

Wildlife, Habitats & Development

Guidelines for the Protection of Biodiversity in
CONSTRUCTION PROJECTS

Who to contact

If you would like more information about biodiversity or wildlife issues the following may be able to help:

Notice Nature

www.noticenature.ie

National Parks & Wildlife Service

Tel: 01.888.2000 *www.npws.ie*

Construction Industry Federation

Tel: 01.406.6000 *www.cif.ie*

Your local authority Biodiversity / Heritage Officer

Environmental NGOs

for a list of relevant NGOs see *www.noticenature.ie*

Introduction

The construction sector is currently experiencing a period of sustained growth. In 2006, total construction output stood at €35.89 billion, equivalent to 24% of GNP, a 7.9 per cent volume increase on 2005 levels (Ref. 1). It is however expected that construction growth in 2007 and beyond will slow down a little to match the slower growth of the wider economy.

This rate of development, coupled with a steady increase in human population, is placing significant stress on our native wildlife populations. Land that may once have been a habitat for wildlife species is being converted into residential and commercial developments, roads and other uses. The development of land and related activities impact both the quantity and quality of wildlife habitat. These guidelines provide an overview of those impacts and offer some strategies for the reduction in the impact of development on native wildlife.

What is biodiversity and why protect it?

Biodiversity means the variety of all life on earth from the smallest and simplest micro-organism to the complex system that is a rainforest. It includes the habitats and ecosystems which support this life and how life-forms interact with each other and the rest of the environment.

Biodiversity is important because it provides a source of significant economic, environmental, health and cultural benefits. It provides us with a large amount of goods and services (such as food, medicine, raw materials and clothing) that help us to sustain life on earth. It is these goods and services that allow us to live on this planet. The wellbeing and prosperity of earth's ecological balance as well as human society directly depend on the extent and status of biological diversity. (CBD, 1992).

Businesses depend on the earth's biological resources as essential components and services for the operation of their day-to-day activities, such as clean water and raw materials. It is therefore important that there is a sustainable supply of these resources to ensure economic growth.

However, biodiversity is constantly under threat both here in Ireland and worldwide. Activities such as increased development, inappropriate agricultural practices, poorly managed afforestation and climate change have all put pressure on Ireland's biodiversity with the result that many species of plants and animals are now under threat of extinction.

It is vital, therefore that all sectors in society play their part in the protection of biodiversity. These guidelines demonstrate some simple ways that the construction industry can take action to halt the loss of biodiversity.

How development impacts on biodiversity

Almost all development sites will have some wildlife or habitat interest regardless of whether they are located in rural or urban areas. Many of our most important sites are designated for conservation at the European level (i.e Special Areas of Conservation and Special Protection Areas) or at the national level (National Heritage Areas). However, many sites which are not subject to such designation may also be important for wildlife in their own right. In all cases, wildlife and/or habitat value should be determined at an early stage in a project and all efforts should be made to avoid, or avoid as far as possible, any potential adverse impacts that a proposed project may have.

There are a number of ways in which the construction industry can impact on wildlife and habitats and these are addressed in the following sections. Table 1 depicts specific construction activities and their potential adverse effects on wildlife.

Habitat loss

The loss of habitat through the conversion of land from its natural state to a developed landscape represents the single greatest impact of increased human activity on native wildlife.

All animal species require certain habitat features to survive. Development typically eliminates or significantly changes many important habitat features found in a natural area thereby altering the habitat value of that area. For example, a diverse wildlife population depends upon the natural ecosystems found in most undeveloped areas. Development can damage or destroy these ecosystems, making it more difficult for many native species to survive. Those species able to survive in urban settings may thrive, but the rest are forced to find new territory to survive.

Where habitats and wildlife species have been identified as being of importance, special measures may be required either to avoid or minimise the loss or to mitigate for it during the construction process.

Habitat Fragmentation

Habitat fragmentation is a process whereby large tracts of the natural landscape are gradually developed and subdivided until only patches of original habitat remain. The patches are often too small and too far apart to support the survival and reproductive needs of many wildlife species during various stages of their life-cycle or in different times of the year.

Linear projects are generally responsible for fragmentation of habitats i.e. road, railway or pipeline projects. This results in both habitat loss and the fragmentation of the remaining parts.

When a species' habitat is separated by such distances that make movement from one area to another impossible, the impacts on the health of the population are significant and reduce a species' ability to reproduce. In addition, fragmentation of habitats results in fewer species, even if the total amount of habitat is the same as it was originally. There is also the likelihood that animals will try to cross between two areas of habitat, which can result in animal deaths if roads and railway lines are involved. Furthermore, smaller patches of habitat and the wildlife that depend on them are more vulnerable to the effects of natural disturbances i.e. fire, flooding etc.



Disturbance

The impact of development/human activity on biodiversity extends beyond the actual area of development into what is referred to as a “disturbance zone” i.e. the entire area where habitat value has been meaningfully reduced. The encroachment of development/human activity into a natural area creates changes in environmental conditions as well as changes in animal behaviour and well-being as a result of being in close proximity to the border between habitat areas.

In addition, the encroachment of human activity reduces the amount of interior habitat area relative to edge or border area. While borders between two different habitats are often an essential part of the ecology of an area, when habitat becomes so small that it is all edge and no interior, it loses its ability to support those species that require an isolated interior for some portion of their life (e.g. some nesting birds).

Other types of landscape disturbance include altering the structure of soil by compaction and adversely affecting the hydrology of a site (see next section also), resulting in the loss of species and changes in habitat type.

Furthermore, landscape disturbance caused by development can also serve to introduce invasive species into natural habitats, further degrading the quality of remaining habitat areas.

Changing Aquatic Habitat

Development can also affect the quality and quantity of aquatic habitats. Increased amounts of hard surface can reduce the ability of rainwater to infiltrate the soil. Rainwater instead runs off the land at an increased volume and rate. This has the potential to reduce the recharge of groundwater and increase flooding, streambed erosion, and sedimentation.

Runoff from developed areas is often warmer with potential for carrying pathogens (i.e. bacteria and viruses), household chemicals, metals, fertilisers, pesticides, oil, and grease. As vegetative buffers along water bodies are lost, sunlight can further warm water beyond a threshold at which some native species can survive and reproduce.

The structural habitat of aquatic systems also can be significantly degraded by modifications associated with roads and development. The quality and flow of rivers, streams and wetlands can be reduced by inadequate or inappropriately designed culverts, creation of new dams, and channel straightening or modification.

Wetland habitats can act as flood buffers, water filters and can be important habitats for many species of flora and fauna.

The amount of water and drainage present at such sites is their most important feature and changes to this from actions such as infilling during construction, can lead to increased erosion, sedimentation and ultimately a loss of habitats and species. Species such as salmon and pearl mussel are extremely sensitive and are indicative of unpolluted waters. Sedimentation or pollution events that may occur during activities such as culverting, bridge construction and even vehicular construction traffic in or around rivers/streams, can impact negatively on these species, both at the construction site and further downstream.



Daily Human Activity

Human activity introduces changes to the surrounding environment that can negatively impact natural habitat. Changes in lighting in an area, for example, can significantly affect some species' behavioural and biological rhythms, which are guided by natural cycles of light and dark. Nocturnal species, particularly birds, can become disoriented by night-time lighting. Domestic pets, particularly cats, may prey excessively on wildlife, such as ground-nesting birds. The availability of household rubbish can alter the composition of wildlife communities by providing food for animal populations that thrive on trash (such as rats etc.) to the detriment of those that do not, e.g. small mammals and some birds.

Human recreational activity in an area may directly impact wildlife and reduce the quality of the habitat provided. Human activities can disturb sensitive habitats and wildlife. Disturbing wildlife raises their stress level and increases energy consumption. If repeated frequently, such disturbance can impact on reproduction and the survival of the species.



Table 1 (Ref.1): Construction activities and their potential adverse effects on wildlife ⁽¹⁾

Construction Activity	Implication	Examples of effect on wildlife
Site clearance	Removal of tree and shrubs	<ul style="list-style-type: none"> » Loss of important species or specimens of tree or shrub that may be protected » Loss of bird nests (during the bird breeding season) or bat roosts, bat commuting routes and bat feeding sites. » Loss of habitat for protected species » Loss of important invertebrates, including those that may require deadwood habitat
	Removal of ground vegetation	<ul style="list-style-type: none"> » Loss of habitat for protected species » Loss of rare plants » Loss of bird nests » Killing or injury of reptiles, amphibians or small mammals » Loss of invertebrates and their breeding habitat
	Removal of Soil	<ul style="list-style-type: none"> » Loss of habitat for protected species » Loss of seed bank » Loss of invertebrates and their breeding habitat » Destruction of badger setts and other ground dwellings
	Demolition of buildings and structures	<ul style="list-style-type: none"> » Loss of bird nesting or bat roosting areas
	Alteration of watercourses	<ul style="list-style-type: none"> » Loss of aquatic and riparian species including fish, amphibian and plants and loss of habitats
	Infilling of wetlands/aquatic habitats	<ul style="list-style-type: none"> » Loss of aquatic species including fish, amphibian and plants and loss of habitats
Site setup	Location of site offices and compounds	<ul style="list-style-type: none"> » Disturbance of breeding animals
	Storage Areas	<ul style="list-style-type: none"> » Potential for pollution of important watercourses, wetlands or other waterbodies, including coastal waters through spillage or dust.
Establishment of haul roads	Rubble or concrete temporary roads constructed	<ul style="list-style-type: none"> » Fragmentation of habitats » Road kills » Destruction of badger setts » Contamination of adjoining habitats by dust » Noise or light pollution may disturb nesting birds or other animals » Change of soil pH through leaching
Groundworks	Ground investigations, foundations, excavators and piling, temporary earthworks, and tunnelling	<ul style="list-style-type: none"> » Impacts on surface - and groundwater, which may have secondary impacts on important wetlands both on and off site » Noise or light pollution may disturb nesting birds or other animals » Destruction of badger setts » Run-off and erosion, which may damage important habitats » Potential to introduce or spread invasive plants
Construction	Concrete pours and other wet trades	<ul style="list-style-type: none"> » Contamination of wetlands » Change of soil pH through run-off

Guidance for the construction industry

In general, there are six phases in the life of a construction project:

- Project Conception / Resource Analysis Phase
- Design / Planning Phase
- Tendering Phase
- Pre-construction / Demolition Phase
- Construction Phase
- Post-construction/Aftercare Phase

To optimise effectiveness, biodiversity needs to be considered during each of these phases starting at the earliest possible stage.

Clients can also assist the process through the specification of measures to address biodiversity throughout the life of a project. Such an approach would determine the conditions under which a project is implemented and would also ensure that key stakeholders also prioritise the protection of biodiversity.

Specific issues to consider through each phase of the Construction project are outlined in the following sections.

The Project Conception / Resource Analysis Phase

As discussed earlier, biodiversity needs to be considered at the earliest possible stage in a project in order to optimise effectiveness. The following issues should therefore be addressed in the Project Conception / Resource Analysis Phase.

- Carry out a constraints assessment to identify designated or proposed designated areas. Avoiding development on such sites, will facilitate expedient progress of the project and will ensure maximum protection for biodiversity. Maps depicting such sites are available from the Local Authority or on www.envron.ie
- Carry out early scoping studies, ecological data collection and environmental assessment to assist in the site selection process. If you are developing within an SAC or SPA an Environmental Impact Statement (EIS) is required.
- Particular attention should be given to proposed developments that may be located within or may impact on designated sites and other ecologically sensitive areas.
- Consider sponsorship of biodiversity action plan species or habitats.
- Include a commitment to wildlife conservation in the environmental policy for the project and ensure it is delivered

Note

All planning applications that might have significant effects in relation to nature conservation must be referred to the Minister for the Environment, Heritage and Local Government. Where significant negative impacts on nature conservation may not be mitigated the Department may recommend to the planning authority that planning permission not be granted. Developments that impact negatively on the conservation interests of such sites are likely to be in breach of EU Law.



The Design / Planning Phase

The design and planning phase of the project should be used to set out measures for the protection of biodiversity through the life of the project. The following issues should therefore be considered at this stage:

- Consult with the relevant local authority to establish whether there are any policies with regard to the protection of wildlife and habitats in the area. If there are ensure that you address and incorporate these policies into your plans.
- Establish whether an Environmental Impact Statement (EIS) will be required for the proposed development i.e. if it exceeds the threshold set out in Schedule 5 of the Planning & Development Regulations, 2001. The preparation of an EIS must follow the EPA Guidelines entitled “Information to be Contained in Environmental Impact Statements” which is available on www.epa.ie. Planning Authorities may request an EIS if you are close to the threshold or if the development is close to a designated area.
- Note the results of any ecological studies that may be available and any recommendations regarding avoidance, mitigation, compensation and enhancement and ensure that they are given due consideration in the plans for any development.
- Allow sufficient time for any additional ecological surveys that are necessary to be carried out prior to lodging a planning application. Ensure that they are all carried out at the appropriate time of year and that they are sufficiently detailed to characterise the ecology of the site and to predict impacts and opportunities accurately. These studies should determine whether there are any rare or protected flora and fauna on the site and should also identify whether any of the trees on site are protected by a preservation order. Trees protected by a preservation order cannot be cut down without permission from the local authority.
- If a licence to interfere with a protected species is required, an application for this should be sought prior to the planning permission stage.
- Where possible, design with a view to incorporating nature conservation into the development. Retain existing habitats where possible and aim to keep natural site features in context rather than in isolated fragments. Pay attention to field boundaries and hedgerows and preserve wildlife corridors and habitat links. Consider integrating ecological features, for example climbing plants, bird nest boxes and bat boxes, within any buildings or structures.
- Consideration should also be given to materials, products and services that are required as part of the project and whether they are sourced or procured in a manner that would have a negative effect on wildlife or habitats in that or other areas.
- Ensure that landscape design reflects local ecology and uses locally sourced plants wherever possible. Native trees and shrubs should be used for landscaping where practical.
- Ensure the aftercare, monitoring and management post-construction are considered and assign responsibility for same (See section 5.6).

Tendering Phase

In this phase of a project, design requirements are finalised and the project is put out to tender. There are dual responsibilities at this stage for the Client/Planning/Design team and the Contractor who is tendering for the job. These responsibilities are outlined below:

Client / Planning / Design Team:

- Ensure that the tender document includes information on any biodiversity issues that have been identified in the previous phases of the project.
- Ensure that drawings, specifications and Bill of Quantities address these issues.
- Ensure through contractual arrangements that contractors are required to take full account of your environmental policy requirements, and of site ecology in their work.
- Consider assigning responsibility for the management of biodiversity matters throughout the project to a member of staff.

Contractor:

- Ensure that you know, and understand, the ecological constraints and opportunities that a project offers at the earliest possible opportunity.
- Ensure that you request additional information on any issues that you are not familiar with.
- Obtain copies of planning permissions, any EIS for the site and check to ensure that all ecological constraints, conditions and obligations are addressed in your tender documentation.
- Ensure that appropriate measures, time and costings for same are incorporated into your tender application particularly with regard to protected habitats or species.



Pre-construction / Demolition Phase

The following should be considered prior to the commencement of construction to avoid damage to important ecological areas and wildlife corridors and to minimise negative impacts on the surrounding environment:

- Prepare a timetable to show when particular measures will be implemented and how construction work will be phased to avoid critical periods.
- Determine where machinery be stored during the life of the project and where the site office will be located.
- Establish how waste will be managed on-site. Waste should be properly stored and removed from the site as soon as possible by a permitted waste collector to a permitted/licensed facility.
- Determine where fuel and other hazardous materials i.e. paints, oils, lubricants etc. will be stored. All fuel tanks must be bunded to avoid pollution of surface-/groundwater in the event of a spillage on-site. Draw up an emergency response procedure to deal with any spillages etc. on site and ensure that all personnel are familiar with the procedure.
- Fence off trees and hedges to avoid damage during construction and allow extra space when excavating to avoid root damage. Badger setts and other protected items should also be fenced off.
- Hedgerows should not be cut or removed during the bird nesting season of March 1st to August 31st.
- Under Section 37 of the Forestry Act, 1946, it is illegal to uproot any tree over ten years old or to cut down any tree, unless notice of the intention to do so has been given in accordance with the Act. Tree felling licences are received and granted by the Felling Section of the Forest Service, Department of Agriculture and Food, Johnstown Castle Estate, Co. Wexford. Tel: (053) 60174 or 60170, www.agriculture.gov.ie
- Obtain a discharge license for the discharge of water into watercourses. Settlement or siltation ponds should also be provided so that excessively silty waters are not discharged into local streams and rivers.
- Check prior to demolition whether there are any biodiversity issues to be addressed with regard to the structure being demolished. Ensure that any species are re-homed prior to commencement of demolition. This may limit the time period within which demolition works can take place as creatures cannot be re-homed during hibernation or breeding seasons. You will also need to hire an expert to carry out any re-homing activities on-site and he/she will need to apply for a license to carry out the re-homing from the National Parks and Wildlife Service.

The Construction Phase

Generally, the following should be considered during construction:

- Minimising the removal off-site of any soils containing invasive species.
- Understanding the ecological constraints of the project and that all staff and sub-contractors may require information and training, if necessary on all such constraints.
- Compliance with the ecological requirements of the project and any other legal requirements with regard to waste management, environmental pollution, discharge to waters etc.
- Protection of all fenced off areas throughout the duration of the project and erection of appropriate signage if necessary.
- Defining roles and responsibilities for site personnel to ensure that all necessary works are carried out correctly.
- Replacement of lost habitat throughout the site or in other areas, where possible.

Post-construction / Aftercare Phase

It is important to consider aftercare, monitoring and management post-construction as part of a project plan. Features that have been suggested as mitigation, or which have been specified as planning conditions, require aftercare so that they are kept in good condition, for example:

- Trees planted for habitat or landscaping can require maintenance until they are established, especially if mature trees have been planted
- Hedges must be appropriately managed (avoiding the bird nesting season of March 1st to August 31st)
- Ponds must be kept clean and unpolluted.
- Larger pieces of habitat will require a management plan to keep them in the desired state e.g. a wildflower meadow will be replaced by scrub if it is not regularly mown or grazed.
- Local authorities may seek information about management measures as part of your planning application and aftercare and maintenance conditions may be included in your planning permission and compliance may be checked.



Designations in Ireland

The different designations for protected sites/species in Ireland are outlined in Table 2 below:

Table 2: Designations for Protected Sites/Species in Ireland		
	Description	Other information
Special areas of conservation (SACs)	<p>These are prime wildlife conservation areas in the country, considered to be important on a European as well as Irish level. Most Special Areas of Conservation (SACs) are in the countryside, although a few sites reach into town or city landscapes, such as Dublin Bay and Cork Harbour.</p> <p>The areas chosen as SAC in Ireland cover an area of approximately 13,500 square kilometers. Roughly 53% is land, the remainder being marine or large lakes. These are areas considered to be of European importance due to presence of some habitats and species (other than birds).</p>	<p>SACs are selected and designated under the EU Habitats Directive, transposed into Irish law in the European Union (Natural Habitats) Regulations, 1997. The Directive lists certain habitats and species that must be protected within SACs.</p>
Special protection areas (SPAs)	<p>These areas are a network of sites in all EU Member States, designated to protect birds at their breeding, feeding, roosting and wintering areas.</p> <p>There are 121 SPAs designated since 1985.</p>	<p>The Birds Directive also requires designation for the following:</p> <ul style="list-style-type: none">» Species which are rare, in danger of extinction or vulnerable to changes in habitat and which need protection. In Ireland, we have 25 of these species regularly occurring.» Regularly occurring migratory species e.g. ducks, geese and waders» Wetlands, especially those of international importance, which attract large numbers of migratory birds each year.
Natural heritage areas (NHAs)	<p>The basic designation for wildlife is the Natural Heritage Area. This is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection.</p> <p>To date, 75 raised bogs have been given legal protection, covering some 23,000 hectares. These raised bogs are located mainly in the midlands. A further 73 blanket bogs, covering 37,000ha, mostly in western areas are also designated.</p>	<p>There are also 630 proposed NHAs (pNHAs), covering approximately 65,000ha. These sites (small and large) are of significance for wildlife and habitats.</p>
Nature reserves	<p>A Nature Reserve is an area of importance to wildlife, and is protected under Ministerial order.</p> <p>There are a number of nature reserves in Ireland. Most are owned by the State. However, some are owned by organisations or private landowners, and persons interested in acquiring statutory protection for their lands.</p>	<p>Those interested in acquiring statutory protection for their lands can seek advice from the Department of the Environment, Heritage & Local Government.</p>
National parks	<p>Ireland has six national parks, (Glenveagh, Wicklow Mountains, Ballycroy, Co. Mayo, Killarney, Connemara and the Burren) which have been established to protect the important species and habitats present. The Parks also provide visitor services to the public to promote a greater appreciation of the natural environment.</p>	<p>Characteristics of a National Park include:</p> <ul style="list-style-type: none">» Where one or more ecosystems are not altered by humans; where species, geomorphological sites and habitats are of special scientific, educational and recreational interest or which contain a natural landscape of great beauty;» Where steps have been taken to protect and prevent damage to the features which have led to its establishment; and» Where visitors are allowed to enter, under special conditions.
Refuges for fauna	<p>Under the Wildlife Acts, the Minister may designate Refuges for wild birds or wild animals or flora and impose protective measures to conserve both the species and their habitats. Seven such refuges already exist; they are mainly islands or cliff faces.</p>	

Typical habitats in Ireland

The following are typical of the habitats found in Ireland:

Freshwater

Freshwater resources form an essential part of our landscape and provide a range of habitats supporting a wealth of wildlife including fish, birds and invertebrates. They are essential to Ireland's biodiversity. Freshwater biodiversity is vulnerable as freshwater is a resource for humans that may be extracted, diverted, contained or contaminated in ways that compromise its value as a habitat for organisms.

There are over 11,000 lakes in Ireland located primarily in the midlands, west and northwest. Together rivers and lakes comprise nearly 1,500 km². There are a number of different types of lakes in Ireland each with their own characteristic species and habitats. The classification of lakes is generally based on the trophic or nutrient status of the water. Typical lakes species include pondweed, a variety of lilies and mosses. Our most interesting type of lake is probably the turlough, which is practically unique to Ireland occurring mainly in the west. This is a seasonal lake in basins or depressions in limestone areas and supports a wide variety of aquatic, amphibious & terrestrial species.

Rivers can be divided into two types of river – upland and lowland. Common plant species found in rivers include aquatic mosses, lichens and liverworts mainly in upland rivers while lowland rivers have such species as waterlilies and reeds. Ireland's rivers support a variety of fish including salmon, trout and pike. Birds that can be seen on the river verges include kingfishers and herons.

Coastal Areas

Coastal areas are typically rich in biodiversity. This is the result of the interaction of the wind and waves, working together to shape the rocks and sand and produce a range of niches in which plants and animals can live. Our coastal lands contain a variety of habitats, ranging from the familiar sand dune systems to the rare machair grasslands.

Sand dunes form where waves encourage the accumulation of sand, and where prevailing onshore winds blow this sand inland. The range of plant species associated with dunes changes as one moves inland – from pioneer species, such as Sea Rocket, to high dunes dominated by Marram Grass, to fiked dunes containing fescue, rest harrow, lichens etc., to wetlands known as dune slack containing sedges and/or creeping willow.

Salt marshes are stands of vegetation that occur in marine and brackish water conditions on mud or peat that is wet, waterlogged or periodically submerged by the sea. Saltmarsh is widely distributed around the coast, but is often highly fragmented. The largest areas are generally associated with mudflats in our major estuaries and sea loughs such as the Broad Water Sea Lough in Mulroy Bay, Co. Donegal

Machair is a highly specialised and complex sandy coastal habitat that, in the entire world, only occurs in the northwest coasts of Ireland and Scotland. In Ireland it can be found along the west coast from Galway Bay to Malin Head, in Donegal, where gales and high winds are frequent. It comprises a flat or gently undulating sandy plain that develops in an oceanic



location with a cool, moist climate. Formed when calcareous sand is blown in by prevailing winds from beaches and dunes, it is one of the rarest wildlife habitats in Europe. In Ireland it is a priority Annex I habitat listed on the EU Habitats Directive, which means it is afforded special protection and conservation.

Many of the coastal habitats in Ireland are protected as Natural Heritage Areas (NHAs), Special Protected Areas (SPAs) and Special Areas of Conservation (SACs).

Marine

The oceans of the world cover approx 70% of the earth surface. As a result they play a huge part in maintaining the global ecosystem. In fact over 51% of the earth is covered by seas deeper than 3000m, meaning that most of the planet is dominated by deep sea life, about which we know relatively little (World Conservation Monitoring Centre, 1992, in Costello, 2000). More is known in fact about the surface of the moon than about the earth's deep seabed.

Our oceans are home to a wide variety of fish, invertebrates, mammals and birds. Some of the services that our seas provide us with include nutrient cycling, recreation, food production, biological control, raw materials, gas regulation and habitats among many others. Coastal seas provide 60% of these ocean services. The ocean acts as a sink and a buffer against rising levels of carbon dioxide, which is a major factor in global warming (Costello, 2000). It is crucial that we carefully manage our seas due to the many services they provide to us.

Grasslands

Over 60% of Ireland is covered by grassland of one type or another and this does not include areas covered by annual crops, golf courses and lawns. Grasslands are economically important in Ireland as they account for much of our agricultural production and they also provide vital areas for amenity and tourism. In addition to the economically important grassland types there are also several grassland types of conservation value, which support diverse plant and animal communities, often rich in species numbers of both plants and invertebrates. These include orchid-rich calcareous grasslands, coastal machairs, species-rich and neutral grasslands, and wet grasslands such the Shannon callows.



Peatlands

Peatland habitats are broadly subdivided into two main types, bogs and fens. Bogs are rain-fed peatlands where almost all inputs of water are derived from precipitation whereas fens are peatlands that, in addition to precipitation, are fed by groundwater or moving surface waters. The two main types of bogs found in Ireland are raised bogs and blanket bogs. Peatlands originally covered more than 17% of the land area of Ireland - a higher proportion than any other European country with the exception of Finland. Peatlands, together with their unique assemblage of plants and animals, are a seriously endangered western European habitat.

Ireland possesses 8% of the world's blanket bog and is one of the few countries where a wide range of peatlands still exists in a near natural state. However, peatlands, together with their unique assemblage of plants and animals, are a seriously endangered habitat. In Ireland over 80% of their former extent has been lost.

Typical bog plants include sphagnum mosses, rushes and sedges, bog cotton, ling heather, bog rosemary, bog asphodel and sundew. Bogs are also home to many rare and protected plants and animals, including orchids, the common frog, Irish hare, otter, hen harrier, Greenland white fronted goose, peregrine falcon, golden plover and merlin, making bogs an extremely important Irish habitat in terms of biodiversity.

Despite their unique statue, our peatlands remain under threat on several fronts including domestic turf cutting, large-scale mechanised turf-extraction schemes, afforestation of upland areas, drainage, over-grazing and repeated burning.

Woodlands

For thousands of years the landscape of Ireland remained covered by forests composed of oak, ash, elm, hazel, yew and other native trees. With the arrival of human beings in Ireland, the landscape was fragmented to facilitate farming and, subsequently, cleared of forest to make way for crops and livestock leaving Ireland as one of the least wooded countries in Europe with approximately 9% covered by forests. However only 1% is native woodland with the remaining 8% mainly non-native coniferous trees.

Woodlands are composed of a variety of trees and shrubs of differing heights. The layers will normally include a canopy layer of tall trees such as oak and ash, an under storey layer composed of shrubs such as hawthorn, holly and hazel. The ground layer will be made up of a variety of ferns, grasses, sedges and herbaceous plants. This gives a woodland a distinct vertical structure and provides a wide variety of habitats which in turn support a diverse range of flora and fauna. Dead wood and fallen trees are also important habitats within semi-natural woodlands and they support a wide range of very specialised insects and fungi. The many layers that comprise woodlands therefore make them very important in terms of biodiversity.

Woodlands in Ireland are divided mainly between semi-natural woodlands and other woodland types, mainly commercial plantations. Natural or 'ancient' woodland is now very rare and many of our native woodlands are currently under threat, principally from the invasion of non-native species, including rhododendron, laurel, beech, sycamore and spruce. They are also threatened by overgrazing by animals that feed on young broadleaf saplings.



Protected flora & fauna

There are certain species of flora and fauna, which because they may be particularly endangered are protected by law. The Wild Birds Directive lists wild birds, which must be protected while The Habitats Directive provides for the protection of threatened species of flora and fauna. The Wildlife Act and the Habitats Regulations implement the above Directives into Irish legislation and again provide for the protection of endangered species.

The Red Data Book series lists species that are threatened, however the following are protected species that are often encountered during construction.

Bats

The bat is an important mammal in Ireland, representing over a third of all our native species. There are 10 species of bat in Ireland. Bat roosts are mostly found in small narrow spaces in between woodwork, stonework, caves, roofs and trees. Bats travel in linear areas especially along tree lines, such as canals, woodland edges, roads and hedgerows.

All bats are strictly protected in Ireland under the Habitats Directive. Bat roosts are also protected and cannot be moved or damaged. If you find a bat roost on the land to be developed, you should contact National Parks and Wildlife Service for advice.

Badgers

Badgers are found throughout Ireland. They are nocturnal creatures that usually live in woodland areas and along hedgerows, but are also found on grasslands, uplands and even sometimes in gardens.

A family of, usually, 2-6 badgers lives in one sett, however badger territory can have as many as 20 badgers and many setts with one main central sett. A sett is a series of extensive underground tunnels and sleeping chambers and may have many entrances. Young badgers are called cubs and are born in a special birthing chamber in the sett, during mid spring. The same sett may be used by many generations and the sett can grow to a considerable distance under the ground, some can stretch to up to over 100m and have 50 entrances.

The large sett and over ground area often put them at risk of their territory being fragmented during large construction projects. The badger territory should be investigated and the NPWS can advise on the situation. Badgers are protected under the Wildlife Act.



Otters

Although relatively common in Ireland, otters are in decline on a European scale making their protection in Ireland significantly important. Otters occur on most Irish watercourses, lakes, marshes, coasts and on some offshore islands. They can also be found in canals and rivers that pass through urban areas.

Each adult otter marks its own home range and often make use of existing cavities to rest or breed. The home of an otter is called a holt and the distribution density of otters can vary quite significantly along rivers / coastline.

While otter cubs can be born at any time of the year, this usually occurs between May and August with two to three cubs in each litter.

The low density distribution of otters makes them susceptible to habitat fragmentation that can be caused by construction. Otters and their breeding grounds are protected under the Wildlife Acts and are also listed in the Habitats Directive.



Conclusion

Biodiversity and construction are both important to Irelands' social and economic wellbeing. It is accepted that construction is necessary for continued economic growth, and that a balance can be struck between protection of biodiversity and continued development.

Ireland has a wealth of biodiversity with habitats and species important on a European scale and relatively unique to Ireland. Construction can have many adverse impacts on this biodiversity through habitat destruction or fragmentation and disturbance of animals / birds and their breeding grounds. Currently, planning and EIS requirements should consider biodiversity during the construction process through ensuring that key factors are addressed as part of the planning process. This approach ensures that habitats and species receive the appropriate level of protection as set out in our legislation. It is vital that we all work with this system to maintain the means of continuing development in a way that protects our natural environment.

The preceding document is just an overview of some of the impacts of construction on biodiversity and ways in which these can be mitigated. It is hoped that these guidelines can help the construction industry to further appreciate the importance of biodiversity and how it can be protected.

References

1. Review of the Construction Industry 2005 and Outlook 2006-2008, DKM Economic Consultants, September 2006
2. CIRIA C567 Working with Wildlife Site Guide 2005

Legislative background

The primary legislation covering the protection of wildlife are the Wildlife Acts 1977 (as amended 2000). There is also a body of European legislation, most notably the European Habitats and Birds Directives which set out measures to be implemented by Member States for Habitats and Species of European importance. A list of this and other legislation is set out in Appendix 1.

Appendix 1: Legislation for the Protection of Biodiversity

European	
Habitats Directive (Council Directive 92/43/EEC)	<p>The European Union Directive 92/43/EEC of May 1992 on the conservation of natural habitats and of wild flora and fauna (the Habitats Directive) aims to protect important habitats and rare or endangered species throughout the European Union. The Directive provides for the establishment of a coherent ecological network of protected areas across all EU member states, known together with sites designated under the Birds Directive as Natura 2000. Special Areas of Conservation are designated under the Habitats Directive.</p> <p>Habitats listed under Annex 1 the Directive are considered vulnerable in a European context or contribute significantly to the suite of habitats across Europe. Annex 2 lists species that must be afforded protection. The Directive also lists species that Require Strict Protection under Annex 4. In this case the resting and breeding locations are also to be protected – bat roosts and otter holts for example.</p> <p>Annex 5 lists species whose taking in the wild must be subject to management measures.</p>
Birds Directive (Council Directive 79/409/EEC).	<p>Under the European Union Directive 79/409/EEC of April 1979 on the conservation of wild birds (the Birds Directive) Ireland must protect particularly vulnerable species included in Annex 1 as well as all regularly occurring migratory species especially wetland species. Ireland is obliged to protect habitats of birds that are vulnerable due to climate change or that are vulnerable due to their small population size. Ireland must also include wetland considerations within landuse planning programmes. Special Protection Areas are designated to help achieve this. The cSAC's and SPAs together constitute the Natura 2000 network of sites, contribution to a network across all of Europe.</p>
Water Framework Directive (Council Directive 2000/60/EC)	<p>It was adopted as part of the restructuring of European Water Policy and sets the objectives for comprehensive management of water resources in the European Community, within a common approach and with common objectives, principles and basic measures.</p> <p>The directive rationalises and updates existing water legislation by setting common EU wide objectives for water. It is very broad in its scope and relates to water quality in rivers, lakes, canals, groundwater, transitional (estuarine) waters and coastal waters out a distance of at least one nautical mile.</p>

Appendix 1: Legislation for the Protection of Biodiversity (continued)

National

<p>The Wildlife Act, 1976, Wildlife (Amendment) Act, 2000</p>	<p>The 1976 Act is the principal legal framework for the for the protection of wildlife in Ireland. This Act also provides for the conservation of areas having specific wildlife values.</p> <p>The Act gives protection to areas designated by the Government as Natural Heritage Areas (NHA's). These sites have special National significance for wildlife and habitats. Most of Irelands wild birds and mammals are protected except for certain 'nuisance' species such as hooded crow and wood pigeon. The Wildlife Act also protects flora, by means of the Flora Protection Order, 1999. Sixty nine species of vascular plants (flowering plants and ferns) and twenty-one species of lower plants (mosses, liverworts and algae) are currently protected. The Act forbids anyone from uprooting, cutting or damaging these plants or interfering with their habitats, except under licence from NPWS.</p> <p>The Act forbids the destruction of Hedgerows during the bird-nesting season from 1st March to 31st August each year</p> <p>The Act also provides for the establishment of Nature Reserves and refuges for Fauna and Wildfowl Sanctuaries.</p>
<p>Local Government (Water Pollution) Act, 1977</p> <p>Water Pollution (Amendment) Act, 1990</p>	<p>This Act places a general prohibition on knowingly causing water pollution. The Act also prohibits any discharge to waters without a discharge licence and requires that all discharges must be in compliance with the requirements of such a licence. Failure to comply with these requirements will result in enforcement proceedings where the polluter will be required to pay the cost of any investigations or remedial measures.</p>
<p>The Forestry Act 1946-1988</p>	<p>This Act contains restrictions on the cutting down or injuring of trees outside urban areas. In most cases, the felling of trees requires formal notice to the Gardaí and/or obtaining a licence from the Forest Service of the Department of Agriculture, Food and Forestry.</p>
<p>European Communities (Natural Habitats) Regulations, 1997</p> <p>European Communities (Natural Habitats) (Amendment) Regulations, 1998</p>	<p>The 1997 regulations give effect to the EU Habitats Directive on the conservation of natural habitats and of wild flora and fauna.</p> <p>The Regulations empower the Minister to designate special areas of conservation (endangered species and habitats of endangered species) as a contribution to an EU Community network to be known as NATURA 2000. They also place an obligation on the Minister, other Ministers of the Government, Local Authorities and other State Bodies to have regard to the provisions of the Regulations in carrying out their powers and functions under certain Enactments under their control.</p> <p>The 1998 Regulations amend the European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997) by providing that the Interpretation of the term "the Habitats Directive" in Regulation 2 be amended to include Council Directive No. 97/62/EC of 27 October 1997, adapting the Habitats Directive to technical and scientific progress.</p> <p>Council Directive No. 97/62/EC of 27 October 1997 replaces Annex I and Annex II to the Habitats Directive with new Annexes in light of technical and scientific progress since the original Directive was adopted in 1992. Annex I lists the natural habitat types of Community interest whose conservation requires the designation of Special Areas of Conservation. Annex II lists the animal and plant species of Community interests whose conservation requires the designation of Special Areas of Conservation</p>
<p>European Communities (Environmental Impact Assessment) Regulations, 1989</p>	<p>These regulations transpose the EC Environmental Impact Assessment Directive into Irish Law. There have been a number of amendments to this regulation.</p>

