

Wildlife, Habitats & **the Extractive Industry**



Guidelines for the Protection of Biodiversity within the
EXTRACTIVE INDUSTRY

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*

Irish Concrete Federation

Tel: 01 464 0082 *www.irishconcrete.ie*

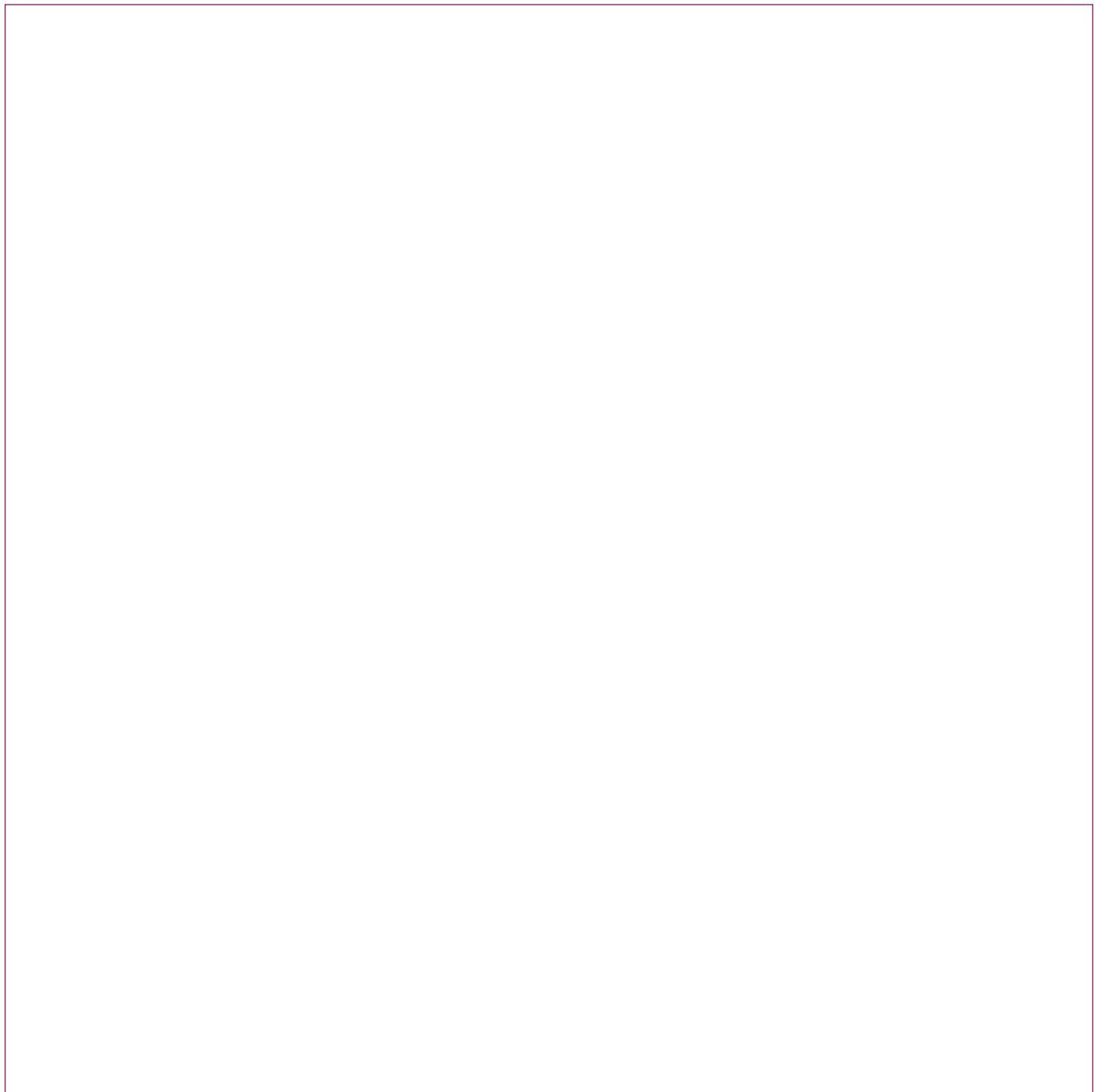
Your local authority Biodiversity / Heritage Officer

Environmental NGOs

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

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1 Foreword

1.1 Notice Nature & NPWS

Notice Nature is Ireland's national biodiversity awareness campaign. Launched in 2006, the campaign aims to encourage protection of biodiversity amongst the general public and within the key sectors of agriculture, business, tourism, and construction.

The campaign is run by the Department of Environment, Heritage, and Local Government's National Parks and Wildlife Service (NPWS).

The role of National Parks and Wildlife Service (NPWS) is:

- To secure the conservation of a representative range of ecosystems and maintain and enhance populations of flora and fauna in Ireland,
- To implement the Wildlife Act, 1976, the Wildlife (Amendment) Act, 2000 and the EU Habitats and Birds Directives,
- To designate and advise on the protection of Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Natural Heritage Areas (NHAs), having particular regard to the need to consult with interested parties,
- To make the necessary arrangements for the implementation of National and EU legislation and policies and for the ratification and implementation of the range of International Conventions and Agreements relating to the natural heritage,
- To manage, maintain and develop State-owned National Parks and Nature Reserves.

The NPWS Notice Nature campaign has partnered with the Irish Concrete Federation (ICF) to create these guidelines for the protection of biodiversity within the extractive industry. The guidelines are designed to help current and future operators, developers and site managers to give full consideration to biodiversity from planning through to operation and rehabilitation of a quarry, sand or gravel pit, or any other extraction area.

The Biodiversity Guidelines for the Extractive Industry are part of a series of guidelines produced by Notice Nature. Other guidelines have been produced for the Tourism, Business and Construction sectors which are available to download from: www.noticenature.ie.

1.2 The Irish Concrete Federation

The Irish Concrete Federation is the Irish national trade federation for the concrete and aggregates industries, representing a wide range of operators from multi-national concerns to regional operators to small local businesses. It has a strong professional team providing services to and representing its members at local, national and EU level.

As part of its strong involvement in and commitment to its European umbrella organisation, UEPG (European Aggregates Producers Association), the ICF has held the Chair of the UEPG Biodiversity Task Force. UEPG is a long-standing signatory of the Countdown 2010 agreement, which commits a powerful global network of active partners working together to achieve a significant reduction in the current rate of loss of biological diversity by 2010. Through its Countdown 2010 and UEPG membership, the ICF and its membership are committed to the principle of biodiversity promotion and protection on extractive sites in Ireland.

1.3 Introduction by Sebastian Winkler, Head of Countdown 2010, Head and Senior European Policy Advisor, IUCN Regional Office for Pan-Europe

The European Aggregates Industry is managing land in a responsible way: extraction is a temporary use of the land that can have positive long-term environmental impacts. Extractive activities, in contributing to biodiversity during and post extraction of raw materials, are clearly compatible with the objectives of the Natura 2000 Directives.

UEPG joined IUCN's Countdown 2010 initiative, a powerful network of active partners working together towards the 2010 biodiversity target. Each partner commits additional efforts to tackle the causes of biodiversity loss. Countdown 2010 secretariat facilitates and encourages action, promotes the importance of the 2010 biodiversity target and assesses progress towards 2010. UEPG partnership with Countdown 2010 includes specific commitments for the industry for working towards the 2010 biodiversity target and provides a platform to exchange best practices with other industry sectors¹. UEPG has requested its members to provide biodiversity case studies and has received numerous contributions.

Aggregates companies can take a wide range of actions to protect and enhance biodiversity throughout a site's life. Actions can include active preservation of habitats (on-site or in surrounding area), development of new habitats, active consultation with parties such as the NPWS, inclusion of biodiversity in site management plans, and consideration of biodiversity in landscaping and restoration plans.

¹ For details of UEPG partnership with Countdown 2010 see: <http://www.countdown2010.net/article/concrete-commitments-uepg-joins-countdown-2010>

Good practices developed by the aggregates industry can enhance biodiversity awareness within the community. People from neighboring communities, including students and school children, as well as government officials and the media may visit the quarries to observe the positive work being conducted and some of the wildlife being fostered. Restored and active sites are increasingly providing both recreational areas for local communities and places where endangered species are finding a secure habitat. In many cases, red-listed species like dragonflies, bees and plants found a new habitat to settle in; other endangered species stopped declining in number.

These Guidelines further promote exemplary biodiversity projects amongst 28,000 aggregates extraction sites across the European Union and will have a valuable contribution to the overarching aim of halting the loss of biodiversity by 2010.

Note on definition of quarry

These guidelines use the definition of 'quarry' as presented in the Safety, Health and Welfare at Work (Quarries) Regulations 2008 where:

A quarry means an excavation or system of excavations for the purpose of, or in connection with, the surface extraction of, or prospecting for, minerals and includes any of the following:

a) So much of the area (including works thereon and ancillary surface installations such as buildings and other premises and structures providing accommodation, rest and sanitary facilities) adjacent to or surrounding the quarrying operations as is occupied for the purpose of, or used in connection with:

- Those operations
 - The storage or preparation for sale of the minerals extracted from the quarry, or
 - The removal from the quarry of any substance extracted from the quarry
- b) a tip
- c) a lagoon
- d) a reclamation site –
- From which materials are being extracted for further use or for sale and
 - Where that extraction forms part of the process whereby that site is restored for agricultural, industrial, leisure or domestic use;
- e) a railway line or siding at the quarry

Introduction

The extractive industry has played an important role in Ireland's recent development providing essential raw materials for construction and creating employment. In order to further its positive contribution to our society and economy there is a need to maintain and continuously improve environmental standards within the industry. This will help ensure that Ireland's extractive industry adheres to legal requirements and best practice and that the industry plays its part in the protection of Ireland's nature whilst balancing social and economic requirements.

While the extraction of stone, gravel, sand or clay results in the alteration of the natural landscape and wildlife of an area, appropriate measures can be implemented to reduce impacts. Conversely, through management of biodiversity during excavation and subsequent rehabilitation, extraction sites can have a positive impact on biodiversity through the creation of new habitats and colonisation by new species of flora and fauna.

Scope of Guidelines

These guidelines have been produced in consultation with the ICF and key stakeholders and aim to become a reference document for those within the extractive industry committed to implementing best practice in the area of biodiversity protection.

The guidelines are designed to help current and future operators, developers and site managers to consider biodiversity from planning through to operation and rehabilitation of a quarry, borrow pit, or other extraction area.

They will assist the extractive industry in meeting legal and environmental requirements and obligations through providing detail on legislation and best practice measures. They will also be of use to Regulatory Authorities and Local Authorities as a reference point to industry best practice.

The guidelines focus solely on nature conservation, including sites, ecosystems, habitat and species. They do not cover issues and obligations relating to other aspects such as water, geology, and archaeology, which should also be considered in the lifecycle of extractive sites. However, rivers and lakes are habitat types themselves, and many habitats and species are surface water or groundwater dependent so the impacts on water need to be considered in the ecological sense.

The guidelines are structured as follows:

- Section One: Foreword – Provides a brief explanation of biodiversity.
- Section Two: Biodiversity – Details legislation governing protection of biodiversity in Ireland and its implications for extractive developments.
- Section Three: Protecting Biodiversity – Provides detail on the planning framework for extractive industry with specific reference to biodiversity.
- Section Four: Planning for Extractive Sites – Outlines potential impacts of quarry operation on biodiversity and the measures that can be taken to reduce these impacts. These measures can be stipulated in an Environmental Impact Statement (EIS) or planning application, in which case they become binding. Alternatively, the measures can be taken on a voluntary basis in existing extractive sites in order to follow best practice.
- Section Five: Consideration of biodiversity in Quarry Operation – Factors to consider in order to promote biodiversity following the end of extraction.
- Section Six – After-Life of exhausted sites.
- Section Seven – List of Contacts.
- Section Eight – References and Further Information.

Why Take Action?

The extractive industry has a key part to play in the collective effort to reduce biodiversity loss. Extractive operators that demonstrate best practice in the area of biodiversity will benefit from improved retention and support of employees, investors, and customers. Those companies acting in a socially and environmentally responsible manner can gain from the positive corporate image associated with better environmental performance, which can help improve competitive advantage.

Key benefits of taking action to protect biodiversity:

- Enhanced compliance with biodiversity, environmental and planning legislation and conditions and reduced liability.
- Reduced delays and more positive outcomes in planning process.
- Positive corporate image.
- Genuine contribution to biodiversity protection and enhancement.
- Competitive advantage.

2 Biodiversity

Biodiversity stands for 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.

The wellbeing and prosperity of earth's natural environment, as well as human society, depends directly on the extent and status of biological diversity. Biodiversity is important because it provides significant economic, environmental, health, and cultural benefits. It provides us with a large amount of goods and services outlined in the below diagram that help us to sustain life on earth.

Ecosystem Services / Functions			
Supporting	Provisioning	Regulating	Cultural Services
Nutrient Cycling	Food	Climate	Aesthetic
Primary Production	Freshwater	Floods	Spiritual
Soil Formation	Wood and Fibre	Disease	Educational
	Fuel	Water Purification	Recreational

(Source: Adapted from Millennium Ecosystem Assessment 2005)

Biodiversity under threat

Despite its importance, biodiversity worldwide and nationally is under threat and has declined more rapidly in the past 50 years than ever before in human history.

Habitat destruction, pollution, land use change, invasive alien species and climate change are the key factors threatening biodiversity.

Ireland is home to 28 species of land mammal, more than 400 regularly occurring bird species, more than 4,000 plant species, and over 12,000 species of insect. If we want all of this to survive, we must help to provide the necessary protection of the habitats and resources they need to survive and flourish.

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

3 Protecting biodiversity — legislation

Since the 1970's there has been widespread consensus that coordinated action needs to be taken globally to protect the world's biodiversity and to ensure its sustainable use. There is now a range of International treaties and agreements, and European Union biodiversity legislation which influences regulation on a local level in Ireland.

Some key International conventions and European directives relating specifically to biodiversity protection are listed in Table 1. These set out measures for the legal protection of flora, fauna and habitats on an International and European level. The extractive industry should consider the various biodiversity conventions and directives presented in this table in conjunction with other legislation, plans, policies, and programmes relating to such things as environment, waste, pollution prevention, soils, archaeology and water (e.g. the Water Framework Directive 2000/60/EC).

Table 2 details the Irish Regulations and Acts that transpose this European and International wildlife legislation into Irish law and ensure the protection of our national biodiversity.

One of the main ways of achieving nature conservation is through the designation of land areas for protection. These are areas where practices potentially harmful to flora and fauna are prohibited and restricted by law. **Table 1** and **Table 2** also list the main designations arising from International Conventions, European Directives and Irish law.

The range of International, European and National law as presented in Table 1 and Table 2 ensure that most of Ireland's wild birds and mammals are legally protected. The main implications of these laws and designations with respect to extractive operations are also outlined in the Tables. Extractive site operators are legally bound to take appropriate action to protect listed species and protected habitats at pre-application phase and during site operation.

The NPWS – Conservation and designation

In Ireland, the Department of Environment, Heritage and Local Government is responsible for the designation of nature conservation sites around the country. The Department's National Parks and Wildlife Service (NPWS) works with farmers, other landowners and users and national and local authorities, trying to achieve the best balance between farming and land-use, and requirements for conserving nature in these selected areas.

Further details on designations and all biodiversity legislation and issues in Ireland can be found on the National Parks and Wildlife Service website: www.npws.ie. The website includes interactive mapping with details of individual sites, including 'site synopses', or summary descriptions of the key conservation interests. The NPWS website also contains tables with 'qualifying interests' for SACs - lists of the Annex I habitats and/or Annex II species for which the sites have been selected.

Table 1: Key International Conventions and European Directives on Biodiversity and Related Designated Areas and Species Protection Law

International Conventions

1) Convention on Biological Diversity (CBD)

Details of Convention:	The CBD, signed by 150 government leaders at the 1992 Rio Earth Summit, recognised for the first time in international law that the conservation of biological diversity is “a common concern of humankind” and is an integral part of the development process. The Convention establishes three main goals: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources.
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2) Ramsar Convention on Wetlands of International Importance (1971 and amendments)

Details of Convention:	The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands (particularly those of importance to waterfowl) and their resources (www.ramsar.org).
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Implications for Ireland: Ramsar sites	There are currently 45 Ramsar sites in Ireland covering an area of 66,994 hectares.
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European Union Biodiversity Directives:

1) The EU Habitats Directive (92/43/EEC)

Details of directive:	<p>The Habitats Directive, together with the Birds Directive, form the cornerstone of EU's conservation policy.</p> <p>It aims to protect some 220 habitats and approximately, 1000 species listed in the directive's Annexes (Annex I covers habitats, Annexes II, IV & V species). These are species and habitats which are considered to be of European interest.</p> <p>The directive led to the setting up of a network of Special Areas of Conservation (SACs), which, together with the existing Special Protection Areas (SPAs) form a network of protected sites across the European Union called Natura 2000.</p> <p>It is built around two pillars: the <i>Natura 2000 network</i> of protected sites and the strict system of species protection.</p> <p>The directive requires Member States to maintain or restore the favourable conservation status of the habitats and species listed in its annexes.</p>
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Transposed into Irish Law by:	European Communities (Natural Habitats) Regulations SI 94/1997, as amended SI 233/1998, and SI 378/2005 (see Table 2)
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Implications for Ireland: Special Areas of Conservation (SACs) and strict protection for species	<p>The areas chosen as Special Areas of Conservation in Ireland cover an area of approximately 13,500 km². Roughly 53% is land, the remainder being marine or large lakes.</p> <p>In Ireland, there are 59 Annex I habitats, including: types of raised bogs, blanket bogs, turloughs, sand dunes, machair, heaths, lakes, rivers, woodlands, estuaries and sea inlets. Sixteen of these Annex I habitats are priority types (in danger of disappearance).</p> <p>Habitats of the 25 species listed in Annex II are designated as Special Areas of Conservation (SACs). These Annex II species include Salmon, Otter, Freshwater Pearl Mussel, Bottlenose Dolphin and Killarney Fern.</p> <p>A further 33 species requiring strict protection are listed on Annex IV. These are:</p> <ul style="list-style-type: none"> ■ All bat species, ■ the otter, ■ all cetaceans, ■ the leatherback turtle, ■ the natterjack toad, ■ the Kerry slug, ■ the Killarney fern, ■ the slender Naiad, and ■ the yellow marsh saxifrage. <p>These species are not necessarily associated with designated areas but can be found throughout the country.</p> <p>Some species while not requiring a high level of protection need to be safeguarded against exploitation. These are listed in the Annex V of the Habitats Directive.</p>
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European Union Biodiversity Directives:

2) The EU Birds Directive (79/409/EEC)

Details:	<p>The EU Birds Directive seeks to prevent and eliminate the causes of bird species loss and maintain and enhance current levels of biodiversity.</p> <p>The EU Birds Directive (79/409/EEC) requires designation of Special Protected Areas (SPAs) for:</p> <ul style="list-style-type: none">■ Listed rare and vulnerable species.■ Regularly occurring migratory species, such as ducks, geese and waders.■ Wetlands, especially those of international importance, which attract large numbers of migratory birds each year (Internationally important means that 1% of the population of a species uses the site, or more than 20,000 birds regularly use the site.).
Transposed into Irish law by:	European Communities (Natural Habitats) Regulations SI 94/1997, as amended SI 233/1998, and SI 378/2005
Implications for Ireland: designations and strict protection for bird species	<p>In Ireland, there are 25 of Annex I species regularly occurring which must be afforded protection. They include Bewicks and Whooper Swan, Greenland White-Fronted and Barnacle Geese, Corncrake, Golden Plover, Bar-Tailed Godwit, five species of tern, birds of prey including Hen Harrier, Peregrine, Merlin as well as the Nightjar, Kingfisher and Chough.</p> <p>Ireland currently has 153 Special Protection Areas for Birds, 82 of which have been advertised and notified in accordance with the requirements of the Birds Directive. The remaining 71 SPA sites will be notified during 2010. A number of SPA sites that have been advertised have now progressed to Statutory Instrument. The Irish SPAs join a total of around 3,000 sites across the European Union.</p>

3) Environmental Liability Directive (2004/35/EC)

Details:	<p>The Environmental Liability Directive has the objective of making operators of activities which cause environmental damage financially liable for that damage ('polluter pays' principle). The Directive was transposed into Irish law by the European Communities (Environmental Liability) Regulations 2008 (S.I. No. 547 of 2008). These Regulations came into operation on 1 April, 2009.</p>
Implications:	<p>Under the Regulations, obligations are imposed on operators whose activities have caused damage to protected species and natural habitats listed in the Birds and Habitats Directives to remedy this damage, and obligations are imposed on those whose activities have caused an imminent threat of damage to protected species and habitats listed in the Birds and Habitats Directives to take immediate steps to prevent damage.</p> <p>Operators of activities listed in Schedule 3 of the Regulations are liable for damage caused by them whether or not they are at fault, whereas operators of any other activities can also be liable for damage to species and habitats, but only if they are at fault or were negligent.</p> <p>The Environmental Protection Agency has been designated as the competent authority for the purposes of the Regulations and the Directive. See www.epa.ie for more details.</p>

Table 2 – Irish Regulations and Acts and Related Designated Areas and Species Protection

Irish Wildlife Regulations and Acts

1) European Communities (Natural Habitats) Regulations SI 94/1997, as amended SI 233/1998, and SI 378/2005

Details:

The 1997 Habitats Regulations give effect to the EU Habitats Directive on the conservation of natural habitats and of wild flora and fauna.

Implications: SACs, SPAs and strict protection of species

The Habitats Regulations empower the Minister to designate networks of SACs and SPAs as a contribution to an EU Community network to be known as NATURA 2000.

In relation to SACs and SPAs, under the Habitats Directive, any plan or project likely to have significant impacts on Natura 2000 sites (SACs or SPAs), on its own or in combination with other plans and projects must undergo an Appropriate Assessment as required by Article 6(3) of the Directive.

In order to determine if a full assessment is required, all new or extended sites, or sites at any new or periodic licensing stage, should undergo screening for likely significant effects prior to or in association with planning and the preparation of the EIS or Ecological Impact Assessment (EclA). Relevant planning authorities must ensure that a proposed development which is likely to have a significant effect on an SAC or SPA is authorised only if it will not adversely affect the integrity of the protected area.

Under Regulation 23 of the Habitats Regulations 1997, any person who, in regard to the animal species listed in Annex IV (see Table 2) of the Habitats Directive:

- "Deliberately captures or kills any specimen of these species in the wild,
- Deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration,
- Deliberately takes or destroys the eggs from the wild, or
- Damages or destroys a breeding site or resting place of such an animal shall be guilty of an offence."

With regard to Compliance with Regulation 23 of the Habitats Regulations 1997-2005 which require strict protection of Annex IV species, the procedure to be followed is set out below:

Species Assessment: In advance of any works, a Species Assessment should be carried out by a qualified ecologist. This will focus on the topics where impacts are likely to occur as identified through consultation or scoping with the relevant authorities. Records of this should be kept with papers associated with the project. It is important to enlist the advice of an ecologist early on in the process in order to avoid delays and deal with any seasonal timing restrictions on undertaking surveys (winter birds, year round bat surveys, etc).

Scientific Species Assessment: Projects where risk is identified should be subject to a Scientific Species Assessment. It will be necessary to identify alternatives or modifications that will avoid that risk.

Derogation Licence: Where it is not possible to identify means of avoiding risk completely, investigate the use of a 'derogation licence' from the Minister under Regulation 23 of the Habitats Regulations to permit interference. The Minister is empowered to grant a licence for derogation in specified circumstances where: "there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range".

Applications for Derogation Licence: Applications for a derogation licence should be made in advance of seeking planning approval. This will ensure that full consideration can be given to the impacts of the proposed project on the species and to avoid the possibility of delay to the proposed project.

The obligation to obtain a derogation licence is additional to the requirement to notify the Minister of a proposed development which may have an impact on nature conservation under the Planning and Development Regulations 2001, article 82(3).

If a problem arises regarding Annex IV species in the course of the works, this must be reported immediately to the NPWS. No further work that might impact on such species should take place unless a derogation licence has been obtained. To proceed without a derogation licence in such circumstances is likely to be an offence under the Habitats Regulations.

Regulation 21 of the Habitats Regulations provides protection for Annex IV plant species. The carrying out of any work that has the potential to disturb these species and for which a derogation licence has not been granted may constitute an offence under Regulation 21 or 23 of the Habitats Regulations.

It should be noted that any action resulting in the deterioration or destruction of the breeding sites or nesting places of species in Annex IV (a) of the Habitats Directive is an offence of strict liability i.e. even if unintentional it is an offence. The onus of due diligence rests with the operator.

Irish Wildlife Regulations and Acts

2) The Wildlife Act (1976), The Wildlife (Amendment) Act, 2000

Details:

The purpose of the Wildlife Act, 1976 and the Wildlife Amendment Act, 2000 is to provide for the protection of wildlife (both flora and fauna) and the control of activities, which may impact adversely on the conservation of wildlife.

Under the Act, the Minister responsible for nature conservation may afford protection to all wild species of fauna and flora. However, the 1976 Act did not provide for the conservation of fish species nor of aquatic invertebrates in general, except insofar as species may be added in agreement with the Minister for Communications, Marine and Natural Resources. Currently all bird species, 22 other animal species or groups of species and 86 species of flora are afforded protected status.

The Act gives protection to areas designated by the Government as Natural Heritage Areas (NHAs), Nature Reserves, National Parks and Refuges.

The Wildlife Act also protects flora, by means of the Flora (Protection) Order, 1999 which lists 90 different flora species for protection (see Implications below).

Implications: designations NHAs, Nature Reserves, National Parks and Refuges

Natural Heritage Areas – There are 155 designated NHAs in Ireland. These are areas of conservation value for ecological and/or geological/geomorphological heritage designated nationally under the Wildlife Acts. The majority of these designated NHA's relate to bog habitat, with 75 Raised Bog and 73 Blanket Bog sites designated and protected under Statutory Instrument.

In addition to the designated NHAs, there is also a large suite of proposed Natural Heritage Areas (pNHAs), 1132 of which were published on a non-statutory basis in 1995, but have not since been statutorily proposed or designated. This is due to the current emphasis in NPWS on Natura 2000 sites and meeting the requirements of the Habitats and Birds Directives. These pNHA sites are of significance for wildlife and habitats. Some of the pNHAs are tiny, such as a roosting place for rare bats. Others are large - a woodland or a lake, for example. The pNHA designation will proceed on a phased basis over the coming years as soon as the Natura 2000 cSAC and SPA designations are complete. Site Synopses are not currently available for pNHAs as this information will need to be evaluated and updated before the Synopses can be re-issued.

The Geological Survey of Ireland (GSI) is compiling a list of geological/geomorphological sites in need of protection through NHA designation. A committee of expert geologists provides an initial list of sites which then undergo a process of survey, reporting and review, to provide recommendations regarding NHA status or otherwise. The GSI has completed its list of karst (i.e. exposed limestone) and early fossil sites.

Nature Reserves – There are 78 Nature Reserves in Ireland covering 18,889 hectares of land. Nature Reserves are protected by Ministerial order and 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. Those interested in acquiring statutory protection for their lands can seek advice from the Department of the Environment, Heritage & Local Government.

National Parks - The term 'National Park' is an international term assigned to areas with the aims of nature conservation and public recreation and appreciation. There are six National Parks in Ireland. Within these National Parks steps have been taken to prevent or eliminate as soon as possible exploitation or occupation in the whole area and to enforce effectively the respect of ecological, geomorphological or aesthetic features which have led to its establishment.

Refuges for fauna –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 in Ireland; they are mainly islands or cliff faces.

Implications: Strict Protection of Species

The Wildlife Act also protects flora, by means of the Flora (Protection) Order, 1999 which lists 90 different flora species for protection. This Act forbids anyone from uprooting, cutting or damaging these plants or interfering with their habitats, except under licence from the NPWS.

The Wildlife Act forbids the destruction of hedgerows during the bird nesting season from 1st March to 31st August each year.

4 Planning for extractive sites

4.1 Irish Planning Acts and Regulations

Ireland is one of the few remaining countries in Western Europe that does not have a National Aggregates Policy. Instead, local authorities are responsible for the planning and environmental regulation of extractive developments and ancillary facilities and primarily provide for this through **County Development Plans**. These plans can be obtained from the relevant local authority website.

The Planning and Development Act 2000 and associated **Regulations 2001** are the key statutory legislation that apply to new and existing extractive developments and ancillary facilities in Ireland.

Quarries (including sand and gravel pits) operating before the existence of planning legislation in Ireland that was implemented in 1964 did not have to obtain planning permission and were essentially unregulated. Despite this, much self-regulation took place such as imposition of emissions (noise, blasting, dust) limits and the implementation of Environmental Management systems accredited to ISO 14001.

However, under **Section 261 of the Planning and Development Act 2000**, a new system of once-off registration for all quarries was introduced. Only those quarries for which planning permission was granted in the five years before Section 261 (i.e. after April 1999) became operative are excluded. Section 261 has also resulted in some extractive sites being required to submit an Environmental Impact Statement and to go through the formal planning process. This review process has resulted in up-to-date environmental and biodiversity management conditions being enforceable on all authorised sites; this process is largely complete at this time.

4.2 Consideration of Biodiversity in the Planning Process

EIA Directive

The **Environmental Impact Assessment Directive (EIA) Directive** (85/337/EEC, as amended) requires that projects which are likely to have significant effects on the environment are subject to an assessment of their likely impacts. An EIA is the process for anticipating the effects on the environment caused by a development. An Environmental Impact Statement (EIS) is the document produced as a result of that process.

A key component of an EIS with respect to biodiversity is an Ecological Impact Assessment (EclA). An EclA is defined as the “process of identifying, quantifying and evaluating the potential impacts of the defined actions on ecosystems or their components. If properly implemented, it provides a scientifically defensible approach to ecosystem management” (www.ieem.net).

The EIA Directive states that EIA is mandatory for all Annex I projects and in the case of Annex II projects, Member States can determine this on a case-by-case basis and/or on the basis of thresholds or other criteria. The EU EIA Directive is implemented in Ireland through the integration of its requirements into the land-use planning consent system and legislation such as the Natural Habitats Regulations and the Wildlife Acts 1976 to 2000.

Habitats Directive

Under the Habitats Directive (92/43/EEC), sites are designated for the protection of birds (SPAs) and other species and habitats (SACs). Plans and projects are required to be assessed for any potential impact on the integrity of these sites and their species.

Consideration of Biodiversity in Planning Phases

EIA Screening

The Planning and Development Regulations 2001 require that new applications for an extractive development, or extension to an existing site, with an **extraction area greater than five hectares submit an Environmental Impact Statement (EIS)**. However, where the extraction area is less than five hectares, local authorities can require an EIS to be submitted if they feel that “significant environmental effects” are likely to arise from its development because of its nature, size or location (DEHLG, 2004). An EIS may also be required in the case of extended developments if it would bring development area above the five hectare threshold. Local Authorities should record a sub-threshold screening for all quarry applications – bearing in mind nature, size, and location criteria. Sub-threshold sites that do not require a full EIS, may be required to conduct an Ecological Impact Assessment (EclA) to determine whether or what sensitive habitats or rare or protected species may be impacted. (Refer to International Ecological and Environmental Management website: www.ieem.com for guidance on EclA).

Scoping and Consultation

Following screening, the next step is scoping to find out the relevant issues for the EIA. In order to do this it is necessary to consult with the competent authority, specialist agencies and NGOs to seek their views at an early stage which will help in discovering impacts of a proposed development and potential mitigation measures. Consultation should take place with the NPWS via the Development Applications Unit of the DEHLG. This will allow for identification of concerns and priorities and enable the applicant to address these in their EIS / planning application. Ongoing scoping should occur through regular dialogue between designers and environmental specialists to ensure that biodiversity concerns are integrated into the site design and operation. See ‘Contacts’ (page 34) section for list of potential consultees.

The scoping phase will identify activities that may have ecological impacts, ecological features that could suffer from the proposed development, the scope of investigations, and recommends suitable survey methodologies. The Scoping Phase should identify any potential licensing requirements regarding legally protected species (See Table 2 on derogation licences). Depending on the activity undertaken at a site, licenses or permits may be required as governed by: Wildlife legislation, the Water Pollution Act, the Air Pollution Acts, Waste Management legislation and Integrated Pollution Prevention Control (IPCC). However, even where a permit is not required, there remains an obligation to comply with the provisions of the relevant acts.

Measures, Conditions and Monitoring

An EIS or EclA should make recommendations relating to environmental management and mitigation measures to avoid, reduce or remedy impact on biodiversity. For example, mitigating measures might refer to phases in excavation to avoid particularly sensitive phases in the calendar (e.g. the breeding season of a bird or mammal), or types of tools that may be used in sensitive habitats.

Monitoring regimes should also be addressed in planning applications / EIS to check the effectiveness of mitigation measures put forward. Planning authorities will need to see information on the potential effects of the proposed development, including proposed mitigation measures in order to make a planning decision.

Conditions are likely to be attached to planning permission including the requirement to implement and adhere to such measures as set out in environmental reports including EclA, EIS and Environmental Management Systems (EMS). Conditions are generally in line with the DEHLG 2004 'Quarries and Ancillary Activities: Guidelines for Planning Authorities' and the EPA 2006 - Environmental Management in the Extractive Industry (Non-Scheduled Minerals).

The next section outlines some of the potential impacts that may arise from quarry or pit operation and suggests some mitigation measures which may be employed to reduce this impact. These mitigation measures may be put forward in the EIS / planning application both by the competent authorities and the developer.

4.3 Appropriate Assessment Under Article 6 of the Habitats Directive

Appropriate assessment of plans and projects for the purposes of the Habitats Directive

European sites (which include sites from the time the Minister gives notice of his intention to designate a site) include Special Protection Areas (SPAs – for the protection of birds and their habitats) and Special Areas of Conservation (SACs – for the protection of other species of fauna and flora and their habitats). These sites and candidate sites are protected under EU and Irish law.

The law requires that the potential impact of all plans and projects that alone or in combination with other plans and projects might impact on a European site or candidate site must be assessed. This requirement extends to plans and projects outside as well as inside a site (for example a plan or project that could result in the release of silt into a river upstream of a European site could have a negative impact on the site).

Screening Assessment

Screening assessment is a preliminary assessment to determine whether an appropriate assessment is required in relation to a plan or project. Unless the screening assessment can establish beyond any reasonable doubt that a plan or project, alone or in combination with other plans or projects, will not have an adverse effect on a European site or candidate site, then an appropriate assessment will be required.

Appropriate Assessment

An appropriate assessment is a scientific study of the potential impacts of a plan or project, alone or in combination with other plans or projects on a European site or candidate site.

Further information

Detailed information and guidance on screening assessment and appropriate assessment is given in “Guidance on Appropriate Assessment for Plans and Projects in Ireland”, which should be consulted. This will be available on the NPWS website by the end of 2009.

An Appropriate Assessment may be incorporated in an EIA. If it is, it must form a discreet section that addresses fully the Article 6(3) requirements and be clearly identified as comprising an appropriate assessment for the purposes of the Habitats Directive.

For more information and guidance on planning regulations and Environmental Impact Statements see:

EPA (2006) 'Environmental Management in the Extractive Industry (Non-scheduled Minerals)', Final Project Report, April 2006.

EPA (2002) 'Guidelines on Information to be contained in Environmental Impact Statements'.

EPA (2003) 'Advice Notes on Current Practice in Preparation of Environmental Impact Statements'.

DEHLG (2004) 'Quarries and Ancillary Activities – Guidelines for Planning Authorities'.

EC (2000b) 'Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC', Office for Official Publications of the European Communities, Luxembourg.

EC (2001) 'Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC', Office for Official Publications of the European Communities, Luxembourg.

EC (2007) 'Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission', Office for Official Publications of the European Communities, Luxembourg.

Top Tips

Consult at pre-application stage – Consult with the NPWS (website and via the Development Applications Unit), local authority biodiversity/heritage officers, statutory consultees, and local community stakeholders with regard to plans for an extractive development, mitigation measures and subsequent restoration work.

5 Consideration of biodiversity in Quarry Operation

5.1 Impact of quarries on biodiversity

Extraction sites can impact upon flora and fauna through habitat destruction or alteration and from general disturbances arising from quarry operation (such as traffic, noise, dust, vibration, water pollution and loss of groundwater supplies). However, these impacts can be managed and extraction sites can enhance and protect biodiversity during operation and post-closure.

An Ecological Impact Assessment (EclA) or EIS (before application) and ongoing ecological monitoring throughout site operation can help assess potential impacts of quarry operations on local wildlife.

Mitigation measures are suggested throughout this section to reduce potential impacts on wildlife. Best practice case studies are also distributed throughout to illustrate working examples of biodiversity protection and enhancement on Irish extractive sites.

The suggested mitigation measures can be put forward in the EIS / planning application both by the competent authorities and the developer. In this case, they become mandatory. Measures suggested can also be voluntarily adopted by those wishing to implement best practice.

It is best practice to discuss potential measures to reduce impact on wildlife with the NPWS, local authority biodiversity officers, and fisheries boards at pre-application phase.

The main part of this section focuses on flora, fauna and habitat impacts and mitigation measures. However, dust, noise, vibration and landscaping can also impact on biodiversity. Therefore potential impacts arising from these are briefly outlined first in Table 3 along with potential mitigation measures.

5.2 Noise, Dust and Landscape Impacts

Table 3

Impacts	Potential Biodiversity Impacts	Potential Mitigation Measures
Noise and Vibration	Operations taking place on-site, such as blasting and crushing of rock and aggregates and the movement of materials, can disturb local ecosystems.	Site screening and noise control measures can be adopted to reduce impact, such as internal traffic routing, placing rubber linings on chutes, optimisation of blasting design, restricting vehicle speeds, minimising height from which material is dropped, and ongoing maintenance of plant machinery.
Dust Deposition	Extractive activities have potential to generate dust from extraction of raw material, loading and haulage and vehicle movement. This can travel into waterways and can impact upon sensitive habitats thus disrupting wildlife.	Best practice mitigation measures include: limiting earth stripping in dry and windy conditions, installing wheel wash facilities for site vehicles, and developing hard surface roads on-site or installation of a sprinkler system can also help to keep dust down.
Landscape	Extractive sites can significantly alter the natural landscape character. Local development plans will indicate areas of high landscape quality and geological heritage areas (see Geological Heritage Guidelines for the Extractive Industry GSI/ICF 2008 for specific guidance in this area).	Measures aimed at reducing the visual impact of a quarry can often have positive benefits for the flora and fauna of an area. For example, screening a quarry through the planting of hedgerows or trees using native species can provide habitats and food resources for wildlife. Excavated soils should be retained and stockpiled for reuse during restoration. Care should be taken to minimise damage to soil structure and to other characteristics necessary for the growth of vegetation. No stockpiled materials should be stored in buffer zones which are adjacent to sensitive areas. Soil heaps should be designed to be stable in periods of wet weather.

Throughout the operative phase of an extractive site, action taken to protect biodiversity will depend on:

- Habitat type and species found.
- Planning requirements and applicable legislation.
- Interaction with the surrounding environment.
- Health & safety considerations.
- Resources available.
- Input from partner organisations.
- Nature and extent of aggregates extraction.
- Availability of suitable restoration materials.
- Presence of or potential for invasive plant species – Gunnera, Japanese Knotweed.

5.3 Flora, Fauna and Habitat Impacts

This section explores how extractive sites can reduce their impact on and contribute to the protection of flora, amphibians, birds, mammals, insects and habitats.

If protected species or habitats are found on-site (such as a badger sett or bat roost) operators are required to protect these from damage or disturbance and take appropriate action and can contact the NPWS local ranger for advice in this regard (See Section Seven).



Top Tips

- Raise staff awareness of mitigation measures to protect biodiversity and why these are being taken.
- Conduct review surveys throughout the period of quarry operation to monitor noise and dust levels and impact on ecology as the site develops. Ecological surveys can contribute to biodiversity research and will be useful for developing best practice.
- Ensure clear demarcation of sensitive areas — this will reduce accidental damage during site operation.
- Understand the seasonal nature of flora and fauna on your site — for example, the bird nesting season is from spring to summer and the frog breeding season is spring.

Flora

Extractive sites (especially sand and gravel pits) often provide a range of suitable habitats for flora. Eskers for example, which are commonly used for extraction, are potentially high in biodiversity. Habitats found on eskers include semi-natural grassland, woodlands, and scrub. Semi-natural grassland can support a wide variety of broad-leaved herbs and grasses such as ox-eye daisy, field scabious, ribwort plantain, clover, thyme and the richest habitat for orchid species including



bee orchid, early-purple orchid, butterfly orchids and autumn lady's tresses. They can also support a number of Flora (Protection) Order species such as basil, thyme and red hemp nettle.

Rock surfaces exposed by excavation that are undergoing low levels of disturbance have the potential to be valuable habitats for species such as (depending on the rock type): Ling heather, tormentil, yarrow, common knapweed as well as a wide variety of grasses, ferns, lichens and mosses.

Areas of bare ground also provide an opportunity for the establishment of pioneer species, some of which may be locally, regionally or nationally important (such as the slender cudweed). This can also be of benefit as a food resource for invertebrates.

Top Tips

- Plant Native Species – When encouraging biodiversity on-site or in restoration plans it is important to plant native species, or allow these to establish naturally, as they provide a more suitable habitat and food source for a variety of Irish wildlife.
- Section 37 of the Forestry Act 1946 – makes it illegal to uproot any tree ten years old without a felling licence.
- If cutting down trees or vegetation it is best practice to leave vegetation in place for 24 hours before removing them from the site.
- Trees that are retained on-site should be flagged to safeguard them against removal.
- Eradicate any invasive species such as Gunnera and Knotweed from quarry/sandpit areas and ensure that the seeds or roots are not spread with material from the site.

Amphibians

In Ireland there are three native species of amphibian: the common frog, smooth newt and natterjack toad (largely confined to the South West), all of which are protected.

The often shallow and temporary ponds that occur due to excavation can be important habitats for amphibians. The common frog, which is listed as an internationally important species can often be found in these ponds, and nearby vegetation can provide an ideal terrestrial habitat for adult frogs. More permanent ponds are likely to provide breeding sites for newts.



Ponds and their associated vegetation should be preserved as much as possible and should not be disturbed during the frog and newt breeding season in spring. If there are plans to drain these ponds it is a good idea to get the pond reviewed by experts first with affected amphibians translocated to a more suitable site.

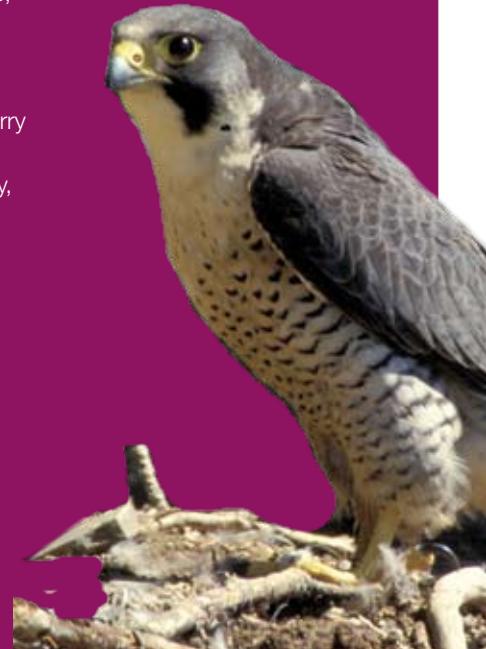
Case Study

Peregrine Falcon protection

Killeady Quarry, Co. Cork,
(Operator: John A. Wood)

Biodiversity Objective: To encourage biodiversity, and preserve existing biodiversity, in particular, the peregrine falcons that are present at the quarry.

Killeady Quarry is a hard rock quarry covering 37 hectares, including aggregate processing and associated works. It has been used by peregrine falcons for over 20 years as a breeding site and is one of Co. Cork's longest known breeding sites. Blasting has been discontinued at the quarry face where the birds have been observed to perch and nest. In the breeding season, from late March to early May, blasting is restricted to two blasts per month to minimize disturbance to the eggs and young chicks. At this time, blasting is restricted to a buffer zone more than 150m from the southern quarry face. Species recorded in the quarry area include rook, raven and peregrine falcon. In the hedgerows, woodland, scrub and agricultural fields surrounding the quarry area, some of which are within the control of the operator, other birds and animals are found. These areas also form the hunting grounds for the falcons. Bats have also been known to be present at the quarry, although no roosting sites are known.





Birds

Quarries can provide important roosting and nesting sites for cliff nesting birds such as peregrine falcons, Annex I species, and ravens. These birds use ledges produced during quarry operations as breeding sites. As well as providing nesting opportunities for many birds, benches also provide areas for vegetation to grow.

Sand martins are listed as a bird of medium conservation concern by Birdwatch Ireland and The Royal Society for the Protection of Birds (RSPB) Northern Ireland (in their 'Birds of Conservation Concern in Ireland' list). These birds often breed on exposed banks especially within sand and gravel quarries.

During the bird breeding season (from 1st March to the 31st August each year) blasting and extraction should be minimised as much as possible in the vicinity of any nests or breeding colonies. Any birds nesting on the quarry face should be left undisturbed while the breeding season concludes and the chicks have fledged. An appropriate buffer zone should be established for the duration of the breeding season and quarrying and blasting can continue at another quarry face where practical.

It is important to note that almost all birds and their nesting places are protected under the Irish Wildlife Act (1976) and the Irish Wildlife (Amendment) Act (2000). This means that it is an offence to kill, trap, harm or willfully disturb these birds on or near a nest containing eggs or unfledged young. The Wildlife Acts impose limitations on the removal of any hedgerows or other vegetation on site during the bird nesting season.

Case Study

Proposed Natural Heritage Area (pNHA) within Quarry Site

Midleton Quarry,
Co. Cork (Operator:
John A. Wood,
under CRH)

Biodiversity Objective: To preserve existing biodiversity at quarry which contains a proposed Natural Heritage Area (pNHA).

Midleton quarry is situated four kms southeast of Midleton in Co. Cork. The underlying geology in the area is limestone and this is frequently outcropping. Carrigshane Hill, a pNHA of five hectares is wholly contained within lands under the operator's control. In order to eliminate potential impacts to biodiversity at the pNHA, quarrying activity does not take place within the two remaining blocks of Carrigshane Hill pNHA, and vehicular access is suspended. Scrub and woodland habitat has been retained containing such species as hawthorn, bramble, gorse, hazel, elder and ash. Ground flora is generally quite sparse and includes lords and ladies, ground ivy and early purple orchid. Foxes and rabbits are present at Midleton Quarry, and yellowhammer, which is a red listed bird of high conservation concern, has been observed.

Top Tips

■ Watch out for new species — as the site develops interim habitats are often created. Inform site staff to keep an eye out for new species that are attracted to the site and take appropriate measures to ensure their protection.

Mammals

Most Irish mammals are protected under the Wildlife Acts. Protected mammals, such as the badger, Irish hare, hedgehog, and pygmy shrew, are common species and ubiquitous throughout much of the Irish countryside. As such, sections of quarries and pits with suitable habitats can provide foraging areas for many mammal species. The red squirrel is exclusively a woodland species that occupies a variety of woodland types. However, in recent years its range has contracted markedly; therefore quarry sites containing suitable woodland may provide valuable habitat for this species.



Otters tend to occupy linear territories along watercourses and are rarely found far away from water. They can be found in all types of wetland including rivers, streams, lakes, marshes and ditches as well as coastal areas. Any quarry sites containing or adjacent to any of these habitats should be mindful of the possible presence of otters in the area.

Bats are commonly found near extractive sites. They commute along linear habitats such as hedgerows, treelines and watercourses because of the high densities of insects present and because of the cover and shelter such features afford. Action can be taken to support the bat population through the creation of linear habitats, preservation of structures and mature trees suitable for roosting or through the erection of bat boxes.

Case Study

Bat protection

Rathmolyon Limestone Quarry, CEMEX Ireland

CEMEX Ireland established links with Bat Conservation Ireland after an environmental impact statement in 1998, prepared for the Rathmolyon limestone quarry, Co. Meath, revealed three different species of bats roosting in two old stone buildings adjoining the site. The quarry is located in a rural area and has been in operation since 2000.

CEMEX preserved one of the stone buildings to ensure quarry operations did not have any adverse effects on the bats. As a result, the bats have remained undisturbed since their discovery and the building is now a documented conservation area for the bat species.



Case Study

Habitat preservation within Quarry site and progressive restoration

Bennetsbridge Quarry,
Kilkenny, Roadstone
Provinces Ltd

Top Tips

Talk to the NPWS – The NPWS will assist in identifying appropriate measures to take if vulnerable or protected species or habitats are found on site. Legal biodiversity requirements should be discussed with the NPWS.

Talk to your Local Authority Biodiversity Officer / Heritage Officer

Biodiversity Objective: To create a habitat within a protected zone of the quarry that supports a wide diversity of flora and fauna.

Bennetsbridge Quarry is located 4.5 kilometres north of the village of Bennetsbridge, Co. Kilkenny and is excavated in dolomitic limestone. The quarry has been in operation for 40 years. The nearest significant surface watercourse is the River Nore which bounds the site to the west. The surroundings are relatively hilly and excavation has extended below the level of the nearby river. There are two archaeological features (raths) within the boundary of the location.

The two raths must be protected and the immediate surrounding lands landscaped to encourage a wide diversity of native flora and fauna. These areas have been developed to include grassland and landscaped with hedgerows and trees to enhance the growth of flora that will encourage the creation of habitats and in turn support wildlife.

Roadstone Provinces Ltd follow the John Holmes model: 'Proposal for Rehabilitation of Worked Out Quarries' as a strategy for the quarry's reinstatement. The northern boundary of the quarry has already been dealt with in accordance with this method, which involved the installation of a 1.2m high chain-link fence above a step-down to the quarry face. Immediately outside the fence is a double row of hawthorn (*Crataegus monogyna*), beyond which is a double row of very large boulders. An encircling berm utilizing overburden material and seeded with mainly deciduous tree and shrub species is located between the boulders and the public road. The rabbit has become the most commonly sighted mammal on site. Hares and foxes are also seen. Stoat is also seen regularly and songbird species associated with bushes and scrub including blackbird, song thrush, robin and wren are supported onsite.



Top Tips

- Establish buffer zones around sensitive habitats, water-bodies or species found on or adjacent to quarry site.
- Preserve valuable habitat on-site – especially trees, hedgerows and water habitats as refuges for biodiversity.

Insects

Quarries and pits can provide numerous habitats for invertebrates. Shallow ponds can provide habitat for dragonflies and damselflies. Butterflies such as the common blue, small blue and the dingy skipper can also be attracted to quarries because suitable habitat for their favoured larval food-plants is often present including bird's foot trefoil and kidney vetch. South-facing sand banks and exposed substrates can provide important habitats for bees, solitary wasps and a host of other invertebrates. Brush piles as a result of tree and scrub clearance can also provide valuable habitats for invertebrates.



Case Study

Aquatic Protection

Cahir Sand Pit, Co. Tipperary, Roadstone Provinces Ltd.

Objective: To enhance the natural biodiversity, in particular for aquatic life and birds, through enhancing the natural habitat and providing new habitats.

At Cahir Sand Pit, Roadstone have taken various measures to enhance the natural biodiversity, in particular for aquatic life and birds, through improving the natural habitat and providing new habitats. Particular attention has been given to the banks of the River Suir that flows along the boundary of the location. Making the river less accessible to people has encouraged the development of the wildlife habitat and allowed aquatic life to prosper. Where possible, the edge of the lake has been landscaped and been allowed to develop in such a way to encourage the growth of flora and fauna. There is a lake area that was developed to attract ducks and marine life. Ducks are plentiful in the area and otters have been seen within and around the edge of the lake.



The landscaped areas have attracted a wide variety of wildlife and birds. Wild grassland has been developed about the location and trees planted that will produce wild berries. Wild berries are plentiful in the area and the wild grass offers a secure habitat for wildlife. A flock of mallard ducks has made the pond their home, and this is protected for them.



Case Study

Diversion of watercourse to protect salmon

Kildavin Sand and Gravel Pit, CEMEX Ireland

The Kildavin Sand and Gravel Pit in Co. Carlow is a CEMEX project which took the nature of the surrounding environment into account. The Kildavin stream, which ran through the pit, was sterilising considerable reserves located beside the extraction area. The stream is a spawning ground for salmon and is located beside the River Slaney, which is renowned for salmon fishing.

To gain access to the reserves without impacting on the waterway, it was decided to divert the stream to a new location, under the guidance of the Eastern Fisheries Board. This involved implementing various bank erosion techniques used by the fisheries board to combat soil erosion and designing the new river cutting. New salmon spawning beds were positioned at regular intervals along the diverted channel and the project was completed before salmon spawning season.

Habitats

Preservation and enhancement of habitats on-site

It is important to note that valuable habitat is not limited to designated areas and all attempts should be made to preserve existing trees and hedgerows and to enhance habitats in the surrounding areas. In extractive development, it is best practice to leave as much of the natural habitat in place as possible (particularly linear connections to ensure flora and fauna can disperse), and to plant alternative habitats as early as possible where practical. Special effort should be made to protect scrub, stone walls and hedgerows. Hedgerows in particular are important wildlife links, harboring a significant diversity of species and thus are known as 'Ireland's rainforests'. Areas of the site can remain unworked through the life of the quarry. These areas often retain their original vegetation and can act as refuges for wildlife as well as being sources of flora and fauna for re-colonisation of the site once extraction has finished. Consideration should also be given to the removal of non-native tree species on site and their replacement with native species of local provenance.

Buffer Zones

Buffer zones can be created to protect sensitive habitats or species found on or near quarry sites. It is useful to establish buffer zones for retained vegetation and near watercourses and river corridors to filter out any unwanted run-off or sediment.

Interim Habitats

Many new species can appear during the evolution of an extractive site. As natural succession or planned restoration takes place, a variety of different habitats can occur. Where extraction has continued below the water table, succession to wetland type habitats can occur. This can provide important habitat for a variety of species. Woodland and scrub can eventually develop on almost any inactive extraction site. The value of such habitats can vary between sites depending on factors including the species present, the substrate, the structural diversity and its proximity to other similar habitats.



Aquatic environment impacts

Many of the processes involved in extraction, especially rock quarrying activities require water abstraction and control and management of dirty water. There are also potential problems of contamination of water bodies from surface water run-off. Suspended sediment in run-off can have severe negative impacts on invertebrate and plant life and on all stages of fish life. Quarry operators must comply with the Water Pollution Acts 1977-1990 and obtain a discharge licence if applicable. Sediment run off can be minimised through sediment traps, silt fences and sediment control ponds. It is best practice to prevent contamination of surface waters by spillages of fuels or other chemicals. This can be achieved through the use of designated fuelling areas, petrol/oil interceptors and drip pans. All washing and cleaning operations using detergents including the washing of plant and vehicles should be carried out in designated areas. The cleaning area should be isolated from the surface water drainage system and porous or unmade ground. Wash water should be recycled wherever possible. If excavating below the water table, a detailed hydrological study may need to be carried out to ascertain any threats to groundwater.

All chemicals, oils and lubricants should be stored in secure locations on drip trays or in suitably bunded areas away from sensitive locations such as watercourses. Foul effluent treatment systems e.g. septic tanks, should be maintained regularly in order to minimise risk to groundwater and surface water.

Top Tips

The top tip of all, for projects with Aquatic environment impacts, must be to make sure no silt gets into watercourses from the operation.

6 After-Life of exhausted sites

The greatest potential for biodiversity in relation to extractive sites is after the operation has ceased and the site has been abandoned. While many extraction sites (especially sand and gravel pits) will be returned to agricultural and forestry use, nature conservation presents a valuable after-life use. With time, nature reclaims a quarry and, left alone, the quarry landscape can revert to a rich zone of biodiversity with little intervention from human hands. Sand and gravel quarries have much greater potential for floral diversity than rock quarries particularly if they comprise calcareous materials.

The aim of any natural restoration plan is to restore ecological balance and to produce self-sustaining plant and wildlife communities and habitats. Old quarry sites can create both terrestrial and wetland habitats for wildlife, significantly contributing to Ireland's biodiversity goals and enhancing the environmental credentials of the company, potentially offering carbon credits.

6.1 Restoration - planning requirements

For newly registered extraction sites, extensions to existing quarries and development of new sites, local authorities often require detail on quarry restoration in planning applications. Responsibility for the restoration and the after-care of quarries and pits lies with the operator, and in the case of default, with the landowner (if different from the operator). Planning authorities will normally attach a 'financial surety' condition to planning permissions to ensure that all the work regarding rehabilitation will be carried out. Such sureties might be reviewable to reflect phased restoration works achieved during the operational phase of a site as an incentive to operators for early rehabilitation works. Planning authorities may also stipulate requirements on management of site and biodiversity in the 'after-care' period. It may be of benefit to see if local conservation groups can help with site management or monitoring during the 'after care' period.

6.2 Backfilling and Progressive Restoration

Since the extraction process is a temporary land-use, restoration and the desired final condition of the land should be considered in the design, operation and decommissioning of quarries. If restoration for agricultural or forestry purposes is intended then 'progressive restoration' should be carried out. This will limit the area of land being excavated at any one time and help minimise biodiversity impacts. Try to do so using indigenous soils, from topsoil or overburden. A soil survey will establish the quantity and quality of soils present and will help determine if this soil will meet restoration requirements. Progressive restoration is generally more appropriate for sand and gravel pits than quarries which can be difficult to manage as narrow seams of rock are followed. However, if biodiversity is to be a significant objective then consideration should be given to a balance between progressive restoration and creating physical habitat diversity.

Site Closure

When the site has ceased to operate, all equipment, fuel tanks, toilets and plant machinery should be removed. Any septic tanks should be emptied by a licensed contractor. A site should be secured to prevent access by unauthorised people.

6.3 Physical Diversity

Pits and quarries can be challenging to landscape as there is often little topsoil left and many exposed rock surfaces. During operation, it is preferable to excavate so that physical diversity is created thus promoting biological diversity after site closure. In excavating procedures, creating benches in rock and varied rock faces of a variety of angles and aspects is preferable over flat surfaces. Granular and fine materials which often get trapped in rock crevices aid rooting of plants and rough topography and rubble provide varied habitats. With sand and gravel quarries, open seams of sand with vertical faces should be left to encourage Sand Martins nesting.

Case Study

ICF Quarry of the Year 2007

Cregaree Quarry, Co. Mayo, McGrath Quarry Group

McGrath Quarry Group's Cregaree Quarry at Cong, Co. Mayo is located on an isthmus between Lough Mask and Lough Corrib in a very sensitive ecosphere.

The quarry was awarded Irish Concrete Federation Quarry of the Year 2007 for outstanding achievement in Environmental Management especially with regard to Water Management, Visual Impact Mitigation and Restoration Planning. The quarry supplies all types of aggregates, ready-mix concrete, blocks and high purity agricultural lime. The company has undertaken work for the restoration and protection of biodiversity at the site. They installed a water treatment plant in order to ensure high quality discharged ground water for the protection of salmon rivers and lakes.

A nursery was planted in 2004 where many different species of trees are grown. The quarry is a habitat for feral goats and the company have increased the depth of the buffer zone around the quarry to increase the habitat for the goats. Amenity walkways are planned to run along the perimeter of the site along by the dry canal.



Top Tips

- Discuss plans for restoration in pre-application phase.
- If promotion of biodiversity is the primary objective then backfilling may not be necessary - subsoil or quarry rubble will, with time, result in much greater floral diversity.
- Excavate to create physical diversity — this will help create a variety of potential habitats for flora and fauna.
- Evaluate the potential for habitat creation from on-site management features, e.g. wetland creation from drainage ponds.

6.4 Decommissioning

Habitats and species that are attracted to a site should be reflective of the local habitat and species in order to restore a natural ecological balance. When creating habitats, it is beneficial to create a new habitat block close to a similar habitat as this will assist colonisation by desirable species and will allow larger populations to inhabit the area. If this is not possible, a new isolated habitat or 'island' can be created. Extraction sites can also be rehabilitated to create wildlife corridors and networks through, for example, hedgerows and rivers.

Ponds and wetlands are frequently created in old quarry and pit sites. It is important to have gradual sloping shoreline banks with shallow areas to foster a variety of wildlife. Increasing shoreline length with peninsulas and the creation of islands will create a variety of habitats and nesting areas. Deeper ponds should be deep enough to maintain water through dry seasons to allow fish to survive.

Decommissioned quarries and pits frequently offer unfavourable conditions for vegetation growth. If there is no imperative to restore the site to agricultural use or to forestry or to encourage scrub to colonise then the quarry may best be left without intervention.

However, if plant, shrub or tree growth is the preferred land use then the following tips should help overcome this and contribute to increased biomass, which will ultimately provide habitat for nesting birds.

Biodiversity

- Ensure a variety of growing mediums, rock, rubble, etc. to encourage soil formation and plant colonisation.
- Try to use topsoil and overburden of local origin restoring the site.
- A varied mix of shrubs, trees and plants should be planted which are reflective of those in the surrounding environs. They should be planted in clusters to provide adequate habitat and to promote diversity.
- Plant native species as these will support a wider variety of wildlife.

Top Tips

- Consult with the NPWS and other stakeholders — this will help ensure the rehabilitation plan that is chosen best matches the local environment.
- Promote the good work you are doing — this can be done through ICF and NPWS contacts.
- Join Countdown 2010 directly if not already committed through ICF membership.

7 List of Contacts

Cooperation between quarry owners, operators, local authorities and the NPWS is necessary to ensure that biodiversity is considered in planning and that mitigation measures are implemented on the ground.

Below is a list of agencies and groups whose expert and local knowledge should be sought when devising a biodiversity protection and rehabilitation plan.

Potential Partners and Consultees

Organisations	Websites	Contact
National Parks and Wildlife Service	http://www.npws.ie/en/	Natureconservation@environ.ie biodiversitypolicy@environ.ie
Irish Concrete Federation	http://www.irishconcrete.ie	info@irishconcrete.ie
An Taisce — The National Trust for Ireland	http://www.antaisce.org/	Anja.murray@antaisce.org
The Heritage Council	http://www.heritagecouncil.ie/	mail@heritagecouncil.com Planning – Alison@heritagecouncil.com
Bird Watch Ireland	http://www.birdwatchireland.ie/	info@birdwatchireland.ie
Bat Conservation Ireland	http://www.batconservationireland.org/	Membership@batconservation.org
Irish Peatland Conservation Council	http://www.ipcc.ie/	bogs@ipcc.ie
Regional Fisheries Boards	http://www.cfb.ie/regions/index.html	info@cfb.ie
Waterways Ireland	http://www.waterwaysireland.org/	info@waterwaysireland.org
Anglers and River Conservation Organisations	There are various organisations found throughout the country which should be consulted if developing near waterways.	
Irish Wildlife Trust	http://www.iwt.ie/	enquiries@iwt.ie

8 References and Further Information

DEHLG (2004) 'Quarries and Ancillary Activities – Guidelines for Planning Authorities', (Especially ch. 3).

EC (2000b) 'Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC', Office for Official Publications of the European Communities, Luxembourg.

EC (2001) 'Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC', Office for Official Publications of the European Communities, Luxembourg.

EC (2007) 'Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission', Office for Official Publications of the European Communities, Luxembourg.

English Nature, Quarry Products Association and Silica & Moulding Sands Association (1999) 'Biodiversity and Minerals – Extracting the Benefits for Wildlife'.

EPA (2006) 'Environmental Management in the Extractive Industry (Non-scheduled Minerals)', Final Project Report, April 2006.

EPA (2002) 'Guidelines on Information to be contained in Environmental Impact Statements'.

ICF (2005) 'Environmental Code: Second Edition' – October 2005.

'Section 261 Planning and Development Act' 2000.

'Planning and Development Regulations 2001', Schedule 7.

GS/ICF (2008) 'Geological Heritage Guidelines for the Extractive Industry'.

ICF/Duchas "Code of Practice between the Department of the Environment, Heritage and Local Government and the Irish Concrete Federation" 2009.

Website Links

Global and European

CBD – <http://www.cbd.int>

Countdown 2010 - <http://www.countdown2010.net/>

EUPG – <http://www.uepg.eu/>

European Biodiversity Legislation (General) -

http://ec.europa.eu/environment/nature/index_en.htm

Habitats Directive

http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm

Birds Directive

<http://eur-lex.europa.eu/LexUriServ/site/en/consleg/1979/L/01979L0409-20070101-en.pdf>

Water Framework Directive - <http://www.wfdireland.ie/>

Ireland

Information on Irish wildlife legislation can be obtained from: <http://www.npws.ie> and <http://www.irishstatutebook.ie/>

Planning and Development Act 2000 - <http://acts.oireachtas.ie/en.act.2000.0030.1.html>

National Biodiversity Plan - <http://www.npws.ie/en/Biodiversity/Ireland/>

NationalBiodiversityPlan/

