Laois Habitats Survey 2006

Part I

River Barrow at Dunrally Bridge on the Laois Kildare border

Report prepared for Laois Heritage Forum:

An Action of the Laois Heritage Plan

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Summary

This report contains the results of habitat mapping carried out in 2005 and 2006 in County Laois. Parts of the north west and south east 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).

Habitats were mapped principally through fieldwork. In the summers of 2005 and 2006 ecologists examined habitats field by field within the survey area. A total of 90 townlands were surveyed over two years in an area covering 140 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 in 2006. The results of the 2005 survey have either been digitised or shown on hand coloured maps.

Principal findings are:

A total of 54 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. 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 6.56km of hedgerow per square kilometre.

Semi-natural habitats, some of which are of high biodiversity value, account for less than 6% 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 54 habitats which have been identified support 385 plant species. In the first year (2005), 335 species were found while in 2006, 49 further species were added to the total. Species diversity varies greatly between habitats. The most valuable habitats for plants are wet grassland (>132 species) and scrub with >121 species. Those with the lowest number of native species include amenity grassland, set aside land, 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 two 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 EU Habitats Directive

Priority habitat types are shown in bold. Reference numbers refer to numbering system used in EU (2003)

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 submountain 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 montane to snow levels (*Androsacetalia alpinae*, *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 provide 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 carried out in Laois in 2005 (Hickey and Tubridy, 2005) provided the first account of the location and nature of habitat diversity in a small representative section of Laois.

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 the 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 provides information on a section of the county adjacent to the land surveyed in 2005. While most of the habitat maps produced in 2005 were only digitised later, the results of the mapping exercise in 2006 will all be digitised.

The two 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 (NHAs) and cSACs (Special Areas of Conservation) were omitted from the survey, 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 excluded areas such as the Slieve Blooms.

In 2005 and 2006 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 the south west of the county habitat mapping focussed on the Aghaboe Roman Catholic Parish. Townlands within that parish were mapped in 2005 and a further set were examined in 2006. During the two years (2005 and 2006), the survey mapped habitats in 90 townlands. This included 58 in the area to the north east of the county and 32 in the south west, covering 140 km^2 of County Laois.

The habitat mapping rate and methodology was informed by trial surveys in 2005 in the townland of Morett and in 2006 around Portarlington. These trials tested the survey methodology, clarified the requirements for mapping and allowed for the resolution in differences in interpretation between surveyors.

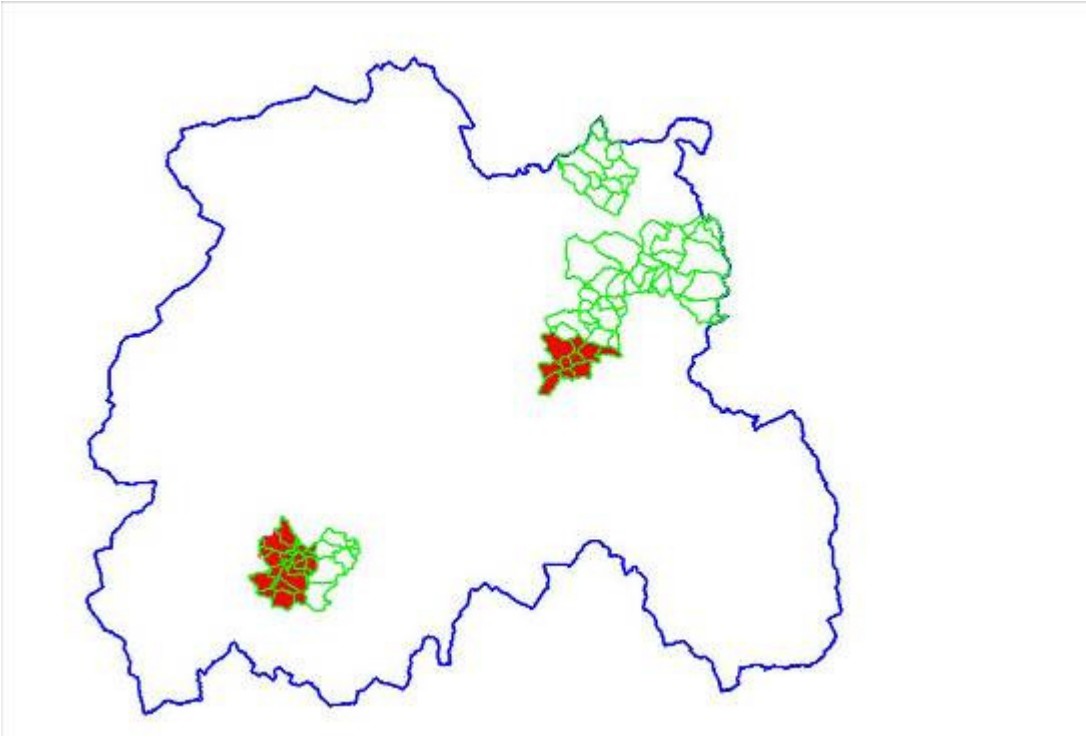


Figure 1 Areas surveyed during the Habitats Survey of Laois in 2005/2006.

Townlands shown in red have been surveyed while those in green have been surveyed and results digitised.

Table 2. Townlands surveyed in Laois in 2005 and 2006

Townlands marked * have not yet been digitised

Year and region	Townlands	
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*

Year and region	Townlands	
	Grange Upper*	Rathcrea
	Hophall	Rossmore
	Killenny	Tonafarna
North East 2006	Ballymorris	
	Belan	Kilbracken
	Bracklone	Kilbride
	Belan	Lough
	Bracklone	Portree
	Coolagh	Rathleash
	Coolroe	Rathronshin
	Cooltederry	Rossmullan
	Courtwood	Tierhogar
	Doolough	Vicarstown (Dodd)
	Droghhill	Vicarstown (Cosby
South West 2005	Ballygowdan*	
	Ballyhinode*	Garryniska*
	Bordwell Big*	Grantstown*
	Bordwell Little*	Kilbreedy*
	Brocka*	Leap*
	Chapelhill*	Middlemount*
	Coolacurragh*	Middlemount or Ballyvoghlaun*
	Coolbally*	Oldglass (Part of)*
	Court*	Rhahandrick Lower*
	Curragh*	Rhahandrick Upper*
	Farranville*	Shanvaghey*
	Garryduff*	Tinnaragh*
South West 2006	Anster	
	Ballycolla	Kilminfoyle
	Dairyhill	Legaun
	Fearagh	Oldglass

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 describes 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.
Coillte	Biodiversity Areas in the Slieve Bloom Forest Management Units 705 (FMU).	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.
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.
Dr Evelyn Moorkens	BSBI records for Laois	The presence of species records for the following townlands: Tierhogar Level Crossing N5710 Ballymorris N5410 Carrick Hill; Cooltederry N5410 Railway bridge and part of Portarlington town N5410 provide an indication of areas of particular interest
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.
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
National Roads Design Office, Kildare County Council	EIS for M7 Heath-Mayfield Motorway	Habitat descriptions for some of townlands surveyed along motorway near Portlaoise.

Data source	Information	Usefulness/value of information
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 – Provided two extra species - *Catapodium rigidum*, Hedgerow Crane's bill

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 2006). 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 a presentation of preliminary results was made to the public during a day long seminar on Laois Heritage in Abbeyleix.

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.

During 2006 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, surveyors 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 46 days during June, July and August in 2005 and 2006. The land was surveyed at an average rate of 3 km^2 per day, however this varied according to the location, terrain and habitat diversity. Cover varied from approximately 1–2 km^2 per day in areas where there was a high diversity of habitats in both rural and urban areas to 5-6 km^2 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: Land being developed refers to areas that are being developed for residential or industrial use and are temporarily in a state of flux. (irregular pattern of tiny grey squares () on a white background).

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.

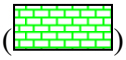
The three garden types were principally distinguished by size; big gardens BL3 1 (> than 500 m^2), medium gardens BL3 2 (250 and 500 m^2) and small gardens BL3 3 (<250 m^2).

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

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

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

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

An additional symbol was developed for ornamental hedgerows (habitat category 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 and 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. 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.

This report contains the results of the mapping projects in 2005 and 2006. 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 3 contains a complete species list of plants recorded in both years Appendices 4/5 and 6 list uncommon species and Appendix 7 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 recorded during the survey, 2005 & 2006

Habitats marked with * were recorded for the first time in 2006.

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*	6
		FL5 Eutrophic lakes	32
		FL8 Other artificial lakes and ponds	3
	FW Watercourses	FW2 Depositing lowland rivers	32
		FW3 Canals*	27
		FW4 Drainage ditches	54
	FP Springs	FP2 Non-calcareous springs	17
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	104
		GS2 Dry meadows and grassy verges	94
		GS3 Dry-humid acid grassland	26
		GS4 Wet grassland	131
		GM1 Marsh	22
H Heath and dense bracken	HH Heath	HH3 Wet heath	18
	HD Dense bracken	HD1 Dense bracken	22
P Peatlands	PB Bogs	PB1 Raised bog*	32
		PB4 Cutover bog	41
	PF Fens and flushes	PF1 Rich fen and flush	13
		PF2 Poor fen and flush	14
W Woodland and scrub	WN Semi-natural woodland	WN1 Oak-birch-holly woodland	4

Level 1 Habitat	Level 2 Habitat	Level 3 Habitat	No. of species recorded per habitat
		WN2 Oak-ash-hazel woodland	106
		WN6 Wet willow-alder-ash woodland	40
		WN7 Bog woodland	10
	WD Highly modified /non-native woodland	WD1 (Mixed) broadleaved woodland	71
		WD2 Mixed broadleaved/ conifer woodland	41
		WD3 (Mixed) conifer woodland	3
		WD4 Conifer plantation	7
		WD5 Scattered trees and parkland	6
	WS Scrub/transitional woodland	WS1 Scrub	122
		WS2 Immature woodland	30
		WS3 Ornamental/non native shrub	5
	WL Linear woodland/scrub	WL1 Hedgerows	106
		WL2 Tree line	17
E Exposed rock and disturbed ground	ER Exposed ground	ER2 Exposed calcareous rock	33
	ED Disturbed ground	ED1 Exposed sand, gravel or till	10
		ED2 Spoil and bare ground	4
		ED3 Re-colonising bare ground	42
		ED4 Active quarries and mines*	1
		ED6 Set-aside	6
B Cultivated and built land	BC Cultivated land	BC1 Arable crops	4
		BC2 Horticultural land	4
		BC3 Tilled land	-
		BC4 Flower beds and borders	19
		BL1A Stone wall	16
		BLIB Other stone-works	4
		BL2 Earth banks	33
		BL3 Building and artificial surfaces	40
		BL3 D Land being developed*	-
		BL3 1 Big gardens*	-
		BL3 2 Medium gardens*	-
		BL3 3 Small gardens*	-

A total of 54 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. These include three garden types found around Portarlington. Some of these are priority and non priority habitats recognised under the Habitats Directive.

In these habitats 385 plant species are found. The most species rich habitats (with >100 species) include dry and wet grasslands, oak ash hazel woodland, scrub and hedgerows. All of these are semi natural types. Those with the highest number of species, wet grassland scrub, tend to be diverse and are usually present within mosaics of other habitats in which either wet grassland or scrub is dominant.

Among the 385 species, 30 (listed in Appendix 4) 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.

Figure 2 Dry calcareous and neutral grassland with the rare bee orchid growing in association with quaking grass and bird's-foot-trefoil in a disused quarry, Kilbride, Co. Laois

Species(protected under the Wildlife Act 1976. GS1, grid square N5209, target note 7).

The Irish Branch of the Botanical Society of the British Isles (Appendix 5) recorded an additional 97 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 8 species (Appendix 6).

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 five 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;
- Grantstown S3379 Target note 1, 10 -15 m long strip on roadway verge adjacent to Coolnacurragh wood.
- Courtwood N6103 Target note 4, beside a derelict house adjacent to canal.

- Vicarstown (Dodd) N6101 Target note 1, where 4 or 5 stands are growing on the western side of the Grand Canal.

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 recorded in Laois Habitats Survey

Habitat	**Area (ha)**	**% total area digitised**
Improved Agricultural Grassland	5201.1	55.51
Arable Crops	2642.6	28.20
Conifer Plantation	200.7	2.14
Amenity Grassland (Improved)	199.1	2.12
Wet Grassland	152.0	1.62
Buildings and Artificial Surfaces	135.4	1.45
Scrub	107.9	1.15
Immature Woodland	102.2	1.09
Oak-Ash-Hazel Woodland	52.8	0.56
Cutover Bog	47.0	0.50
Mixed Broadleaved Woodland	45.9	0.49
Small Gardens	44.8	0.48
Dry Meadows and Grassy Verges	43.6	0.47
Mixed Broadleaved Conifer Woodland	42.6	0.45
Little Gardens	42.0	0.45
Land Being Developed	37.4	0.40
Scattered Trees and Parkland	34.1	0.36
Big Gardens	30.91	0.33
Dry Calcareous and Neutral Grassland	28.2	0.30
Ornamental Non-Native Shrubs	25.9	0.28
Recently Felled Woodland	24.7	0.26

Habitat	Area (ha)	% total area digitised
Tilled Land	23.4	0.25
Recolonising Bare Ground	19.8	0.21
Marsh	13.4	0.14
Mixed Conifer Woodland	13.3	0.14
Active Quarries and mines	9.7	0.10
Horticultural Land	9.6	0.10
Raised Bog	9.3	0.10
Spoil and Bare Ground	7.4	0.08
Dry Humid Acid Grassland	4.9	0.05
Setaside	3.7	0.04
Wet Heath	3.4	0.04
Wet Willow-Alder-Ash Woodland	2.0	0.02
Oak-Birch-Holly Woodland	1.80	0.02
Eutrophic Lakes	1.50	0.02
Other Artificial Lakes and Ponds	1.5	0.02
Rich Fen and Flush	1.0	0.01
Exposed Calcareous Rock	1.0	0.01
Other Stone Works	0.7	0.01
Limestone Marl Lakes	0.6	0.01
Dense Bracken	0.5	0.01
Mesotrophic Lakes	0.3	0.00
Exposed Sand Gravel or Till	0.3	0.00

Table 6 Status of semi-natural habitats recorded

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

Habitat	Area (ha)	% of total area digitised
Wet Grassland	152.0	1.62
Scrub	107.9	1.15
Oak-Ash-Hazel Woodland	52.8	0.56
Dry Meadows and Grassy Verges	43.6	0.47
Dry Calcareous and Neutral Grassland *	28.2	0.30
Marsh	13.4	0.14
Raised Bog *	9.3	0.10
Dry Humid Acid Grassland	4.9	0.05

Habitat	Area (ha)	% of total area digitised
Wet Heath *	3.4	0.04
Wet Willow-Alder-Ash Woodland	2.0	0.02
Oak-Birch-Holly Woodland *	1.80	0.02
Rich Fen and Flush *	1.0	0.01
Exposed Calcareous Rock *	1.0	0.01
Limestone Marl Lakes *	0.6	0.01
Dense Bracken	0.5	0.01
Mesotrophic Lakes	0.3	0.00
Poor fen and flush	0.0	0.00
Total area/% of semi-natural habitats	**422.7**	**5.01**

Semi-natural habitats take up a small proportion of the area surveyed c. 5%. Improved agricultural grassland and arable land together account for almost 84% 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, inaccessible 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 1.62 % and 1.15 % respectively). These are also among the 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 0.6% and 1.15% of the total digitised. In contrast planted non-native woodland makes up 5% 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	919.0	84.62
Drainage Ditches	88.7	8.17
Depositing Lowland Rivers	27.0	2.49
Ornamental Non-Native Shrubs	21.0	1.93
Tree line	20.9	1.92
Stone Walls	6.4	0.58
Canals	1.6	0.15
Earth Banks	1.4	0.13

The survey area contained 919 kilometres of hedgerows accounting for 84 % of the total digitised linear habitats. If these hedgerows average 2m in width their approximate area is 1838 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 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 under recorded as it is not always easy to detect drainage ditches from aerial photographs, nor was it possible to check all those outlined on the vector maps.

Depositing low land rivers are also under recorded particularly as the entire length of the River Barrow was excluded from the survey as it is within a designated area.

The remaining linear habitats in the survey (ornamental non-native shrubs, tree lines, stonewalls, canals, earth banks collectively accounted for slightly less than 5% of the linear habitats with ornamental-non native shrubs (1.93 km) and tree lines (1.92 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 Excel database 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.

Figure 3 Limestone/marl lake (FL3), in a disused quarry in Kilbride, County Laois (N5209, target note 8).

The exposed gravel bank at the back of the photograph is home to a colony of sand martins.

FW2 Depositing lowland rivers (sky blue solid line).

Twenty seven km of depositing lowland rivers were recorded, this excludes all of the River Barrow because it is a designated SAC (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, Fig. 4) and Vicarstown (Dodd, Grid square N6001, target note 2). Depositing lowland rivers range in size from small shallow streams (Garryvacum) to large 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.

Figure 4 The Glasha river (FW2) flowing through arable farmland (BC1) in Courtwood, Co. Laois (N6102, target note2).

FW3 Canals (sky blue dotted line).

The Grand Canal which flows through parts of Co. Laois is a designated NHA and consequently does not fall under the remit of the survey. However 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 water filled sections were rare. Most of the canal is now infilled or no longer contains water.

Figure 5 A disused section of the Mountmellick branch of the Grand Canal in Bracklone, east of Portarlington, Co. Laois (Grid square N5511, target note 3).

W4 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 54 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, Fig. 6) a double ditch was found separated by a dense hedgerow. Both drains contained water but were choked with vegetation.

Figure 6 One side of a double drainage-ditch (FW4) in a field of barley in Ballymorris, Co. Laois (N5211, target note 4).

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. 7) 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.

Figure 7 Species rich dry calcareous and neutral grassland (GS1) in a disused quarry in Kilbride, Co. Laois, (N5209, target note 7)

GS2 Dry meadows and grassy verges (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 (Tierhogar, 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.8). 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.

Figure 8 Dry meadow and grassy verge habitat (GS2) growing on a bank adjacent to Mountmellick Branch of the Grand Canal in Kilbride Co. Laois (N5210, target note 5).

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 9) 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.

Figure 9 Dry humid-acid grassland (GS3) in Morett Co. Laois (N5404, target note 1)

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 4) 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. 10). 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, Fig. 7).

Figure 10 Wet grassland (GS4) in Ballymorris, Co. Laois (N5411, target note 1). Flag iris and Goat willow were among the species found there.

GM1 Marsh (yellow infill).

Marsh habitats are found in 4 townlands two of which, Aghnahilly 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 /Ballycolla (Grid square S3581, target note 1) 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 Aghnahilly bog and the Rock of Dunamase. The marsh in Aghnahilly, which is quaking, appears to be in transition between marsh and cutover bog. This is a species rich habitat with 35 different plant species. In Park or Dunamase, reed canary-grass, marsh willowherb, reedmace and meadowsweet are the dominant species whilst in Aghnahilly 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/Ballycolla (Fig. 11) were unsuccessful and the marsh currently has great fen sedge, common reed, black bog rush and purple loosestrife among its species.

Figure 11 Common species found in Marsh (GM1) habitat (meadowsweet, purple loosestrife and common reed) in Tintore and Ballycolla (S35818, target note 1).

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. 12). 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.

Figure 12 Wet heath (HH3) habitat in Morett (N5404, target note 3), dominated by purple moor-grass, which is being invaded by brambles and gorse scrub.

PB1 Raised bog (violet horizontal lines).

Raised bog occurred only in Garryvacum (Grid square N5507, target note 10, fig. 13). 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. 13).

Figure 13 Raised bog (PB1) habitat in Garryvacum (N5507 target note 10), ling and deergrass were 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 Aghnahilly Bog (Grid square S5198, target notes 1, 3, 4 and 5), the adjacent townland of Dysart (Grid square S5197, target note 1) and in Garryvacum (Grid square N5507, target note 8, fig. 14). In Aghnahilly 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 (Fig.11), 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 47 ha of cut over bog was surveyed accounting for 0.5% of the total area digitised to date (Table 6). In Garryvacum the surface of the cut over bog was dry to walk on but had not dried out. Forty one species were recorded from cut over bog which was dominated by common cotton-grass (Table 4).

Figure 14 Cutover bog (PB4) with conifer plantation, raised bog and a grazing deer in the background in Garryvacum (N5507 target note 8).

PF1 Rich fen and flush (violet diamonds on a white background).

One example of this habitat is found in the townland of Morett (Grid square N5404, target note 6, Fig. 15). It was waterlogged and most of the vegetation formed tussocks. The overall area was small (1 ha, Table 6) but in good condition with no signs of disturbance. 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. A total of 13 species were recorded (Table 4) and in addition to those mentioned above were carnation sedge, water mint and devil's-bit scabious.

Figure 15 Rich fen and flush (PF1) in Morett, where large tussocks of purple moor-grass can be seen N5404, target note 6).

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. 16), as was deer grass, bog asphodel, devil's-bit scabious, cross-leaved heath and round-leaved sundew were also present.

Figure 16 Small area of poor fen and flush (PF2) within cutover bog in Garryvacum (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 52.8 ha of oak-ash-hazel woodland were surveyed which was just over half a percent of the total area digitised (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 (106 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 4 woodlands, in the townland of Park or Dunamase (Grid squares S5198, S5298 and S5398), and in Courtwood (Grid square N6102, target note 1, fig. 17) but not in great numbers. 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 NHAs. 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.

Figure 17 Oak-ash-hazel woodland (WN2) growing on partially intact moat beside the Fort of Dunrally, Courtwood, Co. Laois (N6302, 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.

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 (Fig. 18), 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 122 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 1.15 % (107.9 ha) of the total area of habitats digitised to date and is the largest area of semi-natural habitat recorded so far in the survey (Table 4).

Figure 18 Small area of scrub (WS1) growing on a limestone rock outcrop in a former quarry in Dairyhill, Co. Laois (S3483, target note 1).

WL1 Hedgerows (green horizontal line).

Between the 2 survey areas 106 plant species were recorded in hedgerows (Table 4). At least 35 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.
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, fig. 19). A total of fourteen woody species including pear, crab, yew and holly were found in this dense tall hedgerow.

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 9Grid 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).

Figure 19 Tall and dense hedgerow (WL1) in Vicarstown (Dodd) growing on either side of a double dry ditch N6301, target note 2).

Two rare species pear and yew were among the woody species growing in this hedgerow.

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 and Ballycarroll 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. The 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, Fig. 20). 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.

Figure 20 Exposed calcareous rock (ER2) in a disused quarry, Kilmurry, Co. Laois (N5501, target note 5).

3.2.7 Cultivated and built land

Flower beds and borders
(BC4) 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. 21).

Figure 21 Flower beds and borders (BC4) in the garden of Lily Champ, Ballymorris, Co. Laois (N6301, target note 2)

The area shown above (Fig. 21) is 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 54 habitats (including four not included in Fossitt, 2000) and 385 species. A similar survey in part of County Carlow revealed 45 habitats and 374 species in an area of 74sqkm. 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 3 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 Fossitt (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 98ha in Laois. Species diversity was also high in the two counties but there were 53 species in wet grassland in Carlow compared to 131 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 Laois. 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 106 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 comparisons 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 this year 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 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.

4.2.2 Information service for landowners and householders

Among the farming community the recent introduction of the Rural Environment Protection Scheme (REPS[2]), 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 ponds in Carigeen (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), most 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

- Produce leaflet listing towns and townlands surveyed and stating where maps can be viewed.
- Publicise the principal results in local newspapers.
- Display maps in relevant local libraries in a temporary exhibition.
- Make hard copy of the survey report and habitat maps available in Portlaoise and Portarlington libraries.
- 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.
- Organise a presentation to local authority planners to inform them of the value of the map to their strategic planning and development control.
- Provide a presentation to REPS planners to inform them of its value to their REPS advisory service.
- Ensure results of habitat mapping in 2006 is fully integrated with councils own GIS
- Promote additional survey work (for fauna, breeding birds) in townlands examined for this survey.
- Promote research to utilise and add value to habitats data base i.e. integrate with FIPS/EPA soils/subsoil's data base, local geology (from GSI) and 1st edition OS mapping.
- Obtain data on total number of flowering plant species in the County from the BSBI.

4.2.3 Managing change

Suggested initiatives include:

- Developing a targeted advisory service for landowners who have good examples of semi-natural habitats or householders who wish their gardens to be more biodiversity friendly.
- Develop course materials to be used by REPS planners so that their training courses for farmers includes information on the Laois habitat map and priorities for local biodiversity management.
- Organise through local initiatives for the removal of invasive species such as Japanese knotweed and rhododendron.
- 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:

- Active co-operation with NPWS on management issues affecting pNHAs and SACs and associated linking areas.
- Provision of habitat mapping by NPWS 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 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.

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.

References

Coillte (2004). *The Selection of Biodiversity Areas in the Mid Tipp/Rossmore Plateau FMU 403*.

Department of Arts, Heritage, Gaeltacht and the Islands. (2002). *National Biodiversity Plan*. Irish Government.

Downes, K. and Lynch, J. (2002). *Heath Mayfield Motorway Environmental Impact Statement.* National Roads Design Office, Kildare County Council.

Feehan, J. (1983). *Laois an Environmental History*. Ballykilcavan Press.

Fossitt, J.A. (2000). *A Guide to Habitats in Ireland*. The Heritage Council.

Foulkes, N. and Murray, A. (2005) *County Laois Hedgerow Survey Report.* Unpublished report for Laois County Council.

Higgins, T., Martin, J. and Perrin, P. (2004). *National Native Woodland Survey*. National Parks and Wildlife Service.

Hubbard, C.E. (1992). *Grasses, A Guide to their Structure, Identification and distribution in the British Isles*. Penguin.

Jermy, A.C., Chater, A.O. and David, R.W. (1982). *Sedges of the British Isles. BSB1 Handbook No. 1.* Botanical Society of the British Isles.

Mitchell, A. (1978). *Trees of Britain and Northern Europe*. Harper Collins Publishers.

National Parks and Wildlife Service. Site Synopses for Special Areas of Conservation (SACs) and Natural Heritage Areas (NHA). Website address www.npws.ie.

NRA National Roads authority: *Environmental Impact Statement M7 Portlaoise – Castletown M8 Portlaoise – Cullahill Road scheme*. Vol 7 Appendices Consultants ARUP

Preston, C.D., Pearman, D.A. and Dines, T.D. (2003) *New Atlas of The British Flora.* Oxford University Press.

Rose, F. (1981). *The Wild Flower Key*. Frederick Warne.

Rose, F. (1989). *Colour Identification Guide to the Grasses, Sedges, Rushes and Ferns of the British Isles and north-western Europe*. Viking.

Royal Haskoning and JBA Consulting (2006). *Portarlington Strategic Flood Risk Management: Constraints Study and Scoping Report*. Unpublished final report prepared for Laois and Offaly County Councils.

The Heritage Council (2002) *Draft Habitat Survey Guidelines: A standard methodology for habitat survey and mapping in Ireland.* The Heritage Council, Kilkenny.

Webb, D.A., Parnell, J. and Doogue, D. (1996). *An Irish Flora.* Dundalgen Press LTD.

General references and Field Guides

Curtis, T.G.F. and McGough, H.N. (1988). *The Irish Red Data Book. 1. Vascular Plants.* The Stationary Office, Dublin.

Scannell, M.J.P. and Synnott, D.M. (1987). *Census Catalogue of the Flora of Ireland.* Stationary Office, Dublin.