Dry meadows and grassy verges (GS2)

Townland	Grid square	Target note number
Ballymorris	N5311	N1
Bellegrove	N5806	N4
Bracklone	N5511	N1
Bracklone	N5611	N1
Bracklone	N5611	N3
Coolnacarrick	S5296	N1
Courtwood	N6302	N1
Droughill	N5413	N4
Kilbride	N5210	N6
Kilbride	N5209	N4
Killone	N5402	N3
Raheen	N5300	N7
Raheenahown North	N5902	N2
Rathcrea	N5801	N9
Tirhogar	N5510	N1
Vicarstown (Dodd)	N6301	N1

Dry-humid acid grassland (GS3)

Townland	Grid square	Target note number
Cappakeel	N5604	N2
Garrymaddock	N5702	N7
Hophall	S5095	N10
Morett	N5404	N9
Morett	N5404	N1

Wet grassland (GS4)

Townland	Grid square	Target note number
Ballycarroll	S5199	N2
Ballycarroll	S5199	N7
Ballycarroll	S5198	N5
Ballycarroll	S5198	N6
Ballymorris	N5211	N1
Ballymorris	N5411	N1
Ballymorris	N5210	N3
Bellegrove	N5905	N7
Bellegrove	N5905	N6
Coolacurragh	S3378	N2
Coolacurragh	S3378	N3
Cooltederry	N5311	N1
Curragh	S3481	N2
Dairyhill	S3582	N1
Doolough	N5409	N3
Garryduff	S3182	N14
Garrymaddock	N5702	N9
Garrymaddock	N5702	N14
Garrymaddock	N5703	N4
Garryvacum	N5507	N7
Hophall	S5095	N1
Hophall	S5095	N2
Hophall	S5095	N6
Lough	N5408	N2
Middlemount/Ballyvoghlaun	S3278	N3
Morett	N5403	N3
Morett	N5403	N3
Park or Dunamase	S5198	N2
Park or Dunamase	S5198	N7
Rahandrick Upper	S3181	N1
Raheenahown North	N5902	N3
Rathcrea	N5901	N4
Shanvaghey	S3380	N3
Tonafarna	N5802	N3
Vicarstown (Dodd)	N6201	N1

Marsh (GM1)

Townland	Grid square	Target note number
Aghnahily Bog	S5198	N3
Cooletederry	N5412	N4
Park or Dunamase	S5198	N1
Tintore & Ballycolla	S3581	N1

Wet heath (HH3)

Townland	Grid square	Target note number
Ballyduff		
Garrymaddock	N5702	N11
Morett	N5403	N6
Morett	N5404	N3
Morett	N5404	N6

Raised bog (PB1)

Townland	Grid square	Target note number
Garryvacum	N5507	N10

Cutover bog (PB4)

Townland	Grid square	Target note number
Aghnahily Bog	S5198	N1
Aghnahily Bog	S5198	N3
Aghnahily Bog	S5198	N4
Aghnahily Bog	S5198	N5
Dysart	S5197	N1
Garryvacum	N5507	N8

Rich fen and flush (PF1)

Townland	Grid square	Target note number
Morett	N5406	N6

Poor fen and flush (PF2)

Townland	Grid square	Target note number
Garryvacum	N5507	N11

Oak-ash-hazel woodland (WN2)

Townland	Grid square	Target note number
Ballymaddock	S5498	N2
Ballymorris	N5310	N2
Ballythomas	N5500	N1
Carrageen	N5500	N15
Carrageen	N5400	N2
Chapelhill	S3381	N1
Courtwood	N6102	N1
Courtwood	N6302	N2
Dysart	S5197	N7
Garrymaddock	N5702	N4
Garrymaddock	N5702	N6
Grange Upper	S5396	N1
Hophall	S5195	N5
Kilbride	N5210	N3
Killone	N5500	N2
Kilmurray	N5501	N2

Townland	Grid square	Target note number
Kilmurray	N5501	N4
Kilmurray	N5501	N7
Kilmurray	N5500	N2
Kilteale	S5498	N3
Lamberton Demesne	S4193	N1
Morett	N5402	N2
Morett	N5403	N4
Morett	N5404	N3
Morett	N5403	N4
Park or Dunamase	S5198	N6
Park or Dunamase	S5298	N6
Park or Dunamase	S5298	N15
Park or Dunamase	S5298	N16
Park or Dunamase	S5297	N2
Park Upper	S5498	N3
Raheen	N5300	N2
Raheen	N5499	N1

Scrub (WS1)

Townland	Grid square	Target note number
Aghnahily	S5597	N5
Aghnahily	S5397	N8
Aghnahily Bog	S5198	N1
Aghnahily Bog	S5198	N2
Aghnahily Bog	S5198	N6
Aghnahily Bog	S5198	N8
Ballinlough	S5499	N1
Ballinlough	S5499	N2
Ballycarroll	S5398	N6
Ballycarroll	S5099	N1
Ballycarroll	S5299	N2
Ballycarroll	S5299	N8
Ballycarroll	S5298	N2
Ballycarroll	S5398	N5
Ballycarroll	S5397	N1
Ballycarroll	S5397	N2
Ballycarroll	S5397	N3
Ballymaddock	N5400	N2
Ballymaddock	N5400	N3
Ballymaddock	S5499	N1
Ballymaddock	S5499	N2
Ballymaddock	S5499	N4
Ballymaddock	S5499	N7
Ballymaddock	S5499	N5
Ballymaddock	S5598	N1
Ballymaddock	S5598	N5
Ballythomas	N5600	N3
Ballythomas	N5400	N4

Townland	Grid square	Target note number
Bracklone	N5512	N1
Bracklone	N5512	N2
Cappakeel	N5604	N3
Cappakeel	N5604	N4
Carrigeen	N5500	N11
Carrigeen	N5600	N6
Coolnacarrick	S5296	N1
Coolnacarrick	S5296	N2
Coolnacarrick	S5296	N3
Coolnacarrick	S5296	N4
Coolnacarrick	S5295	N1
Coolnacarrick	S5295	N2
Coolnacarrick	S5295	N3
Cooltederry	N5411	N2
Cooltederry	N5411	N4
Courtwood	N6002	N3
Dairyhill	S3483	N1
Doolough	N5408	N2
Dysart	S5197	N5
Dysart	S5297	N1
Dysart	S5098	N1
Dysart	S5196	N1
Dysart	S5296	N3
Dysart	S5098	N1
Dysart	S5196	N2
Dysart	S5196	N6
Dysart	S5196	N7
Dysart	S5296	N1
Dysart	S5296	N3
Garryduff	S3182	N4
Garryduff	S3182	N5
Garryduff	S3182	N10
Garrymaddock	N5702	N3
Garrymaddock	N5702	N5
Garrymaddock	N5703	N1
Garryvacum	N5608	N1
Garryvacum	N5608	N2
Garryvacum	N5507	N2
Garryvacum	5507	N6
Grange Upper	S5397	N2
Hophall	S5195	N1
Hophall	S5195	N2
Hophall	S5095	N3
Hophall	S5095	N4
Kilbreedy	S3080	N1
Kilbreedy	S3080	N2
Kilbride	N5210	N6
Kilbride	N5210	N8
Kilbride	N5209	N5

Townland	Grid square	Target note number
Kilbride	N5209	N9
Killone	N5502	N2
Killone	N5502	N6
Killone	N5400	N1
Killone	N5402	N2
Kilmurray	N5501	N1
Kilmurray	N5501	N10
Kilmurray	N5601	N3
Kilmurray	N5602	N2
Kilteale	S5498	N4
Kilteale	S5498	N5
Lamberton Demesne	S5194	N1
Lamberton Demesne	S5094	N2
Lamberton Demesne	S5093	N1
Lamberton Demesne	S5093	N2
Loughakeo	S5296	N5
Middlemount	S3079	N1
Middlemount or Ballyvoghlaun	S3278	N1
Morett	N5202	N4
Morett	N5205	N3
Morett	N5402	N1
Morett	N5403	N5
Morett	N5404	N5
Morett	N5404	N6
Morett	N5404	N5
Morett	N5404	N8
Oldglass	S3279	N1
Park Lower	S5597	N1
Park Lower	S5597	N4
Park or Dunamase	S5198	N1
Park or Dunamase	S5298	N5
Park or Dunamase	S5298	N9
Park or Dunamase	S5298	N10
Park or Dunamase	S5298	N11
Park or Dunamase	S5298	N13
Park Upper	S5498	N1
Park Upper	S5598	N1
Powelstown	S5294	N3
Rahandrick Upper	S3181	N2
Raheen	N5300	N7
Raheen	N5399	N5
Raheen	N5400	N1
Raheen	N5400	N3
Raheen	N5400	N11
Raheen	N5400	N2
Raheenanisky	S5395	N4
Rathcrea	N5901	N2
Rathcrea	N5901	N3

Townland	Grid square	Target note number
Shanvaghey	S3181	N1
Tinneragh		N2
Tirhogar	N5509	N2
Tonafarna	N5801	N1
Tonafarna	N5902	N6
Tonafarna	N5802	N4

Hedgerows (WL1)

Townland	Grid square	Target note number
Ballinlough	N5401	N1
Ballinlough	N5400	N1
Ballycarroll	S5398	N8
Ballycarroll	S5299	N1
Ballycarroll	S5398	N2
Ballycarroll	S5398	N8
Ballyduff (ed. Kilmurry)	N5601	N4
Ballymaddock	S5499	N3
Ballymaddock	S5499	N6
Ballymaddock	S5599	N2
Ballymaddock	S5599	N4
Ballymaddock	S5599	N8
Ballymaddock	S5498	N3
Ballymorris	N5509	N1
Ballythomas	N5500	N4
Ballythomas	N5500	N5
Ballythomas	N5600	N2
Bracklone	N5611	N4
Carrageen	N5500	N1
Coolbarry	S3183	N1
Coolbarry	S3183	N4
Coolbarry	S3183	N5
Coolbarry	S3283	N2
Coolbarry	S3283	N4
Cooltederry	N5411	N6
Dairyhill	S3483	N1
Doolough	N5409	N2
Droughill	N5513	General
Farranville	S3082	N1
Fisherstown	N6205	N2
Garryduff	S3183	N2
Garryduff	S3182	N1
Garryduff	S3182	N2
Garryduff	S3182	N6
Garryduff	S3282	N6
Grange Upper	S5496	N1
Grange Upper	S5496	N5
Kilbrackan	N6106	N1
Kilbrackan	N6106	N1

Townland	Grid square	Target note number
Kilbride	N5210	N1
Killone	N5602	N1
Killone	N5501	N4
Kilteale	S5498	N6
Morett	N5403	N7
Morett	N5404	N5
Park Lower	S5597	N5
Park or Dunamase	S5297	N3
Park Upper	S5597	N1
Park Upper	S5497	N3
Raheen	N5300	N1
Raheenahown South	N5801	N1
Raheenanisky	S5395	N2
Raheenanisky	S5395	N3
Rathcrea	N5902	N1
Rathcrea	N5801	N3
Rathleash	N5211	N2
Rathronshin	N5906	N2
Rosnamullane	N6001	N1
Tinneragh	S3282	N3
Tirhogar	N5610	N3
Vicarstown (Dodd)	N6301	N2

Exposed calcareous rock (ER2)

Townland	Grid square	Target note number
Ballycarroll	S5399	N1
Killone	N5502	N5
Kilmurry	N5501	N5

Flower beds and borders (BC3)

Townland	Grid square	Target note number
Ballymorris	N5310	N7