

Laois Habitats Survey 2010



Report prepared for Laois Heritage Forum:
An Action of the Laois Heritage Plan

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An Chomhairle Oidhreachta
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Cover Photograph

SUDS (Sustainable Urban Drainage System) in Portarlinton: Artificial wetland designed and built to treat surface water drainage

Contents

1	Acknowledgements.....	1
2	Summary	2
3	Introduction	3
3.1	The Brief	3
3.2	Approach	3
3.3	Contents of report.....	4
3.4	Digital data	4
4	Habitat mapping in Laois 2005-2010: a guide for Planners	5
4.1	Background	5
4.2	Results	7
4.3	Particular features of habitat diversity in Laois:	10
4.4	Guidelines: Integration of habitat conservation and development	12
5	Ecological Networks/Green Infrastructure assessments	15
5.1	Background	15
5.2	Methodology.....	16
5.3	Abbeyleix.....	18
5.4	Arles	26
5.5	Ballybrittas	32
5.6	Ballacolla	34
5.7	Borris-in-Ossory.....	41
5.8	Clonaslee.....	49
5.9	Durrow	60
5.10	Emo	70
5.11	Killenard	73
5.12	Killeshin	76
5.13	Mountrath.....	79
5.14	Newtown Doonane	90
5.15	Portarlinton	92
5.16	Rathdowney	100
5.17	Rosenallis.....	110
5.18	Stradbally	112
5.19	The Swan	120
5.20	Vicarstown.....	122
6	References.....	129
7	Appendix 1	131

List of Figures & Plates

Figure 1.	Areas surveyed and digitised in Laois, 2005 - 2009	5
Figure 2.	Features in ecological networks	16
Figure 3.	Abbeyleix Habitat Map	19
Figure 4.	Abbeyleix Ecological Networks	20
Figure 5.	Species-rich wet grassland(GS4) and Willow-scrub (WS1) in fields near Abbeyleix Bog	21
Figure 6.	Lime trees along avenue to Church of Ireland Abbeyleix (WL2).....	22
Figure 7.	Overgrown section of Gloreen tributary (FL2/FW4).....	24
Figure 8.	Habitat map of Arles	26
Figure 9.	Location of ecological networks in Arles	27
Figure 10.	View of Arles.	28
Figure 11.	Oak-ash-hazel woodland found on the border of Ashfield and Ballynagall.....	29
Figure 12.	Depositing lowland river (FW2) west of the village Arles	29
Figure 13.	Hedgerow along an old lane east of the village of Arles.....	30
Figure 14.	Mixed conifer broadleaved woodland in a garden bounded by a hedgerow in Arles.	31
Figure 15.	Ballybrittas Habitat Map.....	32
Figure 16.	Ballybrittas Ecological Networks.....	32
Figure 17.	Ballacolla Habitat Map.....	34
Figure 18.	Ballacolla Ecological Networks.....	34
Figure 19.	Drainage ditch (FW4) flowing through wet grassland in Ballycolla.	35
Figure 20.	Wet grassland (GS4) with riparian woodland (WN5) in the distance, east of Ballacolla	36
Figure 21.	Wildlife Park in Ballacolla with broadleaved woodland (WS2) and semi-natural grassland (GS2).	37
Figure 22.	Part of the immature woodland (WS2) that has been cordoned off to rear pheasants.....	38
Figure 23.	Recolonising bare ground, exposed calcareous rock in a disused quarry in Ballacolla.	39
Figure 24.	Other artificial lakes and pond habitat surround by immature woodland SE of Ballacolla	40
Figure 25.	Borris in Ossory Habitat Map.....	42
Figure 26.	Borris in Ossory ecological networks	43
Figure 27.	The River Nore with hedgerow on the left and riparian woodland on the right.	44
Figure 28.	Remains of WN2 next to the road with bramble, hawthorn and dewberry.....	45
Figure 29.	Hedgerow and drainage ditch to the west of the spring.	46
Figure 30.	Wet grassland (GS4) adjacent to a stream and drainage ditch south of Borris-in-Ossory.	47
Figure 31.	Drainage ditch and recolonising bare ground on abandoned building site in Borris-in-Ossory.	48
Figure 32.	Ecological networks associated with Clonaslee	50
Figure 33.	Figure Habitat map covering Clonaslee and environs.....	51
Figure 34.	Section of the river Clodiagh to the south of Clonaslee.	52
Figure 35.	Ash and hazel growing next to the Clodiagh River in Clonaslee.	53
Figure 36.	Map of Brittas Forest Walk in Clonaslee.....	53
Figure 37.	Species rich grassland on a steep roadside bank bordering woodland south of Clonaslee.	54
Figure 38.	Mature open (mixed) broadleaved woodland (WD1) dominated by beech with bramble	55
Figure 39.	Younger woodland dominated by broadleaved species west of the village.....	55
Figure 40.	Conifer plantation next to the road with silver fir and cones.	56
Figure 41.	Semi-natural grassland (GS2) and hedgerow in EN4 north-west of the village.....	57
Figure 42.	Wet grassland (GS4) to east of housing estate in the south east of Clonaslee.	58
Figure 43.	Peacock and tortoiseshell butterflies on buddleia scrub in a derelict site	59
Figure 44.	The Erkina River (FW2) with wet willow-alder-ash woodland (WN6) in the background.....	60
Figure 45.	Durrow Habitat Map.....	61
Figure 46.	Durrow Ecological Features	62
Figure 47.	The Old Stone Bridge dating from 1788 over the Erkina River in Durrow	63
Figure 48.	Underside of the Old Stone Bridge (BL1B) supporting ferns, lichens, liverworts and possibly bats.....	63
Figure 49.	Reed and large sedge swamp (FS1) dominated by common reed at the side of the Erkina River	64
Figure 50.	Wet willow-alder-ash woodland (WN6) next to the Erkina River in Durrow.	65
Figure 51.	Nettle-leaved bell flower in woods on the outskirts of Durrow.	66
Figure 52.	Part of the walled garden (BL1A) containing the flower beds and borders (BC4) habitat.	67
Figure 53.	Silver edged form of yellow archangel, a garden escape on woodland floor in Derrywood.....	68
Figure 54.	Laneway bounded by hedgerows (WL1) at the western end of Derrywood, Durrow.	69
Figure 55.	Emo Habitat Map.....	70
Figure 56.	Emo Ecological Networks.....	70
Figure 57.	Blackthorn scrub (WS1) in back garden at Emo.	71

Figure 58.	Killenard Habitat Map	73
Figure 59.	Killenard Ecological Networks.....	73
Figure 60.	Mixed broadleaved woodland on the grounds of Mount St. Anne’s at Killenard	74
Figure 61.	Killeshin Habitat Map.....	76
Figure 62.	Killeshin Ecological Features	76
Figure 63.	Waterfall and pool on the River Fushoge at Killeshin (FW1)	77
Figure 64.	Tributary of Fushoge at Killeshin	78
Figure 65.	The Mountrath (White Horse) River (FW2) in Mountrath with reed and large sedge swamp (FS1)	79
Figure 66.	Mountrath Habitat Map	80
Figure 67.	Mountrath Ecological Networks	81
Figure 68.	A section of the longest drainage ditch in Mountrath, flowing through an old garden near the park.	82
Figure 69.	Wildlife friendly garden adjacent to the river in Mountrath.	83
Figure 70.	Newly planted woodland (WS2) in the town park forming part of the new wildlife area.....	84
Figure 71.	A small island in the Mountrath River north of Rushin Bridge behind some big gardens.	84
Figure 72.	Wet grassland bordered by drainage ditch (FW4) near Mountrath.	85
Figure 73.	Bog woodland (WN7) being colonised by scrub	86
Figure 74.	Part of the laneway that leads from the town to bog woodland and wet grassland habitats.	87
Figure 75.	Broad leaved woodland (WD1) growing in derelict garden in the centre of Mountrath.	88
Figure 76.	Part of old quarry with (mixed) broadleaved woodland and mature treeline (WL2).....	89
Figure 77.	Habitats at Newtown Doonane	90
Figure 78.	Ecological network at Newtown Doonane.....	90
Figure 79.	Portarlinton Habitats Map	92
Figure 80.	Portarlinton Ecological Networks	93
Figure 81.	River Barrow adjacent to public park.....	94
Figure 82.	Small wetland in housing estate	95
Figure 83.	Filled in canal at Bracklone	95
Figure 84.	Eutrophic pond beside railway embankment	97
Figure 85.	Site of felled woodland in centre of Portarlinton	98
Figure 86.	Wet field in background.....	99
Figure 87.	The Erkina River flanked on either side by reed and large sedge swamp (FS1).....	100
Figure 88.	Rathdowney Habitat Map.....	101
Figure 89.	Portarlinton Ecological Networks.....	102
Figure 90.	Drainage ditch bordering the golf course at Rathdowney.....	103
Figure 91.	Old fields containing wet grassland (GS4) with devil’s bit scabious and flag iris in the foreground.	104
Figure 92.	Riparian woodland next to the Erkina River north of Rathdowney next to the old meadows.	104
Figure 93.	Wet grassland dominated by lesser pond sedge	105
Figure 94.	The pond (FL8) in front of Dawn Meats in the centre of Rathdowney	106
Figure 95.	Millrace in Rathdowney with a grass margin and road on the right and front gardens on the left.	107
Figure 96.	Scrub and dry meadow and grassy verge habitat on a derelict site in the centre of Rathdowney.	108
Figure 97.	Laneway and hedgerows (WL1) adjacent to gardens on the Ballacolla road to near Rathdowney.	109
Figure 98.	Habitats associated with Rosenallis (LAP boundary in red)	110
Figure 99.	Ecological networks in Rosenallis	110
Figure 100.	Habitats in the environs of Stradbally	113
Figure 101.	Ecological networks associated with Stradbally	114
Figure 102.	Ducks feeding in the Stradbally River east of the bridge in the centre of the village.	115
Figure 103.	Tall herb swamp (FS2) and mature (mixed) broadleaved woodland (WD1) by the Stradbally River ...	115
Figure 104.	Coillte owned (mixed) broadleaved wood (WD1), at Knocknamber near Stradbally.....	116
Figure 105.	Dry meadows and grassy verges (GS2) and (BL1A), behind old and large gardens in Stradbally.....	117
Figure 106.	Dry meadows and grassy verge habitat (GS2) in a disused quarry opposite Oughaval graveyard.	118
Figure 107.	The Swan Habitats	120
Figure 108.	The Swan Ecological Networks	120
Figure 109.	Tailings pond in excavated clay mine at The Swan.....	121
Figure 110.	Vicarstown Habitats	123
Figure 111.	Vicarstown Ecological Networks.....	124
Figure 112.	Yellow water lilies, Canadian pondweed, water milfoil and floating sweet grass.....	125
Figure 113.	Reed and large sedge swamp bordering the sides of the canal at Vicarstown.	126
Figure 114.	Ivy clad old stone building (BL1B), beside the canal, potential habitat for birds and bats.	127
Figure 115.	Dry meadows and grassy verge habitat (GS2) being colonized by scrub	128

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2 Summary

Project work in Laois in 2010 involved habitat mapping in a number of settlements and interpretation of the results as ecological networks/Green Infrastructure, presentations to planners and the public and analysis of previous studies to produce a list of important habitats in Laois and guidelines for integrating particular types of habitats with development

In 2010 habitat mapping following Heritage Council guidelines occurred in the following settlements: Abbeyleix, Arles, *Ballybrittas, Ballycolla, Borris-in-Ossory, Clonaslee, Clough, Durrow, *Emo, *Killeshin, *Killenard, Mountrath, *Newtown/Doonane, Portarlinton, Rathdowney, Rosenallis, Stradbally, *Swan, Vicarstown. Sites marked * had been fully or partly examined in previous years habitat mapping studies (Tubridy and Hickey, 2005-2009).

This report contains an introduction and summary of the results of habitat mapping studies in Laois to date, guidelines for planners and ecological network/GI assessments for the settlements listed above. These illustrated assessments are accompanied by habitat maps and aerial photographs indicating the location of networks.

The habitat GIS for the county has been improved by linking the results of all habitat mapping studies. Information on the GIS includes "target notes" short descriptions/notes on biodiversity interest at sites of interest.

3 Introduction

3.1 *The Brief*

The brief for the study was developed in consultation with the Heritage Officer and planners. It built on the results of habitat mapping studies carried out in the County over the last five years. These consultations clarified specific tasks to fulfil the overall objective of assisting the integration of biodiversity and spatial planning.

Principal tasks were:

- Provide practical assistance to local authority planners which will enable them to integrate biodiversity and planning.
- Carry out Biodiversity Assessments and prepare Green Infrastructure Strategies for a selection of settlements
- Raise awareness of biodiversity among general public

3.2 *Approach*

3.2.1 *Support local authority planners to integrate biodiversity and planning.*

Following consultations with planners and the Heritage Officer this aspect of the brief was interpreted as involving:

- A day long workshop for Council planners presenting the results of habitat mapping studies in Laois (Tubridy and Hickey, 2005-2009) and providing an interpretation of habitat mapping in Portarlington as Green Infrastructure.
- Analysis of the results of habitat mapping exercises in Laois to generate a list of most important habitats.
- Preparation of guidelines for planners on how to incorporate consideration of the following habitats : hedgerows, drainage ditches, grasslands, woodlands and bogs in forward planning and development control.

3.2.2 *Biodiversity Assessments/Green Infrastructure Strategies*

Following a review of forward planning in Laois the following list was drawn up of settlements in Laois (in order of priority) requiring an assessment of Green Infrastructure informed by habitat mapping:

- Portarlington
- Abbeyleix
- Clonaslee
- Rathdowney
- Durrow
- Mountrath
- Borris in Ossory
- Stradbally
- Ballacolla
- Arles
- Vicarstown
- Clough
- Killenard
- Ballybrittas

- Swan
- Newtown/Doonane
- Killeshin
- Ballinakill
- Timahoe
- Rosenallis

3.2.3 Awareness raising

Two presentations to the public were made to raise awareness of Laois habitats and their appropriate management. They included a presentation in the Slieve Blooms area in August 2010 (Heritage Week) based on the results of habitat mapping in this area. A second presentation on Green Infrastructure and the Laois Habitats Survey is scheduled for the County Heritage Seminar on Nov 20th 2010

3.3 Contents of report

Chapter 2 of the report contains summary information on habitats in Laois based on the results of previous mapping studies 2005-2009, including an introduction to habitat mapping and guidelines to integrate management of certain types of habitats and spatial planning.

Chapter 3 contains the results of field studies which were carried out to produce biodiversity/Green Infrastructure assessments of settlements and an introduction to Green Infrastructure planning. Due to time constraints assessments could not be carried out for Ballinakill and Timahoe.

3.4 Digital data

Digital data has also been delivered to Laois County Council. This includes a habitats GIS in which digital data from all survey periods including 2010 has been combined and an associated data base which allows users obtain further information about specific sites from target notes which were compiled during field studies.

4 Habitat mapping in Laois 2005-2010: a guide for Planners

4.1 Background

Habitat mapping has been carried out throughout Laois on a townland by townland basis since 2005 (Figure 1) covering extensive areas of countryside, towns, in lowland and upland areas within and outside designated sites such as Special Protection Areas, Special Areas of Conservation and Natural Heritage Areas.

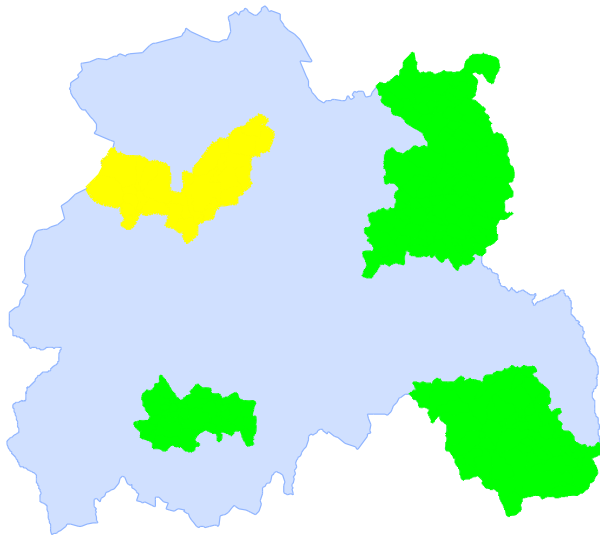


Figure 1. Areas surveyed and digitised in Laois, 2005 - 2009

The green shading represents the areas completed from 2005-2008. Area surveyed in 2009 is shaded yellow. Total area mapped between 2005 – 2010 = 43,959.66 ha

The results have been presented in a series of reports which feature illustrated accounts of noteworthy examples of habitats.

Habitat mapping is a tool used to characterise biodiversity. Habitats are spatially defined areas which have particular plants, environmental characteristics, fauna, vegetation structure or management history. For example a hedgerow is a habitat which must have native shrubs growing in a linear pattern. It may or may not have a dry bank or wet ditch.

Habitats vary in value for biodiversity depending on factors such as naturalness and habitat and species rarity. Habitats of high value are usually less modified by man. They may be associated with land, freshwaters or marine environments. The most important piece of biodiversity legislation the EU Habitats Directive lists habitats requiring special protection.

Habitat mapping in Ireland based on a system promoted by the Heritage Council (Fossitt, 2000), which is compatible with the EU Habitats Directive and is carried out following guidelines also developed by the Heritage Council (Best Practice Guidance for Habitat Survey and Mapping (2005 and recently updated 2010). The Fossitt classification system (summarised in Appendix 1) allows for a hierarchal classification of habitats from Levels One (gross classification similar to a land use survey) to Level Three (allows identification of types compatible with the Habitats Directive).

A Level One classification requires little fieldwork. There are seven Level One habitats of relevance to Laois (coded using one letter): Freshwater (F), Grassland and Marsh (G), Heath and Dense Bracken (H), Peatlands (PB), Woodland and Scrub (W), Exposed Rock and Disturbed Ground (E) Cultivated and Built Land (B).

Level Two allows for a more detailed classification of the Level One types. These are given codes with two letters. For example Level One Freshwater habitats (F) can be distinguished as either lakes and ponds (FP), watercourses (FW) springs or swamps (FS). Fieldwork may be required depending on the scale of the survey and size of site being examined.

A Level Three classification always requires fieldwork and is a further differentiation of the Level Two types. For example there are eight different lake habitats; four types of watercourses, two types of springs and two different kinds of swamps. They are coded by adding a number to the level two code.

Habitat mapping in Laois has always been carried out to Level 3.

Fieldwork led to the identification and mapping of additional habitats (subtypes of Level 3 types) to describe local conditions and aid management. There are four subtypes of BL3 (Buildings and built surfaces) and include:

- BL3D land being developed (i.e. building sites)
- BL3 1 big gardens
- BL3 2 medium gardens
- BL3 3 small gardens

BL3D Land being developed



The code for this habitat type is represented by an irregular pattern of tiny grey squares on a white background.

Land being developed refers to well defined areas that are being developed for residential or industrial use and now have a combination of bare ground and built ground which is likely to radically change within months.

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). 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. Experience elsewhere suggests that the largest gardens support a diversity of habitats often featuring mature trees. Medium size gardens usually have areas with ornamental non-native shrubbery and smaller gardens have a smaller number of habitats dominated by amenity grassland (GA2).

BL3 1 Big Gardens



The code for this habitat type is represented by pattern of small crosses outlined by the colour olive green.

BL3 2 Medium gardens



The code for this habitat type is represented by a pattern of wavy horizontal lines and the colour olive green.

BL3 3 Small gardens



The code for this habitat type is represented by squares with olive green lines on a white background.

Other subtypes described “set aside land” (sub type of ED= disturbed ground being colonised by plants); garden hedgerows and stone features.

- BL1 A stone walls
- BL1 B stone buildings


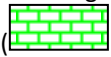
All are man-made habitats. They mostly occur in urban areas.

ED 6 setaside



The code for this habitat type is represented by an irregular pattern of tiny red squares on a white background. It was mapped between 2005 and 2007. However changes to farm support systems meant that this type of land use was not seen after 2007.

WS3 A garden hedgerow planted using ornamental non native shrubs

A garden hedgerow is a sub type of the habitat ornamental trees and shrubs (WS3). Ornamental hedgerows are linear in character, often form boundaries in rural areas while the existing symbol/pattern for WS3 is area based. The habitat WS3A was mapped using the polyline (), whilst the original category remained as WS3 and maintained the original pattern ().

An important feature of habitat mapping in Laois is that landowners were always approached to look for their co-operation with fieldwork. Information leaflets similar to that prepared for 2010 (Appendix 2) were distributed to local libraries, shops and directly to landowners. In almost all areas permission was readily given so that habitats were validated to Level 3 by direct inspection. Following most recent guidelines the level of detail used to identify habitats has been recorded for each example of a habitat, whether by detailed inspection i.e. survey (S), reconnaissance (V) or only through desk research i.e. aerial photo (D). This convention applies from 2009.

4.2 Results

Tables 1, 2 and 3 contain the results of all habitat mapping to date (including results from 2010 surveys). Table 1 features the commonest types: habitats which cover at least 1% of the county. Tables 2 and 3 features rarer types.

Table 1 Habitats which cover at least 1% of Laois

Habitats with * listed in Habitats Directive

Habitat	Area (ha) 2009	% total area surveyed
Improved agricultural grassland	24464.23	55.65
Arable crops	6380.17	14.51
Conifer plantation	4838.70	11.01
Wet grassland	1236.41	2.81
Amenity grassland (improved)	820.16	1.87
*Upland Blanket Bog	632.14	1.44
*Wet heath	570.78	1.30
Scrub	551.53	1.25
Buildings and artificial surfaces	537.11	1.30
Mixed broadleaved woodland	526.82	1.20

Table 2 Habitats which cover > 0.1% and <1%

Habitat	Area (ha) 2009	% total area surveyed
Large gardens	345.04	0.78
Dry meadows and grassy verges	284.73	0.65
Oak-ash-hazel woodland	283.81	0.65
Immature woodland	269.29	0.61
Mixed conifer/broadleaved woodland	208.17	0.47
Scattered trees and parkland	204.93	0.47
*Dry-humid acid grassland	187.41	0.43
Medium gardens	135.88	0.31
Recently-felled woodland	133.77	0.30
*Dry heath	120.95	0.28
Land under development	95.23	0.22
Setaside	88.64	0.20
*Cutover bog	88.62	0.20
Small gardens	84.44	0.19
Recolonising bare ground	83.68	0.19
*Dry calcareous and neutral grassland	78.73	0.18
Wet-willow-alder-ash woodland	76.50	0.17
*Oak-birch-holly woodland	72.56	0.17
Mixed conifer woodland	51.19	0.12
Wet pedunculate oak-ash woodland	49.58	0.11
Horticultural land	48.95	0.11
Poor fen and flush	47.63	0.11
Spoil and bare ground	45.59	0.10
Active quarries and mines	43.98	0.10
Ornamental/non-native shrub (WS3)	42.60	0.10

Table 3 Habitats covering <0.10%

Habitat	Area (ha) 2009	% total area surveyed
*Raised bogs	39.15	0.09
Dense bracken	37.38	0.09
Other artificial lakes and ponds	35.52	0.08
Tilled land	15.13	0.03
*Marsh	13.79	0.03
*Bog woodland	12.85	0.03
Riparian woodland	9.2	0.02
*Eutrophic lakes	8.08	0.02
Reed and large sedge swamp	5.47	0.01
Other stonework	3.82	0.01
Mesotrophic lakes	3.34	0.01
*Tall-herb swamp	2.6	0.01
Flower beds and borders	2.2	0.01
Exposed sand, gravel or till	2.07	0.00
Rich fen and flush	1.03	0.00
Exposed calcareous rock	0.97	0.00
*Limestone/marl lakes	0.64	0.00
Dystrophic lakes	0.06	0.00
Short rotation coppice	0.01	0.00
*Calcareous springs	N/A	N/A
Non-calcareous springs	N/A	N/A

Results were compiled for linear habitats (Results are shown in Table 4.

Total length of linear habitats = 4,811.75 km

Table 4 Status of linear habitats 2005-2010

Habitat	Length (km)	% of total length
Hedgerows (WL1)	3,488.91	72.51
*Depositing Lowland Rivers (FW2)	350.89	7.29
Drainage Ditches (FW4)	317.68	6.60
Tree line (WL2)	181.07	3.76
*Upland/eroding rivers (FW1)	153.35	3.19
Ornamental Non-Native Shrubs (WS3A)	123.10	2.56
Earth Banks (BL2)	121.78	2.53
Stone Walls (BL1A)	63.44	1.32
Canals (FW3)	11.53	0.24

4.3 Particular features of habitat diversity in Laois:

Fieldwork has confirmed that the county supports a total of sixty habitats out of a possible seventy three Level 3 types.

Table 1 confirms that the county has a considerable amount of heath and blanket bog habitats, almost all associated with the Slieve Blooms.

Hedgerows comprise the commonest linear habitat in the county. Canals are the rarest.

Previous reports have shown that habitats not listed in the Habitats Directive support greatest plant diversity. High (plant) diversity habitats include wet grassland (131), scrub (103), earth banks (56) and hedgerows (32).

Rarer habitats cover a small amount of the county. They include fourteen listed in the Habitats Directive. Examples are distributed throughout the areas surveyed. Their presence does not imply that each example deserves protection. It can be assumed that the best examples are within designated areas. Further survey work is required to clarify the status and management requirements for featured types outside designated areas.

“Top twenty” habitats are shown on table below. This is a preliminary list. It includes those types in the Habitats Directive, or those which are rare in Laois and support significant biodiversity.

Table 5 “ Top thirty” important and less common habitats in Laos

Habitat	Area or Length	% of county covered
*Upland Blanket Bog	632.14	1.44
*Wet heath	570.78	1.30
*Dry-humid acid grassland	187.41	0.43
*Dry heath	120.95	0.28
*Cutover bog	88.62	0.20
*Dry calcareous and neutral grassland	78.73	0.18
Wet-willow-alder-ash woodland	76.50	0.17
*Oak-birch-holly woodland	72.56	0.17
Wet pedunculate oak-ash woodland	49.58	0.11
Poor fen and flush	47.63	0.11
*Raised bogs	39.15	0.09
*Marsh	13.79	0.03
*Bog woodland	12.85	0.03
Riparian woodland	9.2	0.02
*Eutrophic lakes	8.08	0.02
Reed and large sedge swamp	5.47	0.01
Mesotrophic lakes	3.34	0.01
*Tall-herb swamp	2.6	0.01
Exposed sand, gravel or till	2.07	0.00
Rich fen and flush	1.03	0.00
*Limestone/marl lakes	0.64	0.00
Dystrophic lakes	0.06	0.00
Short rotation coppice	0.01	0.00
*Calcareous springs	N/A	N/A
Hedgerows	3,488.91	
*Depositing Lowland Rivers	350.89	
Drainage Ditches	317.68	
*Upland/eroding rivers (FW1)	153.35	
Stone Walls (BL1A)	63.44	
Canals (FW3)	11.53	

4.4 Guidelines: Integration of habitat conservation and development

4.4.1 Introduction

The following guidelines have been prepared for planners who may encounter particular habitats during forward planning exercises or dealing with planning applications. Habitats include typical and rare types.

4.4.2 2.3.2 Hedgerows

Hedgerows define rural landscapes and are valuable for terrestrial forms of wildlife. They are particularly important for birds and woodland plants. They provide commuting and feeding corridors for bats. Where they are found in settlements they are significant habitats and corridors for biodiversity. While originally planted by farmers to provide stock proof field boundaries their principal value to farming now, lies in their value as shelter for animals and reservoir of invertebrates which assist pollination and pest control.

Good hedgerows can easily be identified by their structure and location in the landscape. They will have a few mature trees, a three tier structure (with trees, shrubs and herbs) few gaps and will not have been cut into a box shape. Shrubs (almost always) include hawthorn, blackthorn or and possibly dog rose. The herb layer is found under the shrub layer. It should form a strip of tall grassland along the margin of the hedgerow.

Best quality hedgerows will have all these characteristics. They will also be found running along a townland boundary (confirming greater antiquity), adjacent to a drainage ditch and connected to other types of rare semi-natural habitats. There is a particular value in retaining hedgerows which provide corridors for wildlife between high value biodiversity areas dominated by similar habitats (designated and undesignated) and such areas and an urban environment.

Poor quality hedgerows will only have a shrub layer dominated by hawthorn, and will probably have been cut regularly into a box shape.

The objective should be to retain a connected network of good quality hedgerows which has a sustainable function within new development, whether a one off house or estate. Developers should be informed of the value of hedgerows as green infrastructure (landscape, biodiversity, shelter, supporting services to agriculture/horticulture) and given advice on ways to incorporate them in new development.

Boundary hedgerows should always be retained unless they need to be removed for reasons of public safety.

Within the development site a hedgerow could be integrated into the layout of a new linear feature such as a road/pedestrian/cycle track.

Retained hedgerows, or parts of hedgerows could be incorporated into new landscaped shrubberies or woodlands. Depending on the potential risks of anti-social activity or requirements for a more garden look the margins of these new hedgerows/cum woodlands/new shrubberies could be planted with colourful non natives (for amenity) or spiny shrubs to deter vandals. By occasionally mowing the grass margin of hedgerows (or part of it) they will look managed. As litter will accumulate in long grass along their margins arrangements will have to be made to carry out regular clean ups.

Encouragement should be given to develop a new linear feature of biodiversity value such as a hedgerow or dry stone wall, particularly if this type of habitat is found adjacent to the development site. To assist in maintaining and enhancing local biodiversity it is preferable to use native tree and shrub species similar to those found in adjacent hedgerows.

If hedgerows are being removed developers should be reminded of their obligations under the Wildlife Acts. not to remove or interfere with them during the bird nesting season, between March 1st and 31st August.

4.4.3 Drainage Ditches

Drainage ditches (FW4) are green infrastructure features which provide for flood attenuation and support aquatic and semi-aquatic forms of wildlife. They were developed by farmers through deepening a small watercourse or excavating of a new channel beside a field boundary.

Together with all other watercourses and wetlands (FL, FS and type habitats) they are important habitat for aquatic species, support connectivity and provide for flood attenuation. Drainage ditches which form part of the catchment of rivers which hold salmon and trout and are adjacent to hedgerows are most valuable as they are most biodiverse and may even support young fish. Poor quality drainage ditches do not hold water all year or have water of poor quality.

The objective should be to retain a connected network of drainage ditches to manage flooding as flooding incidents are likely to increase. Developers should be informed of their value as green infrastructure (landscape, biodiversity, flood attenuation) and given advice on ways to incorporate them in new development.

Drainage ditches should be retained, by ensuring that their water source is protected, its quality does not deteriorate, culverting does not occur and new development does not drastically alter the physical environment within 5m. Culverting is the main threat to drainage ditches.

Spatial planning should attempt to integrate drainage ditches into new designs. A drainage ditch could be integrated into the layout of new linear features such as a road/ pedestrian/cycle track /hedgerow or redeveloped as an amenity area.

Drainage ditches could become amenity areas through re-profiling and landscaping to expand their extent. Landscaping should involve native species, particularly those occurring locally to maximise biodiversity and amenity values. Suitable trees along their margins are willow and alder. As water is usually considered an attractive amenity the layout should allow for safe and sustainable access.

In large scale developments drainage ditches could be enlarged to become the nuclei of Sustainable Urban Drainage Systems. If used as receiving waters for surface water drainage, or SUDS, monitoring should occur to ensure no deterioration occurs. Particular care needs to be taken when construction is occurring nearby. Native species of wetland plants should be planted in SUDS to maximise their biodiversity value.

If a barrier is required around a drainage ditch, spiny shrubs (hawthorn, blackthorn) should be planted. If a fence is erected a type should be chosen, c3m from the ditch, which would allow for the movement of small mammals.

4.4.4 *Woodlands and Trees*

Woodlands (all WD and WN type habitats) are distinguished by the dominance of trees growing at least 5m tall. A similar type habitat, scrub (WS) is dominated either by small trees or shrubs which generally do not grow taller than 5m. Treelines (WL2) are lines of trees < 5m wide.

Development should generally avoid these types of habitats as all forms of woodlands, most forms of shrubbery and mature trees are important habitats for birds, invertebrates, mammals and native plants. Badger setts may be present in woodland or scrub and bats may be roosting in old trees. Best trees for biodiversity are native species, particularly if are old and their trunks have furrows and cracks.

Developers should be informed of the value of woodlands and trees as green infrastructure (landscape, biodiversity, carbon sink, shelter for animals, potential commercial value, source of fuel and food for people) and given advice on ways to incorporate them in new development.

A retained woodland or mature tree provides a readymade landscaped feature of potential amenity value around which a new natural type landscape could be created. If development occurs adjacent to a woodland usage of the woodland is likely to increase. This implies that sustainable and safe access should be provided to minimise disturbance to key features of wildlife value i.e. possible badger sett. Best advice is to use existing access routes. A temptation to "tidy woodland" by removing dead wood should be avoided as this is an important habitat for invertebrates and fungi. By mowing the grass margin of the woodland occasionally the retained woodland will look managed. As litter may accumulate due to usage, arrangements will have to be made to carry out regular clean ups.

In a large site there may be options to locate new development within a woodland or scrub in less valuable parts. Least valuable parts are likely to be in a part of the woodland which was not covered in woodland in the mid 19th century (check 1st ed OS map), on the north side of woodland as this colder side is less valuable for invertebrates, on its margin (to minimise disturbance to woodland wildlife which is richer in the interior) and areas that contain non native trees (as these are less valuable than natives). Care needs to be taken that development will not unduly cause fragmentation; creation of gaps between blocks of woodland which will affect commuting routes used by wildlife such as bats or small mammals.

If mature trees are being felled replanting should take place elsewhere on the site to assist the development of a native woodland or scrub. Measures should be taken to protect bats if trees scheduled for felling are suspected of having bat roosts. No disturbance should occur during the bird nesting season between March 1st and 31st August.

4.4.5 Grasslands

Grasslands are divided into intensively managed and semi natural types. The majority of grasslands are the intensively managed types such as GA1 (Improved agricultural grassland) found on farms and GA2 (Amenity grassland improved) in amenity areas and gardens. The former have an important provisioning function as they are the principal grasslands on farms. Semi-natural grasslands (GS1,2,3 and 4) are rare and valuable for wildlife. Their soils are less disturbed. They support more native plant species and thus more biodiversity in their soils and vegetation. Visually they are more attractive than GA types. Wet grasslands (GS4) function as flood attenuation areas. As Green Infrastructure features semi natural grasslands are also important for food production.

As GA2 grassland is extremely common there is no particular priority to protect all examples of this habitat. Within areas dominated by GA1 and GA2 hedgerow and drainage ditch management should be examined as these may be the only habitats of value in the vicinity of these types of grassland.

Ideally development should avoid causing any direct or indirect negative impacts on these types of semi-natural grasslands. Developers should be informed of their value as Green Infrastructure.

Reseeding or drainage should not occur. If such grasslands are removed efforts should be made to replace them by creating similar environmental conditions and seeding such sites with seeds collected by hand from habitat areas being removed.

Semi-natural grasslands could become features in new amenity areas/gardens. No ploughing, drainage or reseeded should occur. Ideally these grasslands should only be mown after seed is set and cuttings removed. By mowing the margin of the grassland regularly the retained grassland will look like a managed feature.

4.4.6 Peatlands

Peatlands include a range of habitats all of which share the characteristic of having a soil principally composed of peat. An easy way of determining its presence in a field is to excavate a small hole in the ground. A peat based soil will lack any grit.

Peat soils may be deep or shallow, dry or wet. They are associated with natural to semi-natural habitats such as heaths (HH types with a shallow peat layer), bogs (PB types with deeper peat fed principally by rainwater) and fens (PF types wetlands where peat is laid down under the influence of groundwater or flowing surface water). Some peatland types are particularly rare and are associated with a unique flora. Extensive peatlands will be important for nesting birds.

As Green Infrastructure, most peatlands support a low intensity farming system. They are important for local and regional flood attenuation and function as carbon sinks thus mitigating for climate change. Large extensive peatlands have particular landscape values and could be amenity areas of high recreational value.

Ideally development should avoid having any direct or indirect negative impacts on all peatlands. Developers should be informed of their value as Green Infrastructure. The most significant negative impacts arise through interference with hydrology.

In an area where there is an extensive cover of peatland there may be options to allow development within less valuable areas. Least valuable areas are likely to have a long history of drainage or burning, be located on its margin (to minimise disturbance to wildlife and hydrology) and not involve the removal of substantial amounts of vegetation or peat.

Care should be taken that development does not cause further fragmentation of peatland habitats. Mitigation could involve the redevelopment of the local drainage network to raise the water table in their vicinity.

5 Ecological Networks/Green Infrastructure assessments

5.1 Background

Green Infrastructure stresses the functions of biodiversity and their value to society. Green Infrastructure planning is well established in the USA, England, Scotland and Wales. A definition of Green Infrastructure (GI), developed by a research project undertaken for Comhar Sustainable Development Council, DOEHLG (Compass Informatics et al, 2010,) included a definition of GI

as a “strategically planned and managed network featuring areas with high quality biodiversity (uplands, wetlands, peatlands, rivers and coast), farmed and wooded lands, and other types of green spaces that conserve ecosystem values which provide essential services to society”.

Practical examples of services provided by Green Infrastructure include the provision of food and wood through farming and forestry and water from rivers or aquifers. Regulating services include flood attenuation by rivers and wetlands, air filtering and noise attenuation. Supporting services include pollination of crops. Cultural functions relate to the provision of interesting places for outdoor recreation or passive appreciation.

The latest draft of the National Biodiversity Plan stresses the value of the ecosystem services and contains a brief reference to Green Infrastructure <http://www.npws.ie/en/PublicationsLiterature/NationalBiodiversityPlan/>

Green Infrastructure planning is becoming increasingly important as a tool to integrate biodiversity and development. While GI planning has had different objectives throughout the world it always gives particular consideration to ecosystem benefits. In the United States the planning approach highlights services provided by water and is related to Greenways. Within the European Union, Green Infrastructure is being promoted by the Biodiversity Unit, DG Environment of the European Commission, and the European Network of Environment and Sustainable Development Advisory Councils (to which Comhar is affiliated) as an approach to biodiversity management post 2010. The Commission is currently developing a Green Infrastructure Strategy. http://ec.europa.eu/environment/nature/ecosystems/index_en.htm

In England and Scotland Green Infrastructure inspired studies are principally concerned with developing integrated facilities for outdoor recreation which considers biodiversity values. Green Infrastructure planning in Wales has a broad focus and is linked to improving socio-economic conditions particularly in rural areas. Particular support has been given to the adoption of the Green Infrastructure approach to planning in Ireland by Comhar, which produced a policy document on GI in August 2010. <http://www.comharsdc.ie/themes/index.aspx?TAuto=10>. While there is no statutory obligation yet to use the GI approach to planning features of this approach are already in use in certain local area plans, development plans and strategic plans. It is likely that Green Infrastructure will be mentioned in new guidelines on Local Area Plans being drafted by the Department of the Environment, Heritage and Local Government.

Habitat mapping is at the core of Green Infrastructure assessment as it provides an account of the features in the landscape which are responsible for ecosystem functioning. As ecosystem services are rarely provided by individual examples of habitats but by groups of similar types, the Green Infrastructure approach requires that the links between habitats are first interpreted to identify “ecological networks”. Ecological networks underpin the interpretation of biodiversity as Green Infrastructure.

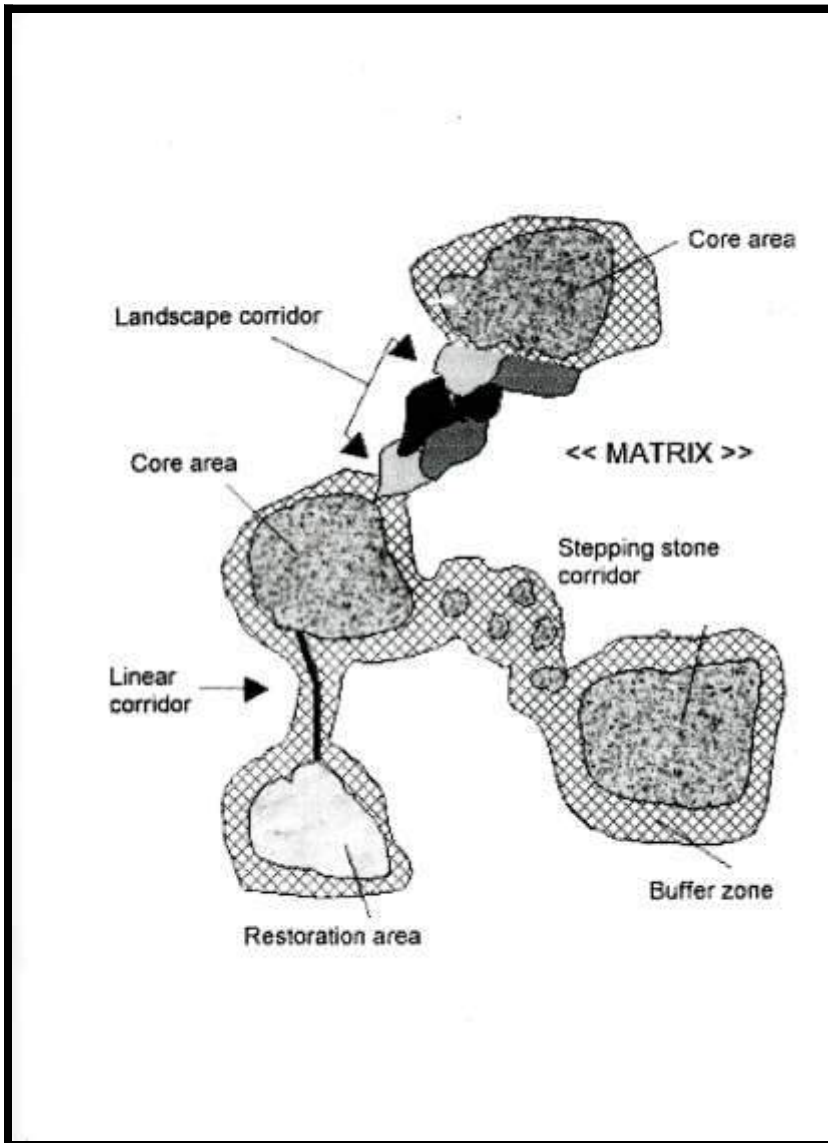


Figure 2. Features in ecological networks

Ecological networks consist of “cores” (habitats/features of key importance for biodiversity and ecosystem functioning), “buffers or “nature rehabilitation areas“(habitats adjacent to the key area whose management influences its quality and which require more appropriate management) and “corridors” habitats which allow for the movement of species, particularly those associated with the “core”. A river provides an obvious examples of an ecological network where the core feature, the watercourse, functions also as a corridor for key species. Buffer or nature rehabilitation areas comprise areas within its catchment which have been drained and no longer function as wetlands.

5.2 Methodology

Green infrastructure assessments were prepared for the following towns in 2010:

Abbeyleix, Arles, Ballybrittas, Ballycolla, Borris-in-Ossory, Clonaslee, Clough, Durrrow, Emo, Killeshin, Killenard, Mountrath, Newtown/Doonane, Portarlinton, Rathdowney, Rosenallis, Stradbally, Swan and Vicarstown.

With the exception of Ballybrittas, Emo, Killeshin, Killenard, Newtown/Doonane and Swan research involved fieldwork in 2010 in all towns to map habitats to Level 3. These settlements were not examined directly in 2010 as habitat mapping had previously occurred in their environs (usually 2008).

For these smaller areas ecological networks were defined from habitat maps produced in 2008, updated by desk research using 2005 digital aerial photography and a reconnaissance visit. Target notes from the original study were also used to define the networks

Fieldwork occurred principally within the Local Area Plan boundary of all these towns. However areas outside the boundary were surveyed and mapped if habitats of particular interest were present. Fieldwork followed conventions used in previous habitat mapping studies in Laois which are based on the Heritage Council's latest guidelines and Fossitt's classification. Photographs were taken of areas of interest. Invasive plants were noted during fieldwork and grid references recorded.

The following on line data sources were consulted

- National Parks & Wildlife Service online data (www.npws.ie) to discover current boundaries of nearest designated sites and access summary accounts (site synopsis) for nearest designated site and mapping data
- Environmental Protection Agency data on soils and water quality <http://maps.epa.ie/InternetMapView/MapView.aspx> - Land/Soils; Land/Subsoils; Water Quality/Current River Data. This was consulted for Portarlinton.
- Geological Survey of Ireland geological data on geology, subsoils and hydrology. http://spatial.dcenr.gov.ie/imf/imf.jsp?site=GSI_Simple – Bedrock datasets/Bedrock 100k Solid Geology; Bedrock datasets/Faults 500k; Groundwater/Karst features; Groundwater/ National Draft Bedrock Aquifer Map; Groundwater/National Draft Gravel Aquifer Map; Groundwater/Irish Interim Vulnerability. This was consulted for Portarlinton.

Other local sources of information included the biodiversity section of a report on flooding in Portarlinton (Royal Haskoning and JBA Consulting, 2006), a drainage impact assessment of the Barrow (Natura, 2006); a biodiversity survey of the Mountmellick canal (Hammond and Feehan, 2006); biodiversity review of a small park in Portarlinton (Tubridy, 2008), a report on a raised bog near Abbeyleix (Ecologic 2009), biodiversity in Abbeyleix for the Tidy Towns and accounts of Laois sites in national surveys of bogs (Derwin et.al. 2002) and woodlands (Perren et. al. 2009).

An information leaflet was produced explaining the project (Appendix 2). This was circulated locally and given to landowners who were approached to allow access to their lands.

5.3 *Abbeyleix*

5.3.1 *Introduction*

Four ecological networks were identified in Abbeyleix. Habitats and networks are shown on the following maps.

5.3.2 *EN1 Abbeyleix Bog-Estate woodlands*

This ecological network is located to the south of Abbeyleix Town and links some semi-natural habitats and important linear habitats such as mature Tree-lines to the Abbeyleix Bog area and to the adjacent mixed woodland in the Abbeyleix Estate. It is divided into two main sections.

The corridors comprise a series of linear habitats including hedgerows, tree-lines and a small stream. It is an important ecological network as it links the north side of the Abbeyleix Bog area (and the southern side of the town) to semi-natural habitats along the River Nore (candidate Special Area of Conservation) including the oak and alluvial woodland (part of Abbeyleix Estate). Much of this Ecological Network actually lies outside but adjacent to the LAP boundary, with some overlapping sections.

The ecological network starts at the south-east side of Abbeyleix and includes some mature mixed woodland (WD2) around Alisworth House. This old estate-type house and grounds contains mature woodland with Sycamore, Beech, Ash and Oak. The ground cover was generally quite dry and dominated by Ivy, Brambles and ferns such as Broad-Buckler Fern and Male Fern. The shrub layer contains Holly. A drain/water-course flows along the southern side of the wood adjacent to the road and continues into Abbeyleix. (This drain/water-course is partially covered in places further west.) The grounds of Alisworth House also contain some old stone walls and buildings (BL1) and some meadows that may be species-rich. The network continues south along the Abbeyleix-Ballynakill Road with some tree-lines (WL2) containing mature Beech, Sycamore and Horse Chestnut (around Thornberry House). A local authority water source (Knocknamoe Well) is also included as well as part of a small channelized stream (which takes a different route to the EN but flows to Abbeyleix Bog and is part of the EN downstream.) Towards the west the EN follows the route of several hedgerows and treelines and takes in some conifer plantation at the southern side of Abbeyleix Hospital. This route also follows some field drains (FW4).

The Abbeyleix Bog area is the core site within this ecological network and is a site of particular ecological value. The LAP boundary extends to the northern tip of the Abbeyleix Bog site. The Ecological Network takes in the northern part of the Abbeyleix Bog site and adjacent habitats such as species-rich wet grassland (GS4) and scrub (WS1) to the north-east of the bog and adjacent to the Abbeyleix-Ballymullen local road. These fields adjacent to the woodland are part of the overall hydrological unit of Abbeyleix Bog. The wet grassland is species-rich and contains indicators of base-rich loving vegetation typical of 'lagg zones' or fen zones found around the edges of raised bogs. Species include Yellow-flag, Purple Loose-strife, Marsh Bedstraw, Lesser Spearwort, Spotted Orchid, Common Reed, Reedmace, Meadowsweet, Floating Sweet-grass, Tufted Hair-grass, Purple Moor-grass, Creeping Bent, Greater Tussock-sedge, Hard Rush and Jointed Rush. This area also contains several patches of scrub with scattered Birch, mature Eared Willow and Grey Willow.



Figure 5. Species-rich wet grassland(GS4) and Willow-scrub (WS1) in fields near Abbeyleix Bog.

There are further linkages from Abbeyleix Bog through conifer woodland and plantation which is part of the Abbeyleix Estate, (Colin's Bog), towards the south-west side of the LAP boundary. The bog is connected to the adjacent Abbeyleix Estate via a small channelized stream, which flows under the main Cork-Dublin road. Japanese Knotweed, an invasive species, is present a little way along this road in the road-side verge south of the LAP boundary.

This part of Abbeyleix Estate (Colin's Bog) mainly contains conifer plantation (WD4) of various ages and some immature broad-leaved woodland (WD1, > 5 m high) dominated by plantation Ash. The zone along the stream contains some semi-natural features. This area can be classified as 'old woodland' as it has been wooded for some time and it is somewhat more diverse than other plantation woodland. The stream is somewhat silted, although Brown Trout were noted in the main channel.

The EN branches north from the entrance to Abbeyleix Bog and takes in some recently-planted immature broad-leaved woodland along the road as well as some rough grassland within a meadow (GS2) that is part of the Stone Arch grounds (grounds of old Abbeyleix Railway Station). The EN extends north and takes in three small areas of mature broad-leaved woodland that are all prominently positioned on mounds. Two of these woodlands are known as 'Ladies Hill' and can be classed as 'old' woodland as they have been wooded for some time. These mounds are part of a large glacial moraine (Feehan 1982) and elements of this moraine can be seen along the Abbeyleix-Ballymullen local road (south of Ballymullen crossroads), where some old gravel pits are exposed north of the road and there is a prominent glacial ridge. The patches of woodland are generally dominated by mature Beech, although there is also some Sycamore, Ash and large Hawthorn present. Elder is found in these woodland fragments. The ground cover is poorly developed and quite dry. Species like Nettle, Bramble and Ivy are prominent and form dense cover.



Figure 6. Lime trees along avenue to Church of Ireland Abbeyleix (WL2)

The Ecological Network also branches to the north of the Abbeyleix Estate and takes in some nature mixed broad-leaved woodland (WD1) adjacent to South School (National School) and tree-lines (WL2) with mature Lime in and around the adjacent Church of Ireland and graveyard (including the Lord's Walk – a public right of way and path linking the church to Colman's Road). This area is likely to be important feeding area for bats. There are many old buildings in the area that have potential for maturity bat roosts and there is a known maternity bat roost in nearby residential house (De Vesci Close). The EN crosses the Abbeyleix-Ballycolla Road and includes the old railway bridge (BL1), which was part of the old Portlaoise-Kilkenny railway. The Lord's Walk passes under this bridge. (Unfortunately the rest of the old railway north of the bridge has been reclaimed as part of farmland.) The mature woodland (WD1) around the South School contains many large specimens of Beech, Sycamore, Oak, Horse Chestnut and some conifers (Fir, Larch). However, the ground cover is species-poor and deeply shaded by a thick layer of Cherry Laurel. The EN also includes part of a small channelized stream/drain that flows along the edge of the road (Abbeyleix-Ballycolla Road) from the town. This small stream once flowed down Abbeyleix Main St but has since been piped and covered. This is the same stream that forms part of EN3 and has its headwaters in Rathmoyle (part of Abbeyleix Golf Course). The Ecological Network continues west through Old Town to follow the path of the stream that flows through Abbeyleix Estate and adjacent land, where it leaves the LAP. The stream continues to flow west outside the study zone where it meets the River Nore.

Abbeyleix Bog area

The Abbeyleix Bog area is a core site within this Ecological Network and contains several semi-natural and modified habitats. The overall area is a significant and large wildlife refuge. The old Portlaoise-Kilkenny railway line enters Abbeyleix bog near the northern tip and divides it into two main sections. The railway has now been removed but the old embankment is an important amenity route (and important wildlife corridor for animals like butterflies) through the site. The majority of the raised bog (PB1) has been classified as 'Degraded raised bog' (Ecologic 2009). Significant features of particular ecological interest include a small area of 'active raised bog'. (Both habitats are listed on Annex I of the EU Habitats Directive and active raised bog is a priority habitat). The presence of an intact lagg along the eastern side of the bog (outside the Ecological Network) is a very significant feature of this site, as these transitional zones around raised bogs have generally been destroyed by peat-cutting and habitat loss. This lagg is partially wooded and can be classified as 'fen carr'.

The high bog is surrounded by old regenerating cutover bog and by mixed woodland and conifer plantation, much of which was planted by the Abbeyleix Estate. Scrub and semi-natural woodland is developing on the old cutover bog with bog woodland (WN7) and wet Willow-Alder-Ash woodland (WN6) developing in this zone. Some of the old planted woodland around the site is developing semi-natural characteristics in the ground, shrub and understorey layers. One feature of interest is the presence of naturally developing bog woodland dominated by Scot's Pine developing on the cutover bog along the western boundary.

The site also contains two rare plant species, bird cherry (*Prunus padus*) and round-leaved wintergreen (*Pyrola rotundifolia*), which are Red Data Book species (Curtis and McGough 1988). (Bird cherry is present at the northern entrance to the bog and in the EN.) There have also been records of marsh fritillary (*Euphydryas aurinia*) and Desmoulin's whorl snail (*Vertigo moulinsiana*) from the site (www.abbeyleixbog.ie). Both species are of particular conservation interest and are listed on Annex II of the EU Habitats Directive. The site is also an important wildlife refuge and is used by a range of bird and mammal species such as Red Squirrel and Fallow Deer.

Abbeyleix Bog is owned by Bord na Mona but has now been handed into the care of the local community to be managed primarily for conservation. Bord na Mona originally bought the bog to exploit its peat resource. However, the bog was only partially developed. Drains were dug across the bog but no peat was extracted. Restoration works were carried out in 2009 on the high bog to block these drains and maintain and enhance the extent and quality of active raised bog. The site was originally not selected for designation as a potential National Heritage Area due to the damage caused by drainage works carried out by Bord na Mona (Derwin et al. 2001).

Green infrastructure assessment – EN1

The overall Abbeyleix bog area is of national ecological value (B) as it contains examples of habitats listed on Annex I of the EU Habitats Directive such as degraded raised bog and active raised bog (a priority habitat). The site also contains a notable intact example of 'lagg vegetation' along the eastern margin and intact examples of this transitional bog habitat are now rarely found around Irish raised bogs, therefore significantly raising the ecological value of this site. The value of the overall area is significantly enhanced by mature woodland that surrounds the bog including some developing wet woodland (WN6) and bog woodland on former cutover bog.

The habitats found in the eastern part of the Ecological Network are of high local ecological importance (C) as they form an important corridor through mainly farmland and contain small areas that are likely to act as wildlife refuges. The mature trees in the tree-lines (WL2) along the Abbeyleix-Ballinakill Road (Thornberry House) are likely to act as an important feeding area for bats.

The area west of the Abbeyleix Bog is dominated by plantation woodland in Abbeyleix Estate and has medium local ecological value (D). Additional habitats such as the woodland (WD1) around the South School, adjacent mature-tree-lines (WL2) and stone work around the church and grave-yard (BL1) have a high local ecological value (C). This is particularly because these habitats link urban elements of Abbeyleix Town to the Abbeyleix Estate via the Lord's Walk. The small mature woodland on the mounds of Ladies Hill are also a prominent landscape feature of the town and provide a wildlife refuge, (although woodland development was relatively poor). Mature trees in this area are also a particular feature of the landscape of Abbeyleix Town.

This Ecological Network is important as it provides connectivity from urban parts of Abbeyleix Town to Abbeyleix Bog and onwards to the River Nore cSAC area. Wetland habitats provide for flood attenuation and the bog acts as a carbon sink. The semi natural features of the landscape are important visual amenities around Abbeyleix. The Lord's Walk passes through this EN and is a public right of way that provides an important walking route linking the Church of Ireland to Colman's Road.

The bog acts as a carbon sink and woodland areas have potential to supply timber. Any proposals for development close to Abbeyleix Bog should include an assessment of the impact on the overall hydrological unit of the bog, which extends further than the actual extent of the bog and woodland habitats. Some fields adjacent to the bog are developing diverse wet grassland and have potential to develop further into habitat of significant value. Some of this grassland around the bog margins further south and outside the EN has been recently planted with forestry so this type of grassland is limited in extent.

This EN provides connectivity to the River Nore and proposals for development that will have a direct impact on the stream/drains in the EN will require to at least be screened for Appropriate Assessment, as there are potential impacts on water quality downstream in the cSAC. This section of the River Nore is particularly vulnerable as it contains the Nore Freshwater Pearl Mussel (*Margaritifera margaritifera durrovensis*) and White-clawed Crayfish (*Austropotamobius pallipes*), both of which are aquatic species of significant conservation interest and listed on Annex I of the EU Habitats Directive. The Nore Freshwater Pearl Mussel is of particular interest as it is an endemic species that is confined to a small part of the River Nore extending several km upriver and down-river of Abbeyleix.

Proposals for removal of mature trees in the Abbeyleix area should also consider whether they have potential to provide summer roosts for bat species, which is likely.

5.3.3 EN2 Gloreen Stream and tributaries

This Environmental Network extends from the northern boundary of the Abbeyleix Local Area to the mid-west section and follows the Gloreen Stream (FW2) and its main tributaries. This stream/small river is also part of the River Nore catchment and links to the River Nore about 1.5 km west of the LAP boundary. The water quality within this stream has been rated by the EPA as of moderate quality with Q-values of 3-4. The EN also includes adjacent riparian features such as hedgerows (WL1) and some tree-lines (WL2) that have been planted along the stream, wet grassland (GS4) in flow-lying areas adjacent to the stream that are part of the floodplain, and other small features such as patches of woodland (WD1) and scrub (WS1)

The Gloreen Stream (western branch) in the northern section is quite small and narrow. Some sections have a gravel channel while other parts are overgrown with riparian and emergent vegetation such as Fool's Water-cress, Reed Canarygrass and Hairy Willowherb and is more typical of a drainage channel. These sections are generally quite silted. The stream flows along field boundaries and generally one side of the stream (sometimes both sides) is planted with a Hawthorn-dominated Hedgerow. Further south-west the stream flows through a low-lying area that is vulnerable to flooding. The majority of the low-lying area contains wet grassland dominated by rushes (Soft Rush and Hard Rush). These fields are grazed by cattle. There are also some patches of Yellow Flag and Reedmace appears in some connecting drainage ditches.



Figure 7. Overgrown section of Gloreen tributary (FL2/FW4).

The eastern tributary (FW2) is quite similar in nature to the Gloreen Stream and is quite small, natural, channelized and with features of drainage ditches. This tributary flows through some urban parts of Abbeyleix. The tributary meets the main part of the Gloreen Stream south of the Abbeyleix Industrial Estate. Also included is a small woodland area (WD1) (known as The Grove) with mature Beech planted on a small mound. These mature trees are likely to provide feeding areas for bats in the local area. This area can be classified as 'old woodland' as it has been planted for some time and contains typical woodland species such as Lesser Celandine, Dog Violet, Primrose and Herb Bennet. This is an important feature of the landscape of Abbeyleix and is visible as traffic enters Abbeyleix from the north. The mature trees are actually planted around the margins of this small enclosure but the central area contains scrub and developing woodland.

Green infrastructure assessment – EN2

This Environmental Network contains habitats that have a high local ecological value (C). While the riparian habitat is relatively poorly developed, channelized and narrow, these tributaries provide important connectivity over a relatively large area that also includes some urban parts of Abbeyleix. The habitats provide for flood attenuation. Development in this area should seek to improve the connectivity value of these streams by planting hedgerows along open sections.

5.3.4 EN3 Abbeyleix Golf Course

This network is located in the north-eastern part of the Abbeyleix Local Area. The EN takes in all of the golf course and includes Rathmoyle House (private residential?). Abbeyleix Golf Club has occupied this site since 1927 and the course is described as a parkland course, spread over 18 holes. As it is quite established it contains mature mainly exotic broad-leaved and conifer trees. The golf course mostly contains amenity grassland (GA2) with these scattered trees and some patches of mixed mature woodland (WD2). The golf course also contains small patches of more-recently planted conifer plantation (WD4) and mixed plantation (immature woodland) that are generally densely planted and have poor woodland development at present. The newer section of the golf course also contains some scrub (WS1) on undeveloped land. Kellegher (2007) recorded a Badger sett in scrub adjacent to the golf course. Another feature of interest is a small stream/drain that flows along the southern boundary. This water course links to EN4 and flows under Abbeyleix Main St.

Green infrastructure assessment – EN3

This network contains habitats that have a low-moderate local ecological value (D-E). The golf course is an important amenity site. However, the site also includes patches of conifer plantation (WD4), mixed plantation (WS2) and mature mixed woodland (WD2) that all provide cover as wildlife refuges. The mature conifer and broad-leaved trees in the golf course are also an important visual feature of the landscape.

5.3.5 EN4 Abbeyleix Church graveyard

The small network is located in the northern part of the Abbeyleix Local Area. It includes a small stream/drain and associated hedgerows that link to the Abbeyleix Roman Catholic Church graveyard and to Dove House Sensory Gardens. This EN links directly from the urban Abbeyleix into adjacent farmland.

The stream/drain is channelized and is a continuation of the stream/drain noted in EN3 and also links to EN1 via the underground link through Abbeyleix Main St. The stream/drain is quite small and narrow and there is relatively poor riparian development. It flows along fields boundaries and this area is of interest as it is farmland that has been enclosed by developed urban land.

The Abbeyleix Roman Catholic Church graveyard contains some mature trees (WL2) and also some old stonework (BL1) with old buildings and stone-walls. The graveyard is quite old and managed as amenity grassland (GA2). The boundary is planted with mature trees including Horse Chestnut and Sycamore (others)

The Dove House Sensory Gardens is located in an old walled garden that was part of a convent. It is a small area containing lawns (GA2), exotic shrubs and planted flowerbeds and borders. The gardens also contain some mature trees. The main objective is to provide sensory interest to persons with intellectual disability by using many different types of plants and shrubs in the gardens. These gardens also attract common song birds.

Green infrastructure assessment – EN4

This network is an important part of the visual landscape of Abbeyleix Town and are part of the town's heritage. Dove House, while containing modified and artificial habitats and dominated by exotic plants, is a typical example of a well-developed garden that has the capacity to attract many types of wildlife including songbirds and butterfly species.

5.3.6 Other features of biodiversity interest

Japanese Knotweed, an invasive species, is located within the Abbeyleix Local Area at two locations along the Dublin-Cork road in private grounds (close to The Grove).

5.4 Arles

5.4.1 Introduction

Three ecological networks were identified around Arles. Habitats and ecological networks are shown on following maps (Figure 3 and 4). Legends to be added.



Figure 8. Habitat map of Arles



Figure 9. Location of ecological networks in Arles

5.4.2 EN1 Semi-natural grassland, hedgerows, woodland and rivers

The main ecological network in Arles is associated with dry meadows and grassy verges (GS2), hedgerows (WL1), mixed) broadleaved woodland (WD1), depositing lowland rivers (FW2) and oak-ash-hazel woodland (WN2).

It is centred on 2 small fields containing dry meadows and grassy verge habitat, adjoining hedgerows, a tree line and a small area of (mixed) broadleaved woodland. Two of the hedgerows border a short laneway (map) which can also be found on the 1st edition OS maps. This formed part of a right of way which joined the centre of the village to the Rathillig road crossing the stream just south of the woodland (Figure 5). It is now part of the Slieve Margy Way walking route. A network of hedgerows connects the village to a stream and to oak-ash-hazel woodland outside of the LAP area.



Figure 10. View of Arles.

Assessment – EN1

This ecological network of semi-natural grassland, woodland and hedgerows is of local importance. The semi-natural grassland and hedgerows connect the village to a nearby stream and an area of oak-ash-hazel woodland. This enhances local biodiversity in Arles and provides a green route for species to travel along. The network is of cultural value as it runs along sections of the Slieve Margy Way, and includes an old mass path leading to St. Abban’s Holy Well dating back to 650AD.



Figure 11. Oak-ash-hazel woodland found on the border of Ashfield and Ballynagall.



Figure 12. Depositing lowland river (FW2) west of the village Arles

5.4.3 EN2, Dry meadows and grassy verges (GS2), hedgerows (WL1), tree line (WL2), and drainage ditch.

Drainage ditches (FW4), a mature treeline (WL2) and hedgerows (Figure 7) form the main part of the ecological network along with dry meadows and grassy verge habitat (GS2), located on the eastern side of the main Carlow to Portlaoise road. Much of the network stretches outside of the LAP area (Maps 1 and 2). Both drainage ditches are next to hedgerows. The drainage ditch adjacent to the eastern most hedgerows growing on both side of an old laneway feature on the first edition OS map and has its origin in an old well (Smith's well). The hedgerows and part of laneway date back to the first edition OS map, most of the original lane is gone and a new section added. Woody species found in the hedgerow included crab apple, hawthorn, wych elm, blackthorn, ash, elder, ivy, bramble, hazel and sycamore.



Figure 13. Hedgerow along an old lane east of the village of Arles

Assessment – EN2

This habitat complex of semi-natural grassland (GS2), drainage ditches (FW4), hedgerows (WL1) and tree line (WL2) is of local importance and provide a green route to and from the village within an intensively managed area of agricultural land. The mature trees adjacent to the church may be suitable habitat for bats and perhaps owl.

5.4.4 EN3 River, hedgerows, stone buildings and large garden

This is a small network on the edge of the LAP area in the south of the village. Depositing lowland rivers (FW2), hedgerow (WL1), stone buildings (BL1B) and a mature garden of trees (WD2) make up the network. The extent of the

area of is outlined on Map 2 and habitats within it are shown on Map 1. A large mature garden connects to a small stream and hedgerow just outside of the LAP boundary. The majority of species were non-native and included beech, monkey puzzle, various Lawson Cypress, western red cedar, holly and laurel



Figure 14. Mixed conifer broadleaved woodland in a garden bounded by a hedgerow in Arles.

Assessment – EN3

This small ecological network of the stream (FW2), mature woodland garden (WD2) and hedgerows are of local importance. The stream and hedgerow connect the village to the wider countryside and bring diversity to an area that is dominated by intensively managed farmland. The house built of cut limestone blocks and the garden date back to at least the 1800's (1st edition OS map) and along with the church are two of the oldest buildings in the village.

5.5 Ballybrittas

5.5.1 Introduction

Two small ecological networks were located in Ballybrittas. Their habitats and location are shown on the following maps.



Figure 15. Ballybrittas Habitat Map

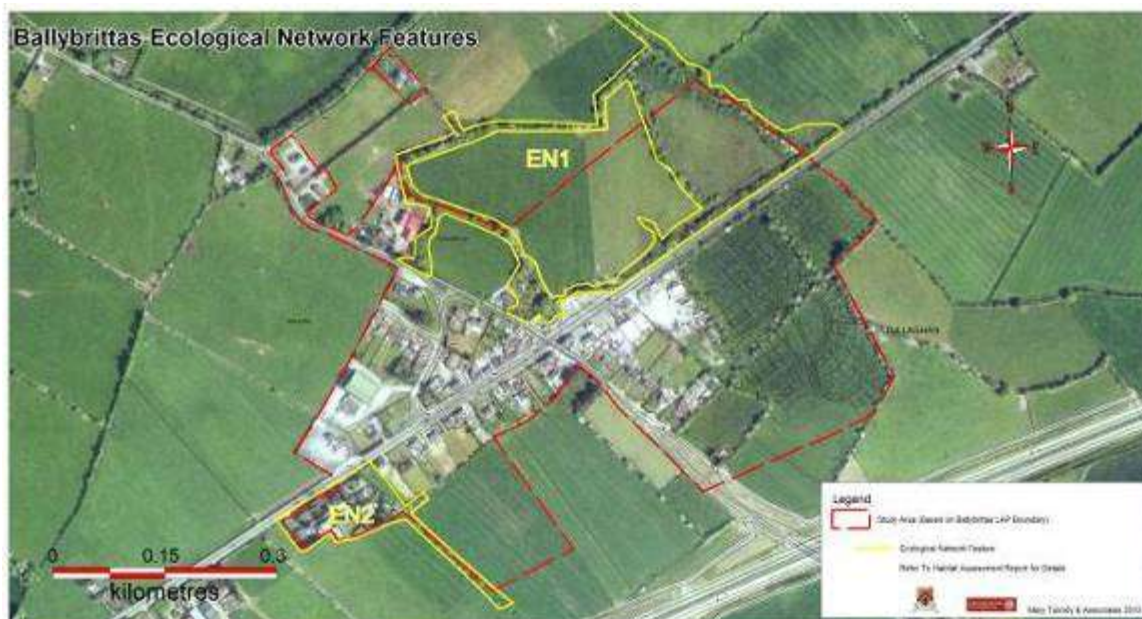


Figure 16. Ballybrittas Ecological Networks

5.5.2 EN1 Rivers, drainage ditches, semi-natural woodland, semi-natural grassland, hedgerows, gardens and ornamental shrubs.

The core ecological network in Ballybrittas is associated with depositing lowland rivers (FW2), drainage ditches (FW4), wet-willow-alder-ash woodland (WN6), oak-ash-hazel woodland (WN2), wet grassland (GS4), hedgerows (WL1), large gardens (BL3 1) and ornamental non-native shrubs (WS3B).

The wet-willow-alder-ash woodland (WN6) developed in a former lake in the past 50 years. Woodland is scrub-like in places and is dominated by grey willow with birch, alder, ash and hawthorn. This was surveyed in 2003 as part of the Native Woodland Survey (NWS Site No. 269).

Assessment – EN1

The habitats in this ecological network of depositing lowland rivers (FW2), drainage ditches (FW4), wet-willow-alder-ash woodland (WN6), oak-ash-hazel woodland (WN2), wet grassland (GS4), hedgerows (WL1), large gardens (BL3 1) and ornamental non-native shrubs (WS3B) are of local importance.

5.5.3 EN2 Semi-natural grassland, hedgerows and gardens.

This small ecological network centres on a small area of dry meadows and grassy verge habitats (GS2), hedgerows (WL1) and large gardens (BL3 1).

Assessment – EN2

The ecological network of dry meadows and grassy verge habitats (GS2), hedgerows (WL1) and large gardens (BL3 1) is of local importance. The habitats link the south west of the village to the recently planted immature woodland along the motorway that was planted with ash, hazel, hawthorn, birch sp., rowan, sycamore and field maple.

5.6 Ballacolla

5.6.1 Introduction

Four ecological networks were identified around Ballacolla. Their associated habitats and extent are shown on following maps.

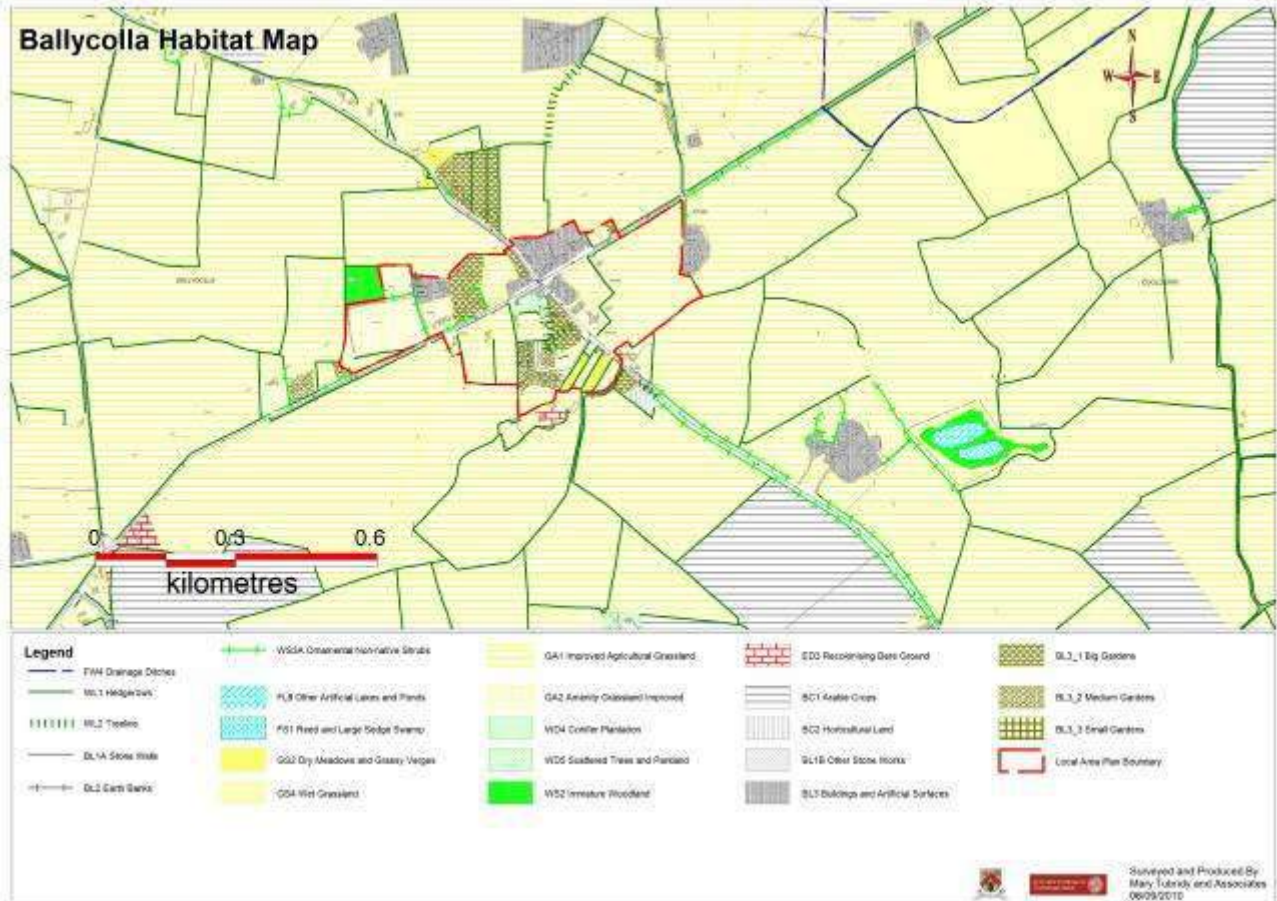


Figure 17. Ballycolla Habitat Map



Figure 18. Ballycolla Ecological Networks

5.6.2 *EN1 Drainage ditches (FW4), Semi-natural grassland (GS2 and GS4), woodland (WN5) and hedgerows (WL1) in the centre and to the east in Ballycolla*

The principal and most important ecological network in Ballycolla is associated with a drainage ditch (FW4, Figure 9), wet and dry grassland and associated hedgerows. This habitat is of local ecological interest.



Figure 19. *Drainage ditch (FW4) flowing through wet grassland in Ballycolla.*

Habitats within the ecological network in the study area (shown on Map 1) include the drainage ditch (FW4), riparian woodland (WN5), wet grassland (GS4, Figure X), dry meadows and grassy verges (GS2) and hedgerows (WL1).

The main feature of this network the wet grassland and the drainage ditch which flows through it and although it is outside of the LAP area it is connected to the village by a hedgerow that is also a townland boundary and features on the 1st edition OS map. The drainage ditch is part of a stream that arises to the north of the site, flows through it and then stops. Water mint and common reed were among the species growing in the water. Adjacent to part of the drainage ditch is a hedgerow containing alder, willow species and hawthorn. A narrow broken stretch of riparian woodland made up mostly of alder and willow can be found along the drainage ditch within the wet grassland (Figure 9). The wet grassland occurs in a shallow depression and is being colonised by scrub of willow and hawthorn. Herbaceous species include purple loosestrife, soft rush, creeping bent and meadowsweet.



Figure 20. Wet grassland (GS4) with riparian woodland (WN5) in the distance, east of Ballacolla

The dry meadow and grassy verge habitat forms the western part of ecological network one and is within the LAP boundary in the village. The grassland takes up most of the back gardens of two houses (map1). Connecting the grassland to the rest of the network are hedgerows surrounding the gardens and bounding the sides of an old laneway. The hedgerow continues east across the road to where it links up with the drainage ditch and associated habitats. The houses with the dry grassland (GS2), the hedgerows and drainage ditches all appear on the first edition OS map. The hedgerow on the northern side of the laneway and the hedgerow that connects it and the dry grassland to the rest of the network form the boundary between the townlands of Park in the north and Cool to the south.

Assessment – EN1

The drainage ditch, wet grassland, riparian woodland, dry grassland and hedgerow habitats present in ecological network one (map 2), are of local importance.

The dry meadows and grassy verges and hedgerows are valuable habitats that support several species of insects, small mammals such as shrews, hedgehog and field mice and several bird species. The connection provided by the hedgerows to the wetland habitats (drainage ditch, wet grassland and riparian woodland) outside the LAP area increases the value of the grassland and allows for movement of species between the two areas.

The wet grassland, riparian woodland and the drainage ditch perform a regulatory function as they absorb floodwaters and may have the potential to remove pollutants. They act as a natural attenuation area reducing the risk of flooding elsewhere in the catchment. The wet woodland is a carbon sink, mitigating for climate change. The occurrence of the hedgerows and drainage ditch on the first edition OS maps is also of cultural value to the area.

5.6.3 EN2 Field, hedgerows and woodland to the west of the village

This ecological network is centred on new wildlife park (Figure 11), north of the football pitch to the west of the village. This includes semi-natural grassland (GS2), hedgerows (WL1) and woodland (WS2) habitats (map 1 and 2).



Figure 21. Wildlife Park in Ballacolla with broadleaved woodland (WS2) and semi-natural grassland (GS2).

The recently planted (mixed) broadleaved woodland makes up the main part of this network. There is a mixture of native and non-native broadleaved species planted on the site. Native species include pedunculate oak, Whitebeam, birch, alder, ash and mountain ash, while lime, copper beech, sycamore were among the non-native species. A number of ornamental shrubby species such as cotoneaster, Hebe and the naturalized species Himalayan honeysuckle (*Leycesteria formosa*) have also been planted. The Himalayan honeysuckle most likely has been planted to tie in with the pheasant enclosure in the woodland (Figure 12). The planting density of the trees and their young age has resulted in the development of dry grassland and grassy verge habitat in the under storey. Two side of the wildlife park are bordered by mature hedgerows.



Figure 22. Part of the immature woodland (WS2) that has been cordoned off to rear pheasants

Assessment – EN2

This habitat complex of dry meadows and grassy verges (GS2), hedgerows (WL1) and woodland (WS2) are of local importance to Ballycolla. The newly developed wildlife park adds value to the village by improving biodiversity and by providing a new amenity area to the village.

5.6.4 EN3 Abandoned quarry, hedgerow, an old orchard, exposed calcareous rock, gardens and tree line in Ballycolla.

The third ecological network in Ballycolla is based on a number of hedgerows, an orchard and a disused quarry (Figure 13).

This includes recolonising bare ground (ED3), scattered trees and parkland (WD5), Exposed calcareous rock (ER1), large gardens (BL31), treeline (WL2) and hedgerow (WL1) habitats (map 1 and 2).

The exposed rock is just a cliff face of limestone, and does not appear on the map. The rock has been colonized by ivy, hawthorn, bramble, hart's tongue fern, and elder and red fescue grass. Recolonising species within the quarry include ragwort, creeping thistle, daisy, yarrow, broad leaved dock and creeping buttercup. The invasive species Japanese knotweed was also present (GPS 52° 52'81 N and 007° 26'79 W).

Hedgerows link the quarry to a small orchard (WD5), large gardens (BL31) and treeline (WL2) in the centre of the village.

Assessment – EN3

This network (exposed calcareous rock, recolonising bare ground, old orchard, gardens, treeline and hedgerow) is also of local importance, adding to local biodiversity, providing habitats for many species of plants and animals. While not all of the plant species are native in particular those found in gardens many will provide food (fruit trees and berried shrubs), shelter and nesting sites for birds and nectar for bees and adult butterflies. It is important that the hedgerows in this and the other networks within the village are retained as they link the village to the wider

countryside and it is becoming rare to find hedgerows in the centre of villages, in particular those that have a cultural value or that form townland boundaries.



Figure 23. Recolonising bare ground, exposed calcareous rock in a disused quarry in Ballacolla.
Note: Japanese knotweed can be seen to the right of the photograph.

5.6.5 EN4 Swamp, pond, woodland and hedgerows to the south east of Ballacolla

The fourth ecological network is outside of the LAP boundary but was included because it contained wetland habitats (maps 1 and 2). These were other artificial lakes and ponds (FL8), reed and large sedge swamp (FS1). Immature woodland and hedgerows surround these habitats.

Moor hens were recorded on the pond (Figure 14) during the survey. The reed and large sedge swamp was dominated by reed-canary grass, other species included soft rush, purple loosestrife, flag iris and mint.

The woodland is older than the woodland in the wildlife park and was also planted with a mixture of native and non-native species such as beech, red oak, sweet chestnut, several different maple species and dogwoods. The main native species were alder, birch, ash and oak. The area has been preserved as a wildlife sanctuary by its owner.



Figure 24. Other artificial lakes and pond habitat surround by immature woodland SE of Ballacolla

Assessment – EN4

Wetland habitats are rare and while this network (swamp, pond, hedgerow and woodland) is quite small, relatively isolated and outside of the LAP area it is of importance adding to the biodiversity of Ballycolla. Although man-made it provides habitat for local species as well as for species in transit. This is particularly important in a region where farming is intensive resulting in few semi-natural habitats making it more difficult for species to travel and access new areas.

5.7 *Borris-in-Ossory*

5.7.1 *Introduction*

Four ecological networks were identified in Borris in Ossory. The habitats associated with them and the location of these networks is shown on the following maps.

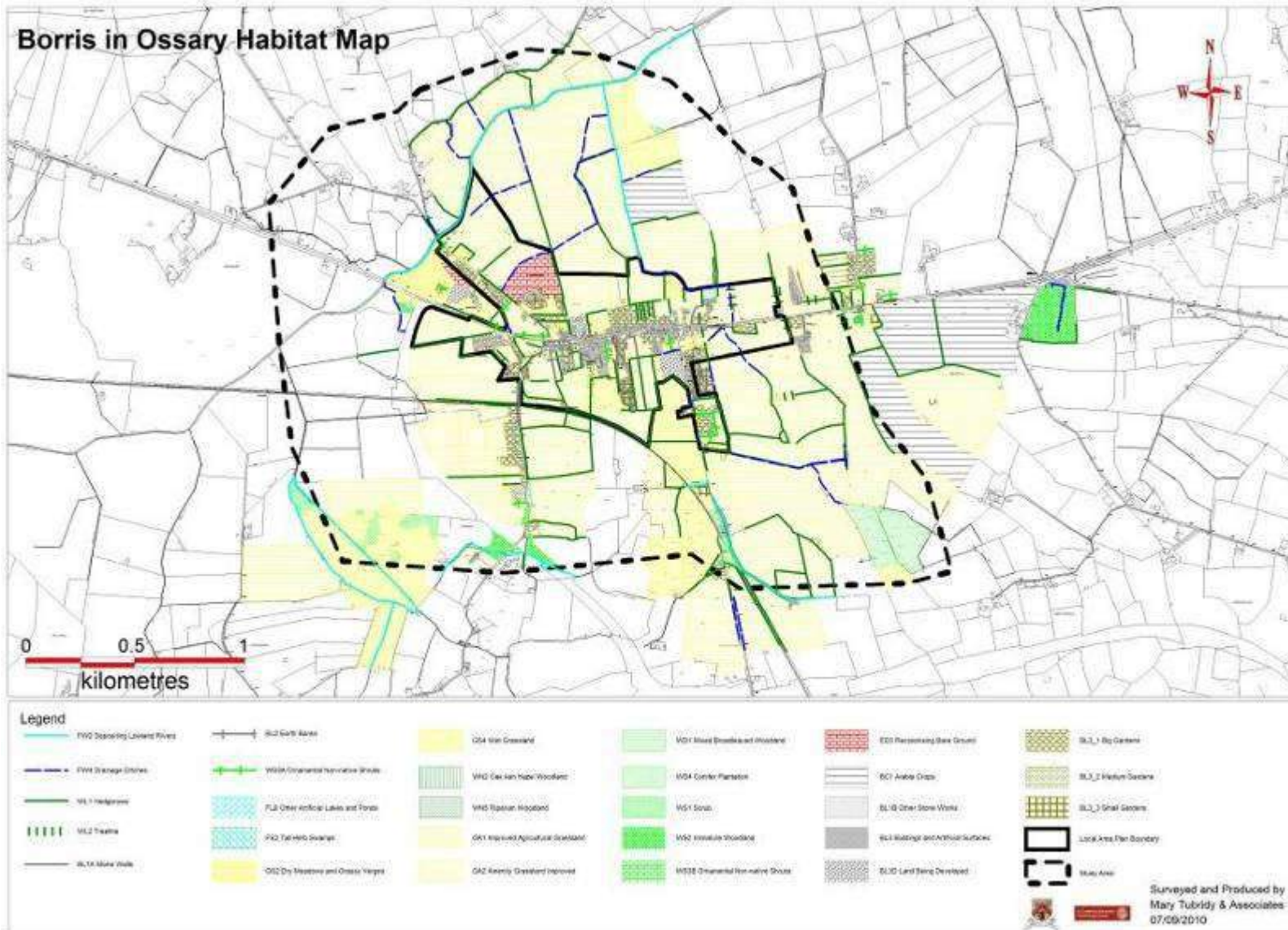


Figure 25. Borris in Ossary Habitat Map

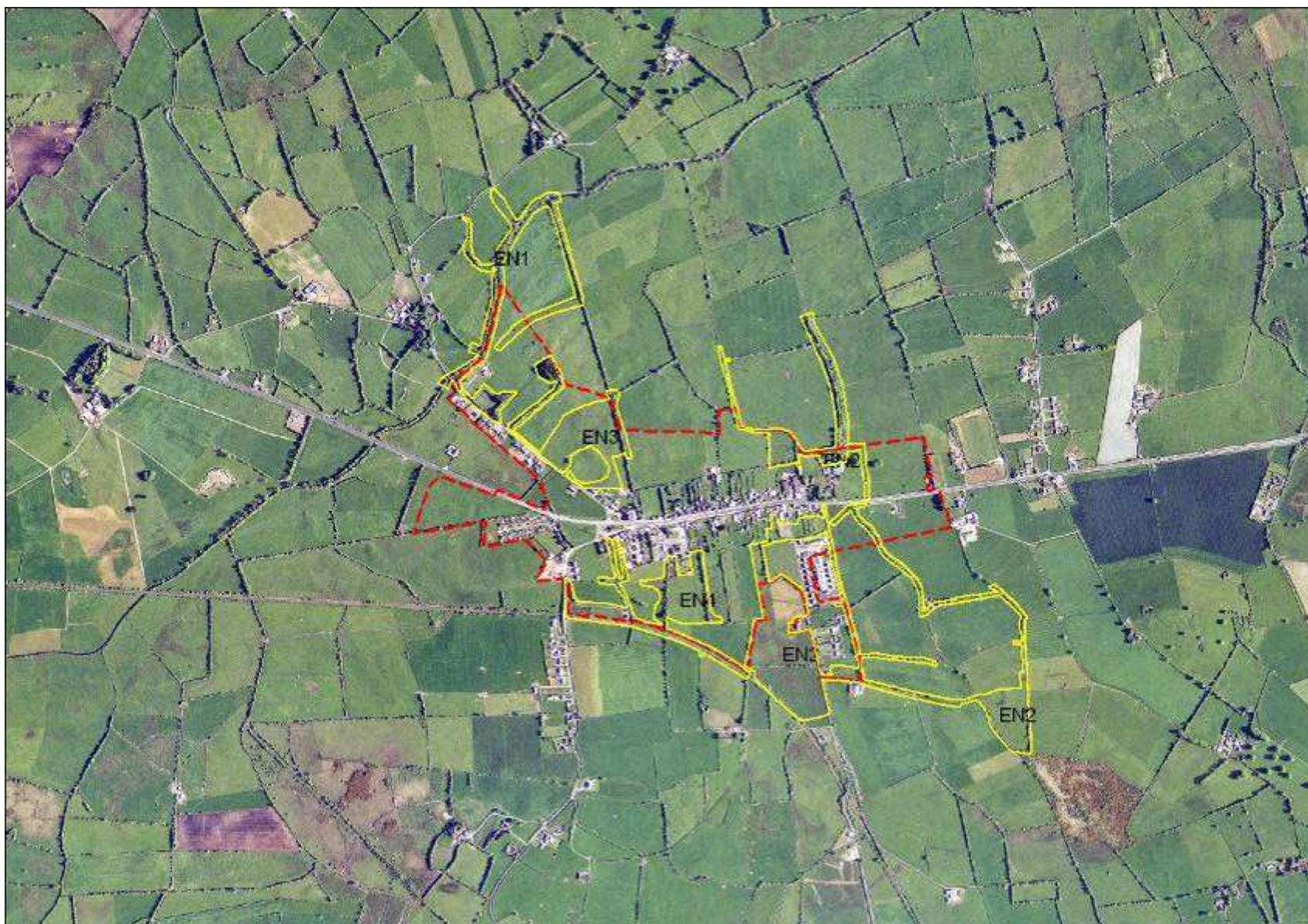


Figure 26. Borris in Ossory ecological networks

5.7.2 EN1 River Nore, stone bridge, associated woodland, semi-natural grassland and hedgerows in Borris-in-Ossory

The principal and most important ecological network in Borris-in-Ossory is associated with the River Nore. It is on the northwest boundary of the LAP (Local Area Plan). The main habitats in this ecological network are depositing lowland rivers (FW2), riparian woodland (WN5), oak-ash-hazel woodland (WN2), hedgerows (WL1) and a stone bridge (BL1A).



Figure 27. The River Nore with hedgerow on the left and riparian woodland on the right.

The core feature of this network is the river, which has water crowfoot, water speedwell, reed canary-grass and fool's watercress growing in it. Floating pondweed, branched bur-reed and common club rush were also present.

Riparian woodland occurs sporadically on the south side of the river and is mainly made up of hawthorn. The hedgerow on the opposite side of the river bank forms a continuous boundary between the river and the adjacent field of improved grassland. Ash is the dominant tree species with hawthorn, bramble and ivy. Both the hedgerow and the riparian woodland can be found on the first edition OS map.

A very narrow strip (~3-4 m wide) of oak-ash-hazel woodland can be found on the Rock Road south of the bridge over the Nore. It is dominated by hazel and hawthorn; other woody species include ash, blackthorn, bramble, dewberry, ivy and alder. The bridge itself is made of natural limestone.

There are two small clumps of Japanese knotweed (GPS 52° 56'56 N and 007° 38'62 W) just south east of the bridge outside the ecological network but within the Lap area. It is growing in a small area of dry meadow and grassy verge habitat with the grounds of a house.



Figure 28. Remains of WN2 next to the road with bramble, hawthorn and dewberry

Assessment – EN1

The River Nore, drainage ditches, riparian woodland, oak-ash-hazel woodland, hedgerows, semi-natural grassland and the stone bridge are of local importance. However, further down river (~6k) just south of Coolrain the Nore becomes part of the Barrow/Nore Special Area of Conservation (SAC) which is of international importance. The links within this ecological network are poor and the habitats are largely gone with improved agricultural grassland the main habitat type.

The river, riparian woodland and the drainage ditches perform a regulatory function as they absorb floodwaters and may have the potential to remove pollutants. They act as a natural attenuation area reducing the risk of flooding elsewhere in the catchment. The amenity value of the river is not developed and this could be exploited to become part of a walking trail linked to other parts of the village. no obvious walks off road were apparent during the survey. Semi-natural woodland such as the oak-ash-hazel woodland provides food, nesting and roosting sites for birds and small mammals.

The dry meadows and grassy verges habitat provides habitat for a Range of small mammals, insect species such as butterfly caterpillars e.g. the larvae of several satyrid species such as meadow brown, ringlet and small heath feed on grasses such as meadow grasses and meadow fescue. Long grass close to water is also important for amphibians providing safe place for them when they emerge from the water.

5.7.3 EN2 Drainage ditch, small stream, spring, woodland, hedgerows and semi-natural grassland

This ecological network is based on drainage ditches (FW4), a calcareous spring (FP1), riparian woodland (WN5), (mixed) broadleaved woodland (WD1), hedgerows (WL1), wet grassland (GS4) and dry meadows and grassy verges (GS2) habitats.

This network can be found on both sides of the Borris-in-Ossory to Dublin road, with some of it outside the Lap boundary, however drainage ditches and hedgerows keep the network linked. The extent of the area of ecological interest is outlined on Map 2 and habitats within it are shown on Map 1.

To the south of the main road the drainage ditch flows for a few hundred meters and then stops and the connection is continued by hedgerows that eventually link up to a spring

The water from the spring flows westward and joins a small stream. At one time part of the stream turned north at Bleakfield house and the rest flowed to the other side of the road, both sections flowed north, joined together and flowed north to the Nore. However, there is no longer a continuous flow and parts of the stream are missing or have been straightened and drained. Several species were recorded growing next to the spring including common reed, branched bur-reed, meadow sweet, soft and hard rushes, willow, silver weed and mint. The hedgerow next to the spring and drainage ditch forms a townland boundary (first edition OS map) and had hawthorn, grey willow, holly, guelder rose, bramble, ivy and gorse growing in it. The sides of the drainage ditch next to the hedgerow supported abundant numbers of early marsh orchids, devils bit scabies, quaking grass and carnation sedge.



Figure 29. Hedgerow and drainage ditch to the west of the spring.

The wet grassland was in a shallow depression and had a very thin layer of peaty soil over marl. Several grasses were recorded including red fescue, quaking grass, cocksfoot, sweet vernal and false oat. Brown sedge, meadowsweet, marsh arrow-grass and great willowherb were also among the species present. A short section of riparian woodland was growing next to the stream.

To the north of the main road a drainage ditch connects to and flows around the north side of a small area of beech dominated (mixed) broadleaved woodland and then flows next to a hedgerow and dry meadows and grassy verge habitat, then through farmland, joining with other drainage ditches that eventually drain into the River Nore. Two hedgerows border an old lane that is featured on the first edition OS map which is connected to the woodland. The most northerly part of the lane is now gone.



Figure 30. Wet grassland (GS4) adjacent to a stream and drainage ditch south of Borris-in-Ossory.

Assessment – EN2

The drainage ditches (FW4), small stream (FW2), a calcareous spring (FP1), riparian woodland (WN5), (mixed) broadleaved woodland (WD1), hedgerows (WL1), wet grassland (GS4) and dry meadows and grassy verges (GS2) habitats are of local importance, with the drainage channels eventually entering the Nore to the north of the village. The spring provides a natural source of water feeding the drainage ditch and stream, while in turn these and the wet grassland help alleviate excess water from the surrounding area.

These habitats contribute to the biodiversity of the area and wetland species such as marsh arrow grass, early marsh orchid and devils bit scabies are becoming less common as their habitat disappears.

5.7.4 EN3 Drainage ditch, recolonising bare ground, semi-natural grassland, conifers and hedgerows.

Ecological network 3 is based on an abandoned building site that is recolonising (ED3) and connected habitats of hedgerow (WL1), drainage ditch (FW4_) and a small copse of conifers (WD4).

The drainage ditch to the north of the building site contains water but the flow is negligible. Reed canary-grass, branched bur-reed, meadow sweet and great willowherb were recorded in the ditch. Ragwort, creeping thistle, soft rush, silver weed and sweet vernal grass were among the species colonizing the remainder of the site.

A hedgerow going north along the road connects the site to a small copse of Sitka spruce, whilst to the south of the recolonising bare ground is an area of dry meadows and grassy verges which has become established in an older part of the site where the houses were finished.



Figure 31. Drainage ditch and recolonising bare ground on abandoned building site in Borris-in-Ossory.

Assessment – EN3

The drainage ditch, hedgerow, semi-natural grassland, recolonising bare ground and small woodland are of local importance. The main part of this network the recolonising bare ground occurs because of the current economic climate which has resulted in many unfinished housing estates. These habitats create links to other habitats within the area such as the Nore river and its associated drainage ditches.

This site has potential to be developed as an amenity area linking it the River Nore and other areas with semi-natural habitats in Borris-in-Ossory to create a walking or cycling route.

5.7.5 EN4 The railway line with associated hedgerows, wet grassland and conifers.

This network includes the hedgerows (WL1) on both sides of the railway track, a small copse of coniferous woodland (WD4) and an area of wet grassland (GS4) north of the track.

Assessment – EN4

The railway line, hedgerows, wet grassland and conifers are of local importance and again add to the overall biodiversity of Borris-in-Ossory.

5.8 Clonaslee

5.8.1 Introduction

Four ecological networks were identified around Clonaslee. Their location and habitats within them are shown on following maps.

EN1 Rivers including drainage ditches, adjacent woodland, scrub, hedgerows and semi-natural grassland in Clonaslee. The principal and most important ecological network in Clonaslee is associated with the Clodiagh River and its tributary the Gorragh. This habitat is of international, national and local ecological interest. The woodland either side of the Clodiagh River south of the village is a Special Protected Area (SPA). The rivers are the main part of the ecological network and join the River Brosna in Co. Offaly which in turn joins the River Shannon (designated site of international biodiversity importance) north of Banagher,

Habitats within the ecological network in the study area (shown on Map 1) include the rivers (FW1), drainage ditches (FW4) oak-ash-hazel woodland (WN2), riparian woodland (WN5), mixed (broadleaved woodland (WD1), mixed broadleaved conifer woodland (WD2), conifer woodland (WD4), scrub (WS1), immature woodland (WS2), dry meadows and grassy verges (GS2), hedgerows (WL1), treeline (WL2) and stone walls (BL1A).

The core feature of this network the eroding upland rivers (FW1) are fast flowing, with stony gravelly beds that support few plant species other than mosses growing on some of the larger rocks and boulders. Marginal plants were also scarce due to the lack of a stable substrate apart from some areas where sand and finer gravel accumulated where wavy bittercress and grasses were observed.

Oak-ash-hazel woodland (WN2) was found growing right to the edges of the two rivers in several places the largest area occurring south of the village (map1). This was dominated by ash with abundant hazel in the under storey. Oak and old mature beeches were interspersed throughout the woodland. Laurel was present in the shrub layer. In the northern part of the network along the Gorragh River, ash, elm, holly hawthorn, bramble and elder were recorded. Bluebells, violet species, wood avens, and nettles were the main herbaceous species. There were lots of crows present and the owner of the wood has recorded foxes, mink, ducks, kingfishers and dippers in the vicinity of the river and wood.

The main species recorded from the (mixed) broadleaved woodland (WD1), included beech, sycamore, ash, hazel and holly. This area is mature in parts and supported a diverse herbaceous layer including male fern, false brome grass, lords and ladies, wood dock, hedge woundwort and herb robert. Occasional plants of Himalayan honeysuckle and cotoneaster species were found.

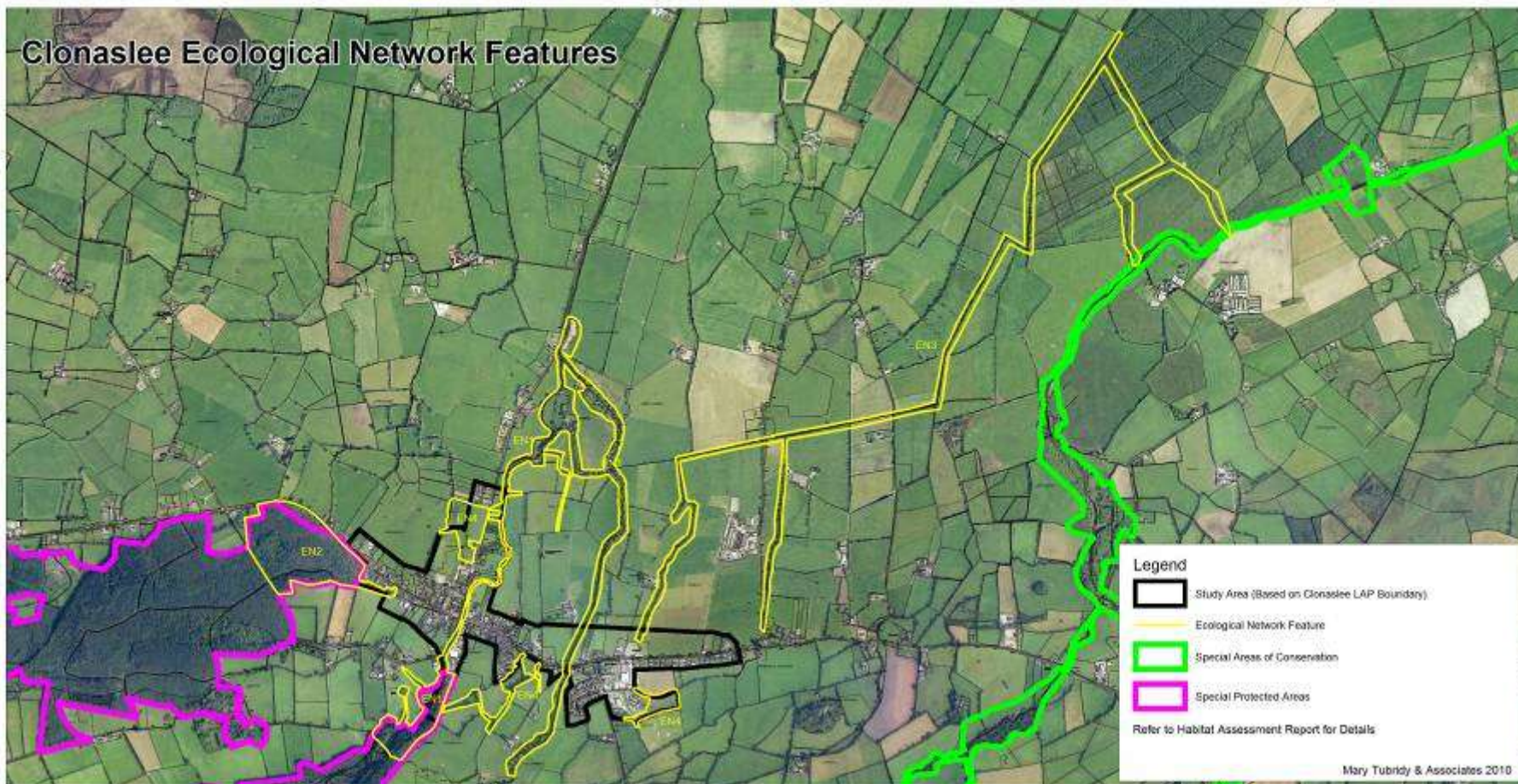


Figure 32. Ecological networks associated with Clonaslee

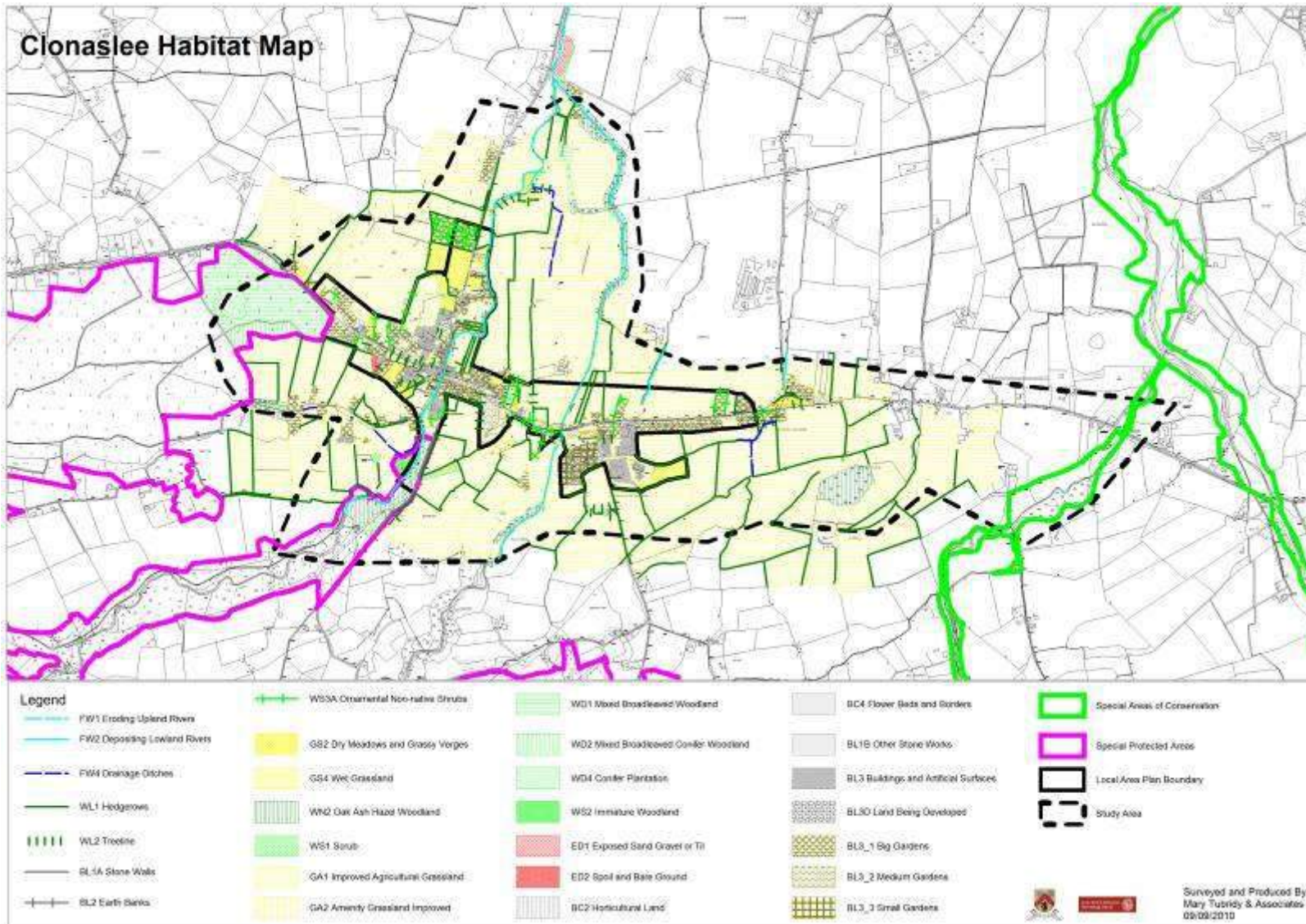


Figure 33. Figure Habitat map covering Clonaslee and environs



Figure 34. Section of the river Clodiagh to the south of Clonaslee.

Riparian woodland (WN5) was found forming narrow bands at intervals along the rivers, one section on between a new housing estate and the river Clodiagh, the river marks the boundary of Ballynakill and Clonaslee townlands and the woodland dates back to at least the first edition OS maps.

Dry meadows and grassy verge (GS2) habitat was recorded next to the Clodiagh River north of the housing estate in fields that were to be developed and are now abandoned. Hedgerows are also a feature of this ecological network (Map1 and map 2) occurring to the south and north of the village and connected to both rivers. To the south of the village hedgerow and a treeline connect scrub growing on or near the old Killyann burial grounds (1st edition OS map) to the west of Clodiagh. Hazel, ash, hawthorn were the main scrub species.

Other important features of this ecological network include drainage ditches (FW4), mixed conifer broadleaved woodland (WD2), immature woodland (WS2) and a very small area of dry calcareous and neutral grassland growing on a roadside bank adjacent to woodland (TN 1 Figure X). More than 40 species were recorded from this species rich patch of grassland including primroses, wood sanicle, quaking grass, violet species, wild strawberry, devils bit scabies, self-heal, bird's foot trefoil, knapweed, glaucous sedge and yarrow. Moss cover was good and seedling regeneration of oak, ash, downy birch and beech was noted.

Assessment – EN1

Part of the habitat complex of the Clodiagh and Gorragh Rivers in Clonaslee (FW1, map 2)), and associated woodland habitats are within the Slieve Blooms SPA designated site. This is one of the 6 main sites in Ireland designated for the conservation of hen harriers which are protected under EU law.

The Clodiagh River and adjoining woodlands south of the village are also an important amenity area and form part of the Brittas forest walk and the Slieve Bloom National Waymarked Way (Figure X and fig X).



Figure 35. Ash and hazel growing next to the Clodiagh River in Clonaslee.

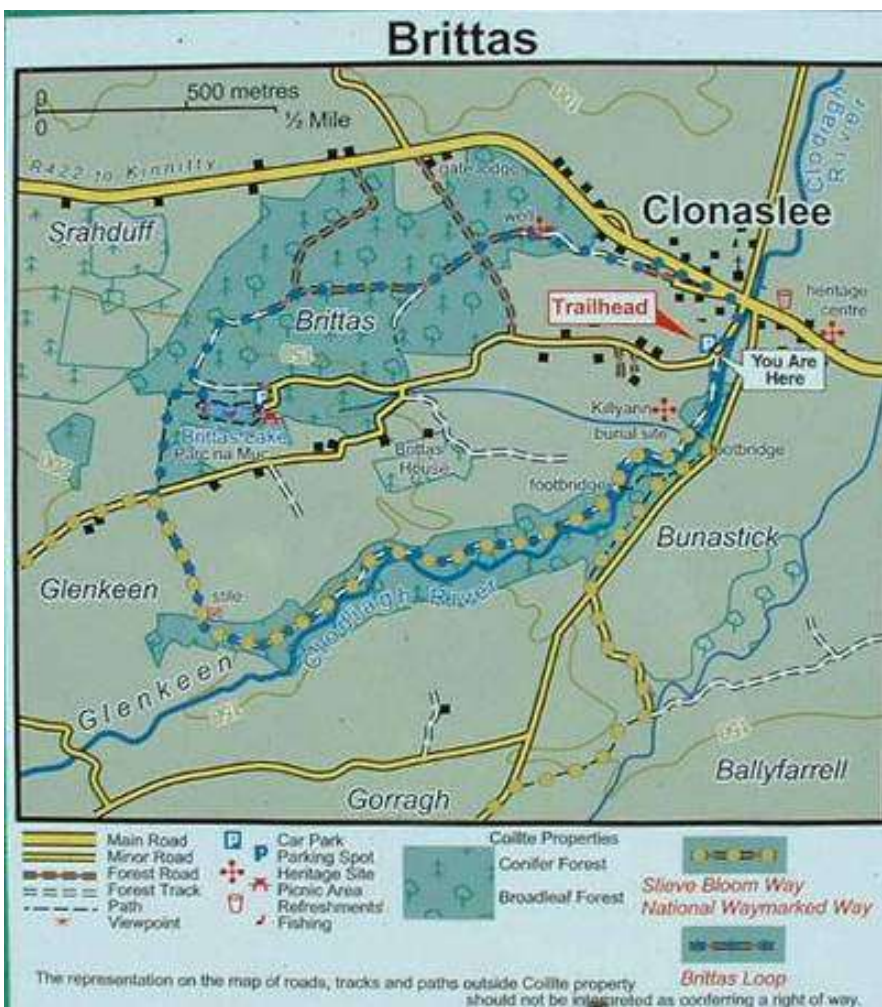


Figure 36. Map of Brittas Forest Walk in Clonaslee



Figure 37. Species rich grassland on a steep roadside bank bordering woodland south of Clonaslee.

5.8.2 EN2 Part of Curragh wood to the west and hedgerow along the path

This ecological network dominated by (mixed) broadleaved woodland (WD1), mixed broadleaved conifer woodland (WD2), conifer plantation (WD4) and hedgerows (WL1) is located to the west of the village. The extent of the area of ecological interest is outlined on Map 2 and habitats within it are shown on Map 1. All of this wooded area is an SPA (Special Protected Area) and extends beyond the study area.

In places the (mixed) broadleaved woodland (WD1) is mature and dominated by beech. In these areas the woodland tends to be open and a scrub layer dominated by bramble occurs. In other parts of the woodland on the south side of the path (going west from the village) natural regeneration is prolific with ash, hazel, holly and rowan growing beneath high and very mature Scots pine and the occasional Norway spruce. The topography varies with the ground gently sloping to rises steeply to the south. Bracken growth is dense in places while in others great woodrush and or bramble form continuous cover.

On the northern side of the path the ground is lower and the trees growth is dense with trees varying in height from 10 -15 m high. Peacock butterflies were feeding on the garden species *Lamium galeobdolon* ssp. *argentatum* and nettles that were growing near the path.



Figure 38. Mature open (mixed) broadleaved woodland (WD1) dominated by beech with bramble

Further west along the path the age of the wood declines and the trees are closer together, lower and dominated by broadleaves. The path comes to a crossroads and north of this is a stand of mature conifers. Another section dominated by conifers such as silver fir, Scots pine and Norway spruce occurs next to the road.

The hedgerow at the start of the path and along the perimeter of the conifer wood adjacent to the road have been included in this network.



Figure 39. Younger woodland dominated by broadleaved species west of the village.

Assessment – EN2

This habitat complex of and woodland (WD1, WD2 and WD4) hedgerows (WL1) are of international, national and local importance. Like the first ecological network these woods are part of the Slieve Bloom designated SPA (Special Protected Area) in order to protect the endangered hen harrier. This woodland is also part of the Brittas forest walk and Slieve Bloom Waymarked Way and is an important amenity locally and nationally bring tourism to the area.



Figure 40. Conifer plantation next to the road with silver fir and cones.

5.8.3 EN3 Drainage ditches connecting to the Barrow River

Only a small part of this ecological network made up of drainage ditches is within the LAP area. It has not been surveyed but it is has been included as the drainage network is connected to the River Barrow SAC which is of international importance.

Assessment – EN3

This ecological network of drainage ditches is connected to the river Barrow and form part of its drainage system. The River Barrow is of which is of international importance (SAC), and the drainage ditches carry water to it from a large catchment area and in doing so remove a large volume of water from the surrounding farmland, thereby increasing its value and use.

5.8.4 EN4 Semi-natural grassland, woodland, scrub, hedgerows and treeline

Semi-natural grassland, scrub and hedgerows make up the final ecological network in Clonaslee. This network is in three sections one to the north of the village, west of the Clodiagh, the second one is between the Clodiagh and Gorrageh while the third is east of the Gorrageh adjacent to the school. The habitats include wet grassland (GS4) and dry meadows and grassy verges (GS2) scrub (WS1 and hedgerows (WL1).

Dry meadows and grassy verge habitats occur in all three sections of ecological network four, the most extensive area occurring in the north of the village above the GAA grounds. It is associated with hedgerows and a small area of blackthorn dominated scrub. Holly and bramble were also recorded. The hedgerows were dominated by hawthorn but also contained bramble, ivy, hazel, alder, elder, sycamore, crab apple and blackthorn.



Figure 41. *Semi-natural grassland (GS2) and hedgerow in EN4 north-west of the village.*

Wet grassland occurred in the second part of EN4 and was the only area in Clonaslee with wet grassland habitat (Figure 42). It was in a slight depression and dominated by soft rush, ragwort and common thistle. A small copse of (mixed) broad leaved trees extending into a tree line was associated with the wet grassland. Across the road from the tree line, dry meadow and grassy verge habitat had established following demolition of the house. Buddleia scrub was spreading and several species of butterflies were recorded including peacock, red admiral, small white, speckled wood and tortoiseshell.



Figure 42. Wet grassland (GS4) to east of housing estate in the south east of Clonaslee.

The final part of this network was adjacent to the secondary school to the east of the village. This consisted of dry meadows and grassy verge habitat and adjacent hedgerow.

Assessment – EN4

This ecological network is of local importance, increasing diversity within the village. The wet grassland habitat is the only wet grassland within the LAP area. Both the wet grassland and the dry meadows and grassy verge habitat are habitat required by the hen harrier, providing habitat for small mammals, and several invertebrate species. The dry meadows and grassy verge habitat with the encroaching buddleia supports at least five species of butterfly, while the grassland to the rear and side of the school in conjunction with the hedgerow would make a valuable on site area for ecological studies. Some of this grassland should be retained for this purpose in addition to supporting wildlife.



Figure 43. Peacock and tortoiseshell butterflies on buddleia scrub in a derelict site
Note this site was created following demolition of dwelling house, now dominated by dry meadows and grassy verge habitat in the second section of EN4.

5.9 Durrow

5.9.1 Introduction

Two ecological networks were located around Durrow. Their habitats and extent are shown on following maps (Figs X and X).

5.9.2 EN1 River Erkina, and associated habitats at Durrow

The principal and most important ecological network in Durrow is the Erkina River and associated habitats. This habitat is of international and national ecological interest (Special Area of Conservation (SAC) and Natural Heritage Area (NHA) respectively). The extent of the area of ecological interest is outlined on Figure 46 and habitats within it are shown on Figure 45.

The river and adjacent alluvial woodland constitute the main part of the ecological network. The Erkina River joins the River Nore a designated site of international biodiversity importance (cSAC no. 2162), just east of the town.



Figure 44. The Erkina River (FW2) with wet willow-alder-ash woodland (WN6) in the background.

Habitats within the ecological network in the study area (shown on Map 1) include the river (FW2), wet-willow-alder-ash woodland (WN6), riparian woodland (WN5), oak-ash-hazel woodland (WN2), (mixed) broadleaved woodland (WD1), conifer plantation (WD4), scattered trees and parkland (WD5), reed and large sedge swamp (FS1), scrub (WS1), exposed sand, gravel and till (ED1), recolonising bare ground ED3, dry meadows and grassy verges (GS2), wet grassland (GS4), flower beds and borders (BC4), hedgerows (WL1), stonewalls (BL1A), other stone works (BL1B) and treelines (WL2).

The core feature of this network the river, supports several plant species including yellow iris, common club rush, water cress, water starwort, common reedmace, fool's watercress, and crowfoot sp. Beneath the old stone bridge over the river were a number of species that thrive in damp and shady sites including maidenhair spleenwort, lichens (*Lepraria* sp.) and liverworts.

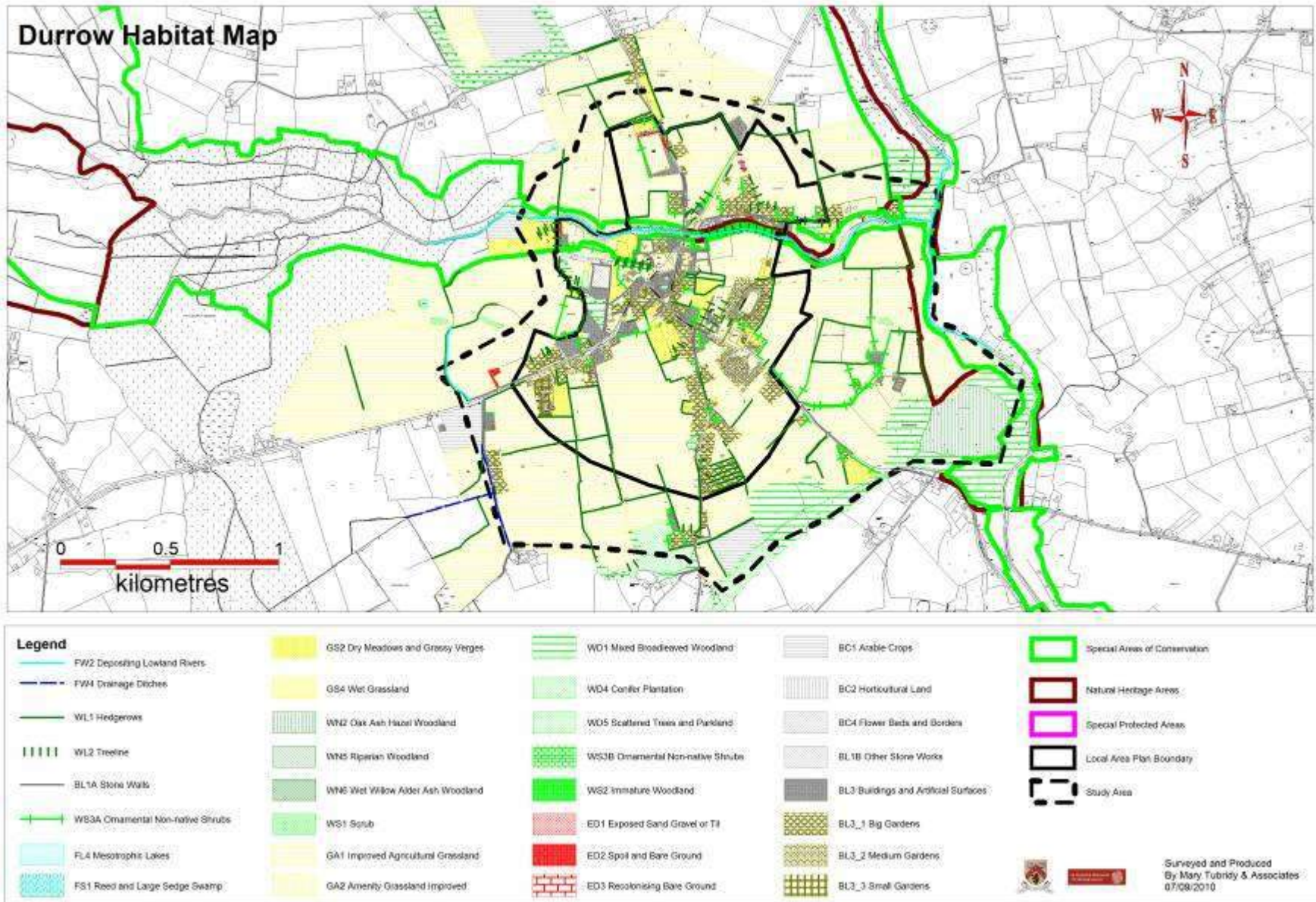


Figure 45. Durrow Habitat Map

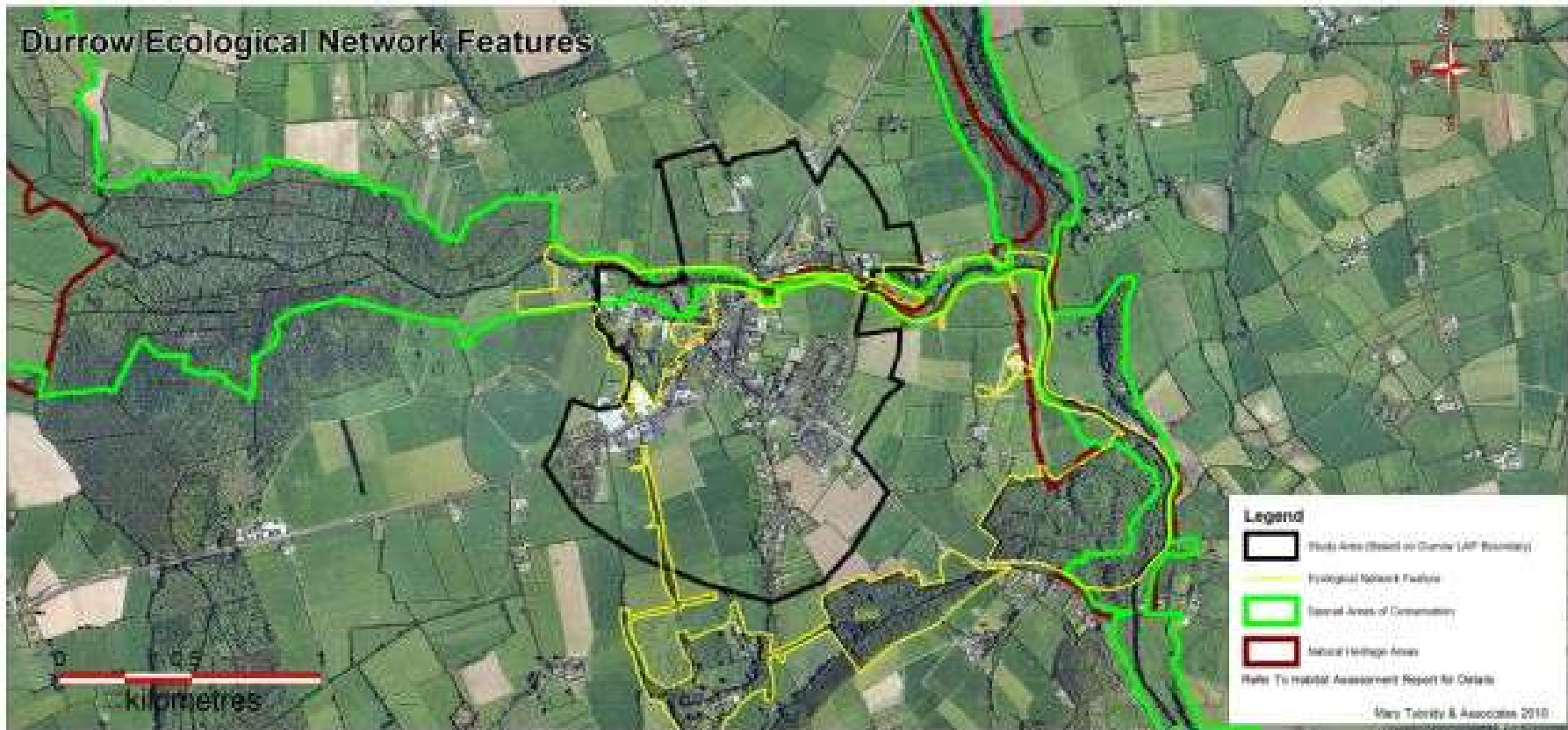


Figure 46. Durrow Ecological Features



Figure 47. The Old Stone Bridge dating from 1788 over the Erkina River in Durrow



Figure 48. Underside of the Old Stone Bridge (BL1B) supporting ferns, lichens, liverworts and possibly bats.

Reed and large sedge swamp (FS1) was found intermittently along the sides of the river and included branched burr weed, iris, meadowsweet, common reed, goat willow and common valerian.



Figure 49. Reed and large sedge swamp (FS1) dominated by common reed at the side of the Erkina River
Location: East of the Old Stone Bridge in Durrow.

Wet-willow-alder-ash woodland (WN6) and riparian woodland (WN5) can be found west of the Old Stone Bridge. The wet willow-alder-ash woodland is more abundant. This Coillte managed alluvial woodland is part of the River Barrow Nore SAC (site no. 002162) and is regarded as one of the main alluvial woodland sites in Ireland and contains some very old trees. The main tree species include alder, ash, hawthorn, crack and grey willow and elder. Over thirty different herbaceous were recorded from a small area west near the bridge that included marsh ragwort, bittersweet, brooklime, soft rush, mint, wild angelica, and nettles.



Figure 50. *Wet willow-alder-ash woodland (WN6) next to the Erkina River in Durrow.*

Parts of the Erkina flows next to the grounds of Castle Durrow and a number of habitats within the grounds have been included in the network. These include (mixed) broadleaved woodland (WD1), scattered trees and parkland (WD5), conifer woodland (WD4), treelines (WL2), hedgerows and dry meadows and grassy verge habitats.

Many of the trees within the castle grounds are mature; these include those growing either side of the main avenue where beech, lime, ash and white poplar were recorded. Other mature trees identified in the castle grounds during the survey included old sycamore, horse chestnut, oak and Lawson's cypress.

A large natural stone (BL1A) walled garden can be found in the castle grounds which is in the process of being restored and developed. A small orchard with apples and medlar, kitchen and medicinal herbs, vegetable in tunnels and beds containing flowers for the house were among the plants growing in the garden dominated by flower beds and borders habitat.

Dry meadows and grass verge habitat (GS2) was also recorded within the castle grounds and was dominated by broadleaved docks. Other species included cocksfoot, scutch grass, yarrow, creeping thistle and hogweed.

Blackbirds, thrushes, robin, chaffinch, swallows and numerous insect species were evident in the walled garden and surrounding area.

Other important features of this ecological network include a large area of old (mixed) broadleaved woodland and a smaller area of mature oak-ash-hazel woodland adjacent to the River Nore to the south east of Durrow (map1). Nettle-leaved bell flower was recorded (52° 50 44 N and 007° 22 56 W) near the western edge of the oak-ash-hazel woodland in association with hazel, common figwort, raspberry and bramble. Other species in this woodland included downy birch, ash, honeysuckle, goat willow, hawthorn, oak, and ivy.



Figure 51. Nettle-leaved bell flower in woods on the outskirts of Durrow.

A large area (~10 x 10 m) of dog's mercury (52° 50 50 N and 007° 22 40 W) was recorded nearby in mixed broadleaved woodland; enchanters nightshade, bramble, hazel and beech were also identified. Dog's mercury is rare in Ireland and it is possible that this is a garden escape.

There was one small area of wet grassland (GS4) adjacent to the woodland (map1) dominated by meadowsweet and rosebay willowherb. This was the only wet grassland habitat recorded in the study area.

Other habitats in this network include an old quarry now covered in scrub (WS1), a more recently quarry (ED1) part of which was recolonising (ED3). These were surrounded by agricultural grassland not far from the river Nore.

Other stone works including Castle Durrow and ruins of a building beside the river east of the Old Stone Bridge.



Figure 52. Part of the walled garden (BL1A) containing the flower beds and borders (BC4) habitat.

Assessment – EN1

The habitat complex connected with the Erkina River at Durrow (FW2)), reed and large sedge swamp (FS1) and wet woodland (WN6) is of national and international ecological value, as it contains an example of an EU Annex I habitat type (alluvial woodland). The oak-ash-hazel woodland (WN2), scrub (WS1), hedgerows, (WL1), treelines (WL2), wet grassland (GS4), dry grassland (GS2), stonewalls (BL1A), stone ruins (BL1B), flower beds and borders (BC4), exposed sand, gravel and till (ED1) and recolonising bare ground (ED3) are of high local ecological value and act as corridors linked directly to the nationally and internationally important habitat complex along the river.

The ecological network provides several services to society. It is an important reservoir of biodiversity, linked functionally to an internationally important cSAC; the River Nore. It contains a habitat of international significance, wet woodland, listed in the Habitats Directive. The wetlands around the river perform a regulatory function as they absorb floodwaters and may have the potential to remove pollutants. They act as a natural attenuation area reducing the risk of flooding elsewhere in the catchment. The wet woodland is a carbon sink, mitigating for climate change. This area is also an outdoor amenity where the public use the towpaths for walking or other recreational pursuits such as fishing.

The biodiversity of this area adds value to features of cultural importance such as stone buildings, walls and bridges and features associated with a designed landscape. Any proposals for development which could impact on EU listed habitats or species found in the River Nore cSAC downstream will require to at least be screened for Appropriate Assessment. This particularly includes any impacts on water quality, habitats within the river or wetland habitats along the river margin.

Future development should seek to improve the quality of “buffer” areas by restoring riparian habitats within 25 m of the river. This could involve the establishment of riparian woodland or wetlands.

5.9.3 EN2 Woodland, semi-natural grassland, hedgerows south of Durrow

The focus of this ecological network is the woodlands south of the Durrow (Derry Wood) which are linked to the LAP area by a continuum of hedgerows. Dry meadows and grassy verge habitat (GS2) and tree lines are included in the network. The extent of the area of ecological interest is outlined on Map 2 and habitats within it are shown on Map 1.

This woodland is on sloping site and is dominated by broadleaved woodland (mixed, WD1) which was originally planted with beech trees. It also contains natural populations of oak, ash holly and hazel, but beech is still the dominant species of tree. Natural regeneration of the tree and shrub species occurs. The invasive species laurel was also recorded in the wood. Herbaceous species include several ferns such as hard fern, male fern and soft shield fern. Bluebell, cow parsley, violets, primroses, wood avens, wood sanicle, wood sedge, yellow archangel and wood rush were among the flowering species recorded.



Figure 53. Silver edged form of yellow archangel, a garden escape on woodland floor in Derrywood.

Badger setts were also noted in the woodland. At the western end of Derry wood merges a path with hedgerows on either side connects it to scattered trees and parkland and treeline habitats that are included in this network. The scattered tree and parkland (WD5) and treelines (WL2) can be found in the grounds of Clonageera House along with some (mixed) broadleaved woodland. These are connected to the LAP area via a series of hedgerows (WL1), some of which bound a laneway near the town.

Other habitats within this network include semi-natural grassland (GS2), stone walls (BL1A),



Figure 54. Laneway bounded by hedgerows (WL1) at the western end of Derrywood, Durrow.

Assessment – EN2

This habitat complex of (mixed) broadleaved woodland (WD1), scattered trees and parkland (WD5) treelines (WL2), hedgerows (WL1), stonewalls (BL1A) and dry meadows and grassy verge (GS2) habitats in Durrow are of local and county importance. At one time the laneway from the town went all the way to Clonageera House (1st edition OS map). This is no longer the case and the laneway stops at an entrance to a field. Derry wood is used as an amenity by locals for walking but they must continue their walk along the road.

The majority of the of the mapped hedgerows in this network appear on the first edition OS maps and should be retained as they contribute to the local biodiversity of the area.

5.10 Emo

5.10.1 Introduction

Three ecological networks were identified around Emo. Their location and associated habitats are shown on the following maps.

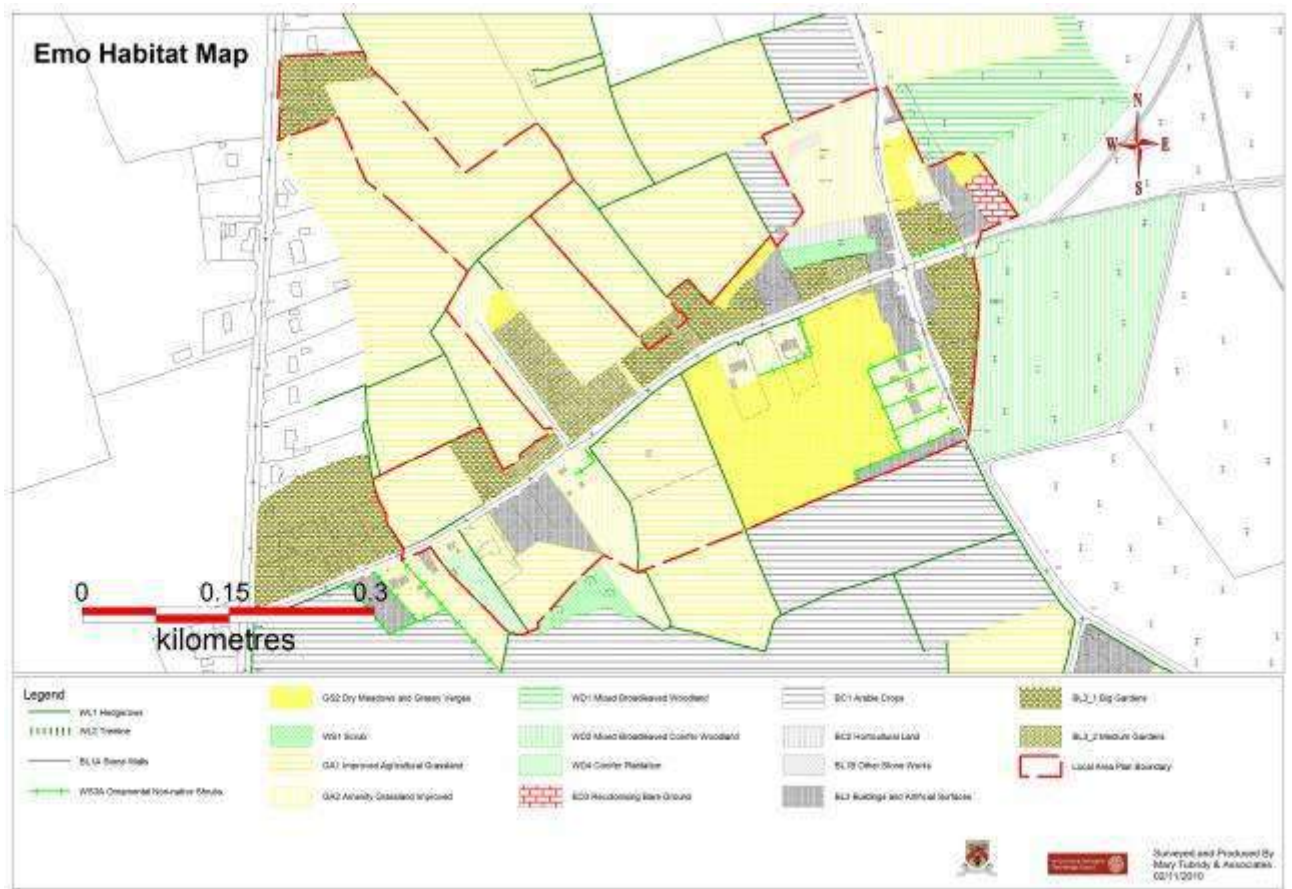


Figure 55. Emo Habitat Map



Figure 56. Emo Ecological Networks

5.10.2 EN1 Scrub, grassland, hedgerows, stone works, cultivated land, and gardens.

The main ecological network in Emo is associated with scrub (WS1), hedgerows (WL1), dry meadows and grassy verges (GS2), stone works (BL1B), horticultural land (BC2), medium gardens (BL3 2) and amenity grassland. The scrub habitat and the horticultural land both occur in the gardens of adjacent properties. The scrub is dense and dominated by blackthorn and brambles. Bracken was also present.



Figure 57. Blackthorn scrub (WS1) in back garden at Emo.

Assessment – EN1

The habitats in this ecological network of scrub (WS1), hedgerows (WL1), dry meadows and grassy verges (GS2), other stone works (BL1B), horticultural land (BC2) and amenity grassland (GA2) are of local importance. These habitats connect to other semi-natural habitats to the north and east of Emo. They are reservoirs for species which are important for pollination and pest control.

5.10.3 EN2 Scrub, woodland, semi-natural grassland and hedgerows

This network consists of scrub (WS1), dry meadows and grassy verges (GS2), conifer woodland (WD4) and hedgerows (WL1).

Assessment – EN2

The second ecological network in Emo made up of scrub (WS1), dry meadows and grassy verges (GS2), conifer woodland (WD4) and hedgerows (WL1) is of local importance. They support the habitats in ecological network 1 but are not directly linked to them or other semi-natural habitats.

5.10.4 EN3 Woodland, semi-natural grassland, hedgerows, disturbed ground, other stone works and gardens.

The third network in Emo consists of (mixed) broadleaved woodland (WD1), mixed broadleaved conifer woodland (WD2), dry meadows and grassy verges (GS2), recolonising bare ground (ED3), other stone works (BL1B) and large gardens BL3 1).

Most of this ecological network was once a nursery and garden centre. The former growing areas are now either recolonising bare ground or dry meadows and grassy verges. There is an old stone building on the ground attached to the dwelling house with its large garden containing mature trees and ornamental shrubs.

Assessment – EN3

The habitats of (mixed) broadleaved woodland, mixed broadleaved conifer woodland (WD2), dry meadows and grassy verges (GS2), recolonising bare ground (ED3), other stone works (BL1B) and large gardens (BL3 1) are of local importance. The adjacent woodland habitats are part of Emo Court which is a proposed national heritage area (pNHA).

5.11 Killenard

5.11.1 Introduction

Three ecological networks were identified around Killenard. Their location and associated habitats are shown on the following maps.

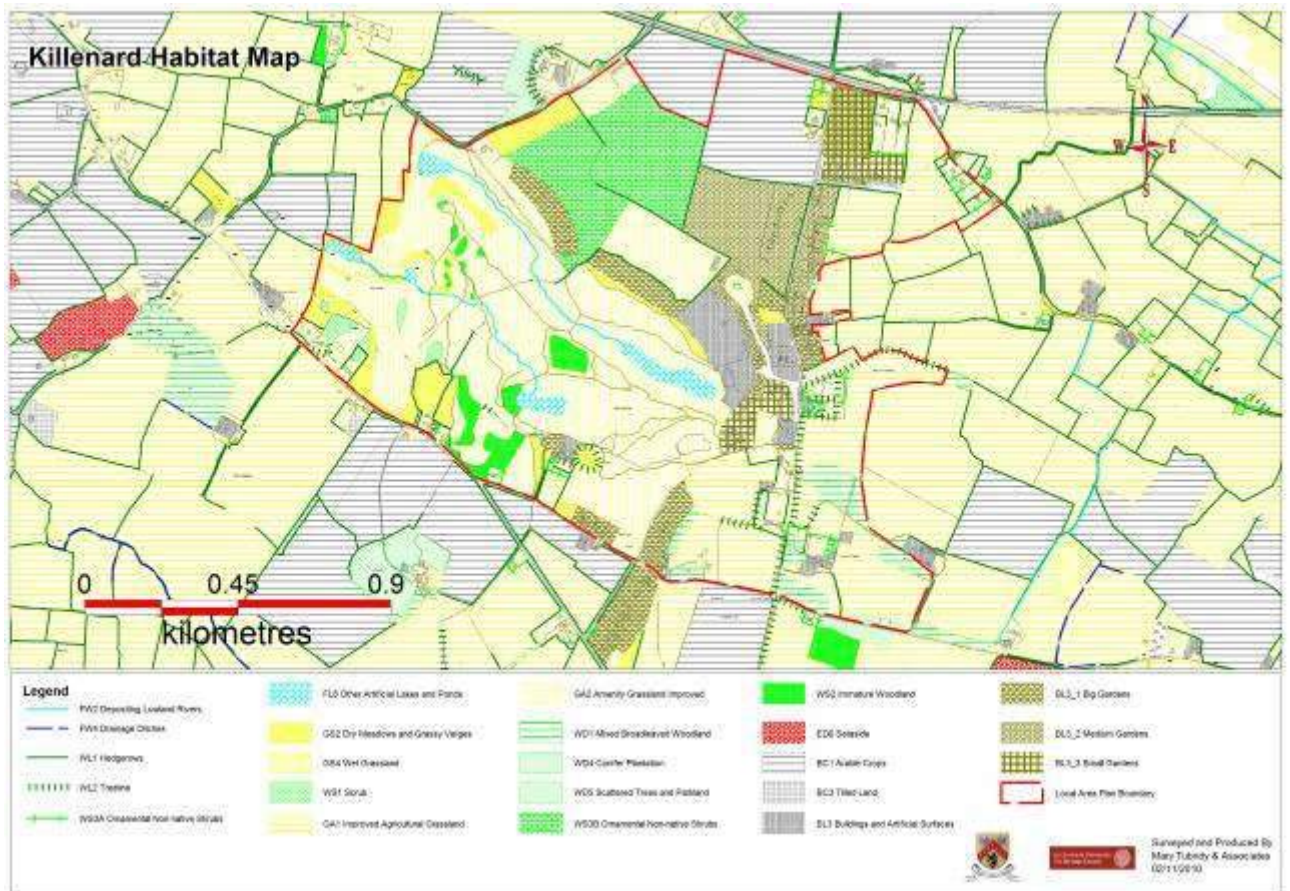


Figure 58. Killenard Habitat Map



Figure 59. Killenard Ecological Networks

5.11.2 EN1 Rivers, drainage ditches, woodland, semi-natural grassland, stone features hedgerows, treelines and ornamental non-native shrubs.

The most important ecological network in Killenard is associated with a small stream (FW2) and a nearby drainage ditch (FW4), (mixed) broadleaved woodland (WD1, fig X), scattered trees and parkland (WD5), immature woodland (WS2), wet grassland (GS4), hedgerows (WL1), treelines (WL2), stone walls (BL1A) , other stone works (BL1B and ornamental shrubby (WS3B).



Figure 60. Mixed broadleaved woodland on the grounds of Mount St. Anne's at Killenard

Assessment – EN1

The habitats in this ecological network of depositing lowland rivers (FW2), drainage ditches (FW4), (mixed) broadleaved woodland (WD1), scattered trees and parkland (WD5), immature woodland (WS2), hedgerows (WL1), treelines (WL2), stone wall (BL1A), other stone works (BL1B) and ornamental shrubs (GA2) are of local importance. The rivers and wetlands provide for flood attenuation. Mature trees and woodland, along with hedgerows and the associated wetland habitats (FW2, FW4 and GS4) provide essential roosting, nesting and feeding sites for birds, bats, small mammals and numerous insects in what is largely an agricultural dominated landscape, with little cover of semi-natural habitats.

5.11.3 EN2 The golf course, woodland, hedgerows, stone walls and other stone works.

This ecological network centres on Killenard Golf Course and includes the following habitats; depositing lowland rivers (FW2), artificial lakes and ponds (FL8), (mixed) broadleaved woodland (WD1), scrub (WS1), immature woodland (WS2), dry meadows and grassy verges (GS2), hedgerows (WL1), treelines (WL2), stone walls (BL1A) , other stone works (BL1B) and ornamental shrubs (WS3).

Assessment – EN2

The depositing lowland rivers (FW2), artificial lakes and ponds (FL8), (mixed) broadleaved woodland (WD1), scrub (WS1), immature woodland (WS2), dry meadows and grassy verges (GS2), hedgerows (WL1), treelines (WL2), stone walls (BL1A) , other stone works (BL1B) and ornamental shrubs (WS3) habitats in the ecological network are of local interest. These provide important amenities in the golf course.

5.11.4 EN3 Woodland, hedgerows and gardens

A small area of (mixed) broadleaved woodland (WD1), hedgerows (WL1) and large gardens (BL3 1).

Assessment – EN3

The woodland (WD1), hedgerows (WL1) and gardens (BL3 1) of this ecological network are of local importance. They act as corridors to connect biodiversity in Killenard village to the wider countryside.

5.12 Killeshin

5.12.1 Introduction

Two ecological networks were identified around Killeshin. The following maps indicate their location and associated habitats.

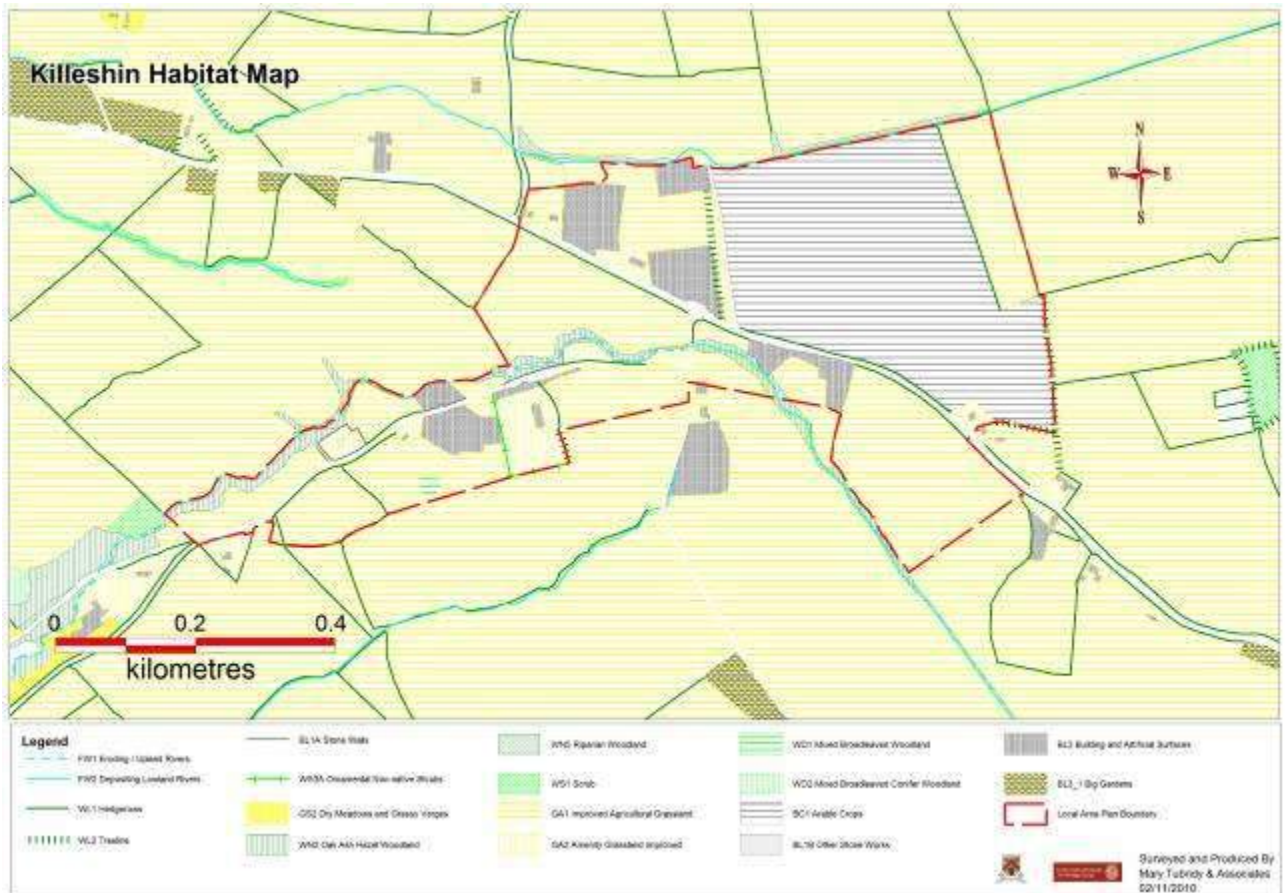


Figure 61. Killeshin Habitat Map



Figure 62. Killeshin Ecological Features

5.12.2 EN1 Tributary of the Fushoge River and associated woodland, scrub, grassland, hedgerows and stone features.

The most important ecological network in Killeshin is associated with the Fushoge River, which is within the Barrow/Nore Special Area of Conservation (SAC).

The habitats in the ecological network are eroding upland rivers (FW1 Figure X), depositing lowland rivers (FW2), oak-ash-hazel woodland (WN1), riparian woodland (WN5), scrub (WS1), Hedgerows, stone wall (BL1A), other stone works (BL1B) and amenity grassland (GA2).



Figure 63. Waterfall and pool on the River Fushoge at Killeshin (FW1)

Assessment – EN1

The habitats in this ecological network of eroding upland rivers (FW1), depositing lowland rivers (FW2), oak-ash-hazel woodland (WN1), riparian woodland (WN5), scrub (WS1), Hedgerows, stone wall (BL1A), other stone works (BL1B) and amenity grassland (GA2) are of international importance, as the river is a tributary of the Fushoge River that is part of the Barrow/Nore SAC.

The river is also a local amenity while the old graveyard and ruins with its Romanesque arch are linked to the historic culture of the area.

5.12.3 EN2 Tributary of the Fushoge River and associated woodland, hedgerows and treelines.

The habitats in this network include depositing lowland rivers (FW2 Figure X), riparian woodland (WN5), hedgerows (WL1) and treelines (WL2).



Figure 64. Tributary of Fushoge at Killeshin

Assessment – EN2

The habitats in this ecological network of depositing lowland rivers (FW2), riparian woodland (WN5), hedgerows (WL1) and treelines (WL2) are of international importance, as the river is a tributary of the Fushoge River that is part of the Barrow/Nore SAC. It is also of local importance as semi-natural habitats are rare in this agricultural dominated landscape.

5.13 Mountrath

5.13.1 Introduction

Five ecological networks were identified around Mountrath. Their habitats and location are shown on the following maps.

5.13.2 EN1 The Mountrath River and associated habitats

The principal and most important ecological network in Mountrath is associated with the Mountrath River. This habitat is of international ecological interest (Special Area of Conservation (SAC)). The extent of the area of ecological interest is outlined on Map 2 and habitats within it are shown on Map 1.

The river forms the main part of the ecological network and is a tributary of the River Nore a designated site of international biodiversity importance (cSAC no. 2162).

Several clumps of the invasive species Japanese knotweed (*Reynoutria japonica*) were found within the ecological network (GPS 53° 00' 11N and 007° 28' 58. 49W), growing in dry meadow and grassy verge (GS2) habitat in a back garden near the river.

Habitats within the ecological network in the study area (shown on Map 1) include the river (FW2), drainage ditches (FW4), narrow strips of reed and large sedge swamp (FS1) that grow intermittently along the sides of the river , riparian woodland (WN5), (mixed) broadleaved woodland (WD1), conifer plantation (WD4), scrub (WS1), ornamental non-native shrub (WS3B), wet grassland (GS4), dry meadows and grassy verges (GS2), immature woodland (WS2), hedgerows (WL1), treelines (WL2), recolonising bare ground (ED3), large gardens (BL31), stone walls (BL1A) and other stone buildings (BL1B).

The Mountrath River and associated wetland habitats are the central features of this network.



Figure 65. The Mountrath (White Horse) River (FW2) in Mountrath with reed and large sedge swamp (FS1) Also note: and stone wall (BL1A) colonised with bramble, ivy and ivy-leaved toadflax.

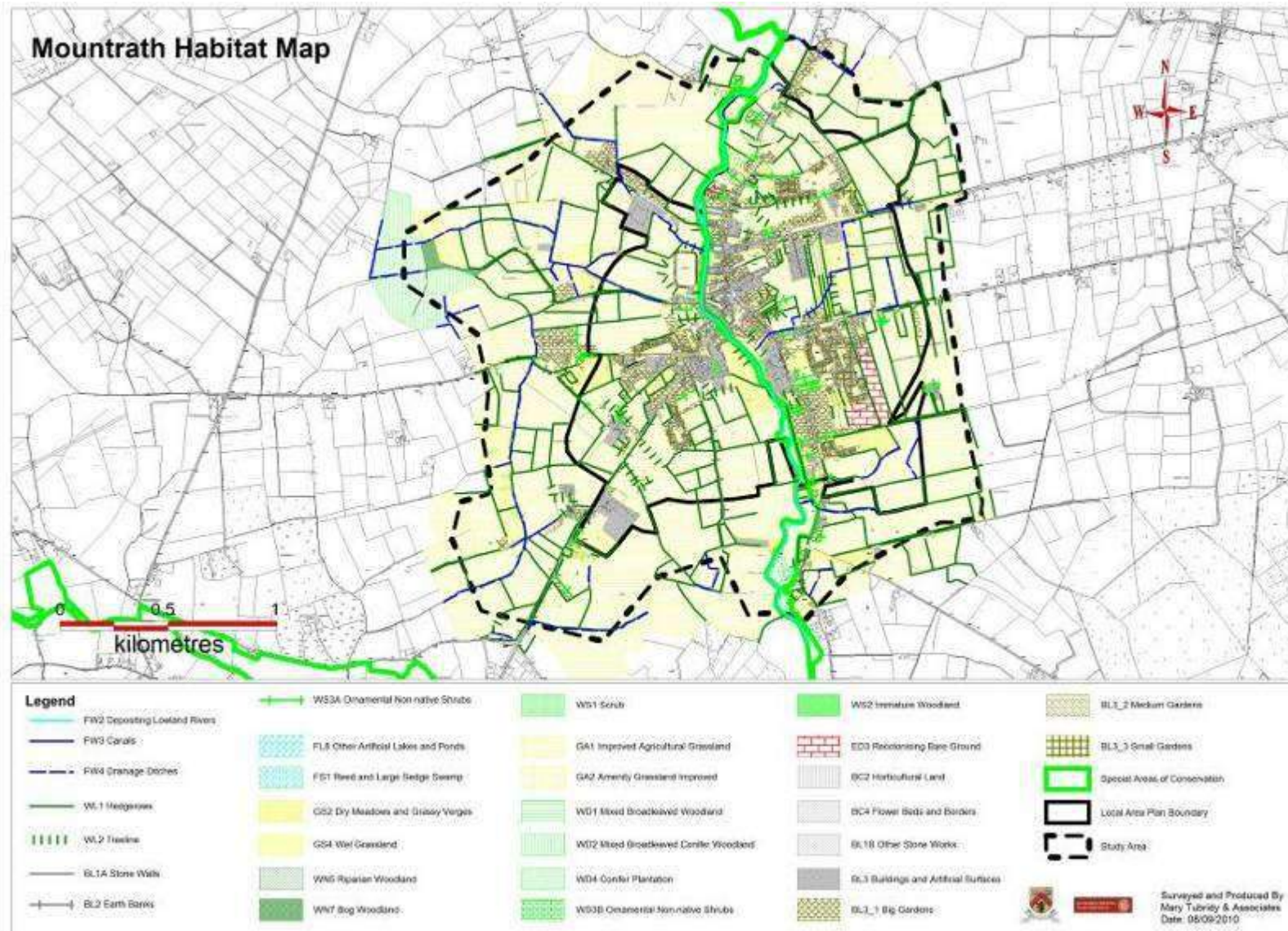


Figure 66. Mountrath Habitat Map

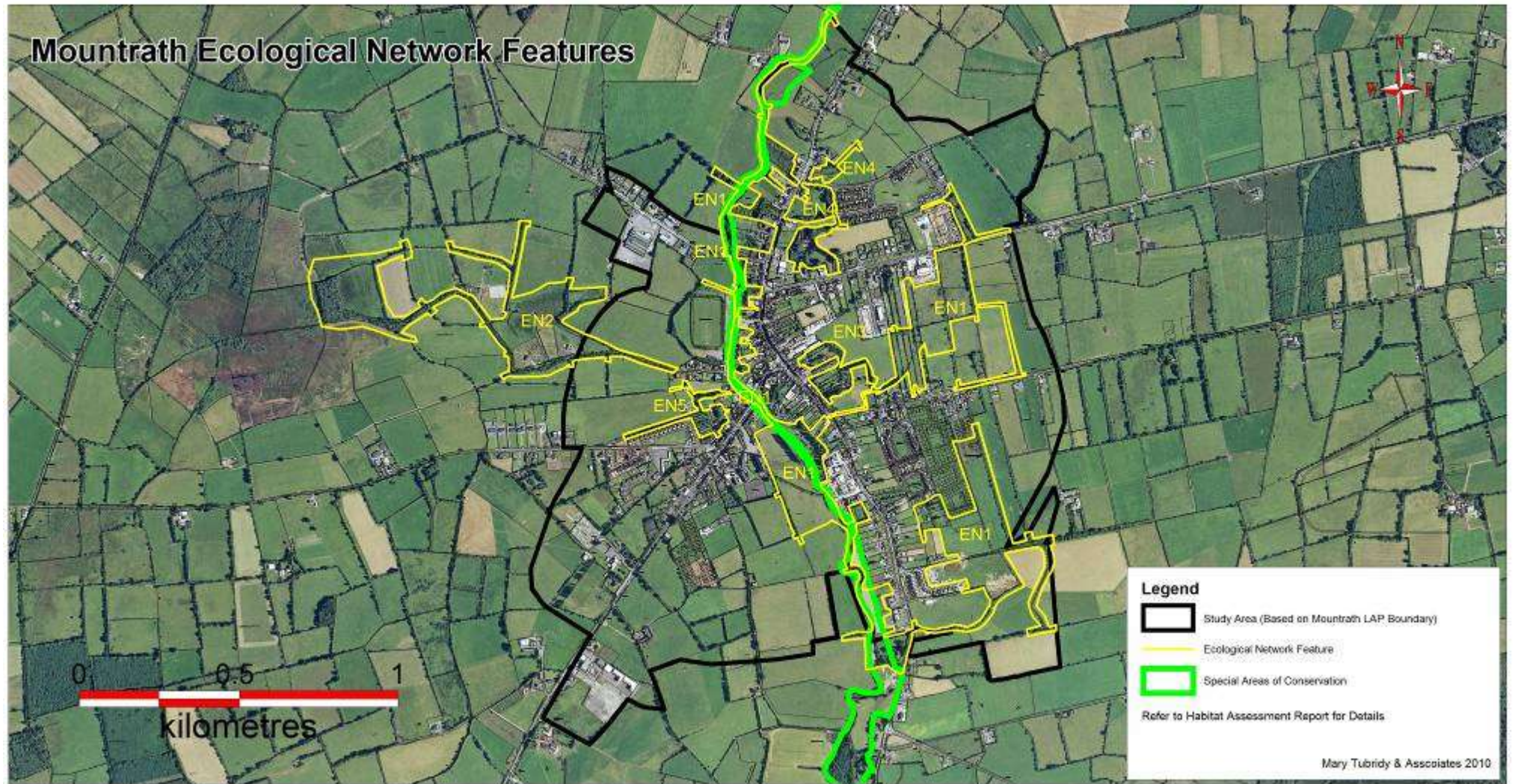


Figure 67. Mountrath Ecological Networks

The river flows in a north-south direction roughly dividing the town into two halves. Most of the network occurs to the east of the river. Much of the habitats adjacent to the river as it flows through Mountrath are noticeably managed. The vegetation growing on the banks of the river has been closely cut and emergent species are poorly represented. In areas where cutting has been restricted or where the water is shallow species include common reed, meadow sweet, branched burr weed, flag iris, wild angelica, water cress and great willowherb.

There were six drainage ditches in the network and just one of these was connected directly to the river, the rest either stopped, or were redirected underground before they reached the river. Common reed and water cress were the main species associated with it.



Figure 68. A section of the longest drainage ditch in Mountrath, flowing through an old garden near the park. It stops at the edge of the park.

Wet grassland (GS4) can be found in 3 locations. The largest area was connected with the longest drainage ditch and occurred to the east of the town (map1). The other 2 areas are in fields adjacent to the river, one of which is opposite the park and dominated by rushes, while the other was further south on the edge of a field of improved agricultural grassland. Other species of wet grassland included cocksfoot, meadowsweet, creeping bent, hard rush, great willowherb and nettles.

Small strips of riparian woodland (WN5) grew intermittently along the banks of the Mountrath River, though these tended to be on the outskirts of the town. Alder, hawthorn and ash were among the species surveyed.

Other features of this ecological network are scrub (WS1), (mixed) broadleaved woodland (WD1), immature woodland (WS2, Figure X), dry meadows and grassy verges (GS2) and hedgerows (WL1). Most of these habitats occurred in large back gardens, some of which have not been tended. In one managed garden backing on to the river north Rushin Bridge, the owner has created a wildlife area next to the river which was dominated by broadleaved trees. Other areas of the garden contained shrubs and herbaceous that were wildlife friendly (fig X).



Figure 69. *Wildlife friendly garden adjacent to the river in Mountrath.*

Several areas of dry meadows and grassy verges are found throughout the network including the field across the river from the park which also contained wet grassland. Most of the other sites with dry meadows and grassy verge habitat tend to be part of large gardens (map1) that are not maintained.

A number of hedgerows (WL1) and treelines (WL2) are also found in this network and serve as connections between the other habitats.

Assessment – EN1

The habitat complex connected to the river at Mountrath, depositing lowland rivers (FW2, map 2), drainage ditches (Fw4) reed and large sedge swamp (FS1), riparian woodland (WN5) and wet grassland is of international ecological value, as the river is part of the River Barrow/Nore SAC . The (mixed) broadleaved woodland (WD1), immature woodland (WS2), dry grassland (GS2) and stone walls adjacent to the river are of high local ecological value and act as focal points for diversity while the hedgerows, (WL1), mature treelines (WL2), provide corridors that linked the other habitats together.



Figure 70. Newly planted woodland (WS2) in the town park forming part of the new wildlife area.

The ecological network provides several services to society. It is an important reservoir of biodiversity, linked functionally to an internationally important cSAC; the River Nore. The wetlands around the river perform a regulatory function as they absorb floodwaters and may have the potential to remove pollutants. They act as a natural attenuation area reducing the risk of flooding elsewhere in the catchment. The wet woodland is a carbon sink, mitigating for climate change. This area is also an outdoor amenity where the public use the paths for walking or other recreational pursuits such as fishing.



Figure 71. A small island in the Mountrath River north of Rushin Bridge behind some big gardens.

The biodiversity of this area adds value to features of cultural importance such as stone buildings, walls and bridges and features associated with a designed landscape.

Any proposals for development which could impact on EU listed habitats or species found in the River Nore cSAC downstream will require to at least be screened for Appropriate Assessment. This particularly includes any impacts on water quality, habitats within the river or wetland habitats along the river margin.

Future development should seek to improve the quality of “buffer” areas by restoring riparian habitats within 25 m of the river. This could involve the establishment of riparian woodland or wetlands.

5.13.3 EN2 Drainage ditches, pond, woodland, semi-natural grassland, hedgerows, earth banks and stonewalls

This ecological network is centred on semi-natural grassland, hedgerow and woodland habitats west of the river in Mountrath. Semi-natural grassland (GS4 Fig X and GS2) forms the main part of the ecological network along with hedgerows (WL1). Oak-ash-hazel woodland (WN2), bog woodland (WN7) habitats which are just outside of the LAP area were included as they complemented the habitats within the network. The extent of the area of ecological interest is outlined on Map 2 and habitats within it are shown on Map 1.

Most of this network is owned by one family who farm ecologically as possible. As a result the habitats are quite diverse and species rich.



Figure 72. Wet grassland bordered by drainage ditch (FW4) near Mountrath. The grass is cut for hay and the site is adjacent to bog woodland

The bog woodland (WN7) is at the most westerly part of this network and backs on to very wet land (cut over bog) recently planted with (mixed) conifer broadleaved woodland. The bog woodland is dominated by downy birch and ash, with a good under storey of holly, hawthorn, bramble, and ivy and goat willow. The vegetation was quite dense and the ground was fairly dry. Broad buckler fern, hard fern, soft shield fern, bracken, wood sedge and violets were some of the species growing there. Moss cover was extensive and there were several varieties of fungi present including Boletus species.

Two fields with wet grassland were growing next to the bog woodland (Figure) which was being cut for hay. These and the bog woodland were associated with a drainage ditch. This habitat complex was linked to by a hedged laneway to a small area of oak-ash-hazel woodland (WN2). One of the hedgerows on the more easterly end of the laneway was growing on top of a stone breasted bank.

In one of the gardens a small pond (FL8) has been excavated on the site of what may have been a spring, and while the water level fluctuates it never dries out. The main plant species were bulrushes and water lilies. The pond supports several animal and insect species including frogs, newts, water beetles, water scorpions, a heron, pond snails and dragonflies. Its owner also noted sparrow hawks, foxes and possible pine martens on the farm. The laneway leads into the town and is within the LAP area Figure X.



Figure 73. Bog woodland (WN7) being colonised by scrub

Assessment – EN2

This habitat complex of bog woodland (WN7), wet grassland (GS4), drainage ditches (FW4), oak-ash-hazel woodland (WN2), artificial ponds (FL8), dry meadows and grassy verges (GS2), hedgerows (WL1) and earth banks (BL2) are of national and local importance. Bog woodland is a rare habitat type in Ireland and needs to be protected. The associated drainage ditch and wet grassland next to it help support it and increase the overall diversity of this area. The small area of oak-ash-hazel woodland and the hedgerow on the stone breasted bank add further to the diversity of this part of the town, and the laneway with its hedgerows and earth bank all feature on the first edition OS maps.



Figure 74. Part of the laneway that leads from the town to bog woodland and wet grassland habitats.

5.13.4 EN3 Woodland, scrub, hedgerows, treelines, semi-natural grassland, stonewall and other stone works, recolonising bare ground, ornamental shrubbery and gardens in Mountrath

This network is located in two areas in the centre of the town and includes small areas of (mixed) broadleaved woodland (WD1) and scrub (WS1), large gardens (BL3 1), semi-natural grassland (GS2), hedgerows (WL1), treelines (WL2), recolonising bare ground (ED3) and ornamental shrubbery (WS3B). The extent of the area of ecological interest is outlined on Map 2 and habitats within it are shown on Map 1.

A small area of (mixed) broadleaved woodland was found behind commercial premises and in between some derelict buildings. Woody species included sycamore, elder, hawthorn, ivy and bramble. Nettles, willow herb sp., herb robert and cleavers were the main herbaceous species. Bramble scrub had taken over a derelict shed or outhouse while ivy was prevalent on the stone walls of several old ruins in this part of the network.

Other habitats in this network included two sites that had dry meadows and grassy verges habitats both occurring in back gardens. Recolonising bare ground habitat was identified next to the woodland and two clumps of pale *Panicum* were occupying much of the site. Ornamental non-native shrubs in a very large garden, mature tree lines and hedgerows also form part of this network.

Assessment – EN3

The woody habitats of (mixed) broadleaved woodland (WD1), scrub (WS1), hedgerows (WL1), treeline (WL2) and ornamental shrubs (WS3 B) along with the semi-natural grassland (GS2) and recolonising bare ground (ED3) are of local importance. They provide an ecological network in the centre of Mountrath that is of value to several species of birds, small mammals and numerous insect species including butterflies and moths.



Figure 75. Broad leaved woodland (WD1) growing in derelict garden in the centre of Mountrath.

Ivy clad ruins make safe nesting sites for birds and roosting sites for bats as well as providing food to birds and insects. Dry meadows and grassy verge habitats provide nest sites for small mammals such as shrews and field mice, while seed eating birds will feed on seeds produced on grasses and herbaceous species such as thistles and docks. The adjacent gardens with hedges (native and non-native) and treelines connect these habitats to the wider countryside ensuring that species can move from area to area.

5.13.5 EN4 Hedgerows, woodland, scrub, semi-natural grassland and treelines at Mountrath

Hedgerows (WL1), woodland (WD1), scrub (WS1), treelines (WL2) and dry meadows and grassy verge (GS2) habitat based largely in a very old disused quarry (it was disused on the 1st edition OS map). The extent of the area of ecological interest is outlined on Map 2 and habitats within it are shown on Map 1.

Mature treelines, narrow strips of (mixed) broadleaved woodland, hedgerows and invading scrub are all found on the periphery of the old quarry which makes up part of this ecological network. Trees include beech, sycamore and ash, while hawthorn, elder, bramble and ivy are the main shrub species. Ivy thickly covered an old building. Small areas of dry meadows and grassy verge habitat (GS2) were also present in this network.

Assessment – EN4

This ecological network of broadleaved woodland (WD1), scrub (WS1), hedgerows (WL1), treelines (WL2) and dry meadows and grassy verge habitat (GS2) to the north of the Mountrath is of local importance, increasing the biodiversity of the town. Again these habitats provide nesting, roosting and feeding sites for several species of wildlife. It is important that these small ecological and cultural sites be retained in the event of future development in the area.



Figure 76. Part of old quarry with (mixed) broadleaved woodland and mature treeline (WL2)

5.13.6 EN5 Drainage ditch, hedgerows, treelines, stonewalls and large gardens at Mountrath

The final ecological network focuses on a drainage ditch (FW4), hedgerows (WL1), treeline (WL2), stone walls (BL1A) and large gardens (BL3 1). The extent of the area of ecological interest is outlined on Map 2 and habitats within it are shown on Map 1.

This network focuses on a series of habitats located in the area of the primary school. Stone walls form part of the school boundary separating it from the surrounding gardens. Several large mature trees are found in the school grounds including sycamore and horse chestnut. A mature treeline of can be found on the lane at the north boundary of the school.

The drainage ditch flows behind some small gardens and then disappears just before the school boundary.

Assessment – EN5

The drainage ditch (FW4), hedgerows (WL1), treelines (WL2), stonewalls (BL1A) and large gardens (BL3 1) are of local importance to Mountrath. They keep the town linked to the wider countryside and provide access routes for and stopping off areas for several species of birds and small mammals as well as insects. They also contribute to the overall biodiversity in Mountrath.

5.14 Newtown Doonane

5.14.1 Introduction

One ecological network was identified around Newtown Doonane. Its location and associated habitats are shown on the following maps.



Figure 77. Habitats at Newtown Doonane

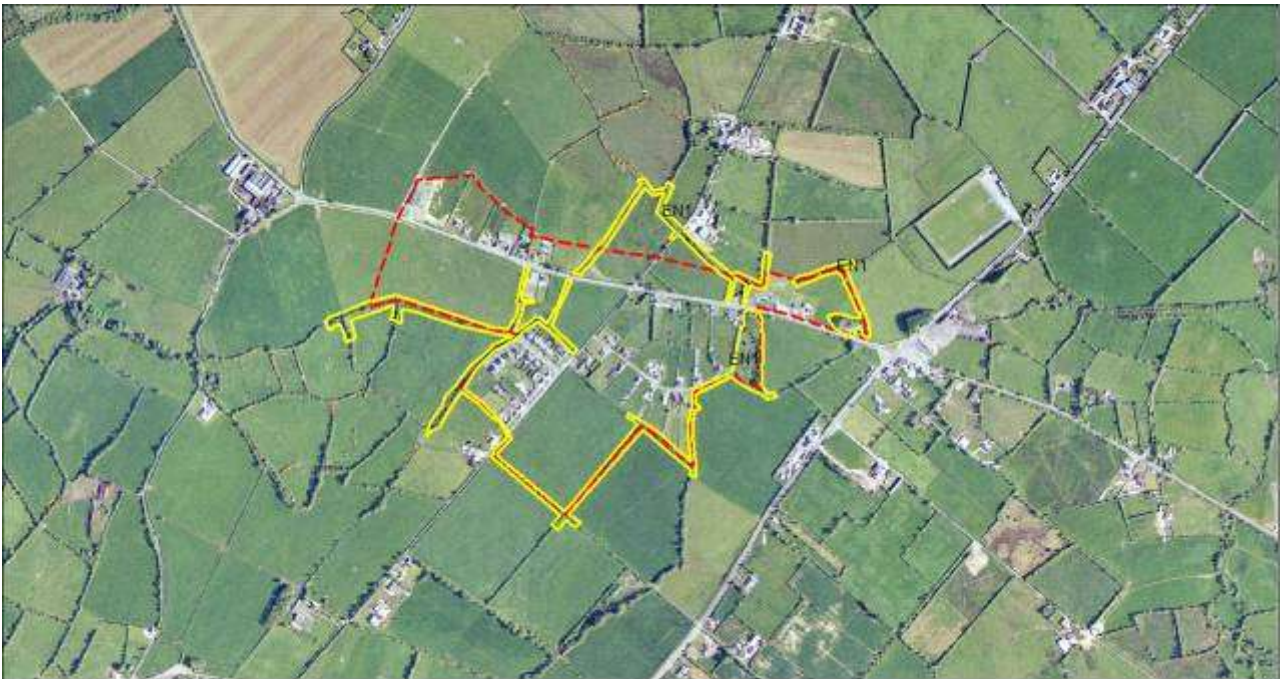


Figure 78. Ecological network at Newtown Doonane

5.14.2 EN1 Rivers, scrub, hedgerows and recolonising bare ground.

This features a small part of a depositing lowland river (FW2), its associated hedgerows (WL1), scrub (WS1) and recolonising bare ground (ED3). Recolonising bare ground results from land being used as a dumping area during the construction of the nearby housing development.

Assessment – EN1

The habitats in this ecological network of hedgerows (WL1), scrub (WS1) and recolonising bare ground (ED3) are of local importance. Semi-natural habitats are rare in the Newtown Doonane area and other than the river and hedgerows there was only one small area of scrub and some recolonising bare ground. The river is important for flood attenuation.

It is important that the hedgerows are retained as they connect biodiversity in the village to the countryside. A plan to increase biodiversity in the village could be devised to maximize the potential value of land now covered in recolonising bare ground.

5.15 Portarlington

5.15.1 Introduction

Four ecological networks were identified around Portarlington. The following maps show relevant habitats and ecological networks.

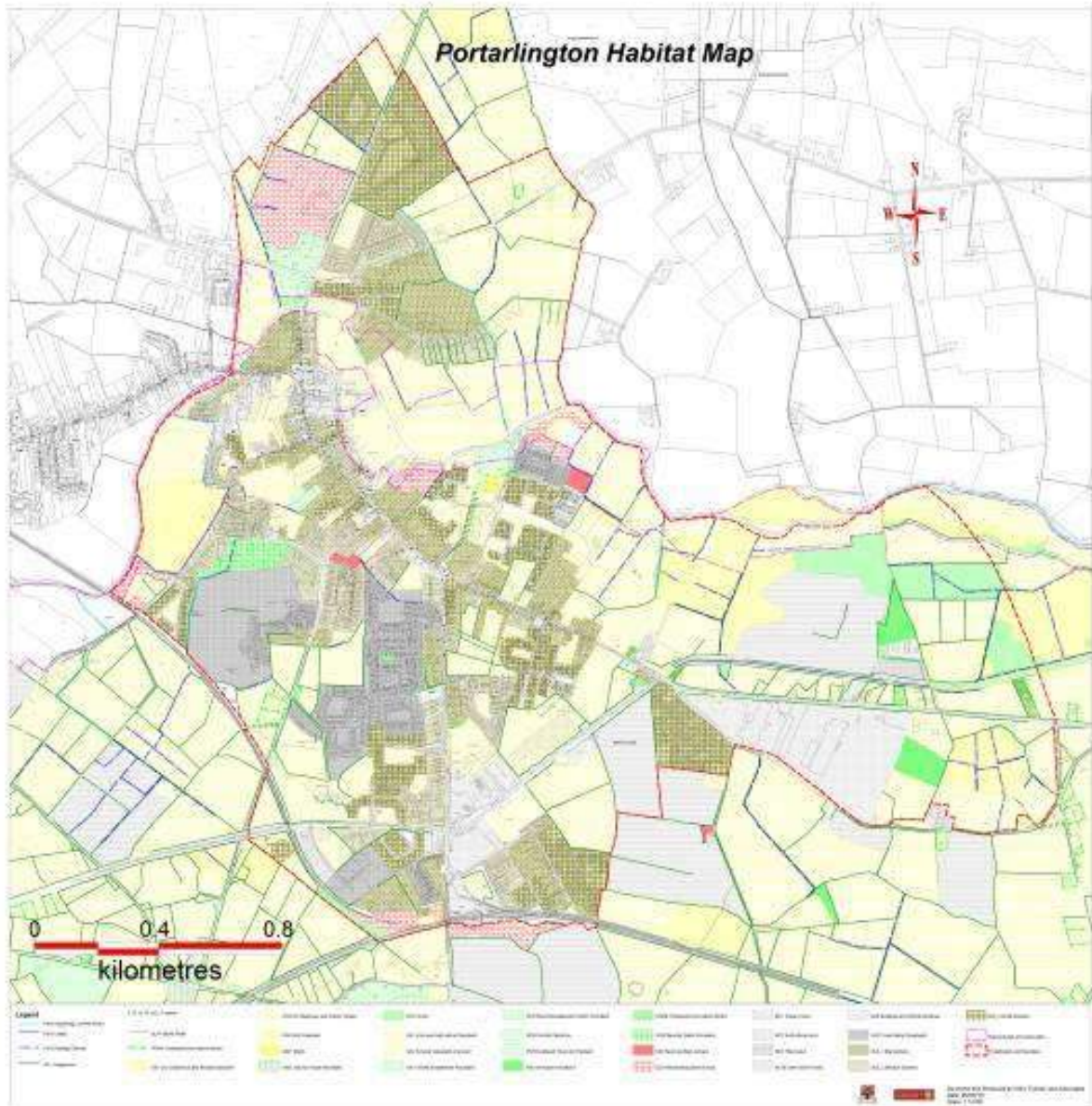


Figure 79. Portarlington Habitats Map



Figure 80. Portarlinton Ecological Networks

5.15.2 EN1 River Barrow, associated wetlands and semi natural habitats

The principal ecological network features the river Barrow, associated wetlands and adjacent and connected semi-natural habitats including the disused canal.

The core habitats of the network are the River Barrow (FW2) and the wetlands (drainage ditches (FW4), and semi-natural grasslands (GS4, GS1) immediately adjacent to it. It is part of a much larger network based on the river Barrow, 192km long, the 2nd longest river in Ireland, the principal channels of which are designated as being of international biodiversity interest.



Figure 81. River Barrow adjacent to public park

Significant features of biodiversity within this area (referenced in EU Directives) include the presence of otter, which use a range of habitats within 12km of the river, salmon, trout, lamprey, abundant crayfish, Desmoulin's snail, bats and kingfisher which are principally associated with the river, associated wetlands and tributaries/drains.

Vegetation within all these habitats is dominated by native species. The river has a type of vegetation which is listed in the EU Habitats Directive. The field to the east of the town has a disturbed species rich dry grassland flora in which 40 species were recorded in 2007.

Associated semi-natural habitats include planted broadleaved woodland (WD1), coniferous woodland (WD4) and a small marsh (GM1) within the immediate environs of the town. Within the town is found a small wet area surviving in a newly built estate, covered in sedges and iris with willow scrub and elm around the edges. Pheasants, orange tip butterfly, coal tits and warblers were noted in this area in 2007.



Figure 82. Small wetland in housing estate

Between it and the river is a mixed broadleaved woodland, only part of which is in the Barrow SAC. Speckled wood and brimstone butterflies were noted in its vicinity and a rookery in the part of the wood outside the SAC.

Outside the immediate environs of the town the network includes treelines (WL2) and hedgerows (WL1) adjacent to the river, newly planted broadleaved woodland (WS2) and all the habitats particularly scrub (WS1) associated with the canal.



Figure 83. Filled in canal at Bracklone

Improved grassland (GA1) between the river and canal was included in this network as it is reverting to a more semi-natural type of vegetation dominated by gorse.

These habitats support mainly native plant species which are important for some of the species associated with the core area such as otter, bats and breeding birds. Breeding bird populations are significant in almost all these habitats (protected under the Wildlife Acts). Linear habitats act as corridors linking semi-natural habitats along the river to the canal. The canal corridor is a significant biodiversity resource important for native trees, shrubs and wetland plants (Hammond and Feehan, 2008). Survey work in 2007 characterised habitat and plant biodiversity in this section of canal. The birds chiff-chaff and willow warbler and an active badger sett were recorded along the canal adjacent to the town. Almost all trees and shrubs were native species

This ecological network provides the following functions to society:

- The river and its wetlands regulate water flows and enhance water quality through flood attenuation and absorption of nutrients through plant growth. The aquifer associated with the river in the vicinity of Portarlinton is regionally important. There are two abstraction points in the vicinity of Portarlinton (one surface, one groundwater) and throughout its course it also provides a source of water for stock.
- The river in the vicinity of Portarlinton attenuates pollution loads. It receives surface water discharges and treated water from the local waste water treatment plant. Certain types of wetlands have peat containing soils. Such soils act as carbon sinks. The continuing accumulation of carbon (in wetlands and new woodlands) mitigates for climate change.
- The river is an important feature in Portarlinton's history as it determined the location of the town (at a river crossing). Water from the river supported local industries. The canal which operated between 1829 closed 1960 was an important transport route for local industries. The river remains an important visual amenity in the town and is a feature in its principal recreation area. While local fishermen utilize other parts of the river more intensively, at accessible locations around the town the local angling club organizes activities to introduce young people to fishing and wildlife.

5.15.3 EN2 Railway line and associated semi-natural habitats

A second and less important ecological network was identified around the railway line bordering the town to the south-west. Habitats associated with this network include the semi natural vegetation on the embankments such as treelines (WL2) bordering the railway, recolonising bare ground (ED3) near the railway station, linking hedgerows (WL1's) and a field with wet grassland (GS4) and small pond (FL5).



Figure 84. Eutrophic pond beside railway embankment

Unmapped features associated with the railway line which are also of biodiversity value are patches of scrub and the network of dry stone walls and bridges whose crevices provide habitats for plants and possibly roosting bats (particularly where they are covered in ivy). The most important feature in this network is the small wetland or pond which is mainly covered in willow (*S. caprea* and *S. fragilis*) /alder/ ash woodland. Reed mace was the dominant species in the water.

This network provides for flood attenuation as the area associated with the pond, wet grassland and drainage ditch acts as a sump for local drainage. As some of the land is farmed the network acts as a source of food. Species associated with these habitats and others such as treelines along the railway include invertebrates which are important for pollination of commercial crops and pest control. The railway supports a sustainable form of transport which mitigates climate change. Certain features in the network, the stonework associated with railway walls, bridges are of industrial archaeology interest.

5.15.4 EN3 Abandoned development site in the town

This small network features an abandoned development site which was once covered in woodland (WS5= recently felled woodland) and associated drainage ditch (FW4), which now drains into a SUDS.

The site is being used as a holding area for horses. It is rapidly developing into a scrub type habitat which will become important for breeding (song) birds and winter migrants feeding on seed heads of plants.



Figure 85. Site of felled woodland in centre of Portarlinton

Part of this site is important for water treatment as it includes a drainage ditch and recently constructed SUDS. As a semi-natural area within the town it supports invertebrates which are important for pollination of garden plants and pest control. It has potential as a local nature reserve /amenity area. Due to its uneven terrain it is difficult to access.

5.15.5 EN4 Wetlands in the countryside east of Portarlinton

This network includes wet grassland (GS4), drainage ditches (FW4), associated hedgerows (WL1), and a newly established broadleaved woodland (WS2) in a small catchment east of the town. It is important for wetland plants and contains a rare example of good quality wet grassland habitat.



Figure 86. Wet field in background

This ecological network provides food and is a potential source of timber (when new woodlands mature). The drains and land covered in wet grassland provide for flood attenuation. Hedgerows provide shelter to farm animals and homes for species which are important pollinators of crops. The landscape dominated by drainage ditches is wetland used for agriculture..

5.16 Rathdowney

5.16.1 Introduction

Three ecological networks were identified. The habitats associated with them and their location are shown on the following maps.

5.16.2 EN1 River and associated habitats at Rathdowney

The principal and most important ecological network in Rathdowney is associated with the Erkina River.

Although this part of the Erkina River is not a designated site, further down river west of Durrow the Erkina and adjacent woodland is of national and international importance and is designated NHA (Natural Heritage Area) and an cSAC (candidate Special Area of Conservation). It then joins the River Nore just on the eastern outskirts of Durrow. The Nore is a designated site of international biodiversity importance (cSAC no. 2162



Figure 87. The Erkina River flanked on either side by reed and large sedge swamp (FS1)
Note immature woodland (WS2) to the left and background.

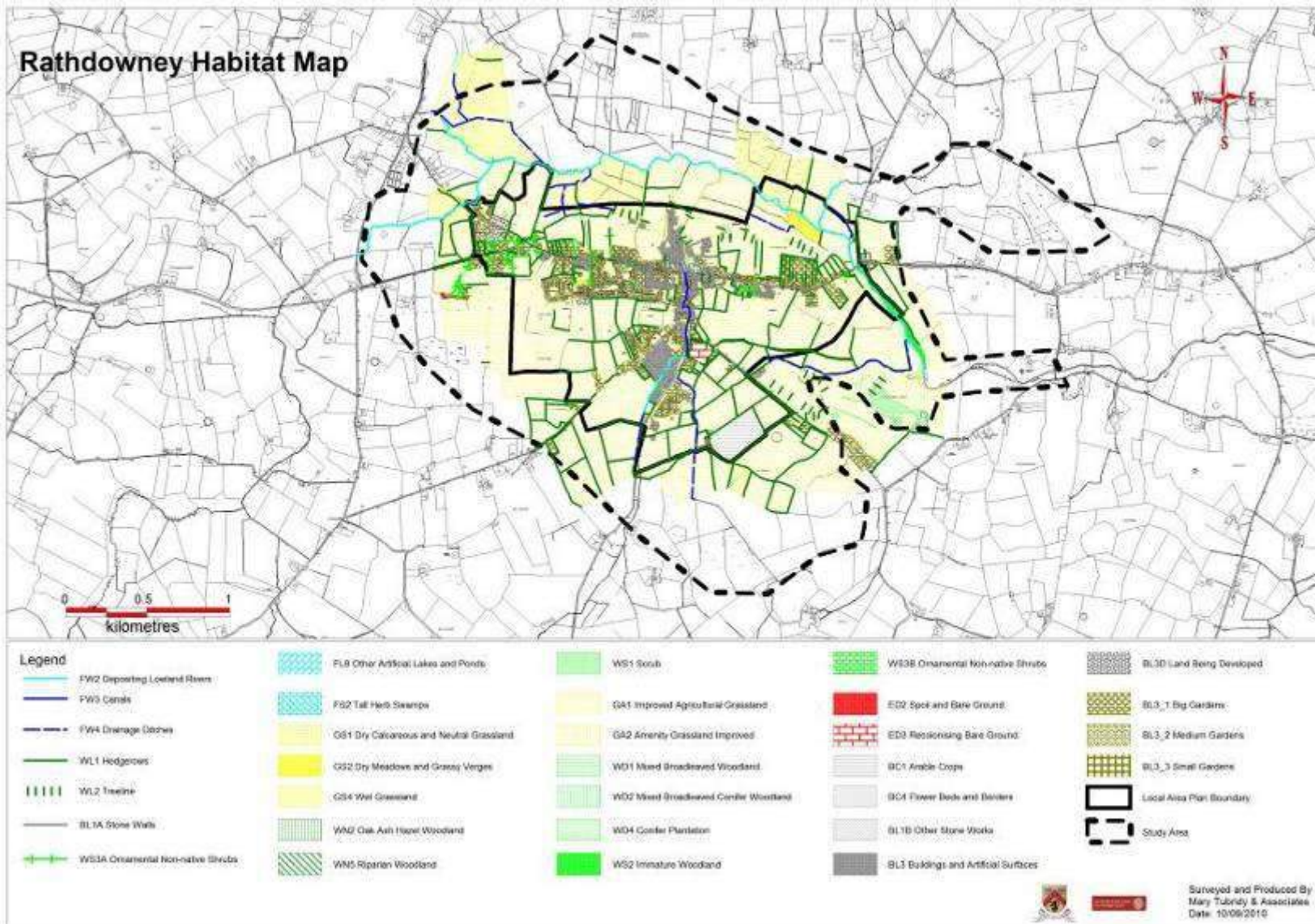


Figure 88. Rathdowney Habitat Map

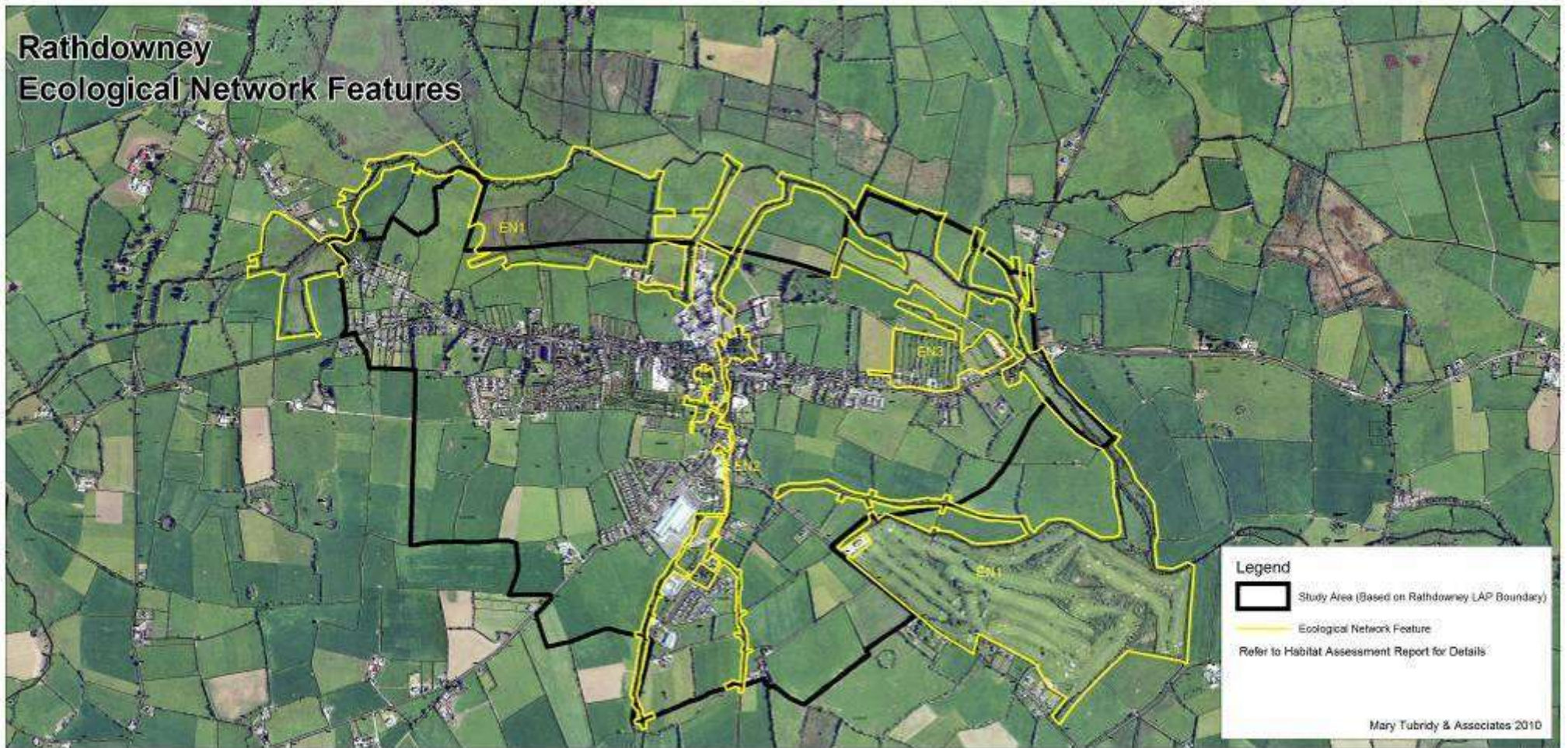


Figure 89. Portarlinton Ecological Networks

Habitats within the ecological network in the study area (shown on Map 1) include the river (FW2), drainage ditches (FW4), narrow strips of reed and large sedge swamp (FS1, Figure X), riparian woodland (WN5), oak-ash-hazel woodland (WN2), wet grassland (GS4), dry humid acid grassland (GS3), (mixed) broadleaved conifer woodland (WD2), scrub (WS1), immature woodland (WS2, Figure X), conifer plantation (WD4), dry meadows and grassy verges (GS2), oak-ash-hazel woodland (WN2), hedgerows (WL1), treelines (WL2) and stonewalls (BL1A).

The core feature of this network, the river encloses Rathdowney to the west, north and east and has direct links to many of the habitats sides in this ecological network. A number of plant species were found in the river including Fontinalis moss, common club rush, water speedwell, water crowfoot, reed canary grass and sweet grass sp. Large sedge swamp (FS1) was found from time to time adjacent to the banks of the river and was dominated by reed canary grass, other species included flag iris and marsh willowherb.

Several drainage ditches within the network join the Erkina or flow towards it. The majority of the drainage ditches in the network were present in the 1800's (1st edition OS map), including the ditch that runs at the back of the golf course. Some of the species found in drainage ditches included water cress, purple loosestrife, reed sweet-grass, meadowsweet, Yorkshire fog, horsetails, mint and common valerian. The drainage ditch by the golf course was clogged with vegetation but it still had a good flow of (eutrophic) water.



Figure 90. Drainage ditch bordering the golf course at Rathdowney

Other wetland habitat included wet grassland (GS4) and this was mainly found north of the Erkina on grassland that is mainly used for summer grazing. Fertiliser inputs are low and the ground has never been disturbed (pers. communication with local business person). The wet grassland was species rich and contained several plants of devil's bit scabious, hard rush, soft rush, purple loosestrife, meadow thistle, cocksfoot, silverweed, Yorkshire fog, water mint, red bartsia and purple moor grass. Small areas of marsh habitat dominated by flag iris formed mosaics with the wet grassland but these were too small to map. Lesser pond sedge dominated part of the wet grassland between a drainage ditch and the river.

Dry humid acid grassland was present in this area as well forming large patches within the wet grassland on slightly higher and drier ground. Species composition was similar to that found in wet grassland but species of drier soils such as eye bright, self heal, and lady's bedstraw and red clover were recorded.



Figure 91. Old fields containing wet grassland (GS4) with devil's bit scabious and flag iris in the foreground.

Other habitats in the ecological network include riparian woodland and scrub. The riparian woodland is not continuous along the river but occurs intermittently. The main woody species are ash, blackthorn, hawthorn, eared and grey willow, bramble and ivy while brooklime, reed canary grass, nipplewort, primrose, arum lily, and chickweed were some of the recorded herbaceous species.



Figure 92. Riparian woodland next to the Erkina River north of Rathdowney next to the old meadows.

Two small areas of scrub were found next to a tributary of the Erkina north west of Rathdowney while there were several small areas of scrub on the golf course. Blackthorn, gorse, hawthorn and bramble were the main species

recorded from the scrub habitats. According to the manager of the golf course there is a sparrow hawk nest in some of the scrub on the course.

Other features of this ecological network are oak-ash-hazel woodland (WN2), dry meadows and grassy verges (GS2) and hedgerows (WL1).

Oak-ash-hazel woodland occurs on a raised bank in the most northerly section of the network. Hawthorn and ash were dominant with occasional guelder rose and field rose. The ground flora included primrose, violet sp. and arum lily.

Hedgerows are found throughout this network forming field boundaries, many of these are present on the first edition OS map including those bordering a laneway behind the golf course. These hedgerows near the golf course contained several woody species, had several tall trees in them and few gaps. However, due to intensive farming methods (high levels of fertilizer and cutting grass right up to the base of the hedgerow) the herbaceous layer was poor.

One small area of dry meadows and grassy verges are in the north east of the network on raised ground next to the river (map1). Limestone walls are found on both sides of Coneyburrow Bridge (BL1A), in the east of the network.

Assessment – EN1

The habitat complex of the Erkina River at Rathdowney (FW2, map 2)), the drainage ditches (FW4), reed and large sedge swamp (FS1), riparian woodland (WN5), wet grassland (GS4), dry humid acid grassland (GS3), oak-ash-hazel woodland (WN2), scrub (WS1), hedgerows (WL1), treelines (WL2) and stone walls and are of high local ecological value. The semi-natural grassland north of the river is very old undisturbed meadows (~200 year) and is important culturally as well as ecologically. Species diversity in this network is very rich and contains plant species important for wildlife, such as devil's bit scabious the food plant of the marsh fritillary butterfly. Otters are found in this network along with badger, foxes and rabbits.



Figure 93. Wet grassland dominated by lesser pond sedge

The ecological network provides several services to society. It is an important reservoir of biodiversity, linked functionally to an internationally important cSAC; the River Nore. The wetlands around the river perform a regulatory function as they absorb floodwaters and may have the potential to remove pollutants. They act as a natural attenuation area reducing the risk of flooding elsewhere in the catchment. This area is also an outdoor amenity and it

is possible to walk along the fields by the river over to Coneyburrow Bridge, continue along by the river and head back into Rathdowney via the laneway behind the golf course. This may or may not be fully open to the public.

The biodiversity of this area adds value to features of cultural importance such as stone buildings, walls and bridges and features associated with a designed landscape.

EN2 River, millrace, drainage ditches, pond, woodland, scrub, semi-natural grassland, hedgerows, treelines, stonewalls and other stone buildings, large gardens and flower beds and borders.

This ecological network is centred on a small stream (FW2), millrace (FW3), drainage ditches (FW4), an artificial pond (FL8), riparian woodland (WN5), (mixed broad leaved woodland (WD1), conifer woodland (WD4), scrub (WS1), immature woodland (WS2), dry meadows and grassy verges (GS2), hedgerows (WL1), treelines (WL2), stonewalls (BL1A), other stone works (BL1B). The extent of the area of ecological interest is outlined on Map 2 and habitats within it are shown on Map 1.

Japanese knotweed was recorded in this network (GPS 52° 51' 36N and 007° 35' 06W), where a large population has become established in neglected back gardens.

The natural stone sided artificial pond (FL8) in the centre of Rathdowney in front of Dawn Meats was once part of the old Brewery (1st edition OS map). Plant species growing on the walls include ivy-leaved toadflax, red fescue, moss, stonecrop, herb robert, lesser trefoil and ivy.

There is a lot of green algae floating in the pond but also submerged species including duckweed sp. and milfoil sp. Other species in the water included iris and wild angelica. There is a small island in the pond with ornamental shrubs growing on it. Swallows were feeding over the pond during the survey.



*Figure 94. The pond (FL8) in front of Dawn Meats in the centre of Rathdowney
Note (mixed) broadleaved woodland and Japanese knotweed (GPS 52° 51' 36N and 007° 35' 06W) in the background.*



Figure 95. Millrace in Rathdowney with a grass margin and road on the right and front gardens on the left.

Water was and still is supplied to the pond via mill race that runs south to north through the town. Part of the millrace goes through Rathdowney shopping centre where it floods. Marsh willowherb, meadowsweet, branched burr weed and fleabane were identified from this part of it.

The mill race then flows parallel to the road and in front of gardens (FW3); while in other cases it runs behind gardens. Small fish were noted during the survey. As the mill race nears the pond small bits of reed and large sedge swamp occur at the sides with marsh speedwell, marsh willowherb and reed canary grass. A large crack willow is growing beside the millrace in this area also.

Another important feature of this network is the two drainage ditches that feed into the stream and millrace south of Rathdowney. Small areas of riparian woodland can be found along the sides of the stream.

Broadleaved woodland (WD1) is growing adjacent to and east of the millpond and contains mature beech, sycamore and London plane. The under storey which is quite open comprises a mixture of native and garden species including Japanese anemones, euonymus, snowberry, holly, nettles and knapweed.

The final part of this network includes stone buildings, stone walls, dry meadow and grassy verges, mature tree lines and a small bit of scrub. These are located for the most part near each other and are habitats associated with old gardens and or derelict sites.



Figure 96. Scrub and dry meadow and grassy verge habitat on a derelict site in the centre of Rathdowney.

Assessment – EN2

This habitat complex of streams (FW2), drainage ditches (FW4), millrace (FW3) and pond (FL8), dry meadows and grassy verges (GS2), hedgerows (WL1), tree lines (WL2) and woodland (WD1 and WD5) are of local importance to Rathdowney. The stream, drainage ditches and mill race help to control flood waters and provide water for wildlife right into the centre of the town. This is supported by the (mixed) broadleaved woodland beside the mill pond providing nesting and roosting sites for birds and bats as well as a food source for birds, mammals and insect. The presence of so several habitat types in an urban area is a valuable asset. Dry grassland (GS2) and scrub habitat, in particular on sites where ivy and scrubby species occur, provide nest sites and areas of refuge for bats and other small mammals, frogs and newts, insects and other small creatures which in turn feed larger species of birds and animals. This ecological network in Rathdowney links the centre of the town to the wider countryside ensuring that these habitats remain viable for wildlife allowing them to move safely from one area to another.

5.16.3 EN3 Hedgerows, treelines and back gardens.

This small ecological network centres on several adjacent large gardens west of Coneyburrow Bridge. This network is of local importance. The habitats are hedgerows (WL1), treelines (WL2) and big gardens (BL3 1). The extent of the area of ecological interest is outlined on Map 2 and habitats within it are shown on Map 1.



Figure 97. Laneway and hedgerows (WL1) adjacent to gardens on the Ballacolla road to near Rathdowney.

Hedgerows are the main feature in this ecological network and these are found for the most part forming boundaries between gardens on the Ballycolla road. The original field boundaries (1st edition OS map) still exist but those between the houses are much younger.

The laneway did not feature on the first edition OS map only one of the hedgerows. This older hedgerow was dominated by hawthorn, blackthorn, and hazel. Other woody species included ash, oak, guelder rose, field rose, honeysuckle, ivy, bramble and ivy. In the field at the bottom of the lane is an old treeline dominated by ash, hazel and willow.

Most of the gardens are amenity grassland or dry meadows and grassy verge habitats.

5.16.4 Assessment – EN3

This ecological network of hedgerows (WL1), treelines (WI2) and gardens is mainly of local value but also link this side of the town to the greater countryside and provide nesting, roosting and feeding sites for birds, small mammals and insects. As some of the hedgerows feature on the first edition OS maps they have a role to play in the cultural heritage of Rathdowney.

5.17 Rosenallis

5.17.1 Introduction

Two ecological networks were identified around Rosenallis. The following maps show the habitats associated with them and the location of the networks.

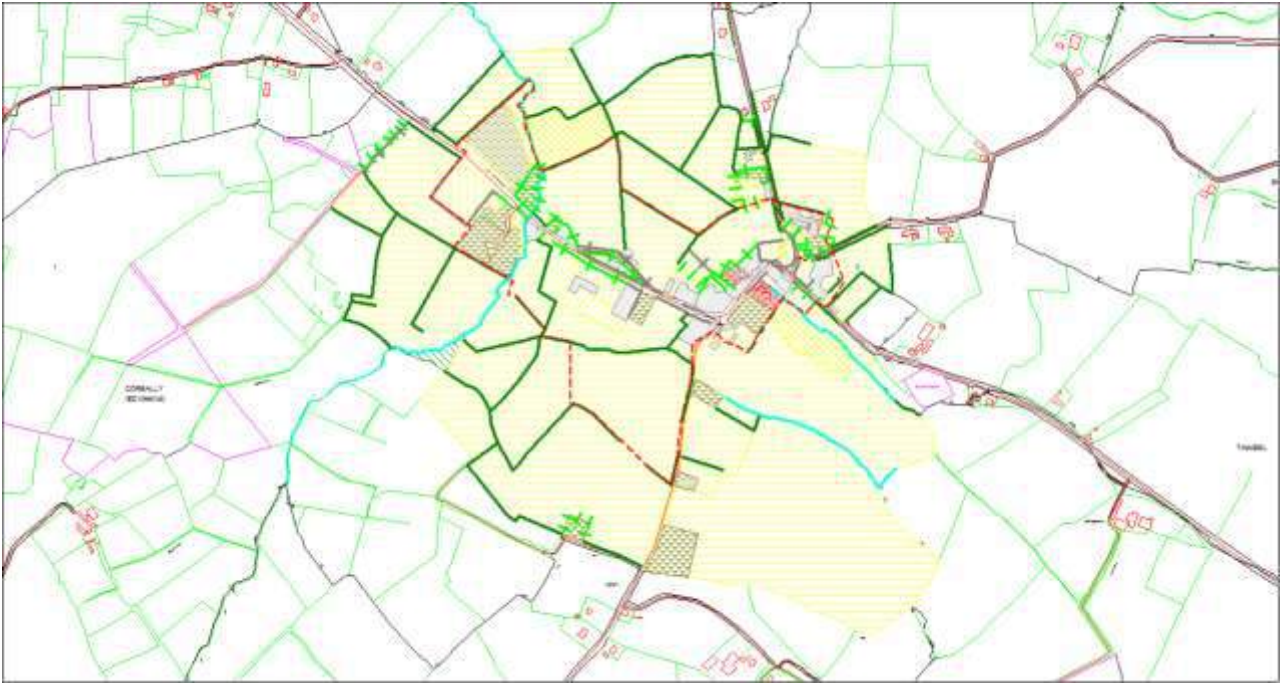


Figure 98. Habitats associated with Rosenallis (LAP boundary in red)



Figure 99. Ecological networks in Rosenallis

5.17.2 EN1 Rivers, woodland, semi-natural grassland, hedgerows and treelines.

The principal habitats in this ecological network are rivers (FW2), riparian woodland (WN5), wet grassland (GS4), hedgerows (WL1), dry meadows and grassy verges (GS2), treelines (WL2) and non-native hedgerows (WS3A). The river flows north, then north east to join the Barrow River just above Two Mile Bridge and while this section is not designated it links to that section of the River Barrow which is of international and national ecological interest (Special Area of Conservation (SAC)). Certain habitats within it are rare in County Laois, such as wet woodland.

Assessment – EN1

The habitats in this ecological network of depositing lowland rivers (FW2) riparian woodland (WN5), wet grassland (GS4), dry meadows and grassy verges (GS2), hedgerows (WL1), treelines (WL2) and ornamental non-native hedgerows provide several functions to society. They include flood attenuation, carbon sequestration, pollution abatement and sources of species which are important for pollination of crops and pest control.

5.17.3 EN2 Rivers, woodland, semi-natural grassland, hedgerows, stone walls, disturbed ground and treelines.

This ecological network of rivers (FW2), riparian woodland (WN5), semi natural grassland (GS2), hedgerows (WL1), stone walls (BL1A) and other stone works (BL1B), treelines (WL2), spoil and bare ground (ED2) and recolonising bare ground (ED3) is also connected to habitats of international and national ecological interest. The stream joins the River Barrow to the south at Mountmellick. This network is linked functionally and spatially to the River Barrow SAC.

Assessment – EN2

The depositing lowland rivers (FW2), riparian woodland (WN5), hedgerows, stone wall (BL1A), other stone works (BL1B) and dry meadows and grassy verge habitat (GS2) provides similar services as EN1.

5.18 Stradbally

5.18.1 Introduction

Two ecological networks are associated with Stradbally. Their habitats and location are shown on the following maps.

5.18.2 EN1 River and associated habitats at Stradbally

The principal and most important ecological network in Stradbally is associated with its rivers. The Bauteogue and Timahoe rivers meet just a few hundred metres to the west of the village where they join to become the Stradbally River which flows east to join up with the Barrow River in the townland of Portree. This habitat is of international ecological interest (Special Area of Conservation (SAC) and is a designated site of international biodiversity importance (cSAC no. 2162).). The SAC extends up to the bridge in the village.

Associated wetland habitats and non-wetland semi-natural habitats adjoining the rivers have been included. The wetland habitats are parts of an old millrace - canals (FW3), drainage ditches (FW4), reed and large sedge swamp (FS1), tall herb swamp (FS2), riparian woodland (WN5), wet grassland (GS4) and mesotrophic lakes (FL4). Non-wetland habitats include dry calcareous and neutral grassland (GS1), dry meadows and grassy verges (GS2), oak-ash-hazel woodland (WN2), scrub (WS1) and hedgerows (WL1). Stonewalls (BL1A and other stone buildings (BL1B) along with man-made woodland habitats such as (mixed) broadleaved woodland (WD1), broadleaved and conifer woodland (WD2) and scattered trees and parkland (WD5) have also been added to the ecological network.

A small stand of the invasive species Japanese knotweed (*Reynoutria japonica*) was found within the ecological network (GPS 53° 01' 08 N and 7° 09' 18), growing on an abandoned site dominated by dry meadows and grassy verges habitat.

The Stradbally River is the main feature of the ecological network. The edges of the channel contain patches of reed and large sedge swamp composed mainly of reed canary-grass, while water crowfoot sp. can be found in deeper sections. Both banks are significantly modified with poor riparian zones.

Although the section of the Stradbally River that flows through the Cosby estate is outside of the LAP area, it contains tall-herb swamp a rare wetland habitat that is dominated by flag iris and abundant meadowsweet. There are also small areas of dry calcareous grassland adjacent to and forming mosaics with it and wet grassland (GS4).

Another wetland habitat surveyed within the estate was mesotrophic lakes (FL4). This consists of one large lake and a smaller one close by. Water milfoil sp. and the introduced invasive Canadian pondweed were among the species growing in the lake. The lake is stocked with trout and most of the lake margins have been strimmed, presumably to facilitate anglers with only occasional patches left un-cut. Common-club rush, water plantain and reed canary grass were found occasionally at the water's edge. There are two small tree dominated islands within the larger lake that are dominated by broadleaved species.

To the left of the roadway that leads into the lake is an area of young woodland (WN5), dominated by willows and reed canary grass growing on dredged material from the lake.

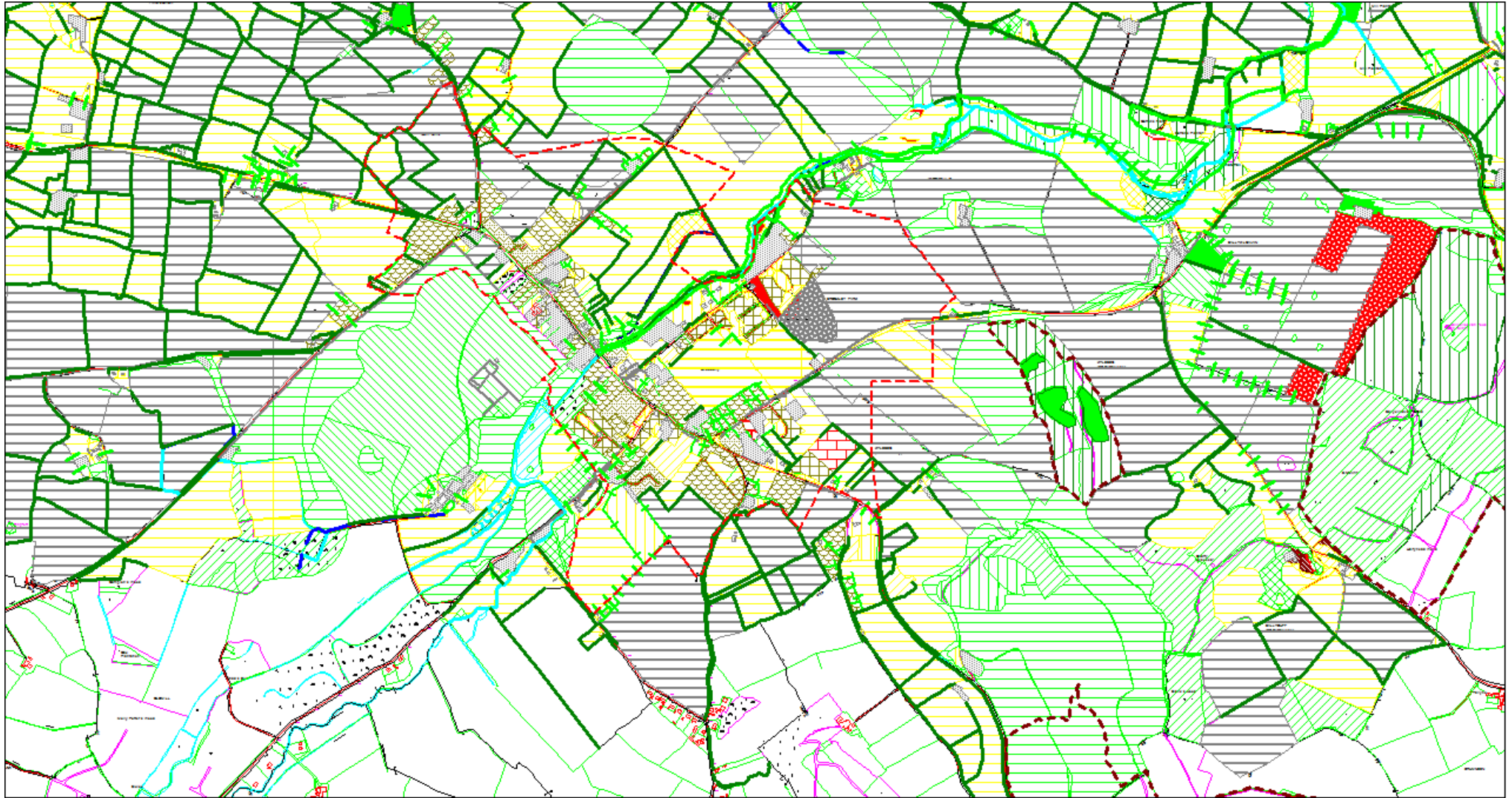


Figure 100. Habitats in the environs of Stradbally



Figure 101. Ecological networks associated with Stradbally



Figure 102. Ducks feeding in the Stradbally River east of the bridge in the centre of the village. Water crowfoot sp. can be seen in the water and reed canary grass is growing on the sides of the channel.



Figure 103. Tall herb swamp (FS2) and mature (mixed) broadleaved woodland (WD1) by the Stradbally River

Location: on the Cosby estate, Stradbally.

The remains of a millrace (FW3) feeding the old mill (now partially restored as apartments) and short section of drainage ditch (FW4), while not directly surveyed were included and mapped using binoculars and aerial photographs. These lead directly into the Stradbally River. An area of wet grassland (GS4) next to these two habitats again inaccessible during the survey was mapped also using binoculars and aerial photography.

Horse chestnuts were among the mature trees in the (mixed) broadleaved woodland behind the former mill and adjacent to a small area of conifers growing next to the river.

Another important feature of this ecological network is the (mixed) broadleaved woodland (WD1) of Knocknumber owned by Coillte. This woodland contains some fine mature oak, beech and pine that are in excess of 30 m in height. Oak regeneration is occurring in wood with young oaks of various sizes. Regeneration of other species such as beech and ash is also occurring. This wood is fairly open and relatively easy to walk through, although the ground flora in places is dominated by ivy and bramble. There is also quite an amount of dead wood throughout. An interesting feature of to the west of the wood is cliff face with exposed limestone rock. Sparrowhawks were circling above during the survey. Knocknumber wood is used by badgers and setts were noted. A remnant of oak-ash-hazel woodland (WN2) on the Vicarstown road opposite Knocknumber wood can be found growing either side of a cut in the road containing hazel and hawthorn. Hedgerows feature throughout this network making important links between habitats. Elm and hazel are frequent components of these species rich hedgerows, as were dog rose, blackthorn, hawthorn and elder.



Figure 104. Coillte owned (mixed) broadleaved wood (WD1), at Knocknumber near Stradbally.

Dry meadows and grassy verges (GS2) were found in 3 locations in ecological network 1 (map1), the largest area stretching from behind the old convent northwards encompassing the backs of very large old gardens that featured on the 1st edition OS maps (Fig X). Stone walls (BL1A, Figure X), and other stone buildings (BL1B), make up the remainder of the habitats in this network.



Figure 105. Dry meadows and grassy verges (GS2) and (BL1A), behind old and large gardens in Stradbally.

Assessment – EN1

This ecological network is centred on the habitat complex of the Stradbally River (FW2, map 2)), which is part of the River Barrow SAC and is of international ecological value (cSAC no. 2162). Its value is directly enhanced by the associated wetland habitats of mesotrophic lakes (FL4), reed and large sedge swamp (FS1), tall-herb swamp (FS2), wet woodland (WN5), wet grassland (GS4), drainage ditch (FW4) and old mill race. These habitats are further extended by their links with the non-wetland habitats of hedgerows, (WL1), dry grassland (GS2) and stone walls and other stone buildings (BL1A and BL1B) adjacent to the canal are of high local ecological value and act as corridors linked directly to the nationally important habitat complex along the river.

The ecological network provides several services to society. It is an important reservoir of biodiversity, linked functionally to an internationally important cSAC; the River Barrow. It contains a habitat that is rare and of national significance, tall-herb swamp. The wetlands around the river perform a regulatory function as they absorb floodwaters and may have the potential to remove pollutants. They act as a natural attenuation area reducing the risk of flooding elsewhere in the catchment. The woodlands are a carbon sink, mitigating for climate change.

The biodiversity of this area adds value to features of cultural importance such as stone buildings, walls and bridges and features associated with a designed landscape. There are several old limestone buildings in Stradbally including the former old mill, churches and private house (map1), that feature on the first edition OS maps.

The network of diverse types of wetlands continues north and south of Stradbally and contributes strongly to the distinctive landscape.

Any proposals for development which could impact on EU listed habitats or species found in the River Barrow cSAC downstream will require to at least be screened for Appropriate Assessment. This particularly includes any impacts on water quality, habitats within the river or wetland habitats along the river margin.

Future development should seek to improve the quality of “buffer” areas by restoring riparian habitats within 25 m of the river. This could involve the establishment of riparian woodland or wetlands.

5.18.3 EN2 Woodland hedgerows and grassland to the south and south east of the village.

The main habitats in this network include oak-ash-hazel woodland (WN2), hedgerows (WL1) and dry meadows and grassy verges (GS2). Other habitats of value in the network include (mixed) broadleaved woodland (WD1), mixed broadleaved conifer (WD2), treelines (WL2) and immature woodland (WS2, map1 and map2).

Woodlands form the largest area of interest in the network, with the oak-ash-hazel woodland (WN2) important nationally (NHA). The (mixed) broadleaved woodland (WD1) and mixed broadleaved conifer (WD2), that are adjacent to the oak-ash-hazel woodland extend and complement it. The oak-ash-hazel woodland is privately-owned and dominated by mature oak. It is quite open in places due to felling in recent past but the ground cover is regenerating. There are several small patches within the woodland that were clear-felled and re-planted with oak (WS2). The woodland extends to the Carlow road and includes the amenity wood in Oughaval which has areas dominated by (mixed) broadleaved trees (WD1) and mixed broadleaved conifer woodland (WD2).

Hedgerows were another element of this network along roadsides, in some of the fields to the west and bordering a lane between the graveyard and the village. Other woodland habitat includes the mature tree line at the graveyard.

A species rich dry meadows and grassy verge habitat was found in a disused quarry opposite the local graveyard. The quarry was filled in using builder's rubble and garden but vegetation has re-established itself. Among the species found there was common knapweed, ragwort, and cocksfoot grass while in stonier and less stable areas there is teasel. There were several species of butterfly including common blue, large white, meadow brown and tortoiseshell. Honey bees and several species of bumblebees were also present. The other site containing semi-natural grassland (GS2) within ecological network 2 was growing along the north side of the Athy road.



Figure 106. Dry meadows and grassy verge habitat (GS2) in a disused quarry opposite Oughaval graveyard.

Assessment – EN2

The oak-ash-hazel woodland at Stradbally hill (WN2) is of national importance whilst the habitat complex of woodland (WN2, WD1 and WD2), hedgerows (WL1), dry meadows and grassy verges (GS2) are locally important to Stradbally. While the oak-ash-hazel woodland is privately owned the broadleaved and conifer woodland at Oughaval is a valuable local amenity area as well as providing habitat for birds, other animals and insects.

Semi-natural grassland support many species of insects and provide habitat for small mammals. In Stradbally the grassland and the hedgerows provide links with the larger areas of woodland and the village..

5.18.4 EN3 Dry meadows and grassy verges and hedgerows.

This is a minor ecological area made up of hedgerows (WL1), a small area of mature (mixed) broad leaved woodland (WD1) that is part of a large garden, a narrow strip of scrub (WS1) and dry meadows and grassy verges (GS2). The main part of it is between the football pitch and the main street while hedgerows connect this area to the narrow road that runs beside the graveyard.

Assessment – EN3

This network though small is a refuge in among large agricultural fields and the built landscape of the village, and provides a connection from the south west of the village into the countryside.

5.19 The Swan

5.19.1 Introduction

Two ecological networks were identified in the vicinity of the Swan. The habitats within them and their location are shown on the maps below.

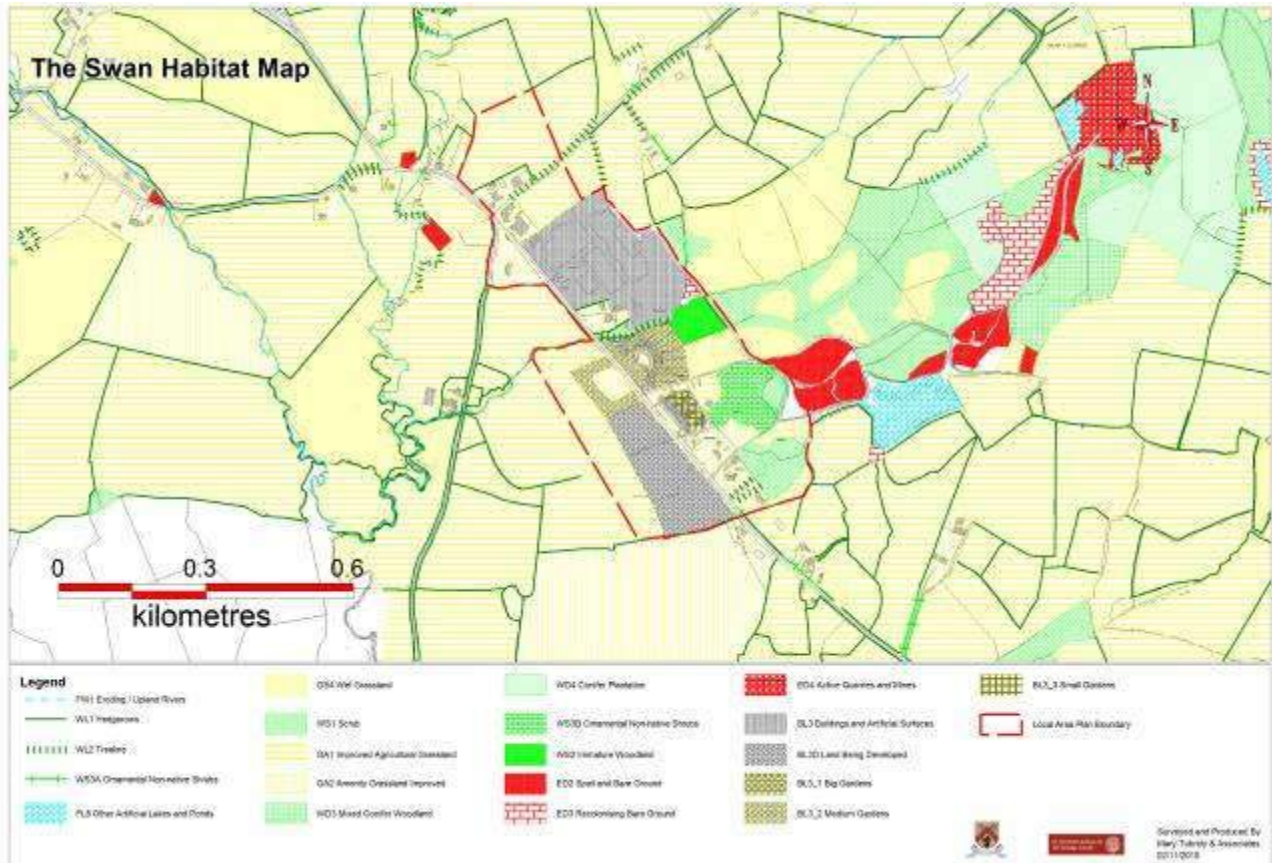


Figure 107. The Swan Habitats



Figure 108. The Swan Ecological Networks

5.19.2 EN1 Rivers, scrub, hedgerows, immature woodland, stone walls, disturbed ground and treelines.

The main ecological network in Swan is associated with upland eroding rivers (FW1), scrub (WS1) hedgerows (WL1), immature woodland (WS2), stonewalls (BL1A), recolonising bare ground (ED3). A patch of Japanese knotweed was recorded alongside the small watercourse (FW1), to the east of the road.

Assessment – EN1

This ecological network of eroding upland rivers (FW1, scrub (WS1), hedgerows (WL1), stone walls (BL1A), disturbed ground (ED3), immature woodland (WS2) and treelines (WL2) are of local importance. These habitats connect the village to a larger network of woodland, scrub and pond habitats to the east the village but outside of the LAP area.

5.19.3 EN2 Pond, scrub, exposed rock, hedgerows, ornamental non-native shrub and treelines

A tailings pond (FL8), exposed siliceous rock (ER1), scrub (WS1), hedgerows (WL1), ornamental non-native shrub (WS3B) and treelines (WL2) are within this network. Exposed rock (ER1) is present was too small to map. It consists of a section of near vertical unvegetated rock along the western side of the old tailings pond. The treeline has several mature trees.



Figure 109. Tailings pond in excavated clay mine at The Swan

Assessment – EN2

An artificial pond (FL8), exposed rock (ER1), hedgerows (WL1), ornamental non-native shrub (WS3B) and treelines are linked into other semi-natural habitats; woodland, scrub and pond habitats that occur outside of the LAP area. This network links biodiversity in Swan with the wider countryside. It provides a sump for waste water generated by the mine and some form of pollution as abatement as silt is removed from water.

5.20 Vicarstown

5.20.1 Introduction

Two ecological networks were identified around Vicarstown. Their associated habitats and location are shown on following maps.

5.20.2 EN1 Canal and associated habitats at Vicarstown

The principal and most important ecological network in Vicarstown is associated with the Grand Canal. This habitat is of national ecological interest (Natural Heritage Area (NHA)).

The canal itself is the main part of the ecological network and joins the River Barrow a designated site of international biodiversity importance (cSAC no. 2162), to the south in Athy Town.

The invasive species Japanese knotweed (*Reynoutria japonica*) is found within the ecological network (GPS 53° 03' 09.18N and 7° 04' 58.49W, Figure X), growing next to the entrance of a farmyard that is located on the west side of the canal, north of the village.



The aquatic invasive species Canadian pondweed can be found growing in several locations within the canal. Habitats within the ecological network in the study area (shown on Map 1) include the canal (FW3), narrow strips of reed and large sedge swamp (FS1) growing at the edges of the canal, wet pedunculate oak-ash woodland (WN4), dry meadows and grassy verges (GS2), oak-ash-hazel woodland (WN2), hedgerows (WL1) and other stone buildings (BL1B).

The core feature of this network the canal supports several plant species including common water plantain, common club rush, common reed, yellow water lily and Canadian pondweed. Young fish were observed during the survey.

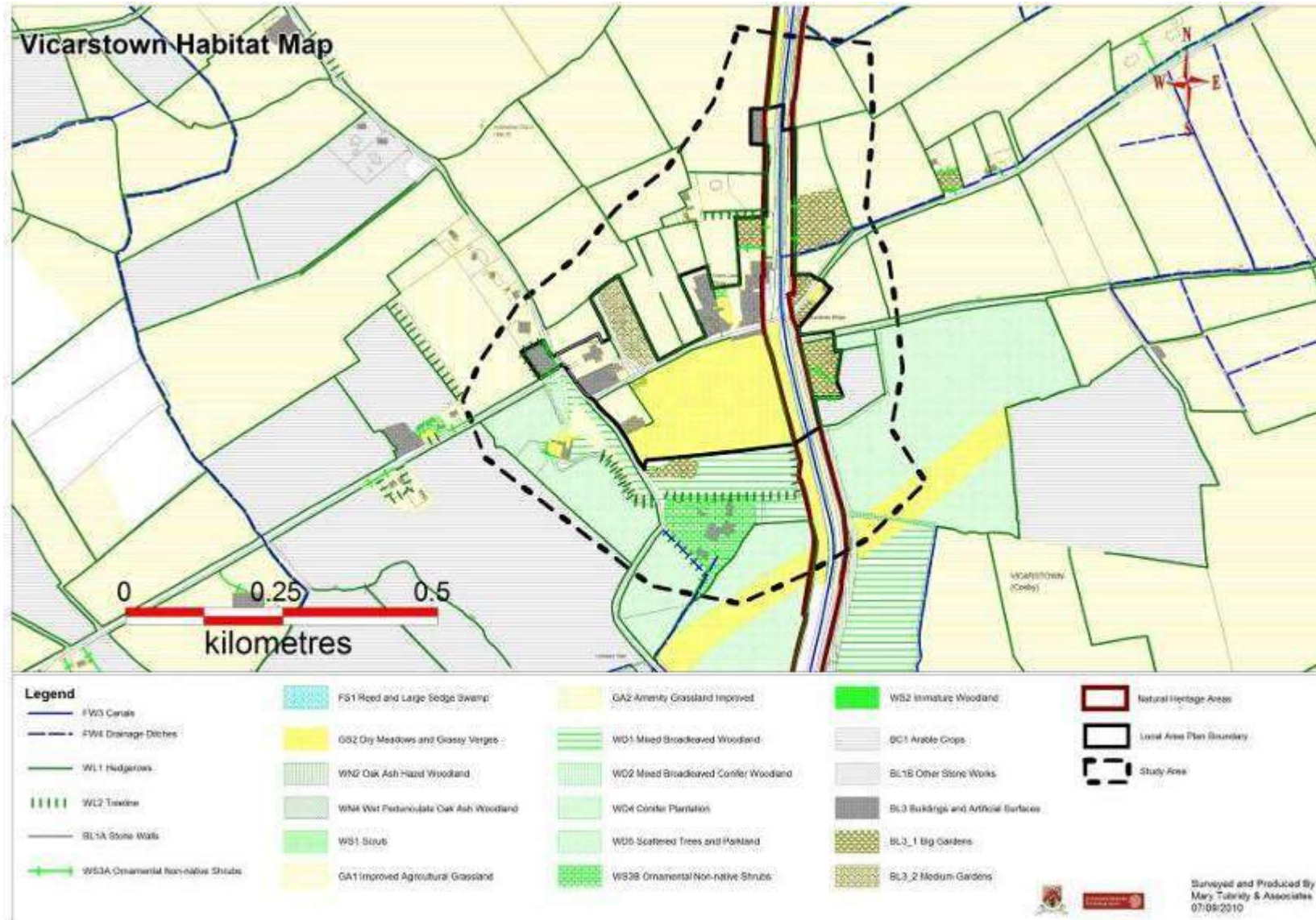


Figure 110. Vicarstown Habitats



Figure 111. Vicarstown Ecological Networks



*Figure 112. Yellow water lilies, Canadian pondweed, water milfoil and floating sweet grass
Location: the Grand Canal, Vicarstown.*

Reed and large sedge swamp (FS1), though occurring in very narrow bands intermittently along the sides of the canal supports several species such as common valerian, soft rush, hemp agrimony, purple loosestrife, iris, angelica and meadowsweet, and provides important habitat for wetland species associated with the canal.



Figure 113. Reed and large sedge swamp bordering the sides of the canal at Vicarstown.

Wet pedunculate oak-ash woodland (WN4) can be found in 3 locations. It forms the boundary between the canal area and adjacent agricultural fields on the eastern side of the canal north of Vicarstown Bridge. It occurs with dry meadows and grassy south of the bridge on the west side of the canal and merges with oak-ash-hazel woodland which adjoins recently planted conifer plantation on the eastern side of the canal south of the bridge. These are low-lying areas which are seasonally wet and tend to dry out during the summer. Wet pedunculate oak-ash woodland supports many of the same species as oak-ash-hazel woodland (WN2) such as hazel, holly and hawthorn but also typical wetland species such as willow and alder. Ivy, bramble and guelder rose were also present. The herbaceous component of the wet pedunculate oak-ash woodland contains similar species to those found in the reed and large sedge swamp such as meadowsweet, angelica and hemp agrimony.

Other important features of this ecological network are oak-ash-hazel woodland (WN2), dry meadows and grassy verges (GS2) and hedgerows (WL1).

Oak-ash-hazel woodland makes up a small portion of south east corner of the LAP area but continues southwards for several hundred metres until it is replaced by arable crops (BC1). In addition to ash and hazel, holly, hawthorn and elder were also present. Wood avens, cleavers, herb robert and primroses were found in the herb layer. The hedgerows adjacent to the western side of the canal tend to be very wide and some could almost be considered as oak-ash-hazel wood and they contain similar species.

Small areas of dry meadows and grassy verges are found either side of the tow path, but amenity grassland (GA2) tends to dominate the open areas between the canal and more wooded sites within the LAP boundary (map1). The old limestone buildings (BL1B), the bridge in particular those that are ivy clad also form part of this ecological network, providing nesting sites for birds and bats as well as providing for species such as butterflies, bees and birds.

Assessment – EN1

The habitat complex of the Grand canal at Vicarstown (FW3, map 2)), reed and large sedge swamp (FS1) and wet woodland (WN4) is of national ecological value, as it contains an example of an EU Annex I habitat type (alluvial woodland. The oak-ash-hazel woodland (WN2), hedgerows, (WL1), dry grassland (GS2) and stone ruins (BL1, fig X),

adjacent to the canal are of high local ecological value and act as corridors linked directly to the nationally important habitat complex along the river.



Figure 114. Ivy clad old stone building (BL1B), beside the canal, potential habitat for birds and bats.

The ecological network provides several services to society. It is an important reservoir of biodiversity, linked functionally to an internationally important cSAC; the River Barrow. It contains a habitat of international significance, wet woodland, listed in the Habitats Directive. The wetlands around the river perform a regulatory function as they absorb floodwaters and may have the potential to remove pollutants. They act as a natural attenuation area reducing the risk of flooding elsewhere in the catchment. The wet woodland is a carbon sink, mitigating for climate change. This area is also an outdoor amenity where the public use the canal and its towpaths for boating walking or other recreational pursuits such as fishing.

The biodiversity of this area adds value to features of cultural importance such as stone buildings, walls and bridges and features associated with a designed landscape. The limestone buildings beside the canal were part of the Grand canal stores and feature on the first edition OS maps. The network of diverse types of wetlands continues north and south of Vicarstown and contributes strongly to the distinctive landscape. Any proposals for development which could impact on EU listed habitats or species found in the River Barrow cSAC downstream will require to at least be screened for Appropriate Assessment. This particularly includes any impacts on water quality, habitats within the river or wetland habitats along the river margin. Future development should seek to improve the quality of “buffer” areas by restoring riparian habitats within 25 m of the river. This could involve the establishment of riparian woodland or wetlands.

5.20.3 EN2 Field, hedgerows and woodland west of the canal

This ecological network is centred on semi-natural grassland, hedgerow and woodland habitats west of the canal that occur mostly south of Vicarstown Bridge (map 1 and 2). Semi-natural grassland (GS2) forms the main part of the ecological network along with hedgerows (WL1). Mixed broad-leaved woodland (WD1), scattered trees and parkland (WD5) and treeline (WL2) habitats just outside of the LAP area were included in the network as they complemented the habitats within the network.

The dry meadow and grassy verges habitat is grazed but contains a number of young tree species which have survived, but these do not appear to be rapidly encroaching. Species diversity was not great but did include species such as cocksfoot, common mouse ear, creeping thistle, perennial rye grass and ragwort.

Most of the mixed broadleaved woodland (WD1) apart from that growing in Grattan Lodge is recently planted and is of limited value at this point but does provide perching sites for birds and food for insects.



Figure 115. Dry meadows and grassy verge habitat (GS2) being colonized by scrub

Assessment – EN2

This habitat complex of dry meadows and grassy verges (GS2), hedgerows (WL1) and woodland (WD1 and WD5) are of local importance to Vicarstown. Semi-natural grassland support many species of insects and provide habitat for small mammals in Vicarstown it also links the canal complex to the woodland habitats to the west. The trees and parkland habitat (WD5) contains mature tree species, but also much of the grassland in the parkland is semi-natural (GS2), and is used for grazing horses. Nearly all of the mapped hedgerows appear on the first edition OS maps and while not all of them are in good condition they still contribute to the local biodiversity of the area.

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7 Appendix 1

Summary of part of the habitat classification scheme in *A Guide to Habitats in Ireland* (Fossitt, 2000) which applies to Laois (marine habitats excluded) with standard alphanumeric habitat codes.

F Freshwater

FL Lakes and ponds

FL1 Dystrophic lakes*

FL2 Acid oligotrophic lakes*

FL3 Limestone/marl lakes*

FL4 Mesotrophic lakes

FL5 Eutrophic lakes*

FL6 Turloughs*

FL7 Reservoirs

FL8 Other artificial lakes and ponds

FW Watercourses

FW1 Eroding/upland rivers*

FW2 Depositing/lowland rivers*

FW3 Canals

FW4 Drainage ditches

FP Springs

FP1 Calcareous springs*

FP2 Non-calcareous springs

FS Swamps

FS1 Reed and large sedge swamps

FS2 Tall-herb swamps*

G Grassland and marsh

GA Improved grassland (highly modified)

GA1 Improved agricultural grassland

GA2 Amenity grassland (improved)

W Woodland and scrub

WN Semi-natural woodland

WN1 Oak-birch-holly woodland*

WN2 Oak-ash-hazel woodland

WN3 Yew woodland*

WN4 Wet pedunculate oak-ash woodland*

WN5 Riparian woodland

WN6 Wet willow-alder-ash woodland

WN7 Bog woodland*

WD Highly modified/non-native woodland

WD1 (Mixed) broadleaved woodland

WD2 Mixed broadleaved/conifer woodland

WD3 (Mixed) conifer woodland

WD4 Conifer plantation

WD5 Scattered trees and parkland

WS Scrub/transitional woodland

WS1 Scrub*

WS2 Immature woodland

WS3 Ornamental/non-native shrub

WS4 Short rotation coppice

WS5 Recently-felled woodland

WL Linear woodland and scrub

WL1 Hedgerows

WL2 Treelines

GS	Semi-natural grassland		
GS1	Dry calcareous and neutral grassland*	E	Exposed rock/disturbed ground
GS2	Dry meadows and grassy verges*	ER	Exposed rock
GS3	Dry-humid acid grassland*	ER1	Exposed siliceous rock*
GS4	Wet grassland*	ER2	Exposed calcareous rock*
GM	Freshwater marsh	ER3	Siliceous scree and loose rock*
GM1	Marsh*	ER4	Calcareous scree and loose rock*
		EU	Underground rock and caves
H	Heath and dense bracken	EU1	Non-marine caves*
HH	Heath	EU2	Artificial underground habitats
HH1	Dry siliceous heath*	ED	Disturbed ground
HH2	Dry calcareous heath*	ED1	Exposed sand, gravel or till
HH3	Wet heath*	ED2	Spoil and bare ground
HH4	Montane heath*	ED3	Recolonising bare ground
HD	Dense bracken	ED4	Active quarries and mines
HD1	Dense bracken	ED5	Refuse and other waste
P	Peatlands	B	Cultivated and built land
PB	Bogs	BC	Cultivated land
PB1	Raised bog*	BC1	Arable crops
PB2	Upland blanket bog*	BC2	Horticultural land
PB3	Lowland blanket bog*	BC3	Tilled land
PB4	Cutover bog*	BC4	Flower beds and borders
PB5	Eroding blanket bog	BL	Built land
PF	Fens and flushes	BL1	Stone walls and other stone work
PF1	Rich fen and flush*	BL2	Earth banks
PF2	Poor fen and flush	BL3	Buildings and artificial surfaces
PF3	Transition mire and quaking bog*		
