Ballyseedy Wood: A 50-Year Management Plan

An Chomhairle Oidhreachta
The Heritage Council

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Comhairle Cabhair, Cairdeas

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1. EXECUTIVE SUMMARY

Ballyseedy Wood is located 2 km southeast of Tralee, Co. Kerry. The majority of the site is owned by Kerry County Council and this management plan pertains to this area. The woodland includes alluvial forest, which is a priority habitat listed on Annex I of the Habitats Directive. The value of this habitat is recognised in the designation of the site as a candidate Special Area of Conservation.

The woodland has been in existence for over 400 years and is currently an important recreational amenity for the people of Tralee and north Kerry. A structured and balanced approach to management is required due to the presence of woodland areas of international importance and the requirements of recreational and educational users.

Woodland habitats at the site include wet alluvial woodland with alder, ash and grey willow; drier alluvial woodland with ash, alder, oak and hazel; dry woodland with ash, hazel and holly; and areas of modified woodland with hornbeam and beech. Other habitats include unimproved grassland, dense bracken and blackthorn and bramble scrub. The River Lee runs along the northern boundary. Surveys have been carried out for butterflies, two-winged flies, ground invertebrates and birds. In addition there are records of badger, otter, common frog, Irish hare and, from the river, salmon and trout. Two of these species (otter and salmon) are listed on Annex II of the Habitats Directive. It is possible that lesser horseshoe bat occur in the wood as a roost occurs nearby but this has not yet been confirmed. Lesser horseshoe bat is also listed on Annex II.

A stand map was produced which identified five stand types within the woodland. Non-native basal area was calculated based on the data gathered, and non-native trees are found to account for 20.3% of the total basal area of the wood.

Each of the habitats and features of Ballyseedy Wood were evaluated. Of major significance is the alluvial woodland, which is regarded as an excellent example of this habitat type. The woodland is considered to have good habitat and plant diversity. The regionally significant plant species thin-spiked wood sedge, twayblade, and rough horsetail have been recorded, and three beetle records are also of regional significance. All woodland areas are affected by non-native trees and shrubs.

Management zones have been developed for the woodland taking into account the sensitivity of the ecology of the site, and these specify the types of activities which can

occur within these zones. Management aims and objectives are listed for each of the habitats and features, and are summarised as follows:

- **Aim 1. Woodland habitat improvement programme:** Through appropriate management promote a native woodland stand, whilst recognising the cultural value of introduced species such as beech, horse-chestnut and hornbeam.
- **Aim 2. Invasive shrub species management:** To control invasive shrubs in the woodland and manage cleared areas.
- **Aim 3. Grassland habitat management:** To maintain and enhance the biodiversity of the semi-natural grassland habitat found at the site.
- **Aim 4. Scrub and dense bracken management:** To maintain and enhance the biodiversity of the semi-natural scrub habitats and dense bracken stands found at the site.
- **Aim 5. River habitat management:** To maintain and enhance the biodiversity of the river habitat found at the site.
- **Aim 6. Faunal biodiversity:** To monitor, maintain and enhance faunal biodiversity in the woodland.
- **Aim 7. Infrastructure improvements:** To improve other aspects of the site not directly covered by the above aims.
- **Aim 8. Recreation and education:** To provide safe and welcoming access to the site, to maintain facilities in appropriate condition and to maximise the education and interpretative potential of the site for the better appreciation of the role of woodlands in the natural environment.
- **Aim 9. Built heritage management:** To maintain and enhance the built heritage of the site and to provide historical and architectural information to the public on the structures present.

The woodland habitat improvement programme involves the gradual removal of sycamore, horse-chestnut and other non-native trees and also the regenerating seedlings and saplings of these trees. Eradication of invasive shrubs is also a priority. Under-planting with native trees is proposed using trees propagated from nursery stock derived from Ballyseedy Wood. Mature trees of beech, hornbeam and conifers will be retained, with any regeneration removed. Once the trees have reached the end of their lifespan they will be replaced with native trees. A regular mowing regime for the grassland and scrub will be introduced to maintain species diversity of these habitats. Flow in the river will be improved through a river habitat improvement programme. This

will create improved spawning conditions for salmon and trout. A survey for bats will be carried out and provision made for following recommendations made regarding potential roosts in trees and buildings within the wood. Surveys for other fauna are proposed such that these considerations can be taken into account by woodland managers. Proposals for infrastructural improvements include a sensitive approach to footpath maintenance and culvert replacement, and long-term aims include extension of the woodland habitat. Recommendations for sources of funding are suggested. It is proposed that the management strategy be reviewed after five years.

2. DESCRIPTION OF SITE

2.1 Basic information

Name: Ballyseedy Wood

Location: Ballyseedy & Caherbreagh townlands, 2 km southeast of Tralee, Co. Kerry.

Area: 32.6ha

Grid reference: Q 868 126

Access: Open to public. Access is through south car park entrance at Q 867 123, or north car park entrance at Q 874 131.

Maps: Ordnance Survey Ireland Discovery Series No. 71 (1:50 000)
Ordnance Survey Ireland Six Inch: Kerry No. 29 & 38

Tenure: Owned by Kerry County Council.

Status: The site constitutes part of Ballyseedy Wood candidate Special Area of Conservation (Site code IE0002112) and proposed Natural Heritage Area (Site code 2112). The statutory designation area includes additional privately owned woodland to the west and east. The site is part of the NeighbourWood scheme administered by the Forest Service.

Primary habitats: Annex I habitat 91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*). Comprises the WN4 and WN6 areas.

WN4 Wet pedunculate oak/ash woodland	19.2ha
WN6 Wet willow/alder/ash woodland	2.9ha
WN2 Oak-ash-hazel woodland	7.6ha
WD1 Mixed broadleaved woodland	1.9ha
WS1 Scrub	0.4ha
FW2 Depositing / lowland rivers	1.7km
GS2 Dry meadows and grassy verges	0.6ha
HD1 Dense bracken	0.1ha

2.2 Geography

Ballyseedy Wood lies just outside Tralee in an area of intensive lowland agriculture. The wood is located predominantly on the floodplain of the River Lee that, together with the N21, forms the northern boundary of the site. To the east is an adjacent area of semi-natural woodland surrounding the Ballyseede Castle Hotel. The remaining adjacent land consists largely of improved pasture. The wood occurs in a low-lying area with altitude varying between approximately 10m and 24m. The highest point on the site is a low ridge that occurs in the southwest of the site. Soils on the floodplain are heavy gleys over a parent material of limestone till, whilst those on the ridge are more freely draining mineral soils with the limestone bedrock outcropping in places.

2.3 History

The history of Ballyseedy Demesne within which Ballyseedy Wood is located has been compiled by McMorran (1991). The wood is first recorded on the map made by English adventurer Sir Edward Denny in 1587. The Blennerhassett family from Cumberland settled in the area in 1590 and by 1620 had acquired perpetual lease of Ballyseedy townland from the Dennys. During the 18th century the Blennerhassetts oversaw considerable plantations at Ballyseedy, although this largely comprised the creation of parkland, except in the area where the hotel now stands (WM Associates 1995). A carriageway was built running along the dry ridge in the southern part of the wood, linking the old Ballyseedy House in the west to the house of Elmgrove in the east. This carriageway (referred to now as the Coach Road) still forms the major routeway through this part of the wood. Several ruins, including an old watermill, occur at the western end of the wood, where the old Ballyseedy House stood. Further planting of “Scotch fir, spruce, oak, sycamore, beech, silver fir, birch, alder and larch” was reported on the estate in the early 19th century. From the late 18th century until Victorian times the wood was used as a venue for May Day celebrations.

Most of the current site is indicated as wooded on the first edition Ordnance Survey map of 1841-42, although considerable areas in the centre of the site appear to have been unwooded at this time (Fig. 1). Woodland also appears to have continued on to the west of the current boundary. It is of note that where the River Lee borders the wood it is indicated at this time to have consisted of numerous meanders. This more natural

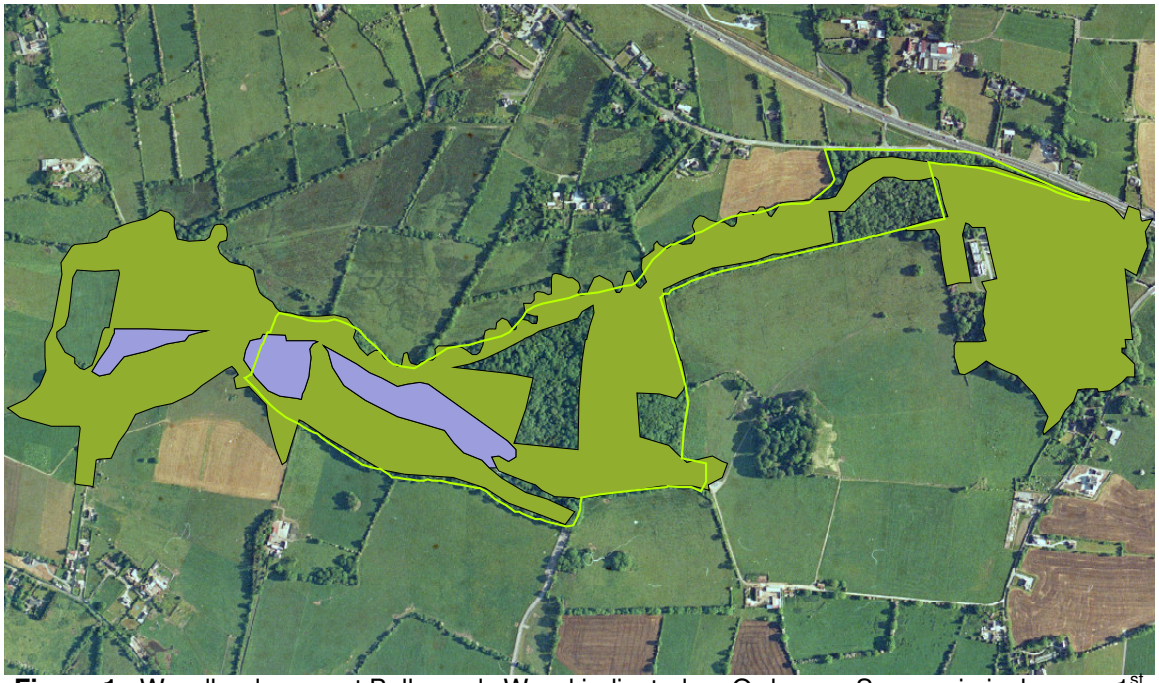

Figure 1. Woodland cover at Ballyseedy Wood indicated on Ordnance Survey six-inch maps 1st edition 1841-1842. Dense cover is indicated in green and more open canopy indicated in blue. The area currently owned by Kerry County Council is indicated by a green line.

Figure 2. Woodland cover at Ballyseedy Wood indicated on Ordnance Survey six-inch maps 2nd/3rd edition of 1894-1915. All areas are indicated as dense woodland. The area currently owned by Kerry County Council is indicated by a green line.

MAPS NOT TO SCALE

river morphology appears to have been removed by the time of the later Ordnance Survey editions of 1894-1938 where the river is marked as a relatively straight channel (Fig. 2). Central areas of the site were still unwooded at this time and probably comprised parkland which has since been planted or subsumed by the wood through natural colonisation.

The estate remained with the Blennerhassetts until 1967, when it was sold and the new Ballyseedy House (previously Elmgrove) became a hotel. The wood became the property of Coillte Teoranta sometime after the company's formation in 1989. In 1993 the Ballyseedy Wood Action Group purchased the larger part of the wood from Coillte Teoranta and, in compliance with the conditions of sale, ownership was transferred to Kerry County Council for perpetuity. In 1995, an ecological investigation by WM Associates was commissioned as part of a campaign by the Ballyseedy Wood Action Group against a proposed re-alignment and upgrade of the N21 to a dual-carriageway. It identified that parts of the wood conformed to EU Annex I priority habitat 91E0 *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*). The site was subsequently designated as a candidate Special Area for Conservation (cSAC; Fig. 3), and this was highly significant in the proposed route being abandoned in favour of a new submission totally avoiding the boundaries of Ballyseedy Wood.

2.4 Current usage and management

As noted above Ballyseedy Wood is designated as a cSAC due to the presence of the residual alluvial forest, which is a priority habitat listed on Annex I of the EU Habitats Directive. As such the woodland is legally protected. Under the EU Habitats Directive, National Parks and Wildlife Service (NPWS) are obliged to ensure designated areas are managed appropriately. They have produced a list of notifiable actions which may alter, damage, destroy or interfere with the integrity of a site and in relation to which the Minister for the Environment, Heritage and Local Government is required to be notified. This list includes felling trees, killing ivy, alteration of the flow of watercourses and cutting scrub. Some of these actions are proposed in this management plan. It will therefore be necessary to obtain permission from NPWS to proceed with the management proposals. It should be noted that the area designated as cSAC extends beyond the area owned by Kerry County Council (see Fig. 3) and this management plan pertains only to the area currently under ownership of the County Council.

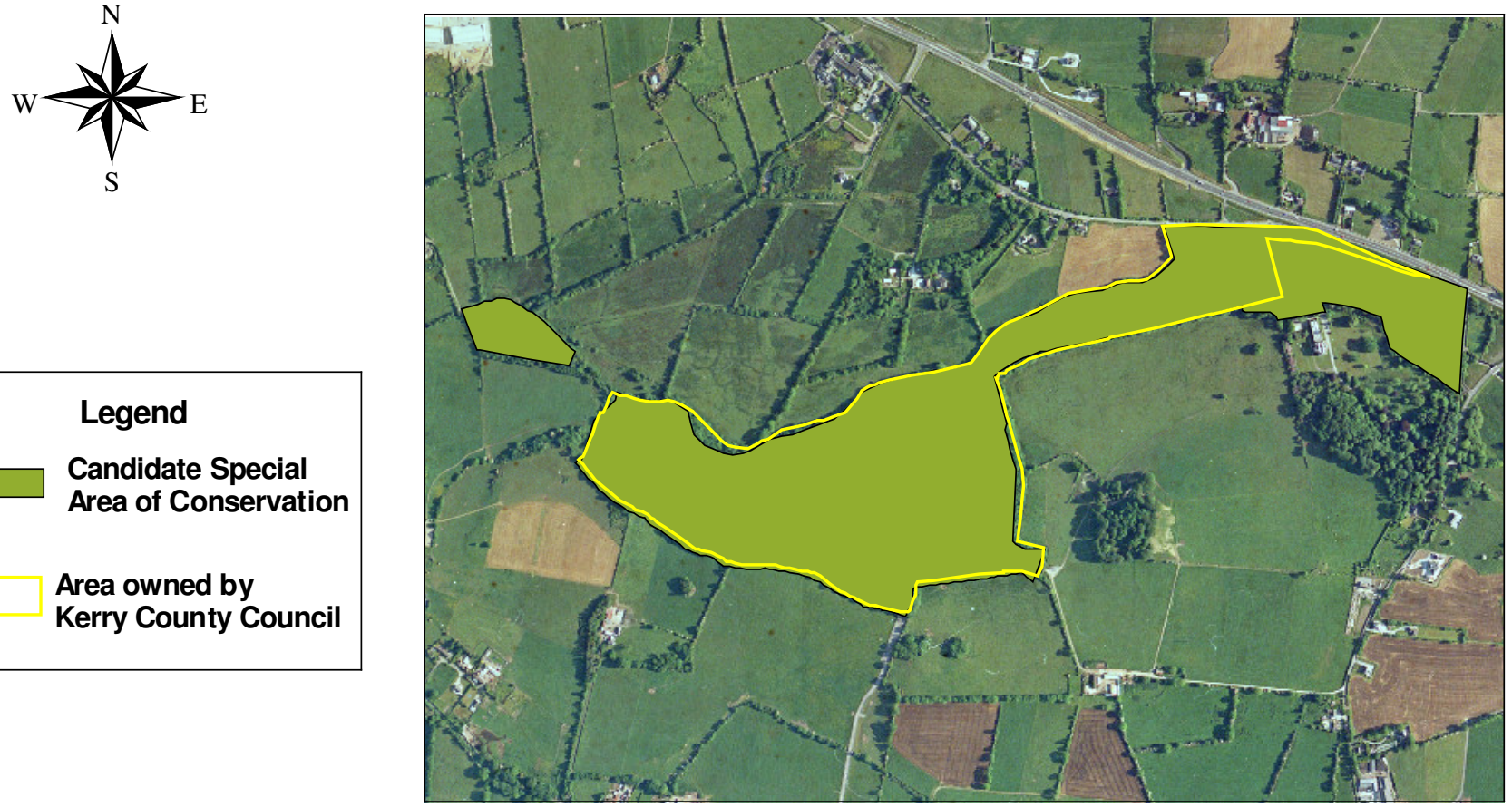

Figure 3. Area of Ballyseedy Wood cSAC

The wood is currently managed by Kerry County Council, primarily for recreation. Funding has been received from the Forest Service (Department of Agriculture and Food) through the NeighbourWood Scheme to help develop the site, which previously had no formal access. Recent work has involved:

- Establishment of a purpose built car park and access road to the south of the site;
- Conversion of part of the old N21 road to a northern car park;
- Surfacing of a network of footpaths and installation of culverts;
- Creation of several signed walking routes;
- Erection of noticeboards and interpretation boards;
- Construction of a bridge over the River Lee;
- Placement of several large stones to serve as seats;
- Cutting of rhododendron and spraying of snowberry.

The wood is used extensively by walkers and dog-owners. The location of items of infrastructure is shown in Fig. 4.

Since its acquisition by Kerry County Council in the 1990s, and following the recommendations of a report in 2003 (WM Associates 2003), Ballyseedy Wood has been developed from a rarely frequented wooded area to a well-used and popular amenity, with plans to link up the woodland path with a walkway that runs from Blennerville, some 5 km to the west. The relatively rapid increase in visitor numbers to the wood, coupled with the likelihood of these numbers rising further with the completion of the proposed footpath link to Blennerville, has necessitated a more structured approach to managing the area well into the future. The fact that most of the woodland is of European importance means that a balance must be struck between ecological and public interests. These points were recognised by Kerry County Council, leading to the commissioning of this 50-year management plan for Ballyseedy Wood in March 2008.

2.5 Ecology

In this section, the semi-natural habitats and species within the site are described. Codes in bold refer to the classification of Fossitt (2000). A habitat map of the site is given in Fig. 5. Full species lists with scientific names of all are given in Appendix A.

2.5.1 Woodland habitats

The woodland may be divided into two broad areas. On the lower ground along the river is an area of periodically inundated wet woodland which conforms to Annex I priority habitat 91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion,*

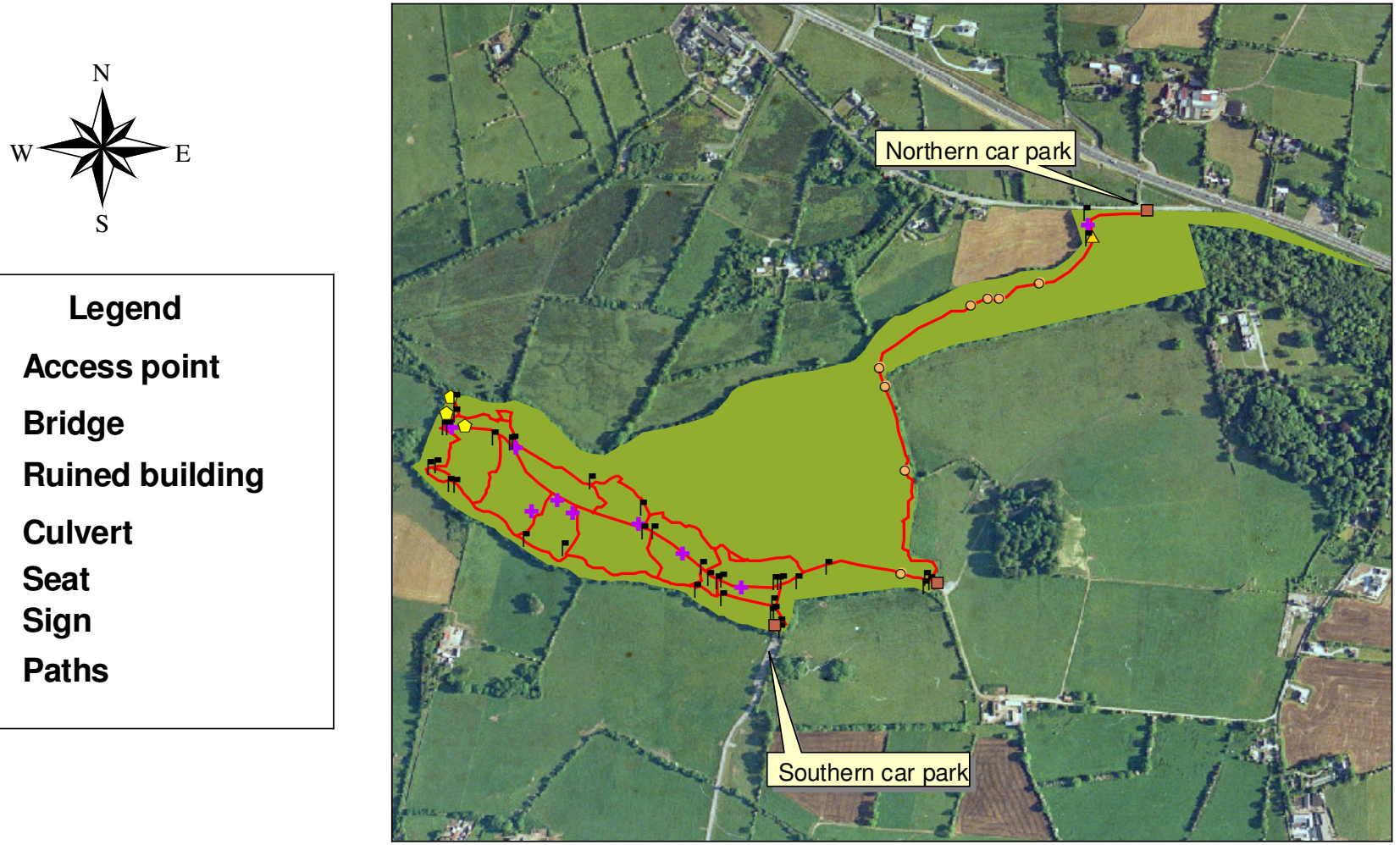

Figure 4. Items of infrastructure

Figure 5. Habitat map **(See Section 2.1 for explanation of codes)**

Alnion incanae, Salicion albae). Numerous ditches are found throughout. On the ridge in the southern part of the site, stand types typical of drier soils occur. Within both areas there is considerable variation in the vegetation.

In the far east of the site is an area of wet, alluvial woodland **(WN6 – wet willow-alder-ash woodland)** on heavy gleyed soils (Plate 1). The canopy is around 12-16m high and is dominated by alder. Ash and grey willow form a subcanopy, whilst hawthorn occurs in the understorey. Horse-chestnut is occasional here. The field layer is dominated by meadowsweet and hemlock water-dropwort. Creeping bent, creeping buttercup, yellow iris and thin-spiked wood-sedge are also abundant. Other species include remote sedge, water mint, marsh bedstraw and opposite-leaved golden-saxifrage. Standing water is frequent even during summer months.

Plate 1. Wet woodland in the east of the site.

To the west of this area is a narrow section of drier alluvial woodland **(WN4 – wet pedunculate oak-ash woodland)** which connects the eastern block with the main area of the site. This section is dominated by ash, although sycamore and horse-chestnut are both frequent and sycamore is freely regenerating. The field layer in spring is a carpet of wild garlic and lesser celandine (Plate 2). Thin-spiked wood-sedge is also abundant through this section. Standing water is again frequent. Where this section of

woodland passes beneath ESB power lines, there is a wayleave strip approximately 20 m wide crossing the site where the trees have been crudely pollarded to prevent interference with the cables.

Plate 2. Carpet of spring flowers beneath horse-chestnut.

The northern and eastern sections of the main block of woodland also consist of alluvial woodland **(WN4 – wet pedunculate oak-ash woodland**; Plate 3**)**. The main canopy species are alder and ash, with oak present in some areas. Hazel forms an understorey in places. Non-native trees are occasional throughout, especially in the northern half towards the river where sycamore and horse-chestnut are locally abundant. The ground flora consists of species typical of periodically inundated areas, including meadowsweet, remote sedge, wild garlic, celandine, enchanter's nightshade and locally abundant wood horsetail. Thin-spiked wood-sedge is also abundant throughout.

Plate 3. Stand of alluvial woodland from the centre of the site.

In the southeast of the site is an area along the Coach Road dominated by mature oaks with some beech **(WN2 – oak-ash-hazel woodland).** Until recently (early 2008) this area was infested by rhododendron but it has now been cleared with the debris being piled into windrows (Plate 4). Cherry laurel still occurs along the roadside, although much clearance of this species has also taken place. There is little in the way of either shrubs or field layer in this section, with the woodland floor being dominated by litter. Where the cleared area extends downslope to the north, soils become increasingly waterlogged as it becomes more alluvial. There are a number of old banks in this area.

To the west of this cleared area, between the Coach Road and southern edge of the site, is a dry section of woodland **(WN2 – oak-ash-hazel woodland)** where ash and hazel are frequent and holly is occasional. The field layer is rich in broadleaved herbs and ferns, with frequent wood avens, enchanter's-nightshade, wild garlic and soft-shield fern. Some small areas of outcropping limestone occur here. Another area of this woodland type occurs at the far west of the site. Here, near the ruins of the old Ballyseedy House and mill, are also some small thickets of snowberry, which have been recently sprayed and cut. A flowering rhododendron bush has also been removed from this area.

Plate 4. Area cleared of rhododendron in the southeast of the site.

Between the two areas of oak-ash-hazel woodland is a section that has a higher proportion of non-native trees **(WD1 – mixed broadleaved woodland)**, particularly hornbeam and beech. In some places hornbeam forms pure stands. The field layer is characterised by species similar to the oak-ash-hazel area, including wood avens, enchanter's-nightshade, violets, sanicle, wild garlic and soft-shield fern. Brambles and wood speedwell are also present, and ash seedlings are locally abundant.

To the northeast of the clearing in the centre of the site is a distinctive area of wet, alluvial woodland **(WN6 – wet willow-alder-ash woodland)** dominated by alder with grey willow abundant. The field layer here has a grassy character, being dominated by remote sedge, creeping bent and tufted-hair grass. Meadowsweet, yellow iris, water mint and creeping buttercup are plentiful (Plate 5).

Plate 5. Wet woodland with open canopy in centre of the site.

2.5.2 Other habitats

In the southern, central part of the site there is a small clearing approximately 200m x 50m (Plate 6). The Coach Road runs through it from southeast to northwest, with the ground sloping away to the northeast. This area consists chiefly of unimproved grassland **(GS2 – Dry meadows and grassy verges)** with some areas of blackthorn/willow scrub and bramble **(WS1 – Scrub)** and two small areas of bracken **(HD1 – Dense bracken)**. The grassland contains a good mix of species including Yorkshire-fog, sweet vernal-grass, cock's-foot, common knapweed, ribwort plantain, common sorrel, red fescue, creeping buttercup, germander speedwell, meadow buttercup, red clover, rough meadow-grass, meadowsweet, dandelion, cat's-ear and tormentil. Towards the bottom of the slope the soils are wetter; here, soft rush, compact rush and sharp-flowered rush occur with yellow iris. There are signs that the areas of scrub are starting to expand, with blackthorn, alder and oak seedlings all recorded within the grassland sward. Along the Coach Road to the southwest is a fairly homogenous tangle of bramble (**WS1 – Scrub**).

Plate 6. Grassland and scrub habitats in the central clearing.

The other most significant habitat within the woodland is the River Lee (**FW2 – depositing** / **lowland river**), which arises in several steep-sided valleys of the Stack's Mountains, merges into one main watercourse some 3 km upstream of Ballyseedy, and empties into Tralee Bay at Blennerville, 5 km west of the woodland. The main vegetation in the section of the river within the woodland is hemlock water-dropwort. Many trees such as sycamore, alder and willow grow on the riverbanks, sometimes falling into the river and partially impeding river flow. The river has a wider significance in that it is part of a hydrological system integral to the ecology of the alluvial woodland. It supports salmon, trout and otters. Water quality of the stretch of the river flowing through Ballyseedy Wood is determined to a large extent by conditions upstream of the wood. A hotel is located upstream of the area owned by Kerry County Council. The EPA has a number of monitoring points along the River Lee. Recent surveys have rated water quality at Ballyseedy Bridge as "Satisfactory" (Q Value 4), with ecological quality improving from a 1987 rating of "Moderately Polluted" (Q Value 3) (Clabby *et al.* 2006).

2.5.3 Fauna

A number of fauna surveys were carried out between 2001 and 2002, including invertebrate and bird studies (WM Associates 2003). Over 100 species of Lepidoptera (including seven noteworthy species) and twelve species of Diptera (two-winged flies) were recorded in a 2002 survey. Ground invertebrates surveyed in 2001 included nine

species of carabid beetle and 40 species of staphylinid beetle, three of which indicate ecologically well-developed dead wood microhabitat and a fourth that indicates well-developed wetland habitat (WM Associates 2003).

A bird survey in 2002 recorded 33 bird species within the woodland, of which 25 were breeding (WM Associates 2003). In addition, the wood has been noted as a nesting site for long-eared owl, and woodcock has been recorded from the site in winter. Badgers, foxes, common frogs and Irish hares have been recorded at Ballyseedy, although the badger sett was not used in 2002-2003 (WM Associates 2003), and appears to have been abandoned in the last two years (L. Tangney, pers. comm). Although no bat survey has been carried out recently, a lesser horseshoe bat roost is known to exist within 500 m of Ballyseedy Wood (T. O'Donoghue pers. comm.). No further data are currently available on numbers or foraging habits of lesser horseshoe bats in the wood.

Both salmon and trout have been recorded from the River Lee at Ballyseedy. The river is closed to salmon fishing due to the low numbers but trout fishing is permitted.

An otter holt was reported by WM Associates (2003) near where the river turns south close to the N21, and otters are known to be still present at Ballyseedy (T. O'Donoghue, pers. comm.). The River Lee supports suitable prey species (e.g. salmon and trout) for otter, and other food items such as frogs and small mammals are also present in Ballyseedy Wood.

There are no records of either the native red squirrel or the non-native grey squirrel from Ballyseedy Wood. Carey *et al.* (2007) presented data for the distribution of the species on a 10 km-square basis through south Kerry and along the Kerry – Limerick border but not in the locality of Ballyseedy. Grey squirrel are currently absent from Kerry with records from south Tipperary being the closest population (Carey *et al.* 2007). The spread of red squirrel into Ballyseedy Wood would be a positive addition to the fauna of the site and would meet one of the aims of the species action plan for this species (Anon. 2008). The occurrence of grey squirrel, which has an adverse impact on the native population, would be undesirable. Over the course of a 50-year management plan both of these possibilities should be considered.

Similarly there are no current records of pine marten from the site. This species has been gradually expanding its range since the 1970s following a serious decline in numbers during the 19th century. Population spread was augmented by deliberate

release of animals into areas where it had historically occurred. Animals were released into Killarney National Park but there is no evidence of the species having spread north to Ballyseedy. This is, however, a possibility within the lifespan of this management plan. This would be a welcome addition to the fauna of the site.

2.5.4 Stand map

Methodology

A grid system with 50 m x 50 m cells was superimposed over the aerial photograph of Ballyseedy Wood. Using a handheld Garmin 12 GPS each intersection point was located on the ground. The dbh (diameter at breast height: 1.3 m) of each of the five trees rooted closest to the point was measured. Notes were also made of the ground flora at each point. A total of 128 points and 610 trees were measured, of which 92 (15.1%) were non-native.

The dbh data were converted to basal area measurements and the percentage of the total basal area at each point contributed by each species was calculated. These data were analysed using hierarchical agglomerative cluster analysis within PCOrd 4. This statistical method sequentially groups (or clusters) data samples together starting with the most similar until all samples have been organised into a hierarchical tree. Sørensen (Bray-Curtis) was used as a distance measure, with flexible beta used as the linkage methods ($\beta = -0.25$). Following visual examination of the resulting hierarchy and some minor subjective changes, it was decided to group the data samples into five different stand types based on tree species and girth.

Non-native basal area was calculated based on the data gathered, and non-native trees are found to account for 20.3% of the total basal area of the wood.

Stand types

Five stand types were identified using the methodology outlined above, and are mapped in Fig. 6. These are as follows:

Ash stand: These are characterised by mature ash (>30 cm dbh) in the canopy and hazel in the understorey, with occasional hawthorn, elder or holly. Soils are moderately dry.

Alder stand: Mature alder (mostly > 30 cm dbh or multistemmed trees, each > 20 cm) occurs in the canopy. Other species, such as grey willow, are no more than occasional. Soils are typically waterlogged.

Willow stand: Large and mature grey willow (some > 40 cm) occur in the canopy with younger willow and ash trees in the understorey, as well as small amounts of other shrub species such as hazel and blackthorn. Soils are typically waterlogged.

Oak stand: Large (some specimens > 100 cm dbh), mature oak (sessile and/or pedunculate) occur in the canopy. Other native species also occur (e.g. alder, hazel, ash, holly) as well as non-natives such as beech, hornbeam and fir.

Non-native stand: The canopy is predominantly composed of mature non-native species, such as beech, hornbeam, sycamore and horse-chestnut. Smaller native trees may also occur, including aspen, hazel, holly, hawthorn and young ash.

Figure 6. Stand map

3. EVALUATION OF SITE

3.1 Habitats

Of major significance is the fact that a considerable proportion of the site is of European importance, conforming to EU Annex I priority habitat 91E0 *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*). 'Priority' habitats are those which are considered to require special attention because they are in danger of disappearance. The alluvial woodland at Ballyseedy is considered an excellent example of this habitat type. There is also very good regeneration of native tree species in several areas of the site, particularly ash and hazel: the lack of natural regeneration due to overgrazing that is a common problem in many Irish woodlands does not appear to be an issue here. In a comparison of over 1,300 sites evaluated as part of the national survey of native woodlands in Ireland (Perrin *et al*. 2008), Ballyseedy achieved a high conservation score and an excellent conservation rating, ranked in joint fifth place by virtue of such attributes as number of species, habitat and structural diversity, international importance and woodland age.

Overall, the centre section of the site, the area under alluvial woodland, is the best in terms of native status, although even here there are problems with sycamore and horse-chestnut, especially towards the river at the northern boundary. The northeastern section is also alluvial woodland but would be improved through the removal of non-native trees and non-native regeneration. The drier southern half of the site is more modified, both in terms of non-native species and man-made structures such as paths, and is of lower ecological value. The woodland habitat is enhanced by the area of open grassland, scrub and dense bracken in the southwest of the site. Fuller and Peterken (1995) regard proper management of open spaces within woodlands as being possibly as important as management of the tree stands. The grassland increases the plant species diversity at the site as well as providing a niche suitable for invertebrates such as butterflies and moths and an area for hawking dragonflies and bats. Scrub provides valuable shelter and food to birds, animals and other fauna. In Balrath Wood in Co. Meath, bird species diversity was greatest where there was a variety of scrub species as well as mature trees (UCC 2007). The food value of some scrub habitat is considerable, with brambles and blackthorn providing nectar and berries. Scrub also provides a transitional habitat between open ground and woodland, a situation preferred by many birds. The most significant areas of scrub occur immediately adjacent to, and across the path from, the grassland area. Small areas of dense bracken add to the structural and habitat diversity of the open area. Bracken can provide habitat for invertebrates and

basking lizards. The increase in area of this habitat would, however, be undesirable. The river which flows along the northern boundary of the site has water quality currently assessed as "Satisfactory" (Q Value 4; (Clabby *et al.* 2006). There are a variety of pools, riffles and glides within the watercourse but flow is generally sluggish with deposition of sediment. The river does support a variety of fauna, including two species listed on Annex II of the habitats directive. Kingfisher, listed on Annex I of the Birds Directive, has also been recorded from the river.

3.2 Flora

3.2.1 Diversity

During field visits in 1995 (WM Associates 1995), 2002 (WM Associates 2003) and 2007 (Perrin *et al.* 2008), a total of 196 vascular and 45 bryophyte species were recorded at the site (Appendix A), with 22 native tree species, including some locally less common species such as spindle and guelder rose and a number of exceptionally large crab apple trees, one specimen with a diameter of over 40 cm. This number of recorded species represents very good diversity and the occurrence of wood anemone is indicative of long-established woodland. No species were found which are listed under the Flora (Protection) Order, 1999 or in the Irish Red Data Book (Curtis & McGough 1988). There is considerable diversity in soil conditions, with parts of the woodland to the south being drier than the rest of the site, resulting in the development of different stand types. Likewise there is good habitat diversity, with grassland, scrub and river habitats all represented, as well as woodland.

3.2.2 Rare plant species

There are several records of regionally rare plants species for the site. *Pylaisia polyantha* is a moss reported from only three 10 km squares in Ireland, (Smith 2004). It was recorded from Ballyseedy in 1953, but this specimen was re-examined in 2005 and identified as *Hypnum resupinatum*. The statement in WM Associates (2003) that *P. polyantha* had recently been re-found in Ballyseedy Wood is erroneous (N. Lockhart pers. comm.).

Shady horsetail (*Equisetum pratense*) was recorded by WM Associates (1995). However, this species occurs only from Fermanagh northwards according to Preston *et al.* (2002). No comment on this species is made by WM Associates (1995) in their assessment of rare species nor did they record it in their 2003 survey. It is therefore likely that this record is a clerical error.

There is a pre-1970s record of dark-leaved willow (*Salix myrsinifolia*) in the 10 km square in which Ballyseedy Wood lies according to Preston *et al.* (2002), but there have been no other records further south than Westmeath. WM Associates (1995) recorded this species at the site as "rare and occurring scattered around the margins of alder/ash compartments" but did not confirm their own record in their 2003 report. WM Associates (1995) report that Scully (1916) recorded the species as rare but it is unclear whether this is at a site or county level. The occurrence of this species at Ballyseedy therefore remains unconfirmed.

Purple willow (*Salix purpurea*) has been recorded from the site pre-1970 (Preston *et al.* 2002) but has not been recorded in any of the recent surveys. The tree is relatively scarce in the southwest of the country but there are recent records from at least eight other sites in the county.

Thin-spiked wood sedge (*Carex strigosa*) is frequent throughout most of the alluvial sections of the site as it favours heavy gleyed soils. This species is also rare in the south of Ireland, being confirmed from only nineteen 10 km squares south of Westmeath since 1986, and occurring in only two other squares in Kerry.

Twayblade (*Listera ovata*) is an orchid species frequent across most of central and northern Ireland, but at a county level rather scarce, occurring in only six other 10 km squares in Kerry. A good-sized population was noted during summer 2008 in the central part of the site (grid reference Q 86801 12585). Wood horsetail (*Equisetum sylvaticum*) is also rather scarce in the south of Ireland although it does occur at several sites in southern Kerry. It occurs scattered through the woodland.

A rough horsetail (*Equisetum hyemale*) colony (Plate 7) occurs in the east of the wood (grid reference Q 87513 13048) straddling the ditch which demarks the boundary with the adjacent area of private woodland. The colony covers an area of approximately 20 m x 20 m with several thousand shoots observed in 2008. This species is rare in the south of Ireland, being confirmed from only fourteen 10 km squares south of Sligo since 1986, and only three other 10 km squares in Kerry.

Plate 7. Colony of rough horsetail.

3.2.3 Non-native trees

Mature non-native trees are frequent and locally abundant (Fig. 7). The majority of these are broadleafs, with the main species being sycamore, beech, hornbeam and horse chestnut. In total, non-natives comprise over 15% of trees and over 20% of basal area. Some of these trees have considerable cultural and amenity value attached but impact negatively on the ecological value of the site as they may outcompete native plants and support fewer species of invertebrates than native trees. Sycamore is regenerating vigorously in several areas of the site (Plate 8) and is liable to outcompete regenerating native species and ground flora. Mature sycamore is frequent and locally abundant in the narrow, northeast section of the site and also in the far west (Fig. 8). Preventing the spread of sycamore and reducing the number of mature trees must be seen as a priority. Horse-chestnut is usually less invasive than sycamore but this species is also freely regenerating (Plate 9) and poses a problem where it occurs in the north of the site (Fig. 9) due to the heavy shade which it casts. Beech is locally abundant along the river bank and in the vicinity of the Coach Road (Fig. 10). This species is typically a very strong competitor, casting heavy shade and acidifying the soil with a deep leaf litter. Regeneration of beech was, however, rarely observed during summer 2008. Hornbeam is locally dominant in the southwest of the wood where it forms a small stand (Fig. 11). Again, this species is not regenerating strongly. Non-

native conifers, such as western red cedar and European silver-fir planted as specimen trees in the 1800s, are present in several parts of the site but these do not appear to have naturalised.

Plate 8. Regenerating sycamore.

Plate 9. Regenerating horse-chestnut.

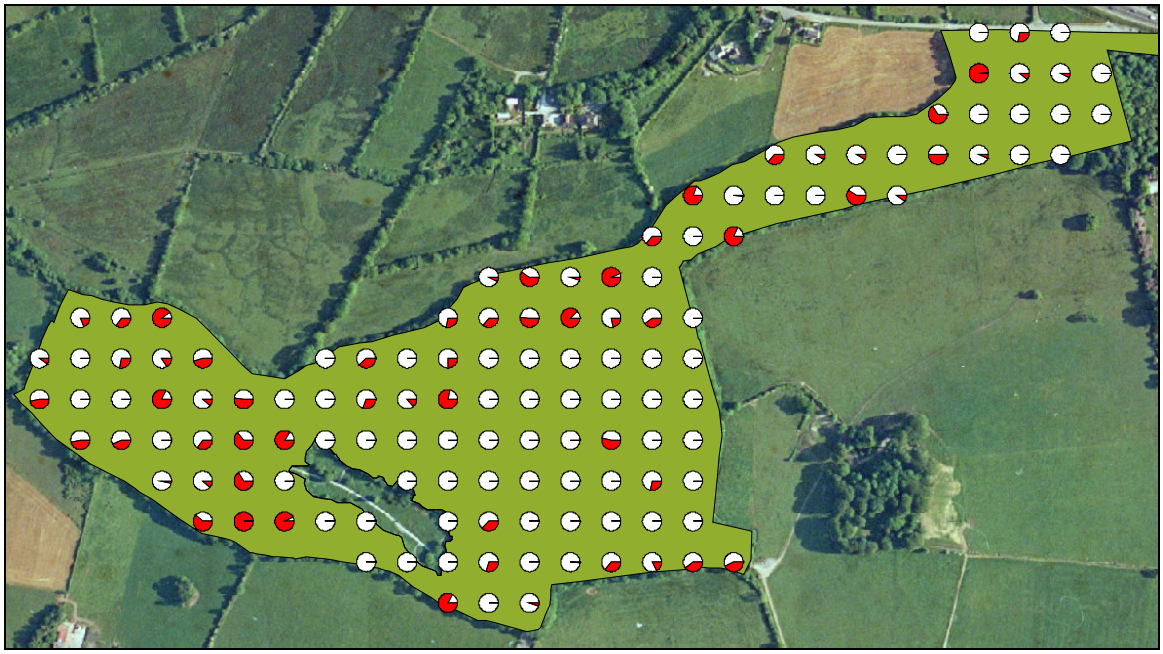

Figure 7. Ratio of combined non-native trees (red) to native trees (white) according to recorded basal area.

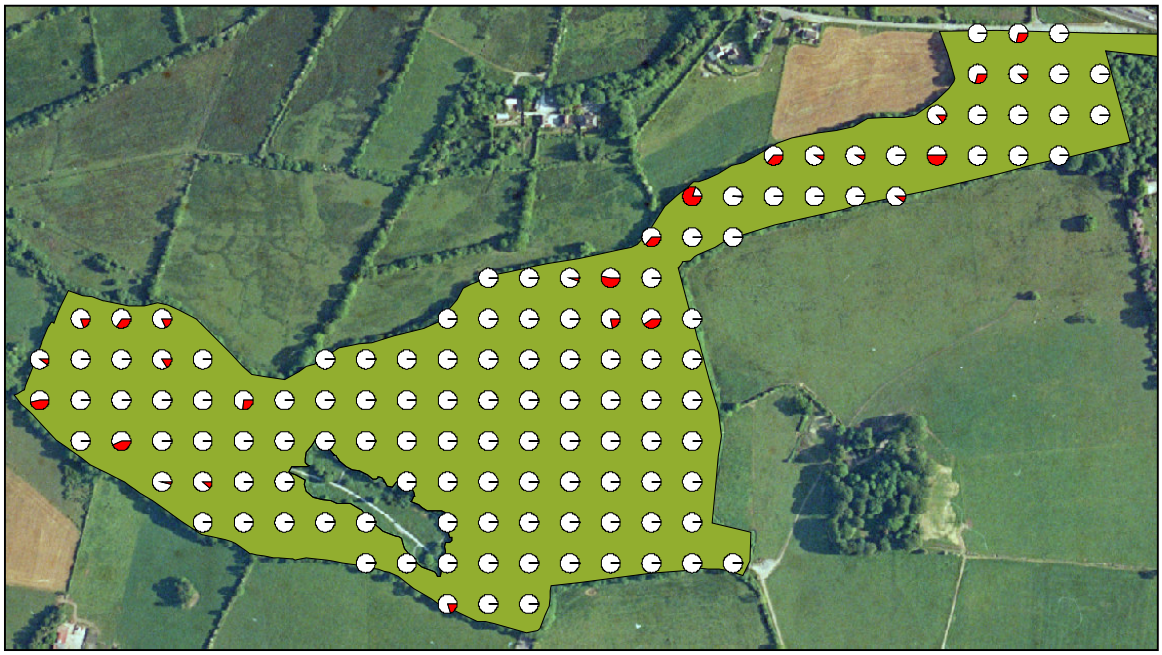

Figure 8. Ratio of sycamore (red) to non-sycamore (white) according to recorded basal area.

NOT TO SCALE

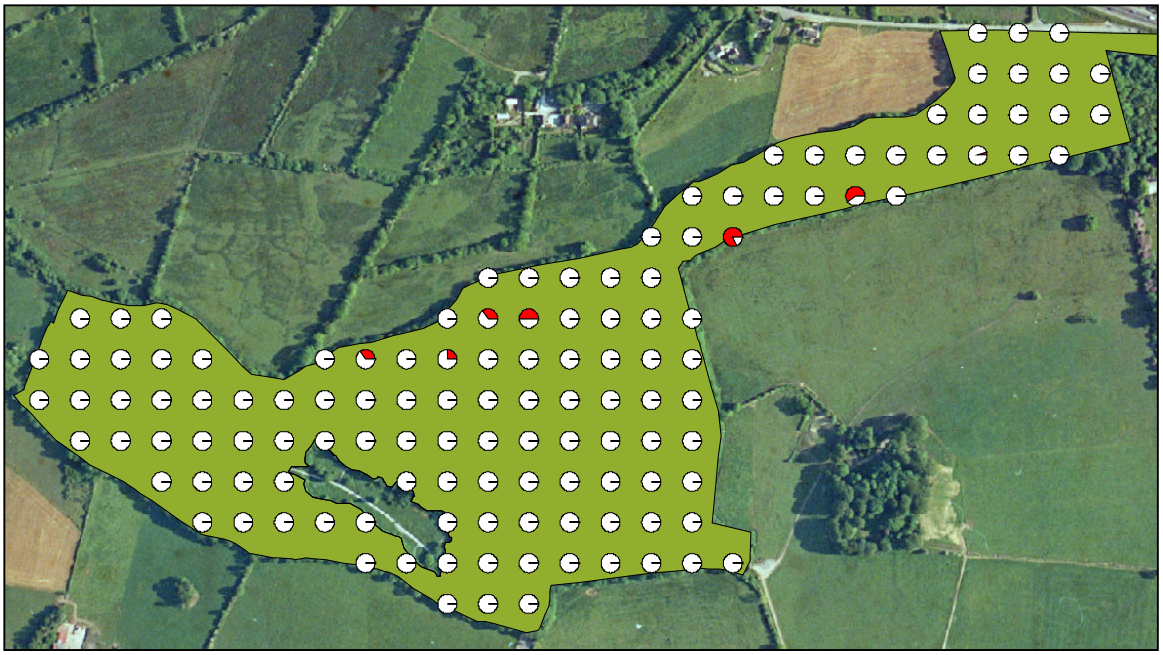

Figure 9. Ratio of horse chestnut (red) to non-horse chestnut (white) according to recorded basal area.

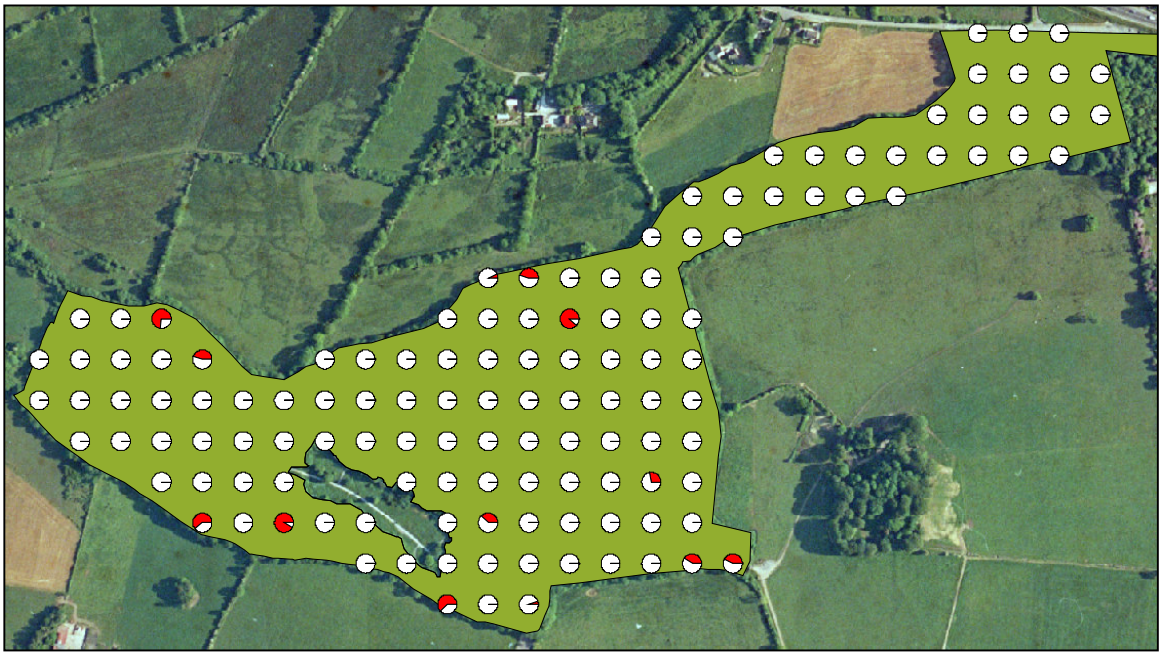

Figure 10. Ratio of beech (red) to non-beech (white) according to recorded basal area.

NOT TO SCALE

Figure 11. Ratio of hornbeam (red) to non-hornbeam (white) according to recorded basal area.

NOT TO SCALE

In the long term, the ecological value of the site would be enhanced by the gradual reduction of the non-native tree component of the woodland and the replacement of these trees by native species. Small stands or individuals of non-native species could be retained for educational and cultural value, particularly in the vicinity of the path.

3.2.4 Invasive shrubs

There are several invasive shrubs present on the site. In the southeast of the site a substantial area has been cleared of rhododendron. There are, however, several flowering plants growing on the southern boundary bank in this section. A small isolated thicket in the west of the site was cut in late summer 2008. It is of high priority that follow up works are conducted on an ongoing basis in areas cleared of rhododendron.

There are several small stands of cherry laurel growing near the Coach Road in the south east of the site and in the west of the site there are areas where snowberry dominates the understorey. Some of these thickets were sprayed in early 2008 and cut later in the summer. A single specimen of red-osier dogwood, an invasive species of wet woodlands, was found in the rhododendron-cleared area. Removal of these species is standard procedure for enhancing the ecological value of woodland sites.

Ivy occurs naturally across the site, both on the ground and as a climber, as it does in the majority of Irish woodlands. Several instances were noted during fieldwork where the main stems of ivy growing on mature trees had been cut through at chest level killing the plant. It is apparent from discussions with local users of the site that many share the common opinion that ivy is harmful to the trees it climbs. Contrary to popular belief, ivy is not parasitic and does not directly affect the health of the trees it climbs. Unlike true parasitic plants such as mistletoe, whose roots tap directly into the resources of the host plant, ivy has its feeding roots anchored in the ground and simply uses the tree as a support. If ivy has become established on a tree, it is more likely to be a sign of stress than a cause of it. A heavy infestation of ivy, particularly in the upper crown, is usually an indication that the tree is in a natural state of decline; most healthy crowns will let insufficient light through for the ivy to grow vigorously. Ivy is a native species with significant wildlife value. The dense foliage provides shelter for birds to build nests. Bats may roost amongst ivy during the day, and very dense ivy may be used as winter hibernation sites. In the autumn ivy flowers are valuable sources of nectar for insects at a time when few other woodland plants are flowering and in the spring ivy berries provide both native and migrant birds with invaluable high fat energy resource. Further details may be found at:

www.arborecology.co.uk/articles/pdfs/ivy_friend_or_foe.pdf. Killing of ivy in an SAC is a notifiable action under the obligations of the EU Habitat Directive and as such, prior consent is required from the Minister for the Environment, Heritage and Local Government. Action is needed to inform users of the site of the wildlife value of ivy and prevent further incidents occurring. If in exceptional cases it is deemed by an expert that it is necessary for the health of a tree to remove ivy from it, approval must first be obtained from the local NPWS ranger for remedial action to proceed.

3.3 Fauna

All bat species are protected under Irish and EU law. Lesser horseshoe bats, which are listed under Annex II of the Habitats Directive, are known to roost in the vicinity and may be utilising Ballyseedy Wood. Survey work is required to determine whether this species or any other type of bat utilise the wood. The paths and river provide good flight lines for bats, and the ruined house and mill in the west of the site are suitable bat habitats that require investigation as a matter of urgency. A species action plan for this species in Ballyseedy Wood is included in Appendix B.1.

Salmon are present in the River Lee in small numbers. Salmon fishing on the river is prohibited due to the low numbers. The present condition of the river is such that the habitats available for spawning and survival of juvenile life-cycle stages of salmon are few and of poor quality. River flow tends to be uniform, with few riffles or pools favoured by salmon. Flow rate is sluggish, with siltation occurring as a result, posing a problem for egg survival. Salmon is listed on Annex II of the Habitats Directive. A species action plan for this species at Ballyseedy Wood is included in Appendix B.2.

Otters are recorded from Ballyseedy Wood and a holt was recorded within the woodland in 2002. Otters have a large home range, between 5 and 15 km of channel (Bailey and Rochford 2006), and factors such as river quality, availability of prey and suitable holt sites undoubtedly play their part in dictating the size of this range. Ballyseedy Wood is likely to be an important part of the home range of the resident otter in the area, with undisturbed woodland along the bank of the river providing a number of locations for sleeping and resting. The river, with salmon, trout and other aquatic animals, will provide food for the otter. Otters are listed on Annex II of the Habitats Directive. A species action plan for this species in the vicinity of Ballyseedy Wood is presented in Appendix B.3.

The bird survey conducted in 2002 (WM Associates 2003), despite acknowledged sub-optimal conditions, provides baseline data against which the future development of the site and the effects of management can be assessed. For instance, Ballyseedy hosts a good population of blackcaps, but recent rhododendron clearance has reportedly caused a decline in numbers of breeding pairs (F. King, pers. comm.). Four species recorded from the site are on the Amber List of Birds of Conservation Concern produced by BirdWatch Ireland and RSPB Northern Ireland, and are of medium conservation concern. These are kingfisher, swallow, woodcock and spotted flycatcher. Kingfisher is also listed on Annex I of the Birds Directive.

At least three of the staphylinid beetles records *(Gyrophaena joyi, Traumoecia picipes Atheta aquatilis)* were new county records for Kerry when recorded in 2002. Of the seven noteworthy species of Lepidoptera recorded, three are confined to the southwest of Ireland, whilst *Ochropleura duplaris* has not been recently recorded from north Kerry. The proportion of lepidoptera species deemed noteworthy was, however, rather low. All of the twelve species of Diptera recorded are widespread in Ireland.

It would be of great benefit to establish a monitoring programme for birds and invertebrates given the surveys that have already taken place in Ballyseedy. This would provide another means of assessing the success of management operations and the effect of vegetation succession. A focus on popular taxa, such as butterflies and dragonflies, would also provide interesting information for interpretative material and nature walks. A study of this nature could form the basis of a project for university students or groups.

Other animals recorded from the woodland which are Internationally Important Irish Red Data Book species are badger, Irish hare and common frog.

3.4 Infrastructure

Ballyseedy Wood is an important recreational resource for north Co. Kerry, providing public access to a woodland environment in an area in which this habitat is relatively scarce. While the Killarney woodlands, some 25 km to the southeast, are internationally renowned, the area around Tralee and North Kerry has few woodlands or comparable outdoor resources.

At the time of the 1995 Wolfe-Murphy report, the woodland character was described as "generally undisturbed", the 1995 NPWS site synopsis for Ballyseedy cSAC noting that it is "apparently infrequently visited by man"; this situation has since changed. A range of facilities for recreational users has now been put in place. The presence of two car parks in particular makes the site attractive to visitors. Surfaced paths mean that the site is accessible in all seasons by visitors with push-chairs and those with limited mobility. Several trails are laid out using marked posts, with explanatory notices at the southern car park. Other interpretation boards give information on some of the native trees found in the woods. Limestone posts placed beside specimen trees, both native and non-native, provide further opportunities for education. The relatively small size of the wood makes it a pleasant and easy walk, ideal for nature study by school groups. The presence of the adjoining river means that both terrestrial and aquatic habitats could be studied by students in an afternoon. These resources should be promoted fully while ensuring the more sensitive areas within the site remain undisturbed. The educational potential of the wood is addressed in the Ballyseedy Wood Recreation Management Plan (Bosbeer, 2008).

Negative aspects from an ecological viewpoint consist of the high number of paths, both surfaced and informal, diverging from the main Coach Road, and the abundance of non-native species. In some cases the paths have become widened through public use

(Plate 10) or unwise deposition of surfacing material (Plate 11), eroding the area under native ground flora.

Plate 10. Erosion of ground flora by informal paths.

Plate 11. Deposition of spoil from path construction and repair.

3.5 Management Zones

Following consideration of the evaluation of the habitats and features of Ballyseedy Wood, the area has been divided into different management zones (Fig. 12). These take into consideration the ecological sensitivity of the habitats and features, and the existing infrastructure.

Disturbance-sensitive zone

This is the core of the wet woodland area and cannot sustain any recreational use. Any activities here should be confined to removing non-native trees. Education in this zone should be limited to specialist study by experts. Selected non-native trees should be removed and the wood left in log piles to limit damage to the native ground flora. Ring-barking of non-native trees may be carried out away from footpaths to create standing deadwood. Monitoring of areas cleared of invasive shrubs should be maintained within this zone, and any regrowth sprayed with glyphosate. All non-native saplings and seedlings must be removed by cutting and stump treatment or by pulling.

Amenity and education zone

This is the drier section of the wood and can sustain recreational activities. A network of pathways has been created here. It is not recommended to lay any more paths as the area is already well enough served in this regard. As for all zones in the wood, areas cleared of invasive shrubs should be monitored for regrowth and sprayed with glyphosate if necessary. The area near the northern car park includes a footpath and an accessible section of river for general education (e.g. aquatic studies). Native woodland conversion areas are any areas of non-native trees (see stand map, Fig. 6) within this zone. The northeastern area of this zone includes the area managed as coppice or high pollard (ESB wayleave). This intervention can continue here, but should be carried out more sensitively, preferably as properly managed coppice to enhance biodiversity.

Limited intervention – river corridor

Activities here are limited to works required for river corridor improvement.

Limited intervention – footpaths

This covers areas within the wet woodland area where footpaths occur, and can sustain footpath use and careful maintenance of paths. The wet woodland can be used for general education only from these footpaths (up to a maximum of 5 metres into the wood). This zone encompasses the area with a concentration of non-native trees along the footpath though the northeastern arm of the site. These trees are to be selectively felled, and the timber left in log piles or, where necessary, sensitively removed.

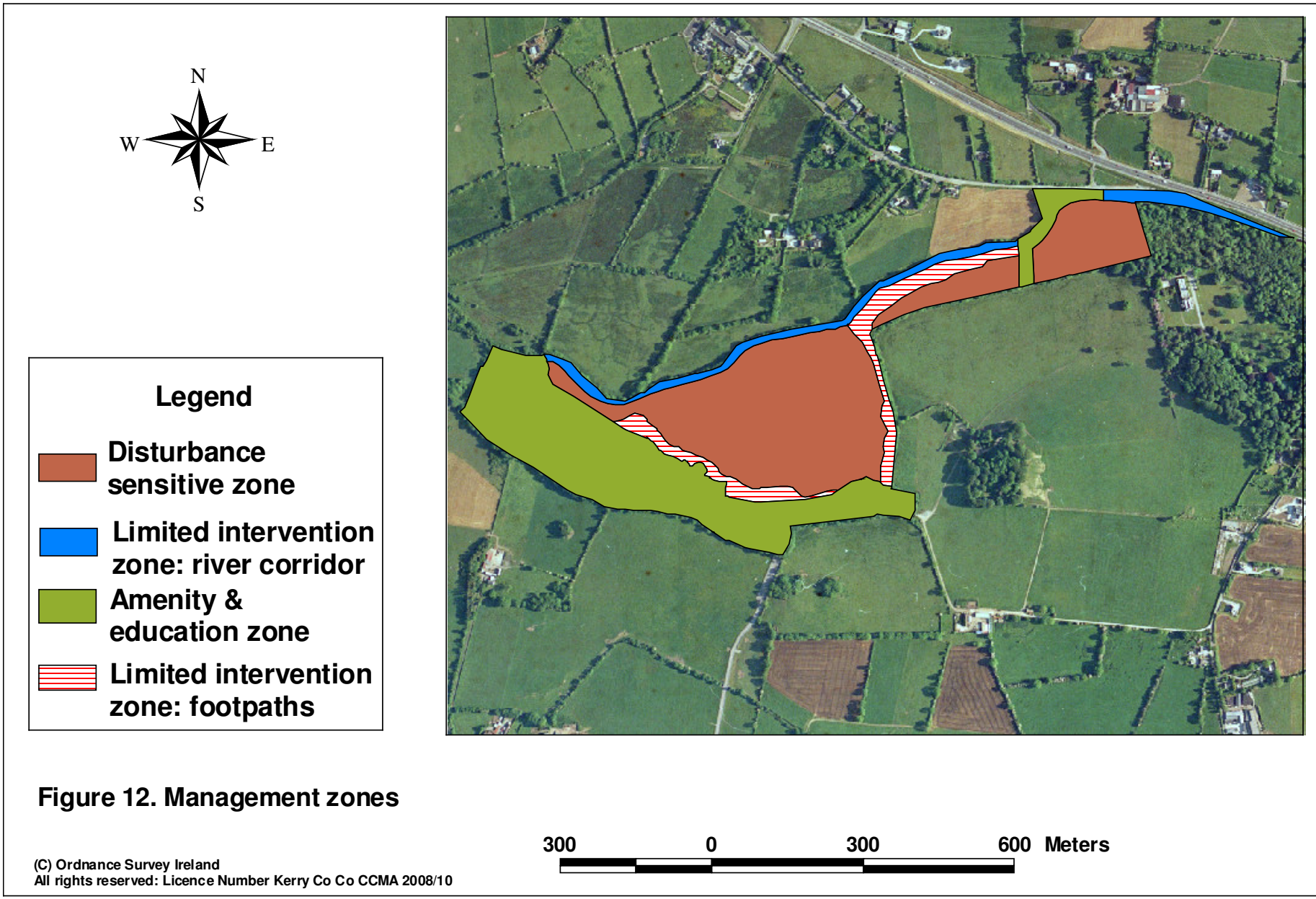

Figure 12. Management zones

4. STRATEGIC AIMS AND MANAGEMENT OBJECTIVES

The overall strategic aims for the site as a whole relate to the woodland and the river. They are as follows:

Strategic Aim 1: Reduce basal area of non-native species in the woodland to below 5% over the next fifty years.
Strategic Aim 2: Restore river quality to increase populations of salmonid fish species.

Based on the preceding site-based description and its evaluation, the key Aims and Objectives for Ballyseedy Wood are set out below.

Aim 1. Woodland habitat improvement programme: Through appropriate management promote a native woodland stand, whilst recognising the cultural value of introduced species such as beech, horse-chestnut and hornbeam.

(a) To manage the northern and northeastern sections of the site ("Disturbance-sensitive zone") in a manner that will promote the retention and improvement of priority Annex I native alluvial woodland.
(b) To eradicate invasive tree species, especially sycamore, by removal of regeneration and removal of adult trees by felling or ring-barking (the latter not recommended for sycamore).
(c) To eradicate invasive shrubs (rhododendron, cherry laurel and snowberry) by glyphosate spraying or hand-cutting (see Aim 2).
(d) To manage the western and southern sections ("Amenity and Education zone") in a manner that will promote the establishment of native woodland while retaining for education and visual amenity reasons specimen non-native trees for the duration of their natural lifespan.
(e) To employ operational methods that avoid excessive disturbance to the site.
(f) To retain standing and fallen deadwood wherever possible, including representatives of each of the tree species found on the site. This will promote associated fungi, invertebrates, hole-nesting birds, and bats.
(g) To monitor and, where necessary, encourage native tree regeneration, especially in gaps created by tree fall or death.
(h) To under-plant cleared areas where necessary, particularly in areas cleared of non-native invasive species.

(i) To retain a diverse stand structure by the retention of mature and over-mature trees, management of regeneration and, where necessary, by the planting in of new material from nursery stock derived from Ballyseedy trees.

(j) To initiate a nursery partnership scheme with the aid of local schools as keepers of seedling and sapling material for restocking Ballyseedy Wood, particularly with slower-regenerating species such as oak.

Further guidance:

- For the purposes of this management plan when considering removal of non-native species, regeneration may be defined as ranging from seedlings that can be hand-plucked to small trees that can safely be cut with a handsaw or loppers.
- Invasive trees on site include widespread sycamore, local horse-chestnut and to a lesser extent beech and hornbeam. Currently sycamore is the greatest cause for concern, with horse-chestnut also regenerating freely in certain locations. Beech and hornbeam are not currently a major concern but this may change during the lifetime of this plan as gaps are created in the canopy. If left unchecked, sycamore and horse-chestnut saplings may develop into larger stands of non-native trees, which impact negatively on the ecological value of the wood. Control of these species is on two fronts. The regenerating plants themselves must be removed, and the parent plants giving rise to the regeneration must also be extracted.
- Measures to remove regeneration of invasive trees and shrubs include plucking of seedlings and saplings (most preferred method), hand-cutting, or spraying with herbicide (least preferred method). It is a matter of priority to remove regeneration and maintain the wood clear of regeneration. The willingness of local volunteer groups and schools to participate in periodic regeneration clean-up operations should be explored and availed of. A "*meitheal*" could be organised on an annual basis, but most especially in the first year of this plan, to remove non-native sycamore, horse-chestnut and rhododendron seedlings, the best time probably being in spring (late April – May) when regeneration is fresh and most visible.
- Removal of adult non-native or invasive trees is a contentious issue but one that needs to be addressed and its implementation commenced as a matter of urgency. Felling trees *en masse* is undesirable due to negative ecological and visual impacts and disturbance to the recreational usage of the site. Priority

should be given to the alluvial woodland areas, as these are Annex I habitat (disturbance-sensitive zones on Fig. 12). Priority should also be given to areas where non-native regeneration is highest, particularly in the northeastern arm of the wood, which is also a disturbance-sensitive zone. Care must be taken to avoid damaging nearby native trees: it is likely that trees will need to be removed in sections by a tree surgeon. Care must also be taken not to create large caps in the canopy, so large adjacent trees should not be felled in a single year. As a guide, 6-8 isolated trees (with a dbh >7 cm and <30 cm) should be removed annually, with 4-5 being removed from the disturbance-sensitive zone and 2-3 from the amenity and education zone. Thereafter, priority should be given to areas away from the public path to minimise disruption. The gradual removal of non-native species is a long-term aim, and may not be achievable by the end of the lifespan of this management plan. Priority should be given to the more invasive sycamore, followed by horse-chestnut. Cut stumps should be treated with glyphosate at manufacturer's recommended rates, particularly sycamore, which coppices readily if untreated.

- Some mature (dbh >30 cm) non-native trees next to paths in the education and amenity zone may be left in place for visual amenity. These will be left to die naturally and be replaced by native species. A small proportion (5-10%) of the larger trees (dbh >30 cm) which are away from paths can be girdled / ring-barked to provide standing deadwood; this must not be carried out for sycamore, which can seed prolifically when damaged (S. Bosbeer, pers. comm.). All other non-native trees should be removed gradually by felling.
- Adult sycamore and horse-chestnut trees should be removed and replaced with one native (preferably ash, alder or oak) tree. Establishment of native saplings (e.g. ash) prior to removal of non-native trees may lessen effects of large non-native removal by shortening the time to canopy closure. A small number of non-native specimen trees (≤ 2 of each of these species) may be retained in the education and amenity zone of the woodland, but the long-term commitment to remove non-native seedling and sapling regeneration must be maintained in these areas.
- Mature trees of beech and hornbeam near paths may be retained and allowed to die naturally, but light gaps created by death or windthrow of these species should be monitored. Native regeneration in gaps should be promoted, and planting of native material introduced only if necessary.

- Prior to felling works being conducted, suitably experienced personnel should assess each stand and clearly mark which trees are to be felled.
- Felled trees within the woodland should be left *in situ* where it can safely be done so and where it does not inhibit further management operations. Where felled trees need to be sawn up, or when they have been removed in sections, the logs should be stacked into log piles (<0.75 m high), which will promote dead wood invertebrates and fungi. Finer branches and limbs should be stacked in windrows with some being left intact on the ground. Care must be taken to avoid felling trees into the river and fallen wood should be removed from the watercourse.
- Extraction of timber from the site is not proposed through this management plan. Extraction would be impractical due to the ecological sensitivity of the site, the heavy usage by the public and due to poor commercial value of trees. Timber extraction may be permitted where trees fall across footpaths. In these cases wood should be removed as soon as possible to prevent establishment of saproxylic (dead wood) invertebrates.
- All felling operations should take place between September and early November. This will avoid disturbance to nesting birds during the bird breeding season (1st March – 31st August) and is at a time of the year when bats are capable of flight (avoiding hibernation and nursery periods) and impacts to bats will be minimised.
- Damage to elm trees should be avoided to prevent release of volatiles that may attract beetles that carry Dutch elm disease (S. Bosbeer, pers. comm.).
- Note that a large amount of regeneration and scrub will initially develop in the gap created by a tree-fall and it may not be necessary to plant native species in directly; however, the areas should be monitored to ensure that no non-native species become dominant in these gaps.
- All regenerating seedlings/saplings of <u>any</u> non-native species should be cut or pulled.
- There will be a preference to retain dead and dying trees within the woodland as standing deadwood. This creates habitat niches for invertebrates, bats and birds. Trees along near to the footpaths should be assessed for damaged or decaying limbs which may present a danger to people walking within the wood. Work to render these safe should be carried out as required. Retention of deadwood should be feasible throughout the disturbance-sensitive zone.
- Slower-growing native species such as oak should initially be propagated off site, for example using the cooperation of local schools. Other species that will be

required for under-planting include holly and hazel. These are more difficult to grow from seed and may be better propagated by layering where this is practical.

Aim 2. Invasive shrub species management: To control invasive shrubs in the woodland and manage cleared areas.

(a) To continue the removal, by cutting and spraying, of rhododendron, snowberry and cherry laurel.
(b) To check for and remove any regrowth that arises every 2 years.
(c) To under-plant cleared areas to reinstate an understorey.

Further guidance:

- Control of rhododendron commenced in early 2008. Plants have been cut and piled into brash heaps. These brash heaps are strategically placed and do not prevent access through the area. Brash will by now have accumulated a population of invertebrates and should be left in place to break down gradually over time: they will continue to provide a dead wood substrate for fungi and bryophytes, and become important habitats for invertebrates.
- Rhododendron should be cut close to the ground and the cut stumps treated with herbicide (e.g. 20% solution of Roundup®) within minutes, best results for this treatment being achieved between October and February (Barron 2006).
- Follow-up work after cutting is a high priority. Regrowth from stumps needs to be spot-sprayed within two years to prevent further regrowth and seed production within the wood. Because rhododendron is controlled by foliar sprays such as glyphosate, this should be carried out in summer when the plant is actively metabolising. Both weather and foliage also need to be dry to minimise the chance of the herbicide washing off. To minimise collateral damage to non-target plant species and other wildlife, precautions should be taken to minimise spray drift, e.g. by using cowls on spray equipment and spraying in windless conditions. Spraying should not be carried out on plants greater than 1.5 m as to do so increases the risk of spray drift. The manufacturer's guidelines and precautions should be followed at all times.
- Seedlings need to be removed within two years and subsequently every 3-4 years. To minimise herbicide damage, seedlings should be pulled where possible, rather than sprayed.

- There were several flowering rhododendron plants growing on the southern boundary bank adjacent to the area where plants were cleared in May 2008. These plants must be removed as a priority to prevent further seed being cast within the woodland.
- Snowberry at the western end of the site has been both sprayed and cut. Any further snowberry removal should be by cutting and spot spraying of regrowth. This will cause less damage to surrounding vegetation than spraying of large plants.
- Cherry laurel should be removed using the same approach as used for rhododendron (i.e. cutting and piling of branches, stump treatment with glyphosate, spot-spraying of regrowth and follow-up management).
- Under-planting of areas cleared of invasive shrubs should be carried out to restore thickets for birds, e.g. blackcaps. Holly is a suitable alternative to rhododendron and should be planted as soon as possible. Hazel should be used in place of snowberry as it is already frequent where this occurs, and soils are suitable. Hawthorn is also a suitable thicket-forming species and is already occasional/locally frequent throughout the wood.

Aim 3. Grassland habitat management: To maintain and enhance the biodiversity of the semi-natural grassland habitat found at the site.

(a) To introduce a regular annual mowing regime for the grassland.
(b) To leave less frequently mown buffer strips of grassy margins between the grassland and adjacent scrub and woodland habitats and mow this every three years.
(c) To control bracken encroachment into the grassland area.

Further guidance:

- Reseeding the grass is not recommended as it has a reasonable diversity of naturally occurring species which can be improved by regular annual mowing.
- Mowing of the grassland area should be carried out annually after the main flowering season, in late August / September. All cuttings should be baled and removed off-site to reduce soil fertility and interspecies competition and therefore to increase diversity. Where the grassland is adjacent to woodland or scrub a 3 m-wide strip should be cut less frequently, i.e. every 3 years. This will provide

habitat for invertebrates, birds, and animals that prefer a taller more unmanaged sward. This also gives a more natural transition to the adjoining woodland but should prevent succession of these grassy margins to scrub.

- The grassland shows signs of encroachment by bracken and scrub from adjacent stands of blackthorn and willow. Scrub development will be controlled by the annual mowing outlined above but bracken control is better achieved by rolling or trampling. Bracken control should be carried out when the plants are newly emerging (July): delaying treatment until later in the season is less successful as plants have hardened up. Public assistance could again be called upon to trample emerging bracken plants within the grassland, as use of a roller could potentially cause excessive disturbance and may not be warranted for such a small area.

Aim 4. Scrub and dense bracken management: To maintain and enhance the biodiversity of the semi-natural scrub habitats and dense bracken stands found at the site.

(a) To maintain the scrub habitat and prevent succession to woodland.
(b) To prevent scrub encroachment onto public paths.
(c) To encourage a lighter coverage of bracken, to prevent development into scrub and to prevent the spread of bracken into the grassland areas.

Further guidance:

- The scrub areas should be cut on an 8-year rotation but to retain some scrub on site at all times the section south of the road will be cut in year 1 and the section along the northern boundary of the open area cut in year 4. Low impact mechanical equipment will be used.
- Scrub should be cut outside the bird breeding season, which is from March to August inclusive, to prevent impacts on nesting birds. Suitably experienced personnel should demarcate the sections which are to be cut and should be present to brief those conducting the work.
- Local encroachment of brambles onto the surface of paths should be trimmed back as necessary but edges of broad paths should be allowed to infill slightly to give a more natural appearance.

- Trampling of bracken as described above should be carried out to encourage a lighter coverage of bracken, which is likely to be of greater habitat value.
- Stands of dense bracken should be mown together with the grassland to prevent development into scrub.

Aim 5. River habitat management: To maintain and enhance the biodiversity of the river habitat found at the site.

(a) To increase the rate of water flow and aeration of the water and to narrow the river channel where possible through the use of in-stream interventions.
(b) To increase spawning success of salmon by improving spawning conditions.
(c) To carry out surveys to determine existing population levels of salmon, trout and other aquatic species, and to identify key areas requiring remedial works.
(d) To remove causes of blockage from the river.

Further guidance:

- All works must take place in consultation with the South-Western Regional Fisheries Board (SWRFB). This includes identification of suitable locations for structures within the river channel and procurement of structures. The work should be carried out by Kerry County Council personnel, or workers under their direction.
- All issues with relation to the procurement of materials will be carried out by Kerry County Council. However, specification and standards of materials should be agreed with SWRFB (e.g., only certain types of gravel are suitable for salmon gravel beds). It is imperative that all tasks in relation to sourcing materials, appointing contractors and arranging land access with landowners be carried out during the winter months so that in-stream works can begin promptly in May.
- Works will be phased in over two years if weather and river conditions are suitable. Year 1 works will involve the placement of structures in one stretch of the river, probably upstream at the eastern end. Year 2 works will install structures downstream to the ruins of Ballyseedy House.
- River channel improvements will entail: insertion of boulders at strategic locations to create riffles, increase aeration, flush out silt and narrow the river channel; installation of weirs to create pools, increase aeration and flush out silt; and installation of deflectors (Plate 12) to narrow the river channel at specific

points to aerate the water, diversify bank structure and introduce meanders into river flow.

- River bed enhancement will be carried out once the river channel improvements noted above have been implemented and found to be effective. River bed enhancement will be carried out through the addition of washed gravel of fisheries-approved grade. This will increase the depth of gravel and will increase suitability for spawning.
- River channel improvements and river bed enhancement should be carried out at low water, between May and September. This will ensure that measures will be effective at low water volumes, while not exacerbating flooding.
- River channel improvement structures will be monitored in the spring after installation to ensure all are still in position and functioning correctly. Any repairs should be carried out promptly. It is essential that sufficient funding be allocated for such monitoring and repairs to be carried out.
- Coarse woody debris, e.g. fallen trees, will be removed from the watercourse to speed up water flow at blocked points and to flush out silt. This measure should be carried out in the summer months and only as often as is clearly necessary (e.g. trees completely impeding water flow) so as not to interfere with spawning. Care must be taken to avoid excessive damage to banks and bankside vegetation. Erosion of riverbanks could have detrimental effects on the installed structures, leading to further costs in repairs.
- Water quality will be monitored according to EPA methodology, e.g. kick-sampling for macroinvertebrates, to ensure no deterioration in water quality for breeding salmon and trout. Pollution of any kind (e.g. siltation due to mudslides) should be notified to the EPA and to the South-Western Fisheries Board. Reference should also be made to the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293/1988), which set out criteria for monitoring water quality for salmonids, and of the Local Government (Water Pollution) Act, 1977 (Water Quality Standards for Phosphorus) Regulations, 1998 (S.I. No. 258/1998), which address the biological quality rating system for rivers and provide for improvements in water quality conditions in rivers and lakes based on phosphorus concentrations.
- Annual surveying of fish stocks will form part of monitoring to assess the success of the procedures as habitat enhancement measures. This should be carried out annually while the efficacy of in-stream work is being assessed, and thereafter every 5-7 years.

- Streams and drains feeding into the river should be periodically checked. While no direct action need be taken with respect to these feeder watercourses, they should be kept open as they introduce invertebrates, leaf litter and other nutrients into the river.

Plate 12. Natural deflector in the River Lee. River channel improvements should aim to reproduce natural configurations like this.

Aim 6. Faunal biodiversity: To monitor, maintain and enhance faunal biodiversity in the woodland.

(a) To commission a bat survey and make provision to follow recommended habitat enhancement measures (e.g. retention of certain trees which act as bat roosts and modifications to proposals for buildings within the wood which may house roosting bats).

(b) To facilitate a survey of fish stocks and macroinvertebrates of the river to determine the baseline conditions of the river and to measure success of river enhancement.

(c) Improve habitat quality for aquatic fauna through river improvements.

(d) Facilitate a mammal survey to determine usage of the woodland by protected species such as otter and badger, as well as smaller, more common species.

(e) Implement habitat enhancement which will increase niches for invertebrates.

(f) Facilitate further invertebrate surveys.
(g) Implement habitat enhancement which will retain and increase niches for birds.
(h) Facilitate further bird surveys.
(i) Implement habitat enhancement which will improve salmon spawning habitat within the river.

Further guidance:

- It is possible that the Annex II species lesser horseshoe use the woodland. A bat survey would determine the presence of this species. In addition all bat species are protected under Irish law and the findings of the survey could have implications for the management of the site such as the timing of works on the buildings within the site and the retention of certain trees identified as bat roosts.
- A baseline survey of the fish stocks and macroinvertebrate species within the river would give baseline data by which the success of the river improvements can be measured.
- Habitat improvements have been described elsewhere in this plan which will give rise to faunal diversity through an increase in the number of niches available. For example, dead wood in the form of standing deadwood and log piles will provide niches for invertebrates, maintaining the grassland area will provide feeding areas for hawking dragonflies and bats, maintaining scrub areas will benefit nesting and feeding birds.
- Woodland managers can manage faunal diversity better if they have an accurate picture of that diversity at the outset. Periodic surveys of different groups of fauna also give a good indication of the success of the management measures being implemented. Some of these surveys can be carried out by students or volunteers, but more specialist work such as the bat survey should be carried out by an experienced ecologist.

Aim 7. Infrastructure improvements: To improve other aspects of the site not directly covered by the above aims.

(a) Replace the large culvert in the northeast of the site (Plate 13) with a bridge or similar non-obstructive structure within the next 2 years for safety and aesthetic reasons.

(b) Stop the practice of deposition of hard-core and pathway materials in non-essential areas and remove such deposition where it has already occurred, so as to reduce the erosion of ground flora habitat.

(c) Restrict informal paths within the woodland so as to reduce the erosion of the ground flora habitat.

(d) Allow edges of broad paths to infill slightly to give a more natural appearance.

(e) Carry out footpath maintenance in a sensitive manner.

(f) Carry out tree risk assessments of trees near footpaths and car parks and to remove dead or decaying trees and limbs as required.

(g) Consider the purchase of adjacent land to extend site.

(h) Encourage landowners to convert adjacent land to woodland through the Native Woodland Scheme or to manage areas less intensively through REPS.

(i) Remove litter from the woodland as and when required.

(j) Keep a log of works carried out at the site.

Plate 13. Large culvert in the northeast of the site.

Further guidance:

- An extensive network of paths has been created within the wood in recent years. No further footpaths should be created as further fragmentation of the woodland

flora must be avoided. Where hard-core has been placed unnecessarily this should be grubbed up and removed using hand tools. Colonisation by native woodland flora will then occur.

- Informal access routes within the path can be blocked by strategically positioned log piles and brash piles.
- Some sections of footpath in the northern arm of the wood were noted as having subsided during heavy rain in the summer 2008. When repairing these, care must be taken not to impact further on the surrounding woodland flora. It may be necessary to consider construction of a wooden boardwalk in these areas which will allow movement of water rather than impeding it.

Plate 14. High paths may interfere with the existing flooding regime.

Aim 8. Recreation and education: To provide safe and welcoming access to the site, to maintain facilities in appropriate condition and to maximise the education and interpretative potential of the site for the better appreciation of the role of woodlands in the natural environment.

(a) This is addressed in the Recreation management plan (Bosbeer, 2008).

Further guidance:

- The wood should not be opened for any potentially damaging recreational activity such as horse-riding, mountain biking or motorcycle scrambling.
- Walkers are well catered for with many footpaths, seats and signs throughout the wood.
- Suitable recreation and educational activities are to be encouraged within the wood but due cognisance must be made of the ecological sensitivity of the sections of alluvial woodland.
- Areas suitable for amenity and education have been delineated on the Management Zone Map (Fig. 12). This includes the areas of dry woodland in the south and west of the site. A further section has been identified in the north of the site where the river can be accessed for education. The areas of limited intervention can be used for access and viewing the wet woodland areas. Disturbance-sensitive areas should not be accessed by groups of students and should only be accessed by limited numbers for specific studies.
- Fishing within the woodland itself should not be encouraged, as this would involve disturbance to the alluvial woodland.

Aim 9. Built heritage management: To maintain and enhance the built heritage of the site and to provide historical and architectural information to the public on the structures present.

(a) This is addressed in the Built heritage management plan (Bolton, 2008).

Further guidance

- Work should not be carried out on the ruined buildings without a bat survey having been carried out by a suitably experienced bat surveyor.

5. IMPLEMENTATION

The timing of specific management tasks detailed in Section 4 is given in the following Gantt chart. Where appropriate the number of the relevant objective is given after the task. Note that not all objectives are detailed here. Ultimate responsibility for fulfilment of *all* objectives in Section 4 lies with Kerry County Council. However, an important task upon adoption of the management plan will be the allocation of responsibility for each objective to individuals and / or organisations and deciding where external contractors will be needed to conduct work or for consultation.

Management task	**2008**	**2009**				**2010**				**2011**				**2012**				**2013**			
	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Consultation with NPWS																					
Allocation of tasks																					
General tasks:																					
Keep log of tasks (7j)																					
Litter clearance (7h)																					
Small path maintenance (7d, 7e)																					
Replace large culvert (7a)																					
Restrict informal access points (7c)																					
Tree risk assessment (7f)																					
Woodland tasks:																					
Control non-native regeneration & small trees (1b)																					
Fell 4-5 non-native trees in disturbance-sensitive zone																					
Fell 2-3 non-native trees education and amenity zone																					
Ring-bark non-native trees (1b)																					
Monitor non-native tree basal area																					
Under-plant cleared areas (1h & 2c)																					
Locate & remove invasive shrubs (1c, 2a)																					
Spray re-growth of invasive shrubs (1c, 2b)																					
Schools nursery scheme (1j)																					

Management task (cont)	2008	2009				2010				2011				2012				2013			
	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Grassland tasks:																					
Cut grassland (3a)																					
Cut grassland margins (3b)																					
Trample bracken encroachment (3c)																					
Scrub & bracken tasks:																					
Cut southern area of scrub (every 8 years) (4a)																					
Cut northern area of scrub (every 8 years) (4a)																					
Trample dense bracken																					
Mow bracken																					
River tasks:																					
Survey fish stocks & macroinvertebrates (5c)																					
Source materials for in-stream improvements																					
Appoint contractor to carry out works																					
Liaise with landowners re access to river																					
Survey river for blockages & clear when necessary (5d)																					
Install boulders, weirs and deflectors (5a)																					
Inspect / Repair in-stream works (5a)																					
Install gravel spawning beds (5b)																					
Fauna studies:																					
Conduct bat survey (6a)																					
Conduct bird survey (6h)																					
Conduct invertebrate survey (6f)																					
Conduct mammal survey (6d)																					
Review management plan																					

5.1 Summary of annual maintenance tasks

- Remove non-native regeneration in April – May, when seedlings are most visible.
- Carry out tree risk assessments, especially along paths. Make any dangerous trees safe by cutting back or other appropriate methods. Half-fallen trees should be left unless they are causing an obstruction or posing a risk to public health and safety.
- Identify non-native trees for felling or ring-barking at the start of the year. Carry out felling operations between September and early November to minimise impacts on nesting bats and hibernating or flightless young bats.
- Remove scrub encroachment from paths.
- Remove any litter from the woodland on a regular basis.
- Mow grassland area in late August / September, leaving a 2-3 m strip between it and the woodland.
- Monitor regeneration in tree fall gaps. Remove any non-native regeneration and scrub encroachment. Plant in native saplings only if necessary.
- Collect seed material for school nursery scheme and distribute seeds, pots and potting compost to schools. Alternatively, organise specific days for schools to come out and collect seed and planting materials themselves.
- Check river for blockages by fallen trees, and remove these if they cause an obstruction to water flow. This should be done only as necessary. Felling of overhanging trees along the river margins is not necessary and could be damaging.
- Surveying of fish stocks should be carried out annually while the efficacy of in-stream work is being assessed, and thereafter every 5-7 years.
- River structures installed as part of the river management and enhancement plan should be checked periodically to ensure that they are still in place and functioning correctly. This task should be carried out annually for the first 5 years. Thereafter it may be gradually stepped back to every 5 years.

5.2 Summary of 2-5 Year maintenance tasks

- Every 2 years, monitor sprayed rhododendron, cherry laurel and snowberry for regrowth in June-September and respray as necessary, taking care to minimise drift damage to native species.

- Every 3 years in late August / September, mow taller grass margins between grassland and scrub/woodland.
- Every 4 years mow alternate areas of scrub.
- Every 5 years, carry out fauna surveys, including bats, other mammals, fish and invertebrates, to monitor changes in species and numbers.
- Every 5 years, check and repair river structures.
- After 5 years, review and refine management plan.

5.3 Long-term maintenance tasks

- Every 10 years, monitor relative proportions of native and non-native trees to assess the success of non-native tree removal. Currently this stands at approximately 20% of total basal area. A reduction should be measurable at the end of each 10-year period. Measurements of dbh should be carried out on a grid-based system, similar to the survey methodology used to produce the stand map (section 2.5.4), or using point-centre quarter, or any similar reproducible method.
- Woodland expansion should be considered as a long-term aspiration for the site. Adjacent landowners should be approached with a view to purchasing land for expanding the woodland outwards, or to encourage landowners to use the Native Woodland Scheme for conversion of some of their own land to native trees to complement the existing woodland.

5.4 Health and safety

All those conducting practical management on the site should be trained in the use of the required equipment (e.g. brushcutters, chainsaws), where necessary be certificated in the tasks they are conducting, and have any relevant insurance cover. All should be aware of Kerry County Council health and safety guidelines. Prominent signs and notices should be used to advise other site users of potential hazards whilst management work is being carried out. Practical work should be planned so that activities which might render an area temporarily unsafe are completed on the same day. It is envisaged that heavier and more disruptive work, such as tree felling, would take place in autumn/winter, while lighter maintenance work, such as trimming back scrub from paths, will take place in spring/summer.

There is a presumption against the use of chemicals on site with the exception of glyphosate to control invasive species. Great care must be taken to minimise drift to prevent incidental damage to non-target species. When working near watercourses, a different formulation of glyphosate may be required, as some contain surfactants which are toxic to aquatic life and amphibians. Any chemicals must be used in accordance with Coillte guidelines (Ward 1998). Only trained operators will be allowed to carry out the work.

5.5 Funding

Additional funding for objectives listed under Aims 1 and 2 could be obtained from the Native Woodland Scheme administered by the Forest Service. This would be most relevant to the area of priority alluvial woodland, where the aim is to enhance native woodland communities. The maximum grant rate available is €5,000 per ha for conservation of existing woodland, plus an annual premium of €350 per annum. A higher grant of up to €6,470 is available for the establishment of new woodland, with annual premiums of up to €573 per hectare available, depending on landowner status and size of area established (figures correct as of October 2008; *http://www.agriculture.gov.ie/forestry/publications/NWS18-06-08-fixedgrantrate.pdf).*
Other areas of the site are likely to be ineligible for Native Woodland Scheme funding due to the long-term retention of some non-native broadleaves, which is specifically proscribed under the Native Woodland Scheme (Forest Service 2005).

Funding may also be sought from the Heritage Council through their Heritage Grants programme for initiatives such as schools liaison schemes and faunal surveys. The biodiversity fund finances capital projects for the management of sites to protect, conserve and enhance their importance for biodiversity, with grants of up to €50,000 available under the current scheme; the wildlife research grants finance projects up to a maximum of €15,000 for data collection, research and management planning relating to flora, fauna and wildlife habitats (Heritage Council 2008).

6. MONITORING & REVIEW

The results of implementing this management plan should be reviewed every five years: thus a review will be necessary in October-December 2013. For these purposes it is imperative that a careful log is kept of all management tasks carried out, stating on what dates work has been done, who conducted it, what problems if any were encountered, and what the results were. This document should also contain copies of all tree risk assessments.

Development of the vegetation on the site should be monitored to ensure that essential ecological processes and functions have not been impaired by any aspect of the management measures implemented. This may be done by the establishment of a series of permanent vegetation plots encompassing the different stand types throughout the site, to be monitored on a five-year basis. A quicker but potentially less accurate method would be the use of carefully recorded fixed-point photography.

Fauna should also be monitored, as the management plan also aims to improve the woodland as a habitat for bird, mammals and fish. These faunal groups should be monitored every five years, or more often if necessary, to assess the success of the management strategy of the woodland.

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APPENDIX A: LIST OF SPECIES OCCURRING AT THE SITE

(Collated from WM Associates (2003), Perrin *et al.* (2008) and field observations in summer 2008)

(* indicates non-native)

Nomenclature follows Stace (1997) for vascular plants, Smith (2004) for mosses and Paton (1999) for liverworts. Where the recorder is not certain of the identification, this is indicated by 'cf.' (e.g. *Salix* cf. *caprea*). English names of bryophytes are from Blockeel and Long 1998 and Smith 2004.

Nomenclature of Staphylinidae follows Lott and Duff (2003), and of Carabidae follows Anderson *et al.* (2000).

Nomenclature of fungi follows Courtecuisse and Duhem (2000). Identifications that could not be confirmed are indicated by a question mark (e.g. *Crepidotus* ?-*mollis*).

Nomenclature for birds is from the RSPB (2008).

Plants

Note: This includes all species recorded from Kerry County Council owned property; it does not include species recorded in adjacent privately owned parts of the wood.

Latin name	**Common name**
Trees	
Abies alba	European Silver-fir*
Acer pseudoplatanus	Sycamore*
Aesculus hippocastanum	Horse-chestnut*
Alnus glutinosa	Alder
Betula pubescens	Downy Birch
Carpinus betulus	Hornbeam*
Chamaecyparis lawsoniana	Lawson's Cypress*
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Euonymus europaeus	Spindle
Fagus sylvatica	Beech*
Fraxinus excelsior	Ash
Ilex aquifolium	Holly
Malus sylvestris	Crab Apple
Pinus sylvestris	Scot's Pine*
Populus alba x *P. tremula* *(P.* x *canescens)*	Grey poplar*
Populus tremula	Aspen
Prunus avium	Wild Cherry
Prunus laurocerasus	Cherry Laurel*
Prunus spinosa	Blackthorn
Pseudotsuga menziesii	Douglas Fir*
Quercus ilex	Evergreen Oak*

Latin name	Common name
Quercus petraea	Sessile Oak
Quercus petraea x *Q. robur* *(Q.* x *rosacea)*	Hybrid Oak
Quercus robur	Pedunculate Oak
Salix aurita	Eared Willow
Salix caprea x *S. cinerea* x *S.viminalis* *(Salix* x *calodendron)*	Grey Willow hybrid*
Salix cf. *caprea*	Goat Willow
Salix cinerea	Grey Willow
Salix fragilis	Crack-willow*
Sambucus nigra	Elder
Sorbus aucuparia	Rowan
Taxus baccata	Yew
Thuja plicata	Western Red Cedar*
Tilia cordata x *T. platyphyllos* *(T.* x *europaea)*	Lime*
Ulmus glabra	Wych Elm
Ulmus procera	English Elm*
Viburnum opulus	Guelder-rose
Low woody species	
Cornus sericea	Red-osier Dogwood*
Fallopia japonica	Japanese Knotweed*
Hedera helix	Ivy
Lonicera periclymenum	Honeysuckle
Rhododendron ponticum	Rhododendron*
Ribes nigrum	Black Currant*
Ribes rubrum	Red Currant*
Rosa arvensis	Field-rose
Rosa canina	Dog-rose
Rosa sp.	Wild Rose
Rubus fruticosus agg.	Brambles
Symphoricarpos albus	Snowberry*
Herbs	
Achillea millefolium	Yarrow
Achillea ptarmica	Sneezewort
Ajuga reptans	Bugle
Allium ursinum	Ramsons (Wild garlic)
Anemone nemorosa	Wood Anemone
Angelica sylvestris	Wild Angelica
Anthriscus sylvestris	Cow Parsley
Apium nodiflorum	Fool's-water-cress
Arum maculatum	Lords-and-Ladies
Callitriche stagnalis	Common Water-starwort
Caltha palustris	Marsh-marigold
Calystegia sepium	Hedge Bindweed
Cardamine flexuosa	Wavy Bitter-cress
Cardamine pratensis	Cuckooflower

Latin name	Common name
Centaurea nigra	Common Knapweed
Cerastium fontanum	Common Mouse-ear
Chrysosplenium oppositifolium	Opposite-leaved Golden Saxifrage
Circaea lutetiana	Enchanter's-nightshade
Cirsium arvense	Creeping Thistle
Cirsium palustre	Marsh Thistle
Cirsium vulgare	Spear Thistle
Conopodium majus	Pignut
Crocosmia aurea x *C. pottsii (C.* x *crocosmiiflora)*	Montbretia*
Dactylorhiza fuchsii	Common Spotted-orchid
Dactylorhiza incarnata	Early Marsh-orchid
Dactylorhiza maculata/fuchsii	Spotted-orchid
Digitalis purpurea	Foxglove
Epilobium hirsutum	Great Willowherb
Epilobium montanum	Broad-leaved Willowherb
Epilobium palustre	Marsh Willowherb
Eupatorium cannabinum	Hemp-agrimony
Euphrasia agg.	Eyebrights
Filipendula ulmaria	Meadowsweet
Galium aparine	Cleavers
Galium palustre	Common Marsh-bedstraw
Geranium robertianum	Herb-robert
Geum rivale	Water Avens
Geum urbanum	Wood Avens
Glechoma hederacea	Ground-ivy
Heracleum sphondylium	Hogweed
Hyacinthoides non-scripta	Bluebell
Hypericum androsaemum	Tutsan
Hypericum tetrapterum	Square-stalked St. John's Wort
Hypochaeris radicata	Cat's-ear
Iris pseudacorus	Yellow Iris
Lapsana communis	Nipplewort
Lathyrus pratensis	Meadow Vetchling
Listera ovata	Common Twayblade
Lotus corniculatus	Common Bird's-foot-trefoil
Lotus pedunculatus	Greater Bird's-foot-trefoil
Lychnis flos-cuculi	Ragged Robin
Lysimachia nemorum	Yellow Pimpernel
Lythrum salicaria	Purple-loosestrife
Mentha aquatica	Water Mint
Mentha aquatica x *M. arvensis (Mentha* x *verticillata)*	Whorled Mint
Moehringia trinervia	Three-nerved Sandwort
Oenanthe crocata	Hemlock Water-dropwort
Oxalis acetosella	Wood-sorrel
Persicaria hydropiper	Water-pepper
Persicaria maculosa	Redshank

Latin name	Common name
Petasites fragrans	Winter Heliotrope*
Plantago lanceolata	Ribwort Plantain
Plantago major	Greater Plantain
Potentilla anserina	Silverweed
Potentilla erecta	Tormentil
Potentilla reptans	Creeping Cinquefoil
Potentilla sterilis	Barren Strawberry
Primula vulgaris	Primrose
Prunella vulgaris	Selfheal
Ranunculus acris	Meadow Buttercup
Ranunculus ficaria	Celandine
Ranunculus flammula	Lesser Spearwort
Ranunculus repens	Creeping Buttercup
Rhinanthus minor	Yellow-rattle
Rumex acetosa	Common Sorrel
Rumex crispus	Curled Dock
Rumex sanguineus	Wood Dock
Sanicula europaea	Sanicle
Scrophularia auriculata	Water Figwort
Scrophularia nodosa	Common Figwort
Senecio aquaticus	Marsh Ragwort
Senecio jacobaea	Common Ragwort
Solanum dulcamara	Bittersweet
Sonchus asper	Prickly Sow-thistle
Sonchus oleraceus	Smooth Sow-thistle
Sparganium erectum	Branched Bur-reed
Stachys sylvatica	Hedge Woundwort
Stellaria graminea	Lesser Stitchwort
Stellaria media	Common Chickweed
Stellaria uliginosa	Bog Stitchwort
Succisa pratensis	Devil's-bit Scabious
Taraxacum agg.	Dandelions
Trifolium dubium	Lesser Trefoil
Trifolium pratense	Red Clover
Trifolium repens	White Clover
Urtica dioica	Common Nettle
Valeriana officinalis	Common Valerian
Veronica beccabunga	Brooklime
Veronica chamaedrys	Germander Speedwell
Veronica montana	Wood Speedwell
Vicia sepium	Bush Vetch
Viola riviniana /reichenbachiana	Common Dog-violet/Early dog-violet
<u>Rushes</u>	
Juncus acutiflorus	Sharp-flowered Rush
Juncus effusus	Soft-rush
Luzula campestris	Field Wood-rush
Luzula sylvatica	Great Wood-rush

Latin name	Common name
Sedges	
Carex flacca	Glaucous Sedge
Carex hirta	Hairy Sedge
Carex pendula	Pendulous Sedge
Carex remota	Remote Sedge
Carex strigosa	Thin-spiked Wood-sedge
Carex sylvatica	Wood-sedge
Grasses	
Agrostis capillaris	Common Bent
Agrostis stolonifera	Creeping Bent
Alopecurus pratensis	Meadow Foxtail
Anthoxanthum odoratum	Sweet Vernal-grass
Arrhenatherum elatius	False Oat-grass
Brachypodium sylvaticum	False Brome
Bromopsis ramosa	Hairy-brome
Cynosurus cristatus	Crested Dog's-tail
Dactylis glomerata	Cock's-foot
Deschampsia cespitosa	Tufted Hair-grass
Festuca gigantea	Giant Fescue
Festuca rubra	Red Fescue
Glyceria fluitans	Floating Sweet-grass
Glyceria fluitans x *G. notata (Glyceria* x *pedicellata)*	Sweet-grass hybrid
Holcus lanatus	Yorkshire-fog
Lolium perenne	Perennial Rye-grass
Phalaris arundinacea	Reed Canary-grass
Poa palustris	Swamp Meadow-grass
Poa pratensis	Smooth Meadow-grass
Poa trivialis	Rough Meadow-grass
Horsetails	
Equisetum arvense	Field Horsetail
Equisetum hyemale	Rough Horsetail
Equisetum palustre	Marsh horsetail
Equisetum sylvaticum	Wood Horsetail
Ferns	
Athyrium filix-femina	Lady-fern
Blechnum spicant	Hard-fern
Dryopteris aemula	Hay-scented Buckler-fern
Dryopteris affinis	Scaly Male-fern
Dryopteris dilatata	Broad Buckler-fern
Dryopteris filix-mas	Male-fern
Phyllitis scolopendrium	Hart's-tongue
Polypodium interjectum	Intermediate Polypody
Polypodium vulgare	Polypody
Polystichum aculeatum	Hard Shield-fern
Polystichum setiferum	Soft Shield-fern

Latin name	Common name
Pteridium aquilinum	Bracken
Mosses	
Amblystegium serpens	Creeping Feather-moss
Atrichum undulatum	Common Smoothcap
Brachythecium rutabulum	Rough-stalked Feather-moss
Brachythecium velutinum	Velvet Feather-moss
Calliergon giganteum	Giant Spear-moss
Calliergonella cuspidata	Pointed Spear-moss
Climacium dendroides	Tree-moss
Dicranum scoparium	Broom Fork-moss
Eurhynchium striatum	Common Striated feather-moss
Fissidens cf. *viridulus*	Green Pocket-moss
Fissidens dubius	Rock Pocket-moss
Fissidens taxifolius	Common Pocket-moss
Homalia trichomanoides	Blunt Feather-moss
Homalothecium sericeum	Silky Wall Feather-moss
Hookeria lucens	Shining Hookeria
Hypnum cf. *andoi*	Mamillate Plait-moss
Hypnum cupressiforme	Cypress-leaved Plait-moss
Hypnum resupinatum	Supine Plait-moss
Isothecium alopecuroides	Larger Mouse-tail Moss
Isothecium myosuroides	Slender Mouse-tail Moss
Kindbergia praelonga	Common Feather-moss
Mnium hornum	Swan's-neck Thyme-moss
Neckera complanata	Flat Neckera
Oxyrrhynchium hians	Swartz's Feather-moss
Plagiomnium undulatum	Hart's-tongue Thyme-moss
Plagiothecium nemorale	Woodsy Silk-moss
Polytrichastrum formosum	Bank Haircap
Pseudoscleropodium purum	Neat Feather-moss
Pseudotaxiphyllum elegans	Elegant Silk-moss
Rhizomnium punctatum	Dotted Thyme-moss
Thamnobryum alopecurum	Fox-tail Feather-moss
Thuidium tamariscinum	Common Tamarisk-moss
Ulota bruchii	Bruch's Pincushion
Ulota phyllantha	Frizzled Pincushion
Liverworts	
Conocephalum conicum	Great Scented Liverwort
Frullania dilatata	Dilated Scalewort
Lejeunea lamacerina	Western Pouncewort
Lophocolea bidentata	Bifid Crestwort
Lunularia cruciata	Crescent-cup Liverwort
Metzgeria furcata	Forked Veilwort
Pellia epiphylla	Overleaf Pellia
Plagiochila asplenioides	Greater Featherwort
Radula complanata	Even Scalewort

Latin name	Common name
Riccardia chamedryfolia	Jagged Germanderwort
Riccardia latifrons	Bog Germanderwort

Mammals

Meles meles	Badger
Vulpes vulpes	Fox
Lepus timidus hibernicus	Irish Hare
Rhinolophus hipposideros	Lesser-horseshoe Bat
Lutra lutra	Otter

Fish

Salmo salar	Salmon
Salmo trutta	Trout

Amphibians

Rana temporaria	Common Frog

Birds

Note: This includes species recorded either within or near Ballyseedy Wood.

Latin name	Common name
Turdus merula	Blackbird
Sylvia atricapilla	Blackcap
Cyanistes caeruleus	Blue Tit
Pyrrhula pyrrhula	Bullfinch
Buteo buteo	Buzzard
Fringilla coelebs	Chaffinch
Phylloscopus collybita	Chiffchaff
Periparus ater	Coal Tit
Streptopelia decaocto	Collared Dove
Prunella modularis	Dunnock
Regulus regulus	Goldcrest
Carduelis carduelis	Goldfinch
Parus major	Great Tit
Carduelis chloris	Greenfinch
Ardea cinerea	Grey Heron
Motacilla cinerea	Grey Wagtail
Corvus cornix	Hooded Crow
Delichon urbica	House Martin
Passer domesticus	House Sparrow
Corvus monedula	Jackdaw

Latin name	Common name
Garrulus glandarius	Jay
Falco tinnunculus	Kestrel
Alecedo atthis	Kingfisher
Carduelis cabaret	Lesser Redpoll
Carduelis cannabina	Linnet
Asio otus	Long-eared Owl
Aegithalos caudatus	Long-tailed Tit
Pica pica	Magpie
Anas platyrhynchos	Mallard
Anthus pratensis	Meadow Pipit
Turdus viscivorus	Mistle Thrush
Gallinula chloropus	Moorhen
Phasianus colchicus	Pheasant
Motacilla alba	Pied Wagtail
Corvus corax	Raven
Erithacus rubecula	Robin
Corvus frugilegus	Rook
Gallinago gallinago	Snipe
Turdus philomelos	Song Thrush
Accipiter nisus	Sparrowhawk
Muscicapa striata	Spotted Flycatcher
Sturnus vulgaris	Starling
Columba oenas	Stock Dove
Hirundo rustica	Swallow
Apus apus	Swift
Certhia familiaris	Treecreeper
Phylloscopus trochilus	Willow Warbler
Scolopax rusticola	Woodcock
Columba palumbus	Woodpigeon
Troglodytes troglodytes	Wren

Invertebrates

Lepidoptera

Acronicta leporine
Agonopterix angelicella
Ectropis bistortata
Eudonia delunella
Lithosia quadra
Nudaria mundana
Ochropleura duplaris

Diptera

Bibio leucopterus
Fannia mollissima
Hilara maura
Melanostoma mellinum
Mesembrina meridiana
Morellia simplex
Polietes lardarius
Rhagio scolopaceous
Scathophaga stercoraria
Siphona geniculata

Carabids

Agonum afrum (Duftschmid)
Agonum muelleri (Herbst)
Carabus granulatus Linnaeus
Nebria brevicollis (Fabricius)
Ocys harpaloides (Audinet-Serville)
Platynus albipes (Fabricius)
Platynus assimile (Paykull)
Pterostichus nigrita (Paykull)
Trechus obtusus Erichson

Staphylinids

Acrotona aterrima (Gravenhorst)
Agaricochara latissima (Stephens)
Aleochara sparsa Heer
Amischa analis (Gravenhorst)
Anotylus rugosus (Fabricius)
Atheta aeneicollis (Sharp)
Atheta aquatilis (Thomson) *
Atheta britanniae (Bernh. & Scheerp)
Atheta castanoptera (Mannerheim)
Atheta crassicornis (Fabricius)
Atheta ravilla (Erichson)
Autalia impressa (Olivier)
Carpelimus elongatus (Erichson)
Chaetida longicornis (Gravenhorst)
Datomicra celata (Erichson)
Datomicra nigra (Kraatz)
Deleaster dichrous (Gravenhorst)
Dinaraea linearis (Gravenhorst)
Gabrius appendiculatus Sharp
Gyrophaena fasciata (Marsham)
Gyrophaena joyi Wendeler *
Lathrobium longulum Gravenhorst
Lordithon exoletus (Erichson)
Lordithon trinotatus (Erichson)
Megarthrus sinuaticollis (Lacordaire)
Mocyta amplicollis (Mulsant & Rey)
Mycetota laticollis (Stephens)
Ocyusa maura (Erichson)
Omalium excavatum Stephens
Omalium rivulare (Paykull)
Omalium rugatum Mulsant & Rey
Philhygra malleus (Joy)
Philonthus decorus (Gravenhorst)
Phyllodrepa ioptera (Stephens)
Proteinus brachypterus (Fabricius)
Proteinus ovalis Stephens
Quedius schatzmayri Gridelli
Stenus bifoveolatus Gyllenhal
Tachinus laticollis Gravenhorst
Traumoecia picipes (Thomson) *

Macro-fungi (recorded as part of Staphylinid survey)

Armillaria mellea (Vahl:Fr.) Kummer
Armillaria gallica Marxmüller & Romagnesi
Crepidotus ?-*mollis* (Sch.: Fr.) Staude
Fistulina hepatica (Sch.:Fr.) With.
Gymnopilus spectabilis (Fr.:Fr.) Smith
Hebeloma sp.
Inonotus dryadeus (Pers.:Fr.) Murr.
?-*Mycaena* sp.
Oudemansiella mucida (Schrad.:Fr.) v.Höhnel
Pholiota squarrosa (Müll.:Fr.) Kummer
Thelephora spiculosa Fr. (Burt.)

APPENDIX B. SPECIES ACTION PLANS

A number of protected species occur in or near Ballyseedy Wood or in the Ballyseedy stretch of the River Lee. These include Lesser-horseshoe Bat (*Rhinolophus hipposideros*), Atlantic Salmon (*Salmo salar*) and Otter (*Lutra lutra*), which are all listed in Annex II of the EU Habitats Directive.

B.1 Lesser horseshoe bat (*Rhinolophus hipposideros*)

Ecology:

Lesser horseshoe bats are found only in western counties in Ireland, from Cork up to Mayo, where they are at the northern limit of their European distribution. Numbers in Ireland are estimated to be around 12,500 individuals (NPWS 2008). Females gather in large maternity colonies at summer roosting sites, where they give birth to one young every second year. Most maternity colonies roost in buildings, especially old large houses and farm buildings, although caves are preferred for hibernation, where a constant low temperature is maintained throughout the winter (NPWS 2008, UK Biodiversity Action Group 1998). Females forage within 3 km of the maternity roost, predominantly in deciduous woodland and riparian vegetation, using linear landscape features such as treelines, stone walls and hedgerows to navigate and commute from roosts to feeding sites, as they avoid flying out in the open (NPWS 2008).

Threats:

The main threats to lesser horseshoe bat populations are: loss of suitable roosting sites (summer and winter) due to the deterioration and renovation of derelict buildings, loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites (NPWS 2008). In Britain, the lesser horseshoe bat is now only present in southwest England and Wales. It is widespread throughout central and southern Europe, but has undergone severe decline in the northern part of its range (UK Biodiversity Action Group 1998). In Ireland, however, population, range and area of suitable habitat are stable or increasing, resulting in an overall conservation status rating of “Good” (NPWS 2008).

Actions in relation to Ballyseedy Wood:

(a) A full bat survey needs to be carried out as a matter of urgency to determine numbers, roost locations, territory and foraging patterns of lesser horseshoe bats

in the immediate vicinity of Ballyseedy Wood and to determine if any roosts are present on site. This also has relevance in the context of the Built Heritage Management Plan, as bats (not only lesser horseshoe) could well be present in the ruined buildings on the west of the site, or in some of the trees on site. A bat survey must be carried out by a suitably qualified and licensed bat specialist before any restoration work can be implemented, such as removal of vegetation from buildings or repointing of brickwork, and before trees are felled. Any trees obscuring the ruins, even non-native species, should also be left in place pending such a survey. The recommendations of the bat specialist should be followed in all matters relating to bat conservation.

(b) All bat species are protected under Irish law (the Wildlife Act (1978) and Wildlife (Amendment) Act (2000)), European law (EU Habitats Directive, where bats are listed on Annex IV; lesser horseshoe bats are further protected under Annex II) and international law under the Bern Convention. Therefore there is a legal obligation to ensure that no damage to breeding sites / nesting places or death/injury of individual bats occurs as a result of any works (Kelleher and Marnell 2006), including tree felling, carried out in Ballyseedy Wood.

(c) If a significant presence of lesser horseshoe bat is confirmed, consideration should be given to adding this to the list of qualifying interests for Ballyseedy cSAC.

B.2 Atlantic salmon (*Salmo salar*)

Ecology:

The Atlantic salmon has a complex life cycle that includes both freshwater and marine phases. Eggs hatch into *alevins*, developing into *fry* once their yolk-sac is absorbed, and then into *parr* at the end of their first summer. After two years, parr develop into *smolts* and migrate to the sea. Between one and five years later they return to the river in which they first hatched to spawn in gravel beds. After spawning, most die but some return to sea, returning to breed again in later years (Anon., 2005a).

Threats:

The Atlantic salmon has declined nationwide by 75% in the last number of decades, and only 43 out of the 148 Irish salmon rivers support healthy populations (NPWS, 2008). Salmon are threatened at every stage of their life cycle, and threats include reduced marine survival (possibly as a result of climate change), overfishing and poor river water quality, encompassing such factors as inadequate sewage treatment, agricultural enrichment, acification, erosion and siltation. Sudden changes in water temperature are also detrimental. Despite the widespread range of the species in Ireland, and the ending in 2007 of drift netting, which threatened salmon numbers in the past, its overall conservation status is considered as "Bad" due to the generally unfavourable rating of its habitats, population levels and future prospects (NPWS 2008).

Actions in relation to Ballyseedy Wood:

(a) Before any actions take place, a survey of the river should be carried out by trained fisheries staff to determine the exact status of the current salmon population in the river. A survey should also take note of suitable locations for new in-stream structures and works. Any blockages caused by fallen trees should be cleared; however, overhanging trees on riverbanks that are not impeding water flow should be left *in situ*.

(b) The primary action relates to the rehabilitation of the River Lee (Kerry County Council-owned stretch) as a salmon spawning ground. This can be achieved by the placement of suitable structures in the river to introduce habitat diversity, increase oxygenation, alter flow rates and reduce siltation. These actions are discussed fully above in Section 4 (Aim 5: River habitat management).

(c) Water quality in the river close to Ballyseede Castle Hotel has been noted as a problem in the past, although recent reports from the EPA suggest that this is no longer the case (Clabby *et al.* 2006). Deterioration of water quality may also arise through agricultural inputs (e.g. run-off) and other potential but unexpected events, such as the mudslides of August 2008 which caused fish kills by loading rivers with peat and silt. Water quality should be monitored, with any deterioration reported to the EPA and the South-Western Fisheries Board and rectified as soon as possible to minimise damage to fish stocks. In particular,

reference should be made to the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293/1988), which sets out criteria for monitoring water quality for salmonids, and of the Local Government (Water Pollution) Act, 1977 (Water Quality Standards For Phosphorus) Regulations, 1998 (S.I. No. 258/1998), which address the biological quality rating system for rivers and provide for improvements in water quality conditions in rivers and lakes based on phosphorus concentrations.

(d) Restocking of the river with a new population of salmon should not be considered as an option unless absolutely necessary. The unique salmon population that currently inhabits the river is adapted to local conditions and other genetic strains should not be introduced. However, should current numbers drop below a sustainable level, restocking may become a viable and necessary option. The South-Western Fisheries Board should be contacted for advice should this situation arise; the aim, however, should be to initiate the in-stream rehabilitation works outlined in Section 4 (Aim 5) in a timely manner to avert such a catastrophe.

B.3 Otter (*Lutra lutra*)

Ecology:

In Ireland the otter is widespread in both freshwater and coastal habitats, but even coastal otters are never far from fresh water. They breed all year round, the mother giving birth to two or three cubs after a two-month gestation period. The holt in which the cubs are born may be located under exposed roots of bankside trees, crevices in rocks and under large boulders, or may be dug out by the otters themselves; there may a number of entrances, one of which may lie under water (Anon. 2005b). The cubs remain in the holt until they are about six weeks old and then go into open water with their mother. They are weaned after three or four months and reach sexual maturity after two to three years (Poole *et al.* 2007). Otters may live for up to ten years. They are mainly nocturnal, except where disturbance is low. They feed mainly on fish, such as salmonids, sticklebacks and eels, but their diet is also supplemented by such prey as frogs, crayfish, small birds and mammals (Poole *et al.* 2007, NPWS 2008).

Otters have a potentially large home range, between 5 and 15 km of shoreline or channel (Bailey and Rochford 2006), and factors such as river quality, availability of prey and suitable holt sites contribute to dictating the size of this range.

Threats:

Estimated to number between 10,000 and 20,000 adults, the Irish otter population has declined by almost a fifth since 1980, although most of that decline occurred in the 1980s (13%), with a smaller decline (4.7%) occurring in the 1990s (Poole *et al.* 2007). While population range remains good, population densities have declined since the 1980s, and despite favourable habitat status and future prospects, the conservation status of otter is therefore considered "Poor" (NPWS 2008).

The main threats to otters are from pollution of waterways, interactions with man (e.g. accidental otter deaths arising due to road traffic, fish and shellfish trapping), hunting for sport (no longer legal but a slight chance of occurrence) and habitat loss from drainage of rivers due to flood alleviation schemes, which often involves river straightening / widening and destruction of suitable holt sites by the removal of bankside vegetation (Anon, 2005). Disturbance from the public does not appear to be a major hindrance to the presence of otters in an area (Bailey and Rochford 2006).

Actions in relation to Ballyseedy Wood and the greater River Lee:

(a) A survey to determine the exact status (e.g. numbers, range, preferred diet) of the current population of otter along the River Lee should be carried out. Due to the often large territory of these species, it is advisable to extend the parameters of any survey to a wider area to get a better picture of the movements of the individuals that frequent Ballyseedy Wood.

(b) Measures outlined in section 5 to improve conditions for prey species such as salmon and trout will have a beneficial knock-on effect on quality of otter habitat.

(c) Monitoring of the population should be carried out on an annual or bi-annual basis to ensure that no deterioration of habitat occurs and that otters continue to occupy a home range at Ballyseedy.

(d) Otter underpasses under the N21 should be monitored and kept clear of debris to facilitate otter movement upstream, as this is fundamental to survival of otters in the area. Otter fencing should also be monitored for breaches. If no such

measures exist to facilitate otter movement across the road, these should be put in place as soon as possible.