

Kilkenny Local Area Plan Habitat Assessments 2010

Ballyragget



River Nore and adjacent woodland south of the bridge in Ballyragget

Report prepared for Kilkenny County Council

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Executive Summary

This report contains the results and interpretation of a habitat mapping study which was carried out in Ballyragget to inform the Local Area Plan. It builds on a descriptive account of biodiversity which was prepared for the previous Local Area Plan CAAS (2004).

A Green Infrastructure approach was taken to describing biodiversity, based on the identification of habitats and their relationship within ecological networks. Green Infrastructure highlights the provision of ecosystem services by biodiversity. These include food/timber production, mitigation of climate effects (e.g flooding), quality of life and supporting services to agriculture. Fieldwork took place in February 2010 to map habitats to level III, following Heritage Council guidelines. Hedgerows were also assessed using a combination of structural and biodiversity criteria. This provided a numerical value for each hedgerow. Using an approach developed by the NRA, the relative value of habitats was also identified. To inform the account of Green Infrastructure further interpretation of the habitat map was carried out to identify “ecological networks”. Ecological networks are based on the core/corridor/buffer principle and emphasise the importance of linkages between habitats to maintain ecosystem functioning. Cores are areas/features of key biodiversity importance/ecosystem functioning, while corridors are land/watercourses which allows linkages between key areas or their expansion. Buffers comprise land adjacent to the key area whose management influences its quality. These networks were identified to assist the identification of functions provided by Green Infrastructure.

A habitat map (Map 1) accompanying the report shows habitats present within the study area. Ecological networks are overlain on an aerial photo (Map 2). Digital files which have been provided to Kilkenny County Council will allow habitat information to be imported into the council’s Geographic Information System (GIS). All hedgerows are numbered on the habitat map. Their value for biodiversity is summarised in Table 2. This report contains a summary account and evaluation of biodiversity and its value as Green Infrastructure.

The principal ecological network in Ballyragget is associated with the River Nore. It features associated wetlands including two tributaries which flow through the village, and semi-natural habitats and mature trees adjacent to them. The core part of this network is contained within the River Barrow/Nore cSAC. The tributaries of the River Nore form corridors. The principal value of the network as Green Infrastructure lies in its function to regulate flooding.

Floodwaters are absorbed by the wetlands thus protecting land elsewhere. The network is a visual amenity and has potential for further development as a focus for active recreation. The key habitats within this network warrant special management and protection from future development. Any development which could affect water quality or wetland habitats should be screened for its potential impact on the cSAC.

Hedgerow evaluation revealed that a minority of hedgerows (7 out of 23) were of high quality. No hedgerows were found along townland boundaries. As Green Infrastructure features hedgerows are important for local biodiversity and support farming by providing reservoirs for species which pollinate commercial crops and control pests and shelter for animals. They are relics of farming history and their appearance helps to define the rural landscape. However their ability to provide these services is limited by poor management. Most hedgerows are cut in a box shape which reduce their extent and biodiversity.

Other features of biodiversity interest are associated with parkland, including mature trees and dry stone walls. They provide important visual amenities and enhance cultural values.

1 Introduction

1.1 Study brief

Kilkenny County Council is reviewing and preparing local area plans (LAP's) for settlements throughout the county. As part of this process, habitat assessments were undertaken as a source of information on local biodiversity, and to help assess future planning applications.

1.2 Approach

This habitat assessment uses a Green Infrastructure approach to identify the most important ecological features of the area and their functions.

A working definition of Green Infrastructure (GI), developed by a research project currently being undertaken for Comhar Sustainable Development Council, DOEHLG (Compass Informatics et al, 2010, in prep.) states that GI is a “strategically planned and managed network featuring areas with high quality biodiversity (uplands, wetlands, peatlands, rivers and coast), farmed and wooded lands and other green spaces that conserve ecosystem values which provide essential services to society”. Ecosystem services include *provisioning*, such as the production of food and water; *regulating*, such as the control of climate and disease; *supporting*, such as nutrient cycles and crop pollination; and *cultural*, such as spiritual and recreational benefits. Practical examples of services provided by Green Infrastructure include: the provision of food and wood through farming and forestry, water from rivers or aquifers; flood attenuation by rivers and natural wetlands, waste decomposition; transport routes, pollination of crops, interesting green spaces for recreation; air filtering and noise attenuation by vegetation and environmental education opportunities. A Green Infrastructure approach to spatial planning is being promoted by the Biodiversity Unit, DG Environment of the European Commission (2006) to support biodiversity management post 2010 as it allows for greater integration between biodiversity and development. This approach is supported by the numerous guidelines such as the Green City guidelines (Brennan and O'Connor, 2008). The study being undertaken for Comhar SDC explains the concept illustrated by case studies, describes a Green Infrastructure planning process and provides recommendations for its elaboration and promotion by Comhar SDC and DOEHLG.

Habitat mapping is at the core of Green Infrastructure assessment as it provides an account of almost all the features in the landscape which are responsible for ecosystem functioning. Habitat mapping following the Heritage Council's *Best*

Practice Guidance for Habitat Survey and Mapping (2010) allows for the identification of each example of a habitat type. It also allows for the evaluation of biodiversity outside designated areas using an ecological evaluation technology developed by the National Roads Authority (NRA), based on criteria such as rarity, naturalness and statutory requirements for protection of particular species (NRA, 2008). As ecosystem services are rarely provided by individual examples of habitats but by groups of similar or related habitats, the Green Infrastructure approach requires that habitat mapping is further interpreted to identify “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 require more appropriate management) and “corridors” habitats which allow for the movement of species, particularly those associated with the core habitats. A river is a good example of an ecological network where the core feature is the remaining watercourse. The nature rehabilitation area comprises the original floodplain which has probably been drained and corridors are the tributaries or hedgerows along which species which breed or feed in the river commute. Not all of these features will necessarily be associated with each part of the network.

Ecological networks support the implementation of the EU Habitats Directive, as Article 10 stresses the importance of ecological corridors linking designated sites. It also highlights the maintenance of biodiversity throughout the wider landscape, not just in areas which are protected for nature conservation designations. It highlights linking features such as hedgerows, streams or small examples of semi-natural habitats. Identification of ecological networks allows consideration of the possible impacts of development on important nature conservation areas, which are outside the survey area but are linked to it through ecological networks. In areas where proposals may have an impact on EU designated nature conservation sites the Planning Authority has an obligation to ensure that adequate screening takes place and, if necessary, that an appropriate assessment under Article 6 of the Habitats Directive is carried out. The identification of ecological networks can be of significant assistance in identifying any features in the study area, outside designated areas that might trigger screening and risk pathways that could suggest the need for full appropriate assessment.

Information on hydrology, geology and soils are all important factors underpinning the quality of ecological networks and Green Infrastructure. As well as human management, these are the main features that explain why a particular habitat occurs in an area. Their consideration is important when

examining Green Infrastructure as it allows a more robust analysis of the quality of current ecological networks, threats and opportunities for enhancement.

Habitat identification and assessment is at the core of ecological networks and Green Infrastructure. Greater connectivity increases the value of individual habitats, the value of the network and ecosystem functioning. The more natural and connected a habitat, the more important it is as Green Infrastructure.

2 Methodology

2.1 Introduction

Preparation of this report can be broken down into three main parts: (i) consultations and desk study; (ii) field survey; and (iii) report writing and database compilation.

In practice these phases all overlap to some extent.

2.2 Consultations and desk study

An initial steering meeting was held with Kilkenny County Council Forward Planning and the County Heritage Officer to agree the approach to the assessment and the data sources to be used. Working maps were then produced to facilitate the desk study. An outline map was prepared using a combination of vector maps, aerial photographs, historic first edition Ordnance Survey maps, and a review of existing information.

Consultations were held with the local National Parks & Wildlife Service conservation ranger, the Southern Regional Fisheries Board, the county botanical recorder, and Kilkenny branch of BirdWatch Ireland, as well as local authority staff. Desk sources consulted included:

- Ballyragget Local Area Plan 2004
- Ecological Survey of Ballyragget to inform the local area plan (CAAS, 2004).
- National Parks & Wildlife Service online data (www.npws.ie)
- Site file for the nearest designated site: Barrow Nore cSAC No.2162 inspected in NPWS, Ely Place, Dublin.
- Environmental Protection Agency data on soils and water quality <http://maps.epa.ie/InternetMapViewer/mapviewer.aspx> - Land/Soils; Land/Subsoils; Water Quality/Current River Data
- 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.

- County Kilkenny Groundwater Assessment (2002). Vol.1 Kilkenny County Council and Geological Survey.
- Kilkenny County Development Plan 2008-2014 (www.kilkennycoco.ie/cdp/index.html)
- Draft County Kilkenny Biodiversity Action Plan 2008

An information leaflet was produced explaining the project (Appendix 1). This was sent out to interested individuals and local groups e.g. Tidy Towns groups, in advance of fieldwork. It was also used in conjunction with a letter of introduction provided by Kilkenny County Council when approaching landowners to seek access.

2.3 Fieldwork

Following Heritage Council guidelines all habitats within the study area were mapped, the boundary of which is based on the development boundary of the 2004 Ballyragget Local Area Plan. Some areas outside this boundary were mapped where they supported important semi-natural habitats or were constituents of an ecological network whose core lay within the study area boundary. Fieldwork took place in January/February 2010.

Standardised field survey and hedgerow recording cards (Appendix 2) were used to gather information on habitats and hedgerows. Wherever possible land was surveyed by direct inspection of the habitats. No land was entered without prior permission of the landowner. Where access was not possible, habitats were viewed from the nearest public road or other public land, and mapped and described using results of desk research.

In the case of habitats previously surveyed in detail for ecological reports for the 2004 LAP, it was sufficient in most cases to ground-truth the habitats to ensure that the new mapping is accurate, and draw on the previous work to complete the habitat descriptions. Previous reports were particularly useful to describe sites with difficult access.

‘Target notes’ were compiled for ecological networks of particular value. These are notes entered into record cards during the field survey and consisted of lists of species (Appendix 3). These were used to inform descriptions contained in this report. Photographs were taken of habitats within these areas.

2.4 Habitat mapping

The methodology followed the latest guidance produced by the Heritage Council (2010). Habitats were mapped according to Fossitt (2000).

Habitats are areas defined particularly by their flora. They may also have particular 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 Fossitt classification system (summarised in Appendix 5) provides a hierarchical classification of habitats from Levels One to Three. Level one provides a gross classification, Level Two is intermediate, and Level Three is the most detailed. Habitats in Ballyragget were mapped to Level Three.

At Level One eleven habitats are differentiated. These are Freshwater, Grassland and Marsh, Heath and Dense Bracken, Peatlands, Woodland and Scrub, Exposed Rock and Disturbed Ground, Cultivated and Built Land, Coastland, Littoral, Sub littoral and Marine Water Body.

Level Two allows for a more detailed classification of the Level One types. For example Level One Freshwater habitats can be distinguished as either lakes, ponds, watercourses, springs or swamps and so on for all other Level One habitats.

Level Three allows for further differentiation of these types. For example there are eight different lake habitats; four types of watercourses, two types of springs and two different kinds of swamps.

In Ballyragget habitat classification followed Fossitt conventions with the following modifications which have been developed through experience of habitat mapping studies elsewhere (Dublin, Laois and Kildare):

1. Hedgerows consisting of non-native shrubs, usually surrounding housing were identified as WS3A. This is a sub type of WS3 (Ornamental /non native shrubs) according to Fossitt 2000).
2. The Fossitt habitat category BL1 (Stone buildings) was subdivided into BL1A (stone walls) and BL1B (stone buildings).
3. Land under development (i.e. a building site) transitional between habitat types, was mapped as BL3D.
4. Due to the difficulty of describing habitats in gardens three additional habitat types were identified in semi-urban areas to describe the characteristic biodiversity associated with houses and gardens. These were principally

observed from outside and the habitat types were developed from experience of fieldwork in Dublin where the recommended habitat type BC4 (Flower beds and borders) did not usefully describe habitat diversity. These new habitats were subsets of the habitat category BL3 (Buildings and built surfaces) and were BL3 1; BL3 2 and BL3 3. The three types are distinguished by size of garden; areas mapped as BL3 1 have houses and gardens occupying an area > 500 m². BL3 2 have gardens between 250 and 500 m² usually associated with semi-detached houses. The third category BL3 3 describes areas dominated by small gardens < 250 m². 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).

These subtypes were identified in the field and digitised for the habitat map.

2.5 Hedgerow survey

A hedgerow survey methodology was devised for this project which enabled a ranking of hedgerows tailored to the rural/peri-urban focus of this study. The methodology is based on hedgerow assessments by Lyons & Tubridy (2006), Murray & Foulkes (2005) and Clements and Tofts (1992).

Hedgerows were inspected along their entire length where possible. Data was collected on their average height and width, gappiness, biodiversity value (number of native tree and shrub species), number of layers (herb, shrub, trees), structural features (bank, ditch, water), connections to other hedgerows, age (whether the hedgerow existed in the 1840s and whether it was a townland boundary), management, and other features of biodiversity interest (rare plants, badger sett etc).

The data was used to score the surveyed hedgerows so that the most important ones could be identified. Details of the scoring system for each characteristic are shown on the Hedgerow Record Card (Appendix 2). Scores under each characteristic were added to give an overall score for each hedgerow.

Under this system, the minimum possible score for any one hedgerow is 5; the maximum is 30. Following careful examination of the results from several settlements, each hedgerow was then allocated to one of the categories shown on Table 1.

Hedgerows that were surveyed and assessed were assigned a number and are mapped accordingly (e.g. H01, H11 etc). Hedgerows which could not be

surveyed due to access difficulties but were validated as present are mapped as WL1 and have no individual number.

Table 1. Hedgerow rating system

Score	Rating	Description
5-10	1 *	Low value – least important
11-19	2 **	Moderate value - of moderate importance
20-30	3 ***	High value – most important

2.6 Map digitisation and database compilation

Clean hard copy maps were marked up clearly with habitat polygons and line features and handed over to the GIS specialist for digitisation. Each feature was marked as being surveyed (S) where it was directly inspected in the field; validated (V) where it was checked from a distance if access was not possible, or assigned a habitat code based on the desk study (D), where no visual confirmation was possible. This information is contained in the GIS database.

Information relating to each habitat area and hedgerow is stored in a separate Microsoft Access Database, allowing this information to be linked to Kilkenny County Council's GIS system. This allows the maps to be queried for information.

A standard hatching and map layout was agreed for final presentation. A hardcopy habitat map and ecological features map accompany this report. Ecological networks described in the report are given a unique identifier number on the map so that readers can easily find the feature in question.

2.7 Reporting and data presentation

This written report, a set of photographs, along with the maps and GIS database, gather together the information collected during the survey, desk study and consultations. The main body of this report contains descriptive accounts of habitats and ecological networks. This is based on species lists compiled for

principal habitats within these networks (Appendix 3 , Target Notes). The assessment of the habitat networks is based on a system developed by the NRA.

2.8 Study constraints

The timeframe for carrying out the assessment required that fieldwork takes place over a short time outside the optimum period for fieldwork which is late spring/summer. Fieldwork for this report took place in March 2010.

Accordingly, the list of plant species recorded from the habitats is incomplete. Seasonality did not affect the principal objectives of the study: to map, assess the significance of the habitats present, identify ecological networks and comment on their significance as Green Infrastructure. The principal objective was met despite the seasonal constraints, by using previous reports particularly CAAS (2004), targeted consultations, field survey and professional judgement.

3 Results

3.1 Geodiversity

Mapping located on the GSI website (sources listed in 2.2) revealed that the village is underlain by different types of limestone rock, principally the crinoidal wackestone/packstone limestones of the Ballyadams formation. To the west along the river there is a small amount of limestone of the Durrow formation, while to the east, the Ballyadams formation is bounded by the Clogrenan formation. According to GSI mapping, limestone outcrops in a few small areas north of the village.

Associated with the river the main subsoil is glaciofluvial sand and gravel derived from carboniferous limestone. Alluvium is found above this material adjacent to the river. A band of limestone till is associated with higher ground east of the village.

The principal soil type is a rendzina/lithosol derived from the calcareous sands and gravels.

The aquifer associated with the Ballyadams formation is regionally important and karstified (diffuse). The aquifer associated with the Durrow formation is locally important. The aquifer associated with the Ballyadams formation is of high to extreme vulnerability and is extremely vulnerable where bedrock is near the surface.

Most recent records of water quality (EPA, 2007) for the Nore, based on water samples taken from Ballyragget Bridge, in the village, Tallyho Bridge to the north and Lismaine Bridge to the south, show water quality of Q4 (good status) north of the village, Q3-4 (moderate status) in the village and Q4 (good status) to the south. This suggests a deterioration of water quality in the vicinity of Ballyragget.

3.2 Ecological networks

BR1 The Nore and tributaries

The principal and most important ecological network in Ballyragget is associated with the River Nore and its tributaries. Its extent is outlined on Map 2 and the habitats found within it are shown on the Habitat Map (Map 1).

The core part of this network is associated with River Barrow and River Nore cSAC (Site code 2162), a designated site of international biodiversity importance and the Barrow/Abbeyleix Woods proposed Natural Heritage Area (pNHA). The most important habitats within the network are wetland types within the SAC particularly depositing/lowland river (FW2, Fossitt 2000). Other semi natural habitats associated with this core area include its tributaries classified as upland river (FW1), riparian woodland (WN5) and wet grassland (GS4). Also found within this network are hedgerows (WL1), dry meadows and grassy verges (GS2), dry stone walls and buildings (BL1A, BL1B) and mixed deciduous woodland (WD1). The principal wetland habitats and their environs are contained within the SAC. Snowberry an invasive exotic was recorded in the north east of the study area. No other exotic invasives were recorded.

The River Barrow and Nore cSAC is of particular conservation significance for wetland habitats, such as alluvial wet woodlands and petrifying springs which are priority habitats on Annex I of the EU habitats directive. It is also important for a number of animals listed on Annex II of the EU Habitats Directive such as the otter, Daubenton's bat, freshwater pearl mussel, freshwater crayfish and salmon. This is the only site in the world to contain the hard water form of the pearl mussel and one of the few spawning grounds in the country for twaidd shad. The River Nore is also a designated salmonid river (River Barrow and River Nore cSAC, site synopsis, NPWS). According to the Fisheries Board, the river in the vicinity of Ballyragget is a significant habitat for salmonids (Frank O' Donoghue, pers.comm.).

Bird species known to use the riparian habitats throughout the cSAC include sedge warbler, mute swan, moorhen, coot, little grebe and little egret (River Barrow and River Nore cSAC, site synopsis). Greenland white footed geese use parts of the river Nore, and nationally important numbers of golden plover and bar-tailed godwits. Many of these bird species are on the list of Birds of Conservation Concern in Ireland (Lynas *et al* 2007). A member of the local branch of BirdWatch Ireland (Pat Durkan, pers.comm.) reports the presence of mute, whooper and Bewick swans; curlew, snipe, woodcock, little grebe, dipper,

kingfisher, grey heron, little egret, grey wagtail, reed bunting and grasshopper and willow warbler in the vicinity of the river in Ballyragget.

The river provides suitable habitat for kingfisher, which were recorded previously (CAAS 2004). Birds recorded in the vicinity of the river during fieldwork in 2010 include willow warbler, chiffchaff, grey wagtail and heron.

The principal characteristics of the wetland habitats in the network adjacent to the Nore have been described by CAAS (2004) and confirmed by fieldwork in 2010.

Within the study area, riparian (riverside) woodland (WN5) forms a narrow band along the banks of the River Nore where water levels fluctuate within the floodplain. The woodland is dominated by alder, ash, willow tree species, holly and hawthorn. This riparian woodland is of particular significance for biodiversity. Its presence in the environs of Ballyragget is significant as it is generally absent along the banks of the River Nore.



Figure 1. Area of scrub and neutral grassland on the banks of the River Nore, to the south west of village.

South of Ballyragget Bridge the river flows through agricultural grazing land, which is fenced from livestock close to the riverbank. Where it is fenced, areas of wet grassland (GS4) are present, dominated by creeping bent, marsh foxtail and creeping buttercup. Meadow buttercup, silverweed, cuckoo-flower, nettle, spear thistle and sedges also occur here. Emergent vegetation on the river bank is dominated by reed grass, bur reed and club rush. Trees including; crack willow, osier, alder, sycamore and grey poplars. Meadowsweet is occasional. Bare ground is also present in areas subjected to frequent flooding and trampling by livestock.

North of Ballyragget Bridge the field within the study area has wet grassland (GS4) with drain and channel patterns evident. The area is grazed by cattle and is dominated by grasses, including; floating sweet grass (in the channels), timothy and tall fescue. Other species recorded in the area indicate that the field supports good quality wet grassland. They include; jointed rush, meadowsweet, marsh marigold, marsh bedstraw, amphibious bistort, marsh ragwort, marsh pennywort, ragged robin and water plantain (CAAS 2004). A drain along the north-east of the field (associated with H22) has water parsnip, purple loosestrife, marsh valerian and yellow flag iris with willows including; white, sally/rusty, crack willow in the hedgerow (CAAS 2004).

A stone bridge forms part of the river crossing on the Durrow road. It has been replaced by a modern bridge, which takes the main traffic, but remains open to local traffic with a one way system operating. The walls of the old stone bridge are a habitat and support numerous plants of rocky habitats, including; common polypody, mouse-ear hawkweed, ivy, red fescue, maidenhair spleenwort, sweet vernal grass, ivy-leaved toadflax, rusty-back, wall-rue and fairy foxglove. It may be used as a bat roost, however a survey would be required to verify if this is the case. Between the bridges on an area of higher ground neutral grassland (GS1) is present with bush vetch, cats-ear, meadow buttercup, cleavers, sweet-vernal grass, creeping bent and red fescue. Gorse is also present here. On lower ground near the river, wet grassland (GS4) exists with creeping bent, Yorkshire fog and creeping buttercup. Perennial rye grass is also present, but does not dominate the sward. Neutral grassland (GS1) is also present on the road into the village with the moss *Rhytidiadelphus squarrosus*, cat's-ear, yarrow, creeping cinquefoil, mouse-ear hawkweed, ribwort plantain, daisy and wood rush species.

The River Nore is connected with a range of habitats extending into the village.

The links are formed primarily by two tributaries both of which are located south of the village centre. These tributaries provide suitable habitat for certain species associated with the SAC such as otter, bats and salmon fry. Tributary 1 is just

south Ballyragget Bridge and Tributary 2 flows near the southern boundary of the study area. They are generally fast flowing (FW1), with small weirs/rapids and pools and have loose pebble and rocky beds. As the water is generally fast flowing, there is little or no vegetation (Fossitt, 2000). Hawthorn and bramble are found occasionally along their banks.



Figure 2. Tributary 1 of the River Nore, with hawthorn and bramble scrub along its banks.

In the centre of the village short lengths of these tributaries have been culverted, which reduce their value as corridors and habitats.



Figure 3. Tributary 1, where it flows through the village. It is surrounded on both sides by walls, with those composed of natural stone of greater biodiversity value.

Tributary 1 just south of the bridge forms the more important corridor linking the river with other green areas within the village including; Ballyragget Castle (protected structure) consisting of old walls, an area of grassy verge habitat (GS2) and a small patch of mixed deciduous woodland (WD1).

Between the castle and the River Nore, it passes through an agricultural field. On the boundary with the castle and tributary, a small band of mixed deciduous woodland is present (WD1), containing alder, hawthorn and non-native sycamore.

A *leylandii* treeline (WS3A) with hawthorn and bramble scrub connects the castle and Tributary 1 (FW1) with mature gardens associated with the Aislinn treatment centre in the south-west of the village. The old house, part of the treatment centre, is associated with large mature trees (beech, Scot's pine), shrubs and an open area of amenity grassland (GA2) that has been planted with non-native shrub borders. The mature trees (in BL31) have an active rookery and robin, blackbird, chaffinch, jackdaw and woodpigeon were recorded around the house.

The grounds of the Aislinn Centre are close to the banks of the River Nore and include several semi-natural habitats (too small to be mapped). They include an area of scrub, mature trees (horse chestnut, beech, and willow) and neutral grassland (GS1) with creeping bent, Yorkshire fog, cock's-foot, yarrow, red clover, ragwort and meadow buttercup. The scrub and mature trees (identified as BL31) have a ground flora of lesser celandine, violet, germander speedwell and wood-sorrel. Mosses and lichens are numerous. Willows dominate the bank of the river and there is a limited ground flora due to frequent flooding.

Ballyragget Castle is on private land, associated with a dwelling and commercial premises. The castle and the surrounding stone walls support a wide variety of plants. Aubrietia, (an ornamental non-native plant) is abundant, with ivy, maidenhair spleenwort, common polypody, white stonecrop, pellitory, germander speedwell and various mosses and lichens all frequent. Surveys by CAAS (2004), recorded rue-leaved saxifrage, barren broome and mullein.



Figure 4. Ballyragget Castle, supporting rich flora and surrounded by dry meadow and grassy verge habitat.



Figure 5. Stone wall surrounding the castle which supports rich flora, including ivy and aubrieta.

Dry meadow and grassy verge habitat (GS2) is present around the grounds of the castle. Cock's-foot, nettle, cleaver, ribwort plantain, creeping buttercup and docks are abundant. Elder and sycamore are also present, with dead lime trees along the south-western wall. Alder have been planted on the avenue to the castle.

The castle provides suitable habitat for bat species, but no bat survey was undertaken as part of this study. The castle also provides habitat for common birds, with jackdaw, blackbird, song thrush, robin, blue tit, house sparrow, chaffinch and swallow recorded in and around the castle grounds in 2010.

Adjacent to the south wall of the castle grounds, there is a small area of scattered trees and parkland (WD5), with mature oak, beech and cherry. Shrubs include lilac, elder and ivy. Ground flora features dandelion, lesser celandine, lesser periwinkle, violet, creeping cinquefoil, daisy and lords-and-ladies. Borders with non-native species of shrub have been planted nearer to the road.

Further upstream Tributary 1 is adjacent to mature gardens associated with private residences including the Church and Parochial House which contain a mosaic of habitats of biodiversity value (too small for mapping). Features of biodiversity value include mature trees, shrubs and lawns, grassy verge habitat (DS2) and neutral grassland (GS1). Many of these large gardens are surrounded by high stone walls.

Mature trees include beech, horsechestnut and Scot's pinel. Cypress, lime and holly are present on the grounds of the church. Dry meadow and grassy verge habitat (GS2) is present by the tributary around the parochial house and is dominated by grasses such as cocks-foot and creeping bent. Small areas of neutral grassland (GS1 unmapped) occur behind the church, with mouse-ear hawkweed, self-heal, yarrow, white clover, dandelions, germander speedwell and the moss present. Mature apple trees are present in a garden adjacent to the church, which is also surrounded by old stone walls.



Figure 6. Church and parochial house with gardens containing mature trees and surrounded by high stone walls with abundant ivy.

The church and gardens are linked by a network of stone walls (BL1A), grassy verge habitat (GS2) and a hedgerow (WL1) to a mixed deciduous woodland

(WD1) around a private dwelling (Eden Hall). CAAS (2004) highlighted the biodiversity importance of the environs of this house. The adjacent mixed deciduous woodland (WD1) is dominated by beech, horsechestnut and ash trees and has a well developed ground flora consisting of bramble, ivy, lesser celandine, lords-and-ladies and ground ivy. Hedge woundwort, wood speedwell, and wood sedge were recorded in previous studies (CASS, 2004).

CAAS (2004) recorded well-developed wet grassland (GS4) behind the house with timothy, crested dogtail, oval and glaucous sedges abundant. Herbs such as knapweed, self-heal, red bartsea, red clover, and centaury were also recorded here. Impressive amounts of naturalised Elecampane were found in a hedge and behind farm buildings.

This habitat was not surveyed as part of this study. Up-stream of the village Tributary 1 continues through agricultural land.

Tributary 2 is found to the south of the village. Within the study area it is not associated with any significant habitats. While it is culverted within a housing estate the watercourse still functions as a corridor for biodiversity associated with aquatic environments.

Within the village the “green” supports two habitats. At present this area is not connected to the principal ecological network. It supports amenity grassland (GA2) and treelines (WL2). The former is of low value for biodiversity. There is potential to improve the value of the “green” by establishing shrubberies (in the corners) which could provide food and nesting sites for birds and insects. Also in addition native bluebells or wild garlic could be planted under the trees. By allowing these species to seed, grass cutting would have to be delayed under the trees thus promoting greater species diversity in the amenity grassland and improving the biodiversity value of this area. To improve connectivity between the “green” and ecological network, tree lines (WL2) using native species could be established on the connecting streets and gardens.

Green infrastructure assessment – BR1

The core green infrastructure feature in Ballyragget is the river Nore. It is part of a network which includes other types of wetlands and two tributaries, one of which flows through the village. This type of Green Infrastructure provides several services to society. It is part of an important reservoir of biodiversity

(cSAC) of international importance supporting important habitats and species which links the area with other important sites inside and outside the county.

As the river floods periodically <http://www.floodmaps.ie/View/Default.aspx> the river, its adjacent tributaries (FW1) and associated wetlands (particularly land with GS4) perform a regulatory function as they absorb floodwaters thus reducing the risk of flooding elsewhere in the catchment. Because some parts of the tributaries are culverted or surrounded by walls their regulatory and supporting functions are much diminished.

The river and wetlands have potential to remove pollutants through active or/and passive absorption. This function could be enhanced to improve water quality in the Nore as it flows past the village.

Green Infrastructure is a visual amenity. Views of the river, its associated semi natural habitats and features such as mature trees in gardens contribute strongly to the character of the village and certain buildings. The natural environment contributes strongly to the setting of the Aislinn Centre and enhances the value of its environs for passive recreation.

There is potential to further develop the river and its tributaries for active recreation.

Green Infrastructure adds value to certain features of cultural importance such as bridges and the setting of Ballyragget Castle.

Any proposals for development which could impact on the cSAC and associated habitats 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.

Hedgerows

Hedgerows form a particular type of ecological network important for trees, plants associated with woodlands, songbirds, small mammals and invertebrates including bees and butterflies.

Twenty three hedgerows were surveyed and evaluated. All of these are within or on the study area boundary.

The extent of hedgerows reflects the field patterns and history of land management. Over half of the hedgerows are of cultural value as they are shown on the 1st edition OS map (1837-1842); none of these lie along townland

boundaries. Two hedgerows H01 and H10 are associated with a disused railway line east of the village. The line of the old railway is no longer visible.

Hedgerow numbers are shown on the habitat map and the results of the evaluation of individual hedgerows are in Appendix 4. Table 2 below summarises the results of the hedgerow evaluation for Ballyragget.

Table 2. Hedgerow Evaluation

Hedgerow Numbers	Rating	Description
-	1 *	Low value – least important
H01, H02, H03, H04, H05, H09, H10, H12, H14, H15, H16, H17, H18, H19, H20, H21	2 **	Moderate value - of moderate importance
H06, H07, H08, H11, H13, H22, H23	3 ***	High value – most important

The majority of hedgerows in the study area were found to be of moderate value, with seven found to be of high value.

In hedgerows the most frequently-occurring tree species is ash. In hedgerows that are regularly managed (box shaped) trees are present but are cut with the hedgerow. Non-native sycamore also occurs in places. Holly is found in H02 and H04.

Eight different shrubs were recorded from the surveyed hedgerows: hawthorn and elder were found throughout. Other native shrub species; blackthorn, ivy, bramble are also present, while non-natives; lilac, cotoneaster, privet and leylandii were found in hedgerows bordering residential properties.

The highest-ranking hedgerow was H22 with H06, H07, H08, H11, H13, H23 also ranking high. H22 is found on the western end of Ballyragget where it forms part of the ecological network. H22 is generally a good height (over 4 m) in parts and is approximately 2 metres wide. It also has a diverse structure along most of its length, composed of mature and immature trees, shrubs, herbs and a dense base. Trees found here include ash, willows and crab apple. Hawthorn, bramble and

ivy are present in the understory. This hedgerow is associated with a ditch and flowing water that drains into the River Nore at the river crossing. The hedgerow is unmanaged and gaps have developed in places.



Figure 7. H22 is a hedgerow of high value and locally important, it has a diverse structure

H06, H07, H08, H11, H13, H23 are also of high value and are composed primarily of native species; hawthorn, elder and blackthorn, with bramble and ivy abundant in the under story. Trees including native ash, elm and non-native sycamore. These hedgerows are of good height (2-4m) and width (approximately 2 metres) and consist of a mixture of trees, shrubs, herbs and dense bases. H06, H07, H08, H11 and H13 form a good network on the northern fringe of Ballyragget. They appear unmanaged in recent times with new growth evident. Gaps are present in most, but are not extensive. The connectivity of these hedgerows improves their value as does the fact that they appear on the 1st edition OS map (1837-1842).

Yellowhammer, chaffinch, wren, house sparrow, robin, starling, dunnoek, great tit and blackbird were recorded in the network of hedgerows around Ballyragget in 2010. Yellowhammer is on the list of Birds of Conservation Concern in Ireland (Lynas *et al* 2007). As a result of modern farming practices the breeding population of yellowhammer has declined dramatically in Ireland over the last 25 years. Sympathetic hedgerow management and increasing field margins can help improve long term survival of this species in the area. Starling is amber listed and is considered of medium concern in Ireland.

H23, also ranked high on evaluation, achieved by a combination of good height, width, structure and structural diversity. It contains native species, predominately hawthorn and elder, with some ash. Bramble, gorse and ivy are present in the under story. The connectivity of this hedgerow to H22 and to the River Nore and associated habitats improves its local value, as does the fact that it appears on the 1st edition OS map (1837-1842). However, part of the hedgerow to the east has been removed recently and replaced with a fence.

With few exceptions management of hedgerows as stock-proof barriers and for biodiversity is poor. This is typical of the situation throughout the country. Few hedgerows showed signs of appropriate management within the last five years. With the exception of H14, H16 and H17 they are regularly managed to achieve a box-shape. This has resulted in the removal of the herb layer, damage to trees and increased gappiness. Trees that are present have been cut with the hedgerows, with loss of structure as a result. (Appendix 4).

Green infrastructure – hedgerows

Hedgerows in the study area primarily function as ecological corridors. They comprise semi-natural habitats and are important for nesting birds (protected under the Wildlife Acts). Two hedgerows (H22 and H23) are present within an ecological networks.

They have potential for development as landscaped amenity areas and more effective stockproof barriers.

They are important features of the cultural landscape. Hedgerows planted as natural boundaries provide the only visible evidence for the presence of a railway line in the environs of the village.

They provide habitat for pollinating insects and predators of crop pests for commercial crops.

Priorities for development should be the promotion of higher standards of management by owners and greater consideration of hedgerow values by planners if development is proposed adjacent to them. Guidelines are provided to inform planning around hedgerows.

3.3 Summary of biodiversity assessment/evaluation

Supported by criteria contained in guidelines produced by the NRA (www.nra.ie, Appendix 6) the relative significance of the principal habitats and ecological networks within the study area was assessed. These results are summarised in Table 3, which should be used in conjunction with Maps 1 and 2.

Table 3. Summary of biodiversity assessment/evaluation in Ballyragget

Ecological network/Habitats	Ecological network element	Ecological evaluation
BR1: River (FW2), tributaries within the cSAC (FW1) riparian woodland (WN5), wet grassland within cSAC (GS4)	Core area	Internationally important
BR1: Tributary 1 and 2 linked to cSAC (FW1), wet grassland (GS4) outside SAC, drainage ditch linked to SAC, (FW4), scrub (WS1) and immature woodland (WS2) linked to Tributary 1; Hedgerows (H22, H23), mixed woodland (WD1) and trees and parkland (WD5)	Corridors linked to core area	Local importance (higher value)
BR1: Dry grassland (GS2), stone features (walls and buildings) (BL1A and BL1B))	Buffer Nature rehabilitation areas	Local importance (lower value)
Hedgerows not related to networks which scored 20 -30 : H06, H07, H08,H11, H13	Corridors	Local importance (higher value)
Hedgerows not related to networks which scored 10 -19: H01, H02, H03, H04, H05, H09, H10, H12, H14, H15, H16, H17, H18, H19, H20, H21	Corridors	Local importance (lower value)
Stone features (BL1A and BL1B) not within networks , tree lines (WL2 where mapped), mature trees (unmapped)	Core and corridor features	Local importance (lower value)

4 Guidelines for Sustainable Development of Hedgerows and Drainage Ditches

The Green City Guidelines (Brennan and O'Connor 2008) contain many suggestions for integrating biodiversity and development.

Hedgerows

Spatial planning should protect best quality hedgerows (those which score between 20 and 30). If a dense network of such hedgerows is present within fields proposed for development, those with highest values and which function as connecting features/wildlife corridors should be retained. The objective should be to retain a connected network, which links to other types of semi-natural areas, provides a wildlife or green corridor, particularly from countryside into the town centre and has a sustainable use within the new development.

No development should be allowed within 5m of retained hedgerows.

Developers and local groups should be reminded of their obligations under the Wildlife Act i.e. not to remove or interfere with hedgerows between March 1st and 31st August.

Boundary hedgerows should be retained unless there is an imperative reason of public safety. Prospective developers should be reminded that hedgerows require little management, look more appropriate in rural locations than garden hedges and are a ready made green feature of particular value to birds.

If a new boundary has to be established encouragement should be given to replace the original semi-natural feature (hedgerow, stonewall) with another type of semi-natural boundary. It is preferable to use native species, particularly the locally occurring ones mentioned in the hedgerow section of this report. This will provide alternative habitat for displaced species, be more compatible with local landscape values and maintain connectivity for species which relied on such features for commuting or feeding.

Spatial planning for large scale developments should integrate retained hedgerows into the design of roads, pedestrian/cycleways routes or open spaces. A grass margin should be retained around all retained hedgerows. By cutting grass regularly within this margin the hedgerow will appear to be managed.

Landscaping plans should retain hedgerows by incorporating them within new shrubberies or woodlands. Hedgerows (or individual mature trees contained within them) could become a nucleus for a new woodland developed by

planting native trees/shrubs. Instead of retaining a straight line, gaps (for roads, paths, views) could be created and resulting smaller lengths could become the focii of woodlands/shrubberies of more varied shapes. Depending on the potential risks of anti-social activity or requirements for a more garden look the margins of these new hedgerows/cum woodlands/shrubberies could be planted with spiny shrubs or species of horticultural value.

Drainage Ditches

Drainage ditches provide a habitat for aquatic species, allow for connectivity and provide for flood attenuation. Drainage ditches which form part of the catchment of salmonid rivers and are adjacent to hedgerows are most valuable.

Drainage ditches should be retained, unless there is an imperative reason of public safety, by ensuring that their hydrology is protected, culverting does not occur and new development does not drastically alter the physical environment within 5m.

Spatial planning should attempt to integrate drainage ditches into new designs.

Drainage ditches could become amenity type wetland features through reprofiling and landscaping. Landscaping should involve native species, particularly those occurring locally to maximise biodiversity and amenity values.

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.

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

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Study Area
 (based on 2004 Ballyragget LAP boundary)

Habitats

- Arable crops (BC1)
- Tilled land (BC3)
- Flower beds and borders (BC4)
- Stone building (BL1B)
- Buildings and artificial surfaces (BL3)
- Houses with big gardens (BL31)
- Houses with medium gardens (BL32)
- Houses with small gardens (BL33)
- Land under development (BL3D)
- Spoil and spare ground (ED2)
- Recolonising bare ground (ED3)
- Eroding/upland rivers (FW1)
- Depositing/lowland rivers (FW2)
- Improved agricultural grassland (GA1)
- Amenity grassland (improved) (GA2)
- Dry calcareous and neutral grassland (GS1)
- Dry meadows and grassy verges (GS2)
- Wet grassland (GS4)
- (Mixed) broadleaved woodland (WD1)
- Scattered trees and parkland (WD5)
- Riparian woodland (WN5)
- Scrub (WS1)
- Immature woodland (WS2)

Hedgerows & Treelines

- Hedgerows (H00: surveyed; WL1: unsurveyed)
- Treelines (WL2)
- Non-native hedge (WS3A)

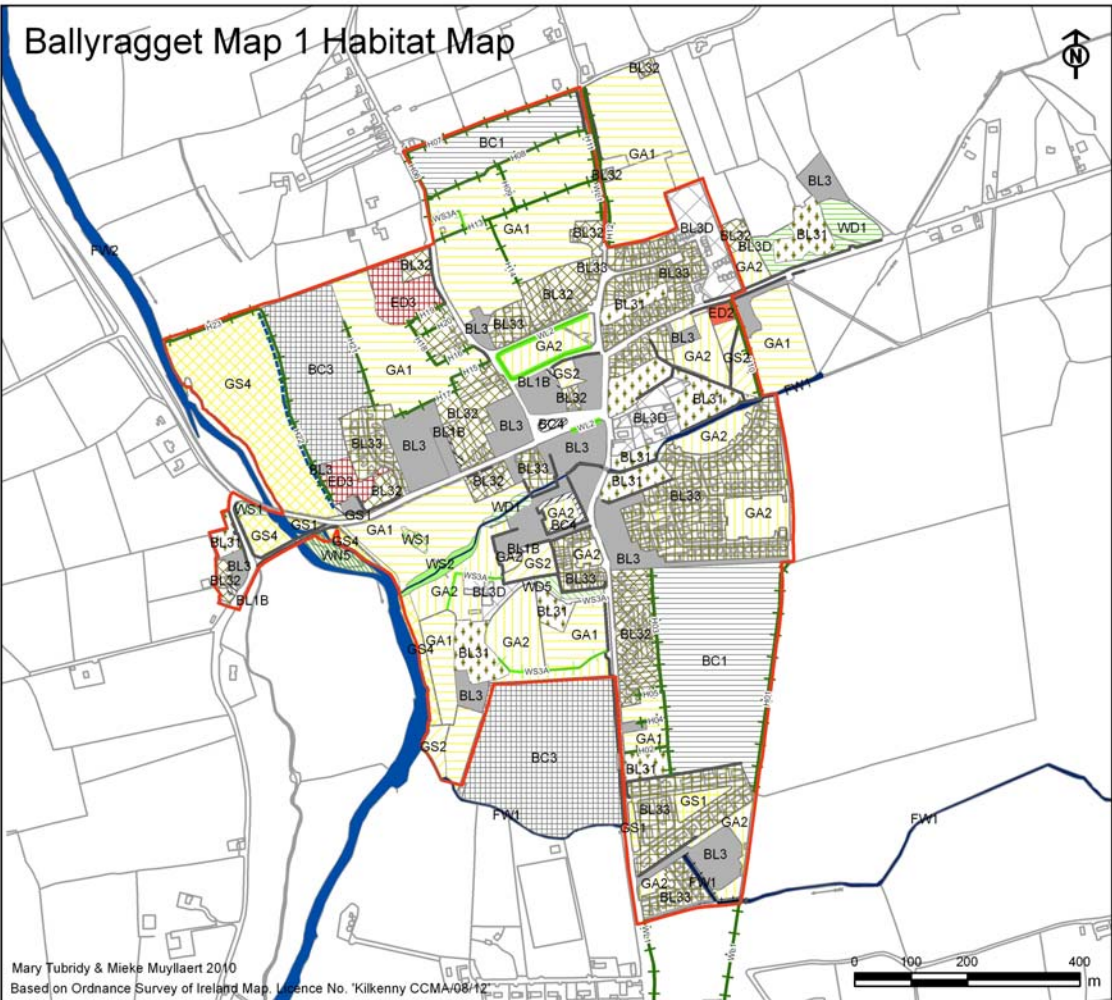
Drainage

- FW4

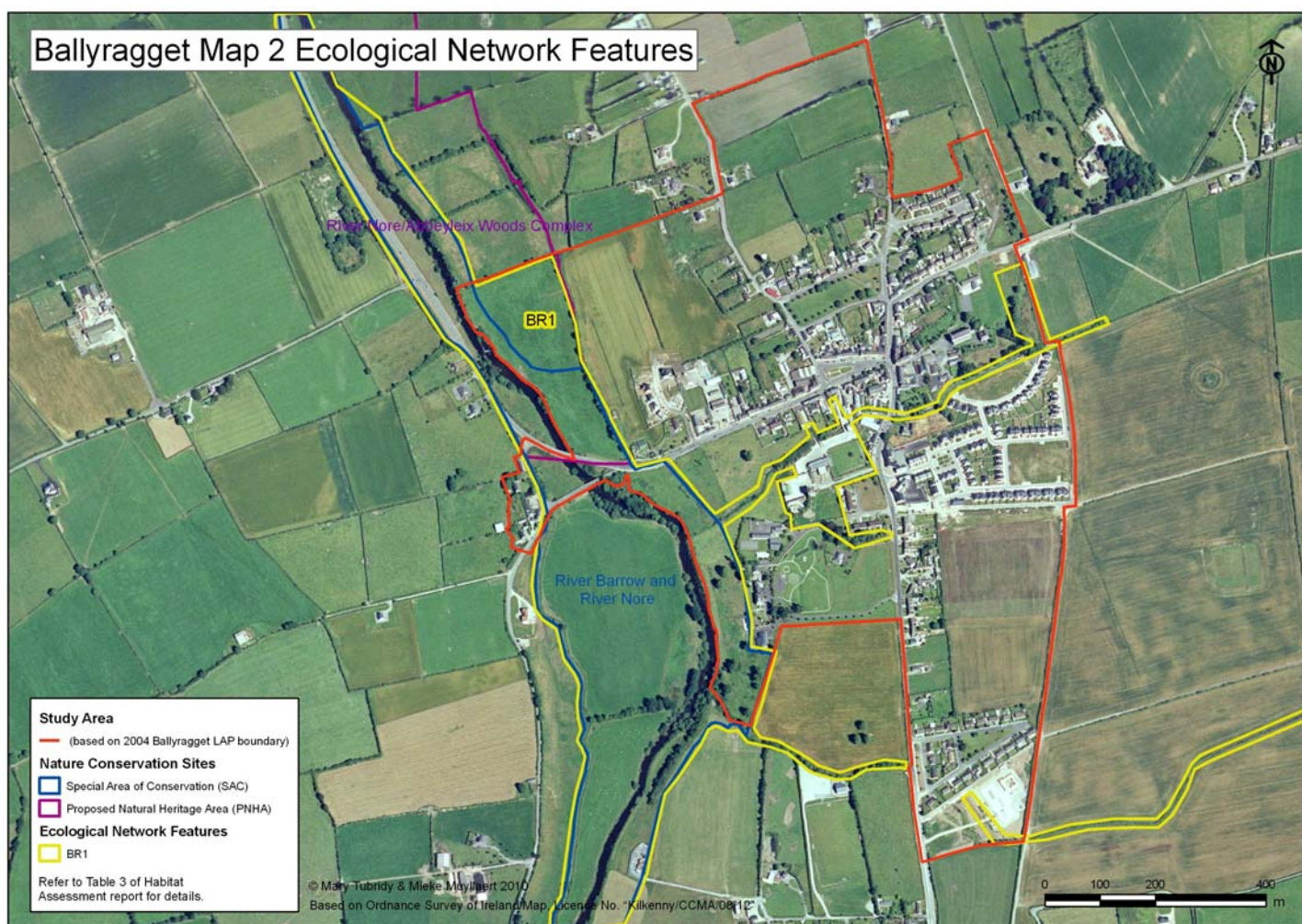
Walls

- Stone wall (BL1A)
- Earth Bank (BL2)
- Block/Concrete wall (BL3)

Base Map



Ballyragget Map 2 Ecological Network Features



Appendix 1 Information Leaflet



Appendix 2 Record sheets used in habitat mapping and hedgerow evaluation

Kilkenny LAP habitat survey 2010

Target areas

Settlement:_____ Recorder:_____ Date:_____

Target note ID no.	List species, describe features, management, invasives

Settlement:	Surveyor:
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No.	Height	Width	Gaps	Biodiversity value	Structure	Structural diversity	Bird value	Management	Notes
	1 <1.5m 2 1.5-2.5m 3 2.5-4m 4 >4m	1 <1m 2 1.2m 3 2-3m 4 3m+	0 50%+ 1 25-50% 2 10-25% 3 5-10% 4 <5% 5 no gaps	List tree and shrub species	1 Shrub layer only 2 Shrub + herbs 3 Tree, shrub + herbs, open base 4 Tree, shrub + herbs, dense base	0 No bank/ditch 1 Bank only 2 Bank + ditch 3 Bank, ditch, stagnant water 4 Bank, ditch, flowing water	1 Roosting habitat only 2 Roosting, feeding habitat 3 Roosting, feeding, nesting habitat	1 Short-term unmgd (5 yrs) 2 Long-term unmgd 3 Box profile 4 Cut one side 5 Cut both sides 6 A-shape	Include notable spp., signs of fauna

NB Connectivity and Cultural value are entered directly to spreadsheet afterwards using field map and 1st ed. map.

Appendix 3 Target notes

Ecological network feature: BR1

Habitat codes

WN5, FW2, WL1, GS4, GS1, WS1, FW1, BL1A, BL1B, WD1, WD5

Scientific name	Common name
<i>Fraxinus excelsior</i>	Ash
<i>Persicaria amphibia</i>	Amphibious bistort
<i>Aubrieta deltoidea</i>	Aubrieta
<i>Fagus sylvatica</i>	Beech
<i>Prunus spinosa</i>	Blackthorn
<i>Rubus fruticosus</i>	Bramble
<i>Rumex obtusifolius</i>	Broad-leaved dock
<i>Sparganium erectum</i>	Bur reed
<i>Vicia sepium</i>	Bush vetch
<i>Hypochaeris radicata</i>	Cat's-ear
<i>Galium aparine</i>	Cleaver's
<i>Schoenoplectus lacustris</i>	Club rush
<i>Dactylis glomerata</i>	Cock's-foot
<i>Alnus glutinosa</i>	Common Alder
<i>Urtica dioica</i>	Common nettle
<i>Polypodium vulgare</i>	Common polypody
<i>Malus sylvestris</i>	Crab apple
<i>Salix fragilis</i>	Crack willow
<i>Agrostis stolonifera</i>	Creeping bent
<i>Ranunculus repens</i>	Creeping buttercup
<i>Potentilla reptans</i>	Creeping cinquefoil
<i>Cardamine pratensis</i>	Cuckoo-flower
<i>Taraxacum officinale</i>	Dandelions
<i>Bellis perennis</i>	Daisy
<i>Sambucus nigra</i>	Elder
<i>Erinus alpinus</i>	Fairy foxglove
<i>Glyceria fluitans</i>	Sweet grass
	Germander
<i>Veronica chamaedrys</i>	Speedwell
<i>Ulex europaeus</i>	Gorse
<i>Glechoma hederacea</i>	Gound Ivy
<i>Populus canescens</i>	Grey poplar
<i>Juncus inflexus</i>	Hard rush
<i>Crataegus monogyna</i>	Hawthorn
<i>Geranium robertianum</i>	Herb robert
<i>Ilex aquifolium</i>	Holly
<i>Aesculus hippocastanum</i>	Horse chestnut
<i>Hedera helix</i>	Ivy
<i>Cymbalaria muralis</i>	Ivy-leaved toadflax
<i>Juncus articulatus</i>	Jointed rush
<i>Ranunculus ficaria</i>	Lesser celandine
<i>(Leylandii) x Cupressocyparis</i>	Leyland Cypress

<i>leylandii</i>	Lime
<i>Tilia x europaea</i>	Lords-and-ladies
<i>Arum maculatum</i>	Maidenhair
<i>Asplenium trichomanes</i>	spleenwort
<i>Galium palustre</i>	Marsh bedstraw
<i>Alopecurus geniculatus</i>	Marsh foxtail
<i>Caltha palustris</i>	Marsh marigold
<i>Hydrocotyle vulgaris</i>	Marsh pennywort
<i>Senecio aquaticus</i>	Marsh ragwort
<i>Valeriana officinalis</i>	Marsh valerian
<i>Ranunculus acris</i>	Meadow buttercup
<i>Filipendula ulmaria</i>	Meadow sweet
	Mouse-ear
<i>Pilosella officinarum</i>	hawkweed
<i>Quercus sp.</i>	Oak
<i>Salix viminalis</i>	Osier
<i>Parietaria judaica</i>	Pellitory
<i>Lolium perenne</i>	Perennial rye-grass
<i>Vinca minor</i>	Periwinkle (lesser)
<i>Lythrum salicaria</i>	Purple loosestrife
<i>Lychnis flos-cuculi</i>	Ragged robin
<i>Senecio jacobae</i>	Ragwort
<i>Trifolium pratense</i>	Red clover
<i>Festuca rubra</i>	Red fescue
<i>Phalaris arundinacea</i>	Reed grass
<i>Plantago lanceolata</i>	Ribwort plantain
<i>Ceterach officinarum</i>	Rusty-back
<i>Salix cinerea</i>	Rusty/Sally willow
<i>Pinus sylvestris</i>	Scot's pine
<i>Prunella vulgaris</i>	Self-heal
<i>Potentilla anserina</i>	Silverweed
<i>Cirsium vulgare</i>	Spear thistle
<i>Anthoxanthum odoratum</i>	Sweet vernal grass
<i>Acer pseudoplatanus</i>	Sycamore
<i>Festuca arundinacea</i>	Tall fescue
<i>Phleum pratense</i>	Timothy
<i>Holcus lanatus</i>	Yorkshire fog
<i>Cirsium sp.</i>	Thistle specie
<i>Asplenium ruta-muraria</i>	Wall-rue
<i>Berula erecta</i>	water parsnip
<i>Trifolium repens</i>	White clover
<i>Salix alba</i>	White willow
<i>Sedum album</i>	White stonecrop
<i>Salix sp.</i>	Willow
<i>Oxalis acetosella</i>	Wood sorrel
<i>Luzula sp.</i>	Wood rush
<i>Achillea millefolium</i>	Yarrow
<i>Iris pseudacorus</i>	Yellow flag iris
<i>Holcus lanatus</i>	Yorkshire fog

Kilkenny LAP Habitat Assessment BALLYRAGGET

Voila sp.

Violet

Rhytidiadelphus

Moss

Appendix 4 Results of hedgerow evaluation

No.	Height	Width	Gaps	Biodiversity value	Structure	Structural diversity	Connectivity	Cultural value	Score	Management
	1 <1.5m 2 1.5-2.5m 3 2.5-4m 4 >4m	1 <1m 2 1.2m 3 2-3m 4 3m+	0 50%+ 1 25-50% 2 10-25% 3 5-10% 4 <5% 5 no gaps	No. of native tree & shrub species 1 One-two 2 Three 4 Four+	1 Shrub layer only 2 Shrub + herbs 3 Tree, shrub + herbs, open base 4 Tree, shrub + herbs, dense base	0 No bank/ditch 1 Bank only 2 Bank + ditch 3 Bank, ditch, stagnant water 4 Bank, ditch, flowing water	0 No direct connections 1 Connection by water (ditch only) 2 1 connection 3 2 connections 4 3 connections 5 4 or more connections	1 Not on 1 st ed map 2 On 1 st ed map (but not tld bdry) 4 Townland boundary		1 Short-term unmgd (5 yrs) 2 Long-term unmgd 3 Box profile 4 Cut one side 5 Cut both sides 6 A-shape
H01	3	3	2	1	2	1	2	1	15	3
H02	2	2	2	2	4	1	2	1	16	3
H03	3	3	2	2	4	1	3	1	19	3
H04	2	3	2	4	4	1	2	1	19	3
H05	3	3	3	2	4	1	2	1	19	3
H06	4	3	3	1	4	1	3	2	21	5
H07	3	3	3	4	4	1	2	2	22	2
H08	4	3	2	4	4	0	4	2	23	1
H09	2	2	1	1	2	0	3	2	13	3
H10	1	2	2	1	2	0	3	2	13	3
H11	4	3	3	4	4	0	2	2	22	5
H12	2	3	1	2	4	1	2	2	17	3
H13	3	3	3	2	4	1	2	2	20	3
H14	3	3	1	1	4	1	2	2	17	1
H15	1	3	0	1	2	0	2	1	10	3
H16	3	3	2	1	2	0	2	1	14	1
H17	3	3	2	1	4	1	2	2	18	1
H18	3	2	2	1	3	0	4	1	16	1
H19	2	2	3	1	2	0	2	1	13	3

Kilkenny LAP Habitat Assessment BALLYRAGGET

H20	4	2	1	1	3	0	2	1	14	2
H21	3	2	1	1	2	0	0	2	11	3
No.	Height	Width	Gaps	Biodiversity value	Structure	Structural diversity	Connectivity	Cultural value	Score	Management
	1 <1.5m 2 1.5-2.5m 3 2.5-4m 4 >4m	1 <1m 2 1.2m 3 2-3m 4 3m+	0 50%+ 1 25-50% 2 10-25% 3 5-10% 4 <5% 5 no gaps	No. of native tree & shrub species 1 One-two 2 Three 4 Four+	1 Shrub layer only 2 Shrub + herbs 3 Tree, shrub + herbs, open base 4 Tree, shrub + herbs, dense base	0 No bank/ditch 1 Bank only 2 Bank + ditch 3 Bank, ditch, stagnant water 4 Bank, ditch, flowing water	0 No direct connections 1 Connection by water (ditch only) 2 1 connection 3 2 connections 4 3 connections 5 4 or more connections	1 Not on 1 st ed map 2 On 1 st ed map (but not tld bdry) 4 Townland boundary		
H22	4	3	1	4	4	4	2	2	24	2
H23	4	3	3	1	4	0	3	2	20	1

Appendix 5 Summary of Fossitt habitat classification

Summary of the habitat classification scheme in *A Guide to Habitats in Ireland* (Fossitt, 2000) with standard alphanumeric habitat codes.

NON-MARINE		NON-MARINE	
F	FRESHWATER		Peatlands contd.
FL	Lakes and ponds	PB4	Cutover bog
FL1	Dystrophic lakes	PB5	Eroding blanket bog
FL2	Acid oligotrophic lakes	PF	Fens and flushes
FL3	Limestone/marl lakes	PF1	Rich fen and flush
FL4	Mesotrophic lakes	PF2	Poor fen and flush
FL5	Eutrophic lakes	PF3	Transition mire and quaking bog
FL6	Turloughs		
FL7	Reservoirs	W	WOODLAND AND SCRUB
FL8	Other artificial lakes and ponds	WN	Semi-natural woodland
FW	Watercourses	WN1	Oak-birch-holly woodland
FW1	Eroding/upland rivers	WN2	Oak-ash-hazel woodland
FW2	Depositing/lowland rivers	WN3	Yew woodland
FW3	Canals	WN4	Wet pedunculate oak-ash woodland
FW4	Drainage ditches	WN5	Riparian woodland
FP	Springs	WN6	Wet willow-alder-ash woodland
FP1	Calcareous springs	WN7	Bog woodland
FP2	Non-calcareous springs	WD	Highly modified/non-native woodland
FS	Swamps	WD1	(Mixed) broadleaved woodland
FS1	Reed and large sedge swamps	WD2	Mixed broadleaved/conifer woodland
FS2	Tall-herb swamps	WD3	(Mixed) conifer woodland
		WD4	Conifer plantation
		WD5	Scattered trees and parkland
G	GRASSLAND AND MARSH	WS	Scrub/transitional woodland
GA	Improved grassland (highly modified)	WS1	Scrub
GA1	Improved agricultural grassland	WS2	Immature woodland
GA2	Amenity grassland (improved)	WS3	Ornamental/non-native shrub
GS	Semi-natural grassland	WS4	Short rotation coppice
GS1	Dry calcareous and neutral grassland	WS5	Recently-felled woodland
GS2	Dry meadows and grassy verges	WL	Linear woodland and scrub
GS3	Dry-humid acid grassland	WL1	Hedgerows
GS4	Wet grassland	WL2	Treelines
GM	Freshwater marsh		
GM1	Marsh	E	EXPOSED ROCK/DISTURBED GROUND
H	HEATH AND DENSE BRACKEN	ER	Exposed rock
HH	Heath	ER1	Exposed siliceous rock
HH1	Dry siliceous heath	ER2	Exposed calcareous rock
HH2	Dry calcareous heath	ER3	Siliceous scree and loose rock
HH3	Wet heath	ER4	Calcareous scree and loose rock
HH4	Montane heath	EU	Underground rock and caves
HD	Dense bracken	EU1	Non-marine caves
HD1	Dense bracken	EU2	Artificial underground habitats

		ED	Disturbed ground
P	PEATLANDS	ED1	Exposed sand, gravel or till
PB	Bogs	ED2	Spoil and bare ground
PB1	Raised bog	ED3	Recolonising bare ground
PB2	Upland blanket bog	ED4	Active quarries and mines
PB3	Lowland blanket bog	ED5	Refuse and other waste
		NON-MARINE	MARINE
B	CULTIVATED AND BUILT LAND	L	LITTORAL (INTERTIDAL)
BC	Cultivated land	LR	Littoral rock
BC1	Arable crops	LR1	Exposed rocky shores
BC2	Horticultural land	LR2	Moderately exposed rocky shores
BC3	Tilled land	LR3	Sheltered rocky shores
BC4	Flower beds and borders	LR4	Mixed substrata shores
BL	Built land	LR5	Sea caves
BL1	Stone walls and other stonework	LS	Littoral sediment
BL2	Earth banks	LS1	Shingle and gravel shores
BL3	Buildings and artificial surfaces	LS2	Sand shores
		LS3	Muddy sand shores
		LS4	Mud shores
		LS5	Mixed sediment shores
C	COASTLAND	S	SUBLITTORAL (SUBTIDAL)
CS	Sea cliffs and islets	SR	Sublittoral rock
CS1	Rocky sea cliffs	SR1	Exposed infralittoral rock
CS2	Sea stacks and islets	SR2	Moderately exposed infralittoral rock
CS3	Sedimentary sea cliffs	SR3	Sheltered infralittoral rock
CW	Brackish waters	SR4	Exposed circalittoral rock
CW1	Lagoons and saline lakes	SR5	Moderately exposed circalittoral rock
CW2	Tidal rivers	SR6	Sheltered circalittoral rock
CM	Salt marshes	SS	Sublittoral sediment
CM1	Lower salt marsh	SS1	Infralittoral gravels and sands
CM2	Upper salt marsh	SS2	Infralittoral muddy sands
CB	Shingle and gravel banks	SS3	Infralittoral muds
CB1	Shingle and gravel banks	SS4	Infralittoral mixed sediments
CD	Sand dune systems	SS5	Circalittoral gravels and sands
CD1	Embryonic dunes	SS6	Circalittoral muddy sands
CD2	Marram dunes	SS7	Circalittoral muds
CD3	Fixed dunes	SS8	Circalittoral mixed sediments
CD4	Dune scrub and woodland		
CD5	Dune slacks		
CD6	Machair		
CC	Coastal constructions	MW	MARINE WATER BODY
CC1	Sea walls, piers and jetties	MW1	Open marine water
CC2	Fish cages and rafts	MW2	Sea inlets and bays
		MW3	Straits and sounds
		MW4	Estuaries

Appendix 6 Ecological evaluation criteria

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International Importance:

‘European Site’ including Special Area of Conservation (SAC), Site of Community Importance

(SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.

Proposed Special Protection Area (pSPA).

Site that fulfills the criteria for designation as a ‘European Site’ (see Annex III of the Habitats Directive, as amended).

Features essential to maintaining the coherence of the Natura 2000 Network¹.

Site containing ‘best examples’ of the habitat types listed in Annex I of the Habitats Directive.

Resident or regularly occurring populations (assessed to be important at the national level)² of the following:

Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or

Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.

Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).

World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).

Biosphere Reserve (UNESCO Man & The Biosphere Programme).

Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).

Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).

Biogenetic Reserve under the Council of Europe.

European Diploma Site under the Council of Europe.

Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988)³.

National Importance:

Site designated or proposed as a Natural Heritage Area (NHA).

Statutory Nature Reserve.

Refuge for Fauna and Flora protected under the Wildlife Acts.

National Park.

Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA);

Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.

Resident or regularly occurring populations (assessed to be important at the national level)⁴ of the following:

Species protected under the Wildlife Acts; and/or

¹ See Articles 3 and 10 of the Habitats Directive.

² It is suggested that, in general, 1% of the national population of such species qualifies as an internationally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

³ Note that such waters are designated based on these waters’ capabilities of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*).

⁴ It is suggested that, in general, 1% of the national population of such species qualifies as a nationally important population. However, a smaller population may qualify as nationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

<p>Species listed on the relevant Red Data list.</p> <p>Site containing ‘viable areas’⁵ of the habitat types listed in Annex I of the Habitats Directive.</p>
<p>County Importance:</p> <p>Area of Special Amenity.⁶</p> <p>Area subject to a Tree Preservation Order.</p> <p>Area of High Amenity, or equivalent, designated under the County Development Plan.</p> <p>Resident or regularly occurring populations (assessed to be important at the County level)⁷ of the following:</p> <ul style="list-style-type: none"> Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. <p>Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.</p> <p>County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP⁸, if this has been prepared.</p> <p>Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.</p> <p>Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.</p>
<p>Local Importance (higher value):</p> <p>Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;</p> <p>Resident or regularly occurring populations (assessed to be important at the Local level)⁹ of the following:</p> <ul style="list-style-type: none"> Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. <p>Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;</p> <p>Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.</p>
<p>Local Importance (lower value):</p> <p>Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;</p>

⁵ A ‘viable area’ is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).

⁶ It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.

⁷ It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

⁸ BAP: Biodiversity Action Plan

⁹ It is suggested that, in general, 1% of the local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

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Sites or features containing non-native species that are of some importance in maintaining habitat links.