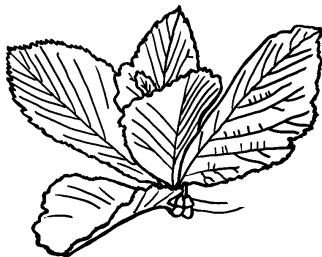


coillte



Five-Year Management Plan Ballyannan Woods Midleton, County Cork (Public Consultation Draft)

Ballyannan Wood Steering Committee
November 2006



Compiled by
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with final editing by the Ballyannan Wood Steering
Committee

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1 SUMMARY OF MANAGEMENT PLAN

Ballyannan Wood is an old forest covering 24.5 ha in Midleton, County Cork. The woodland, which is owned by Coillte, is currently used for recreation, education, and timber production. Expanding population and the development of a new bridge in Midleton are likely to increase the recreational use of Ballyannan Wood. In addition, the woodland has many environmental values, and the County Nature Trust has compiled detailed ecological and historical information on the woodland. The Ballyannan Wood Steering Committee has come together to develop a comprehensive management plan for the future preservation and appropriate development of the woodland. This plan addresses in particular the next five years (2007 – 2011). The general objectives of this management plan for Ballyannan Wood are to:

- A. Maintain and enhance existing features of nature conservation importance.
- B. Create and enhance features which are characteristic of woodland ecosystems in Ireland, so that they can be used for educational/interpretative purposes.
- C. Demonstrate typical methods of woodland nature conservation and monitor their effects.
- D. Provide facilities for walkers, especially local residents, particularly as visitor numbers are expected to increase.
- E. Develop interpretative facilities.
- F. Honour the place of Ballyannan Wood in the heritage of the Midleton town, from personal memories to archaeological features.
- G. Retain economic options with regards to timber production.

Detailed description of the features of the site and actions to achieve the objectives are outlined in this plan. It is hoped that each of these management actions will be supported by a suitable financial source.

2 POLICY STATEMENTS

THE BALLYANNAN WOOD STEERING COMMITTEE

The Ballyannan Wood Steering Committee has been established to develop a management plan for Ballyannan Wood. The steering committee includes representatives from six organizations: Coillte, County Nature Trust (CNT), Cork County Council, Midleton Town Council, National Parks and Wildlife Service (NPWS), and East Cork Area Development Ltd. (ECAD). The policy of each organization with regards to Ballyannan Wood is described in brief below.

1.1 COILLTE

Coillte is a state-owned company operating in forestry, land based businesses and added-value processing operations. The company was established in 1988 as a private limited company owned by the Minister for Finance and the Minister for Agriculture and Food. Coillte has committed itself publicly to comply with Sustainable Forest Management (SFM) principles, specifically the Forest Stewardship Council (FSC) Principles and Criteria. SFM is defined as the "stewardship and use of lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not

cause damage to other ecosystems." Social and cultural functions of forests, as well as conservation of nature and biodiversity, are integral components of SFM. The Coillte District Strategic Plan, Cork District 2006-2010 is influenced by the long-term sustainability of the company estate and also by the principles of SFM, particularly as reflected in the Soil Association FSC standard. The main principles are listed in Coillte's District Strategic Plan (p 8) as "wise use of natural and cultural resources, effective protection of the environment, sustainable production of forest products, and working with people".

Ballyannan Wood is currently managed by Coillte as an amenity woodland with some commercial timber value in accordance with the Coillte Recreational Policy. Coillte would like to manage the wood in a manner which ensures the forest is developed in a progressive and orderly fashion. Coillte's long term aim for Ballyannan's composition is to transform the site from a mixed broadleaf/conifer forest to a mainly broadleaf high forest dominated by native Irish species and with a scattering of mature Irish conifers (such as Scots Pine) to enrich the variety of species. Some areas of the wood will be managed with a view to producing commercial timber, and the recommendations of Coillte's biodiversity survey (Sweeney 2005), identifying all subcompartments of the wood as important for biodiversity, will also be taken on board.

Coillte recognises in its Recreation Policy that its forests are important contributors to intangible social values such as well-being. Good management of the 440,000 ha owned by Coillte could permit multifunctional use of forests for both commercial timber production and recreation. Low-impact recreation, such as walking, is the main activity encouraged in Ballyannan. Access for disabled visitors, including people who are visually impaired as well as those using wheelchairs and people with learning difficulties, should be considered in appropriate sites, with clear indications as to which paths and facilities are accessible.

1.2 COUNTY NATURE TRUST (CNT)

The County Nature Trust (CNT) is a non-profit organization which aims to see our counties rich in wildlife by protecting and positively managing species both common and rare for the betterment of nature and the enjoyment of the public. CNT has been working in partnership with Coillte to develop Ballyannan Wood as an educational/amenity nature reserve. One step was commissioning detailed studies of the history and ecology of the wood (part funded by East Cork Area Development Ltd.) and the second was to prepare management proposals to maintain and enhance the nature conservation value of the woodland and to develop the use of the wood for educational and interpretative purposes. The County Nature Trust's general objectives are:

- The protection of wildlife and natural habitats in south-west Ireland,
- The development of nature reserves,
- The promotion of sustainable development, and
- The raising of public awareness in relation to wildlife issues and habitat conservation.

BALLYANNAN WOOD ACCESS WALK

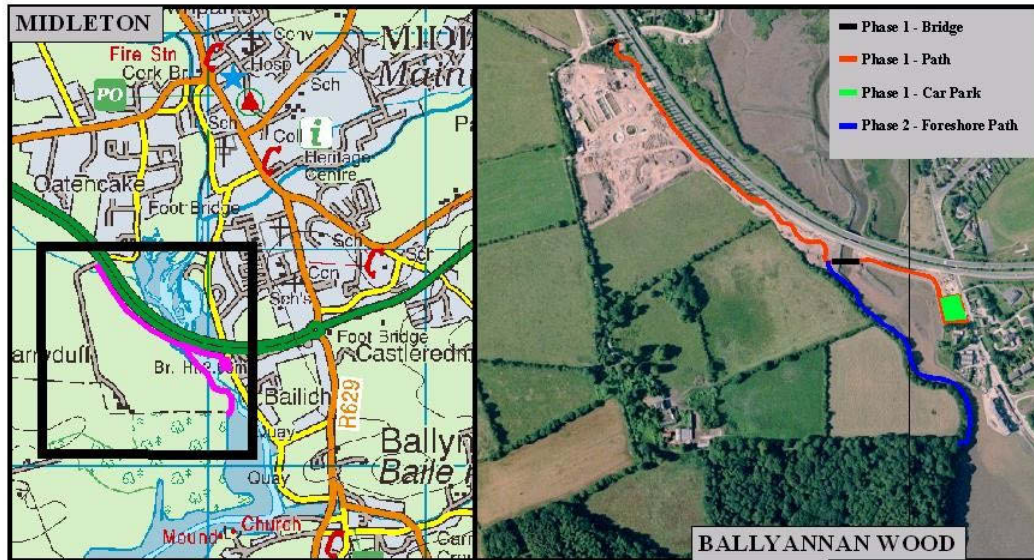


Figure 1: Route of the new Ballyannan Wood access walk. Phase 1 is under construction.

1.3 CORK COUNTY COUNCIL

Cork County Council is a local authority established by statute whose corporate purpose is to enhance the physical, social, cultural and economic environment of the county in a sustainable and socially inclusive manner, so as to improve the quality of life of its citizens. Ballyannan Wood has been identified in the Midleton Special Local Area Plan as an important amenity area. Cork County Council and Midleton Town Council are committed to the provision of access from Bailick Road, Midleton, to Ballyannan Wood for recreation and amenity purposes (see Figure 1). Part 8 Planning process has been completed for the project. Construction of phase 1 of the project, comprising a pedestrian bridge and some paths, began in 2006 and will be completed in 2007. The remainder of the project may take a number of years to complete. In any event, it is unlikely that direct access from Bailick Road to the wood will be in place before 2008.

1.4 MIDLETON TOWN COUNCIL (MTC)

The Midleton Town Council maintains green spaces and parks within the town boundaries as recreation and amenity facilities for the residents of Midleton. The population of the urban area is expected to increase to more than 20,000 residents within the next 15 years. With regard to Ballyannan Wood, the MTC has three broad concerns: protection of the interests of Coillte as the landowner, protection of the environmental values of the woodland, and the development of recreation where it is not in conflict with the environmental values.

1.5 NATIONAL PARKS AND WILDLIFE SERVICE (NPWS)

The National Parks & Wildlife Service (NPWS), part of the Department of the Environment, Heritage & Local Government, manages the Irish State's nature conservation responsibilities under National and European law. NPWS is charged with the conservation of a range of ecosystems and populations of flora and fauna in Ireland. A particular responsibility of NPWS is the designation and protection of Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Natural

Heritage Areas (NHAs). Consultation with interested parties is an integral element of the designation process.

The Owenacurra Estuary is included in the Cork Harbour SPA and the Great Island Channel cSAC. At present, Ballyannan Wood is not included within the areas subject to these designations. However, the National Parks and Wildlife Service is considering extending the SPA boundary to incorporate Ballyannan Wood due to the presence of a breeding colony of Little Egrets. The presence of heron, badgers, and red squirrel are also of conservation interest.

1.6 EAST CORK AREA DEVELOPMENT LTD. (ECAD)

East Cork Area Development is a local and rural development company operating in East Cork. It operates as a community partnership, managed by a voluntary management committee drawn from the community, voluntary, private and public sectors. Established in 1995, it is responsible for the local delivery of the National Rural Development Programme, and the Local Development Social Inclusion Programme. The organisation aims to promote the positive economic, social and cultural development of the area.

3 DESCRIPTION OF THE SITE

Ballyannan Wood is a 24.5 ha mature mixed woodland owned by Coillte located south of Midleton on the Owenacurra Estuary in County Cork. It has been managed for timber in the recent past, and the forest is today composed primarily of sycamore (*Acer pseudoplatanus*), beech (*Fagus sylvatica*), Scots pine (*Pinus sylvestris*), oak (*Quercus* sp.), ash (*Fraxinus excelsior*), Lawson's cypress (*Chaemecyparis lawsonii*), larch (*Larix* sp.), and Sitka spruce (*Picea sitchensis*). Many of the trees present were planted in the 1950s, although some old oaks and other broadleaves are thought to date to the 19th century. While the site is not high quality native woodland, it nevertheless holds a diverse range of woodland habitats with notable features including a visually spectacular ground flora, old or veteran trees, and a breeding population of the bird Little Egret.

The name Ballyannan, or Baile Ui Anain, means "O'Hannon's Homestead". The wood dates back to at least the mid-17th century, and it is shown on the Down Survey map of 1654-1656 as well as the French Naval map of Cork Harbour (probably 1792). The woodland is depicted as a mixed conifer-broadleaf woodland on the 1842 Ordnance Survey map and continues to be indicated on all later editions of the Ordnance Survey Maps, implying continuous woodland cover over the centuries.

Ballyannan townland was owned by the Hodnett family from the 13th or 14th century. By 1653, Sir John Broderick, a Cromwellian Settler, had turned the castle built by the Hodnetts into a fortified Tudor mansion. The castle lies outside the woodland, but old stone walls and banks, stone gate pillars, and ruined cottages and boathouses remain within the wood as a reminder of the past. A Charter of Incorporation for the borough and town of Midleton was granted to Sir John Broderick in 1670, but by 1752, his family had left Ballyannan and were managing their lands through agents. An example is a 1782 letter to a local agent discussing replenishing the woodland by grafting following death of some oaks. In 1840, the 5th Viscount Midleton followed the advice of a valuer, Charles Bailey, and established a small nursery of about ¼ acre in a wood clearing. Fruit trees and conifers were grown here until the estate closed in 1964.

The woodland was purchased by Coillte in 1980. Despite the persistence of the site as a woodland through at least the last three centuries, the oldest trees recorded on the Coillte inventory are only estimated to date to 1830. Visually, however, many trees are large and appear old. Oaks (*Quercus* sp.) estimated by Coillte to date from 1880 line the estuary foreshore. Large old lime (*Tilia* sp.) trees, thought to date from 1830, line part of the drive on the northern side of the forest. There are a few relatively uncommon trees, such as a large hornbeam (*Carpinus betulus*) and some relatively old crab apple (*Malus sylvestris*) trees. About a fifth of the site is dominated by sycamore (*Acer pseudoplatanus*) and/or beech (*Fagus sylvatica*) canopy with an open internal structure, allowing good visibility for walkers from the forest road into the forest and promoting the vernal flowers like bluebell. The shrub layer is primarily composed of patches of elder trees (*Sambucus nigra*), while sycamore saplings are also frequently present throughout the site. The composition of the field layer depends on the shade coming through the canopy and ranges from ivy and shade-tolerant moss under heavy canopy, to thick, tall bramble under light canopy and in gaps.

The woodland is situated on a well-drained, unconsolidated sediment which has given rise to soils which are low in pH yet enriched. Overall, the main plant

community in the forest, as determined by the ground flora and not the planted trees in the canopy, is the oak-ash-hazel woodland community (using the Heritage Council classification, see Fossitt 2000). Characteristic vegetation, including wood speedwell (*Veronica montana*), yellow pimpernel (*Lysimachia nemorum*) and enchanter's nightshade (*Circaea lutetiana*), is most commonly encountered along paths and roads in the woodland and less frequently under the canopy of the trees. Shuttlecock ferns are scattered throughout, primarily scaly male fern (*Dryopteris affinis*), broad buckler fern (*D. dilatata*), and soft shield fern (*Polystichum setiferum*), a fern which prefers rich, or calcium-enriched, sites. Great woodrush (*Luzula sylvatica*), a plant associated with acid woodlands, is also found scattered throughout the site. Two unusual grasses are found in Ballyannan: wood millet (*Milium effusum*) and wood blue-grass (*Poa nemoralis*).

Within the woodland and non-wooded areas of the site are a variety of habitats which contribute to the diversity of animals and plants which are found in Ballyannan. These include the tall herbs along the sides of the paths and in glades, thickets of bramble, a wet willow woodland, the reedbed near the estuary, and the stands of different types of conifers and broadleaves of different ages in various parts of the forest. Surveys of the fauna have found that this diversity of habitats supports many types of animals. Molluscs (slugs and snails), hoverflies, birds, and bats are been surveyed in detail. Thirty-five species of slugs and snails were found in Ballyannan. Although this is low in numbers and in numbers of species compared to other Irish woodlands, some interesting species were found. One was an unusual species associated with old broadleaf woodland, especially ash, called *Perforatella subrufescens*. Another slug found in the open stands at Ballyannan was *Balea perversa*, a species that has been in decline due to its intolerance of pollution. Heavy shade may be one of the reasons that there are relatively few molluscs in Ballyannan.

Seventy-four species of hoverfly were recorded in Ballyannan, representing 69% of the Co. Cork fauna associated with oak-ash-hazel woodland. Among these, there were four which are probably threatened or declining in Ireland (*Brachyopa insensilis*, *Brachypalpoidea lentus*, *Criorhina floccosa* and *Orthonevra nobilis*), with another two species (*Heringia vitripennis* and *Melangyna umbellatarum*) also notable records. Five species in Ballyannan had not been recorded before in County Cork. A good representation of hoverflies associated with dead wood were found, including three nationally scarce species (*Brachyopa insensilis*, *Brachypalpoidea lentus* and *Criorhina floccosa*). These are probably mainly associated with the tree avenue on the northern side of the wood. In addition, one scarce wetland species was recorded (*Melangyna umbellatarum*), probably associated with the wet willow woodland and the reed swamp. Hoverfly species associated with grassy clearings are under-represented in the Ballyannan oak-ash-hazel woodland fauna compared to those tolerant of closed-canopy conditions.

Bats have also been surveyed in Ballyannan Wood. Six species of bat were observed hunting or commuting in the area: common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Leisler's bat (*Nyctalus leisleri*), Daubenton's bat (*Myotis daubentonii*), whiskered bat (*Myotis mystacinus*) and brown long-eared bat (*Plecotus auritus*). The whiskered bat and brown long-eared bat glean their prey from the leaves of broadleaf trees; they were heard hunting within the woodland. Several of these bats are of conservation interest: the whiskered bat is described as threatened in the Red Data Book, and all the other bat species found in Ballyannan are considered internationally important.

Other mammals recorded as present in Ballyannan are the red squirrel, badger, hedgehogs, and foxes. Birds breeding in Ballyannan include: Little Egret, Grey Heron, Mallard, Woodpigeon, Wren, Dunnock, Robin, Blackbird, Song Thrush, Blackcap, Chiffchaff, Goldcrest, Blue Tit, Great Tit, Coal Tit, Long-tailed Tit, Treecreeper, Jay, Magpie, Hooded Crow and Chaffinch. Long-eared Owls probably also breed in Ballyannan. Sparrowhawk and Kestrel have also been reported as present in the forest. The most unusual birds present are the breeding population of Little Egrets, a species listed on Annex 1 of the EU Bird's Directive. Other notable fauna known to be living in Ballyannan include the Speckled Bush-cricket (*Leptophyes punctatissima*). The woodland paths offer routes for insects such as the holly blue, speckled wood, small tortoise-shell, red admiral, peacock and painted lady butterflies.

The variety of habitats and the long-time existence of this woodland have created a special place for many animals and also for people who like to walk the paths of the woodland. The nearby town of Midleton is expected to grow at a rapid rate over the next 15 years or so. Construction will be completed in 2007 of a footbridge and path leading from Bailick Road to Dwyers Road, facilitating access to Ballyannan Wood although not leading directly to the wood (see Figure 1). This bridge is expected to increase access to the wood. This is the perfect time to plan for well-designed, sustainable development of Ballyannan Wood for conservation, recreation and education.

4 PUBLIC CONSULTATION SUBMISSIONS

Submissions were requested from interested members of the public through an advertisements in the Irish Examiner and signs in Ballyannan Wood. Letters and e-mails were received from the following people:

John Ahern
Dr Fidelma Butler (Department of Zoology Ecology and Plant Science, University College Cork)
Sean Cotter (Bishopstown Orienteering Club)
Joseph S. Cuddigan
John Fenton
Collette Fitzgerald
D. McMahon
Sinead O'Brien
Michael O'Connell
John O'Flynn

Many submissions recounted experiences either of family outings or contact with nature in Ballyannan. The importance of the woodland to the public was very clear in the submissions. Issues raised included maintenance of the serenity and naturalness of the woodland as it is, without development, and, conversely, addition of facilities such as distance marking on paths and shelters. Maintenance including removal of litter and prevention of anti-social behaviour were other issues raised. Some submissions, such as provision of a water tap, will be addressed in the proposed car park on the Bailick Road outside the woodland (see Figure 1), as there is no source of fresh water inside the wood. Others, such as highlighting the built heritage within the wood by restoring the Wood Rangers Cottage and boathouse, are possible only with external funding. The general policy of development within Ballyannan Wood will be low-impact, for quiet recreation, and while walks and maintenance will be important elements, the addition of many new facilities will not comprise any part of the plan.

5 LIST OF IMPORTANT FEATURES

The following list identifies the special features of Ballyannan Wood which will be maintained and enhanced in this management plan. The factors influencing each feature are discussed in the next section.

FEATURES OF NATURE CONSERVATION VALUE

1. Ancient woodland status.
2. Wood Millet (*Milium effusum*) population.
3. Ash woodland (sub-compartment 2) and associated rare snail (*Perforatella subrufescens*) population.
4. Veteran trees and saproxylic invertebrate populations.
5. Reedbed/willow woodland and associated invertebrate populations.
6. Speckled Bush-cricket (*Leptophyes punctatissima*).
7. Breeding colony of Little Egret (*Egretta garzetta*).
8. Red Squirrel (*Sciurus vulgaris*) population.
9. Whiskered Bat population (*Myotis mystacinus*; status requires confirmation).

HERITAGE AND EDUCATION FEATURES

1. Variety of tree species.
2. Vernal flora.
3. Diverse recreational experiences in different habitats.
4. Elements of serenity and quiet valued by walkers.
5. Potential for educational use both for the public, schools, and third-level institutions.
6. Opportunities to demonstrate woodland habitat management techniques.
7. Opportunities for nestbox and batbox studies.
8. Old walls, ruins of cottages and boathouses, earthenbanks, and pillars.
9. Wishing Tree.
10. Gravel pits.

6 ASSESSMENT OF FACTORS INFLUENCING THE IMPORTANT FEATURES

FEATURES OF NATURE CONSERVATION VALUE

1. Ballyannan has ancient woodland status because of a record of long-time woodland cover. This is a special habitat in Ireland and one which is extremely difficult to re-create.

Internal natural factors: Many of the subcompartments are currently dominated by exotics which would not have comprised part of Ireland's woodland after the last Ice Age. This is only important insofar as some species affect the community composition of plants and animals. A variety of different types of canopies is more likely to contain a suitable habitat for any species persisting from long ago. In addition, clearfelling or other large openings in the canopy, with resultant loss of the forest microclimate, may be a threat to the continuation of some forest specialist species.

Internal human induced factors: As this woodland has been managed for timber production, and that remains one of the owner's aims, some clearfelling and replanting has taken place in the recent past. The Coillte Biodiversity Survey recommends minimum intervention in all subcompartments of Ballyannan. The Coillte S3 District Strategic plan 2006-2010 does not include Ballyannan on a list of old woodland sites.

2. Wood Millet population.

Internal natural factors: This population has expanded since 2003, implying the current light and humidity conditions are suitable for its growth.

Internal human induced factors: path verge cutting appears to encourage this population, as well as may the additional light by creation of a gap to the south through forest harvesting of subcompartment 6 in 2004/5.

3. Ash woodland (sub-compartment 2) and associated rare snail (*Perforatella subrufescens*) population.

Internal natural factors: This snail is a woodland species of mollusc which tends to climb trees. It is associated with ash, and the existence of this ash-dominated subcompartment provides the habitat for this species.

Internal human induced factors: The subcompartment is scheduled for thinning in 2012.

4. Veteran trees and saproxylic invertebrate populations.

Internal natural factors: The veteran oaks along the estuary are estimated as being from 1880, while the veteran trees along the northern avenue are thought to date to 1830. The avenue trees provide dead wood within a humid forest microclimate. They will slowly die over the next few centuries and creation of future generations of

veteran trees should be considered to ensure continuation of the saproxylic invertebrate populations.

Internal human induced factors: A concern for site risk assessment and visitor safety may conflict with maintaining these trees.

External human induced factors: Unauthorised removal of fallen trees for firewood will reduce the amount of fallen dead wood available.

5. Reedbed/willow woodland and associated invertebrate populations.

Internal natural factors: The willows, birch, and oaks may be spreading into the open reedbed in the process of vegetation succession.

Environmental relationships which may influence the features: These wet habitats are probably affected by seepage from the estuary and therefore would be vulnerable to any drop in water level.

6. Speckled Bush-cricket, which lives in grassy clearings and glades.

Internal natural factors: Glades in a woodland are an early successional stage and will become woody over time unless mowed or otherwise disturbed.

External human induced factors: Subcompartment 18 lies over a gas line and must be kept clear of deep-rooting trees.

7. Breeding colony of Little Egrets.

Internal natural factors: The Little Egrets nest in trees near water and hunt in shallow water. This combination of factors must be retained to preserve the suitability of this habitat for the Little Egret.

Internal human induced factors: Coillte's S3 District Strategic plan 2006-2010 identifies the Little Egret nesting populations as important and recommends retention of high forest and nesting sites.

External human induced factors: Little Egrets are listed on Annex 1 of the EU Birds Directive as being of conservation importance and are therefore of interest to NPWS.

8. Red Squirrel population.

Internal natural factors: Red squirrels are threatened throughout Ireland by the spread of the grey squirrel. Red squirrels feed more on the small seeds of trees, including Scots pine and other conifers, as well as broadleaves with small seeds, such as alder.

External human induced factors: The red squirrel is protected under the Wildlife Act and therefore of interest to NPWS.

Environmental relationships which may influence the features: Red squirrels are easily outcompeted by grey squirrels when they occupy the same woodland site.

However, it has been postulated in two woodlands in the Irish Midlands that a resurgence of pine marten populations helped reduce the grey squirrel population and allow the red squirrels to maintain a foothold (Hutton Bury, pers. comm.).

9. Whiskered Bat population (status requires confirmation).

Internal natural factors: Whiskered bats tend to roost in buildings but also may use cracks and holes in trees as well as bat boxes. They glean invertebrates from the foliage of trees and may be better served by broadleaves in their hunt.

External human induced factors: All Irish bats are protected under the Wildlife Act.

HERITAGE AND EDUCATION FEATURES

1. Variety of tree species. A variety of tree species are present, including both native species and trees unusual in Ireland, such as coast redwood and southern beech.

Internal natural factors: Some of the existing trees are large and may slowly become senescent, bringing them into the remit of consideration with regard to visitor safety. However, large trees are frequently an inspiring feature for visitors to woodlands. The variety of trees present would be reduced if the currently successful sycamore natural regeneration were permitted to reach and dominate the canopy.

Internal human induced factors: Some of these species may be targeted for timber production. Specimen trees of interesting exotics which are not invasive should be earmarked for retention in any felling or thinning operation.

2. Vernal flora. There is a good display of vernal flowers such as bluebells, lesser celandine, wood anemone, and greater stitchwort in patches across much of the wooded portion of the site.

Internal human induced factors: The vernal flowers are found most often in stands of shade-producing deciduous trees. Forest operations resulting in loss of or opening of the canopy, with resultant growth of the field layer including bramble, or replacement of the overstorey with evergreen or less shade-producing species, will reduce these populations.

External human induced factors: Recreationists may be tempted to pick some of these flowers, especially bluebells. This, possibly together with trampling of the leaves, has led to a decline in the bluebell population in other woodlands, such as Barna Woods in Galway. The dense shade of the overstorey allows good visibility from the forest path into the stand, as well as easy access.

Environmental relationships which may influence the features: The vernal flowers do best in shade under deciduous trees, especially those which put out their leaves relatively late in the spring.

3. Diverse recreational experiences. The five main habitats present (oak-ash-hazel woodland, wet willow-alder-ash woodland, saltmarsh, estuary

foreshore, and open glades in the woodland) allow diverse flora and fauna on site as well as a variety of experiences for recreationists.

Internal natural factors: Open canopies and gaps in existing subcompartments have allowed a high proportion of the woodland to develop thickets of bramble in the field layer. This provides a natural zonation to areas which will be visited less, allowing the flora and fauna within the bramble cordon to exist with minimum disturbance from recreational visitors.

Internal human induced factors: Visual impact of forest operations, both in terms of tidiness and in terms of shady/open canopy changes, may affect the recreational experience.

External human induced factors: The apparent naturalness of the estuary foreshore to recreational visitors could be altered by addition of a path and/or litter.

4. Elements of serenity and quiet valued by walkers.

Internal human induced factors: Many woodland recreationists value in their woodland experience the sense of being away from any human management or development. It is possible that seeing machinery or other evidence of forest operations may interfere with this sense of being in nature.

External human induced factors: Increased access may bring larger numbers of people and possibly increase litter and informal recreation such as drinking parties.

5. Potential for educational use. Much of the diversity of vegetation, including the rare grass wood millet, is found along the existing paths, allowing easy indication of plants during guided walks.

Internal human induced factors: Much of this vegetation is maintained and encouraged by slashhooking the path verges, a management practice which should continue.

External human induced factors: The population of the Midleton area is expected to expand to over 20,000 in the next 15 years, creating a large audience for future educational events but also more pressure on the woodland. Visitor numbers may also increase with improved access through the construction of the footbridge and path from Bailick Road to Dwyers Road (see Figure 1).

6. Opportunities to demonstrate woodland habitat management techniques.

Internal human induced factors: Where best practice in forest management, whether for timber production or for habitat enhancement, is carried out in Ballyannan, it could be showcased.

7. Opportunities for nest box and bat box studies.

Internal human induced factors: Nest box and bat box studies are most compatible with a minimum intervention forest management regime.

External human induced factors: The proximity of third-level institutions means that robust studies can be set up, and the results can feed into educational walks or signage for the general public or school groups.

8. Several old walls, earthenbanks, and pillars are present both bordering and within the woodland (see Hill 2004). Ruins of a caretaker's cottage shown on the 1842 Ordnance Survey map, and the related garden, are also present. Two ruined boathouses are located along the shoreline.

Internal natural factors: The ruins will degrade over time, especially the caretaker's cottage, which has been colonised by woody vegetation.

External human induced factors: Ruins of a landlords estate can evoke mixed emotions in Irish people and may inspire vandalism with increased access.

Environmental relationships which may influence the features: The garden and the area surrounding the garden contain some exotic species, some of which are somewhat invasive, such as Himalayan honeysuckle (*Leycesteria formosa*) and *Lonicera nitida*.

9. Wishing Tree: A few paces down the first woodland path leading south from the boathouse in the northeast corner, there is a tree with a bisected trunk. This is known as the Wishing Tree, and local tradition states that anyone who can squeeze through the small hole shall have a wish granted (Hill 2004).

Internal natural factors: The Wishing Tree, however old it may be now, will be subject to normal tree senescence.

External human induced factors: There may be safety issues associated with visitors attempting to squeeze through a tree gap.

10. The two gravel pits: the larger, near the main avenue, was possibly used as far back as 1764.

Internal natural factors: The gravel pits provide good locations for setts and dens for the larger mammals in the woods.

External human induced factors: The drop and soft walls of the quarries, especially the larger one, may present safety issues for visitors.

7 IDENTIFICATION OF OBJECTIVES AND ACTIONS FOR THE MANAGEMENT OF THESE FEATURES

The objectives of the owner are threefold: ecological conservation, recreation and education, and commercial. The general objectives of this management plan for Ballyannan Wood are as follows:

- A. Maintain and enhance existing features of nature conservation importance.
- B. Create and enhance features which are characteristic of woodland ecosystems in Ireland, so that they can be used for educational/interpretative purposes.
- C. Demonstrate typical methods of woodland nature conservation and monitor their effects.
- D. Provide facilities for walkers, especially local residents, particularly as visitor numbers are expected to increase.
- E. Develop interpretative facilities.
- F. Honour the place of Ballyannan Wood in the heritage of the Midleton town, from personal memories to archaeological features.
- G. Retain economic options with regard to timber production.

OBJECTIVE A: MAINTAIN AND ENHANCE EXISTING FEATURES OF NATURE CONSERVATION IMPORTANCE.

1. Ancient woodland status.

Actions: Continuation of woodland cover to maintain ancient woodland status. Management operations to result in no more than 0.25 ha gap (H. Denman, pers. comm.) at any one time. Inclusion of Ballyannan on Coillte's district list of old woodlands in the Strategic Plan.

2. Wood Millet (*Milium effusum*) population.

Actions: Identification of the factors contributing to the expansion of the wood millet population, particularly that along the path in Subcompartment 4, between 2003 and 2006. Annual summer monitoring of population size. 5-yearly assessment of other populations within Ballyannan and their environmental conditions (particularly shade and humidity). Any reduction in population to be analysed and causes addressed within 1 year.

3. Ash woodland (sub-compartment 2) and associated rare snail (*Perforatella subrufescens*) population.

Actions: Maintenance of the existing ash stand into the future with minimal intervention as recommended by the Coillte Biodiversity Plan (Sweeney 2005). Any natural gaps in the canopy should be allowed to regenerate ash; if sycamore regenerates extensively, it should be removed at sapling stage. Encouragement of regeneration of ash, or planting of ash, in neighbouring subcompartments (1 and 4). Bramble and other forbs in Subcompartment 4, south of the wood millet, to be retained with natural regeneration to encourage this snail.

4. Veteran trees and saproxylic invertebrate populations.

Actions: Maintain all existing veteran trees. Identify and map or tag all potential future veterans in subcompartments 5 and 25, as well as where they occur in other subcompartments throughout the forest. Future veterans are trees which will reach old age or senescence in approximately 200 years. The species preferred for this are the same as those which currently host the invertebrate populations: lime and oak, as

well as horse chestnut. If necessary, plant additional trees of the same species, to reach density 5-8 veterans for each of the two subcompartments where they currently occur in large numbers, or to maintain future veterans in each subcompartment where veterans currently occur (Sub 1 (by the turning circle), 5, 22, and 25)

Carry out risk assessment of veteran trees survey by trained arboriculturalist together with saproxylic invertebrate expert and find solutions to any identified risk to walkers that are amenable to both. Monitor any tree surgery closely with penalties to contractor if guidelines are not followed.

Existing dead and dying trees, senescent features on living trees (e.g. dead branches, rot-holes), and fallen dead wood should be left on site. Where trees are being felled for timber, the non-timber parts will be left on the site. To provide habitat for snails and slugs, single large branches in the shade in both vegetated and unvegetated ground would be the most valuable. The occasional full trunk or part trunk would also be good. The branches should be placed lightly on the ground, not deeply embedded. Artificial rot-holes will be created to provide habitat for dead wood-associated hoverflies. This involves making v-shaped vertical cuts in tree stumps and filling them with a sawdust mixture (G. Rotheray, pers. comm.).

Blackthorn and hawthorn shrubs will be planted in open areas close to veteran trees, mainly along the northern avenue and the central ride. The adults of many of the dead wood-associated invertebrate species require open-structured flowers as nectar sources. At present, bramble and hogweed are important nectar sources from mid-June on, but there seems to be limited availability of suitable nectar sources earlier in the summer. Blackthorn and hawthorn would together, potentially, fill this gap, but are both rare within the woodland. Therefore, planting these shrubs is likely to benefit populations of dead wood-associated invertebrates, as well as providing an attractive amenity for recreational visitors.

5. Reedbed/willow woodland and associated invertebrate populations.

Actions: Monitor habitats annually for changes in hydrology or structure. Monitor proportion of tree cover as a measure of succession or tree invasion. If changes occur, analyse and address.

Ballyannan Wood has no areas of freshwater wetland habitat. Development of a small wetland would increase the habitat diversity of the wood and allow additional plant and invertebrate species to colonise. There are two areas within the wood where the ground remains wet all summer, indicating that the water-table may be sufficiently high for creation of a wetland. Of these, the eastern location is probably more suitable as it is located under a canopy gap. Further investigation and design will be required to develop this proposal.

6. Speckled Bush-cricket (*Leptophyes punctatissima*), which lives in grassy clearings and glades.

Actions: Maintenance of glades which are suitable habitats for this cricket.

7. Breeding colony of Little Egrets.

Actions: Maintain tall trees in the woodland to continue to host the Little Egret nests.

8. Red Squirrel population.

Actions: Maintain populations of small-seeded trees such as Scots pine. Monitor presence/absence or records of grey squirrel invasion annually.

9. Whiskered Bat population (status requires confirmation).
Actions: Confirm status. May be encouraged by bat boxes (see below).

OBJECTIVE B: CREATE AND ENHANCE FEATURES WHICH ARE CHARACTERISTIC OF WOODLAND ECOSYSTEMS IN IRELAND, SO THAT THEY CAN BE USED FOR EDUCATIONAL/INTERPRETATIVE PURPOSES.

1. Vernal flora.

Actions: Maintain shady deciduous broadleaf components at least in part of the stand. Transform sycamore slowly by creating small openings in the canopy and allowing the development of a more diverse structure (to oak-dominated mixed, broadleaves). Include information about effect of picking wild flowers (= future seeds) on their populations for walkers who may be tempted to fill jars with bluebells.

2. Potential for educational use both for the general public, and for schools and third-level institutions. The issues and challenges facing the management of the wood (amenity use, nature conservation, commercial potential) are of relevance to the participants of the Biodiversity in Commercial Forestry course at UCC and provide a perfect stimulus for discussion of these topics.

Actions: Maintain the characteristics of the woodland and other habitats which make it a suitable destination for field trips, including the nature conservation values as highlighted under Objective A above. These include: the diversity of woodland types and tree species; the ground flora, which is particularly interesting and illustrates the value of this element of woodland; and the age of the site allowing illustration of past management strategies. There is also great deal of ecological information available for the site. A more active management of targeted features, such as methods to increase the deadwood component of the woodland and associated data to monitor the effects, will increase the value of the wood for teaching.

Development of a brochure or background flyer in non-technical language to help primary or secondary school teachers use Ballyannan Wood as a teaching tool. Some local teachers have already expressed an interest in using such material. Detailed information, such as a nature trail, on the Internet for download by walkers and by teachers. Topics suitable to focus on in educational material include: the species present and their particular needs, management for conservation, habitat and niche, and the role of native woodland. Provisions of guided walks for teachers or school groups. Schools should apply for a license to use Ballyannan, in order to know which groups are using it and to control numbers on any one day.

The employment of some ranger-type staff who would be able to lead walks for groups is an option. For example, a person may be employed by ECAD and sponsored and supervised by CNT or the Steering Committee. This may link into the options (below) with regards to safety.

OBJECTIVE C: DEMONSTRATE TYPICAL METHODS OF WOODLAND NATURE CONSERVATION AND MONITOR THEIR EFFECTS.

Management for nature conservation should maintain natural processes, while intervention disrupts these processes. Many of the subcompartments in Ballyannan do not need any intervention in order to maintain their existing values.

1. Variety of tree species.

Actions: Maintain the current tree populations for recreation and conservation as per the detailed subcompartment management plan in Appendix 1. If future needs dictate timber production, harvest using small coupe or continuous cover systems, and maintain the old examples of unusual trees such as crab apple, hornbeam, lime, and coast redwood.

2. Diverse recreational experiences in different habitats.

Actions: Design paths and interpretation which create varied recreational experiences. Paths should vary from surfaced and wide paths for larger groups and people in wheelchairs or buggies, to soft, informal, narrow paths for individuals or small groups to explore without guidance or signage. (See Objective D below.)

Maintenance of existing habitats and their nature conservation value.

3. Opportunities to demonstrate woodland habitat management techniques.

Actions: Promote any conservation work (see Objective B above) through brochures, field days, the Internet, or signage.

Grassy open spaces with tall forbs (e.g., hogweed, meadowsweet) would create more breeding habitat for various hoverfly species as well as increasing the floral resources available for adult hoverflies to feed on. Open spaces with a short herb and grass/sedge mix would create a non-acid, tightly thatched ground litter for snails and slugs and would benefit a notable species (*Perforatella subrufescens*) and may encourage an additional three species to colonise (Moorkens, 2003).

Selected areas will be periodically cut by CNT volunteers to create small grassy open spaces. These could include:

- The bramble-dominated scallops along the central ride.
- The gas line in sub-compartment 18.
- The bracken dominated open areas in sub-compartment 15.
- The scrub-dominated areas in sub-compartment 3.

The size of the open areas would vary from a bole width of 4-5 trees (for snails) to a size equivalent to the existing open area at the southern end of the central ride (for hoverflies). The hedges along the entrance laneway and Sub 18 are colonised by traveller's joy (*Clematis vitalba*), a climber which may overtop trees and shrubs. This may need to be removed or controlled.

4. Opportunities for nest box and bat box studies.

Actions: Nest boxes will be erected in suitable locations in Ballyannan Wood, focussing particularly on areas where few hole-nesting birds were recorded to allow populations to increase and provide a valuable resource for education and research. Treecreepers are a particular target as they are quite rare in Ballyannan Wood.

'Schwegler' woodcrete or concrete bat boxes have been proven to be acceptable alternatives for bats and they are readily occupied. Around 15 – 20 bat boxes will be erected in suitable locations in the wood to provide additional roosts, especially in sections of the wood where suitable mature trees are not present. These will also facilitate monitoring of bat populations.

OBJECTIVE D: PROVIDE FACILITIES FOR WALKERS, ESPECIALLY LOCAL RESIDENTS.

1. Walks and paths:

Defined, easily useable walks which make it obvious where the public is permitted to go are desired and will help protect natural processes in other areas, where it will be difficult to access. According to the policy of the owner, recreational development is oriented only towards walkers. (Mountain bikers should be able to use Ballyhoura trails.) Orienteering is also an acceptable activity as it is also on foot, although events should be licensed for safety.

The existing path network is sufficient and comprises a mixture of wide, surface forest roads suitable for groups and soft, narrow, more natural paths. What is expected to be the most heavily used path once the new entrance is installed at the northeast corner is a flat path approximately 390 m long from the entrance to the glade that comprises the turning circle (see Figure 2 below). Signage should make it clear to the first-time visitor that the eastern portion of the path is somewhat hilly. A bench is present in this glade and can serve as a resting place for tired visitors. Another 220 m will bring the visitor to another bench with a view of the estuary. A large kissing gate or other entrance should be installed to allow wheelchair access at the most accessible entrance (without permitting access by motorbikes or quad bikes). Although the current management does not cater specifically for wheelchairs, facilities should be maintained to an accessible standard. The woodland is currently used by local residents who cycle on mountain bikes for fitness. It is strongly recommended that these are residents involved in plans or are liaised with if all bikes will be excluded from the woodland.

The start of various paths, in particular the one behind the bench in the glade, should be checked for obviousness. Walkers should be encouraged onto paths and away from rides and extraction routes, which may be uneven and end at clearfells.

The paths should be zoned according to expected use, and the level of facilities provided designed to match the level of use expected (see figure below):

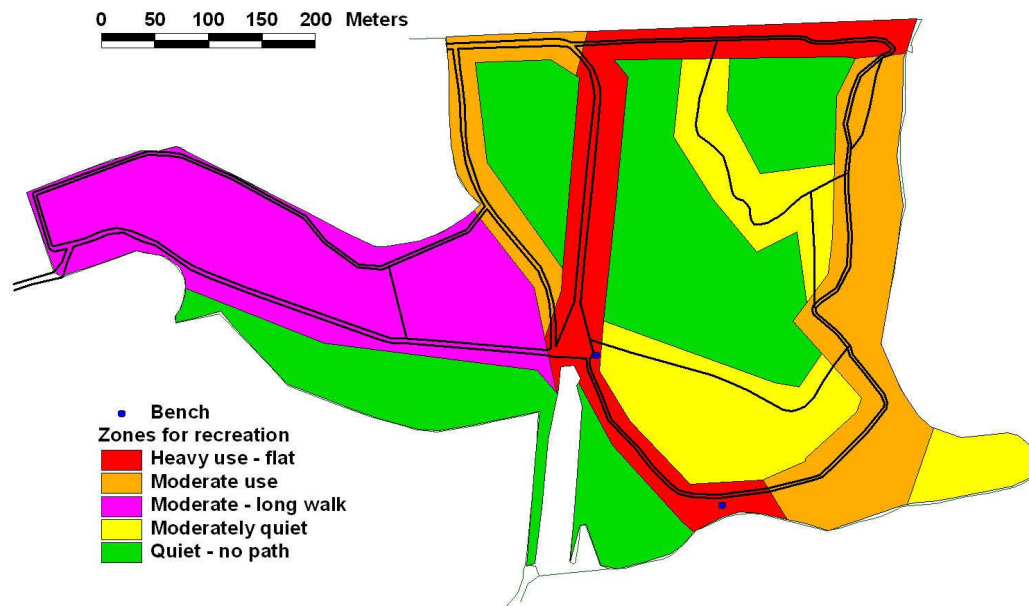


Figure 2: Map of Ballyannan showing the paths in existence and estimated zonation of use with provision of a new entrance on the northeast, from heavy use (main path to estuary) to quiet (relatively inaccessible). The eastern side of the wood is hilly and therefore is expected to be used slightly less than the flat northern and central paths.

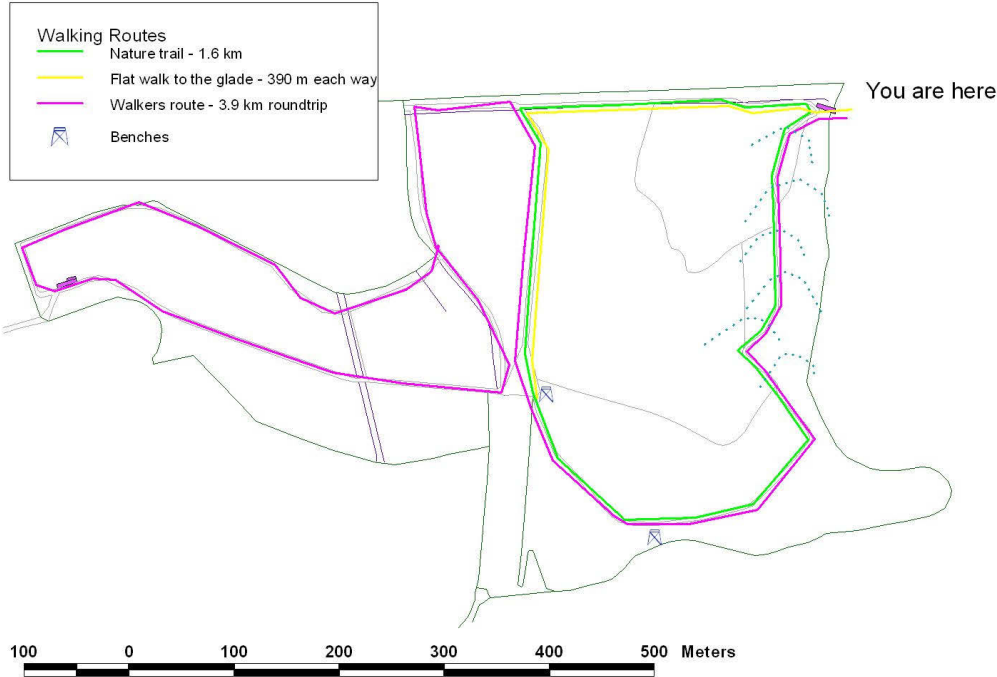


Figure 3: Map of routes in Ballyannan. A simple indicative map like this one showing the various routes should be included on the welcome sign at the entrance.

Signage should be confined to the areas of heavy and moderate use. Relatively few interpretation signs should be included: further information will be available for the curious from guided walks, additional brochures, and/or websites. Areas of path for a walk in nature without encountering evidence of development should comprise part of the plan. An area without signs should be included. For example, the long walk along the western arm of the wood (approximately 1 mile long) should be treated as a nature walk, without permanent signs albeit perhaps with a nature trail accessible for repeat visitors from the internet or a brochure.

- Other signs to be included (see Appendix 2 for details):
- A welcome sign with rules and a basic map of the trails (see Figure 3).
- Orientation signs for one trail with distances marked.
- The narrower, soft paths should be left without signs, to encourage a sense of exploration.

2. Other facilities:

While a third bench near a viewing point may be a boon, it is not necessary to develop Ballyannan further into a forest park. Picnic tables and other facilities would not fit in with the protection of the nature conservation values of the wood.

3. Safety:

One main concern with regard to the development of Ballyannan Wood is uncontrolled access and anti-social behaviour. The Cork County Council representatives on the Steering Committee have identified this as a main concern, especially among the more secluded on closed paths on the site (in comparison to the open glades). The MTC representatives have pointed out that the numbers using the wood at the moment are not large, and that an increase in groups such as school

groups would not be a problem. There will always be a need for young people to have places to congregate outside of organized activities, but Ballyannan is not a suitable location for such recreation. Multigames areas are planned by the County Council, and these may draw young people more than Ballyannan will.

Lighting of illegal fires is another safety and liability issue. Uncontrolled access could have the knock-on effect of damaging the nature conservation values of the wood.

The Coillte Security policy (2004) will apply to Ballyannan and will include the introduction of bye-laws to improve security. This designation gives the Gardaí the power to enter the woodland with a key for any locks in order to monitor any activity taking place. A licensed recreational event include volunteer work will include opening, closing and locking gates.

Other suggested solutions for safety monitoring are:

- Request for patrolling by Gardaí on bikes
- ECAD and CNT employing workers on a common project, or rural social scheme workers as has been successful in Glengarriff. Passive supervision such as the presence of wardens is likely to help prevent litter and dumping as well.
- Within the town parks, checks by the Gardaí in areas where young people have developed habits of congregating in screened areas has been effective, but this may not be suitable for a large site like Ballyannan.
- Making the site relatively inaccessible at night. A sign giving the times of closure would be necessary.
- The first phase of bridge-building will not make the wood much more accessible, but the second phase will. Monitoring increased visitor numbers and their behaviour after Phase 1 may be an important input into taking precautions with regard to decreased safety or serenity in the wood. A path along the foreshore and a riparian park are other Phase 2 alternatives which may increase access in a different manner (see Figure1).
- Moving benches out of shadow to streetlights was successful in the Baby's Walk, but the provision of lights in Ballyannan may affect invertebrates and bats.
- Use by groups may discourage unacceptable use by individuals.

Liability and safety provisions should be taken, especially with regard to the gravel pits, upon expert legal advice.

4. Litter:

Litter and dumping are not only unsightly but affect the apparent naturalness and 'getting away from it all' aspects of the outdoor recreational experience. The provision of bins in the car park and signage indicating how long it takes a crisp bag to decompose, may help with the problem on litter on the ground, although bins if provided must be emptied regularly. Litter on the ground should be removed on a regular basis. Clean-ups by volunteers could be one way of involving the community. Dumping is one of the activities included under the Coillte Security Policy.

5. Maintenance:

Maintenance has been identified as essential, particularly of the signage and other facilities.

OBJECTIVE E: DEVELOP INTERPRETATIVE FACILITIES

Interpretation is different from education; interpretation aims to explain the meaning and importance of sites to the visitor (see Bell 1997). Ballyannan Wood is a suitable site for both interpretation and also for contributing towards education of school pupils and third-level students. Facilities which may be developed using the baseline information already collected on Ballyannan Wood by CNT include information boards, a nature trail, educational material for local schools, and guided walks.

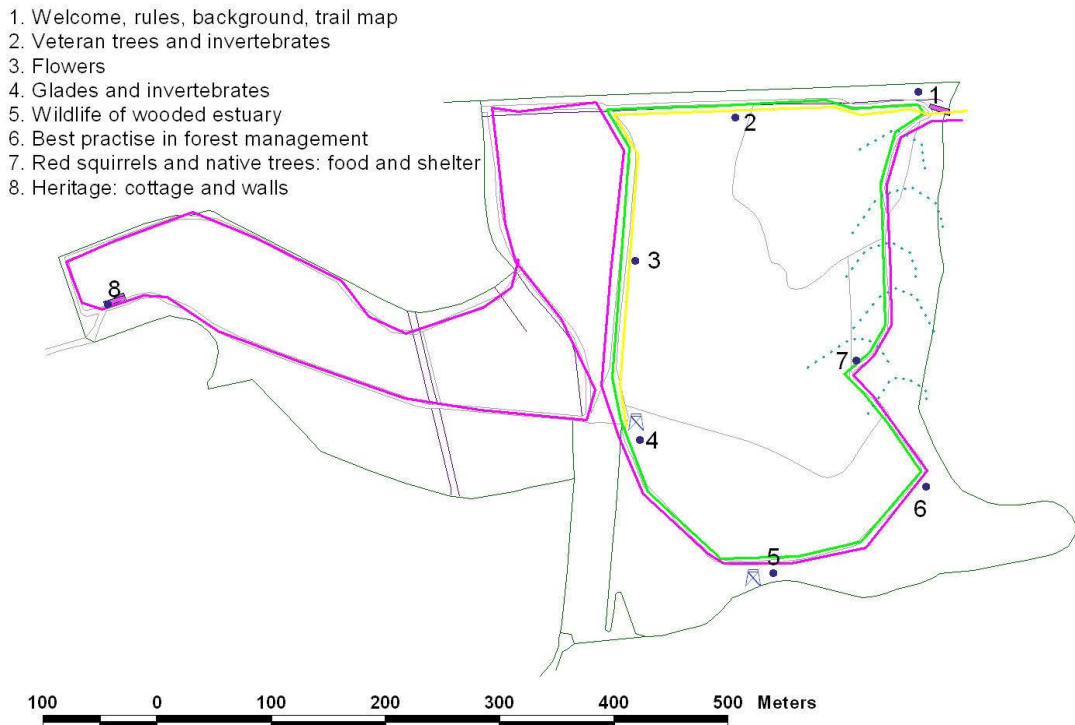
1. Interpretation boards:

Interpretation boards can be placed in the woodland for any visitor to be able to read. They could link into the successful board about the estuary as part of the East Cork Trail. It is important to refrain from overloading the site with boards. One appropriate average is 2 boards for 8 or 9 ha of woodland. This implies that 6 information boards is the maximum appropriate to Ballyannan Wood.

The boards should be constructed of nature-appropriate and durable material. While routed wood or screen-painted steel are most often used in forests in Ireland, the opportunity exists at Ballyannan to find a creative way to present information. For example, at Timoleague, a walk has been made with handmade tiles giving information every 100m. These are singularly attractive as well as simple and durable. The potential for a link with local craftspeople who may be able to produce tiles would make the walk local and special. Tiles have also been used at Cong.

Interpretation signs should rely on the principle of few words and many pictures. Photos or clear drawings of the different plants and animals one might see are important elements to such signs. Other active or participatory information may be included on brochures or downloadable nature trails. A relevant example of such an activity is how to measure the height of a tree using sticks.

Figure 4 shows the recommended locations of interpretation signs:



Signs should be checked for wear-and-tear and need for repair or replacement at least once a year. Plastic or other rough signboards may need to be cleaned if colonised by subaerial algae.

2. Promotion:

Ballyannan could be promoted as an educational resource. Examples of promotion could be on radio on shows such as 'Mooney goes Wild', and publication of a book guide such as Kevin Corcoran's *West Cork Walks* with directions, about 35 stops, and something to read and something to see at every stop. Ballyannan should also be promoted via Dragnet (http://www.dragnet-systems.ie/regional/munster/county_cork/midleton/index.htm) and the Midleton Town Council website. It could also be linked to the Heritage projects of Cork County Council.

Detailed information could be made available to the public via a dedicated website which is maintained and updated regularly. Use of an easy-to-remember alias such as Ballyannan.com could mean high virtual visitor numbers, even if the actual website used is that of the County Nature Trust or other member of the Steering Committee.

OBJECTIVE F: HONOUR THE PLACE OF BALLYANNAN WOOD IN THE HERITAGE OF THE MIDLETON TOWN, FROM PERSONAL MEMORIES TO ARCHAEOLOGICAL FEATURES.

Ballyannan Wood has been in existence longer than the town of Midleton and has links of the childhood memories of many local residents. Two physical features exist in the wood reminding the visitor of these personal links:

1. Wishing Tree.

Actions: Include information about the folklore of the Wishing Tree in information about Ballyannan. Assess tree condition and decide whether to identify which tree is the Wishing Tree depending on tree, root, and stem health. As it is probable that identifying the specific tree would encourage rubbing and other damage as well as possible vandalism, a general indication of the story may be the better action.

2. Old walls, ruins of cottages and boathouses, earthenbanks, and pillars.

Actions: Monitor their condition and use appropriate methods to maintain or reconstruct walls as needed.

Inclusion of interpretation information on history and heritage in Ballyannan would be interesting to visitors who have interest in social as well as natural history.

Analysis of the feasibility and desirability of restoration of some of the built features, such as the Wood Ranger's Cottage or a boathouse.

OBJECTIVE G: RETAIN ECONOMIC OPTIONS WITH REGARDS TO TIMBER PRODUCTION.

In order to preserve any woodland, management must promote continuity of the woodland habitat. Management of a woodland such as Ballyannan with different habitats should also ensure continuity of these various habitats. As trees take a long time to grow and much may change over the next few centuries, it is reasonable to continue to manage Ballyannan to retain the owner's economic options in the future. However, both because of the environmental values and expected high recreational visitor numbers, any forest operations should be carefully considered and carried out in a manner which showcases best practice. Felling of all trees in a large area should be avoided, despite the advantages of economies of scale, as it interferes seriously with the visual and conservation values. Coupes to a maximum size of 0.25 ha are

recommended (Denman, pers. comm.). Coillte's plans for this site are for low-impact silviculture, such as single tree selection harvesting, selective thinning and removal of small (2-3) groups of trees. Implementation of this strategy will ensure protection of the habitats. Some areas may be selected to be managed for future timber production, through thinning and pruning, but others, particularly the small habitats, should be left undisturbed.

The environmental values of the forest can be enhanced through restructuring as recommended by van der Sleesen (2003, see Appendix 1 for updated recommendations by subcompartment). In general, increasing the proportion of native trees will be beneficial to many native animals. For example, ash and hazel, as well as oak, are beneficial to molluscs. Any transformation of the forest can be highlighted in interpretative signs to increase public awareness of the management of the forest for conservation, recreation, and timber. At the same time, the impact of forest operations, including thinning, should be strictly controlled to prevent disruption to ecosystems present, as well as to mitigate visual impact for recreationists. A high standard of practice should be adhered to and promoted in the related interpretation materials. All forest operations should be confined to existing rides to prevent further disruption of the soil and ground flora. Contractors should be given explicit guidelines and training in low impact forest operation methods.

8 SUMMARY OF ACTIONS AND OPERATIONS

MAINTENANCE OF WOODLAND / MINIMUM INTERVENTION:

Continuation of woodland cover to maintain ancient woodland status. Management operations to result in no more than 0.25 ha gap at any one time.

Identification of the factors contributing to the expansion of the wood millet population, particularly that along the path in Subcompartment 4, between 2003 and 2006. Any reduction in population to be analysed and causes addressed within 1 year.

Maintenance of the existing ash stand into the future with minimal intervention and encouragement of regeneration of ash, or planting of ash, in neighbouring subcompartments (1 and 4). Bramble and other forbs in Subcompartment 4, south of the wood millet, to be retained with natural regeneration to encourage this snail.

Carry out risk assessment of veteran trees, especially those near walkways, by trained Coillte personnel. Trees predisposed to structural failure will be earmarked for treatment. Solutions for risk reduction to be found in cooperation with a saproxylic invertebrate expert, aiming at solutions to any identified risk to walkers that are amenable to both. In case of identification of unsound trees by a trained tree assessor, removal of branches or cutting down to snag will be considered with input from an invertebrate expert. Best practise with regard to risk reduction will be adhered to, but invertebrate habitat taken into consideration. Monitor any tree surgery closely with penalties to contractor if guidelines are not followed.

Maintain all existing veteran trees where possible. Identify and map or tag all potential future veterans. These are trees which will reach old age or senescence in approximately 200 years. The species preferred for this are the same as those which currently host the invertebrate populations: lime and oak. If necessary, plant additional trees of the same species, to reach density 5-8 veterans for each of the two subcompartments where they currently occur.

Maintain shady deciduous broadleaf components at least in part of the stand. If future needs dictate timber production, harvest using small coupe or continuous cover systems, and maintain the old examples of unusual trees such as crab apple, hornbeam, lime, and coast redwood.

Maintain tall trees in the woodland to continue to host the Little Egret nests.

Maintain populations of small-seeded trees such as Scots pine.

All forest operations should be confined to existing rides to prevent further disruption of the soil and ground flora. Contractors should be given explicit guidelines and training in low impact forest operation methods.

MONITORING:

Assess condition of the Wishing Tree.

Monitor wood millet population size. 5-yearly assessment of wood millet populations within Ballyannan and their environmental conditions (particularly shade and humidity).

Monitor wetland habitats annually including proportion of tree cover. If changes occur, analyse and address.

Monitor presence/absence of red squirrel or records of grey squirrel invasion annually.

Confirm status of Whiskered Bat population.

Monitor condition of old walls, ruins of cottages, earthenbanks, and pillars and use appropriate methods to maintain or reconstruct walls as needed. Analyse the feasibility and desirability of restoration of the Wood Rangers cottage or a boathouse.

HABITAT CREATION OR IMPROVEMENT:

Design and create of a small wetland in one of two areas within the wood where the ground remains wet all summer.

Develop and implement dead wood and rot hole policy.

Plant blackthorn and hawthorn shrubs in open areas close to veteran trees. Some of these shrubs should be planted as a natural barrier between the northern path and the quarry in sub-compartment 24.

Cut selected areas periodically to create small grassy open spaces. Consider removal of traveller's joy.

Transform sycamore slowly by creating small openings in the canopy and allowing the development of a more diverse structure (to oak).

Erect nest boxes and bat boxes.

RECREATIONAL FACILITIES

Level and surface main path to glade.

Erect kissing gate or other access for wheelchairs that excludes quads, etc.

Erect welcome sign and interpretation signs.

Erect directional and reassurance markers on trails.

Develop litter bins in car park and add signage in the woods requesting people to take their litter to the litter bins in the car park, incorporating information about effect of litter on ecosystems.

Instigate tradition of litter removal with volunteers once or twice a year with the assistance of the County Council in removal of gathered rubbish.

Maintain facilities.

EDUCATION AND INTERPRETATION:

Development of a brochure or background flyer in non-technical language to help primary or secondary school teachers use Ballyannan Wood as a teaching tool. To include information about effect of picking wild flowers and information on the Wishing Tree, as well as summaries of the ecological and heritage information known.

Development of detailed information, such as a nature trail, on the Internet for download by walkers and by teachers.

Provisions of guided walks for teachers or school groups.

Establishment of a license or permit system for schools.

Explore employment options for guided walks and safety.

Promote Ballyannan as an educational resource on the Internet, radio, and through publications.

Include Ballyannan on Coillte's list of old woodlands in the district Strategic Plan.

9 COSTED ACTION PLANS FOR THE MANAGEMENT OF THESE FEATURES.
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The following costings are rough estimates of the cost for various management actions. VAT is not included. Some of the actions for which costings are included may be carried out by volunteers. This table also includes an indication of the priority of each action, as follows:

- 1 = to begin within year 1 of the management plan.
- 2 = to begin within years 2-3 of the management plan.
- 3 = to begin within years 4-5 of the management plan.

Implementation of these actions will depend upon securing the necessary funding. Potential sources of funding include: the Forest Service Neighborwood Scheme, East Cork Area Development Ltd., Cork County Council, and the Heritage Council.

	Estimated cost per unit (€)	Number of units	Unit	Cost over five years of management plan (€)	Priority
Woodland continuity and monitoring:					
Assess condition of the Wishing Tree.	200	1		200	3
Carry out risk assessment of veteran trees, especially those near walkways, by trained Coillte personnel.	Coillte				1
Solutions for risk reduction to be found in cooperation with saproxylic invertebrate expert.	500	1		500	1
Identify and map or tag all potential future veterans.	1200	1		1200	1
Develop and implement dead wood and rot hole policy.	1000	1		1000	2
Monitor wood millet population size on 5-yearly basis.	300	1		300	1
Identification of the factors contributing to the expansion of the wood millet population, particularly that along the path in Sub-compartment 4, between 2003 and 2006. Any reduction in population to be analysed and causes addressed within 1 year.	300	1		300	2
Monitor wetland habitats annually including proportion of tree cover. If changes occur, analyse and address.	150	5	years	750	1
Monitor presence/absence of red squirrel or records of grey squirrel invasion annually.	300	5	years	1500	1
Confirm status of Whiskered Bat population.	500	1		500	1

	Estimated cost per unit (€)	Number of units	Unit	Cost over five years of management plan (€)	Priority
Monitor condition of old walls, ruins of cottages, earthenbanks, and pillars.	1000	1		1000	3
Use appropriate methods to maintain or reconstruct walls as needed.		unknown until monitored			3
Analyse the feasibility and desirability of restoration of the Wood Rangers cottage or a boathouse	1200	1		1200	3
Design and create of a small wetland in one of two areas within the wood where the ground remains wet all summer.	1000	1		1000	2
Removal of Sycamore regeneration and other exotics	volunteers				2
Cleaning of recently planted sub-compartments	Coillte				1
Plant blackthorn and hawthorn shrubs in open areas close to veteran trees including between the northern path and the quarry in sub-compartment 24.	volunteers				1
Plant other trees to replace veterans or to increase ash and other native population.	volunteers				1
Cut selected areas periodically to create small grassy open spaces. Consider removal of traveller's joy.	volunteers				1
Erect nest boxes and bat boxes.	30	10	each	300	2
Recreational facilities					
Level and surface main path to glade.	20	400	meters	8000	1*
Erect kissing gate or other access for buggies that excludes quads, etc.	2000	1		240	2
Design of welcome and interpretation boards	6000	1		6000	1*
Construction of welcome and interpretation boards	1500	8		12000	1*
Erect welcome, interpretation boards, as well as one informing the visitor of the bin in the car park.	390	9	each	3510	1*
Directional and reassurance markers	120	8	each	960	1*
Instigate tradition of litter removal with volunteers once or twice a year with the assistance of the County Council in removal of gathered rubbish.	volunteers				1

* Dependent upon securing funding under the Neighborwood Scheme.

	Estimated cost per unit (€)	Number of units	Unit	Cost over five years of management plan (€)	Priority
Maintain facilities.	volunteers?				2
Safety audit of quarry	Coillte				1
Education and interpretation:					
Development of a brochure or background flyer in non-technical language for school teachers.	1000	1		1000	3
Printing of above brochure in full colour.	595	1	per 5000	595	3
Development of detailed information, such as a nature trail, on the Internet for download by walkers and by teachers.	3000	1		3000	2
Provisions of guided walks for teachers or school groups.	volunteer or ECAD				3
Establishment of a license or permit system for schools.	1200	1		1200	3
Promote Ballyannan as an educational resource on the Internet, radio, and through publications.	3000	1		3000	1 (limited) 3 (major)

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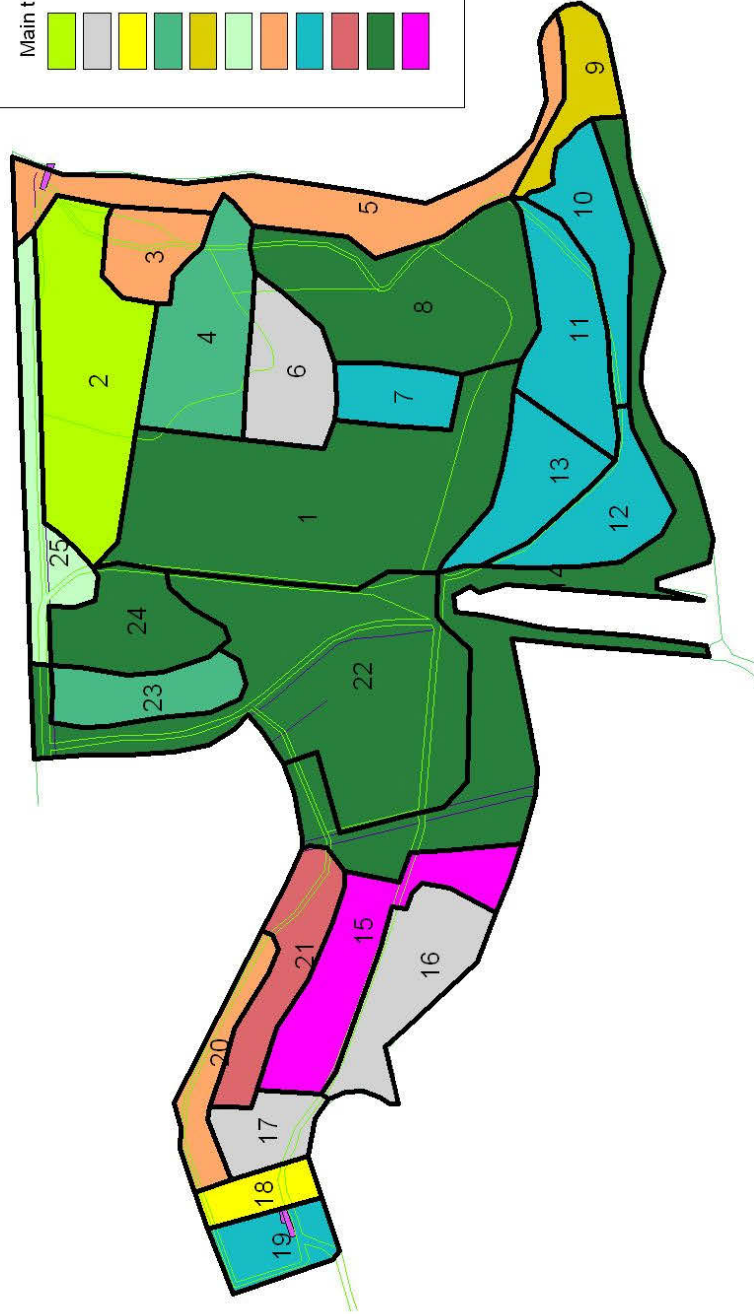
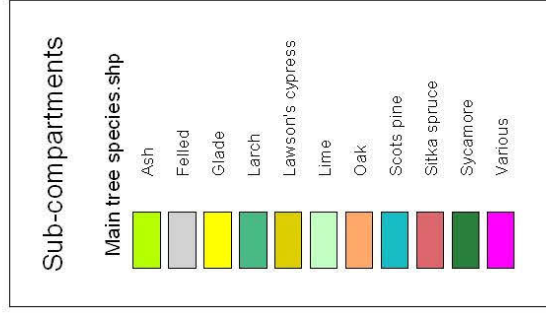
Personal communications:

H. Denman, forester specialising in continuous cover forestry, SelectFor Wales.

D. Hutton-Bury, forest owner.

G. Rotheray, National Museums of Scotland

11 APPENDIX 1: MANAGEMENT RECOMMENDATIONS BY SUB-COMPARTMENT



Sub	Area (ha)	Soil	Planting year in Coillte inventory	Harvest date in Coillte inventory	Canopy species	Field layer	Coillte Biodiversity plan (Sweeney 2005) and rare species found	Recommended management for forest restructuring (based on van der Sleesen 2003).
1	2.8	Shallow brown earth, soil is mixed in texture and red in colour. pH 4.5	1950	Scheduled for selective thinning in 2012.	Sycamore dominated but the canopy also contains downy birch, some oak and few large beeches.	Primarily ivy and bluebells with some shuttlecock ferns over bryophytes, although bramble dominates in places where light reaches the floor.	Retain with minimum intervention.	There are two options for this compartment: 1) Leave as is, as some other trees and small shrubs are succeeding where there are gaps in the canopy. 2) Gradually remove sycamore if a priority is to remove invasive exotics. Convert to dominance by native trees, particularly ash (to support <i>Perforatella subrufescens</i>). This is a dark and shady compartment with good visibility throughout for recreationists, and as two paths cross through this subcompartment, operations may be very visible to walkers.
2	1.6		1950	Scheduled for thinning in 2012.	Open canopy of ash and Scots pine. On ridge bordering northern walkway and probably highly visible to recreationists.	Bramble dominates in some areas, ivy in others.	Contains <i>Perforatella subrufescens</i> . Retain with minimum intervention.	Leave to develop naturally but remove sycamore saplings and encourage ash regeneration for <i>Perforatella subrufescens</i> .
3	0.5		-	-	Oak with many gaps; the shrub layer is dense tall bramble and elder as well as some ash	Ivy under bramble	Reported to be site of heron nests. Retain with minimum intervention.	Leave to develop. Can be used to teach about forest succession.
4	1.1		1962	-	Open larch on two sides of path	Bracken and bramble	Retain with minimum intervention.	Encourage existing natives (ash, wych elm, holly, rowan, etc.) to regenerate by weeding around natural regeneration or planting.

Sub	Area (ha)	Soil	Planting year in Coillte inventory	Harvest date in Coillte inventory	Canopy species	Field layer	Coillte Biodiversity plan (Sweeney 2005) and rare species found	Recommended management for forest restructuring (based on van der Sleesen 2003).
5	1.3		1880	-	Large oak and beech shelterbelt on very steep edge overlooking estuary.	Field layer Greater woodrush in patches with ferns.	Retain with minimum intervention.	Retain. Remove Sycamore regen.
6	0.6		1960	2005	Clearfelled and replanted in 2005 with 90% oak. Some Western Red cedar standards have been retained. A strip on the northern edge (near informal path leading to wood millet population) is designated uncultivated open space and dead wood by Coillte. Downy birch and sweet chestnut are also present.	Bramble dominates.	Retain with minimum intervention.	Retain open space, birch and sweet chestnut. Remove (and stump treat to prevent resprouting) sycamore saplings. Clean transplants by slashhooking two or three times a growing season until they overtop bramble.

Sub	Area (ha)	Soil	Planting year in Coillte inventory	Harvest date in Coillte inventory	Canopy species	Field layer	Coillte Biodiversity plan (Sweeney 2005) and rare species found	Recommended management for forest restructuring (based on van der Sleesen 2003).
7	0.4		1938		Scots pine under stress; up to about 10% are dead. The understorey is nearly all sycamore.	Bramble dominates.	Minimum intervention, allowing natural processes to continue.	Dead and dying trees are not a threat to the current objectives. They do provide an extremely light canopy. Remove sycamore saplings forming complete cover in the understorey, as they will change this sub from a light-canopied Scots pine one to a shaded sycamore area. Underplant with oak and Scots pine (these light demanders should be able to tolerate the very light canopy).
8	1.8	Mainly shallow brown earth, although peat is upper layer in some places.	1950	Scheduled for thinning in 2012.	Beech and sycamore canopy, similar in character to Subcompartment 1. There is still some Scots pine in the canopy but it exerts minimal influence.	Ivy and some bramble similar to Subcompartment 1. Some patches of greater stitchwort (<i>Stellaria holostea</i>). Sycamore bears epiphytes, as elsewhere.	Retain with minimum intervention.	Similar to 1.

Sub	Area (ha)	Soil	Planting year in Coillte inventory	Harvest date in Coillte inventory	Canopy species	Field layer	Coillte Biodiversity plan (Sweeney 2005) and rare species found	Recommended management for forest restructuring (based on van der Sleenen 2003).
9	0.4	-	1955	-	Two stands: pure Lawson's cypress in about ½ the area, and Scots pine with downy birch in the other half.	Only litter under the Lawson's cypress, and bramble in profusion under the Scots pine. This subcompartment contains some unusual trees, including holly oak and saplings of bay laurel and cherry. Evidence of campfires under Lawson's cypress.	Monitor for spread of cherry laurel and take action to control if it becomes problematical. Little Egret reported here by Sweeney.	Leave Lawson's cypress and use to educate about effects of shade and about the concept nativeness (Lawson's, or Port Orford cedar, is rare in its native range). Allow Scots pine portion to continue to develop naturally.
10, 11, 12, 13	2.8	Shallow peat (15 cm)	1954	Thinned 2004. Possibly to be thinned selectively in 2015, depending on growth rate.	Scots pine, larch, and ash in groups, with some canopy-height downy birch and (hybrid) oak. The canopy understorey is very patchy and comprises rowan, elder, and one holly.	Bramble under Scots pine and in gaps, interspersed with patches of bryophytes and wood sorrel. Bracken is dominant in patches.	Minimum intervention, allowing natural processes to continue.	Can be retained until it breaks apart. Replanting should not be necessary with high seed production of trees such as downy birch. Sycamore regeneration should be considered for removal.

Sub	Area (ha)	Soil	Planting year in Coillte inventory	Harvest date in Coillte inventory	Canopy species	Field layer	Coillte Biodiversity plan (Sweeney 2005) and rare species found	Recommended management for forest restructuring (based on van der Sleesen 2003).
14	2.4	-	Lodgepole pine planted 1957. Only 30% canopy reported.	Possibly to be selectively thinned in 2015 or 2020.	Sycamore and oak are the main components of the canopy. This subcompartment runs down the slope along a former laneway with a high estate wall, and continues to border the estuary of the southeastern portion of the woodland.	Bluebells and calcicole ferns over a carpet of ivy.	Retain with minimum intervention.	Sycamore is casting heavy shade on the ground which both advantages vernal species and disadvantages regeneration of native trees, which are generally not shade tolerant. Recommendations as per Subcompartment 1 (gradual removal of sycamore using small coupes) but with retention of the oak.
15	1.1 (with 17)	-	Lodgepole pine 1957	-	Very open canopy of different trees including large oaks as well as hornbeam and three apples. Many of the large trees have good epiphyte communities. Southern beech has been planted on the eastern side of this compartment.	Bramble dominates with some bracken. Part has been planted with oak and beech and weeded this year.	Minimal intervention, allowing natural processes to continue.	Sub 15 is designated uncultivated open space and dead wood by Coillte. Further manual weeding if necessary to ensure oak sapling survival; beech should be removed now while the trees are small in order to prevent future dominance by shade-casting and invasive non-native trees. Alternatively, the young trees could be progressively thinned to favour natives over the next several decades. Apple trees and hornbeam could be highlighted in signage. Some have fallen and are fallen dead wood. No more neighbouring subs should be felled as 15, 16, and 17 border each other and currently together form a large area of open space.

Sub	Area (ha)	Soil	Planting year in Coillte inventory	Harvest date in Coillte inventory	Canopy species	Field layer	Coillte Biodiversity plan (Sweeney 2005) and rare species found	Recommended management for forest restructuring (based on van der Sleesen 2003).
16	1.2 (with 19)	-	1957	2005	Replanted post clearfell and post windrowing with 90% oak and Scots pine in 2005. A few sycamore standards have been retained.	Thick bramble over a carpet of ivy. Some elder saplings.	Minimal intervention, allowing natural processes to continue. (surveyed prior to clearfell)	Remove sycamore standards either immediately or within next 10 years. These standards are contributing little to forest microclimate and are probably seeding vigorously. Clean around transplants and thin in future to favour a more varied mix of broadleaf tree species.
17	1.1 (with 15)	Soft, surface is peaty	1960	2005	Clearfelled in 2005 and currently has scattered Western Red cedar standards over planted oak (90%). Coast Redwood was present in last rotation and may coppice.	Brash and bramble. Some regenerating sycamore among probably planted oak and ash. A large cherry laurel bush overhangs the southern path on the downslope side of this sub.	Minimal intervention, allowing natural processes to continue (surveyed prior to clearfell).	Remove sycamore saplings. Planted oak and ash saplings have been cleaned by slashhook in 2006. Continue cleaning 2 or 3 times a growing season until saplings overtop bramble. Allow invasion by other broadleaves, excluding sycamore, to encourage greater variation of trees. Retain any coppicing from Coast Redwood stumps, and progressively single some for future timber production. Retain large Coast Redwood near path for the interest of recreationists.

Sub	Area (ha)	Soil	Planting year in Coillte inventory	Harvest date in Coillte inventory	Canopy species	Field layer	Coillte Biodiversity plan (Sweeney 2005) and rare species found	Recommended management for forest restructuring (based on van der Sleesen 2003).
18	Gas line	-		-	Occasional saplings of sycamore covered with clematis	Thick cover of bramble with some garden shrubs and other gap plants	No intervention is the preferable management option in this subcompartment, allowing vegetation to develop naturally (but classified as recently felled woodland; may be an error.)	Mow about two times in a growing season to prevent re-invasion by woody shrubs. Remove and control traveller's joy. Consider mowing/slashhooking path edges somewhat to encourage walkers to use this path, as trampling will help keep the subcompartment open. The base of this subcompartment may be a suitable place for an information sign, unless the western side of the woodland is zoned natural/sign-less.
19	1.2 (with 16)	-	Scots pine 1958, ash 1880	-	Scots pine with oak on an upper slope; sycamore over ivy and a few garden escapes (including Portugal laurel) on the lower slope. A few large Monterey pines are present along the upper path.	The upper slope has bramble and bracken over brash	Retain this stand with minimum intervention.	Remove sycamore saplings. If necessary to replant, use oak and Scots pine mix. Monterey pine may be retained if safe. Can be used to illustrate differences in rates of growth between different tree species.

Sub	Area (ha)	Soil	Planting year in Coillte inventory	Harvest date in Coillte inventory	Canopy species	Field layer	Coillte Biodiversity plan (Sweeney 2005) and rare species found	Recommended management for forest restructuring (based on van der Sleen 2003).
20 (edge)	0.5	-	Scots pine 1958, oak 1880		Oak and Scots pine. Some windsnap and windthrow appears to have occurred since harvesting in Subcompartment 17.	Field layer Elder understorey, with ground flora of ivy, enchanter's nightshade, violets, wood sorrel and other woodland plants along the path.	Retain this stand with minimal intervention.	Retain; plant or allow natural regeneration to maintain edge as old trees die and/or fall.
21	0.8	Peaty in places, gravelly in others	Larch 1938, others 1985		Patches of Sitka spruce, Douglas fir, Monterey pine, with open patches.	Litter only under Douglas fir; bramble and bracken in gaps, up to 1.5 m (July).	Minimal intervention, allowing natural processes to continue.	Allow existing saplings of hazel, hawthorn, ash, and apple to grow up, providing a slow transition to mixed broadleaf woodland. The small patches of dense conifer can be left to break up naturally. As neighbouring subcompartments have been clearfelled, the maintenance of shade and the woodland microclimate in this subcompartment is important for conservation of woodland specialists in this part of the forest.

Sub	Area (ha)	Soil	Planting year in Coillte inventory	Harvest date in Coillte inventory	Canopy species	Field layer	Coillte Biodiversity plan (Sweeney 2005) and rare species found	Recommended management for forest restructuring (based on van der Sleenen 2003).
22	2.9	Shallow brown earth	1930, 1950, and 1958	Scheduled for thinning in 2012.	Widely spaced stems of sycamore, Scots pine, and larch.	Very shady. Open feel for recreationists. A lot of bluebells over ivy. Local hollow is wet. A main walking path runs through the sub. Ivy and shade-tolerant moss with bluebells. Abuts end of quarry. Evidence of campfire. Wood millet is reported here by Sweeney (2005).	Retain this stand with minimal intervention.	Allow to break up naturally, or, alternatively, open up gaps in canopy and plant small groups of native oaks.
23	0.6	Shallow brown earth	1984	-	Patches of larch and western hemlock, interspersed with some oak (including non-native oaks) and beech in tubes.	Ivy and shade-tolerant moss with bluebells. Abuts end of quarry. Evidence of campfire. Wood millet is reported here by Sweeney (2005).	Retain this stand with minimal intervention.	Existing varied structure with open spaces can be retained.
24	0.8	-	1950, 1984		Sycamore, beech, and Scots pine with western hemlock underneath. This subcompartment also contains a quarry with steep walls. Sallies and bramble are frequent in the quarry.	Ground flora is only present in the gaps; western hemlock has suppressed all ground vegetation.	Retain this stand with minimal intervention.	Remove western hemlock (using low impact methods such as motor manual felling). Leave vegetation in quarry to develop naturally if possible. Plant a hedge of hawthorn between the northern path and the quarry to form a natural barrier while providing nectar sources for invertebrates.

Sub	Area (ha)	Soil	Planting year in Coillte inventory	Harvest date in Coillte inventory	Canopy species	Field layer	Coillte Biodiversity plan (Sweeney 2005) and rare species found	Recommended management for forest restructuring (based on van der Sleenen 2003).
25	0.6	-	1830		Former entrance with embankment, a few Scots pine present; recently planted with Scots pine. This compartment also extends along the avenue and includes several large limes and a horse chestnut.	Diverse woodland and woodland edge ground flora.	Retain this stand with minimal intervention.	Retain. Flailing edges appears to encourage existing ground flora. Survey and retain veteran trees, including those with holes and epicormics.

12 APPENDIX 2: PROPOSED TEXT FOR SIGNS

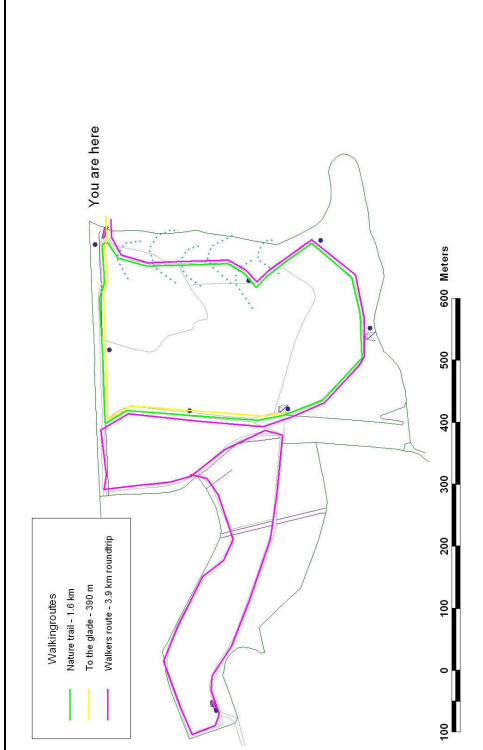
The following are proposed text for signs. Fonts and relative size may not be accurately represented in these depictions.

WELCOME SIGN:

A welcome sign should be erected near the main entrance to the woodland. It is important that a welcome sign be simple, clear, and positive in tone. Rules for visitors and an indication of facilities available should be included here, but only as necessary. A short background to Ballyannan and basic trail map should be included.

Material: routed timber with enamel/colour in text and map routes.

Welcome to Ballyannan Wood



Walkers are welcome.

There is a lot of wildlife present, so please mind your dog.

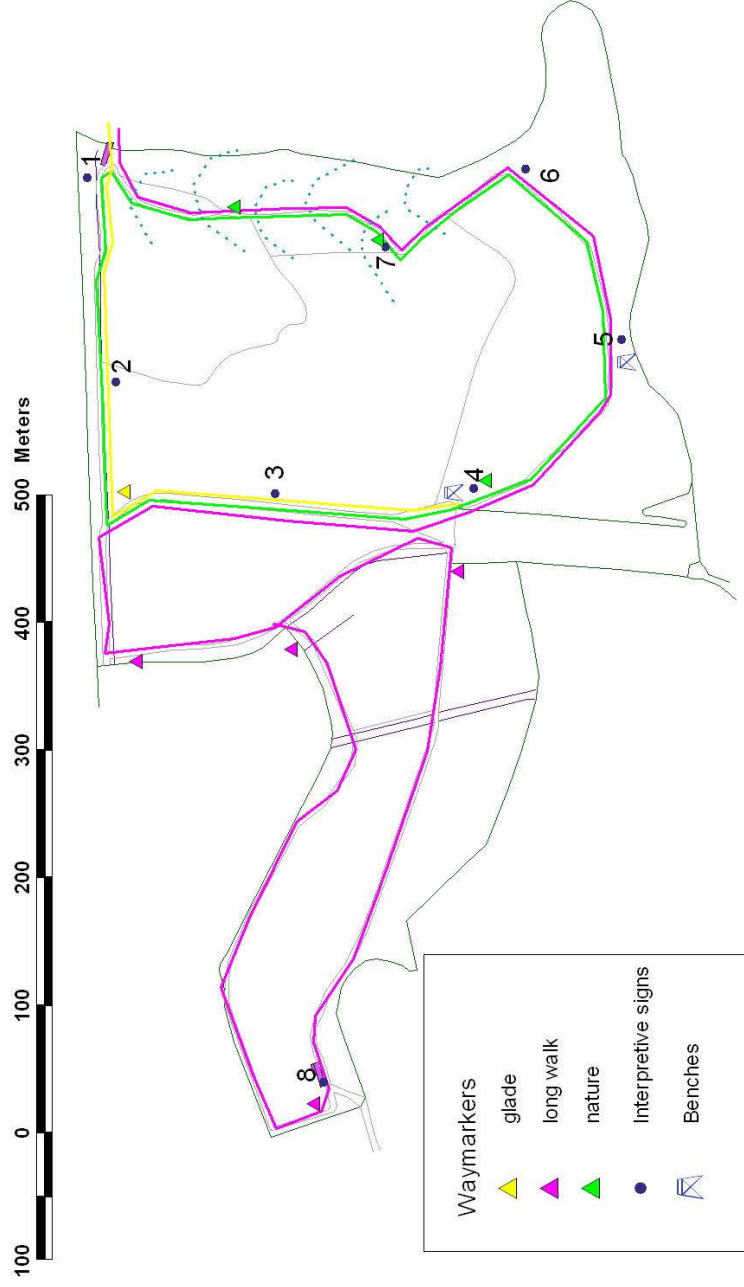
Ballyannan Wood is managed by Coillte for recreation, education, and timber under principles of wise use of natural and cultural resources, effective protection of the environment, and sustainable production of forest products, and working with people. The name Ballyannan (Baile Uí Anain) means “O’Hannon’s Homestead”. The woodland dates back to at least the mid-17th century, and there are some old trees here which provide habitats to rare animals such as hoverflies. Ballyannan is also home to a variety of birds, some of which use the Owenacurra Estuary nearby, as well as bats, badgers and red squirrels.

[logos of organizations involved.]

For more information or a nature trail brochure, please visit Ballyannan.com or pick up a brochure at the Midleton Town Council office.

WAYMARKERS:

Waymarkers and reassurance signs are used to give visitors an idea of the distances travelled or which path to take at a cross roads. Discrete colour-coded poles up to 30cm tall and painted on all sides are suggested for Ballyannan, and only as necessary to reassure visitors of being on the correct path. The westernmost marker of the red path could include distance travelled, as it is about half way along the loop and this may encourage weary exercisers.



INTERPRETATION SIGNS:

The rest of the signs to be erected along the nature trail are to provide information for the curious visitor. To avoid overstimulating the visitor, six interpretive signs are proposed on the main trail, and another near the Wood Ranger's Cottage, leaving most other trails free of indications of development and human management.

Material: tile mosaics; screened stainless steel; or screened durable plastic. Colours should reflect natural surroundings while still being easy to read. The uprights should be durable but also reflect the woodland in colour scheme. Neutral dark brown or olive are suitable colours for the uprights.

Topics (once topics have been decided, draft text and images can be compiled)

- 1: Welcome, rules, background, trail map
- 2: Veteran trees and invertebrates
- 3: Flowers
- 4: Glades and invertebrates
- 5: Wildlife of wooded estuary
- 6: Management of wood
- 7: Red squirrels and native trees: food and shelter
- 8: Heritage: cottage and walls