NATURA 2000

GUIDANCE DOCUMENT

Non-energy mineral extraction and Natura 2000

nature

EUROPEAN COMMISSION

environment

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EC GUIDANCE ON:

UNDERTAKING NON-ENERGY EXTRACTIVE ACTIVITIES

IN ACCORDANCE

WITH NATURA 2000 REQUIREMENTS

July 2010

NATURA 2000

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PURPOSE OF THIS GUIDANCE DOCUMENT

Background

The Non-Energy Extractive Industry (NEEI) provides many of the basic raw materials for Europe's manufacturing and construction activities. In November 2008, the European Commission adopted a Raw Materials Initiative which sets out targeted measures to secure and improve access to raw materials both within the EU and globally.

It identified a range of factors which could potentially influence the competitiveness of industry. One of these factors relates to the difficulties it sometimes faces in having access to land. This has led to situations where individual plans and projects have come into conflict with competing land uses or broader societal interests, including nature conservation.

The EU Habitats and Birds Directives are the cornerstones of the Europe's biodiversity policy. At their heart lies the creation of a network of sites designed to safeguard Europe's rarest and most endangered species and habitat types – the Natura 2000 Network. There is no automatic exclusion of NEEI activities in and around Natura 2000. Instead, extractive activities shall follow the provisions outlined in Article 6 of the Habitats Directive to ensure that these activities do not adversely affect the integrity of Natura 2000 sites.

Purpose of this Guidance document

The purpose of this document is to provide guidance on how best to ensure that NEEI developments are compatible with the provisions of the two EU Directives. It focuses in particular on the procedures to follow under Article 6 and provides clarifications on certain key aspects of this approval process in the context of NEEI developments in particular.

The document has been written in close collaboration with representatives of different industry sectors, experts, public authorities and NGOs via a dedicated EC Working Group. It is designed principally for use by competent authorities and developers, as well as consultants, site managers and other practitioners who are involved in the planning, design, implementation or approval of mineral plans or NEEI projects. It is hoped that it will also be of interest to other organisations such as NGOs and international bodies, and the general public.

Structure and Contents

The document is made up of 9 main sections:

- Chapter 1: provides an overview of the NEEI industry in Europe and EU Raw Materials Initiative.
- Chapter 2: introduces the EU's biodiversity policy and key provisions of the Habitats and Birds Directives in particular. It explores the relationship between Strategic Environmental Assessments, Environmental Impact Assessments and Appropriate Assessments under the Habitats Directive.
- Chapter 3**:** reviews the different types of impacts that NEEI extraction activities might have and how they may impact species and habitats of Community interest protected under the Habitats and Birds Directives.

- Chapter 4: examines how strategic planning can create a more integrated sustainable development strategy for the mineral sector whilst also taking account of wider societal concerns, such as nature conservation, at a very early stage in the decision making process.

- Chapter 5: focuses on the provisions of Article 6.3 of the Habitats Directive and offers a step-by-step guide of the procedures to follow when assessing NEEI plans or projects that might affect Natura 2000 sites. It provides advice on how to carry out an Appropriate Assessment, how to determine whether there are any adverse effects on the integrity of a Natura 2000 site and how to mitigate against these, where possible.

- Chapter 6**:** reviews the provisions of Article 6.4 which allow, in exceptional cases, the approval of plans or projects for which it cannot be ascertained that they will not adversely affect a Natura 2000 site , when they are considered of overriding public interest and there are no alternatives. In such cases appropriate compensation measures will be required.

- Chapter 7: reviews various NEEI activities such as site rehabilitation and biodiversity offsetting and explores how they relate to the provisions of Article 6.

- Chapter 8**:** looks at extractive activities in the context of the marine environment.

- Chapter 9: concludes with sections on long term monitoring and the importance of good cooperation between the industry, relevant public authorities and other stakeholders;

Limitations of the document

This guidance document is intended to be bound by and faithful to the text of the Birds and Habitats Directives and to the wider principles underpinning Community policy on the environment and on raw materials. It is not legislative in character, it does not make new rules but rather provides further guidance on the application of those that already exist. As such, it reflects only the views of the Commission services and is not of a legally binding nature. It rests with the EU Court of Justice to provide definitive interpretation of a Directive. Wherever relevant, existing case law has been included when clear positions have already been taken by the Court

The document also does not replace the Commission's existing general interpretative and methodological guidance documents on the provisions of Article 6 of the Habitats Directive[1]. Instead, it seeks to clarify specific aspects of these provisions and place them in the context of non energy mineral extraction in particular. The present guide must therefore always be read in conjunction with the existing general guidance and the two Directives.

Finally, the guidance recognises the two nature Directives are enshrined by the principle of subsidiarity and that it is for Member States to determine the procedural requirements deriving from the Directives. The good practice procedures described in this document are not prescriptive in their intent; rather they aim to offer useful advice, ideas and suggestions based on extensive discussions with NEEI industry representatives, NGOs and other stakeholders through the Commission's NEEI Working group.

The Commission would like to thank all those who participated in the Working Group for their valuable contributions and discussions. This has been central to the elaboration of the present guidance document.

[1] "Managing Natura 2000 sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC".
"Assessments 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".
"Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC"
http://ec.europa.eu/environment/nature/natura2000/management/guidance_en.htm

1. NON- ENERGY EXTRACTIVE INDUSTRY IN THE EU

- *The non-energy extractive industry (NEEI) provides many of the basic raw materials for Europe's manufacturing and construction industries and is therefore central to the EU's economic competitiveness, generating a significant turnover and employment*
- *It is divided into three main sub-sectors: construction minerals, industrial minerals and metallic minerals. The construction industry represents the largest of the three sub-sectors.*
- *In November 2008, the European Commission adopted a Raw Materials Initiative which sets out targeted measures to secure and improve access to raw materials in the UE both within the EU and worldwide*
- *Within the EU a range of factors have been identified which could potentially influence the competitiveness of the NEEI industry. One important factor relates to the competition for the use of land for different purposes;*

1.1 The non-energy extractive industry in the EU: an overview per sub-sector

The Non-Energy Extractive Industry (NEEI) provides many of the basic raw materials for Europe's manufacturing and construction industries. In 2007, it generated a turnover of around €49 billion and provided employment for about 287,000 people[2]. Yet, its economic importance is even greater if one considers the added value brought to larger downstream sectors whose businesses are dependant upon a steady supply of raw minerals.

The European NEEI sector is often divided into three main sub-sectors – 'construction' minerals, 'industrial' minerals and 'metallic' minerals - depending on the physical and chemical characteristics of the minerals concerned and, in particular, on their uses and on the downstream industries they supply (see box).

The three main groups of raw minerals extracted by NEEI industries

- ***Construction minerals*** *are usually considered as including aggregates in a range of particle sizes such as sand, gravel and various types of crushed rocks (eg chalk, limestone, sandstone, chalk, slate..), natural rock materials (such as marble and granite) plus a range of clays, gypsum and shale.*
- ***Industrial minerals*** *can loosely be classified as physical minerals (eg bentonite, borates, calcium carbonates, diatomites, feldspar, kaolin, plastic clays, silica and talc) or chemical minerals (eg salt, potash and sulphur)*
- ***Metallic minerals*** *include a wide range of ores which, following processing, yield metals or metallic substances such as bauxite, chromium, copper, gold, lithum, manganese, nickel, selenium, silver, tin, tungsten etc…*

[2] http://ec.europa.eu/enterprise/sectors/metals-minerals/files/sec_2007_771_en.pdf

- *Construction minerals*

The extraction of '*construction minerals'*, and aggregates[3] in particular, represents the largest sub-sector of the NEEI industry within the EU in terms of value and volume.

Potential sources of raw construction minerals are widely distributed across all Member States and are extracted in large quantities (ca 3 billion tonnes annually)[4].The amount produced does however vary significantly between countries: Germany, France, Italy, Spain and the UK together account for the majority of its production.

Aggregates have a wide range of uses, including in the construction of buildings, roads and railways. Demand for aggregates is therefore closely related to the level of new house-building, maintenance and repair of existing buildings and the scale of civil engineering projects. It is estimated that there are currently around 22,000 sites being exploited across the EU, many of which are close to built up areas[5]. Transport costs dominate the price of aggregates which means that most markets are local or regional and there is relatively little international trade. This requires an adequate network of pits and quarries in order to reduce transport distances and associated cost and environmental impact.

- *Industrial minerals*

The EU also mines a range of '*industrial minerals'*, including feldspar, kaolin, mangesite, perlite, potash and salt. Whilst some are found in around half of the Member States, others, such as fluorspar, mica, phosphate rock and sulphur are extracted in just one or two countries. Overall, the production of most industrial minerals has remained stable, or has increased, over the last 10 years.

Industrial minerals are used in a very wide range of industries, but, in contrast to base or precious metallic minerals, they are not marketed or sold as standardised products via centralised markets. Instead, they are most often sold directly to the end-user. So, although a few industrial minerals are traded globally, most are processed and used in manufacturing within the EU. The relatively high cost of transport has a significant impact on the delivery price and effectively limits the geographical availability of suitable resources.

- *Metallic minerals*

Comparatively few '*metallic minerals'* are mined within the EU. They include chromium, copper, iron ore, nickel, lead, silver and zinc. The geology of the European continent is such that other raw metallic materials are not found in large quantities within EU borders, or are only found in situations where extraction is technically difficult and expensive.

The current distribution of mines is consequently limited to a relatively small number of Member States. Only Austria, Finland, Greece, Ireland, Poland, Portugal and Sweden have metal mining industries that contribute more than 1% of the global production of one particular metallic mineral. As a result, many metallic minerals are imported from the rest of the world.

[3] Crushed rock plus sand and gravel

[4] Small but increasing amounts of aggregates are also produced from by-products of other industrial processes, such as blast and furnace slags or residues from mineral process such as china clay sands and left-overs from stone quarrying and from reprocessing of material previously used in construction.

[5] In the Netherlands and Belgium, due to the relatively limited aggregate reserves, raw materials are more frequently transported over longer distance along navigable rivers and canals. Similarly highly populated cities such as London or Paris have to obtain much of their aggregates from more distant sites.

The main initial markets for metal ores and concentrates in the EU are the refining and processing sectors which produce semi-finished and finished products for many other segments of the manufacturing industry.

Within the three sub-sectors, construction minerals present the biggest challenge for recycling in terms of volumes involved, while metals present the biggest economic opportunities for recycling. Many metals, including iron and steel, copper, tin, lead and aluminium are relatively simple to recycle as they can be melted down and recast without losing their important characteristics. But this potential is not yet fully realised as end-of-life products are often exported outside the EU and consequently lost to the EU market.

1.2 The EU policy framework for the NEEI industry

Securing reliable and undistorted access to raw materials is an increasingly important factor for the EU's economic competitiveness and, hence, vital to the success of the Lisbon Partnership for growth and jobs. Recognising this, the European Commission adopted, in November 2008, a Raw Materials Initiative which sets out targeted measures to secure and improve access to raw materials for the EU[6].

The Raw Materials Initiative is based on three pillars:

- ensuring **access to raw materials** from international markets under the same conditions as other industrial competitors;
- setting the **right framework conditions** within the EU in order to foster a sustainable supply from European sources; and
- **boosting overall resource efficiency and promoting recycling** in order to reduce the EU's consumption of primary raw materials and decrease the relative import dependence.

Building on the findings of a comprehensive analysis of the competitiveness of the NEEI industry in the EU[7], the Initiative calls for an integrated approach through which relevant EU policies and instruments work in concert to ensure the availability of essential raw materials, and the sustainability in their extraction and use.

The first pillar is related to active raw materials diplomacy and ensures a fair, undistorted and secure access to raw minerals. It responds also to the fact that the majority of Europe's metallic minerals have to be imported (in 2007 this represented a trade deficit of over €20 billion). Policy dialogues with third countries, emerging economies and their regional groupings follow the principle of 'mutual interest'. One major line of action concerns the promotion of sustainable access to raw materials in the field of development policy, in particular, the dialogue and actions with Africa in the area of access to raw minerals and on natural resources management as well as transport infrastructure are reinforced in view of sustainability and social responsibility[8].

The import dependency renders the EU's manufacturing sector vulnerable to outside market influences. In recent years, the price of many minerals has risen sharply due to the rapid industrialisation of emerging countries, such as Brazil, China and India. Many resource-rich

[6] Commission communication of 4.11.08 'the raw materials initiative – meeting our critical needs for growth and jobs in Europe, Com (2008) 699 final.
[7] Commission staff working document of 4.6.07, SEC(2007)771
[8] http://www.euroafrica-ict.org/downloads/EAS2007_action_plan_2008_2010_en.pdf

countries are now also restricting exports in favour of their own domestic manufacturers, which puts the EU's industry at a competitive disadvantage. In line with the Raw Materials Initiative, the EU will tackle any unfair trade[9].

The second pillar addresses the industry's concerns over access to raw mineral sources within the EU, and in particular the related regulatory framework. Differing regulatory procedures, planning processes and environmental, health and safety protection rules have the potential to constrain mining activities or increase their costs. Moreover, gaining access for mining can be both expensive and time-consuming, particularly where land is already in use for other activities. The European Commission will therefore work with Member States to improve the framework conditions on which mineral extraction depends, with the objective of simplifying and speeding up the administrative processes.

The EU initiative will also seek to improve the investigation and sharing of knowledge about mineral deposits throughout the Union. One of the goals is to ensure that areas with a high potential for mineral deposits are not unnecessarily sterilised. In addition, it will support research projects aimed at developing new extraction techniques for raw minerals which may in turn also reduce their environmental impact.

The third pillar aims to promote better resource efficiency and recycling. At present, a significant proportion of end-of-life products are not reliably processed to recover valuable materials, especially high-tech metals, which can be recycled. In particular, waste products are exported from Europe without effective controls over their final destination and processing prospects. The Commission intends to work with Member States to improve verification of the destiny of such waste shipments, to reduce the environmental damage caused and increase the proportion of recycling of their components.

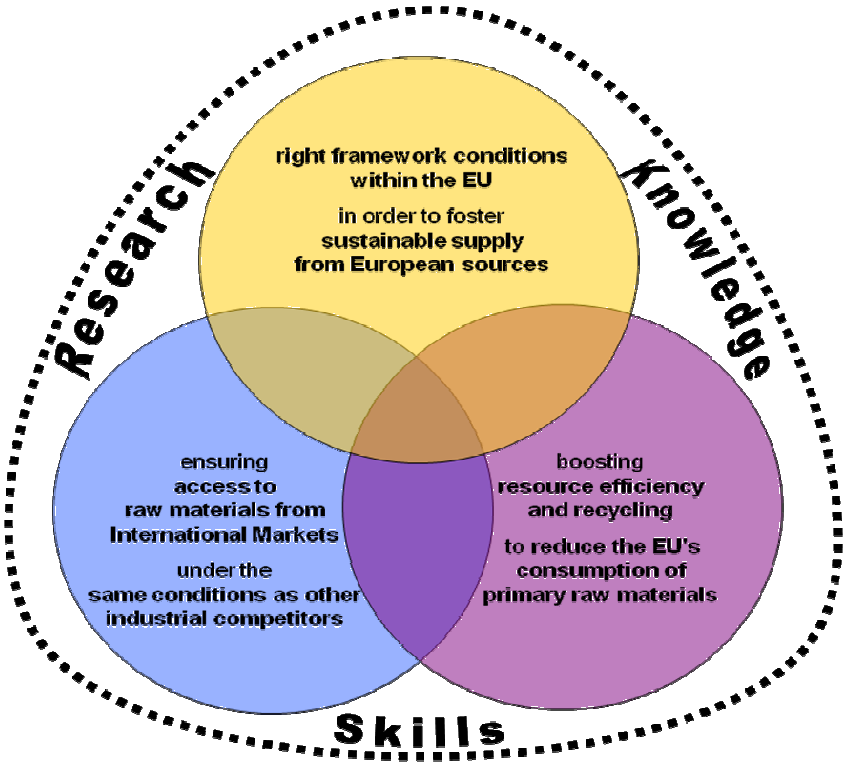


Figure 1: Key elements of the EU's Raw Materials Initiative

[9] http://ec.europa.eu/trade/tackling-unfair-trade/

1.3 Factors influencing non-energy extraction within Europe: access to land

Regarding the second pillar of the Raw Materials Initiative, a range of factors have been identified which could potentially influence the competitiveness of the European non-energy extractive industry[10]. They vary from concerns over the diversity and complexity of permit procedures in different Member States to conflicts with other land uses, the lack of availability of a skilled workforce and environment or health and safety requirements. They also reflect the need for more innovative extraction techniques and better knowledge of where potential resources are located.

The extractive industry is confined to locations with known and commercially viable deposits of minerals. The occurrence of minerals is determined by past geological activity, and knowledge of their distribution is very much a function of the level of investment in geological mapping, prospecting and exploration. The industry cannot therefore necessarily seek to operate only in areas where there would be no conflict with other land uses, the general public or areas of conservation, landscape or visual importance.

Access to land has been highlighted in particular. This is at least partly due to the nature of the NEEI sector. Although the EU has many raw mineral deposits, they are spread unevenly across the territory and are of varying quality. The industry can therefore only operate where the minerals are present.

Moreover, not all deposits are commercially viable and the decision over whether to exploit a particular site will be heavily influenced by market demand as well as the degree of initial investment required and the cost of transporting resources to the end user. The cost of transport, in particular, increases significantly the further away the goods have to be transported and effectively limits the geographical availability of such minerals (see table 1).

	By Road		By Rail		By water	
Sub-sector	Av transport distance	% of total transported	Av transport distance	% of total transported	Av transport distance	% of total transported
Construction minerals						
Estimated average*	33km	89%	148 km	6%	142 km	5%
Industrial minerals						
2001	245 km	63%	234 km	15%	2482 km	22%
2002	-	63%	-	22%	-	15%
2003	-	68%	-	19%	-	13%
Metallic minerals						
2001	232 km	62%	273 km	16%	4494 km	22%
2002	84 km	15%	225 km	78%	1583 km	8%
2003	59 km	7%	203 km	81%	912 km	12%

* *reported figures for this sub-sector are limited as the information about onward transport to the customer is not readily available*

Table 1. Transport distances and modes used for the three sub-sectors during 2001-2003[11] .

In practice, this means that many quarries are often located close to or in the vicinity of where the raw minerals are needed, for instance near growth centres. For the same reasons, new quarries also tend to be placed near existing operations, although entirely new 'greenfield' sites are occasionally explored and developed as well.

[10] SEC (2007) 771

[11] EU Non-Energy Extractive Industry Sustainable Development Indicators 2001-2003; http://www.uepg.eu/uploads/documents/pub-3_en-final_report_2001_2003.pdf

This need for access to particular parcels of land also means that, whilst the amount of land required for non-energy extraction is relatively small in absolute terms (less than 1% of the EU territory), individual development projects may nevertheless come into conflict with competing land uses or broader societal interests, or they may have an unacceptably high environmental impact. This has to be examined on a case-by-case basis as much depends on where precisely the development is proposed to take place and how the extraction process will be done.

Nevertheless, one of the most frequently cited concerns of the NEEI industry is the difficulty it has in obtaining new permits to replace exhausted sites or to explore and exploit new sources.

It is beyond the scope of this document to elaborate on all of the issues raised in detail[12] Like all developments, the NEEI industry's activities must find a balance between their aspirations and those of other economic interests as well as the natural environment and broader societal concerns in order to ensure that they operate in a sustainable manner.

This guidance document concentrates specifically on one element: that of clarifying how the provisions of the Habitats and Birds Directives apply to NEEI development plans and projects. It is in direct response to the commitment made under the second pillar of the EU's Raw Materials Initiative and, as such, aims to provide sector-specific guidance on how to apply the EU's nature legislation in the context of the NEEI industry in particular[13].

[12] See SEC(2007) 771 for details

[13] In a separate document the Commission will publish a report on the implementation of the Raw Materials Initiative by the end of 2010. In a sub-report an ad-hoc working group on best practice on land use planning will also report back on best practice examples in mineral and land use planning applying in Member States.

2. THE EU'S POLICY FRAMEWORK AND LEGISLATION FOR NATURE AND BIODIVERSITY

- *The EU 'Habitats' and 'Birds' Directives are the cornerstones of the EU's biodiversity policy. They enable all Member States to work together to protect and ensure the survival of Europe's most endangered and vulnerable species and habitat types.*
- *Central to the two Directives is the creation of the Natura 2000 Network, an ecological network of sites spanning 27 EU countries. Nearly 26,000 sites are included in the Network so far, covering almost 18% of the EU's land area. The marine component of the Network is not yet complete.*
- *NEEI projects in and around Natura 2000 sites are not automatically excluded. Instead, if they are likely to have a significant effect on the site in question, they must be subject to an Appropriate Assessment. Depending on the outcome, a decision will be taken whether or not to approve the plan or project and if so under what conditions. The aim is to avoid an adverse effect on the integrity of the Natura 2000 site.*
- *In exceptional cases, developments that could have an adverse effect on a Natura 2000 site can still go ahead under certain conditions where the procedural safeguards foreseen by the two nature Directives are respected.*
- *NEEI plans and projects may also be subject to the provisions of the SEA and the EIA Directives but these are distinct, and different, from the appropriate assessment undertaken under the Habitats Directive.*

2.1 Introduction

In order to meet the continuing demand for raw minerals within the EU, new extraction sites may have to be developed as old quarries become exhausted. It will be important to ensure that these new developments are sustainable in all respects and are achieved without unnecessary damage to the natural environment and to Europe's natural heritage.

Like any other industrial activities entailing the use of land or sea, NEEI developments inevitably have an ecological footprint and, although the actual land-take is comparatively small compared to some other industrial activities and land uses, the impacts on the natural environment still need to be considered and addressed where relevant.

This chapter outlines the EU key environmental laws that must be applied when developing new non-energy extraction plans and projects in the EU. Subsequent chapters will provide further detailed guidance as regards developments affecting Natura 2000 sites in particular.

2.2 The EU's commitment to halting biodiversity loss

Biodiversity conservation is high on the EU political agenda. At the European Summit in Gothenburg in 2001, the European Union set itself the goal "*to halt the loss of biodiversity in the EU by 2010*". This commitment is firmly embedded in all aspects of EU policy. Biodiversity conservation is also identified as one of the key operational objectives of the Sustainable Development Strategy (SDS)[14] and the Lisbon partnership for growth and jobs. Given the imminent expiry of the 2010 target and the realisation that the target will be

[14] COM (2001) 264 final; Renewed EU Sustainable Development Strategy adopted June 2006.

missed, a new biodiversity target for 2020 was adopted by the Council of the European Union on 15 March 2010 and subsequently endorsed by the European Council on 26 March. This new target aims at "*halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss.*"

The 6th Environment Action Programme (6th EAP)[15], which sets out the framework for environmental policy-making in the EU for the period 2002-2012, has 'nature and biodiversity' as one of four priority areas for action. The 6th EAP also advocates full integration of environmental protection requirements, including those related to biodiversity conservation, into all other Community policies and actions.

The details of how this is to be achieved are laid down in the European Commission's EU Biodiversity Action Plan adopted in 2006[16]. The EU Action Plan represents an important new approach for EU biodiversity policy as it is the first time that all the relevant economic sectors and policy areas are addressed in a single strategy document and apportioned a share of the responsibility in its implementation[17]. It recognises that change will only happen if there is a concerted effort from all economic sectors to help deliver the 2010 target.

The EU Plan also stresses the economic value provided to society by the ecosystem services that nature provides and upon which our economy and social wellbeing depends. Healthy ecosystems help purify the air and water, and regulate the climate. They also provide basic goods such as food, fibre and wood. Preserving and restoring healthy ecosystems will be important in helping to fight the potentially devastating effects of climate change in years to come.

The Commission will present a new EU biodiversity strategy by the end of 2010 on the basis of the Communication on an EU vision and target for biodiversity beyond 2010 (COM(2010) 4 final, 19.1.2010) and the EU Council Conclusions on biodiversity post-2010 adopted on 15 March 2010. This strategy should set a limited number of measurable sub-targets for different ecosystems, driving forces, pressures and responses, and ensure their integration into relevant internal and external EU sectoral policies. An innovative aspect of the 2020 biodiversity strategy will be the establishment of a biodiversity baseline that will enable us to assess progress towards reaching the target. The EU strategy[18] will be developed with a view to the global post-2010 biodiversity framework that is to be adopted under the United Nations Convention on Biological Diversity in October 2010.

Biodiversity and climate change

The Intergovernmental Panel on Climate Change (IPCC) predicts that average surface temperatures across the globe will rise by 2–6.4°C by 2100 compared to pre-industrial levels. The impact on biodiversity and ecosystems is hard to estimate but is expected to be very considerable. Already studies show that many species are experiencing difficulties in adapting to the changing climate and that this is exposing them to an even greater risk of extinction.

[15] Decision No 1600/2002/EC, OJ L 242, 10.9.2002,

[16] COM/2006/0216 final. http://ec.europa.eu/environment/nature/biodiversity/comm2006/index_en.htm

[17] One of the actions foreseen is to develop business and biodiversity partnership and to facilitate such partnerships at the Community level. Accordingly, an initiative was launched in 2007 to strengthen the links between business and biodiversity protection, under the title "Building Better Partnerships: linking Business to Biodiversity" (The EU B@B initiative): http://ec.europa.eu/environment/nature/partnerships/index_en.htm, http://www.countdown2010.net/business

[18] Further developments can be followed at http://ec.europa.eu/environment/nature/biodiversity/policy/index_en.htm

Climate change also puts at risk the valuable ecosystems upon which society depends for important goods and services, such as flood prevention or carbon storage. Healthy ecosystems are an essential component of any climate mitigation strategy but, like wildlife, they are under significant pressure from habitat loss and degradation. According to Millennium Ecosystems Assessment, ecosystems have suffered more human induced fragmentation in Europe than in any other continent.

The abilities of ecosystems and species to respond to the demands of climate change will be largely determined by how effectively they are safeguarded from inappropriate development and other land uses and how active we are in restoring what has already been damaged.

2.3 The Habitats and Birds Directives

The Birds and the Habitats Directives are the cornerstones of the EU biodiversity policy. They enable all 27 EU Member States to work together, within a common legislative framework, to protect some of Europe's most valuable species and habitats across their entire natural range within the EU, irrespective of political or administrative boundaries.

The Directives have two main objectives:

- they protect species in their own right across the EU (through species protection provisions);
- they conserve certain rare and endangered habitat types or the core habitats of certain rare and endangered species in order to ensure their continued survival (through site protection provisions leading to the establishment of the Natura 2000 Network)

In the case of the latter, it is important to note that the Natura 2000 Network is not a system of strict nature reserves where all human activities are excluded. Instead, the two Directives provide a common legislative framework, applicable in all EU countries which ensures that human activities – *inter alia* NEEI activities – are undertaken in a way that does not adversely affect the integrity of Natura 2000 sites.

Article 6 of the Habitats Directive lays down, in its paragraphs 3 and 4, procedural safeguards to be followed in the case of plans and projects. Its provisions are explained in greater detail in subsequent chapters. But first it is useful to understand the general purpose of the two Directives.

2.3.1 Overall objectives of the Birds and Habitats Directives[19]

The overall objective of the Birds Directive, adopted in 1979, is to maintain and restore the populations of naturally occurring wild bird species present in the EU (ca 500 species) at a level which will ensure their survival over the long term. This should '*correspond in particular to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements' (cf Article 2)*.

The Habitats Directive, adopted in 1992, has similar objectives to the Birds Directive but covers species other than birds as well as habitat types in their own right. Its aim is to ensure the conservation of around 1000 species of endangered, rare, endemic or vulnerable wild

[19] Directive 2009/147/EC of the European Parliament and of the Council (codified version of Council Directive 79/409/EEC on the conservation of wild birds, as amended)
Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, consolidated version reference 01992L0043 of 01.01.2007 – see http://ec.europa.eu/environment/nature/legislation/index_en.htm

animals and plants listed in its annexes as well as a further 230 habitat types which are in danger of disappearing.

It should be noted that the Directives do not cover *every* species of plants and animals in the EU (i.e. not all of the EU's biodiversity). Instead, it focuses on a sub-set of around 1500 species - often referred to as species of Community interest - which need protection in order to ensure their long-term survival within the EU.

2.3.2 Species protection provisions

As regards species protection, both Directives require that Member States establish a general system of protection for all wild bird species in the EU and for species listed in Annex IV of the Habitats Directive throughout the natural range of the species within the EU. These provisions apply both inside and outside protected areas. The exact terms are laid down in article 5 of the Birds Directive and Article 12 (for animals) and Article 13 (for plants) of the Habitats Directive (see main elements in the table below).

Article 5 of Birds Directive

Member States should take the requisite measures to establish a general system of protection for all wild bird species throughout their natural range within the EU. In particular they should prohibit the following:

- *deliberate killing or capture by any method;*
- *deliberate destruction of, or damage to, their nests and eggs or removal of their nests;*
- *taking their eggs in the wild and keeping of eggs;*
- *deliberate disturbance of these birds particularly during the period of breeding and rearing, in so far as this would have a significant negative effect on the birds;*
- *keeping the birds in captivity and their sale.*

Article 12 and 13 Habitats Directive

Member States should take the requisite measures to protect the species listed in Annex IV throughout its natural range within Europe.

*In the case of **protected animals** this means prohibiting the:*
- *deliberate killing or capture by any method;*
- *deliberate disturbance, particularly during breeding, rearing, hibernation and migration;*
- *deliberate destruction or taking of eggs in the wild;*
- *deterioration or destruction of breeding sites or resting places;*
- *the keeping, sale and transport of specimens the from the wild.*

*In the case of **protected plants** this mean prohibiting:*
- *the deliberate picking, collecting, cutting, uprooting or destruction of such plants in the wild;*
- *the keeping, transport of sale of such species taken from the wild.*

Derogations are allowed in some circumstances (e.g. to prevent serious damage to crops, livestock, forests, fisheries and water) provided there is no other satisfactory solution and the consequences of these derogations are not incompatible with the aims of the Directives. The conditions for applying derogations are set out in Article 9 of the Birds Directive and Article 16 of the Habitats Directive[20].

2.3.3 Habitat protection provisions: the Natura 2000 Network:

Some species and habitat types are so endangered that they require their core habitats to be protected as well. Collectively, these sites make up the Natura 2000 Network, an ecological network of nature conservation sites spanning all 27 EU countries.

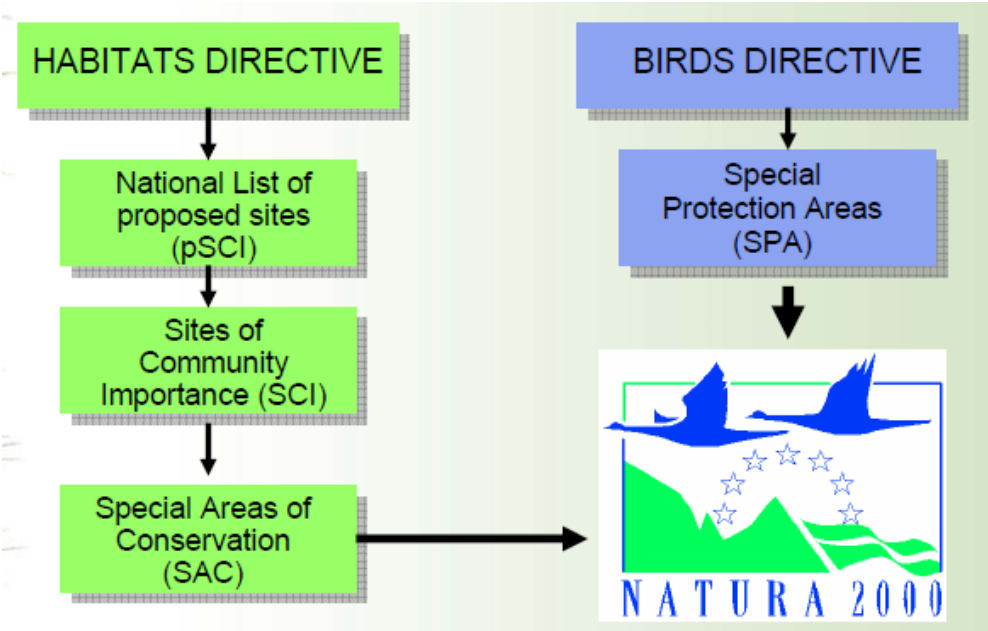
[20] 'Guidance document on the strict protection of animal species of Community interest under Directive 92/43/EEC http://ec.europa.eu/environment/nature/conservation/species/guidance/index_en.htm

Under the Habitats Directive, core sites need to be protected for the habitat types listed in Annex I and species listed in Annex II[21]. The first step is for Member States to propose a national list of possible sites for inclusion in Natura 2000. These are then examined at a biogeographical level[22] to ensure that they offer sufficient coverage for the species or habitat concerned. These sites, once adopted by the Commission, become Sites of Community Importance (SCIs) and form part of the Natura 2000 Network and are protected by Article 6. It is important to note that the selection of SCIs must be done on scientific grounds only. Member States may not take economic aspects into account at this stage.[23]

Once a site becomes an SCI, Member States have six years at most to designate it as a Special Area of Conservation (SAC) and establish the necessary conservation measures to maintain and restore the habitats and species at a favourable conservation status. At this stage practical management solutions that help integrate these conservation needs into other land use activities may be explored, where possible taking socio-economic issues into account.

Under the Birds Directive, sites need to be classified for ca 190 species of birds listed in Annex I of the Directive. Member States must classify sites for other regularly occurring migratory bird species not listed in Annex I, bearing in mind the need to protect their breeding, moulting and wintering areas and staging posts along their migration routes, eg wetlands of international importance. These sites are called Special Protection Areas (SPAs) and are included directly into the European Natura 2000 Network[24].

By December 2009, some 25,800 sites (covering some 22,400 SCIs and 5,200 SPAs) were included in the Natura 2000 Network[25]. Together, they cover around 17.6% of the land area



[21] There is considerable overlap between the species listed in annex II and those listed in annex IV but not all Annex IV species require specific site protection under Natura 2000 so they are not all listed in annex II.
[22] The EU has 9 biogeographical regions, each with its own characteristic blend of vegetation, climate, topography and geology. Working at this level makes it easier to check species and habitat conservation trends under similar natural conditions, irrespective of national boundaries.
[23] ECJ Ruling C-371/98, First Corporate Shipping LTD.
[24] In contrast to the Habitats Directive, there is no intermediary step of selecting sites according to biogeographical region in the case of SPAs. These are included directly into the Natura 2000 Network
[25] European Commission, http://ec.europa.eu/environment/nature/natura2000/barometer/index_en.htm

in the EU-27[26]. About 1400 SCIs and 600 SPAs include a marine part but further sites will need to be added to complete the marine component of the network. The aim is to achieve this by 2012.

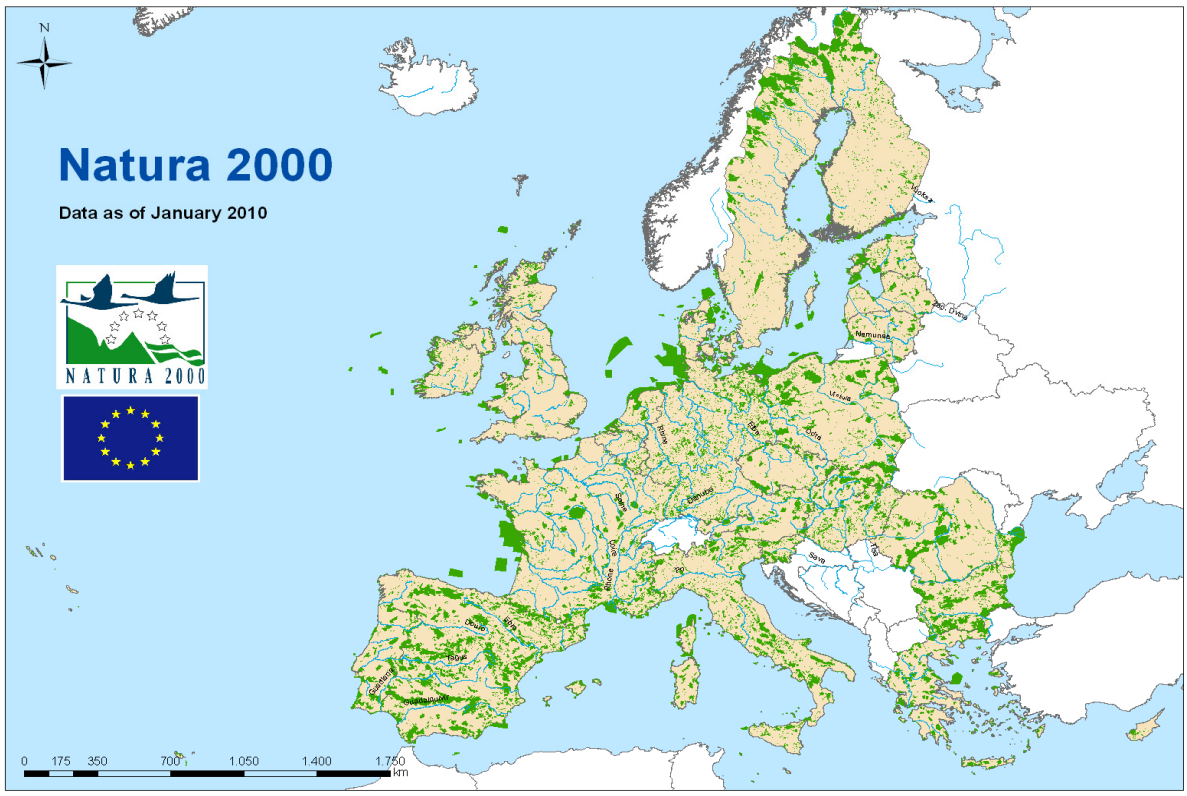


Figure 2: the European Natura 2000 Network across EU-27, status January 2010

2.3.4 Managing and conserving Natura 2000 sites

Within Natura 2000 sites, Member States must:

- take appropriate conservation measures to maintain and restore the habitats and species *for which the site has been designated* to a favourable conservation status (Article 6.1).
- avoid damaging activities that could significantly disturb these species or deteriorate the natural habitat types or habitats of the protected species (Article 6.2);

The competent authorities in each country should identify the conservation objectives for Natura 2000 sites at the latest 6 years after the adoption of the site as Site of Community Interest (or in the case of SPA immediately upon classification). These conservation objectives are to be based on the status and ecological requirements of the habitats and species for which the site is designated Natura 2000. The ultimate objective is to ensure that the species and habitat types are maintained or restored to a favourable conservation status across their natural range.[27]

[26] There is sometimes considerable overlap between SPAs and SCIs so the figures are not cumulative

[27] The concept of Favourable Conservation Status is not mentioned in the Birds Directive but there are analogous requirements, i.e. all SPAs must still be subject to special habitat conservation measures in order to ensure the survival and reproduction of the Annex I birds in their area of distribution.

What does favourable conservation status mean in practice?

The ultimate objective of the Habitats Directive is to ensure that the species and habitat types covered reach what is called a 'favourable conservation status' and that their long-term survival is deemed secure across their entire natural range within Europe.

In the case of the species covered by the Directive (ref Article 1i)) this means that:
- *populations are maintaining themselves over the long term and are no longer showing signs of continuing decline;*
- *their natural range is not being reduced;*
- *there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.*

In the case of a habitat type, favourable conservation status (ref Article 1(e)) is achieved when:
- *its natural range and the areas it covers within that range are stable or increasing; and*
- *the specific structure and function which are necessary for its long-term maintenance are present and are likely to continue to exist in the foreseeable future;*
- *the conservation status of typical species that live in the habitat type is favourable as well.*

As regards the conservation measures that should be undertaken on individual Natura 2000 sites, the Habitats Directive (article 6.1) states that "Member States shall establish the necessary conservation measures involving, if need be, appropriate management plans specifically designed for the site in question or integrated into other development plans.

These management plans, where they exist, can be a useful source of information for developers wishing to carry out activities in and around Natura 2000 sites because:
- they record the conservation needs of the habitats and species present for which the site is designated so that it is clear to all what is being conserved and why;
- they analyse the socio-economic and cultural context of the area and the interactions between different land-uses and the species and habitats present;
- they spell out the conservation objectives for the site;
- they identify practical management solutions that can help integrate conservation activities with other land-use practices.

2.3.5 Developments affecting Natura 2000 sites

Whereas Articles 6(1) and (2) of the Habitats Directive concern the routine management and conservation on Natura 2000 sites, Articles 6(3) and 6(4) lay down the procedure to be followed when planning any ***developments*** that might affect a Natura 2000 site[28].

This procedure is examined in detail in chapter 5 and 6 but, in essence, it requires that a plan or project likely to have a significant effect on a Natura 2000 site undergoes an 'Appropriate Assessment' (AA) to study these effects in detail and to see how they relate to the site's conservation objectives.

Depending on the findings of the Appropriate Assessment, the competent authority either agrees to the plan or project as it stands if it has ascertained that it will not adversely affect the integrity of the site concerned, or depending on the degree of impact it may require one or more of the following:

[28] This applies to SCIs, SACs and SPAs and concerns not just plans or projects inside a Natura 2000 sites but also those that are outside but could have a significant effect on the conservation of species and habitats within the site. For instance a dam constructed upstream on a river that could alter or stop the regular flooding of an important wetland for birds within an SPA further downstream.

- certain measures are introduced to remove the negative effects;
- certain conditions are respected during construction, operational or closure phases of the project, again to remove the likelihood of negative effects or to reduce them to a level where they no longer affect the integrity of the site;
- alternative options are explored instead.

In exceptional circumstances, a plan or project may still be allowed to go ahead under certain conditions, despite having been assessed as having negative effects on the site provided the procedural safeguards laid down in the Habitats Directive are followed. This may be possible if there are no alternatives available and the plan or project is considered to be of overriding public interest. In such cases, compensation measures will need to be introduced to ensure that the overall coherence of Natura 2000 is protected.

2.3.6 Improving the ecological coherence of the Natura 2000 Network

In addition to designating core sites under the Natura 2000 Network, Article 10 of the Habitats Directive also requires Member States to endeavour, through land-use planning or development policies, to improve the ecological coherence of the network by maintaining and, where appropriate, developing features of the landscape which are of major importance for wild fauna and flora, such as wildlife corridors or stepping stones which can be used during migration and dispersal.

2.4 The SEA Directive and the EIA Directive

The following EU environmental Directives are also directly relevant to the NEEI industry:

- Directive 2001/42/EC on the evaluation of the effects of certain plans and programmes on the environment (commonly referred to as the '**SEA' Directive**)[29]
- Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment, as amended in 1997 (97/11/EC), 2003 (2003/35/EC) and 2009 (2009/31/EC) – (commonly referred to as the '**EIA' Directive**[30].)

2.4.1 The SEA Directive

The purpose of the SEA Directive 2001/42/EC is to ensure that the environmental consequences of ***certain plans and programmes*** are identified, assessed and taken into account during their preparation and before their adoption.

In this respect, Member States are required to:

- prepare an environmental report which identifies and assesses the likely significant environmental effects of the plans and programmes, and of any reasonable alternatives.
- provide certain authorities and the general public with an opportunity to express their opinion on the environmental report as well as on the draft plan or programme. Consultation not only helps to ensure that the information supplied for the assessment is comprehensive and reliable but also provides more transparency in the decision making process.

[29] OJ L 197, 21.7.2001, p. 30–37 – see http://ec.europa.eu/environment/eia/home.htm
[30] OJ L 156, 25.6.2003, p. 17, OJ L 140, 5.6.2009, p. 114 – see http://ec.europa.eu/environment/eia/home.htm

Ultimately, the SEA aims to encourage a more integrated and efficient approach to territorial planning where environment, including biodiversity considerations, are taken into account much earlier on in the planning process and at a much more strategic level. If this is done, it usually translates itself into fewer conflicts further down the line at the level of individual projects. It also allows for a more appropriate siting of future developments away from areas of potential conflict with nature conservation.

A Strategic Environmental Assessment is mandatory for a variety of plans and programmes (i.e. prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications, tourism, town and country planning or land use) which set the framework for future development consent of projects listed in the 'EIA Directive'. An SEA should also be carried out on any plans or programmes, which, in view of the likely significant effect on sites, have been determined to require an assessment pursuant to Article 6 or 7 of the Habitats Directive.

In the context of NEEI, the SEA Directive is most likely to be applicable where a national, regional or local authority is preparing a plan or programme (e.g. land-use, but also industry or waste management) which is either specifically designed to deal with mineral extraction (e.g. a "minerals plan"), or where mineral extraction is one of the land uses considered in the plan.

2.4.2 The EIA Directive

While the SEA process operates at the level of public plans and programmes, Environmental Impact Assessments (EIA) operate at the level of ***individual public and private projects***. Thus, a development consent for projects that are likely to have significant effects on the environment should be granted only after an assessment has been made of the likely significant environmental effects of that project.

The EIA Directive defines project as *the execution of construction works or of other installations or schemes, other interventions in the natural surroundings and landscape* including those involving the extraction of mineral resources (Article 1.2). Mining operations are listed in both Annex I and II of the EIA Directive. NEEI activities therefore require an environmental impact assessment under this Directive, or at least a "screening" (see table below).

2.4.3 The relationship between SEA, EIA and Appropriate Assessments

There are many similarities between the procedures for SEA and EIA, and the Appropriate Assessments carried out for plans or projects affecting Natura 2000 sites under the Habitats Directive. But this does not mean they are one and the same, as there are also some important distinctions (see table). Therefore, **an SEA or an EIA cannot replace, or be a substitute for, an Appropriate Assessment as neither procedure overrides the other**.

The SEA/EIA procedures and the Appropriate Assessment may of course run alongside each other (in the framework of a coordinated procedure) or information pertaining to the Appropriate Assessment may form part of the EIA/SEA process and documentation[31] (in the framework of an integrated procedure). Nonetheless, in all cases, the Appropriate

[31] Doing an Appropriate Assessment at the level of a plan also does not remove the need to apply the Article 6(3)-(4) procedure to individual projects as well. Of course if the Appropriate Assessment of a plan results in a development being zoned into areas of low or no potential conflicts with Natura 2000 sites then it is likely that fewer projects resulting from the plan will require an Appropriate Assessment at a project level.

Assessment should be clearly distinguishable and identifiable in the SEA's Environmental Report or in the EIA's Environmental documentation, or should be reported on separately so that its findings can be differentiated from those of the general EIA or SEA[32].

Environmental Impact Assessments process (EIA)

The typical EIA procedure includes the following stages:

- *Screening (Article 4(2)-(4) and Annex III of the EIA Directive): to determine whether an EIA is required. Screening is required for any type of project listed in Annex II. The screening decision of the competent national authority should be based on the criteria listed in Annex III and should be made available to the public.*
- *Scoping (Article 5): is the stage of the EIA process that determines the content and extent of the matters to be covered in the environmental information to be submitted by the developer to a competent authority. The scoping stage is an important feature of an adequate EIA regime, mainly because it improves the quality of the EIA.*
- *Preparation of an Environmental Statement, study or report (Article 5), which includes the following necessary environmental information: description of project, description of measures to avoid or reduce significant adverse effects, data required to identify and assess the main effects on the environment, an outline of the main alternatives studied by the developer, and an indication of the reasons for the preferred choice, taking into account the environmental effects identified. This should be made publicly available.*
- *Consultation: (Articles 6, 7 & 8) The public, the environmental authorities and Member States affected by the project must be informed and consulted before the decision on the request for development consent is taken. The results of consultations and the information gathered must be taken into consideration in the development consent procedure.*
- *Information on and explanation of the final Decision: (Article 9), When a decision to grant or refuse a development consent has been taken, the national authorities are obliged to make available to the public information, such as the content of the decision and any conditions attached thereto, the main reasons and considerations on which the decision is based, including information about the public participation process, a description, where necessary, of the main mitigation and compensatory measures.*

*The EIA should address direct and indirect effects on (Article 3) human beings, **fauna and flora,** soil, water, climate and the landscape, material assets and the cultural heritage and the interaction between these factors. The EIA should consider direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project (Annex IV).*

One of the key distinctions between SEAs/ EIAs and Habitats Directive's Appropriate Assessments, apart from the fact that they measure different aspects of the natural environment and have different criteria for determining 'significance', is how the outcome of the Assessment is followed. In this regard, the assessments under the SEA and EIA lay down essentially procedural requirements and do not establish obligatory environmental standards; on the contrary, the assessment under the Habitats Directive lays down obligations of substance, mainly because it introduces an environmental standard, i.e. the conservation objective of a Natura 2000 site and the need to preserve its integrity.

In other words, if the Appropriate Assessment can not ascertain that the plan or project will not adversely affect the integrity of a Natura 2000 site, the authority cannot agree to the plan or project as it stands unless, in exceptional cases, they invoke special procedures for plans

[32] "Assessments 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".

or projects for which there are no less damaging alternative solutions and which are deemed to be of overriding public interest.

The SEAs/ EIAs on the other hand are designed to make the planning authorities fully aware of the environmental implications of the proposed plan or project so that these *are taken into account* in their final decision.

The considerations above are summarised in Table 2.

Table 2: Comparison of procedures under Appropriate Assessment, EIA and SEA

	AA	EIA	SEA
Which types of developments are targeted?	Any **plan** or **project** which - either individually or in combination with other plans/projects - is likely to have a significant effect on a Natura 2000 site (excluding plans or projects directly connected to the management of the site for conservation)	All **projects** listed in Annex I. For projects listed in Annex II the need for an EIA shall be determined on a case by case basis and depending on thresholds or criteria set by Member states (taking into account criteria in Annex III)	Any **Plans** and **Programmes** which are (a) prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications, tourism, town and country planning or land use and which set the framework for future development consent of projects listed in Annexes I and II to Directive 85/337/EEC, or (b) which, in view of the likely effect on sites, have been determined to require an assessment pursuant to Article 6 or 7 of Directive 92/43/EEC.
Which impacts need to be assessed relevant to nature?	The Assessment should be made in view of the site's conservation objectives (which relate to the species/ habitat types ***for which the site was designated.***) The impacts should be assessed to determine whether they will not adversely affect the integrity of the site concerned, or otherwise.	Direct and indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative significant effects on ….'fauna and flora'	Likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors;
Who carries out the Assessment?	It is the responsibility of the competent authority to ensure that the AA is carried out. In that context the developer may be required to carry out all necessary studies and to provide all necessary information to the competent authority in order to enable the latter to take a fully informed decision. In so doing the competent authority may also collect relevant information from other sources as appropriate.	The developer supplies the necessary information to be taken into consideration by the competent authority issuing the development consent	The competent planning authority
Are the public/ Other authorities consulted?	Not obligatory but encouraged ('if appropriate')	Compulsory consultation to be done before adoption of the development proposal Member States shall take the necessary measures to ensure that	Compulsory –consultation to be done before adoption of the plan or programme The authorities and the public shall be given an early and effective opportunity within appropriate time frames to express their opinion on the draft plan or programme and the

		the authorities likely to be concerned by the project by reason of their specific environmental responsibilities are given an opportunity to express their opinion on the request for development consent Ditto for the public	accompanying environmental report before the adoption of the plan or programme or its submission to the legislative procedure Member States must designate the authorities to be consulted which, by reason of their specific environmental responsibilities, are likely to be concerned .
How binding are the outcomes ?	Binding. The competent authorities can agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site.	The results of consultations and the information gathered as part of the EIA ***must be taken into consideration*** in the development consent procedure.	The environmental report, as well as the opinions expressed ***shall be taken into account*** during the preparation of the plan or programme and before its adoption or submission to the legislative procedure

2.5 Other relevant EU environmental laws and policies

The following environmental laws and policies are also of relevance to the NEEI activities:

- *Directive on the management of waste from extractive industries (2006/21/EC)*
- *Environmental Liability Directive (2004/35/EC).*
- *Water Framework Directive (2000/60/EC) and Groundwater Directive (2006/118/EC)*
- *Marine Strategy Framework Directive (2008/56/EC)*
- *EU Strategy on Sustainable Use of Natural Resources*
- *The precautionary principle*

They are briefly summarised in Annex I as it is beyond the scope of this document to elaborate on them further.

3. POTENTIAL EFFECTS OF NON-ENERGY EXTRACTIVE ACTIVITIES ON THE NATURAL ENVIRONMENT

- *The extraction of minerals inevitably has an impact on the land upon which it operates. This can also, on occasion, cause damage to natural habitats and serious disturbance to wildlife.*
- *The type and degree of impact depends on a range of factors and must therefore be determined on a case by case basis.*
- *In the case of Natura 2000, extractive activities may cause the loss of valuable rare habitats and species protected under EU legislation or affect the physical structure and functioning of these habitats in particular areas, thereby causing a loss in overall ecosystem resilience.*
- *Not all effects are negative, the non-energy extractive industry also makes an important positive contribution to biodiversity conservation, for instance through the rehabilitation of mining sites at the end of the project cycle.*
- *More and more companies are adopting biodiversity policy statements as part of their overall cooperate social responsibility strategy and are actively restoring used quarries and mines for the benefit of wildlife. This is especially valuable in areas that have already lost much of their nature.*

3.1 Positive and negative impacts: the need for a case by case approach

By its very nature, the extraction of minerals invariably has an impact on the land[33] upon which it operates. Most mines and quarries require the removal of surface features during the extraction process and will need space for storage mounds, spoil tips and lagoons as well as for associated infrastructures, buildings and access roads.

Such activities can also, on occasion, cause significant disturbance to wildlife and lead to the loss or deterioration of valuable natural habitats. However, this is by no means systematic. There are many cases where new extraction sites have been found to cause only a limited or temporary impact on the biodiversity and the natural environment.

There are also a growing number of examples of where an extraction site has, over the course of its entire life cycle, delivered an overall net benefit for biodiversity. This is because more and more quarries, pits and mines are being rehabilitated at the end of their life, with biodiversity in mind. Where this occurs in an already impoverished natural environment, such rehabilitated sites have the potential to make a significant positive contribution to biodiversity by providing new habitats for wildlife.

Nevertheless, this does not remove the obligation to ensure that individual extraction projects do not cause significant damage or disturbance to areas that are already of high nature value, especially when this could affect rare and threatened species of habitats of Community interest. Such risks must be assessed on ***a case by case basis***.

[33] This concerns specifically extraction activities on land, chapter 8 explores the issues relating to extraction in the marine environment

The NEEI: making positive contributions to biodiversity conservation

If planned properly, modern non-energy extractive industry (NEEI) activities can actively contribute to biodiversity conservation. This is especially relevant when the extraction area is located in an already modified or impoverished environment. In such cases, the extraction industry can help create new habitats for wildlife, for instance new wetland areas suitable for different amphibian species or new cliffs that provide good nesting opportunities for some birds. Open quarries may also provide a suitable habitat for various insects and reptiles such as thermophyllous ground beetles, spiders, bees and lizards whilst disused mine shafts may be colonised by bats.

Moreover, because some of these new habitats may be located in areas of low nature conservation value they can act as important stepping stones or ecological corridors between core protected areas, thereby improving the overall coherence of existing protected area networks, such as the Natura 2000 Network.

Studies carried out in France and Germany on extraction areas have shown that some protected species that have become rare in these countries find refuge in the new habitats offered by former extraction sites. An ecological survey carried out in 35 massive rock quarries in France (of which a half were still in operation) has shown that these sites host about 50% of the species of birds, reptiles, amphibians and grasshoppers currently found on the French territory (UNICEM, 2008a).

Another survey carried out in 17 alluvial quarries over the six French river basins also resulted in similar percentages regarding breeding bird species, reptile, amphibian and dragonfly species, including some rare and threatened species (UNICEM, 2008b).

Species protected under the Birds and Habitats Directives have also been found in or near extraction sites and several former quarries or mining pits have been included in the Natura 2000 network precisely because they now harbour rare and endangered species of Community interest:

- Former quarries may be used by protected bird species, for instance *Bubo bubo, Falco tinnunculus and Falco peregrinus.*.
- Pits for sand and sandstone are potential nesting sites of *Merops apiaster, Riparia riparia* or *Upupa epops* if during its nesting (March-August) at least one part of the site with „steep“ wall is kept aside from excavation;
- New aquatic habitats created in quarries provide suitable sites for reproduction of amphibian species included in Annex II of the Habitats Directive, such as *Bufo calamita, Pelodytes punctatus, Bombina variegata, Alytes obstetricans, Triturus alpestris, Triturus cristatus, Salamandra salamandra, etc.*
- temporary ponds and other wetlands, riverine forests, grasslands, heaths, oak and ash woods, amongst other habitat types, have been succesfully established thanks to adequately planned rehabilitation of mines and quarries in Europe.

Quarry and mine rehabilitation projects are now a common practice across Europe, and these are increasingly used to improve wildlife habitats and biodiversity during the project and at the end of the project life cycle.

Several companies issue biodiversity policy statements as part of their overall corporate social responsibility strategy. Some also produce more detailed biodiversity strategies and action plans which analyse how the industry can make a positive contribution to biodiversity at its extraction sites and ensure that these contributions are embedded in a practical way into the operation of each site.

Numerous examples can be found of how industrial Biodiversity Action Plans have been put into practice. These are often achieved by working in partnership with nature conservation authorities and organisations at both national and international levels.

More details about some of the above-mentioned initiatives and experiences, as well as other interesting examples are presented in Annex 2.

3.2 Identifying potential negative effects

Since the main purpose of this guidance document is to clarify the provisions of Article 6 of the Habitats Directive in relation to non-energy extractive activities, this chapter focuses mainly on reviewing the potential negative impacts that extraction activities could have on biodiversity as these will need to be taken into consideration as part of the impact assessment. This does not distract from the fact that mining and quarrying activities can and do also actively contribute to enhancing biodiversity (see box above)

When assessing the potential impacts of extraction activities on nature and wildlife it is important to bear in mind that these impacts may concern not just the extraction site itself, but also all associated installations such as access roads, conveyer belts, crushers, storage sites, spoil tips, lagoons and tailing ponds etc. They also concern all phases of the development proposal from the initial exploration and actual operation of the site (including site rotation/expansion) to its eventual closure and rehabilitation.

Table 3 below provides an overview of potential negative impacts from mines and quarries on biodiversity, according to each stage of the activity.

The prevention of impacts throughout the life of a mine or a quarry is also to a significant degree determined by decisions reached in the feasibility and design phase of a project. The adoption of suitable mitigation measures can help, for instance, reduce or even eliminate some negative effects of mining and quarrying. This is discussed further in Chapter 5.

3.3 Factors influencing the type and degree of impact

The environmental impacts vary considerably from one site to another depending on a range of factors. This points again to the need to look at such aspects on a case by case basis.

Much will depend on the type and quality of minerals being extracted as well as the geological constitution of the earth's sub-surface. This influences the kind of extraction methods and processing techniques that will be used as well as the overall design of the development proposal. Extraction from underground mines, open pits, quarries, or underwater clearly all require very different extraction processes[34].

The scale of the extraction process will also influence the extent of the potential environmental impact. Many quarries used for construction materials tend to be operated by small or medium-sized local enterprises generating an output of 0.25-0.50 million tonnes per year. Such quarries often last less than a decade until the minerals run out and tend to require much less land than the larger "super-quarries" or other mines which may be in operation for a much longer period.

The sensitivity of the environment in which the extraction is proposed to take place is also of major importance. Extraction sites located in a fragile environment, such as a wetland or near a river or lake, or on land that is of high nature value, may have a potentially greater impact than those placed in an already heavily altered environment.

[34] The extraction of aggregates from quarries or sand/gravel pits, for instance, tends to be a largely mechanical process whereas the extraction and processing of certain metals may be much more complex, requiring for instance the use of chemicals which could lead to the generation of dangerous by-products.

Table 3. Overview[35] of potential biodiversity impacts from extractive activities

Stages / Activities	Potential impacts on habitats and species					
	Habitat loss, deterioration or fragmentation	Disturbance and/or displacement of sensitive species	Loss of rare or endangered species individuals or populations	Changes in species composition (local flora & fauna)	Site colonisation by alien and invasive pioneer species	Changes and degradation of aquatic ecosystems
Exploration						
Land clearance*	♦	♦	♦	♦	♦	
Drilling and trenching	♦	♦	♦			♦
Road/trail construction	♦	♦	♦	♦	♦	♦
Movement of people and vehicles		♦			♦	
Site preparation / Mineral extraction						
Stripping/storing of "overburden" of soil and vegetation	♦	♦	♦	♦	♦	
Infrastructure development (power lines, roads, buildings, crushers, conveyor belts)	♦	♦	♦	♦	♦	♦
Blasting to release ores/rock		♦				
Ore/rock Extraction & stockpiling	♦	♦	♦	♦		♦
Mine and surface water treatment*						♦
Surface & ground-water discharge						♦
Drawdown of water table	♦	♦	♦	♦		♦
Creation of waste rock piles*	♦	♦	♦	♦		♦
Transport of materials		♦			♦	
Processing						
Crushing / grinding		♦				♦
Chemical leaching, concentration or processing of ore*		♦				♦
Use and storage of process chemicals*						♦
Dumps and tailings ponds	♦	♦		♦		♦
Site closure						
Re-contouring of pit walls, quarry faces and waste dumps		♦		♦	♦	
Covering of reactive tailings dumps*	♦			♦	♦	♦
Fencing dangerous areas	♦	♦		♦		
Decommissioning of roads / dismantling of buildings		♦			♦	
Reseeding/revegetation of disturbed areas				♦	♦	
Monitoring and possible water quality treatments						♦

NOTE: Activities marked with * are not expected to be related to construction minerals.
This Table does not imply that these impacts will occur in all circumstances and that they will be permanent. Much will depend on the particular circumstances surrounding each individual case and on the availability of corrective measures for their mitigation.

[35] Based on: Miranda *et al*. 2003. Mining and Critical Ecosystems. World Resources Institute. ICMM 2006. Good Practice Guidance for Mining and Biodiversity. Rio Tinto/EarthWatch Institute 2006. A Review of Biodiversity Conservation Performance. Information has also been provided by UEPG on possible impacts from construction minerals extractive activities

3.4 Impacts of extraction activities on biodiversity: potential effects

Some of the potential causes and effects of extractive activities on species and habitat types of Community interest are briefly described below. This list is non exhaustive and is merely intended to help illustrate the kind of issues that may need to be considered in an appropriate assessment.

3.4.1 Habitat loss[36] and degradation

The NEEI sector's primary impact on biodiversity is often through land clearance and the removal of surface features during the extraction of minerals or the building of associated infrastructures such as access roads, dumping sites and tailings ponds.

Through this process, existing habitats may be altered, damaged, fragmented or locally removed. Again, the scale of habitat degradation depends at least on the following factors: size, location and design of the extraction site and its associated infrastructures and the type of the natural environment.

For instance, an underground mine with little surface level activities is likely to cause significantly less direct habitat loss than an open cast mine which progressively deepens and widens with every year. Similarly, an extraction site situated in, or immediately adjacent to, an already artificial landscape is likely to have a much smaller effect on valuable natural habitats than one that is located in an area of high nature value such as a river bed or a wetland.

This may not only result in direct habitat loss at the site itself but could result in damage to surrounding habitats. These indirect effects may be caused by the alteration of existing hydrological or hydrogeological regimes (for instance through abstraction of groundwater, the diversion of surface waters, water abstraction etc) or a change in water quality (eg through effluent discharges, soil contamination …) amongst others.

Such indirect effects can cause severe habitat deterioration and loss, not just at the site itself but also further afield, for instance in distant springs or wetlands, which may disrupt the normal physical structure and ecological functioning of certain habitats or complexes of habitats or reduce the ecosystem's resilience[37].

As these habitats are often also valuable for wildlife, habitat loss and deterioration can also have repercussions for local populations of fauna and flora.

In the case of extraction projects in and around Natura 2000 sites, the damage to, habitats can result in one or more of the following:

- the loss, degradation or fragmentation of habitat types protected under the Habitats Directive
- the decline or displacement of local populations of species protected under the EU Nature Directives, which depend upon these habitats for their survival.

The significance of the damage depends on the rarity and vulnerability of the habitats affected (eg even a small area can have major consequences for a habitat type that has a

[36] i.e. partial or total removal of a habitat locally

[37] Effects on soil characteristics should also be included in the assessment, as NEEI operations affect the properties of the soil, which could lead to habitat deterioration and species loss. There are soil classification systems which should be used in the assessment process to compare pre- and post-mining situation

very restricted range) and/or their importance as a feeding, breeding or resting sites for the species affected.

To give an example, the loss of a single breeding site for a rare species like the Bonelli's eagle could have major consequences for the species' survival. On the other hand, the loss of a small proportion of breeding habitat for a much more common species may be less significant for that species if, for instance, there is a sufficient number of suitable alternative nesting sites available within the immediate vicinity that have not yet reached their carrying capacity.

The assessment of the impacts on species of Community interest should not only consider the loss of adults but also of eggs, seeds or juvenile stages of species. In the case of habitat types, the evaluation should include both the size of the habitat and its conservation status.

These potential impacts, if properly assessed and understood, may be avoided or mitigated against by altering the extraction site's initial design and methods of operation or by selecting an alternative location for all or parts of the quarry or mine.

3.4.2 Species disturbance and displacement

The NEEI extraction process may also cause significant disturbance to certain species or plants or animals. The impact may be temporary or permanent, direct or indirect, on-site or off-site and may come into play at different times during the project cycle.

Animals can de disturbed by a range of factors such as noise, dust, pollution, human presence, regular movements (eg transportation of goods) etc.… This may affect the species ability to breed, feed, rest or disperse and migrate.

If the disturbance reaches significant levels it can lead to the exclusion of the species from that area and hence the loss of habitat use or it can result in poorer survival and/or breeding success. In the case of rare and endangered species even small or temporary disturbances can have serious repercussions for their long-term survival in the region.

The level of disturbance depends on many factors which will need to be assessed both in function of the type of disturbance caused as well as the species likely to be affected (some species are more sensitive to certain disturbance factors than others). The scale and degree of disturbance determines the significance of the impact, as does the availability and quality of other suitable habitats nearby that can accommodate the displaced animals.

Again, these potential impacts, if properly assessed and understood, may be avoided or mitigated against by altering the extraction site's initial design and methods of operation or by selecting an alternative location for all or parts of the quarry or mine.

3.5 Impacts of extraction activities on biodiversity: potential causes

3.5.1 Land clearance

Land is often cleared to gain access to the minerals and to make space for all associated infrastructures including stock piling or dump sites, tailings ponds and physical structures such conveyor belts, processing plants etc…

It may also be required in order to gain access to the site, for instance through the construction of an access road

3.5.2 Hydraulic disruptions (alteration of hydrology/hydrogeology conditions)

If de-watering of the ore-body or any other extraction site is required, extractive activities can potentially modify hydrological conditions in the extraction areas and in its surroundings, with consequent changes in the drainage network caused by a temporary imbalance in surface runoff, infiltration etc. In such cases, this could lead to impacts on nearby or distant springs and wetlands, both in terms of quantity and quality.

Properly developed mining sites should therefore always include sustainable water management and/or where possible sophisticated drainage techniques that can limit the extent of groundwater draw-down during mining.

Such impacts may concern both underground and surface waters and the assessment of their effects on a Natura 2000 site may require a hydrological study. Potential effects that should be analysed include changes in the groundwater level (lowering or raising in different zones), hydrodynamic changes of the aquifer around the water body, modifications of the relationship between superficial groundwater and watercourses (e.g. reduced recharge from the aquifer which may reduce water level), reduction of watercourse movement, etc[38].

Depending on the kind of impact, it can affect the aquatic and semi-aquatic communities (flora and fauna) that are adapted to existing conditions in the water bodies and respective wetland habitats (swamp, fen, bog etc.) which existed previous to the extraction activity.

The assessment of these effects should take into account the physical features of the groundwater table, its flow direction, level changes (piezometric fluctuations), etc. It should also analyse the foreseeable changes in the surface hydrology over the short, medium and long term (including possible exceptional floods) and their effects on the biological communities that have led to the designation of the site as a Natura 2000 site (the qualifying habitats and species).

3.5.3 Changes in water quality

Some mineral extraction and production processes can cause pollution as well as other changes in water quality, which could either directly affect the aquatic habitats and species present in the site and/or indirectly affect other sites that are vulnerable to this type of change.

[38] According to Directive 2000/60 (Water Framework Directive), “the minimum requirements to be complied with” include “controls over the abstraction of fresh surface water and groundwater, and impoundment of fresh surface water, including a register or registers of water abstractions and a requirement of prior authorization for abstraction and impoundment. These controls shall be periodically reviewed and, where necessary, updated…”, and “for any other significant adverse impacts on the status of water identified under Article 5 and Annex II, … measures to ensure that the hydromorphological conditions of the bodies of water are consistent with the achievement of the required ecological status or good ecological potential…” [11(3)(e) and (i) Dir. 2000/60]. Annex II requires estimation and identification of "significant water abstraction for urban, industrial, agricultural and other uses, … and of loss of water in distribution systems", and of "the impact of significant water flow regulation, including water transfer and diversion, on overall flow characteristics and water balances."

To improve processing efficiency, many NEEI operations operate closed water circuits with zero discharge, or with very limited and controlled discharge of waste water. Water pollution is also prevented through the implementation of existing regulations, which usually require suitable treatment of water used in the extraction activity before its release to the environment.
Legal obligations require the developer to take measures to limit the risk of pollution caused by wash water, acid rock drainage, pollutants diffusion into the groundwater. However, it will be important to assess, on a case-by-case basis, whether or not meeting these legal obligations is sufficient to avoid or reduce potential effects on a Natura 2000 site's qualifying habitats and species, or whether additional measures are required.

3.5.4 Habitat changes that may promote invasive species colonisation

Ecological changes caused by mines and quarries may favour colonisation by pioneer species, some of which can become invasive (Melki, 2007). Colonisation by invasive species may have three origins:

- Natural colonisation from areas where the species is already present and by different dispersal means (through animals, wind and water). In a largely undisturbed environment, invasive species rarely express their invasive potential due to competition with local species. On the other hand, if a new environment is created, it may enable invasive species to grow rapidly and establish themselves, thereby increasing the risk of subsequent invasions into other surrounding areas.
- Species introduction due to site rehabilitation. This can be an intentional introduction, for instance when fish are introduced into ponds, or unintentional, in the case of exotic seedlings contained in imported soils used for top-filling. The latter is usually prevented through the preservation and re-use of the original soil from the site.
- Uncontrolled introduction by third parties (residents, fishermen, etc.). Once operations have ceased, and depending on the rehabilitation of the site, species may be introduced by others having access to the site.

It is to be noted that the deliberate introduction of non-native species should be regulated by Member States, so as not to prejudice natural habitats within their natural range or the wild native fauna and flora and, if considered necessary, such introduction should be prohibited, in accordance with Article 22(b) of the Habitats Directive and Article 11 of the Birds Directive.

3.5.5 Noise and vibrations

Different kinds and intensities of noise may occur in extractive activities. It is important to distinguish between more constant noise (e.g. produced by crushing, screening, trucks, conveyor belts for transporting materials, etc.) and intermittent but violent noise (e.g. from blasting). In the case of massive rock extraction, blasting is sometimes required to break down the rocks that constitute the ore.

Vibrations, other than those from blasting, are generated by large primary crushers and plant screening equipment but if the foundations are correctly designed, vibration from crushing and screening operations can be greatly reduced. The sensitivity to different types of noise and vibrations depends on each species and it is difficult to assess given the lack of studies on the subject.

3.5.6 Movement-related disturbances

The movement of equipment and vehicles and the presence of people on the site may affect some species. For example, large raptors are quite sensitive to human presence, especially in the vicinity of their nesting sites, and may even abandon their eggs or clutches if disturbances are too numerous or too close by. Under the Habitats and Birds Directive it is an offence to intentionally or recklessly disturb some species particularly during breeding, rearing, hibernation and migration (see section 2.3.2).

3.5.7 Dust

The potential for dust emission depends on the operation methods and activities (blasting, loading, transport, crushing, etc.). Dust produced in plants (by fine crushing, milling, screening, drying, etc.) is generally collected through ventilation systems which end up in filters. The dust collected from these filters may have to be disposed of, but in many instances it can be returned to the process cycle, or even sold directly as a specific product grade. The dynamics of dust generation is a complex issue and assessment of its effect on the concerned Natura 2000 site's qualifying species and habitats should include a qualitative evaluation of dust emissions and dispersion considering prevailing winds.

3.5.8 Landslides and collapses

Currently, these impacts are very limited and may concern mostly underground quarries of cut stone, chalk, gypsum, clay or ochre. Risks for animal and plant species are also very limited, but they could be significant if they do occur.

3.6 Cumulative effects

Cumulative effects may arise when several extraction sites are present within a given area, or as a result of combined impacts of extraction activities and other types of development (e.g. forestry or other industrial developments). The cumulative effect is the combined effect of all developments taken together. So even if an individual extraction project may not be considered to have an adverse effect on a Natura 2000 site, project developers must nevertheless also consider the potential cumulative effects of this project in combination with other plans and projects in the area.

This is not simply a sum of the effects of one extraction project plus the effects of a second project. It may be more, it may be less. For instance, the first extraction project may give rise to a small but acceptable level of species disturbance and habitat loss, which lies well within the capacity of that population to regenerate and hence has little effect on the overall population level within the area.

But the level of species disturbance and habitat loss occasioned by several extraction projects, taken together, may exceed the capacity of that species population to regenerate. In this case, whereas the impact of the first and second projects, each on their own, is not discernable, the effect of both taken together could be significant and could cause the local population of that species to decline. This influences the planning decision for both project proposals.

Habitat fragmentation also needs to be considered during the assessment of cumulative effects as this can have a deleterious impact on population structure and dynamics among a wide range of species.

3.7 Distinguishing between significant and non-significant effects

So far, this chapter has looked at which aspects of extraction activities might have a potentially negative effect on biodiversity. When an appropriate assessment is undertaken under the Habitats Directive on a plan or project that could affect a Natura 2000, the focus will be specifically on the potential effects of these activities on the species and habitat types ***for which the site has been designated.***

This will help determine which species and habitat types of Community interest are at risk and why. The next step will then be to determine if the potential effects are significant or not for the species or habitat types concerned. The process for determining 'significance' in any plans or projects affecting Natura 2000 sites is described in chapter 5 but, first, it may be useful to consider the basic reasoning behind the process of deciding whether an impact is significant or not.

Significance will vary depending on:

- Magnitude of impact
- Type
- Extent
- Duration
- Intensity
- Timing
- Probability
- Cumulative effects

Clearly, the assessment of significance needs to be done on a case-by-case basis, in function of the species and habitats affected. The loss of a few individuals may be insignificant for some species but may have serious consequences for others.

Similarly, the displacement of animals may significantly reduce the fitness, and ultimately the survival rate of certain species, but have only a limited impact on other species, especially those that have a sufficient number of alternative habitats in the vicinity. Hence, population size, distribution, range, reproductive strategy and life-span will all influence the significance of the effects.

The assessment of significance should also be considered over an appropriate geographical scale. For migratory species that travel over long distances during their annual life-cycle, the impact at a specific site may have consequences for the species over a larger geographical area. Likewise, for resident species with large territories or changing habitat uses, it may still be necessary to consider potential impacts on a regional, rather than local, scale.

A common means of determining the significance of effects is through the use of key indicators. Some indicators, such as percentage of habitat lost, may be more significant for priority habitat types or habitats with a limited distribution than for others because of their status.

The interconnectivity of factors that could potentially and significantly influence a species or habitat type should also be taken into account. Physical effects such as displacement from feeding areas or the modification of habitats can cause ecological effects such as changed access to habitats and movements over greater distances. This can in turn lead to increased energy expenditure which can potentially affect fitness related parameters such as survival and reproductive output and thus impact directly on the size of the local population.

It is clear that any impact assessment should be based on the best available data. This may be data from dedicated field surveys or various types of predictive population models. In special cases such data may also be available from comprehensive, "research type" monitoring programmes.

4. THE IMPORTANCE OF STRATEGIC PLANNING

- *Mineral plans, especially when they are integrated into spatial land use plans, help the industry and relevant authorities to establish a stable planning framework for mineral extraction over the long term.*
- *They are also very effective at creating a more integrated sustainable development strategy that takes account of wider societal concerns, such as nature conservation, at a very early stage in the decision making process.*
- *In the case of Natura 2000, overlaying mineral resource maps on Natura 2000 maps can help to identify potential areas of conflict so that future developments can be zoned away from these areas wherever feasible.*
- *This is best done in consultation with all stakeholders and interest groups so that viable alternatives can be explored.*
- *Ultimately, this kind of strategic spatial planning approach can lead to a more predictable and stable planning framework for all concerned. This should, in turn, help reduce the risk of unforeseen difficulties and delays at later stages, for instance at the level of individual projects.*

4.1 Strategic level spatial planning

Strategic level spatial planning is a tool used by public authorities to help them establish a coherent sustainable development policy for their municipality, region or country.

Enacted at national, regional or local levels depending on the laws and planning systems in place in each country, spatial planning allows different demands on the land to be examined across a broad geographical area so that a more integrated regional development strategy can be drawn up that maximises wins-wins and minimises conflicts wherever possible.

It also provides for a more balanced development framework because it enables wider societal and environmental concerns to be taken into account very early on in the planning process. In addition, it encourages different economic sectors, interest groups and the general public to become engaged through public consultation, thereby ensuring greater transparency in the decision making process.

In this context, spatial planning is a particularly useful tool for examining how to support economic development whilst at the same time avoiding or reducing, wherever possible, potentially negative impacts on the natural environment, including preserving the integrity of Natura 2000 sites. The fact that this happens at such an early stage in the planning process is important as the scope for examining alternative approaches and scenarios is usually that much greater at this level.

Although not in place in all EU countries, there is growing evidence to show that this kind of strategic spatial planning approach leads to a more predictable and stable planning framework for all concerned. This should, in turn, help reduce the risk of unforeseen difficulties and delays at later stages, for instance at the level of individual projects.

4.2 Mineral plans

The NEEI industry is characterised by two important geological facts: the first is that minerals are unevenly spread under the earth's crust. The second is that existing sites eventually become exhausted, consequently new sites have to be opened up in order to continue to meet the demand for raw minerals.

Forward planning is therefore an important tool for the industry. Although only few countries in the EU have adopted strategic mineral plans, those that have done so consider it a useful process on several counts. It can for instance help to:

- identify well in advance where the reserve mineral deposits are located so that initial explorations can be made to gauge their quality and quantity, and to determine whether their exploitation could be commercially viable or not[39];
- analyse projected needs for different types of minerals over the longer term and ensure, as far as possible, the prudent, efficient and sustainable use of minerals and recycling[40] of suitable materials in line with the EU Raw Mineral Initiative.
- develop a more integrated mineral planning strategy which takes account of wider societal concerns such as the environment. In this respect the involvement of different stakeholders, amongst others from the NEEI and nature conservation sectors, in the development of the mineral plan is a key point.

Important elements of a minerals policy within the context of sustainable development are:

General

- Recycling
- Changed construction methods employing renewable materials

Minerals specific

- Demand situation
  - -local demand for minerals
- Supply situation
  - How can demand be met? (from local sources, through imports)
  - How secure is the supply?
- National resource situation
  - Knowledge of mineral resources
  - Protection of mineral resources
- Legislative and administrative framework which regulates the industry
  - Mineral rights
  - Access to minerals
  - Health and safety of workforce
  - Environmental protection and monitoring

Adapted from University of Leoben study 2004 - see footnote 40 for full reference

Mineral plans also make it much easier for the needs of the NEEI industry to be taken into consideration in wider spatial and land-use plans as it helps to raise the profile of the

[39] Member States have been carrying out geological surveys for many years but the quality and completeness of the surveys does vary significantly from one country to another. The Commission has proposed to provide a platform for Member States to exchange best practices in the area of land use planning, permitting and geological knowledge sharing for the extractive industry in the EU Raw Materials Initiative (COM(2008)699).

[40] UEPG shows production of recycled aggregates in 2008 as 216 million tonnes, with Germany and the UK producing 56 and 53 million tonnes respectively.

industry within national, regional or local planning authorities. Mineral resource maps, for instance, can be used in the spatial planning process to identify mineral deposits which should be safeguarded for the future and to prevent them from being 'sealed' over by other land uses, such as urban developments.

A study commissioned by the European Commission[41] showed however that in 2002 only a few of the Member States had clearly defined and published mineral policies. As land use planning is about choices between different options, the study concluded that the NEEI industry tends to be considerably disadvantaged by the absence of clearly defined mineral policies.

Some Member States have nevertheless developed schemes which identify areas where severe constraints exist for quarrying, areas where quarrying may be allowed subject to certain conditions and areas where in principle quarrying will be permitted. Conversely, others provide policy guidance which is to be taken into account by lower tiers of government (see Annex 2).

Examples of planning systems for mineral extraction

- Mineral Plans elaborated by some Member States (e.g. Austria, France, some German Lander) identify mineral reserves (mainly sand and gravel) and evaluate their quality and quantity (productivity), regional importance (demand, etc.) and suitability for exploitation. The plan also analyses the possible conflicts with other land uses, which include Natura 2000, natural protection areas, forests, groundwater protection zones, settlement areas and traffic routes. It finally identifies areas that may be suitable or unsuitable for extraction.
- In England (see Annex 2), Planning Policy Statements and guidelines for Minerals and Biodiversity and Geological Conservation provide clear rules and conditions for the extraction of aggregates, brick clay, natural building and roofing stone, oil and gas. The roles and responsibilities of the planning authority and the project developer are defined and the competent authority for nature conservation (Natural England) must be consulted as regards the assessment of effects when extractive activities are likely to have adverse effects on protected areas (including Natura 2000). Regional and local strategic plans set out the spatial framework within which proposals for the extraction sites will be considered. Such plans are subject to a strategic environmental impact and, where necessary, an appropriate assessment under the Habitats Directive.
- In Slovakia (see Annex 2), in the framework of the national raw materials policy, the overlapping of protected areas (including Natura 2000 sites) and mineral reserves has been analysed in order to better understand which are the actual overlaps, how far Natura 2000 sites are "limiting" extraction of known reserves, and what are the possible solutions in sites that are subject of interest of both, mining and nature protection
- Some mineral planning systems also consider the need of safeguarding mineral resources for future exploration and/or extraction. For instance, Sweden has developed a landbank system by declaring various types of mineral reserves to be of national interest in accordance with the Environmental Code, and protecting the resources from being sterilised by other land use development.

[41] University of Leoben (2004). "Minerals planning policies and supply practices in Europe" Report prepared for DG Enterprise and Industry. The main objective of this study was to provide information on the different approaches to mineral planning policies and practices of the Member States. Summary available at: http://ec.europa.eu/enterprise/steel/non-energy-extractive-industry/mpp_extended_summary.pdf

4.3 Mineral maps and Natura 2000 maps: identifying conflicts at a strategic level

A key to good spatial planning is sound geographical knowledge. Much of the planning is done with the help of maps which make it possible to overlay different interests, activities, resources, etc on base maps that show the area's natural geography and existing land uses. From these overlays, decisions can be made about zoning certain areas for particular types of development.

In the case of the NEEI industry, detailed mineral maps are essential in identifying which types of minerals are located where and whether these are considered exploitable or not from a commercial perspective[42].

Natura 2000 areas do not *a priori* prohibit mineral extraction, but if mineral maps are overlaid on maps showing the location and boundaries of Natura 2000 sites within a particular geographical region, it should be possible to quickly identify areas where there is no or a low risk of potential conflicts and those where there is a higher risk, for instance where the potential mineral sites are located within or close to a Natura 2000 sites. These can then be investigated further.

The Natura 2000 online viewer:
With the assistance of the European Environment Agency, the European Commission has developed a public Natura 2000 viewer which makes it possible to explore Natura 2000 sites in the EU[43] at the press of a button. Built on state of the art GIS technology, the public viewer is an interactive and user-friendly tool that allows the user to view Natura 2000 sites over different types of backgrounds (street maps, satellite imagery, bio-geographical regions, Corine Land Cover, etc.) and to quickly locate any related information on species and habitats of interest.

The Natura 2000 viewer is available under http://natura2000.eea.europa.eu/

[42] The International Metallogenic Map of Europe (drawn, under the auspices of IUGS and UNESCO at a scale of 1:2,500,000) is widely available, and suffices for a rough assessment of possible conflicts at a regional level (Dottin and Gabert 1990). Jackson and Asch (2002) surveyed Geological organisations in Europe and reported that "few Surveys had a significant percentage of large-scale (i.e.>1:25,000) digital map data available covering their territories; at medium scale (1:25,000–1:250,000) nine Surveys can offer more than 50% data available; while at small scale (<1:250000) 17 Surveys can offer 100% coverage".

[43] Information about Natura sites in the UK can be found through the JNCC website (www.jncc.gov.uk).

Such overlay maps can be created by developers, nature conservation bodies or local, regional or national administrations, including mining administrations. Ideally, they should cover large enough areas and have a high enough resolution as well as a reliable long-term data input. Some geological surveys or other national institutions and organisations have produced similar tools that allow the display of information about the location of mineral resources alongside the location of protected areas (including Natura 2000 sites)[44].

4.4 Carrying out more detailed investigations and searching for alternatives

The detailed investigation of potential conflict areas identified through these overlay maps can be done either by the industry itself as part of its own forward planning strategy or through the public authorities' mineral plan, or spatial development/ land-use plans.

In the case of public authority plans and programmes, it is most likely that such plans will be subject to a Strategic Environmental Assessment under the SEA Directive as they usually set the framework for future development consent of projects listed in the EIA Directive. Where they are likely to significantly affect one or more Natura 2000 sites, an Appropriate Assessment under the Habitats Directive will also be required[45]. These assessments provide a mechanism for examining the extent and degree of potential negative effects on the environment and for exploring viable alternatives.

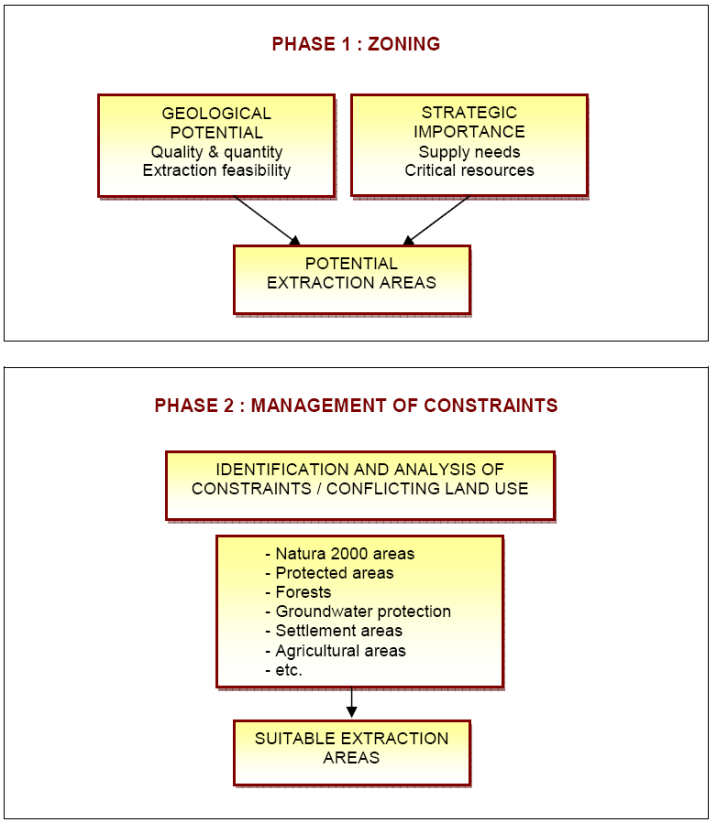


Figure 3: Schematic process sometimes followed for planning aggregates extraction

[44] E.g. for UK: http://www.bgs.ac.uk/mineralsuk/maps/home.html; for Germany: http://www.georohstoff.org/

[45] Spatial planning should also take into account the potential for NEEIs to adversely affect the integrity of Natura 2000 sites even where there is no spatial overlap between the Natura 2000 area and the extraction site (e.g. water quality downstream).

The AA procedure for plans and projects under Article 6 of the Habitats Directive is presented in detail in the following chapter. But at this stage it is worth recalling that the assessment should consider not only the impacts on the integrity of the individual Natura 2000 site that may be affected but also potential impacts on the overall coherence of the Natura 2000 Network (eg in terms of the contribution of each site to the conservation of habitats and species of Community interest).

In the case of the latter, impacts can be both positive and negative. Some NEEI activities may cause a further fragmentation of existing nature areas whilst others (for instance those that involve site rehabilitation at the end of the extraction process) can, on the contrary, help to actively reconnect nature areas. This is especially important in regions where nature is already scarce and impoverished. Here, newly rehabilitated mining sites provide valuable stepping stones or additional pockets for wildlife which can contribute significantly to local or regional conservation aims or strategies.

During a SEA, it should also be borne in mind that some species are protected both inside and outside Natura 2000 sites in accordance with the provisions of the Habitats Directive (Articles 12 and 13) and Birds Directives (art. 5). Identification of important areas for such species (e.g. breeding sites and resting places) should also therefore be taken into account when mapping location sensitivity and when developing a strategic land-use plan.

Strategic plans and accompanying impact assessments don't just help identify potential areas of conflict, they also provide a means for resolving these conflicts early on in the planning process. This is achieved by examining various less damaging alternatives. This is an essential part of both the SEA and the Art. 6 procedure and could involve looking at alternative locations so as to be able to zone future mining operations away from sensitive areas or it may involve studying alternative approaches, such as placing a greater emphasis on recycling instead of more first time extraction.

The key is to find as many win-win situations as possible where future mineral resources are safeguarded whilst at the same time avoiding Natura 2000 sites or minimising the risk of adverse effects on them and preserving their integrity. To achieve this, it is important that all stakeholders are involved in the exploration of alternative scenarios so that they can bring their reasoning to the table and at the same time learn more about the concerns of other interest groups.

It has been demonstrated time and time again that discussion and public consultation helps raise awareness of the issues at stake and the needs of each sector (be it the mineral sector or nature conservation) so that more a integrated and informed decision can be taken which are based on a greater recognition and understanding of the needs of others.

This is not to say that all conflicts can be planned away. There will be occasions where potential overlaps with Natura 2000 may not be avoidable[46] (e.g. for very rare minerals located only in a few places) or where potential sites without important land-use conflicts but with good possibilities for efficient exploitation of raw materials are very difficult to find. In all cases decisions have to be taken on the basis of the Art. 6(3) and (4) provisions.

[46] Metallic mineralisation is usually only economically and technically feasible in a tiny minority of mineralised occurrences (the figure 1 in 1000 is often used) so mineral planning is likely to identify relatively few alternative locations for metal mines, while more options will usually be identified for aggregate or limestone quarries, for instance.

4.5 Consideration of extractive activities in Management Plans for Natura 2000 sites

Some Natura 2000 sites may have a management plan which addresses, *inter alia*, the development of extractive activities, usually aggregate extraction, subject to certain conditions and prescriptions. This may be the case for some areas where aggregate extraction has been traditionally carried out and where some suitable zones that do not host any qualifying interests have been identified.

Natura 2000 Management Plans may suggest or include a specific regulation for extractive activities, such as a zoning that defines the permitted areas, as well as detailed prescription for the types of activities that have been agreed between the stakeholders involved. For instance, the extraction area may be restricted to a maximum surface per year including buffer areas, and certain restrictions may be imposed on the operations in order to minimise their potential impacts (e.g. noise, vibrations and dust). Furthermore, particular mitigation measures are required through permits in order to mitigate possible negative effects.

In any case an appropriate assessment will be necessary to determine whether new activities are permissible as well as whether existing permits may be extended or renewed when likely significant effects are expected, in accordance with Article 6(3) of the Habitats Directive (see following chapter).

5. ARTICLE 6.3: CARRYING OUT AN APPROPRIATE ASSESSMENT OF NEEI PLANS AND PROJECTS IN ACCORDANCE WITH THE HABITATS DIRECTIVE

- *Paragraphs 3 and 4 of Article 6 of the Habitats Directive set out a series of procedural and substantive safeguards that must be applied to plans and projects that are likely to have a significant effect on a Natura 2000 site. Each procedure must be carried out in stages.*
- *The first stage is to determine whether a plan or project should undergo an Appropriate Assessment. If it cannot be excluded that there will be a significant effect upon a Natura 2000 site, either individually or in combination with other plans and projects, then an Appropriate Assessment (AA) must be undertaken.*
- *The purpose of the Appropriate Assessment is to assess the implications of the plan or project in respect of the site's conservation objectives, individually or in combination with other plans or projects. The conclusions should enable the competent authorities to ascertain whether the plan or project would not adversely affect the integrity of the site concerned, or otherwise.*
- *The appropriate assessment should consider the effects on elements contributing to the site's integrity in view of its conservation objectives. It should focus on the species and habitats that have justified the site designation and all the elements that are essential to the functioning and the structure of the site. The appraisal of effects must be based on objective information.*
- *Mitigation measures are an integral part of the specifications of a plan or project and should be considered during the appropriate assessment. Avoidance or reduction of impacts at source should be the preferred option. They should be also focused on the sites' conservation objectives*

5.1. Introduction

The previous chapter outlined the benefits of strategic and proactive planning as a means of avoiding or minimising any potentially negative impacts of non-energy extractive activities on Natura 2000 sites as early as possible in the planning process.

The present chapter looks specifically at the procedures to follow under Article 6 of the Habitats Directive in the event that a non-energy extraction plan or project is foreseen in or near a Natura 2000 site. The information is based largely on the guidance that already exists on article 6 but sets this in the context of the non-energy extractive industry (NEEI)[47].

Because Natura 2000 concerns Europe's most vulnerable and rare habitat types and species, it is logical that the procedures for approving such developments are sufficiently rigorous to avoid undermining the objectives of the Birds and Habitats Directives – i.e. to contribute towards ensuring biodiversity and to bring species and habitats of Community interest to favourable conservation status.

Particular attention is therefore given to the need for decisions to be taken on the basis of sound scientific information and expertise. Delays during the decision making process are often caused by the lack of information or poor quality assessments that do not allow the competent authorities to make a clear judgement on the potential impacts of the proposed plan or project.

[47] available at http://ec.europa.eu/environment/nature/natura2000/management/guidance_en.htm

5.2 Article 6 of the Habitats Directive: a step-by-step approach

Article 6 of the Habitats Directive is one of the most important articles in the Directive as it determines the relationship between conservation and land-use. Paragraphs (3) and (4) set out a series of procedural and substantive safeguards that must be applied to plans and projects that are likely to significantly affect a Natura 2000 site.

This procedure is designed to:

- Fully assess the impacts of plans or projects that are likely to have a significant effect on a Natura 2000 site by means of an Appropriate Assessment;

- Ascertain, through the Appropriate Assessment, whether an adverse effect on the integrity of the site can be ruled out. If such is not the case, the plan or project can only be approved if mitigation measures or planning conditions can be introduced that remove or minimise the adverse effects on the site so that its integrity is not affected;

- Provide a mechanism for approving, in exceptional circumstances, plans or projects for which it cannot be ascertained that they will not adversely affect a Natura 2000 site even after the introduction of mitigation measures, when these plans or projects, in the absence of alternative solutions, are judged to be of overriding public interest (cf Art 6.4 – see chapter 6)

ARTICLE 6 (3) and (4) OF THE HABITATS DIRECTIVE

6(3). Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

6(4). If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.

The procedures laid out in Article 6(3) and 6(4) should be carried out in stages. Every stage determines whether a further stage in the process is required. For instance if, after stage one, it is concluded that there will be no significant effects on the Natura 2000 site, then the plan or project can be approved without the need for further assessment:

- **Stage one: Screening** – this initial screening exercise is intended to determine whether a plan or project has to undergo an appropriate assessment. If it cannot be excluded, on the basis of objective information, that there will be significant effects upon a Natura 2000 site, then an Appropriate Assessment should be undertaken.

- **Stage two: Appropriate Assessment** – once it has been decided that an Appropriate Assessment is required, more detailed information should be gathered in order to be able to objectively assess the type of impacts that are like to occur and their effects on the site's conservation objectives as well as on the species and habitat types present for which the site was designated. This will make it possible to ascertain whether the integrity of the site will not be adversely affected.

  In practice, the Appropriate Assessment (AA) will often be an iterative process, allowing for improvements to the plan or project in order to avoid adverse effects on the integrity of the Natura 2000 sites concerned. Thus, depending on the assessment's findings, the authorities should also consider if mitigation measures can be introduced or restrictions should be applied to the permit in order to avoid or reduce the effects so that the integrity of the site is not affected.

  At the end of the day, the plan or project can only be authorised if it has been ascertained that there is no adverse effect on the integrity of the site. If these cannot be ruled out, then the authorities must refuse its authorisation or apply the derogation test (Stage 3) under Article 6.4.

- **Stage three: derogation procedure in the absence of alternatives and for imperative reasons of overriding public interest:** If the adverse effects cannot be removed through mitigation, the authorities will also have to examine viable alternatives to the plan or project. If no alternative solutions exist, then, in exceptional cases, the authorities can decide if the plan or project should still proceed on the grounds of imperative reasons of overriding public interest (IROPI). If the answer is yes, then appropriate compensation measures must be identified and implemented to ensure that the overall coherence of Natura 2000 is protected. (covered in chapter 6)

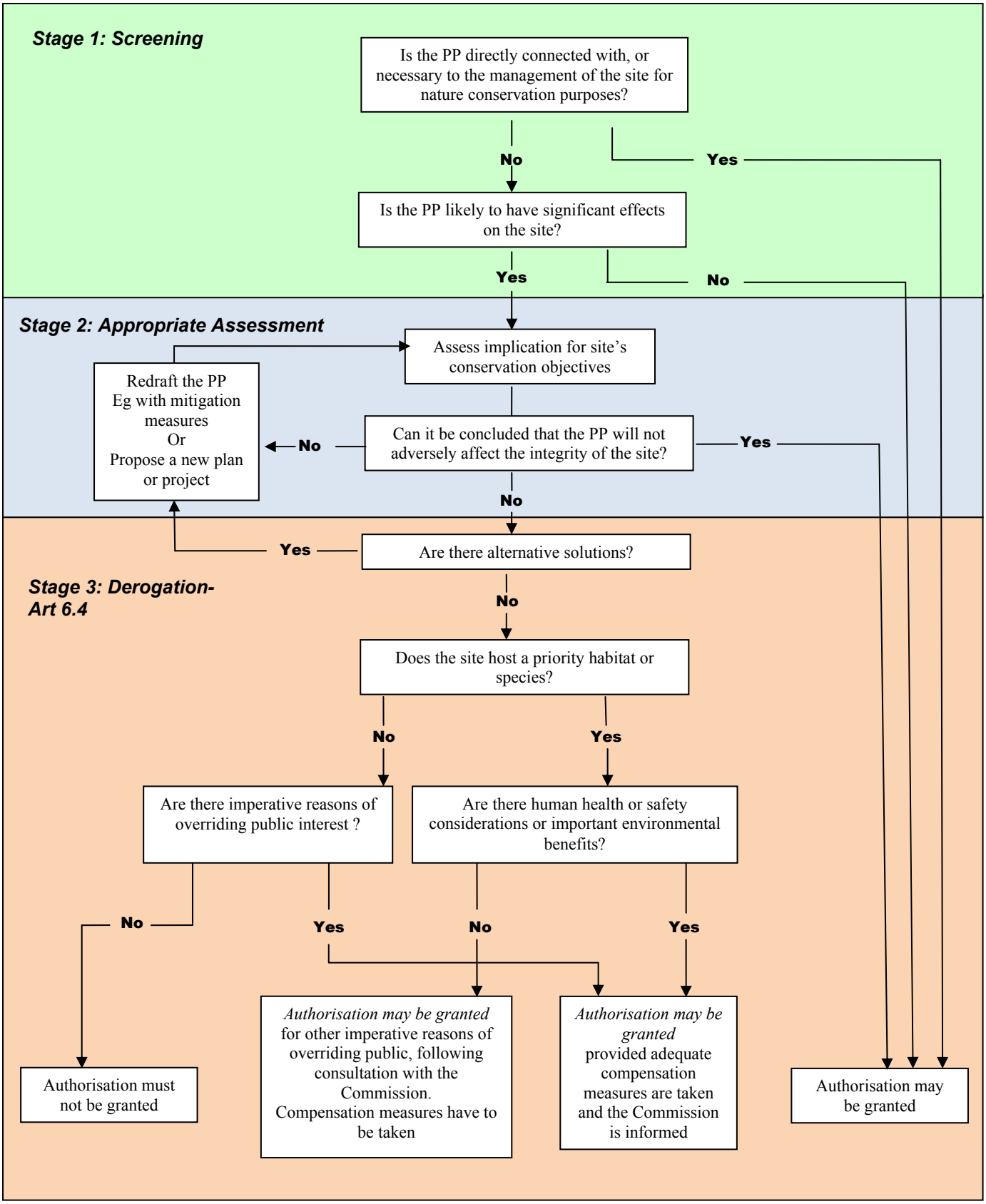
It is clear from the above that this decision-making process is underpinned by the precautionary principle. The emphasis should be on objectively demonstrating, with reliable supporting evidence, that there will be no adverse effects on the Natura 2000 site. For this reason, the lack of scientific data or information on the potential risk or significance of impacts cannot be a reason to proceed with the plan or project.

Links with EIA/SEA (see chapter 2)
Where plans, programmes or projects are subject to the EIA or SEA requirements, a common or coordinated process with the appropriate assessments is not unusual, provided the requirements of both Directives are fulfilled. But the Appropriate Assessment should remain a clearly distinguishable and separate section within the report so that it can be considered on its own and its findings can be differentiated from those of the general EIA or SEA.

It should also be noted that EIA and SEA procedures use some of the same terms as in the AA but they mean different things. For instance, consideration of 'significant effects' and the conclusions of the assessments have different implications in comparison to the AA. Nevertheless, information required for an EIA or SEA can be used to inform an AA and reduce overall administrative burden of carrying out these assessments.

The following flow chart demonstrates how the stages are applied and how decisions are reached on the authorisation or rejection of a plan or project. Subsequent sections in this chapter examine each of the stages to be undertaken as part of the process under Article 6.3 whilst chapter 6 looks at the derogation procedure under Article 6.4.

Figure 4: Flow chart of Article 6(3) and (4) procedure



STAGE 1: SCREENING

5.3 When is an Appropriate Assessment needed ?

The first step is designed to determine whether or not an Appropriate Assessment is needed. If it can be determined with certainty that the plan or project is not likely to have a significant effect, either individually or in combination with other plans or projects, then the plan or project can be approved without further assessment.

If there is any doubt, then an Appropriate Assessment will need to be undertaken so that these potential effects can be studied in full before a decision is made on the plan or project. It is ultimately for the competent authority to decide, in the light of screening, whether or not an AA is required.

Screening is required for:

- Both ***plans*** that serve as a framework for development consents and individual ***projects*****.** This ensures that the potential impacts on Natura 2000 are taken into account at both the strategic planning level and at the level of each individual project[48].
- Plans or projects affecting sites classified under the ***Birds Directive*** and sites designated under the ***Habitats Directive***. They are both part of the Natura 2000 network.[49]
- Plans or projects both ***inside*** and ***outside*** the Natura 2000 site if they are likely to have a significant effect on the Natura 2000 site[50]. For instance, a NEEI development located outside a Natura 2000 site could still have a significant effect on a Natura 2000 site because it affects the hydrology of the site.
- ***New permits, extension of existing permits and resumption of old permits*** for NEEI activities (see also Case C-201/02 related to EIA[51] and C-226/08 related to Art. 6(3)) where they are considered likely to have a significant effect on a Natura 2000 site.

To carry out the screening exercise, sufficient information is needed both on the NEEI plan or project and on the Natura 2000 site(s) that might be affected. This should include data on the location of the NEEI extraction site and associated infrastructures in relation to Natura 2000 site(s) in the area as well as details on the scale and design of the NEEI site and its associated infrastructures. It should also include details of all activities that are expected to be undertaken during each stage of the project's cycle – i.e. during the construction, operation and closure phases.

[48] Case C-6/04: 20 October 2005

[49] **For Potential SPAs** (IBA) Article 6(3)-(4) is not applicable but Article 4(4) of the BD is applicable. Areas which have not been classified as SPAs but should have been so classified continue to fall under the regime governed by the first sentence of Article 4(4) of the Birds Directive. [Commission/France, Basses Corbières, C-374/98]

For potential pSCIs (eg marine sites): the MS are required to take protective measures that are appropriate, from the point of view of the Directive's conservation objective, for the purpose of safeguarding the relevant ecological interest which those sites have at national level. [Dragaggi, C-117/03. [Bund Naturschutz, C-244/05].

[50] Case C-98/03 paragraph 32: "…In its definition of measures to be subject to an assessment of the implications, the Directive does not distinguish between measures taken outside or inside a protected site."

[51] Case C-201/02 para.53: "….the decisions adopted by the competent authorities, whose effect is to permit the resumption of mining operations, comprise, as a whole, a 'development consent' within the meaning of Article 1(2) of that directive (85/337), so that the competent authorities are obliged, where appropriate, to carry out an assessment of the environmental effects of such operations…"

As regards the Natura 2000 site, information should be gathered on the species and habitat types for which it has been designated, their conservation state and on the overall conservation objectives of the site. Part of the information needed to determine the likely significant effects can be found in the Natura 2000 Standard Data Form, the site designation and management plans for the Natura 2000 sites, where available.

The collaboration of competent authorities, especially those responsible for nature conservation, in the screening of plans and projects may be crucial, as they should be able to provide useful information which should be taken into account at this stage. It is also recommended to keep an audit trail of the decision making process.

It is worth recalling that the initial screening undertaken here is not the same as a full-scale Appropriate Assessment – it only requires sufficient information to be able to decide if there is likely to be a significant effect or not.

Natura 2000 Standard Data Form
The Standard Data Forms which have been compiled for each site contain information about the surface area, representativity and conservation status of the habitats present in the site, as well as the global assessment of the value of the site for conservation of the natural habitat types concerned. For the species present in the site, information is provided on their populations, status (resident, breeding, wintering, migratory) and on the site value for the species in question.

Conservation status of habitats and species
According to the provisions of Article 17 of the Habitat Directive, the EU 25 Member States (i.e. excluding Romania and Bulgaria) reported, in 2008, on the conservation status of all the species and habitats listed in the annexes of the Habitats Directive which occur in their territory. On the basis of this, the Commission produced a consolidated report on the conservation status of each species and habitat type at a biogeographical and EU level. These reports provide useful contextual information[52]

Natura 2000 Management plans
Some sites have a Natura 2000 management plan which can include important elements such as the conservation objectives for the site, the species and habitats, theirs status, threats, etc, which can be useful for the screening stage and for the appropriate assessment.

A management plan may address, inter alia, the development of extractive activities, usually aggregate extraction, subject to certain conditions and prescriptions. This may be the case for some areas where aggregate extraction has been traditionally carried out and where some suitable zones that do not host any qualifying interests have been identified.

Natura 2000 management plans may suggest or include a specific regulation for extractive activities, such as a zoning that defines the permitted areas, as well as detailed prescription for the types of activities that have been agreed between the stakeholders involved. For instance, the extraction area may be restricted to a maximum surface per year including buffer areas, and certain restrictions may be imposed on the operations in order to minimise their potential impacts (e.g. noise, vibrations and dust). Furthermore, particular mitigation measures are required through permits in order to mitigate possible negative effects.

[52] *All reports are available at: http://biodiversity.eionet.europa.eu/article17 and http://ec.europa.eu/environment/nature/knowledge /rep_habitats/index_en.htm*

Pre-screening by developers:
preparing the ground for a smoother decision making process

It is strongly recommended that developers already gather information on the Natura 2000 sites before starting to design their plan or project (i.e. even before the screening stage) so that they can be aware of the possible sensitivities regarding nature and wildlife and can take these into consideration during the preparation of their development proposal.

It is also very useful, at an early pre-screening stage, for developers to hold initial discussions with their planning authority and with the statutory nature conservation authorities to learn more about the potential environmental constraints the project might face and how these might be best avoided. This could also help to identify any potential issues to watch out for or any gaps in scientific knowledge that might need further investigation before the plan or project is approved. Experience has shown time and again that good research and consultation right from the start, ie already at the conceptualisation and design stages helps considerably in avoiding unnecessary time and expense later on.

5.3.1 Determining if it is likely to have a 'significant effect'

Every plan or project that could potentially affect a Natura 2000 site(s) should initially be considered a candidate for an Appropriate Assessment. But an Appropriate Assessment will only be required for those that are '….*likely to have a significant effect ..'*.

When doing this initial evaluation it is important to recall that the emphasis is on there being a 'likelihood' of potentially significant effects – not a certitude. This shows the precautionary nature of this initial test. If there is any doubt over whether the effects are likely to be significant or not then an Appropriate Assessment must be undertaken to ensure that these potential effects can be studied in full. The lack of information or data cannot be used as a reason for not carrying out an Appropriate Assessment (cf The European Court of Justice (C-127/02 Waddensea)[53].

The 'likelihood' of potentially significant effects should be considered in the light of the conservation objectives, the characteristics and the specific environmental conditions of the site. Plans or projects likely to undermine the site's conservation objectives must be considered likely to have a significant effect on that site.

Likely effects
Likely effects on the site should first be identified at this stage. The biodiversity elements liable to be affected (habitats, species, ecological processes) should be determined, taking into account their sensitivity in relation to the planned activities. Risks of effects must be identified using a precautionary approach. Where preliminary scientific evaluation indicates that there are reasonable grounds for concern as to the absence of significant effects, an appropriate assessment has to be carried out.

Significant effect
The significant nature of the effects on a site of a plan or project not directly connected with or necessary to the management of the site is linked to the site's conservation objectives. So, where such a plan or project has an effect on that site but is not likely to undermine its conservation objectives, it cannot be considered likely to have a significant effect on the site concerned. Conversely, where such a plan or project is likely to undermine the conservation objectives of the site concerned, it must necessarily be considered likely to have a significant effect on the site. In assessing the potential effects of a plan or project, their significance must be established in the light, inter alia, of the characteristics and specific environmental conditions of the site concerned by that plan or project (Case C-127/02 para. 46-48).

[53] ECJ ruling C-127/02 paragraph 43 et. seqq.: EC 2006a; see annex 2

5.3.2 Looking at potential cumulative effects

The screening process also applies to plans or projects *in combination with other plans or projects*. It may be that one NEEI project alone might not have a significant effect but, if taken in combination with other plans or projects (other NEEI sites or other developments) within the area, the cumulative effects may turn out to be significant. Other plans or projects to be considered in this case include those that have already been completed, those that are approved by the planning authorities, or those that are currently undergoing planning approval.

The geographical scale over which these cumulative effects need to be considered will depend on the exact circumstances and scale of the plan or project being studied but should cover a sufficiently large area to capture any cumulative effects that may arise with the plan or project under assessment. Again, the competent nature conservation authorities will be able to help identify the possible plans or projects that need to be considered as part of the in-combination test.

Key questions to be considered at the stage of screening:

- Identify the geographical scope of the plan or project, and its main characteristics (e.g. extraction methods, minerals to be extracted etc.)
- Identify all Natura 2000 sites that might be affected by the plan or project. Identify the qualifying interests of the Natura 2000 sites concerned (i.e. the habitats and species for which the sites are designated) and the sites' conservation objectives.
- Determine which of those species and habitats could be significantly affected by the planned activities.
- Analyse other plans or projects which could, in-combination with the planned activities, give rise to a likely significant effect on Natura 2000 sites (e.g. it is important to consider all other planned or existing extraction activities).
- Analyse the possible interactions between the plan or project activities, either individually or in combination with other plans or projects, and the qualifying interests, the ecological functions and processes that support them.

5.3.3 Recording the screening decision

Finally, as screening is a legal requirement, the reasons for the final decision as to whether or not to carry out an Appropriate Assessment should be recorded and sufficient information should be given to justify the conclusion. If the conclusion at the end of this first stage is that no significant effects on Natura 2000 sites are likely, there is no need to proceed further.

STAGE 2: CARRYING OUT THE APPROPRIATE ASSESSMENT

5.4. Steps involved

The purpose of the Appropriate Assessment is to assess the implications of the plan or project in respect of the *site's conservation objectives*, individually or in combination with other plans or projects. The conclusions should enable the competent authorities to ascertain whether the plan or project would not adversely affect the integrity of the site concerned, or otherwise.

The focus of the Appropriate Assessment should therefore be specifically on the species and/or habitat types for which the site is designated Natura 2000, and on the possible effects of the plan or project on them. This should also include any indirect effects on these species and/or habitat types, for instance on their supporting ecosystems and natural processes.

In summary, the term 'appropriate' essentially means that the assessment needs to be appropriate to its purpose under the Habitats and Birds Directives – i.e. that of conserving rare and endangered species and habitat types of European interest. 'Appropriate' also means that the assessment has to result in a *reasoned* decision. If the record of the assessment does not disclose the reasoned basis for the final decision regarding the authorisation of the plan or project, then the assessment does not fulfil its purpose and cannot be considered 'appropriate'.

In this respect, it is important to recall that, in contrast to the EIA or SEA, the outcome of the Appropriate Assessment is legally binding for the competent authority and conditions its final decision[54]. Thus, if it cannot be ascertained that there will be no adverse effects on the integrity of the Natura 2000 site, even after the introduction of mitigation measures, then the plan or project cannot be approved, unless the conditions of Article 6(4) are met. This applies also in case of doubt over the impacts.

There are several basic steps to follow when carrying out an Appropriate Assessment. These are illustrated in the following table and described further in the following sections:

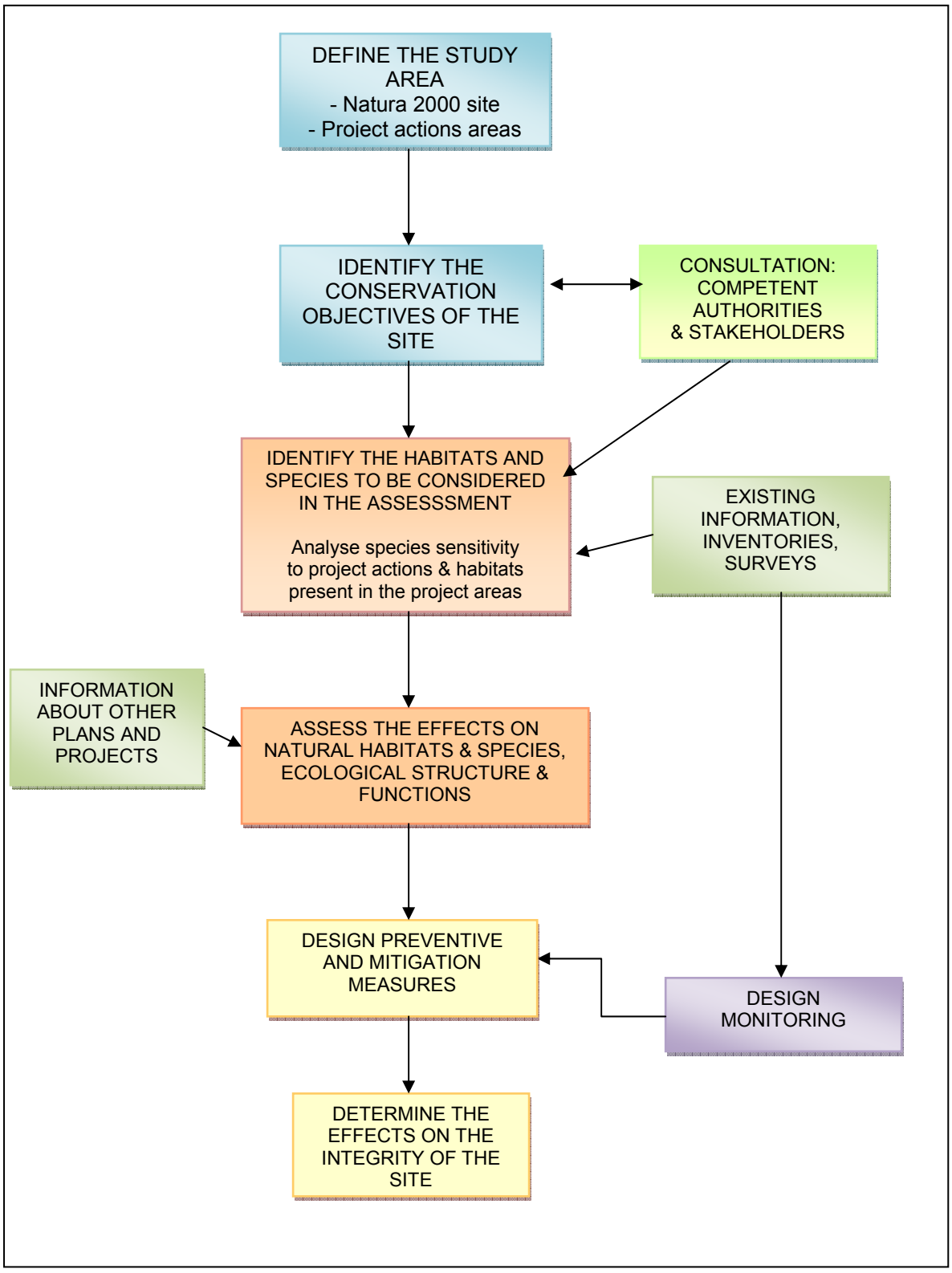
It is the responsibility of the competent authority to ensure that the AA is carried out. In that context the developer may be required to carry out all necessary studies and to provide all necessary information to the competent authority in order to enable the latter to take a fully informed decision. In so doing the competent authority may also collect relevant information from other sources as appropriate.

5.5. Appropriate assessment of NEEI projects

Where a *project* is likely to have a significant effect on the qualifying interests of a Natura 2000 site, an appropriate assessment of the implications for the site concerned by the project must precede its approval and take into account the cumulative effects which result from the combination of that project with other plans or projects in view of the site's conservation objectives.

[54] See chapter 2 for details on the relationship between SEA, EIA and AA

Figure 5: Steps to be undertaken as part of the appropriate assessment



For a non-energy extractive project, the AA is the key tool for ensuring that adverse effects on the integrity of the sites concerned are prevented or mitigated during design of the project.

Integrity of the site

Biological integrity can be defined as all those factors that contribute to the maintenance of the ecosystem, including structural and functional assets. In the framework of the Habitats Directive, the "integrity"' of the site is linked to the conservation objectives for which the site was designated as part of the Natura 2000 Network (EC 2007b). It has been usually defined as "the coherence of the site's ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or populations of species for which the site is classified" (EC 2000b, ODPM 2005). As regards the meaning of 'integrity', this can be considered as a quality or condition of being whole or complete. In a dynamic ecological context, it can also be considered as having the sense of resilience and ability to evolve in ways that are favourable to conservation. (EC 2000b).

A site can be described as having a high degree of integrity where the inherent potential for meeting site conservation objectives is realised, the capacity of self-repair and self-renewal under dynamic conditions is maintained, and a minimum of external management is required. When looking at the "integrity of the site", it is therefore important to take into account a range of factors, including the possibility of effects manifesting themselves in the short, medium and long-term (EC 2000b).

Authorisation of a plan or project granted in accordance with Article 6(3) of the Habitats Directive necessarily assumes that it is considered not likely to adversely affect the integrity of the site concerned and, consequently, not likely to give rise to deterioration or significant disturbances within the meaning of Article 6(2) (ECJ ruling on case C-127/02 para. 36).

5.5.1. The scope and focus of the assessment

Scoping will ensure that the Appropriate Assessment is well focussed and provides clear terms of reference for evaluating the potentially negative effects of the NEEI project on the Natura 2000 site(s). Its aim is to identify more precisely what impacts the Appropriate Assessment should cover and to ensure that all necessary information is gathered to enable these impacts to be assessed correctly.

This builds on the information already gathered under the screening exercise but, this time, any gaps in knowledge should also be filled as far as possible so that the assessment can be made on sound scientific grounds. Sound baseline data is of vital importance as the Appropriate Assessment has to be able to ascertain ***with certainty*** that the proposal will not affect the integrity of the site concerned. If there is some degree of doubt, the competent authorities may require further field work to be carried out or may refuse the project as it stands on the grounds of uncertainty over the impacts.

The EU Court of Justice confirmed this position in the Waddensea case (C-127/02) where it stated that '*an appropriate assessment of the implications for the site concerned of the plan or project implies that, prior to its approval, all the aspects of the plan or project which can, by themselves or in combination with other plans or projects, affect the site's conservation objectives must be identified* ***in the light of the best scientific knowledge in the field***' (paragraph 4 of the judgement).

Once again, in addition to requesting the developer to provide any relevant assessments, impact studies and surveys etc… that may be reasonably required of them, it is strongly recommended that the competent authorities also consult with, and seek the advice and guidance of, the statutory nature authorities, as early as possible during the scoping stage.

They will be able to provide details about the Natura 2000 site and its conservation objectives. They can also provide scientific advice on the likely ecological effects that a NEEI project could have on the site.

Other bodies such as conservation NGOs, research institutions or local stakeholder groups can also be contacted to help provide further local knowledge and ecological information. Consulting these organisations already during the scoping exercise will help ensure that as complete a picture as possible is built up about the site, the species/habitats present and the potential impacts of the plan or project on these. It can also lead to a smoother decision making process if all interest groups are collaborating from the start in finding solutions that are acceptable to all.

Information gathering is necessarily an iterative process. If the first identification and analysis of effects reveals that there are important gaps in knowledge, then further surveys and monitoring work will need to be undertaken in order to complete the picture. This will ensure there is a sufficient basis of scientific knowledge to be able to make a reasoned decision.

All the aspects of the project which can, either individually or in combination with other plans or projects, affect the site's conservation objectives must be identified in the light of the best scientific knowledge in the field. (ECJ ruling C-127/02, EC 2006a; see also Annex 3). The appropriate assessment should consider the elements contributing to the site's integrity in view of its conservation objectives. The decision as to whether it is adversely affected should focus on those objectives (EC 2000).

The Appropriate Assessment should focus on the species and habitats of Community interest that have justified the site designation (the qualifying interests of the site). However, these qualifying interests interact with other species and habitats in complex ways; it is therefore important to consider all the elements that are essential to the functions and the structure of the site, its qualifying interests and its conservation objectives. Furthermore, other species also can be relevant for determining potential effects on protected habitats if they constitute typical species of the habitat in question.

Conservation objectives of Natura 2000 sites

The conservation objectives for a Natura 2000 site are determined at member state level.

The Natura 2000 Standard Data Forms (SDF), which have been compiled for each designated site, contain information about the habitats (e.g. surface area, representativity and conservation status) and the species (populations, status) and the value of the site for the habitats/species for which the site has been designated. The SDF therefore provides information regarding the qualifying interests of a Natura 2000 site and in the absence of more detailed definition of conservation objectives for a Natura 2000 site, they can be considered as such. Some countries have developed in detail the conservation objectives for their Natura 2000 sites. Some sites may also have management plans or management objectives that provide clear indications about the conservation objectives to be attained.

The Habitats Directive (Article 4.4) establishes that once a site of Community importance has been adopted, the Member State concerned shall designate that site as a special area of conservation as soon as possible and within six years at most, establishing priorities in the light of the importance of the site for the maintenance or restoration at a favourable conservation status of natural habitat types in Annex I or species in Annex II and for the coherence of Natura 2000, in the light of the threats of degradation or destruction to which those sites are exposed

The assessment should be based on the best available scientific knowledge of the following main elements as they relate to the **qualifying interests** of the site (EC 2007b):

- Structure and function, and the respective role of the site's ecological assets.
- Area, representativity and conservation status of priority and non-priority habitats in the site.
- Population size, degree of isolation, ecotype, genetic pool, age class structure, and conservation status of species under Annex II of the Habitats Directive, Annex I of the Birds Directive, and regularly occurring migratory species not listed in Annex I Birds Directive present in the site.
- Role of the site within the biogeographical region and in the coherence of the Natura 2000 network.
- Any other ecological assets and functions that are essential for meeting the site's conservation objectives.

Geographical scope for the appropriate assessment of NEEI projects

AA of NEEI projects should consider the following study areas (Melki 2007):

- areas directly affected by the project actions (stripping areas, extraction areas, roads, tailings, installations for transport and treatment of materials, etc.);
- areas situated at a certain distance from the extraction area where indirect or induced effects can occur, e.g. hydrological effects, noise, emissions, etc.
- a reference study area constituted by the whole Natura 2000 site(s) concerned. The study of this area will serve to quantify the potential effects on the integrity of the site in view of its conservation objectives.

It is also important to consider the potential effects of the project on areas outside the Natura 2000 site that are used by the species occurring in the site e.g. arable fields used by feeding geese from a nearby SPA.

As stated above further baseline ecological and survey field work may be necessary to supplement existing data. Detailed surveys and fieldwork should focus on those **qualifying interests that are sensitive to the project actions**. Sensitivity should be analysed taking into account the possible interactions between the project activities (nature, extent, methods, etc.) and the habitats and species concerned (location, ecological requirements, vital areas, behaviour, etc.). Such survey work should be based on agreed scoping with relevant competent authorities, appropriate nature conservation bodies, regulators, NGOs, scientists and the public.

Identification of particular sensitive areas to the project effects within the Natura 2000 site is generally a first step in the appropriate assessment of NEEI projects, which may guide the suitable location of the project activities. Care should also be taken to avoid locations outside the Natura 2000 site that could result in adverse effects on the integrity of that site. Activities that are distant from a Natura 2000 site can still have significant effects on them e.g. de-watering or discharges from quarries upstream of a wetland.

5.5.2. Appraisal of effects - Indicators for the appropriate assessment

The appraisal of effects must be based on objective and, if possible, quantifiable criteria. A common means for that is through the use of key indicators, such as habitat loss or degradation, species population affected, key ecological functions altered, etc.

To meet the requirements of Article 6(3) assessment, it seems most appropriate that the competent authorities set up the specific formal requirements regarding the type of

information and criteria to be follow when carrying out the appropriate assessment. Dissemination and training to the relevant parties (e.g. authorities at a different level of government, NEEI representatives, consultants and project developers) is highly recommended.

Example of factors/parameters that may be used in the appraisal of effects on habitats/species of Community interest that have justified the site designation (based on Melki 2007)

- Total amount of affected habitat and percentage in relation to the estimated total habitat surface within the Natura 2000 site.
- Estimated number of affected individuals and proportion of the species population occurring in the site.
- Estimated habitats and species population trends in the affected area and on the site.
- Rarity and overall trends of affected habitats and species;
- Existence of a habitat or species restoration programme which may be affected by the project.
- Reversibility of the effect or potential recovery of damaged elements from existing sources inside or outside the site.
- Distribution of concerned habitats or species distribution within the Natura 2000 site (continuous, scattered, dispersed, etc.)
- Effects on the overall ecological functioning of the Natura 2000 site.

5.5.3 Identifying suitable mitigation measures

Mitigation measures are aimed at minimising or even cancelling the negative impact of a project. Avoidance or reduction of impacts at source should be the preferred options (EC 2000). Mitigation measures are an integral part of the specifications of a plan or project and should be considered during the appropriate assessment.

For example, they may cover:
- the dates and the timetable of implementation (e.g., not to operate during the breeding season of a particular species);
- the type of tools and operation to be carried out (e.g., to use a specific dredge at a distance agreed upon from the shore in order not to affect a fragile habitat);
- the delineation of strictly inaccessible areas inside a site (e.g., hibernation burrows of an animal species).

Good practice indicates that prevention and mitigation measures are best considered already in the design and appropriate assessment phases of a project. In practice this creates an iterative process: projects which may seem unsuitable at first can thus be improved to ensure that adverse effects on the integrity of the Natura 2000 site is prevented.

Total suppression or significant reduction of impacts at the design stage is preferable in order to facilitate the AA of plans or projects affecting Natura 2000 sites. Prevention and reduction of impacts in non-energy extractive activities can often be achieved through alternative and more appropriate location of associated activities and infrastructure (other than the ore-extraction site itself, which of course cannot be moved, but only reduced in extent) and selection of techniques and times that avoid damage to the most sensitive areas. Concerning projects, good design of the operation can also help in reducing the environmental impact on the sites. Much of the infrastructure (e.g. processing plant, accommodation and other buildings) could, for instance, be located in non-sensitive areas. Also, roads can be replaced by conveyors and/or cableways.
Mitigation measures in the mining context should be therefore understood as technically feasible solutions that are the least damaging for habitats, for species and for the integrity of the Natura 2000 site, especially if alternative locations are not feasible. Mitigation measures

should be focused on the sites' conservation objectives and the elements on which the integrity of the site depends. Examples of potential measures for avoiding or minimising biodiversity impacts from mining operations are presented in the following table.

Table 4. Examples of possible measures suggested by some NEEI for avoiding or minimising potential biodiversity impacts from mining operations *(Adapted from Rio Tinto / EarthWatch Institute. 2006)*

Impact category/source	Avoidance measures	Minimisation measures
Direct impacts (i.e. directly attributable to project actions)		
Habitat loss from extraction operations and supporting infrastructure (e.g. access roads, buildings, power supplies)	Avoid important areas	Take measures to minimise footprint (e.g. avoid opencast mining).
Hydrological degradation of habitats (e.g. from site drainage or impoundments)	Design project to avoid needs for site drainage	Sensitive drainage system design
Plant mortality from dust deposition	Use machinery that collects dust	Plant tall screening vegetation to intercept dust
Mortality of animals from operations	Avoid use of certain machinery/operations	Avoid the death of protected species individuals
Emigration as a result of disturbance (e.g. by noise, vibrations and lights)	Avoid use of lights at night	Use efficient, quiet machines
Mortality of river fauna from toxic effluents in site run-off	Avoid use of toxic chemicals	Use procedures to remove risk of spillages
Loss of river macrophytes from particular areas due to increased turbidity caused by silty site run-off	Use traps to intercept sediments	Use vegetation to stabilise worked ground
Indirect impacts (i.e. resulting from other impacts that are directly attributable to project actions)		
Loss of river fauna resulting from die-off of macrophytes (resulting from turbidity)	Use traps to intercept sediments	Use vegetation to stabilise worked ground
Loss of predators as a result of reduced prey resources (e.g. due to habitat degradation or disturbance)	See disturbance measures above	Management actions to boost prey resources
Increased vegetation browsing due to increases in herbivores resulting from reduction in predation rates (e.g. due to emigration of sensitive predators)	See disturbance measures	See disturbance measures
Loss of animal species from particular areas as a result of habitat fragmentation	Avoid sensitive areas	Use existing access routes
Reduced viability of small populations of species due to reduced immigration resulting from habitat fragmentation	Avoid sensitive areas	Management measures to increase viability of populations
Cumulative impacts (i.e. impacts that arise in combination with other projects)		
Loss of species requiring large territories (e.g. top-level predators) as a result of combined effects of habitat loss and fragmentation	See habitat loss and fragmentation measures	See habitat loss and fragmentation measures

5.6 Appropriate assessments of plans

Both ***plans and programmes*** and ***individual projects*** may be subject to an Appropriate Assessment under Article 6(3) of the Habitats Directive. In the case of the former this concerns in particular land use plans[55] and mineral plans.

Such plans will also be subject to an SEA[56] (see chapter 2). According the SEA Directive recitals: *Where the obligation to carry out assessments of the effects on the environment arises simultaneously from the SEA Directive and other Community legislation, such as the Birds and the Habitats Directives, in order to avoid duplication of the assessment, Member States may provide for coordinated or joint procedures fulfilling the requirements of the relevant Community legislation*.

The SEA must consider the effects on Natura 2000 sites and is also helpful in terms of wider environmental issues and the resolution of land-use conflicts at a strategic level, but the AA provides the decision-making system that is required to analyse the effects of extractive industries on the integrity of Natura 2000 sites. A common or coordinated process for the appropriate assessment and the SEA is recommended for plans and programmes, provided the requirements of both Directives are fulfilled and clearly distinguished.

The Appropriate Assessment should consider the effect on the integrity of the Natura 2000 sites of the mineral plan policies and proposals, alone and in combination with other plans or projects. The identification of adequate mitigation measures and the search for less damaging design solutions should be considered. This may also include the removal or replacement of certain elements of the plan which, due to their adverse effects, might not get approval later on.

The AA must be recorded and carried out with a view to ascertain whether the plan will not adversely affect the integrity of the Natura 2000 sites concerned. Again, the assessment should be confined to the effects on the habitats and species of Community interest for which the sites are designated. The comprehensiveness of the assessment work undertaken should be proportionate to the geographical scope of the plan and the nature and extent of any effects identified.

An AA need not be done in any more detail, or using more resources, than is necessary for its purpose. It would be inappropriate and impracticable to assess the effects in the degree of detail that would normally be required for the appropriate assessment at the project level (DCLG 2006). However, sufficient information must be obtained to allow the AA to be carried out: this may require some additional survey and impact analysis.

The proportionality principle also applies: for more strategic plans, or strategies, where it is not possible to identify affects on individual sites, the analysis should focus on broad constraints and major risks; at the project level it should focus on site-specific effects. Nevertheless, the underlying aim at all times is to avoid or remove any risk of adverse effect on the integrity of Natura 2000 sites, or to remove any reasonable grounds for concern that such an adverse effect may occur.

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[55] The European Court of Justice confirmed that Articles 6(3) of the Habitats Directive must be applied to land-use plans likely to have a significant effect on a Natura 2000 site. (*ECJ ruling on Case C-6/04, Commission v. United Kingdom, 20 October 2005.* EC 2006a; see Annex 2).

[56] *Article 3.2.(b) - An environmental assessment shall be carried out for all plans and programmes, which, in view of the likely effect on sites, have been determined to require an assessment pursuant to Article 6 or 7 of Directive 92/43/EEC*

The process involved in the AA of mineral plans may include the following tasks:

Site Analysis
- Identify all the Natura 2000 site(s) in the area affected by the mineral plan
- Identify the sites' conservation objectives and qualifying features (habitats and species)
- Identify the key environmental features and the ecological factors that support site integrity
- Analyse sites' vulnerability in relation to the plan's policies and proposals

Analysis of other Plans and Projects
- Identify all other National/Regional/local Plans which may contribute to adverse effects on some or all Natura 2000 sites in the area affected by the mineral plan
- Identify possible additional effects through interaction with other plans and projects

Plan Analysis
Determine whether it can be ascertained that the plan would not adversely affect the integrity of Natura 2000 sites, taking into account the following issues:
a. The conservation objectives of the sites
b. The geographical scope and objectives of the plan
c. The status and condition of the sites
d. Factors affecting the sites' qualifying features
e. Impact of the Plan on these factors
f. Likely effect on sites integrity of the plan alone and/or in combination with other plans and projects
g. The mitigation measures identified to avoid adverse effect on the integrity of Natura 2000 sites.

The likely effects of the plan are assessed against each of the qualifying features of the sites concerned. Risks of adverse effects on the integrity of each of the Natura 2000 sites within the geographical scope of the Plan should be identified applying the precautionary approach. That means where scientific evidence is insufficient, inconclusive or uncertain, any indications through preliminary objective scientific evaluation that there are reasonable grounds for concern should be considered when identifying effects that may damage the integrity of the site.

Consultation with the appropriate nature conservation body to assess whether the plan is likely to affect the integrity of any Natura 2000 site should start as early as possible in the plan-making process. If an adverse effect cannot be ruled out, the plan-making authority must address mitigating the effects, which may allow to reach a conclusion of no adverse effect.

The main options will be:
- Modify the plan policy or proposal;
- Re-design the proposal including re-location of certain elements of the plan;
- Implement a mitigation strategy.

If the plan changes significantly at any time before adoption, the changes should be also addressed in the AA. (Dodd *et al.* 2007)

The proposal of mitigation measures can be further developed as part of the assessment process. The plan-making authority must verify that the mitigation will work in order to be able to conclude that, when it is taken into account, there will be no adverse effect on the integrity of the Natura 2000 site.
At a high level of planning (e.g. national/regional plans), mitigation (and compensation when needed) is likely to mean setting out the broad parameters that should be worked up in more detail at a lower level, where it should be possible to set out the ecological, locational, temporal, legal and financial parameters that need to be met by any planning application.

These should be validated by relevant bodies such as Nature Conservation authorities to ensure they are both appropriate and capable of being implemented (Dodd *et al*. 2007).

A key benefit of the plan-making process is the ability to consider less damaging solutions to meet the plan's objectives, e.g. supply x million tonnes of sand over 25 years. This iterative process should be fully utilised to provide solutions that protect Natura 2000 sites and ensure a sustainable supply of minerals sufficient to meet society's needs.

5.7 The conclusions of the Appropriate Assessment

It lies with the competent national authorities, in the light of the conclusions of the appropriate assessment of the implications of a plan or project for the Natura 2000 site concerned, to approve the plan or project. This can be done only after having ascertained that it will ***not*** adversely affect the integrity of that site. If the conclusions are positive, in the sense that no reasonable scientific doubt remains as to the absence of effects on the site, the competent authorities can give their consent to the plan or project.

Where reasonable scientific doubt remains as to the absence of adverse effects on the integrity of the site linked to the plan or project being considered, the competent authority will have to refuse authorisation (ECJ ruling on case C-127/02, EC 2006a; see also Annex 3), and/or require incorporation of further mitigation measures such that the reasonable scientific doubt is removed. Finally, when conditions allow for it, Article 6(4) provisions could be applied.

The concept of 'integrity of a site' focuses on the specific site and relates to its conservation objectives. Thus, it is not allowed to adversely affect its integrity on the basis that the conservation status of the species or habitats that it hosts and are affected by the plan or project will remain favourable within the European territory of the Member State (EC 2000b).

The Appropriate Assessment and its conclusions should be *clearly recorded*. In this respect, the Appropriate Assessment report should be sufficiently detailed to demonstrate how the final decision was reached, and on what scientific grounds the decision was made. This is confirmed by ECJ case-law[57] .

The report should:

- describe the project or plan in sufficient detail for members of the public to understand its size, scale and objectives;
- describe the baseline conditions and conservation objectives of the Natura 2000 site;
- identify the adverse effects of the project or plan on the Natura 2000 site;
- explain how those effects will be avoided through mitigation;
- set out a timescale and identify the mechanisms through which the mitigation measures will be secured, implemented and monitored.

[57] "The AA should contain complete, precise and definitive conclusions capable of removing all reasonable scientific doubt as to the effects of the works proposed on the site concerned". (Commission/Italy, C-304/05)

6. ARTICLE 6.4: ALTERNATIVE SOLUTIONS, IMPERATIVE REASONS FOR OVERRIDING PUBLIC INTEREST AND COMPENSATION

- *Article 6.4 of the Habitats Directive provides a mechanism for dealing, in exceptional circumstances, with plans or projects for which adverse effects on the integrity of Natura 2000 site(s) cannot be excluded.*
- *The competent authorities must analyse and demonstrate the lack of less damaging alternatives and the need of the plan or project concerned for imperative reasons of overriding public interest.*
- *A good knowledge not only of where mineral resources occur but also about access, quality and feasibility for the mineral extraction is essential in order to fully assess alternative sources.*
- *Overriding public interests may include human health, public safety, beneficial consequences of primary importance for the environment and other interests of a social or economic nature.*
- *In such a case, appropriate compensatory measures must be implemented to ensure that the overall coherence of Natura 2000 is protected. Compensatory measures must be specific to the unavoidable adverse effects of the plan or project.*

6.1 Introduction

If, on the basis of the Appropriate Assessment, it cannot be ascertained that a plan or project will not adversely affect the integrity of the site concerned, the provisions of Art. 6(4) of the Habitats Directive apply to any subsequent decisions which are taken to continue with the project as proposed. Article 6(4) is only applicable under the strict conditions.

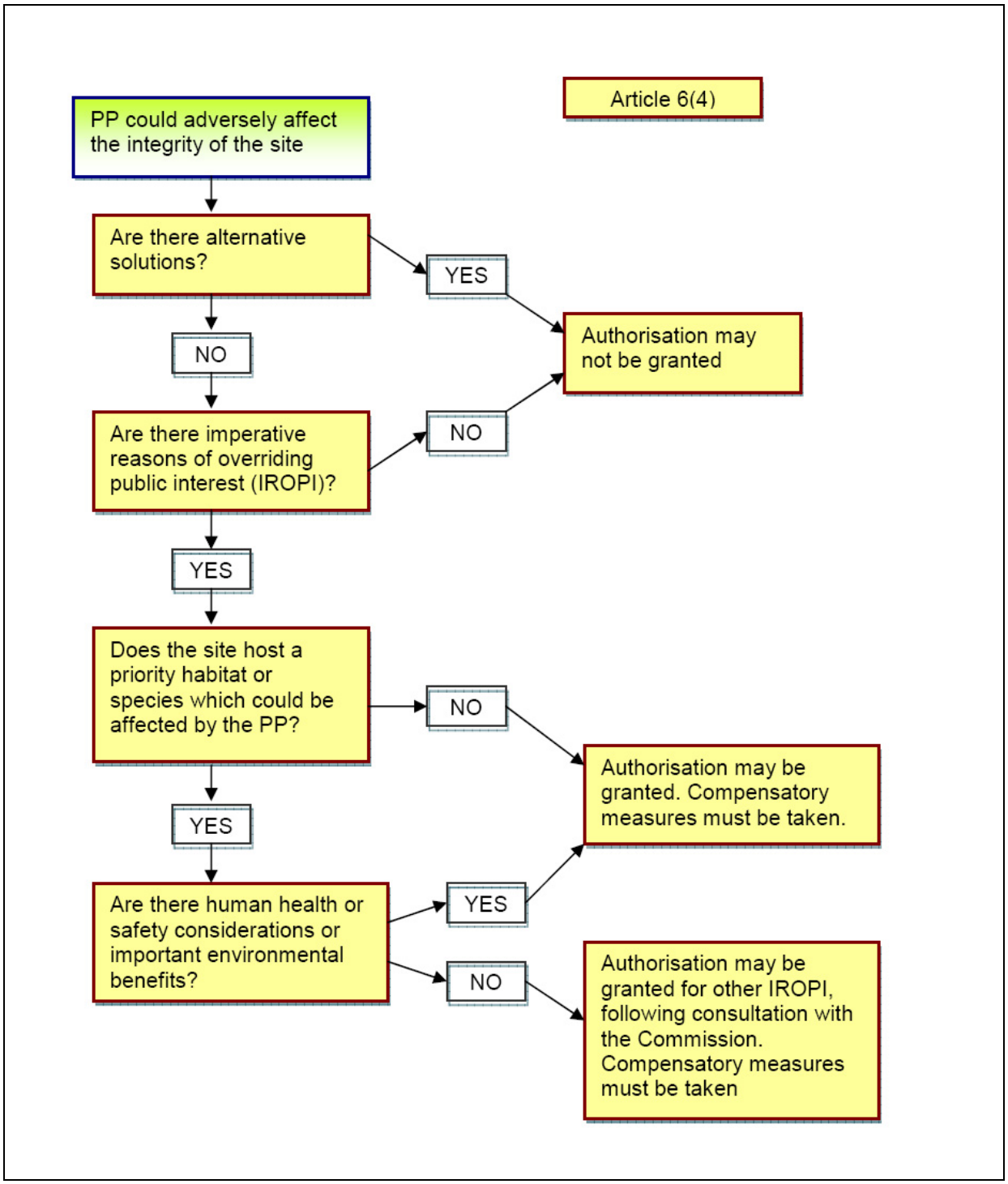
The requirements of Article 6(4) of the Habitats Directive establish a set of conditions, which must be met for the competent authority to authorise the plan or project in case the AA cannot show that the integrity of a Natura 2000 site will not be adversely affected by it**.** Being an exception to Article 6(3), the fulfilment of the conditions under which it may be applied is subject to strict interpretation.

Article 6 of the Habitats Directive (92/43/EEC), paragraph 4

4. If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

Where the site concerned hosts a priority natural habitat type and/or a priority species the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.

Figure 6. Flow chart of the Article 6(4) conditions



It falls on whoever wants to make use of Article 6(4) to prove, as a prerequisite, that the following conditions do indeed exist:

1 The alternative put forward for approval is the least damaging for the integrity of the Natura 2000 site in terms of its qualifying interests, and no other feasible alternative exists that would not adversely affect the integrity of any Natura 2000 site;
2 There are imperative reasons of overriding public interest (IROPI);
3 All necessary compensatory measures have been adopted .

The European Commission has published a Guidance Document on Article 6(4) of the Habitats Directive (EC 2007b) which provides clarification of the concepts of alternative solutions, imperative reasons of overriding pubic interest, compensatory measures, overall coherence and the opinion of the Commission required in some cases[58].

6.2 The absence of alternative solutions

Alternative solutions could involve alternative locations, different scales or designs of development, or alternative processes. Other alternative solutions to be considered are the reuse or recycling of materials or the use of alternative materials, which should be better addressed at strategic planning level.

Project or plan proponents should consider alternative solutions and their impacts at the earliest stages of development planning. However, to fulfil the requirements of Article 6(4), it is for the competent authority to assess alternative solutions, once the appropriate assessment stage has concluded that it cannot be ascertained that the plan or project will not have adverse effects on the integrity of the site concerned.

In conformity with the principle of subsidiarity, it rests with the competent national authorities to assess the relative impact of other alternatives on the site concerned or any other Natura 2000 site that might be affected. It should be stressed that the reference parameters for such comparisons deal with aspects concerning the conservation and the maintenance of the integrity of the site and of its ecological functions. Any subsequent decision to continue with the project requires suitable consideration of all possible alternatives and the absence of alternative solutions should be demonstrated (see case C-239/04 in annex 3).

A good knowledge not only of where mineral resources occur but also about access, quality and feasibility for the mineral extraction is essential in order to fully assess alternative sources. The competent authorities have to analyse and demonstrate first the need of the plan or project concerned. Thus, the zero option should also be considered at this stage (EC 2000, 2007b).

6.3. Imperative reasons of overriding public interest (IROPI)

The concept of imperative reason of overriding public interest is not defined in the Directive. However, it is clear from the wording of Article 6(4) that only public interests, irrespective of whether they are promoted either by public or private bodies, can be balanced against the conservation aims of the Directive. Thus, projects developed by private bodies can only be considered to meet this condition of Article 6(4) where such public interests are served and demonstrated (EC 2007b).

[58] http://ec.europa.eu/environment/nature/natura2000/management/guidance_en.htm

Such public interests may include human health, public safety, beneficial consequences of primary importance for the environment, and other interests of a social (e.g. employment) or economic nature[59].

To fulfil the requirements of Article 6(4) of the Habitats Directive, the competent national authorities have to make their approval of the plans and projects in question subject to the condition that the balance of interests between the conservation objectives of the Natura site(s) affected by those initiatives and the above-mentioned imperative reasons weighs in favour of the latter. This should be determined according to the following considerations:

a) The public interest must be **overriding**: it is therefore clear that not every kind of public interest of a social or economic nature is sufficient, in particular when seen against the particular weight of the interests protected by the Directive (see e.g. its 4th recital stating *"Community's natural heritage"*).

b) In this context, it seems also reasonable to assume that the public interest can only be overriding if it is a long-term interest; short term economic interests or other interests which would only yield short-term benefits for the society would not appear to be sufficient to outweigh the long-term conservation interests protected by the Directive. Overriding interests, as long-term, fundamental social interests, may be properly identified beforehand by published policies and plans.

It is reasonable to consider that the "*imperative reasons of overriding public interest, including those of social and economic nature*" refer to situations where plans or projects envisaged prove to be indispensable:
- within the framework of actions or policies aiming to protect fundamental values for the citizens' life (health, safety, environment);
- within the framework of fundamental policies for the State and the Society;
- within the framework of carrying out activities of economic or social nature, fulfilling specific obligations of public service.

It should be noted that the conditions of overriding public interest are even stricter when it comes to the realisation of a plan or project likely to adversely affect the integrity of a Natura 2000 site that hosts qualifying *priority* habitats and/or species, where those habitats and/or species are affected. These can only be justified if the imperative reasons of overriding public interest concern
- human health and public safety or
- overriding beneficial consequences for the environment, or,
- for other imperative reasons if, before granting approval to the plan or project, the opinion of the Commission has been given (EC 2007b).

6.4. The adoption of all necessary compensatory measures

Compensatory measures, as described in Article 6(4) of the Habitats Directive, constitute the "last resort" and are used only when the decision has been taken to proceed with a plan or project that could have an adverse effect on the integrity of the Natura 2000 site because no alternatives exist and the project has been judged to be of overriding public interest under the conditions described above.

[59] In this regard, relevant aspects set out in the Communication on the Raw materials Initiative (COM(2008) 699 final, SEC(2008) 2741) can be taken into account.

The compensatory measures constitute measures specific to the unavoidable adverse effects of a project or plan. They aim to ensure that the overall coherence of Natura 2000 is protected, and should provide compensation corresponding precisely to the negative effects on the species or habitat concerned.

There is little experience with the implementation of compensation measures under Article 6(4) of the Habitats Directive in the context of NEEI projects, given that it is unlikely that many NEEI projects will reach this stage as there is normally a less damaging alternative solution available. Also there may be a lack of information about such cases. The implementation of compensation measures under Article 6(4) can benefit from the experience that exists with the more general use of biodiversity offsets by the NEEI (see Chapter 7).

To ensure that the overall coherence of Natura 2000 is protected, the compensatory measures proposed for a plan or project should:

a) contribute to the conservation of natural habitats and species of Community Interest "within the biogeographical region concerned", in order to ensure the maintenance of the overall coherence of the Natura 2000 Network (for sites designated under the Habitats Directive), or within the same range, migration route or wintering area for bird species (i.e. sites designated under the Birds Directive) in the Member State concerned.

b) address, in comparable proportions, the habitats and species of Community Interest negatively affected;

c) provide functions comparable to those which had justified the selection of the original site, particularly regarding the adequate geographical distribution

It is considered good practice to take compensatory measures as close as possible to the affected area in order to maximise chances of protecting the overall coherence of the Natura 2000 network. Therefore, locating compensation within or nearby the Natura 2000 site concerned in a location showing suitable conditions for the measures to be successful is the most preferred option. However, this is not always possible and it is necessary to set a range of priorities to be applied when searching locations that meet the requirements of the Habitats Directive.

As a general principle, the compensatory measures should be in place and working before the work on the plan or project has begun. This is to help buffer the damaging effects of the project on the species and habitats by offering them suitable alternative locations in the compensation area.

If this is not fully achievable, the competent authorities could require extra compensation for the interim losses that would occur in the meantime. Member States should pay particular attention when the negative effects of a plan or project are produced in rare natural habitats or in natural habitats that need a long period of time to provide the same ecological functionality (EC 2007b). Under these circumstances, the likelihood of long-term success is best evaluated by peer-reviewed scientific studies of trends.

The information on the compensatory measures should be submitted to the Commission before they are implemented and indeed before the realisation of the plan or project concerned. It is therefore advised that compensatory measures should be submitted to the Commission as soon as they have been adopted in the planning process in order to allow the Commission, within its competence of guardian of the treaty, to assess whether the provisions of the Directive are being correctly applied (EC 2007b).

The Commission will deliver an opinion when priority habitats and/or species might be adversely affected. In delivering its opinion, the Commission will check the balance between the ecological values affected and the invoked imperative reasons, and evaluate the compensation measures. The opinion is not binding but in case of non-conformity with Community law, legal action may be taken.

According to existing EC guidance (EC 2007b), compensatory measures under Article 6(4) can consist of one or more of the following:

- **Restoration or enhancement** in existing Natura 2000 sites: restoring the habitat to ensure the maintenance of its conservation value and compliance with the conservation objectives of the site or improving the remaining habitat in proportion to the loss due to the plan or project on a Natura 2000 site;

- **Habitat Recreation**: recreating a habitat on a new or enlarged site, to be incorporated into Natura 2000;

- **Designation of new sites** under the Birds and Habitats Directive, in association with other works, as described above. As regards compensatory measures for designated sites under the Birds Directive (SPA), any new habitat created as compensation for damage to an SPA should be designated as an SPA once it meets its objectives in order to maintain the overall coherence of the network.

Key issues to address in designing compensatory measures include:

- Targeted objectives to address the unavoidable adverse effects and to ensure that the overall coherence of Natura 2000 is protected
- Ensuring the compensation is feasible and effective i.e. level of risk of failure;
- Assessment of technical feasibility;
- Extent of compensatory measures;
- Location in relation to damage;
- Timing in relation to damage;
- Long-term implementation.

7. SOME NEEI PRACTICES AND THEIR RELATIONS WITH THE PROVISIONS OF ARTICLE 6.3 AND 6.4

- *NEEI are making important efforts not only to reduce their impacts but also to contribute to biodiversity conservation, in particular through the rehabilitation of extraction sites and the implementation of biodiversity offsets.*
- *Site rehabilitation can also make a contribution to creation of habitats and conservation of certain species that are protected under the EU Nature Directives.*
- *Increased rehabilitation of mines and quarries has led to more recognition of their potential to contribute to biodiversity objectives.*
- *Biodiversity offsets represent a practice often used by the NEEI to compensate for unavoidable impacts on biodiversity resulting from their activities. This practice may also provide opportunities to enhance habitats and species populations in the EU.*
- *The possibilities for considering these NEEI practices in relation to Article 6(3) and 6(4) of the Habitats Directive should be further explored in the future.*

7.1 Rehabilitation

Rehabilitation is the process of converting derelict land to usable land and may include engineering as well as ecological solutions. The rehabilitation plan is normally an integral part of the NEEI project and part of the permit conditions[60]. Quarry and mine rehabilitation projects are increasingly used to reinstate certain species and habitats at the end of the project life cycle.

Site rehabilitation projects have thus the potential to make a contribution to the creation of habitats and conservation of certain species that are protected under the EU Nature Directives. Strategic planning of rehabilitation is then advisable, when actions can be integrated in a wider conservation strategy (e.g. regional, national). Some interesting experiences have been developed in the EU through partnerships between NGOs, local stakeholders and industry. Some relevant examples are included in Annex 2.

7.1.1. The consideration of mine/quarry rehabilitation in the context of Article 6 of the Habitats Directive

A relevant question in relation to the appropriate assessment of effects of extractive activities on Natura 2000 is whether the rehabilitation plan can contribute to mitigation or compensatory measures of adverse effects on the site integrity.

[60] Rehabilitation of mining waste facilities such as waste heaps and tailing ponds is required by the Mining Waste Directive 2006/21/EC.

Planning sites rehabilitation for biodiversity gain in mineral extraction operations (UK)

In 2005, the RSPB began the Minerals Restoration Potential project, which used Geographical Information Systems (GIS) to assess the potential for creating important wildlife habitats on mineral sites across England. This potential was then compared to targets for habitat expansion within the UK (the UK Biodiversity Action Plan), to show the contribution mineral sites in England could make. The project was made possible with Aggregate Levy Sustainability Fund (ALSF) support through the Minerals Industry Research Organisation (MIRO).

The first output of the project was the report '*Nature After Minerals: how mineral site restoration can benefit people and wildlife'*. The report set out the results of the GIS analysis, together with the results of a survey of operating companies and planners looking at the factors preventing more habitat from being created on mineral sites. It also set out a vision for how mineral sites could contribute to the UK BAP and gave recommendations to help realise this vision.

A second output was the After Minerals website (www.afterminerals.com), which allows users to look at any of the 1300 active mineral extraction sites in England and see the habitat(s) that could be created there. This is an important resource to support the creation of more high quality habitat on mineral sites.

Recognising that it is not feasible, or even desirable, to create habitat on mineral sites everywhere it is physically possible to do so, the model went on to prioritise sites according to their proximity to existing patches of the same habitat. For example, if a mineral site was suitable for the creation of lowland heathland, and was adjacent to an existing patch of lowland heathland, it would be the highest priority for this habitat type.

Existing EC guidance on Article 6 of the Habitats Directive makes the following distinction:

- **Mitigation measures** aim to minimise or even cancel adverse effects on the site (see Section 5.5).

- **Compensatory measures** are intended to compensate for the effects on sites whose integrity is adversely affected by the plan or project so that the overall coherence of the Natura 2000 network is maintained.

  Compensatory measures in the meaning of Article 6(4) are only considered after an appropriate assessment has been carried out and it has not been ascertained that the integrity of the site will not be adversely affected, where there are no alternative solutions and where there are imperative reasons of overriding public interest. Compensatory measures are intended to compensate for the effects on habitats and/or species affected negatively by the plan or project, e.g. a specific piece of a habitat is replaced by another, often newly created, or by improving one already existing.

With regard to the possibilities for rehabilitation to contribute to mitigation or compensatory measures in the context of Article 6, the following considerations can be made:

- Mineral operators should analyse the possible role of rehabilitation in reducing predicted adverse effects. Although rehabilitation is unlikely to completely remove those effects, especially if they are a consequence of physical excavation and therefore loss of features, there may be scope to reduce their magnitude, for example through phased rehabilitation of the mined-out parts of the extraction areas during the operation phase. In such cases, it may be possible to consider rehabilitation as a contribution to "mitigate" the effects of the project.

- Rehabilitation is often done not only after, but already during mining in an integrated manner., e.g., the whole extraction area may cover 10 ha, but only 2 ha are operated at any given moment accompanied by ongoing rehabilitation of mined out areas. How substantial its contribution to mitigation may be depends, however, on the habitats and species involved. Agricultural habitats used by various bird species can in many cases be restored with sufficient certainty in relatively short time, especially when the original soil is stored and used for rehabilitation. Most habitat types of Annex I Habitats Directive, on the other hand, may need much more time to be fully restored.

- Where the results of the rehabilitation actions are not achieved for many years (or possibly even decades) after mining operations begin and the effects on a Natura 2000 site occur, it would not be possible to consider rehabilitation as a contribution to "mitigate" the effects of the project, at least in the context of an Appropriate Assessment under Art. 6.

- The Appropriate Assessment will analyse whether the project could adversely affect the integrity of a Natura 2000 site and take into account any contribution that rehabilitation could make to the overall mitigation measures. This should be determined on a case by case basis, taking into account all relevant issues, such as: the conservation objectives of the Natura 2000 site that may be affected by the extraction project, the nature and duration of the project and the predicted adverse effects, the size of the extraction area worked out at each time, the design and timing of the rehabilitation programme as part of the ongoing management of the project, etc..

With regard to Natura 2000 sites, the main criterion for rehabilitation to fulfil the requirements of a mitigation measure is that, at all times, it must be demonstrated that the integrity of the site, i.e. the coherence of its ecological structure and function across the whole area, is maintained (see chapter 5).

Supporting criteria that should be fulfilled when considering whether rehabilitation contributes to the maintenance of the integrity of the site are the following:

1. The rehabilitation measure addresses the habitats and/or species negatively affected (i.e. restoration of the same habitat type/species).
2. The rehabilitation measure targets the affected area.
3. The rehabilitation must result in a significant reduction of the negative effects, in duration, extent and intensity. This reduction must be achieved is short time during extraction.

Under Article 6(4), the Commission has suggested that compensatory measures should be implemented before the project starts (EC 2007b) so, in general, rehabilitation could not be regarded as contributing to compensation, at least not for the same project.

However, under very particular circumstances, the rehabilitation of a mining site (project A), without adverse effect on a Natura 2000 site) could provide appropriate and advanced compensation measures for another extractive project (project B) in a different site, where adverse effects cannot be ruled out and where the alternative solutions and IROPI tests can be met.

This would require that recreation or restoration of the habitat types affected by the project or the recovery or enhancement of species population is successfully achieved before the negative effects of that project take place. Moreover, such measures must be carried out in a suitable place in order to preserve the coherence of the Natura 2000 network.

7.1.2 Effectiveness of rehabilitation

The potential for creating habitats of high value for biodiversity through site rehabilitation is considerable. However, reinstatement of original communities of plants and animals is often very difficult to achieve, especially if the site has been severely degraded (ICMM, 2006*).* The feasibility and success rate of creating or restoring habitats or species populations that have an equivalent quality (in terms of ecological properties and ecosystems services) of those that are affected has to be analysed carefully.

Many habitats of Community Interest, particularly habitats that have developed over thousands of years, are difficult to restore and would require many decades or even hundreds of years to attain a reasonable level of ecological quality. Also, it must be taken into account that certain habitat types and/or species included in the Habitats and Birds Directives may be irreplaceable in a particular site and in the context of the Natura 2000 network.

There are, of course, many positive examples – such as flooded sand, clay and gravel workings which have become important sites for overwintering wildfowl and aquatic species. NEEI are undertaking significant efforts to carry out rehabilitation plans that aim to restore original habitats and communities from the extraction areas. Suitable techniques may include e.g. the reproduction of native and endemic plants in plant nurseries, which require collection of seeds on site and replanting in the area under suitable environmental conditions (e.g. soil, humidity, exposure, etc.). An increased recognition of the potential of mines and quarries to contribute to national and local biodiversity objectives has led to more sites being rehabilitated to nature conservation.

The integration of rehabilitation with on-going extraction and civil engineering work of the quarry site is a key factor in achieving efficiency. Appropriate landforms can be created by ongoing quarrying and tipping operations, and soil stripping can be timed so that the soil can be transferred directly to nearby sites where it will be used in rehabilitation[61]

Some rehabilitation plans include an evaluation of techniques, and an analysis of their feasibility and their effectiveness. This can provide useful information to better understand the time needed to achieve the expected results and the possible rate of success.

Evaluation of rehabilitation techniques – some examples

Techniques to recover the coastal vegetated shingle (a rare and fragile habitat) are being trialled in an old sand and gravel quarry at Dungeness, in UK (see Annex 2). The natural processes of developing vegetated shingle are very slow. Trials included seeding of broom, an early coloniser of shingle, which produces litter that helps other species, including lichens to establish. After 4 years, survival was 6%, and some plants are quite substantial. Lichen communities have begun to establish among the more established plants.

Evaluation of techniques to rehabilitate gypsum quarries has also been carried out in Southeastern Spain, (Mota *et al*. 2004) showing that rehabilitation programmes of gypsum quarries can be an opportunity to recover populations both of the more strictly endemic plants and also of very rare species. Gypsophylous plants tend to recover their former populations in a succession process, which reveals the extraordinary resilience of these habitats, when gypsum soils are adequately preserved. However, the widely used technique of covering the quarry after the end of exploitation with top soil seems to promote vegetal communities very different from the original gypsicolous ones. Due to their peculiar ecological profile, gypsum communities should be restored with species and procedures especially tailored, avoiding to 'bury' the gypsum under layers of soil of a very different edaphic composition.

[61] Williamson et al. 2003).

Rehabilitation plans should take into account the *long time* needed to achieve successful restoration of natural habitats and communities. As an example, a 40 year restoration plan has been agreed between RSPB and Westminster Dredging PLC, which aims to create a complex of mixed depth saline lagoons and brackish pools, on the Cliffe Pools, and area located on the southern shore of the Thames Estuary (UK), where clay for the cement industry was extracted until 1972, leaving a series of pits that flooded to form pools. From the 1960's onwards the site was used by Westminster Dredging Ltd for the licensed disposal of river dredging deposits by infilling of the pools (see Annex 2).

Another important issue, in addition to the time required to achieve results, is the *rate of success*. Lockwood and Pimm (1999) have reviewed 87 restoration projects of aquatic ecosystems, that shared 3 criteria: (a) clear goals; (b) goals that aim at the restoration of some part of former ecosystem; (c) ecosystems subject to initial management. The time needed to achieve the expected results was between 1-53 years, with an average of 6, and with a varying success rate, with only a few goals reached, when management ceased.

7.1.3 Additional biodiversity benefits

Where the AA has determined that no adverse effects on the integrity of a Natura 2000 site are expected from an extraction project, the rehabilitation of the extraction area offers a good opportunity to contribute to improving the conservation status of certain habitats and species protected under EU nature legislation, and to improve the connectivity for those habitats and species within the site or between that site and other Natura 2000 sites.

Many species of high conservation importance in the EU are at risk as a result of current and ongoing habitat fragmentation. Ecological connectivity is necessary to enable foraging movements, migrations, the genetic exchange through pollination and dispersal.

The intensive use of the EU countryside has led to a gradual loss of semi-natural habitats. The remaining patches have become increasingly isolated and fragmented. Rehabilitation of mines and quarries provides an opportunity to address some of this loss by creating new habitats, enlarging existing patches, and to re-instate habitat linkages, connecting remaining patches to form sustainable ecological networks.

The restoration or creation of habitats that restore functional connectivity can provide considerable conservation benefits provided these are of appropriate types and quality (e.g. sufficiently wide) and in appropriate locations (Kettunen *et al*. 2007). Although as noted above the restoration of fully functional habitats of Community interest is often very difficult and slow – the creation of habitats that can facilitate movements between habitat patches (e.g. by providing sufficient cover) or buffer habitats is often feasible (Eftec, report for the EC, unpublished).

This highlights the importance of what the industry often refers to as "integrated closure planning". Most attempts so far have only contributed to conservation of biodiversity once extraction is finished – through rehabilitation of the land disturbed during operation and long-ago abandoned. In fact, to ensure successful management of biodiversity value in and around extraction sites, active and adaptive management is required throughout the life-time of the mine or quarry – from initial exploration through to closure and after-care.[62]

[62] "Planning for Integrated Mine Closure: Toolkit" (2008), by the International Council on Mining Metals is a useful source of further information on how integrated closure planning can assist with rehabilitation of mine sites for the purpose of conserving biodiversity.

7.2. Biodiversity Offsets

The non-energy extractive industries often voluntarily apply a hierarchy of biodiversity mitigation measures, where offsets are considered as a last resort to deal with unavoidable residual impacts.

In general, offsets are conservation activities that take place outside the impacted area in order to address unavoidable harm, in addition to any mitigation or rehabilitation that may take place on that site (ten Kate et al. 2004). Some developers own large plots of land and in some circumstances, biodiversity offsets are undertaken on land that would not otherwise be managed for conservation, as a way of offsetting development activity on another part of the plot (Rio Tinto/EarthWatch Institute, 2006).

Offsets undertaken by NEEI may include habitat creation, restoration or enhancement. In some cases translocations of species or plant communities may be undertaken. Offsets may also include purchasing an area of equivalent habitat for longer-term protection (Rio Tinto/Earthwatch Institute 2006, ICMM 2006).

What are biodiversity offsets?

- Biodiversity offsets are sometimes defined measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity (BBOP 2009).

As for the rehabilitation, the key question is how offsets can be considered in relation to the provisions of Articles 6(3) and 6(4) of the Habitats Directive, i.e. whether offsets could be considered as mitigation or compensatory measures.

Taking into account the definition of mitigation and compensatory measures in existing EC guidance (see 7.1), and the above mentioned definitions of "biodiversity offsets" as measures that address residual adverse effects after mitigation has been exhausted, it would not seem possible to consider offsets as mitigation measures for the purposes of the Habitats Directive. Nonetheless, they could offer some opportunity to provide compensation within the meaning of Article 6(4) of the Habitats Directive, when all the requisites set out in that Article are met (i.e. IROPI and absence of alternatives, see chapter 6). However, this is an important issue that requires further investigation (see chapter 9).

Biodiversity offsets also represent a concept typical for NEEI practice that goes beyond the obligations resulting from the Habitats Directive. NEEI often own large areas of land and have long-ranging economical perspectives in the regions they operate and may wish to offset non-significant impacts in order to avoid a possible accumulation of several non-significant impacts that might lead to a significant impact. This may provide more room for manoeuvre for future projects in the same region

NEEI may voluntarily take actions to improve the conservation status of relevant species or habitat types. Biodiversity offsets may provide opportunities to enhance habitats and species populations in the EU, many of which are in unfavourable conservation status. There is also considerable potential for reversing habitat fragmentation and improving functional connectivity by restoring habitats in appropriate locations, as already mentioned in the previous section on rehabilitation.

Many EU Member States have developed Biodiversity Action Plans that include habitat restoration targets (e.g. the UKBAP[63]). Site selection tools can also be used to guide the location of offsets (Keisecker et al. 2009).

[63] http://www.ukbap.org.uk/

8. EXTRACTIVE ACTIVITIES AND NATURA 2000 IN MARINE AREAS

- *The Habitats Directive provisions apply both to sites designated in terrestrial and marine areas but the Natura 2000 network is still not completely established in the marine environment.*
- *Extractive activities in marine areas, especially aggregates' extraction, are becoming more and more important. Plans and project dealing with extractive activities in the marine environment would also be the subject of an appropriate assessment in accordance with Article 6(3) of the Habitats Directive if they were likely to have significant effects on Natura 2000 sites.*
- *Maritime spatial planning is considered a key instrument to optimise the use of marine space to benefit economic development and the marine environment. Adopting a zoned approach may provide the option of introducing marine aggregate extraction to an existing multi-use environment in a strategic manner.*
- *Compared to the terrestrial environment, the lack of detailed information concerning biodiversity in the marine environment may pose some difficulties. In some cases, certain good practice measures can be undertaken to enable recovery of affected habitats and benthos associations.*

Human activities in marine Natura 2000 sites are regulated by the same provisions of the Habitats Directives as for the terrestrial areas. Plans and projects within the marine environment shall therefore be considered in relation to the provisions of Article 6(3) and 6(4) where there may be potential effects on marine or coastal Natura 2000 sites.

The principles outlined in the previous chapters of this document apply equally to non-energy extractive activities in marine sites. Nevertheless, recognising that the features, sensitivities and impact types are different to some extent from those of terrestrial environment, this section will discuss some specific issues that concern such activities in the marine environment.

Extractive activities in marine areas, especially aggregates' extraction, are becoming more and more important. Marine aggregates are important as regional supplies[64] and in many countries sand and gravel dredged from the seabed may replace materials extracted from land-based sources. The amount of sand used for coastal protection and beach replenishment has recently increased significantly. For beach replenishment, marine materials are generally considered to be the most appropriate economically, technically and environmentally (ICES 2003, Sutton and Boyd 2009). In this regard, more than 40% of the

[64] For example in London and South East England one third of primary aggregate requirements are met from marine sources (10Mt) and in South Wales 90% of natural fine aggregate (sand) requirements come from marine sources.

total amount of aggregates extracted mainly in the North Sea in 2002 was used for beach replenishment (Birklund and Wijsman 2005). Furthermore, sand and gravel extraction may well play a significant role when building coastal defence structures against the sea level rise resulting from climate change, especially in low coast areas where such adaptation measures could be a matter of national safety. Extraction carried out for such purposes may cover large areas and should consequently be included in any national as well as cross-border maritime spatial plans.

Marine material resources on the seabed that comply with the relevant quality standards are not widespread. Economic factors, technical constraints and the occurrence of suitable resources of sand and gravel are key factors for the selection of potential dredging areas. Distance from the licence area to the point of landing and market is critical in determining the commercial viability and competitiveness of marine aggregates. Water depth is also fundamental, dredgers work in a maximum water depth of 60 metres but most extraction takes place between 20 and 35 metres (PDE 2001).

Sand and gravel constitute most of the minerals dredged from the sea, but there are also other minerals which may be dredged from the seabed, such as for example stone shell and metalliferous minerals.

Furthermore, considering that sand and gravel seafloors also provide spawning habitats for many fish species of which several are subject to commercial fishing, the EU's Common Fisheries Policy is also a relevant key policy instrument.

Natura 2000 in the marine environment

While the Natura 2000 network is as a whole well developed in inland and coastal areas, the identification of Natura 2000 sites for the offshore marine environment has not been completed yet. The need to fully apply the Habitats and Birds Directives to the offshore marine environment of the European Union, especially with regards to the establishment of the Natura 2000 network, represents a key challenge for EU biodiversity policy in the coming years.

A Marine Working Group set up by the Habitats Committee has developed specific guidelines for the establishment of the Natura 2000 network and the application of the Habitats and Birds Directives in the marine environment[65], particularly in offshore waters where these Directives apply (EC 2007d, see also ECJ ruling on case C-6/04, Commission v. United Kingdom, para. 114 et seq).

Marine habitat types definitions have been prepared by the European Commission as an update of the "Interpretation Manual of habitats of the European Union" as well as Lists of existing marine habitat types and species for different Member States.

Only seven marine habitat types (Annex I) and 22 marine species (Annex II) of Community interest are listed in the Habitats Directive (92/43/EEC). Two Annex I habitats in the marine environment '*sandbanks slightly covered by seawater all the time'* (EC-Code 1110) and '*reefs*' (EC-Code 1170) have shown in the past to overlap spatially with areas of interest for marine sand and gravel extraction. Therefore, in particular these two habitats have the potential for a conflict between economic and ecological interest. But it should be remembered that the selection of Natura 2000 sites has to follow scientific criteria (see Case C-371/98).

One may also argue that some of the terrestrial dune habitats listed in the Habitats Directive Annex I depend on marine sand deposits for the maintenance of their favourable conservation status, in particular in areas with land uplift such as the Baltic Sea; in that regard, achieving coherence between terrestrial and maritime spatial planning is one of the

[65] EC 2007d. http://ec.europa.eu/environment/nature/natura2000/marine/index_en.htm

10 key principles for Maritime Spatial Planning (see 8.1). Marine mammals have also the potential to be affected by underwater extraction, in terms for instance of habitat loss, disturbance, distancing, breeding failures.

As regards marine bird species, important breeding colonies of seabirds and coastal, wintering or resting areas for waterbirds on migration are already Special Protection Areas (SPAs) or will be designated as such in the near future. Benthic and pelagic habitats, in areas near and distant from the coast, are used by some Annex I and migratory birds, for a variety of purposes, including feeding, resting, and moulting. A list of species that occur in European marine waters for which SPAs need to be considered is presented in the Guidelines for the establishment of the Natura 2000 network in the marine environment (EC 2007d).

8.1. Maritime spatial planning

Existing planning frameworks have a largely terrestrial focus. Challenges that emerge from the growing competing uses of the sea, ranging from maritime transport, fishing, aquaculture, leisure activities, off-shore energy production and other forms of sea bed exploitation must be addressed. Therefore, maritime spatial planning can be a fundamental tool for the sustainable development of marine areas and coastal regions, and for the restoration of Europe's seas to environmental health (EC 2007e).

Maritime spatial planning provides a mechanism for stakeholder involvement, which is particularly important as multiple organisations have competencies in the planning and management of activities in the marine environment (WWF/Wildlife Trusts 2004; Ehler and Douvere 2009).

In 2008 the European Commission launched a Communication on Maritime Spatial Planning (MSP), which focuses on achieving common principles in the EU (COM(2008) 791 final)[66]. Maritime Spatial Planning is considered a key instrument for the Integrated Maritime Policy in the EU. It helps public authorities and stakeholders to coordinate their action and optimises the use of marine space to benefit economic development and the marine environment. This Communication aims to facilitate the development of MSP by Member States and encourage its implementation at national and EU level. It sets out key principles for MSP and seeks, by way of debate, to encourage the development of a common approach among Member States.

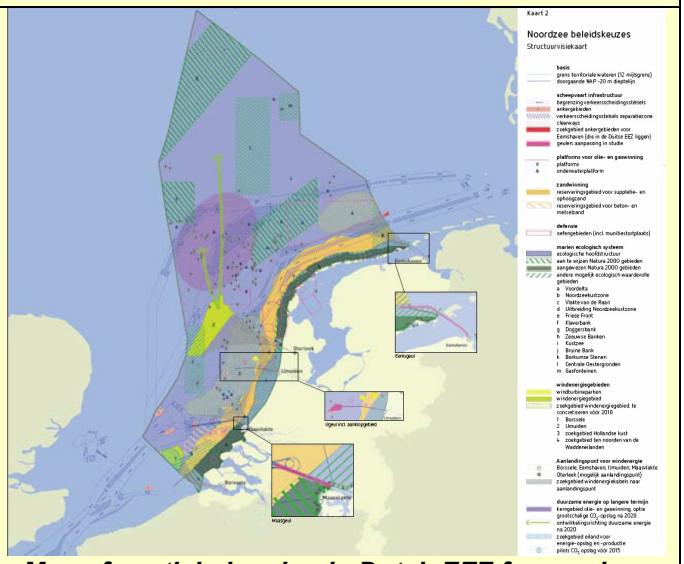
[66] "Roadmap for Maritime spatial Planning: Achieving common principles in the EU" http://ec.europa.eu/maritimeaffairs/spatial_planning_en.html

Example of spatial planning: NEEI policy for sand extraction in the Netherlands

The Dutch National Water Plan[67], provides an overall framework for a future integrated Dutch water policy, including policy for sand extraction. It contains a long term foresight for the use of the North Sea in which the entire ecological rich coastal zone down to the established 20 m depth contour is safeguarded from exploitation, while sand extraction has priority over other uses in the zone between the established 20 meter depth contour and the 12 miles border.*

In order to limit the possible effects of sand extractions on benthos and fisheries and in order to ensure the availability of sand within the 12 miles zone as long as possible, deep sand extractions are proposed instead of the 2 meters depth which is used at present. Particular protection measures are envisaged for Natura 2000 areas.

** The established depth contour is a simplification of the real depth contour line.*



Map of spatial planning in Dutch EEZ for sand extraction

Natura 2000 and other valuable natural areas are presented in green; areas for sand extraction for beach nourishments and raising land are presented in orange.

Adopting a zoned approach may provide the option of introducing marine aggregate extraction to an existing multi-use environment in a strategic manner. The provision of well founded, scientifically robust data on relevant variables and interactions allows potentially unfavourable interactions with Natura 2000 to be considered prior to the receipt of application for particular activities within a specific area. By using a process of zoning it becomes possible to identify in an objective and transparent manner, areas where dredging for marine aggregates is likely to be more appropriate or acceptable.

This approach is mutually beneficial to both the regulator - in terms of guidance in the decision-making process, and the developer - by reducing uncertainty in relation to their future investment planning (Sutton *et al.* 2008). The success of such an approach is largely dependent on the extent and resolution of baseline marine environmental data on a wide range of parameters, especially the location, distribution and extent of marine habitats and species. The zoned approach also needs to take into consideration the importance of the security of the raw materials supply with a long-term view. In all a long term zoning approach can provide the certainty that the dredging industry prefer and the environmental protection requires.

In case of likely significant effects on Natura 2000 sites such plans shall be subject to appropriate assessment in accordance with Article 6(3) of the Habitats Directive.

8.2. Impacts of extraction on marine natural sites

The effects of marine aggregate extraction are related to the prevailing hydrological regime, sediment conditions at the site and the effects of the removal of seabed sediments, or a

[67] http://www.verkeerenwaterstaat.nl/english/topics/water/water_and_the_future/national_water_plan/

result of sediment returned to the seabed through plumes (Newell & Garner, 2007). Plumes generated by the dredging operations may extend a considerable distance beyond the worked area (MIRO 2004; John *et al*. 2000). Therefore some extractions outside marine Natura 2000 sites can have indirect effects on them. In order to give some advice on extracting aggregates from the seabed the UK have published a Marine Mineral Guidance for this area *(DCLG 2002)*.

The most significant effect of dredging is the lowering of seabed levels and the removal of seabed sediments, which causes a temporal alteration of seabed topography, sediment composition and structure. Moreover, the removal of the substrate leads to the partial or perhaps ultimately to the destruction of the benthic biota (MIRO 2004).

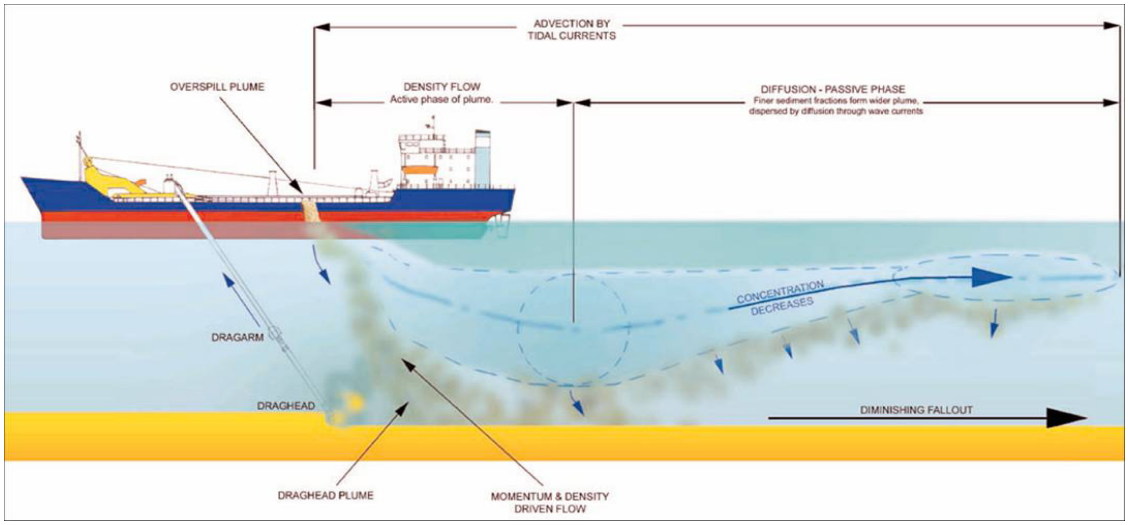


Figure 7: Effects of marine aggregate extraction process Source: BMAPA

However, it is necessary to differentiate between stationary dredging and trailer dredging: anchor dredging is less practiced in the EU (UEPG *pers. comm*.) and trailer dredging has generally a lower impact on macrofauna within the dredged site (Newell *et al*. 2003). Changes to seabed morphology, in the nature of surface sediments, and the effects on associated macrofauna are more profound and long lived where extraction operations are more intensive, or where extraction sites occur in stable environments.

Recent research carried out in the UK under the Aggregate Levy Sustainability Fund (ALSF)[68] analysed the impacts of dredging on organisms living on the seabed (benthic organisms) under the path of the draghead. Studies have reported losses of 30-80% of the species diversity, population density and biomass of benthic invertebrates in dredged areas, the magnitude of the loss depending on the intensity of dredging over the area as a whole.

These losses are not strictly confined to the dredged area itself. Where large quantities of sand are returned to the seabed following screening, there is evidence of a 'footprint' on species composition that roughly coincides with the zone of thin sand veneer deposited and

[68] The Aggregate Levy Sustainability Fund (ALSF) was launched in 2002 from a proportion of the revenue generated by aggregate production. ALSF is funding research aimed at minimising the effects of aggregate production. The marine ALSF is administered by four Delivery Partners including: the Centre for Environment, Fisheries & Aquaculture Science (Cefas), Communities & Local Government (CLG) administered through the Minerals Industry Research Organisation (MIRO), Natural England and English Heritage. See: http://www.alsf-mepf.org.uk/downloads.aspx

subsequently transported along the axis of the tidal streams in the dredge site (MALSF 2007).

On the other hand, research studies have shown that the concept of ‘‘recovery’’ of biological communities following the initial colonization phase is not an easy one to define for complex communities whose composition can vary over time, even in areas that remain undisturbed (Kenny et al., 1998, van Dalfsen et al., 1999 and Boyed et al 2005)[69]..

A study carried out in the Atlantic Sea of Northern France showed that the deposition area was biologically more disturbed than the dredged one. These results show that the indirect impact of sands depositing in the vicinity of the extraction site on macrobenthic fauna can be as significant as the direct effects (Desprez 2000). Dependent upon the particle size of the fines a silt plume can cause reduced production of phytoplankton and a shift of timing in blooming.

According to this study, which involved 10-year monitoring, fish in general would be less affected than shellfish resources by dredging activities because they may evade the disturbed area. However, certain species may be particularly vulnerable if aggregate extraction activities coincide with areas where they breed or spawn. The prime risk of plume sediment deposition is smothering of fish eggs on spawning grounds, such as those of herring and sandeel.

Hampering of filter-feeding benthos such as mussels represents another potential impact. Also, many demersal fish species may be affected by the removal of benthos that provides an important source of food. However, benthic animals will colonize the area and may serve as a resource for demersal fish species, if the dominant organisms are acceptable as food (Desprez 2000). These effects should be considered in the relevant scales of time and space.

The consequences of the deterioration of the benthic communities have also to be considered in relation to food chains. For seabirds feeding on bivalves which live in the upper layers of the sediment, resources are removed and the suitability of feeding areas may be affected. Effects can also be expected for sandeels, especially if the preferred grain size of the sediment is changed. Sandeels are a key factor in marine food webs and of particular importance to seabirds (e.g. Red-throated Diver, Sandwich Tern) and marine mammals (e.g. Harbour Porpoise; Santos and Pierce, 2003).

Also, the noise introduced into the sea by extraction activities may affect marine mammals like harbour porpoises and seals. Ship traffic can disturb birds with strong escape/avoidance behaviour and/or large flushing distances (Camphuysen *et al*. 1999; Garthe & Hüppop 2004). Disturbance potential especially exists during the moulting period when birds are unable to fly.

Nevertheless, under certain circumstances the environmental change arising from extraction may not be negative. The *Sabellaria spinulosa* biogenic reef (Annex I Habitat) adjacent to existing production licence areas (e.g. in and around the Hastings Bank, UK) is an example of positive effects, which is thought to benefit from the additional sand that is mobilized by the dredging process (Newell and Garner 2007). Also changes in seabed topography can

[69] Comparison studies on experimentally dredged sites and undredged sites off the east coast of England have shown that both sites were similar to each other 3 years after cessation of dredging, but dissimilar to their community composition of the previous year (Kenny et al., 1998). Results may be different though in other sites.

generate micro-habitats which can become more biodiverse e.g. horse mussel reefs established in the bottom of old static dredging depressions in the English channel.

However, current understanding of dredging effects on biological resources of conservation importance is still somewhat limited. While the level of confidence of current knowledge of impacts on benthic communities in dredged areas is high, it is still rather low as regards impacts on biological communities outside the boundaries of dredged areas (MALSF 2007).In the European context, several initiatives and studies concerning the effects of non-energy extractive activities on the marine environment are currently taking place[70].

8.3 Appropriate Assessment

Plans and projects which are likely to have a significant effect on Natura 2000 sites will need to be considered in relation to Article 6(3) of the Habitats Directive. Within a Natura 2000 site and/or in the surrounding zone that might be affected by the dredging works (in so far as it might affect the Natura 2000 site), the Appropriate Assessment has to consider the potential impacts to the qualifying interests of the site. An extractive activity may take place within (or in the surroundings of) a marine Natura 2000 site as long as it will not adversely affect the integrity of that site in accordance with Article 6(3) of the Habitats Directive.

Marine Natura 2000 sites that are proposed by the Member States but for which the designation are not completely achieved have also the potential to be affected by the activities of the marine aggregates industry (Bellew and Drables 2004). As regards sites to be designated under the Habitats Directive, "*the protective measures prescribed in Article 6(2), (3) and (4) of the Directive are required only as regards sites which are on the list of sites selected as sites of Community importance adopted by the Commission. Consequently, those measures do not apply to the sites included in the national lists transmitted to the Commission but not yet adopted by the Commission* (case C-117/03").

However, "*Member States must, as regards the sites identified with a view to their inclusion on the Community list, take appropriate protective measures in order to maintain the ecological characteristics of those sites"* (see case C-244/05 para. 44, 46).

As regards Natura 2000 sites designated under the Birds Directive (Special Protection Areas - SPAs), Article 6(2) to (4) of the Habitats directive applies, according to Article 7 of the directive, to such areas. Nevertheless, for areas which have not been classified as SPAs but should have been so classified, Member States shall take appropriate steps to avoid pollution or deterioration of habitats or any disturbances affecting the birds, in so far as these would be significant (case C-374/98 para. 44, 45, 47).

The assessment of potential direct and indirect, individual and cumulative impacts of marine extraction on the Natura 2000 sites in the marine environment and possibly on coastal areas should consider the likely duration of each impact on each protected habitat and species. As an example, potential impacts of aggregate extraction on a range of Annex I Habitats and Annex II species sites have been identified in a project financed by the LIFE programme in the UK[71] (see Table 5 below).

[70] See e.g.: ICES Working Group on the Effects of Extraction of Marine Sediments and their Guidelines for the Management of Marine Sediment Extraction (http://www.ices.dk/reports/MHC/2003/WGEXT03.pdf); and the Marine Aggregate Network (http://www.maggnet.info/show.php

[71] UK Marine SACs project, with financial support of the European Commission's LIFE-Nature Programme. A joint venture involving English Nature, Scottish Natural Heritage, Countryside Council for Wales, Joint Nature

Table 5. Some potential impacts of marine aggregates extraction on Annex I habitats and Annex II species*(adapted from PDE 2001)*

Qualifying Feature	Potential impact				
	Removal of Substratum / Benthos	Increased Turbidity	Changes in Sediment Composition	Changes in Hydrodynamics/Sediment Transport	Water Quality Effects
Annex I Habitat					
Sublittoral sandbanks	X	X	X	X	X
Estuaries	X	X	X	X	X
Mudflats and sandflats	X	X	X	X	X
Lagoons				X	
Large shallow inlets and bays	X	X	X	X	X
Reefs		X	X		X
Sea cliffs and shingle/stony banks				X	
Saltmarshes and salt meadows				X	
Coastal sand dunes				X	
Rocky habitats and caves		X		X	X
Annex II Species					
Marine Mammals	X	X			X
Fish	X	X	X		X

The significance and extent of the effects will depend upon a range of factors including the location of the extraction area, the nature of the surface and underlying sediment, coastal processes, the design, method, rate, amount and intensity of extraction, and the sensitivity of habitats and species present in the Natura 2000 area affected by the extractive activities.

For example in particular circumstances it may be considered acceptable to remove sand from a Natura 2000 designated sandbank so long as the scale and the volume being extracted do not impact the integrity of the wider site. Equally, extraction activity should be permitted to occur within Natura 2000 site boundaries (which can be enormous – several thousand km²) so long as the features within them are similarly not being adversely impacted by the activity

Potential effects of aggregates extraction on seabird species protected under the Birds Directive must also be taken into account. The marine aggregate industry has highlighted the difficulty in locating and obtaining appropriate information sources for detailing impacts from marine aggregate extraction on seabirds and waterbirds for EIAs and Appropriate Assessments. The Aggregate Levy Sustainability Fund (ALSF) has recently launched a project to review the current state of knowledge on these potential impacts with the aim to reduce the uncertainty about these impacts and aid the marine aggregate industry, regulators and their advisors when undertaking and advising on Environmental Impact Assessments and Appropriate Assessments.

Compared to the terrestrial environment, the lack of detailed information concerning biodiversity in the marine environment may be considered a disadvantage for project

developers. A classic example is the lack of high resolution data across broad-scale areas. In many cases, the project developer will thus have to acquire additional data.

A good data and knowledge basis is therefore important for making the appropriate decisions concerning the marine environment; in that regard it should also include data on other types of sea-uses, e.g. recreational activities, cables and pipelines, maritime traffic, fishing.

This emphasises the need for survey work to ensure that any appropriate assessment and subsequent decision is based on the best available scientific knowledge. The industry therefore can and does make a positive contribution to this process of knowledge acquisition.

Assessments and decisions must take into account these limitations in present data availability and knowledge. It is also important not to automatically apply the terrestrial thinking with respect to Natura 2000 and non-energy minerals to a marine setting. The issues are very different, as are the policy and regulatory settings.

For example, to effectively deal with marine data the Netherlands have developed an approach where the final impact is the result of several links in an effect chain. For each link, a worst case value is chosen which ensures that the final estimate is the worst case impact. As a result the environment is protected by restrictions on the extractions. Careful and appropriate monitoring subsequently aids in adapting enforced constraints in exploitation. For instance safety zones or time constraints in exploitation can be adapted to new knowledge (Prins *et al.* 2008).

There is a need to have sufficient information and understanding to allow the sensitivity of habitats and species at marine development sites to be viewed in a regional context – rather than in isolation which happens too often at present.

Given the need for a broad scale approach to place site specific activities into a regional context and also to facilitate the assessment of cumulative impacts, Regional Sea approaches may be appropriate. The UK marine aggregate industry has commissioned a series of Regional Environmental Assessments to help support the site specific EIA processes that are required. This information might also be used to inform appropriate assessments, where relevant.

Regional Environmental Assessments

In order to ensure regional sustainability of aggregate extraction and improving the evidence base for individual licence applications, the marine aggregate industry has made a voluntary commitment to undertake Regional Environmental Assessments (REAs) for a number of strategic areas of extraction. The first REA was commissioned by the East Channel Association (ECA) for the East Channel Region (ECR) and published in 2003 presenting a regional assessment of potential impacts of dredging in the ECR. Following the completion of the REA, a regional environmental monitoring programme was developed by the ECA to test the predictions of the REA. In 2007, Regional Environmental Assessments have also been commissioned for the Outer Thames Estuary, the Isle of Wight, the East coast and the Humber Area. (http://www.jncc.gov.uk/page-4278)

A comprehensive overview on the requirements of a marine EIA for sediment extraction and the effects of dredging is published by the working group of the International Council for the exploration of the Sea (ICES) on the effects of sediment extraction on marine ecosystems (ICES WG EXT (Sutton and Boyd 2009). This guideline was also adopted by the OSPAR convention for the North-East Atlantic.

8.4 Mitigation

Depending on the affected Natura 2000 site's features and the extraction methods, many habitats and associated benthos can recover to a similar state if certain good practice measures are adopted, e.g. leaving the seabed similar to that which existed prior to dredging and minimising area of seabed dredged. However, a case by case assessment needs to be done.

Coarse grained sand and gravel areas, which are very valuable habitats and important components of the marine ecosystems within Natura 2000 sites, should not be exploited totally. Silt pluming should also be avoided or, when this is not possible, it shall be done with special care to avoid significant turbidity and allow a smooth re-deposition of fine-grained particles. Protecting these habitats from significant exploitation is the way to safeguard that they can recover to their prior habitat quality and function for the ecosystem. Otherwise the character of marine ecosystems can degrade over a longer period of dredging activities.

The particular extraction methods and the way by which these methods are applied play a significant role for the recovery of the extraction site, e.g. to maintain the ecological properties of the area as well as its suitability for fisheries or other uses that can occur at the same time or soon after the extraction.

Recovery times depend on the sensitivity of the receiving environment and the life history traits (age, size, number of offsprings, etc) of the biological associations of the site - in shallow water with mobile sand it can be regularly shorter than in deeper water with more stable environmental conditions where it can be many years or decades (Foden *et al*. 2009). In either case, an assessment of the effects of any such "loss" on site integrity is therefore needed.

The considerable variation in recovery time within and between habitat types dictate that meaningful assessments of recovery can only be undertaken on a site-specific basis, incorporating local environmental factors (Bellew and Drable 2004).

Some examples of mitigation measures in marine aggregate extraction sites across Europe

- The dredging intensity period is limited to a specific number of hours per surface unit (ha).
- In order to protect bird species which are sensitive to disturbances, no dredging activities are undertaken during certain months of the year.
- No dredging activities are undertaken during the reproduction and nursery period of marine mammals, which are extremely sensitive to disturbances.
- No-use buffer zones of sufficient size are established around special sensitive areas.
- To minimize the area of the seabed dredged and thus the environmental footprint, the working areas are relatively small. In each concession a limited number of working areas are allowed. Only when one working area is completed can a new one be opened. A return to former dredged areas is not allowed in order to provide an optimal setting for natural regeneration.
- The dredging depth of the sediment is limited.
- To reduce the plume, the dredger channels the overflow underneath the bottom of the vessel into the sea.

As regards compensatory measures under article 6.4 of the Habitats Directive, there can be significant difficulties to implement this type of measures in relation to marine extractive

activities at the moment. More research would be required to better identify ways and solutions for the implementation of this type of measures.

9. OTHER ISSUES

- *Establishment of a monitoring plan and definition of appropriate criteria and indicators are essential to assess the efficacy of prevention, mitigation, and, if necessary, compensatory measures to be implemented in relation to extractive activities.*

- *In the context of non-energy extractive activities development, cooperation between competent authorities and proponents is crucial to discuss constraints and find the most appropriate solutions on a case by case basis.*

- *Early and regular consultation between competent authorities, project developers and relevant stakeholder in relation to Article 6(3) procedure is highly beneficial.*

- *NEEI activities must also take into account existing provisions for the protection of species outside the sites designated under Natura 2000, which are established under Article 5 of the Birds Directive and Articles 12 and 13 of the Habitats Directive.*

9.1. Monitoring in the framework of Article 6(3) and 6(4) provisions

A detailed mitigation and monitoring plan should be agreed as part of any consent, setting out the detailed measures required to ensure mitigation is achieved and adverse effects on site integrity avoided in view of its conservation objectives. There should be provisions for adaptive management to address any problems in terms of mitigation measures not working as foreseen. Such an approach provides certainty for all parties: the operator, the competent authority, other regulators, NGOs and the public. There is the potential for the various types of monitoring to be integrated with environmental management systems, which an increasing number of operators are implementing.

Establishment of a monitoring plan and definition of appropriate criteria and indicators are essential to assess the efficacy of prevention, mitigation, and, if necessary, compensatory measures[72]. This monitoring should be useful to detect unforeseen events, since mitigation measures should have been designed so that there is a high level of certainty about their efficacy (beyond reasonable scientific doubt) so as to ensure that the integrity of a Natura 2000 site will not be adversely affected.

A key point is that these indicators need to be defined in a way to provide evidence of change before that change becomes an adverse effect, and that they should be accompanied by binding commitments to take corrective actions. Monitoring might relate, for example, to an individual species or to factors that can indirectly affect wildlife (e.g. changes in dust deposition or water levels). It provides the information necessary to modify mitigation measures during the extraction period.

Monitoring provides a method of measuring progress against an objective. Various techniques can be used that involve repeated measurement and sampling of indicators over time. Expert assistance may be required in selecting and reviewing the most appropriate indicators to be used, particularly regarding their measurability. Each mining operation

[72] Good practice about monitoring programmes can be found in the IMPEL document about compliance monitoring (available at: http://ec.europa.eu/environment/impel/compliance.htm)

should, in conjunction with government regulators and stakeholders, determine what set of indicators will be required, where mitigation measures are being relied on to avoid adverse effects, and/or compensation measures are taken to preserve the coherence of Natura 2000. Monitoring of the selected Natura 2000 indicators can be undertaken in partnership with various institutions such as universities and other organisations.

In exceptional cases where compensatory measures are required under Article 6(4), the monitoring plan should address these measures too. The programme of compensatory measures needs to include detailed monitoring during implementation to ensure effectiveness in the long term. Being in the framework of the Natura 2000 network, such monitoring should be co-ordinated with, and eventually integrated into, that foreseen under Article 11 of the Habitats Directive (EC 2007b).

For marine extractive activities, the UK Marine SACs Project has produced a Marine Monitoring Handbook (Davies *et al*. 2001) which provides advice on monitoring marine SAC to assess their condition. It also contains a procedural guideline designed to provide information sufficient to fulfil marine SAC conservation objectives taking into consideration the possible pressures that may exist within or in the vicinity of the SAC. This handbook may therefore be useful when defining a monitoring programme or survey.

9.2. Cooperation between competent authorities and stakeholders

It has been stressed in different sections of this guidance document the importance of achieving a good cooperation between competent authorities and stakeholders for a correct understanding and implementation of the provisions of the Habitats and Birds Directives that are relevant for the development of non-energy extractive activities.

Cooperation between competent authorities and proponents is crucial to discussions regarding constraints and as a means of finding the most appropriate solutions on a case by case basis. Regional authorities have an important role to play in determining the legal and administrative environment in which the extractive industry operates as they often have primary responsibility for spatial planning policies, permit procedures, environmental impact assessments, etc. An increased involvement of local- or regional authorities, land-use planners and geological surveys will often be highly beneficial.

Early and regular consultation (i.e. pre-application stage) with competent authorities in relation to Article 6(3) procedure is highly beneficial. Project developers are encouraged to discuss their approach at an early stage with all stakeholders. The collaboration of competent authorities in screening of plans and projects to determine the need for an appropriate assessment may be crucial, as they should be able to provide useful information to be taken into account at this stage.

National and regional authorities (including the appropriate nature conservation bodies) should be able to provide relevant information about the conservation objectives and the condition of the Natura 2000 sites (conservation objectives, status of habitats/species, trends, particular needs of species, etc.) concerned by mineral plans and projects.

Partnerships between a NEEI company and various educational and research institutions, NGOs and civil society may also be very effective for acquiring the information needed to carry out appropriate assessment. If detailed surveys and fieldwork are necessary to supplement existing data for the appropriate assessment, such survey work should be based on agreed scoping with relevant competent authorities, regulators, representatives of the NEEI sector (associations), NGOs and the public.

It will also be useful to develop good cooperation between project developers, environmental agencies and NGOs to assess mitigation measures (and compensation requirements when needed). Developing partnerships with the right organisations can help all parties to understand the relevant issues and to set about managing these.

There are many examples of successful co-operation and partnership among competent authorities, the mining and conservation sectors in the development of NEEI activities all over the EU. Some relevant examples are presented in Annex 2.

9.3 Some further research needs

Some potential further research priorities to be tackled in the future are mentioned below.

- Improving the EU mineral knowledge base that would allow assessing the potential overlapping of Natura 2000 sites with established/potential EU mineral resources should be further investigated, taking into account the results of the actions proposed by the EU Raw Materials Initiative in this regard. A short to medium term action could possibly be undertaken using the methodology developed in the OneGeology-Europe project[73] using available information on Member States minerals resources. For a longer term initiative, GMES[74] action.

- Suitable methodologies and good practice for appropriate assessment of extractive activities in marine areas (in the context of article 6.3 of the Habitats Directive) could be further developed with relevant contributions from Member States with experience in this area.

- Potential use and possibilities for good practice adopted by the EU NEEI sector (e.g. biodiversity offsets and rehabilitation focusing on habitats restoration) to comply with the provisions under art. 6(3) and 6(4) of the Habitats Directive. In particular, biodiversity offsets is a key practice on which NEEI are undertaking significant efforts, which should deserve more attention and further dialogue in the future, in relation to the Habitats Directive.

- Possibilities for exchange of experience and networking between countries in dealing with strategic mineral planning and appropriate assessment.

- Research would be needed to identify suitable ways and solutions for the implementation of compensatory measures under article 6.4 of the Habitats Directive in relation to marine extractive this type of measures.

[73] OneGeology-Europe is a project co-funded by the EU to make geological spatial data further known and accessible (http://www.onegeology-europe.eu/)
[74] Global Monitoring for Environment and Security, http://ec.europa.eu/gmes/index_en.htm

GLOSSARY

Alternative solutions: Different ways of achieving the objectives of a plan or project. The Commission services suggest that 'they could involve alternative locations, different scales or designs of development, or alternative processes (EC guidance on art. 6 (3) and (4), 2001).

Appropriate Assessment (AA): The process under Article 6(3) of the Habitats Directive by which the potential effects of a plan or project upon a Natura 2000 site are assessed in view of the site's conservation objectives in order to ascertain whether the plan or project will not adversely affect the integrity of the site.

Compensatory measures: A requirement set out in Article 6(4) where damage to a European site has been justified in the absence of alternatives and for imperative reasons of overriding public interest (IROPI). Compensatory measures must be designed to protect the overall coherence of the Natura 2000 network. This normally entails the creation of appropriate habitat as close as possible to where the damage will occur and fully functioning before the damage occurs.

Cumulative impacts: Impacts that accumulate over space and time from multiple plans/projects.

Deterioration: physical degradation affecting a habitat, or a breeding site or resting place of a species. In contrast to destruction, such degradation may occur slowly and gradually reduce the functionality of the site in terms of quality or quantity and might over a certain period of time lead to its complete loss.

Disturbance: A temporary or permanent change in environmental conditions (e.g. by noise, source of light) that may have a negative effect on a natural habitat or a species. Disturbance may be detrimental for a protected species e.g. by reducing survival chances, breeding success or reproductive ability and may give rise to additional indirect effects (e.g. increased competition for food resources).

Favourable Conservation Status:
The conservation status of a natural habitat will be taken as "favourable" when: its natural range and areas it covers within that range are stable or increasing; the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and the conservation status of its typical species is favourable (Article 1.e of the Habitats Directive).
The conservation status of a species will be taken as "favourable" when: viable population is maintained on a long-term basis; the natural range of the species is neither being reduced nor is likely to be reduced in the future; and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Habitat of Community Interest: a natural habitat type in Annex I of the Habitats Directive.

Imperative Reasons of Overriding Public Interest (IROPI): A requirement set out in Article 6(4) which, in limited circumstances, permits a plan or project to go ahead even after an AA has failed to ascertain that the integrity of a Natura 2000 site will not be adversely affected.

Mitigation: Measures aimed at minimising or even cancelling the negative impact of a plan or project, during or after its completion.

Monitoring: Collection and analysis of repeated observations or measurements to evaluate changes in condition and progress toward meeting a management objective.

Natura 2000 site: sites designated to form the Natura 2000 network, which include Special Protection Areas (SPA) and Sites of Community Importance (SCI) approved by the European Commission and declared as Special Areas of Conservation (SAC) by the Member States.

NUTS: Nomenclature of Territorial Units for Statistics (*in French*, Nomenclature d'Unités Territoriales Statistiques) is a geocode standard for referencing the administrative divisions of EU countries for statistical purposes. The NUTS classification is hierarchical in that it subdivides each Member State into three levels: NUTS levels 1, 2 and 3. For example, NUTS 3 level corresponds to: "arrondissements" in Belgium; "amtskommuner" in Denmark; "Kreise/kreisfreie Städte" in Germany; "nomoi" in Greece; "provincias" in Spain; "départements" in France; "regional authority regions" in Ireland; "provincie" in Italy; "län" in Sweden; "maakunnat/landskapen" in Finland.

Offset: Biodiversity offsets are conservation actions intended to compensate for the residual, unavoidable harm to biodiversity caused by development projects, so as to aspire to no net loss of biodiversity.

Precautionary principle: where scientific evidence is insufficient, inconclusive or uncertain and there are indications through preliminary objective scientific evaluation that there are reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or plant health may be inconsistent with the chosen level of protection, lack of scientific knowledge shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation (Rio Declaration, 1992 & EC, 2000).

Qualifying Interest: a natural habitat type listed in Annex I or a species listed in Annex II of the Habitats Directive, a species listed in Annex I of the Birds Directive or regularly occurring migratory species not listed in Annex I, for which a Natura 2000 is designated.

Rehabilitation: The process of converting derelict land to usable land and may include engineering as well as ecological solutions. The restoration of natural habitats is often included as part of the site closure and rehabilitation process. In this guidance document the term is used to imply a process guided by ecological principles that promotes the recovery of ecosystem integrity in all its structural and functional aspects.

Reserve: A ‘Mineral Reserve’ is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined. Assessments, which may include feasibility studies, have been carried out, and include consideration of and modification by, realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified. Mineral Reserves are subdivided in order of increasing confidence into Probable Mineral Reserves and Proved Mineral Reserves (Pan-European Code for Reporting of Exploration Results, Mineral Resources and Reserves, 2008)

Resource: A ‘Mineral Resource’ is a concentration or occurrence of material of economic interest in or on the Earth’s crust in such form, quality and quantity that there are reasonable

prospects for eventual economic extraction. The location, quantity, grade, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge. Mineral Resources are subdivided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories (Pan-European Code for Reporting of Exploration Results, Mineral Resources and Reserves, 2008).

Restoration: action taken at a site following anthropogenic degradation or deterioration, to restore or enhance its ecological value. In this guidance document is often used for rehabilitation that is guided by ecological principles and promotes the recovery of ecological integrity; reinstatement of the original (pre-mining) ecosystem in all its structural and functional aspects.

Screening: This process is used to determine whether an AA is needed for a plan or project.

Site of Community Importance (SCI): it is defined in the Habitats Directive (92/43/EEC) as a site which, in the biogeographical region or regions to which it belongs, contributes significantly to the maintenance or restoration at a favourable conservation status of a natural habitat type in Annex I or of a species in Annex II and may also contribute significantly to the coherence of Natura 2000, and/or to the maintenance of biological diversity within the biogeographic region or regions concerned. SCIs are proposed to the Commission by the Member States and once approved, they must be designated as Special Areas of Conservation (SACs) by the Member States.

Special Area of Conservation (SAC): site of Community importance designated by the Member States through a statutory, administrative and/or contractual act where the necessary conservation measures are applied for the maintenance or restoration, at a favourable conservation status, of the natural habitats and/or the populations of the species for which the site is designated.

Special Protection Area (SPA): Protected area designated in accordance with the Birds Directive for species listed on Annex I of the Directive and/or regularly occurring migratory species, and included in the Natura 2000 network.

Species of Community Interest: a species listed in in Annex II and/or Annex IV or V of the Habitats Directive.

Stakeholders: People or organisations that will be affected by, or will influence a programme, project or action.

Surveillance: An extended programme of surveys systematically undertaken to provide a series of observations to ascertain the variability that might be encountered over time.

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ANNEX 1

Other relevant environmental laws and policies

- The ***Directive on the management of waste from extractive industries (2006/21/EC)*** which applies since 1 May 2008, provides for measures, procedures and guidance to prevent or reduce as far as possible any adverse effects on the environment, in particular water, air, soil, fauna and flora and landscape, and any resultant risks to human health, brought about as a result of the management of waste from the extractive industries. Associated best available technology (BAT) has been developed to assist in its implementation[75].

  The Directive requires, amongst others, that all operators prepare a waste management plan which ensures an appropriate planning of waste management options with a view to minimising the generation of extractive waste and its harmfulness, encouraging waste recovery and securing its short long-term disposal.

- The ***Environmental Liability Directive*** 2004/35/EC[76] establishes a framework for environmental liability based on the "polluter pays" principle, with a view to preventing and remedying environmental damage from “events, acts or omissions”. Under the terms of this Directive, environmental damage includes direct or indirect damage to species and natural habitats protected at Community level by the Birds Directive or by the Habitats Directive, but excluding acts authorized under Article 6(3) and 6(4) of the latter.

  The liability scheme applies to certain specified activities where it is possible to establish a causal link between the damage and the activity in question. The public authorities are responsible for ensuring that the operators responsible take or finance the necessary preventive or remedial measures themselves.

- The ***Water Framework Directive*** (2000/60/EC)[77] establishes a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater which prevents further deterioration and protects and enhances the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on the aquatic ecosystems. Some derogations may apply to NEE activities (under Article 11). The Water Framework Directive is complemented by the **Groundwater Directive** (2006/118/EC)

- The ***Marine Strategy Framework Directive*** (2008/56/EC)[78], adopted in June 2008) seeks to achieve good environmental status of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. The Marine Strategy Directive establishes European Marine Regions on the basis of geographical and environmental criteria. Each Member State - cooperating with other Member States and making every effort to coordinate their actions with non-EU countries within a marine region - is required to develop strategies for its marine waters.

[75] http://ec.europa.eu/environment/waste/mining/index.htm
[76] http://europa.eu/scadplus/leg/en/lvb/l28120.htm
[77] http://ec.europa.eu/environment/water/water-framework/index_en.html
[78] http://ec.europa.eu/environment/water/marine/index_en.htm

- The EU ***Strategy on Sustainable Use of Natural Resources*** was launched in December 2005[79]. The objective of the strategy is to reduce the environmental impacts generated by the use of natural resources and to do so in a growing economy. It aims to introduce an analytical framework allowing the environment impact of resource use to be taken into account into public policymaking.

  The strategy includes actions 1) to improve our understanding and knowledge of European resource use, its negative environmental impact and significance in the EU and globally, 2) develop tools to monitor and report progress in the EU, Member States and economic sectors, 3) foster the application of strategic approaches and processes both in economic sectors and in the Member States and encourage them to develop related plans and programmes, and 4) raise awareness among stakeholders and citizens of the significant negative environmental impact of resource use.

The precautionary principle

The approach taken by the European Commission in the application of the precautionary principle is elaborated in a Communication from 2000[80]. The scope of the precautionary principle covers those specific circumstances where scientific evidence is insufficient, inconclusive or uncertain and there are indications through preliminary objective scientific evaluation that there are reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or plant health may be inconsistent with the chosen level of protection.

The use of the precautionary principle presupposes:

- The identification of potentially negative effects resulting from a phenomenon, product or procedure;
- A scientific evaluation of the risks which, because of the insufficiency of the data, their inconclusive or imprecise nature, makes it impossible to determine with sufficient certainty the risk in question[81].

The principle should be considered within a structured approach which comprises three elements: risk assessment, risk management and risk communication.

Where action is deemed necessary, measures based in the precautionary principle should be, *inter alia*:

- *proportional* to the chosen level of protection,
- *non-discriminatory* in their application,
- *consistent* with similar measures already taken,
- *based on an analysis of the potential benefits and costs* of action or lack of action,
- *subject to review,* in the light of new scientific data, and
- *capable of assigning responsibility for producing the scientific evidence* necessary for a more comprehensive risk assessment.

The measures envisaged must make it possible to achieve the appropriate level of protection. Measures based on the precautionary principle must not be disproportionate to the desired level of protection and must not aim at zero risk, something which rarely exists.

[79] COM(2005) 670 final. http://ec.europa.eu/environment/natres/index.htm
[80] Communication from the Commission on the precautionary principle, COM(2000)1.
[81] COM (2000) 1 final, p. 14.

However, in certain cases, an incomplete assessment of the risk may considerably limit the number of options available to the risk managers. In some cases a total ban may not be a proportional response to a potential risk. In other cases, it may be the sole possible response to a potential risk (COM(2000)1).

The application of the precautionary principle is also relevant to the implementation of the Habitats Directive. This has been confirmed in the ruling of the European Court of Justice on Case C-127/02 [82].

[82] Text from the Judgement: "(57) Where doubt remains as to the absence of adverse effects on the integrity of the site linked to the plan or project being considered, the competent authority will have to refuse authorisation. (58) In this respect, it is clear that the authorisation criterion laid down in the second sentence of Article 6(3) of the Habitats Directive integrates the precautionary principle […] and makes it possible effectively to prevent adverse effects on the integrity of protected sites as the result of the plans or projects being considered. A less stringent authorisation criterion than that in question could not as effectively ensure the fulfilment of the objective of site protection intended under that provision. (59) Therefore, pursuant to Article 6(3) of the Habitats Directive, the competent national authorities, taking account of the conclusions of the appropriate assessment of the implications of mechanical cockle fishing for the site concerned, in the light of the site's conservation objectives, are to authorise such activity only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects…"

ANNEX 2

Selected case studies / good practice examples

Case studies included in this annex were selected because of their relevance in relation to Natura 2000 and species protected under the Birds and the Habitats Directive, or because they represent good practice examples of NEEI activities that take into account biodiversity conservation.

The summary examples presented below concern the following issues: positive contribution to biodiversity (1), mineral planning (2), mitigation measures (3), rehabilitation (4), extractive activities in marine areas (5), monitoring and indicators (6) and cooperation with competent authorities and stakeholders (7).

These examples aim to illustrate some of the issues discussed in the guidance document. The content of this annex does not necessarily reflect the views of the European Commission.

1. Examples of positive effects and contribution to biodiversity from NEEI

Industrial Biodiversity Action Plans (IBAP)

***Type of exploitation*:** Several quarries
Countries: UK, Germany

Description:
Some NEEI undertake Industrial Biodiversity Action Plans (IBAPs) on their extraction sites in order to ensure that biodiversity is embedded into the operation of each site. Such plans identify the main wildlife habitats and species occurring on, and adjacent to the extraction sites and elaborate a number of cost-effective recommendations by which these habitats and species can be conserved and, if possible, enhanced. As with national and regional Biodiversity Action Plans, IBAPs are based on surveys of the flora and fauna of the particular site and establish a clear programme of implementation, monitoring and reporting of activities relating to the conservation of biodiversity. IBAPs recommend conservation projects that complement national and regional programmes whenever possible.

Some companies intend to have specific Biodiversity Action Plans (BAPs) in place in all of their active quarries. For instance, Tarmac in the UK has prepared individual plans for 120 of its sites as part of its commitment to ensure that biodiversity is embedded into the operation of each quarry.

As another example, Heidelberg Cement (Germany) issued Guidelines for the promotion of biodiversity at all their mineral extraction sites in Europe and has started preparing Biodiversity Management Plans (BMP) for all its extraction sites related to NATURA 2000 areas, which would involve the elaboration of more than 150 BMPs.

References: http://www.angloamerican.co.uk/aa/development/performance/cs/cs2008/tarmac/
http://www.heidelbergcement.com/NR/rdonlyres/C670433C-321E-4DB9-B72F-D0C0E9FF26FF/0/UK_biodiversity_and_geodiversity_action_plans.pdf
http://www.initiative-nachhaltigkeit.de/downloads/Poster_Pilot_Schelklingen_en.pdf

Eagle owls in German quarries

***Type of exploitation*:** Stone quarries
Country: Germany
Targeted habitats/species: *Bubo bubo*
SCI/SPA: NO

Description:
The eagle owl is the biggest of all European owls and is listed in Annex I of the Birds Directive. Eagle owls nest in rocky, mountainous forests and on inaccessible mountainsides and cliffs, but in Germany currently most of these birds are found in rock quarries, which offer good nesting opportunities for them. This fact led a German extractive company and a nature conservation organization to prepare a guide on good practice for the conservation of eagle owl in quarries, which include the following recommendations:

- In quarries where the rock is mined using hydraulic breakers rather than by blasting, such structures are less common. Quarry operators can help here by creating artificial nesting areas.
- It is even possible to help eagle owls during rock mining. Quarry operators can remove material in such a way as to create niches up to 2 metres deep rather than leaving smooth faces. The more nesting spaces available, the easier it is for an eagle owl to get over the loss of an old nesting place caused by mining progress.
- Eagle owls regularly return to their nesting sites. Areas that have been recognised as nesting areas may, if possible, be kept free of mining activities. Quarries or waste rock piles, where work has been completed, can be marked as no-go areas to protect nesting places. Humans should avoid these areas so as not to disturb the birds.

Eagle owls biological features to consider when adopting conservation measures/practice:
• Eagle owls breed from mid-January to the end of March.
• The four-week hatching period starts in April.
• The parent birds care for their young between May and July.
• The young leave their parents between August and September.
• These times may vary depending on the region and the weather.
• Having chosen a nesting site, many eagle owls return consistently.

References: *Bundesverband Baustoffe – Steine und Erden e.V., Berlin, NABU, Naturschutzbund Deutschland, Bonn. 2007. Betreiber von Steinbrüchen sichern den Lebensraum von Uhus*
http://www.gips.de/organisat/bvgips/publik/uhu-flyer/Gips_FlyerUhu_BBS_LDIN6S.pdf

Quarries: an opportunity for biodiversity

***Type of exploitation*:** Rock quarries
Country: France
Targeted habitats/species: *Corvus corax, Bubo bubo, Bufo calamita*, *Charadrius dubius, Tachybaptus ruficollis*, *Hottonia palustris*, etc.
SCI/SPA: N.A.

Description:
In October 2008, the UNICEM (Union Nationale des Industries de Carrières et Matériaux de construction) published the results of an extensive study about biodiversity in hard rock quarries of France. The data collected by scientists confirm that quarries represent a real opportunity for biodiversity. These sites host about 50% of birds, reptiles, amphibians and grasshoppers found on the French territory. The study was conducted at the request of UNICEM, under the direction of a scientific committee chaired by the Museum National d'Histoire Naturelle (MNHN - National Natural History Museum). Ecological surveys were carried out in 35 massive rock quarries; half of them are currently active extraction sites. A summary of the main findings is presented below:

♦Fauna: 362 species found in the surveyed quarries of which 164 are listed as of *significant natural heritage value** in France. They include:
-121 bird species (i.e. 45% of bird species present in France). For example the common raven (Corvus corax) and the eagle owl (Bubo bubo).
-19 reptile species (i.e. 51% of reptile species present in France)
-16 amphibian species (i.e. 50% of these species present in France). For example the Natterjack Toad (Bufo calamita).
-81 grasshopper and locust species (41% of grasshopper and locust species present in continental France)

♦Flora: 1096 species found in the surveyed quarries, of which 96 are listed as of *significant natural heritage value** in France.

Prior to this study, an ecological survey was launched in 1995, under the scientific coordination of the MNHN and the *Centre National de la Recherche Scientifique* (CNRS - National Centre for Scientific Research), to inventory wetlands resulting from quarry exploitation. The survey was carried out in 17 alluvial quarries over the 6 French river basins. A summary of the main findings concerning animal and vegetal species found is presented next:

-132 breeding bird species (equal to 48% of France breeding bird species), of which 28 breeding species are considered as rare or very rare. For example, the Little Ringed Plover (Charadrius dubius) and the Little Grebe (Tachybaptus ruficollis).
-17 reptile species (45% of reptile species found in France), of which 5 species are threatened.
-16 amphibian species (52% of amphibian species present in France), of which 5 species are threatened.
- 52 dragonfly species (45% of dragonfly species present in France).
-26 protected plant species, as for example the Water violet (Hottonia palustris).

** In France, this protection category justifies the designation of areas presenting high biological capacities and a good state of conservation, as Natural Zones of Animal and Plant Ecological Interest (Zones Naturelles d'Intérêt Ecologique Faunistique et Floristique - ZNIEFF).*

References: UNICEM 2008. Les carrières, une opportunité pour la biodiversité. Dossier de presse. http://www.3dterritoires.org/UNICEM/dossier_presse/UNICEM_communique.pdf
UNICEM 2008. Les carrières, une opportunité pour la biodiversité. Fiche #3 : La Biodiversité dans les carrières de roches massives. Available at: http://www.3dterritoires.org/UNICEM/dossier_presse/03-UNICEM_biodiversite_dans_carrireres_roches_massives.pdf
UNICEM 2008. Les carrières, une opportunité pour la biodiversité. Fiche #2 : La Biodiversité dans les carrières de roches meubles. Available at: http://www.3dterritoires.org/UNICEM/dossier_presse/02-UNICEM_biodiversite_dans_carrieres_roches_meubles.pdf

SPA designated in a quarry

***Type of exploitation*:** Gravel extraction in the Vah River
Country: Slovakia
Targeted habitats/species: *Sterna hirundo, Ixobrychus minutus* and *Porzana porzana*
SCI/SPA: SPA Dubnické štrkovisko (SKCHVU006)

Description:
The SPA Dubnické štrkovisko (SKCHVU006) is located in an area where industrial gravel excavation was carried out in the Vah River. Thanks to incomplete excavation (*i.e.* leaving small islands) a natural site was created. Once the extractive activity was stopped, there was a rapid natural succession that led to the creation of a high quality area for wild birds. In Slovakia, this site (ca. 60 ha) is one of the three best nesting habitats of *Sterna hirundo,* a Birds Directive species depending on regular management of nature succession which, in this case, is carried out by both the State and non-governmental organisations. Six other nesting bird species can be found in the site, including *Ixobrychus minutus* and *Porzana porzana.* The ancient quarry is also used for migratory species and

for wintering. The site keeps its ecological character despite the fact that it is part of an authorised mining area and is located in a strongly man-modified area, close to a town and a highway.

References: *Ministry of Environment, Slovakia. 2008*

See also:

European Mineral Day 2009 – biodiversity case studies

The European Minerals Day in 2009 was organised by the European minerals sector and related organizations giving special attention to biodiversity. The website created by IMA Europe offer numerous case studies and relevant examples of biodiversity conservation in mineral extraction sites.

References: http://www.mineralsday.eu/biodiversity/

UEPG Biodiversity case studies

The Biodiversity Case Studies Database is a website created by UEPG which provides examples of habitats rehabilitation and management, species management (flora, birds, amphibians, insects, crustaceans and bats), environmental assessment, stakeholder cooperation and contribution to the community.

References: http://www.uepg.eu/uploads/fmanager/matrix_website_biodiversity_case_studies.pdf

EuroGypsum Biodiversity case studies

The European Gypsum Industry presents in this document the activities carried out to conserve biodiversity in some of their extraction sites in several countries: Austria, Germany, Italy, Romania, Spain, UK and France.

References: http://www.eurogypsum.org/Bioweb.pdf.pdf

Euromines Biodiversity case studies

The European Association of Mining Industries, Metal Ores & Industrial Minerals Industry is an associate member of the International Council on Mining & Metals. Both organisations have produced guidance, with relevant examples, on the management of biodiversity.

References: http://www.euromines.org/who_is_euro_environ.html
http://www.icmm.com/our-work/work-programs/environment

2. Mineral planning

Guidelines for mineral planning in England

***Type of exploitation*:** aggregates, brick clay, natural building and roofing stone, oil and gas.
Country: United Kingdom

Description:
Minerals Policy Statements set out the Government's national planning policies for minerals planning in England. MPS 1 concern planning and minerals and should be taken into account by planning bodies in the preparation of Regional Spatial Strategies and Local Development Documents. Specific objectives are provided for different types of materials in four annexes (aggregates, brick clay, natural building and roofing stone, oil and gas).

Where minerals development is proposed within, adjacent to, or where it is likely to significantly affect a Natura 2000 site, specific Planning Policy Statements (PPS9: Biodiversity and Geological Conservation) and guidelines[83] must be taken into account. These set out clear rules and conditions for the development of activities that are likely to have adverse effects on the site. The roles and responsibilities of the planning authority, the project developer and English Nature (currently Natural England) who must be consulted as regards the assessment of effects, are identified.

The contents of an appropriate assessment, the options for public consultation, the assessment of alternative solutions, the consideration of imperative reasons of overriding public interest and the conditions for the implementation of compensatory measures are covered in these guidelines. The procedures for permits given before the creation of the Natura 2000 network, where a review by competent authorities is necessary, are also described.

National planning policy outlines how individual Mineral Planning Authorities (MPA) should undertake their mineral planning. Each MPA produces a Mineral Development Framework, sometimes combined with a Waste Development Framework. These frameworks comprise a suite of documents, and most MPAs are in the process of producing some or all of these documents. 'Planning Policy Statement 9: Biodiversity and Geological Conservation' states that Local development frameworks should:

(i) indicate the location of designated sites of importance for biodiversity and geodiversity, making clear distinctions between the hierarchy of international, national, regional, and locally designated sites; and
(ii) identify any areas or sites for the restoration or creation of new priority habitats which contribute to regional targets, and support this restoration through appropriate policies.'

This statement of national policy makes it clear that Local Development Frameworks, including Mineral Development Frameworks, play an important role both in avoiding conflict between development such as mineral extraction and in supporting a 'net gain' in biodiversity. By discussing the end-use of proposed new mineral extraction sites with stakeholders at the earliest possible opportunity, opportunities for habitat creation through mineral site restoration can be identified.

References: Minerals Policy Statement 1: Planning and Minerals. Available at:
http://www.communities.gov.uk/publications/planningandbuilding/mineralspolicystatement5

[83] Government Circular: Biodiversity and geological conservation – statutory obligations and their impact within the planning system.

«Schéma Departémental des Carrières»

***Type of exploitation*:** quarries
Country: France

Description:
A Quarry Plan has to be prepared for each Department (NUTS 3) according to law (Loi 93-3, 4 January 1993). The aim of so-called Quarry Department Scheme (*Schéma Departémental des Carrières*) is to organise the access to mineral resources taking into account all constraints and in particular those related to the protection of the environment. The plan provides mapping in which the deposits are classified according to main constraints and possibilities for exploitation. Three main classes are defined:

- Deposits that can not be exploited owing to severe constraints: natural reserves, protection areas for water collecting, etc.
- Deposits that can be exploited but are subject to less severe constraints: sensitive natural areas, Natura 2000, etc. Quarries may be allowed provided that adequate measures are taken in relation to the existing constraints.
- Deposits that have no particular constraints and can be exploited in accordance with existing regulations.

The Scheme is prepared by a Department Commission set up with the participation of competent administration, local stakeholders, environmental and agrarian associations, representatives of extractive materials producers and consumers. The Plan generally contains:

- Inventory and mapping of mineral deposits in the Department (aggregates, industrial minerals, rocks…).
- Evaluation of demands, materials supply and transport (data, orientations and objectives).
- Environmental analysis (impacts and solutions).
- Landscape integration and rehabilitation of sites. Guidelines for rehabilitation on landscape units.
- Mapping of constraints.
- Zoning.

References:
Loi nº 93-3 du 04/01/93 relative aux carrières
http://www.ineris.fr/aida/?q=consult_doc/consultation/2.250.190.28.8.141
Décret nº 94-603 du 11/07/94 relatif au schéma départemental des carrières
http://www.ineris.fr/aida/?q=consult_doc/consultation/2.250.190.28.8.753

Raw materials policy of the Slovak Republic

Country: Slovakia

Main description:
The raw material policy of the Slovak Republic (Government resolution No. 722 of 14th July, 2004)[84] identifies the following objectives:
- long-term objective: sustainable raw materials' use within the European market,
- medium-term objectives: minimization of raw material excavation in protected areas. Conflicts analysis by re-evaluation of raw material resources within protected areas. Setting out the limits of surface excavations: its application on territorial planning in order to meet regional needs and a long-term use of resources.

Measures include the evaluation of raw material potential in protected areas (national parks, protected landscape areas, special protected areas, cultural heritage sites) as the basis for promoting optimal use of resources and limiting negative impacts to the environment within the decision making process.

[84] Available (in Slovak) at official web page of the government:
http://www.rokovania.sk/appl/material.nsf/0/B08067F0A780A79BC1256E9F00340B6D?OpenDocument

An analysis of the overlapping of all protected areas (including Natura 2000 sites) and raw material deposits was carried from 2004 to 2007. 227 deposits were analysed, located in 9 national parks and 13 protected landscape areas, including buffer areas or zones of influence and the borders of all protected areas overlapping with borders of deposits. In 2008 all the data were revised by mining, geology and nature protection bodies, to better understand what are the actual overlaps; how far Natura 2000 sites are "limiting" extractive activities, and what are the possible solutions in sites with mining and nature protection interests.

References: *Ministry of Environment, Slovakia. 2008.* Available (in Slovak) at: http://www.rokovania.sk/appl/material.nsf/0/B08067F0A780A79BC1256E9F00340B6D?OpenDocument

Mapping Mineral Planning

***Type of exploitation*:** sand and gravel extraction
Country: Austria

Description:
The Austrian mineral resources plan stresses the need for identifying important deposits in the country and for protecting these areas against other unsuitable land uses. To this end, the plan provides several maps in a first step, where some environmental factors are analysed:

- Quality. 5 classes are laid down according to the lithology; the first class (1) corresponds to sand and gravel deposits of best quality and the last one (5) to those of worst quality.
- Quantity. Data concerning the dimension of the mineral deposits (surface, thickness) are considered and 5 classes are described regarding productivity.
- Geological potential. It is obtained from the combination of the two previous factors with 5 classes established depending on this potential.
- Regional importance. Depending on the number of current mine sites, 5 classes of importance are established.
- Suitability. As final result of this first process, a suitability map for sand and gravel is calculated from the combination of the geological potential and the regional importance. Again 5 different classes are described.

The second step of the plan analyses the potential conflicts and takes into consideration different aspects such as the demand estimation by regions, forests and protected areas (Natura 2000 sites, groundwater protection, etc.), and settlements and traffic routes (using for both buffers of 100 and 300m). The final result is a map that contains information about the actual suitability of the territory and about the areas that must be safeguarded by land use planning.

References: *Weber L. (presentation) 2008. Ministry of Economy and Labour, Vienna. SEIE Brussels, 25 June 2008.*

3. Mitigation

Project design for the protection of Natura 2000 areas

***Type of exploitation*:** pure silica sand extraction
Country: Germany
Targeted habitats/species: NO
SCI/SPA: *Nearby Natura 2000 areas (DE 4549-301 "Rohatschgebiet zwischen Guteborn und Hohenbocka" and DE 4549-303 "Peickwitzer Teiche")*.

Description:
The extension of a mining site for pure silica sand (quarry pond) in Brandenburg was planned, which would require lowering the groundwater level in order to get access to a part of the mineral deposit above the water table of the quarry pond and to extract the remaining part of the mineral below water surface by a dredger. As a consequence, the groundwater level would have also been lowered in the surrounding area, which would have a negative effect on two nearby wetland areas designated as Natura 2000 sites.

In order to avoid such impact the dredger was modified in a way that enabled the company to carry out the mining project without mineral extraction above the water table and therefore without lowering the groundwater level. Therefore the negative impact on the groundwater level in the surrounding area and the wetland biotopes was avoided.

In addition, the company also backfilled the drainage channels that were built in one of the wetland biotopes in former times in order to dry the land for agricultural purposes. This backfill stopped the drainage and was therefore a measure to improve the wetland biotope and its further development.

References: Case study provided by Quarzwerke GmbH.
Gerling, H. & Puetter, T. 2004. Praktische Erfahrungen mit der FFH-Verträglichkeitsprüfung. Kies+Sand, 1/2004.

Mitigation measures for flying squirrels

***Type of exploitation*:** gold mine
Country: Finland
Targeted habitats/species: flying squirrel (*Pteromys volans*)
SCI/SPA: NO

Description:
A gold mine in southwestern Finland was designed and permitted over an area of 45 hectares, including both open pit and underground mine. In addition to environmental impact assessment, a detailed study on the natural values of the area was carried out. Birds and plants were surveyed and separate studies were also made on the flying squirrel, which is the most important mammal in the area and is a species protected under the Habitats Directive. According to the study there were three territories of this species in the mining area where possibly 1- 3 male squirrels and three breeding female squirrels live. There were not many nesting trees available for the squirrels in the area. Each of the three territories were studied in detail, also considering the possible connections between them and with other flying squirrel areas outside the mining site. The nearest Natura area was situated 5 km northeast from the mine.

The applicant complemented its application concerning protection of flying squirrel after having consulted with the regional environmental authorities. According to the conclusions of the survey, the conservation of flying squirrels was possible if extensive clear cuttings were not made and the connections to the northwestern forest areas were maintained. The working phase of the open pit would take approximately 3–4 months. The open pit area would be outlined so that it would not

extend to the transition routes between the flying squirrel territories. This species moves at night when there are not many activities at the open pit.
The permit conditions to secure the flying squirrel included the following prescriptions:

- The edge of the open pit can extend at most to 40 m distance from the nearest nesting tree. Between the nesting tree and the pit the wood must not be logged except for 5 meters area between the pit edge and the wood, where cuttings may be allowed for mine safety reasons. Thus, a 40 m wide zone of forest would be preserved between the nesting tree in territory 1 and the edge of open pit.
- The breeding and nourishment trees in the flying squirrel territories in the area shall not be destroyed and sufficient shelter wood shall be preserved around the nesting trees in the territories. Wood shall not be cut from the routes of the flying squirrel within the mining area.
- The decline to the underground mine must be situated outside the territories so that when constructing the tunnel the old trees (aspens or spruces), which are breeding and resting trees for the species, will not be cut.

References: Case study provided by Euromines (Polar Mining Oy, Vammala, Finland)

A Porphyry* quarry in a protected area: Les Grands Caous in Saint-Raphaël

***Type of exploitation*:** Porphyry quarry
Country: France
Targeted habitats/species: Mediterranean forest **(**olive trees, cork oak, pines, etc.)
SCI/SPA: NO (close to *Estérel Oriental* natural site)

Description:
The *Grands Caous* quarry is found on hills of the *Estérel Oriental* natural site, which contains a high quality blue porphyry deposit, unique in the region, with exceptional geotechnical features. The quarry is located in the western border of the site. The natural environment is rich and fragile, with cork oak, scrub heather and pine trees. The current excavation is not very visible because it is worked into the terrain.

To minimize the impacts, the operator has limited the extraction area. The ridge lines are not affected and extraction in pits minimize the impact, which is limited to their immediate vicinity. A landscape survey was conducted as part of the authorisation process, which has helped to define the final rehabilitation and to visualize the different stages by scale models and computer pictures. Strict conditions for the site's rehabilitation have been prescribed. There is also a water management plan that enables the restoration of the river banks and a colonization of these areas by spontaneous vegetation.

** Porphyry is a variety of igneous rock consisting of large-grained crystals, such as feldspar or quartz, dispersed in a fine-grained feldspathic matrix or groundmass.*

Reference: *DIREN/DRIRE PACA. 2006. Guide de bonnes pratiques. Aide à la prise en compte du paysage et du milieu naturel dans les études d'impact de carrières en Provence-Alpes-Côte d'Azur. Tome 2.*

Good environmental practices in La Falconera quarry, Catalonia

***Type of exploitation*:** limestone quarry
Country: Spain
Targeted habitats/species: NO
SCI/SPA: *Macizo de Garraf* protected natural area, next to the SCI *Serres del Litoral Central*.

Description:
La Falconera is a limestone quarry within the protected natural area of *Macizo de Garraf*, in Barcelona province, which is also next to the SCI *Serres del Litoral Central*. The conservation value of this area

made the operators take into account all necessary measures and good practices aimed at the mitigation and minimisation of potential negative effects like noise, vibrations, dust, particles, wastes, etc.

The mitigation measures also included the delimitation and establishment of non-exploited areas where significant natural values were found, and setting up perimeters of protection including the wooded areas next to high ecological value areas, which remained intact. This quarry achieved the Spanish award for good environmental practices in 2007.

References: Los áridos y el desarrollo sostenible. Premios ANEFA 2007. FdA - Federación de Áridos (Spanish Aggregate Federation). Information available at: http://www.medioambienteyaridos.org/pdfs/Premios07.pdf

4. Rehabilitation

The Nature After Minerals programme

Through partnership between the RSPB and Natural England, the programme aims to support and facilitate the recreation of habitats on mineral sites in accordance with the Biodiversity Action Plan. Advice on creating and managing different habitat types are provided. Several restoration case studies carried out in England are included in the after minerals data base. The search can be done by case study, operator, mineral (clay & shale, coal, limestone, sand, gravel) or habitat type.

Hereafter, two case studies concerning Natura 2000 sites and species are presented:

The Cliffe Pools (Kent, England)

***Type of exploitation*:** Clay extraction quarry
Country: United Kingdom
Targeted habitats/species: Saline lagoons (equivalent to habitat 1150 **Coastal lagoons* of the Habitats Directive)
SAC/SPA: Thames Estuary: Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), Ramsar and Environmentally Sensitive Area (ESA)

Description:
The Cliffe Pools are located on the southern shore of the Thames Estuary and the area is designated as Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), Ramsar and Environmentally Sensitive Area (ESA). The site was acquired as a reserve by the RSPB in October 2001. The 237 hectares support a range of habitats including saline lagoons, brackish pools, grasslands, salt marsh, mud flat and scrub.

Clay for the cement industry was extracted at the site until 1972, leaving a series of pits that flooded to form pools. From the 1960's onwards the site was used by Westminster Dredging Ltd for the licensed disposal of river dredging deposits by infilling of the pools. In the 1980's, discussions commenced between English Nature, RSPB, Blue Circle Industries Plc (the former owners of the site) and Westminster Dredging Ltd (the dredging disposal operators). This culminated in an agreement to alter the original plans for infilling the remaining pools for the benefit of nature conservation. Early dredging activity filled in 60 ha of the sites north-western clay pits with a mixture of sand, gravel & silt dredgings, upon which developed a rich mosaic of upper salt-marsh, grasslands and hawthorn/bramble scrub. The pits adjacent to the NE also received dredgings but were not entirely filled, resulting in the creation of a suite of 27ha of rain-fed brackish pools. To the south, ongoing dredging disposal into the saline lagoons is part of the 40 year agreed restoration plan between RSPB and Westminster Dredging PLC.

The 111 ha of saline lagoons and 27 ha of brackish shallow pools were created through clay extraction for the cement industry. The site is renowned for wading birds, with massed flocks moving from the Thames Estuary onto the pools on winter high tides, a wide range of passage birds in autumn and spring, and breeding avocets, redshanks, lapwings and ringed plovers. Restoration was achieved primarily through:

- Targeted disposal of dredgings to infill existing saline lagoons; to reduce their depth to increase feeding habitat for waterfowl; and to create nesting islands.
- Creation of shallow margins through re-profiling of the edges of currently deep lagoons to provide open and vegetated margins.
- Creation of additional islands through isolation and re-profiling of existing causeways and if practicable, excavation of areas in the northernmost brackish pools.

Dungeness (Kent, England)

***Type of exploitation*:** Sand and gravel quarry
Country: United Kingdom
Targeted habitats/species: Habitat 1220 *Perennial vegetation of stony banks* and 7140 *Transition mire and quaking bogs*, both listed under Annex 1 of the Habitats Directive. *Triturus cristatus* and *Hirudo medicinalis*.
SAC/SPA: Dungeness peninsular: Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), and Special Area of Conservation (SAC) for habitats and rare species

Description
The Dungeness peninsular is the largest shingle structure in the UK and large parts have several important nature conservation designations; including Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) for birds and Special Area of Conservation (SAC) for habitats and rare species. Dungeness is one of only four UK sites with the rare annual vegetation of drift lines – a highly specialised plant community - less than 100 ha exist in total. It also has the most diverse and extensive stable communities of perennial vegetated shingle banks in Europe.

Large areas remain intact, despite considerable past damage mainly due to gravel extraction. Small natural water bodies within the shingle support fen and open water plant communities and are considered unique in the UK. They are important for Transition Mire habitats (habitat 7140 *Transition mire and quaking bogs*, listed under Annex 1 of the Habitats Directive), great crested newt (*Triturus cristatus,* listed under the Habitats Directive*)* and medicinal leech (*Hirudo medicinalis*, also listed under the Habitats Directive*)*. Willow scrub has encroached into these areas, but they are now being restored.

Mosaics of habitats are incorporated in restorations, including freshwater lakes with islands and other associated wetland features. Where soil and overburden removal is necessary to access gravel, this has been incorporated into the design.

Coastal vegetated shingle is extremely rare and fragile, occurring in very few locations. Techniques are being trialed at Dungeness to repair historical damage to the vegetated shingle. This is a very slow process, involving a poorly understood ecosystem, with no guarantee of success. However, the outcomes of the trials may be useful to those intending to create coastal vegetated shingle at other sites. The main measures undertaken were:

- Turfing and seeding of broom. It is an early colonizer of shingle and the leaf litter that develops helps other species, including lichens to establish. Seeds were planted in sand at around 1m intervals. After 4 years, survival was 6%, and some plants are quite substantial. Lichen communities have begun to establish among the more established plants.
- Spreading dock seeds (failed)
- Applying sea campion seed to shingle enhanced with peat free compost. The plants have become successfully established.
- Translocation of wood sage and false oat grass into shingle during the winter - some establishment of vegetation but no spread.
- Planting broom plants – broom established if conditions stay moist after planting.
- Creating grasslands for invertebrates. At Dengewest South, gravel was extracted from beneath pastoral soils, and restoration has been to nectar rich grassland for invertebrates, primarily bees.

The operating company (currently Hanson Aggregates) has, since the 1960s, consulted with RSPB and Natural England (formerly English Nature) on all restoration plans at Dungeness. Restoration techniques and outcomes for biodiversity have continually improved over time.

References: *www.afterminerals.com*

Strategic planning for quarry rehabilitation

***Type of exploitation*:** Quarries
Country: France

Description:
The Quarry Department Schemes generally include guidance for restoration in landscape units. A project promoted by the Regional Directorate of Industry and Energy of Ile-de-France has analysed the results obtained in strategic planning for the recovery of a number of sites in the area of La Bassée (SPA FR1112002) and prepared a methodology for this activity. The experience of the "Cellules de reflexion" in deciding about rehabilitation of sites following a coherent approach on several exploitation areas seems a good example.

Indeed, French regulations do not define the modalities of functioning (composition, role, duration, etc.) for the consultation instances needed. This led project developers in environmental sensitive contexts, to the spontaneous creation of informal "reflexion groups" (called "cellules de réflexion") sponsored by operators, competent authorities, etc. This working group analyses the future of an extraction site by extending the analysis to a coherent spatial unit in order to include all the territory issues.

Reference: *DRIRE Ile-de-France. 2006. Etude sur l'aménagement global des carrières à l'échelle du gisement.*

Rehabilitation of a gravel quarry through creation of riparian habitats

***Type of exploitation*:** Gravel quarry
Country: Austria
Targeted habitats/species: riparian habitats and several red list species
SCI/SPA: NO

Description:
A quarry at Steyregg Danube has been supplying sand and gravel to the Upper Austrian Building Economy since 1962 and should be active until 2025. The gravel quarrying project creates after extraction large waterbeds which are similar to the back waters of the old Danube riverside still shown on historical maps. The settlement of newly created habitats is initiated by applying soil and mud from one still existing back water on the banks of the new ponds. Great parts of the area are left to natural succession. The aim of the rehabilitation is to resettle, protect or enlarge the populations of more than 20 partly highly endangered red list plant-species, 7 red list amphibian-species, 3 red list-reptiles, of 20 partly endangered dragonfly-species, and some endangered birds.

Apart from numerous red list-species, 2 plants species (*Nymphoides peltata, Hydrocharis morsus-ranae*), which have only known populations in the province of Upper Austria, are currently found in the rehabilitated areas. Also regarding the amphibian fauna the results are noteworthy, e.g. *Bufo viridis* is found again in the new ponds more than 25 years after the last record of this species in the so called "Steyregger Au". Many amphibians are also represented with large populations. Regarding the bird fauna, there are several endangered species, which profit highly from the quarry-activities and the rehabilitation strategies (e.g. *Luscinia svecica, Riparia riparia, Actitis hypoleucos, Charadrius dubius*). Also the Castor fiber – a European wide endangered animal – lives in a population in the surroundings of the aggregates extraction. This aggregates extraction project is not only an economically important contribution for the Upper Austrian raw Material extraction, but also an important country-wide project of protection of a lot of endangered species.

Reference:
http://www.uepg.eu/uploads/documents/biodiversity/biodiversity%20_case_study_austria_2.pdf

Restoration of a sand and gravel quarry in Madrid

***Type of exploitation*:** Sand and gravel quarry
Country: Spain
Targeted habitats/species: NO
SCI/SPA: within a Natural Park (Parque Regional del Sureste) and close to a SPA and SCI

Description:
In a quarry located in the fertile plain of the Jarama River, within a Natural Reserve and close to a SPA and SCI, a rehabilitation project has been carried out taking into account the conservation objectives of the management plan issued for the natural area.

The rehabilitation was carried out achieved through:
- recovery of natural habitats and improvement of the degraded areas within the river and shores,
- habitats restoration in the lagoons that resulted from the exploitation,
- use of endangered autochthonous species for seeding and planting.

The rehabilitated area has been donated to the regional authorities and is currently considered as a natural area of high ecological value.

References: *Case study provided by FdA - Federación de Áridos, (Aggregates Federation of Spain)*

Quarries rehabilitation in Phokis and Milos

***Exploitation*:** Perlite and bentonite extraction in Milos region; bauxite extraction in Phokis region.
Country: Greece
Targeted habitats/species: NO
SCI/SPA: NO

Description:
These quarries are located on the island of Milos and in Central Greece, in the region of Phokis. The Environmental Impact Assessment (EIA) of these mines was used in mine operation and rehabilitation planning.
Phased restoration work is carried out at the same time as mining and it consists of five stages, each of which relies on the success of the previous one:
1. Landscaping of the mine and dumping sites. During the first stage of restoration, the landscape of the mining site and surrounding area are rehabilitated so as to achieve a good integration in the area. The waste material produced during mining is used to fill in exhausted mines wherever possible.
2. Covering with topsoil: depositing fertile soil. The site is covered with topsoil that has either been stored or brought over from nearby dumping sites.
3. Sowing: efforts are made to reproduce the local vegetation.
4. Planting of trees and shrubs. Establishment of nurseries in Phokis (1980) and on Milos (1995) in which native plants are propagated.
5. Fencing, watering and general maintenance. Fencing and constant surveillance of the restored areas are the only defence against sheep and goats. With regard to the lack of rainfall, the solution is to water - at least until the plants have grown to a satisfactory size.

References: Bringing nature back to the mine (brochure). Silver & Baryte Ores Mining Co. S.A.
Michalis Stefanakis and Ms Vini Filippi (S&B Industrial Minerals S.A.). Presentation at the Convention on Biological Diversity SBSTTA, Paris 2-6 July, 2007

Rehabilitation of quarries next to Natura 2000 sites

***Exploitation*:** Quarry
Country: Belgium
Targeted habitats/species: Natterjack Toad, Midwife Toad, Kestrel Falcon, Pilgrim Falcon and a dragonfly
SCI/SPA: Between two Natura 2000 areas

Description:
The quarry is situated between two Natura 2000 areas of high biological interest. This area shelters a very wide variety of botanical and animal species, among which many are uncommon, and even extremely rare in the Walloon Region. The rehabilitation carried out in a quarry in aimed at recreating areas similar to those of the neighbouring Natura 2000 sites.

The measures included the partial recovery of the original relief and the pre-existing ecological lawns of interest, as well as at the creation of natural banks by the excavated pond to provide suitable habitats for several species that depend on the aquatic environment, including dragonflies, amphibians, aquatic birds, diving beetles, etc.).

An ecological study was also carried out in 2006 to bring to light the most interesting species and landscapes already present and to ensure their preservation. A very important population of Natterjack Toad was found in the numerous temporary puddles, as well as a small population of Midwife Toad. These two species are some of the most threatened amphibians within the country. The Kestrel Falcon already nest in the site here and the Pilgrim Falcon has also been seen. The restored wetland areas already shelter a dragonfly listed on the red list in Belgium. A new fauna-flora-landscapes study is already planned to refine the results and to study the evolution of the biotopes on the quarry's site.

At the end of the exploitation, the quarry will return to the public domain to become a zone of ecological and landscape interest. Because of its particular geographical situation, between two Natura 2000 perimeters, the quarry will be a key element in the local ecological network.

Reference: UEPG biodiversity case studies
http://www.uepg.eu/uploads/documents/biodiversity/biodiversity_case_study_belgium_7.pdf

The woodland project

***Exploitation*:** China clay
Country: UK
Targeted habitats/species: Upland oak and ash woodland (identified as an endangered habitat in the United Kingdom).
SCI/SPA: NO

Description:
The woodland project is a post-mining restoration project. It aims to restore the landscape of the china clay area in Cornwall. It follows on from the Heathland Project. From 1997 to 2004, 750 hectares of lowland heath land – another endangered habitat - was restored on former mining sites. Together, the two projects form the biggest initiative of their kind in Europe. To restore the sites, "non native" or commercially planted species will be removed and oak, ash and other native hardwoods will be reintroduced.

References: Case study provided by IMA_Europe
http://www.naturalengland.org.uk/regions/south_west/ourwork/chinaclaywoodlandproject.aspx

5 Extractive activities in marine areas

ICES International Council for the Exploration of the Sea

***Type of exploitation*:** several marine extractions
Country: Several countries around the North Atlantic

Description:
ICES is the organisation that coordinates and promotes marine research in the North Atlantic. This includes adjacent seas such as the Baltic Sea and North Sea. They act as a meeting point for a community of more than 1600 marine scientists from 20 countries around the North Atlantic.

Scientists working through ICES gather information about the marine ecosystem. As well as filling gaps in existing knowledge, this information is also developed into unbiased, non-political advice. Their advice is then used by the 20 member countries, which fund and support ICES, to help them manage the North Atlantic Ocean and adjacent seas.

ICES Working/Study Groups cover all aspects of the marine ecosystem from oceanography to seabirds and marine mammals. A Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem (WGEXT) has been set up.

An overview of research on marine extraction can be found in the yearly reports of ICES Working Group Extraction: http://www.ices.dk/iceswork/wgdetail.asp?wg=WGEXT

ICES WGEXT also reviewed and reported programmes of national resource mapping, changes to legislative and administrative frameworks, approaches to Environmental Impact Assessment and research of member countries in the field of marine sediment extraction.

Moreover, WGEXT reviewed and evaluated the use of ICES Extraction guidelines across member countries. Most members refer to the guidelines in national regulatory frameworks, and some make more explicit reference to some or all the provisions in statutory regulations.
The group reviewed experience of member countries in the implementation of monitoring programmes in relation to marine sediment extraction activities. Owing to the agreed need to consider the key issues in finer detail, members agreed to provide further responses immediately post session.

References: *ICES. 2007. Report of the Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem (WGEXT), 17-20 April 2007, Helsinki, Finland. ICES CM 2007/MCH:08. 96 pp.*
Sutton, G. and Boyd, S (eds.) 2009. Effects of Extraction of Marine Sediments on the Marine Environment 1998-2004. ICES Cooperative Research Report no. 297, 180 pp.
Information available at: www.ices.dk

Good practices on aggregate extraction in the marine environment: the Goodmarine Project

***Type of exploitation*:** Aggregate extraction
Country: United Kingdom

Description:
This project has been managed by the Department of Mining, Quarry and Mineral Engineering at the University of Leeds with support from the Mineral Industry Research Organisation (MIRO).

The Goodmarine website provides information for those with an interest or involvement in extraction of aggregates by dredging in the marine environment. The main aim, however, is to highlight the “good practice” that seeks to remove or minimise environmental effects. The website also provides a useful resource for the industry in relation to their plans, processes and operations. While marine

habitats are not yet fully understood, there is much research in progress. Results will contribute to future improvements in regulation and dredging practices. As the website demonstrates, there are many existing examples of good environmental practice being employed already in the UK.

The Good Practice chapter includes Mitigation and Monitoring. Measures specifically designed to avoid adverse impacts to sites and features designated under the Habitats Directive and Birds Directive should be contained within the initial dredging licence proposals. Proposals deemed to adversely affect European protected sites should be assessed as to the possibilities of imposing certain conditions to avoid these adverse affects. Such modifications could include changes to the location or extent of the proposed works, the timing of certain activities and the use of certain obligations or legal agreements.

Reference: http://www.goodmarine.com

Impacts of aggregates extraction along Dieppe coast

***Type of exploitation*:** Marine aggregate extraction
Country: France

Description:
The "Centre Régional d'Innovation et de Transfert de Technologies (CRITT)" manages a project aimed at monitoring the impacts of aggregates extraction along the Dieppe coast, in the North of France. The main objectives of the project are:
- development of a monitoring methodology for an existing extraction site useful for large scales exploitations (European program project for the Eastern English Channel - INTERREG III),
- quantitative evaluation of direct impacts of dredging on living resources (benthic and fishing) by comparison with a not exploited site of reference,
- spatial evaluation of indirect impacts of dredging (mainly overflow of fine elements)
- temporal evaluation of these impacts through the monitoring of the restoration process (physical and biological) of the seabed,
- quantification of the intensity and duration of the disturbance on the whole benthic and fishing settlements .

Reference: http://critt.estran.free.fr/critt.htm

Nature Conservation & Aggregate Extraction in the Eastern Channel Region

***Type of exploitation*:** Marine aggregate dredging
Country: United Kingdom

Description:
Between 2000 and 2004, the CEFAS (Centre for Environment, Fisheries and Aquaculture Science, UK) undertook a government funded study entitled the "Assessment of the Rehabilitation of the Seabed following Marine Aggregate Dredging", designed to investigate the physical and biological recovery of the seabed once dredging had ceased. The study was undertaken at a number of relinquished or fallow sites previously exposed to commercial aggregate extraction in the Southern North Sea and off the South Coast. The results and conclusions of the work are based on data gathered at the sites used within the survey and as such may not be applicable to all aggregate extraction sites.

This study produced two technical reports. The first one highlighted that the degree of natural physical disturbance plays an important role in influencing epifaunal community structure following the cessation of dredging activity. The second one reported macrobenthic recovery rates up to six years after the cessation of aggregate dredging and also provided a generic framework for evaluating post-cessation re-colonization studies. This document shows that distinct differences in the nature of assembles at study sites exposed to high and low levels of dredging intensity persist at least six after dredging has finished.

Other notable work on the subject has been conducted by Marine Ecological Surveys Ltd, in conjunction with Plymouth University, in the Southern North Sea and English Channel. The paper entitled Impacts of Marine Aggregate Dredging on Benthic Macrofauna off the South Coast of the United Kingdom concludes that the rate of restoration of biomass following dredging was slower than that recorded for species diversity and population density.

In addition to work on rehabilitation and recovery, some work is developing in the area of restoration and enhancement of the seabed once aggregate dredging has ceased. Current studies are primarily focussed on seeding of the seabed with a media to promote recovery of benthic organisms. Such media include gravel and shell.

A project being currently undertaken by CEFAS is looking at gravel seeding and its potential for restoration of the seabed following marine aggregate dredging. In 2005 Cefas, working with industry, established a field experiment at an extraction area off the river Humber. The objective of the experiment is to test the practicality of gravel seeding as an approach to remediating an area of seabed where sands may have accumulated as a result of dredging. The area was a previously licensed aggregate extraction site that had been surrendered after several years of use. To undertake the reseeding experiment, a dredging vessel was chartered by Cefas to extract gravel from a neighboring licensed area. The gravel was then deposited in the experimental site. Prior to the gravel deposit, Cefas conducted a number of pre-experiment surveys, which were repeated after the disposal and have continued as part of an ongoing programme to determine the benthic recovery rate. This work is ongoing and will be reported over the coming years.

Work being undertaken by the University of Southampton, linked with the Shellfish Association of Great Britain, aims to examine the potential for shell to speed the recovery of aggregate dredged seabed. The project will look to determine the significance of biogenic material (shell) as a substratum contributing to the biodiversity of existing natural sand and gravel seabeds and to monitor the colonisation of shell deposited on dredged gravel seabed to the east of the Isle of Wight in comparison with untreated seabed.

Reference: *Cooper, K.M., Eggleton, J.D., Vize, S.J., Vanstaen, K., Smith, R., Boyd, S.E., Ware, S., Morris, C.D., Curtis, M., Limpenny, D.S. and Meadows, W.J., 2005. Assessment of the re-habilitation of the seabed following marine aggregate dredging - part II. Sci. Ser. Tech Rep., Cefas Lowestoft, 130: 82pp.*

Marine Mineral Guidance

***Type of exploitation*:** Sand and gravel dredging
Country: United Kingdom

Description:
As sand and gravel constitute most of the minerals dredged from the English seabed, these are the main focus of this guidance. However, the guidance is also generally relevant to other minerals which may be dredged from the seabed, such as maerl (calcified seaweed), coal and metalliferous minerals. To ensure that extraction does not cause unacceptable adverse impacts, a range of controls have been imposed on dredging activities.

The Government wishes to see the continued use of marine dredged sand and gravel to the extent that this remains consistent with the principles of sustainable development. The Government believes this can be achieved by minimising the total area licensed/permitted for dredging, careful location of new dredging areas, Environmental Impact Assessment (EIA) where such an assessment is required, etc.

The Environmental Statement should include consideration of the practical steps that might be taken to mitigate the effects of the proposed mineral extraction. These should be site specific and closely linked to particular potential environmental effects identified during the EIA process. Mitigation measures may include:

- modification of the dredging depth to limit changes to hydrodynamics and sediment transport patterns to acceptable levels;
- agreed dredger navigation routes to minimise interference with shipping, fishing and other uses of the sea;
- zoning of the permitted area to protect sensitive fisheries, optimise access to traditional fisheries, and to reduce the impact on sensitive benthic assemblages;
- exclusion zones to protect rare or stable communities identified as occurring in small areas within a much larger application area;
- the choice of dredging technique and the timing and phasing of working may also assist in preventing disturbance;
- seasonal restrictions, where appropriate, to minimise impacts on migratory fish stocks or on vulnerable life history stages of fish or the benthos;
- safety buffer zones around war graves, important wrecks or other marine archaeological sites, pipelines and cables.

The guidance also includes monitoring of environmental effects.

Reference: *Guidance "Marine Mineral Guidance 1: Extraction by dredging from the English seabed".2006, Department for Communities and Local Government, UK.*

Good practices for marine aggregate dredging

***Type of exploitation*:** Marine Aggregate Dredging
Country: United Kingdom

Description:
Marine aggregates play an important part in the provision of high quality raw materials for both the UK construction industry and for coastal protection. Sand and gravel are generally taken from the seabed by trailer suction hopper dredgers that are capable of transporting cargoes of up to 9,000 tonnes from offshore dredge sites direct to the wharves located close to the point of end use. The dredge areas are licensed from The Crown Estate following an extensive Environmental Impact Assessment (EIA) and stakeholder consultation process formerly regulated through Communities & Local Government (CLG) and Department for Environment, Food and Rural Affairs (Defra) and now through the Marine and Fisheries Agency (MFA), an executive agency of Defra.

In 2002 the Government provided an additional source of funding by the imposition of a levy on primary aggregates from both land-won and marine sources. This Aggregate Levy Sustainability Fund (ALSF) has four main objectives:
1. Minimising demand for primary aggregates
2. Promoting environmentally friendly extraction & transport
3. Addressing the environmental impacts of past aggregates extraction
4. Compensating local communities for the impacts of aggregates extraction

The marine ALSF in England was initiated mainly to support research that leads to a greater understanding of the nature and sensitivity of marine resources to disturbance by aggregate dredging, and how such impacts may be minimised.

The guide also includes some other interesting sections, such as *Natural Seabed Resources*, where some projects and examples, mainly on mapping the seabed resources, are given; *Mitigation and Management* of marine aggregate dredging, etc.

Reference: *Marine aggregate extraction: Helping to determine good practice. Conference proceedings: September 2006. Editors: Newell and Garner.*

Strategy for the British marine aggregate industry

***Type of exploitation*:** Marine Aggregate Dredging
Country: United Kingdom

Description:
Extraction of marine aggregates involves a very small proportion of the UK's continental shelf - typically an area totalling some 140km2 is dredged every year. Despite this small footprint, the industry recognises that the marine environment in which it operates is sensitive, and accepts that it has a responsibility to manage its operations in ways that minimise any effects on the marine environment and on its other users. Within the Environmental Protection chapter, some key objectives and indicators are identified:
- Minimise the spatial footprint of dredging operations through responsible and effective management.
- Maintain and develop industry contribution towards the understanding of the marine sand and gravel habitats and of Britain's marine historic environment.
- Reduce the impact of atmospheric emissions released through the production and transport processes.

References: *Strength from the depths. A sustainable development strategy for the British marine aggregate industry. BMAPA (British Marine Aggregate Producers Association). November 2006.*

6 Monitoring and indicators

Developing indicators for integrated raw material and nature conservation management in the German cement industry (Pilot project in Schelklingen cement plant)

***Type of exploitation*:** Cement plant
Country: Germany

Description:
A pilot project in Schelklingen cement plant provided scientifically based solutions for further optimization of the balance between raw material extraction and nature conservation. The extraction of raw materials for cement production represents a substantial intervention in nature and the landscape. However, even while they are in operation quarries can also take on an important function in the protection of nature and species: with their specific site conditions they often provide a habitat for rare and endangered species of animals and plants that hardly exist any more in cultivated landscapes. The aim of the pilot project was to develop indicators with which it is possible to measure the diversity of species and habitats in quarries.

Qualitative and quantitative biodiversity indicators were developed and tested, in order to make it possible to measure, *inter allia,* the effects of nature conservation measures before, during and after mining. The indicators then were integrated into a Biodiversity Action Plan and a Species Action Plan; these integrate deficit analysis, research, monitoring and sanction planning – including cost estimations - and thereby support the possibilities and objectives of existing planning instruments and especially their ecological contents.

Different indicators for flora, fauna and types of habitat that were tailored to suit the specific conditions and potential of mining areas were developed during the project so that equal justice could be done to the demands of quarry operation and of nature conservation. The biodiversity indicators were tested during the course of the project in a cement quarry in Schelklingen, in southern Germany, as were various procedures for monitoring the diversity of species and habitats.

The findings obtained were used as the basis for developing Biodiversity Action Plans that covered the specific measures for maintaining and promoting the diversity of species. The results of the project were discussed on a workshop with experts from companies and federations of different non-metallic minerals industries and on a stakeholder dialogue including authorities and NGO's.

References: *Tränkle, U., Rademacher, M., Friedel, G., Löckener, R. , Basten, M. & Schmid, V. 2008. Sustainability indicators for integrated management of raw material and nature conservation – pilot project in the Schelklingen cement plant. Cement International: 4/2008 (vol. 6) pp 68-75.*
Information (in German) available at: http://www.initiative-nachhaltigkeit.de/

Monitoring effects of quarries in or near SPAs in Catalonia

***Type of exploitation*:** Aggregates extraction
Country: Spain
Targeted habitats/species: *Falco naumanni, Tetrax tetrax, Burhinus oedicnemus, Melanocorhypha calandra, Miliaria calandra, Alauda arvensis, Galerida theklae, Galerida cristata*
SCI/SPA: Several SPAs in the Lerida Plains

Description:
In 2004 an agreement was signed between the regional Aggregates Association (Gremi d'Àrids de Catalunya) and the Department of Environment of the Regional Catalan Government with the aim of evaluating the effectiveness of the mitigation measures agreed for steppe birds in areas included or near SPAs where aggregates extraction is being carried out. Although no significant impact on the SPAs were predicted, as the most important areas for the steppe birds were not affected by the extractive activities, some additional mitigation measures were agreed in order to prevent any potential risk of habitat loss. These mitigation measures included the creation of new fallow land in former cultivated land and their subsequent management as suitable habitat for steppe birds, e.g. through grazing, mowing and sowing.

The monitoring carried out by reputed scientific experts showed that there was not any reduction in former species populations in the area and the new fallow areas managed for steppe birds were effectively used by the target species; even some increase in the species occurrence was achieved in those areas. For instance, the use of the new fallow land by the Little Bustard was very high. These fallow lands, despite only representing 5% of the Balaguer SPA (1,358 ha), hosted approximately 15-20% of the males observed during their reproductive display and of the females with chicks accounted for the SPA.

Reference: *Case study provided by FdA - Federación de Áridos, (Aggregates Federation of Spain), 2008.*

7 Cooperation with competent authorities and stakeholders

Examples of good cooperation in the United Kingdom

***Type of exploitation*:** different types of extractive activities
Country: United Kingdom

Description:
There is in general good cooperation between mining industries and nature conservation organisations. Approximately 700 nationally important Sites of Special Scientific Interest (SSSIs) and many more locally important nature conservation sites are associated with quarrying and large areas of important habitat have been created through quarry restoration.

During the last 10 years the *Minerals and Nature Conservation Forum*, a partnership between the minerals industry and English Nature (currently Natural England), the government agency responsible for championing nature conservation, has played a pivotal role in bringing industry and the conservationist together to develop, share and disseminate good practice.

More recently, the *Nature After Minerals* partnership between Natural England and the RSPB has continued working with the mineral industry toward achieving more priority habitats on mineral sites. For example, now there is a deal between Natural England and a peat extraction company to restore lowland raised peatbog habitat on a SAC in Thorne and Hatfield moors in South Yorkshire and Wedholme Flow in Cumbria.

References: http://www.mineralsandnature.org.uk/
http://www.afterminerals.com/

The "Cellules de reflexion

***Type of exploitation*:** Aggregates extraction
Country: France
SCI/SPA: La Bassée SPA

Description:
The «Cellules de réflexion» are voluntary groups formed by competent authorities, extractive industries and local stakeholders to discuss about the development of extractive activities in a coherent area related to a mineral deposit (e.g. 500-2000 ha in La Bassée SPA, Île de France).

The aim is to organise the rational exploitation of materials and discuss a strategy for the rehabilitation of the sites. These groups are a new intermediate element for decision making, between the Quarry Department Scheme and the individual permission for exploitation. A number of such groups have been set up in the last twelve years in several areas in the "Ile-de-France" region, where important deposits exist and are being exploited, some of which are included in Natura 2000 areas (e.g. La Bassée, SPA, 27.643 ha).

Reference: *DRIRE Ile-de-France. 2006. Etude sur l'aménagement global des carrières à l'échelle du gisement. Report prepared by Écosphère.*

Cooperation between NEEI and the regional environmental authorities in Catalonia

***Type of exploitation*:** Aggregates extraction
Country: Spain

Description:
Good communication and cooperation exists in this region between project developers and the competent regional authority for project approval, which tries to streamline procedures and find appropriate solutions for each case.

A number of common initiatives have been undertaken between the regional authority and an association of aggregates extraction companies (*Gremi d'Arids*), also involving some scientific institutions, to promote and develop best practices in extractive activities in Catalonia. A Best practice guide and a manual on restoration techniques for the areas used for extractive activities in the region have been published.

Agreements are also established between the regional government and the operators to define adequate mitigation measures and to improve the natural conditions in areas where extractive activities are developed. For instance, actions for the enhancement of habitats for endangered steppe birds have been implemented through such agreements in a SPA where important deposits of gravel are also under exploitation with special measures to avoid and mitigate the impacts.

References: *Case study provided by FdA - Federación de Áridos, (Aggregates Federation of Spain), 2008.*
Best practice guide (in Catalan) available at: http://www.gremiarids.com/pdf/GBP.pdf

Cooperation between a nature conservation association and a quarry operator in Belgium

***Exploitation*:** Limestone quarry
Country: Belgium
Targeted habitats/species: Dry grasslands
SCI/SPA: Devant-Bouvignes

Description:
The quarry, of 150 hectares, is located in the town of Dinant, in Leffe (southern Belgium), and is devoted to the production of limestone. The site is close to a natural reserve (Devant-Bouvignes) also classified as a Natura 2000 site since 2005. The area is rich in dry grasslands on limestone, with a high diversity of plants and insects.

The operator entrusted a nature protection association (Natagora) the management of a 35 hectare area located between the reserve area and the quarry. Their expertise enabled carrying out a project for the restoration and management of dry grasslands, which included sheep reintroduction into the area. The project was also financed by the European fund "LIFE-Nature" (project LIFE02 NAT/B/008593 Restoration and sustainable management of Upper Meuse dry grasslands).

Reference: *Mertens, D. (presentation) 2007. UEPG partnership with IUCN for Countdown 2010. High Level Conference on Business and Biodiversity, November 2007. Lisbon.*
See also:
http://www.mineralsday.eu/fileadmin/Downloads/Biodiversity_Case_Studies/Holcim_Granulats_Belgique__sheep_reintroduction_pdf

Cooperation between the Ministry of Environment and the German Ceramic Raw Materials Association

***Exploitation*:** Clay
Country: Germany
Targeted habitats/species: Yellow-bellied toad and crested newt

Description:
In May 2009, the German Ceramic Raw Materials Association "Bundesverband Keramische Rohstoffe e.V. (BKR)" and the Ministry of Environment, Agriculture and Forestry of Rhineland-Palatinate (Ministerium für Umwelt, Forsten und Verbraucherschutz in Rheinland-Pfalz) signed an agreement to protect Natura 2000 species.

The agreement acknowledges that extraction sites of ceramic raw materials are of particular interest for the national and European conservation, because suitable habitats for endangered species may result from the extraction of clay:

- Amphibians like the yellow-bellied toad and the natterjack toad benefit especially from the sparsely covered clay soils and the flat clayey midget waters during the active extraction.
- Other amphibians, like the tree frog etc., prefer more covered waters in temporarily reducing inactive stages and after ending the extraction activities.
- Bird Species like the eagle owl find good hatcheries in the structured rock faces.

The agreement aims to protect the yellow-bellied toad (Bombina variegata) and the crested newt (Triturus cristatus). It applies to the extraction sites (permitted sites) and sites for which extraction is planned (future extraction sites), which are located within and outside the designated Natura 2000 areas.

On extraction areas within Natura 2000 areas, the agreement supports the Natura 2000 assessment. Extraction on these sites is designed and carried out taking into account the maintenance and development of the target species.

In any case, mutual early information on projects and about new facts and insights as well as a mutual search of solutions in case of conflicts between the responsible Nature Conservation Agencies and the companies will be arranged.

Reference: Case study provided by IMA Europe.

ANNEX 3

Rulings of the European Court of Justice related to Nature and Biodiversity cases

Hereafter are included some excerpts of legal cases of the European Court of Justice concerning Article 6(3) and 6(4) of the Habitats Directive that are mentioned in the Guidance document and may be useful to understand the provisions of the Birds and Habitats Directives.

Detailed information on legal cases up to 2006 can also be found in the booklet "*Nature and Biodiversity Cases. Ruling of the European Court of Justice",* published by the European Commission in 2006 and available at:
http://ec.europa.eu/environment/nature/info/pubs/docs/others/ecj_rulings_en.pdf.

Case C-6/04. Commission of the European Communities v United Kingdom of Great Britain and Northern Ireland. *Failure of a Member State to fulfil obligations — Directive 92/43/EEC — Conservation of natural habitats — Wild fauna and flora*.

Summary of the Judgement

[…]
3. Environment – Conservation of natural habitats and of wild fauna and flora – Directive 92/43 – Special areas of conservation – Obligations of the Member States – Assessment of a project's implications for a site – Coming into being of the obligation to carry out an assessment (Council Directive 92/43, Art. 6(3)).

Article 6(3) of Directive 92/43 on the conservation of natural habitats and of wild fauna and flora makes the requirement for an appropriate assessment of the implications of a plan or project that is not directly connected with or necessary to the management of a site in a special area of conservation conditional on there being a probability or a risk that it will have a significant effect on the site concerned. In the light, in particular, of the precautionary principle, such a risk exists if it cannot be excluded on the basis of objective information that the plan or project will have a significant effect on the site concerned (see para 54).

Judgement (relevant excerpts)

[…]
52 According to the Commission, although land use plans do not as such authorise development and planning permission must be obtained for development projects in the normal manner, they have great influence on development decisions. Therefore land use plans must also be subject to appropriate assessment of their implications for the site concerned.
[…]
54 As to those submissions, the Court has already held that Article 6(3) of the Habitats Directive makes the requirement for an appropriate assessment of the implications of a plan or project conditional on there being a probability or a risk that it will have a significant effect on the site concerned. In the light, in particular, of the precautionary principle, such a risk exists if it cannot be excluded on the basis of objective information that the plan or project will have a significant effect on the site concerned (see, to this effect, Case C-127/02 Waddenvereniging and Vogelbeschermingsvereniging [2004] ECR I-7405, paragraphs 43 and 44).
[…]
56 It thus follows from the foregoing that, as a result of the failure to make land use plans subject to appropriate assessment of their implications for SACs, Article 6(3) and (4) of the Habitats Directive has not been transposed sufficiently clearly and precisely into United Kingdom law and, therefore, the action brought by the Commission must be held well founded in this regard.
[…]

117 As the Advocate General has rightly observed in points 132 and 133 of her Opinion, it is common ground between the parties that the United Kingdom exercises sovereign rights in its exclusive economic zone and on the continental shelf and that the Habitats Directive is to that extent applicable beyond the Member States' territorial waters. It follows that the directive must be implemented in that exclusive economic zone.
[…]

Full Judgement available at:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:62004J0006:EN:HTML

Case C-98/03. Commission of the European Communities v Federal Republic of Germany. *Failure of a Member State to fulfil obligations – Directive 92/43/EEC – Conservation of natural habitats – Wild fauna and flora – Assessment of the implications of certain projects on a protected site – Protection of species.*

Judgement (relevant excerpts)

[…]
31 The Commission complains that the Federal Republic of Germany has failed to fully transpose Article 6(3) and (4) of the Directive into its national law in so far as the definition of 'project', in Paragraph 10(1)(11)(b) and (c) of the BNatSchG 2002, which applies to projects undertaken outside the SACs, is too restrictive and excludes the duty to carry out an assessment of the implications of certain acts and other activities which are potentially harmful to protected sites.

32 As regards projects within the meaning of Paragraph 10(1)(11)(b) of the BNatSchG 2002, the Commission submits that since they include only acts affecting nature and the countryside, within the meaning of Paragraph 18, certain projects likely to have a significant effect on protected sites are not subject to a prior assessment of the implications for the site in accordance with Article 6(3) and (4) of the Directive. Paragraph 18(1) covers only changes of form or use of surface areas, but fails to take account of any other activities or measures which do not concern the surface area of a protected site or those which do not result in any change, even where they are likely to have a significant effect on such a site. In fact, the term 'project', within the meaning of Paragraph 10(1)(11)(b) of the BNatSchG 2002, which refers to acts carried out outside the SACs, is narrower than that in Paragraph 10(1)(11)(a), which concerns projects carried out within an SAC. In its definition of measures to be subject to an assessment of the implications, the Directive does not distinguish between measures taken outside or inside a protected site.

Full Judgement available at:
http://curia.europa.eu/jurisp/cgi-bin/gettext.pl?where=&lang=en&num=79939889C19030098&doc=T&ouvert=T&seance=ARRET

Case C-117/03. Società Italiana Dragaggi SpA and Others v Ministero delle Infrastrutture e dei Trasporti and Regione Autonoma del Friuli Venezia Giulia. *Reference for a preliminary ruling from the Consiglio di Stato - Directive 92/43/EEC – Conservation of natural habitats – Wild fauna and flora – National list of sites eligible for identification as sites of Community importance – Conservation measures.*

Summary of the Judgment

Environment – Conservation of natural habitats and of wild fauna and flora – Directive 92/43 – Special areas of conservation – Sites, included in the national lists, eligible for identification as sites of Community importance – Protective measures – Inapplicability of the measures prescribed in Article 6(2), (3) and (4) – Obligation on the Member States to safeguard their ecological interest (Council Directive 92/43, Arts 4(5), and 6(2),(3) and (4)).

On a proper construction of Article 4(5) of Directive 92/43 on the conservation of natural habitats and of wild fauna and flora, the protective measures prescribed in Article 6(2), (3) and (4) of that directive

are required only as regards sites which, in accordance with the third subparagraph of Article 4(2) of the directive, are on the list of sites selected as sites of Community importance adopted by the Commission in accordance with the procedure laid down in Article 21 of the directive. Consequently, those measures do not apply to the sites included in the national lists transmitted to the Commission pursuant to Article 4(1) of the directive.

However, by virtue of that directive, the Member States are required, as regards the latter sites, which are eligible for identification as sites of Community importance, and in particular as regards those hosting priority natural habitat types or priority species, to take protective measures that are appropriate, from the point of view of the directive's conservation objective, for the purpose of safeguarding the relevant ecological interest which those sites have at national level (see paras 21-22, 25, 28-30, operative part).

Full judgement available at:
http://curia.europa.eu/jurisp/cgi-bin/form.pl?lang=en&Submit=Submit&docrequire=alldocs&numaff=c-117/03

Case C-127/02. Landelijke Vereniging tot Behoud van de Waddenzee and Nederlandse Vereniging tot Bescherming van Vogels v Staatssecretaris van Landbouw, Natuurbeheer en Visserij. Reference for a preliminary ruling from the Raad van State. *Directive 92/43/EEC – Conservation of natural habitats and of wild flora and fauna – Concept of 'plan' or 'project' – Assessment of the implications of certain plans or projects for the protected site.*

Summary of the Judgment

[…]

3. Environment – Conservation of natural habitats and of wild fauna and flora – Directive 92/43 – Authorisation of a plan or project on the protected site – Conditions – Appropriate assessment of its implications – Identification of aspects which can affect the site's conservation objectives. (Council Directive 92/43, Art. 6(3), first sentence)

The first sentence of Article 6(3) of Directive 92/43 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that any plan or project not directly connected with or necessary to the management of the protected site is to be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives if it cannot be excluded, on the basis of objective information and, in particular, in the light of the characteristics and environmental conditions of that site, that it will have a significant effect on that site, either individually or in combination with other plans or projects. Such an assessment of the implications implies that, prior to the approval of the plan or project, all the aspects of the plan or project which can, by themselves or in combination with other plans or projects, affect the site's conservation objectives must be identified in the light of the best scientific knowledge in the field.

The competent national authorities, taking account of the appropriate assessment of the implications of the plan or project on the site concerned in the light of the site's conservation objectives, are to authorise that plan or project only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects (see para 45, 49, 61, operative part 3-4).

4. Environment – Conservation of natural habitats and of wild fauna and flora – Directive 92/43 – Failure to transpose – Determination by the national court of the lawfulness of an authorisation for a plan or project on the protected site – Whether permissible. (Council Directive 92/43, Art. 6(3))

Where a national court is called on to ascertain the lawfulness of an authorisation for a plan or project within the meaning of Article 6(3) of Directive 92/43 on the conservation of natural habitats and of wild fauna and flora, it can determine whether the limits on the discretion of the competent national authorities set by that provision have been complied with, even though it has not been transposed into the legal order of the Member State concerned despite the expiry of the time-limit laid down for that purpose. The effectiveness of Directive 92/43 would be weakened if, in such a case, individuals were

prevented from relying on it before their national courts, and if the latter were prevented from taking it into consideration (see para 66, 70, operative part 5).

Judgement

[…]

36 Authorisation of a plan or project granted in accordance with Article 6(3) of the Habitats Directive necessarily assumes that it is considered not likely adversely to affect the integrity of the site concerned and, consequently, not likely to give rise to deterioration or significant disturbances within the meaning of Article 6(2).

43 It follows that the first sentence of Article 6(3) of the Habitats Directive subordinates the requirement for an appropriate assessment of the implications of a plan or project to the condition that there be a probability or a risk that the latter will have significant effects on the site concerned.

44 In the light, in particular, of the precautionary principle, which is one of the foundations of the high level of protection pursued by Community policy on the environment, in accordance with the first subparagraph of Article 174(2) EC, and by reference to which the Habitats Directive must be interpreted, such a risk exists if it cannot be excluded on the basis of objective information that the plan or project will have significant effects on the site concerned (see, by analogy, inter alia Case C-180/96 United Kingdom v Commission [1998] ECR I-2265, paragraphs 50, 105 and 107). Such an interpretation of the condition to which the assessment of the implications of a plan or project for a specific site is subject, which implies that in case of doubt as to the absence of significant effects such an assessment must be carried out, makes it possible to ensure effectively that plans or projects which adversely affect the integrity of the site concerned are not authorised, and thereby contributes to achieving, in accordance with the third recital in the preamble to the Habitats Directive and Article 2(1) thereof, its main aim, namely, ensuring biodiversity through the conservation of natural habitats and of wild fauna and flora.

45 In the light of the foregoing, the answer to Question 3(a) must be that the first sentence of Article 6(3) of the Habitats Directive must be interpreted as meaning that any plan or project not directly connected with or necessary to the management of the site is to be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives if it cannot be excluded, on the basis of objective information, that it will have a significant effect on that site, either individually or in combination with other plans or projects.

[…]

48 Conversely, where such a plan or project is likely to undermine the conservation objectives of the site concerned, it must necessarily be considered likely to have a significant effect on the site. As the Commission in essence maintains, in assessing the potential effects of a plan or project, their significance must be established in the light, inter alia, of the characteristics and specific environmental conditions of the site concerned by that plan or project.

49 The answer to Question 3(b) must therefore be that, pursuant to the first sentence of Article 6(3) of the Habitats Directive, where a plan or project not directly connected with or necessary to the management of a site is likely to undermine the site's conservation objectives, it must be considered likely to have a significant effect on that site. The assessment of that risk must be made in the light inter alia of the characteristics and specific environmental conditions of the site concerned by such a plan or project.

[…]

54 Such an assessment therefore implies that all the aspects of the plan or project which can, either individually or in combination with other plans or projects, affect those objectives must be identified in the light of the best scientific knowledge in the field. Those objectives may, as is clear from Articles 3 and 4 of the Habitats Directive, in particular Article 4(4), be established on the basis, inter alia, of the importance of the sites for the maintenance or restoration at a favourable conservation status of a natural habitat type in Annex I to that directive or a species in Annex II thereto and for the coherence of Natura 2000, and of the threats of degradation or destruction to which they are exposed.

[…]

57 So, where doubt remains as to the absence of adverse effects on the integrity of the site linked to the plan or project being considered, the competent authority will have to refuse authorisation.

58 In this respect, it is clear that the authorisation criterion laid down in the second sentence of Article 6(3) of the Habitats Directive integrates the precautionary principle (see Case C-157/96 National Farmers' Union and Others [1998] ECR I-2211, paragraph 63) and makes it possible effectively to prevent adverse effects on the integrity of protected sites as the result of the plans or projects being considered. A less stringent authorisation criterion than that in question could not as effectively ensure the fulfilment of the objective of site protection intended under that provision.

59 Therefore, pursuant to Article 6(3) of the Habitats Directive, the competent national authorities, taking account of the conclusions of the appropriate assessment of the implications of mechanical cockle fishing for the site concerned, in the light of the site's conservation objectives, are to authorise such activity only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects (see, by analogy, Case C-236/01 Monsanto Agricoltura Italia and Others [2003] ECR I-0000, paragraphs 106 and 113).

Full Judgement available at:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:62002J0127:EN:HTML

Case C-201/02. The Queen on the application of Delena Wells v Secretary of State for Transport, Local Government and the Regions. *Reference for a preliminary ruling from the High Court of Justice of England and Wales, Queen's Bench Division (Administrative Court) - «Directive 85/337/EEC – Assessment of the effects of certain projects on the environment – National measure granting consent for mining operations without an environmental impact assessment being carried out – Direct effect of directives – Triangular situation*».

Summary of the Judgment

1. Environment – Assessment of the environmental effects of certain projects – Directive 85/337 – Obligation on the competent authorities to carry out an assessment before consent is granted – Meaning of consent for the purposes of Article 1(2) – Decision laying down new conditions for a project to resume mining operations – Included (Council Directive 85/337, Arts 1(2), 2(1) and 4(2)).

Article 2(1) of Directive 85/337 on the assessment of the effects of certain public and private projects on the environment — which provides that Member States are to adopt all measures necessary to ensure that, before consent is given, projects likely to have significant effects on the environment are made subject to an assessment with regard to their effects — read in conjunction with Article 4(2) of that directive, is to be interpreted as meaning that, in the context of applying provisions such as section 22 of the Planning and Compensation Act 1991 and Schedule 2 to that Act, which lay down a special set of rules for old mining permissions, the decisions adopted by the competent authorities, whose effect is to permit the resumption of mining operations, comprise, as a whole, a development consent within the meaning of Article 1(2) of the directive, so that the competent authorities are obliged, where appropriate, to carry out an environmental impact assessment. In a consent procedure comprising several stages, that assessment must, in principle, be carried out as soon as it is possible to identify and assess all the effects which the project may have on the environment (see para 42, 53, operative part 1).
[…]

Judgement

[…]

20 In 1947 an old mining permission was granted for Conygar Quarry by interim development order under the Town and Country Planning (General Interim Development) Order 1946.

21 […] In June 1991 operations recommenced for a short period.

22 The site is recognised to be environmentally extremely sensitive. The area in or adjacent to which the quarry lies is subject to several designations of nature and environmental conservation importance.

23 At the beginning of 1991, the owners of Conygar Quarry applied to the competent MPA for registration of the old mining permission under the Planning and Compensation Act 1991.
[…]
26 After the MPA, by decision of 22 December 1994, had imposed more stringent conditions than those submitted by the owners of Conygar Quarry, the latter exercised their right of appeal to the Secretary of State.

27 By decision of 25 June 1997 (hereinafter, together with the decision of 22 December 1994, the decision determining new conditions), the Secretary of State imposed 54 planning conditions, leaving some matters to be decided by the competent MPA.

28 Those matters were approved by the competent MPA by decision of 8 July 1999 (hereinafter the decision approving matters reserved by the new conditions).

29 Neither the Secretary of State nor the competent MPA examined whether it was necessary to carry out an environmental impact assessment pursuant to Directive 85/337. At no time was a formal environmental statement considered.
[…]

50 As provided in Article 2(1) of Directive 85/337, the environmental impact assessment must be carried out before consent is given.

51 According to the first recital in the preamble to the directive, the competent authority is to take account of the environmental effects of the project in question at the earliest possible stage in the decision-making process.

52 Accordingly, where national law provides that the consent procedure is to be carried out in several stages, one involving a principal decision and the other involving an implementing decision which cannot extend beyond the parameters set by the principal decision, the effects which the project may have on the environment must be identified and assessed at the time of the procedure relating to the principal decision. It is only if those effects are not identifiable until the time of the procedure relating to the implementing decision that the assessment should be carried out in the course of that procedure.

53 The answer to the first two questions must therefore be that Article 2(1) of Directive 85/337, read in conjunction with Article 4(2) thereof, is to be interpreted as meaning that, in the context of applying provisions such as section 22 of the Planning and Compensation Act 1991 and Schedule 2 to that Act, the decisions adopted by the competent authorities, whose effect is to permit the resumption of mining operations, comprise, as a whole, a development consent within the meaning of Article 1(2) of that directive, so that the competent authorities are obliged, where appropriate, to carry out an assessment of the environmental effects of such operations. In a consent procedure comprising several stages, that assessment must, in principle, be carried out as soon as it is possible to identify and assess all the effects which the project may have on the environment.
[…]

Full Judgement available at:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:62002J0201:EN:HTML

Case C-226/08: Stadt Papenburg v Bundesrepublik Deutschland**.** *Directive 92/43/EEC* — Conservation of natural habitats and of wild fauna and flora - Articles 2(3), 4(2) and 6(3) and (4) of Council Directive 92/43/EEC as amended by Council Directive 2006/105/EC of 20 November 2006 (OJ 2006 L 363, p. 368).

Judgment

[…]

The dispute in the main proceedings and the questions referred for a preliminary ruling

10. Papenburg is a port town in Lower Saxony on the river Ems, where there is a shipyard.

11. In order to enable ships with a draught of 7.3 metres to navigate between the shipyard and the North Sea, the Ems must be deepened by means of 'required dredging operations'. By a decision of 31 May 1994 of the Wasser und Schifffahrtsdirektion Nordwest (Waterways and Navigation Directorate for the North-West Region), Stadt Papenburg, Landkreis Emsland (the district of Emsland) and the Wasser und Schifffahrtsamt Emden (Emden Waterways and Navigation Office) were granted permission to dredge that river, where required. That decision is definitive and means, in accordance with German law, that future 'required dredging operations' are considered to have been granted permission.

[…]

15. According to Stadt Papenburg, as a seaport with a shipyard its planning and investments and its economic development depend on the Ems remaining navigable for large seagoing ships. It fears that, if the Lower Ems and Outer Ems were included in the list of SCIs, the dredging operations required for that purpose would in future, and in every case, have to undergo the assessment provided for in Article 6(3) and (4) of the Habitats Directive.

[…]

The questions referred for a preliminary ruling

[…]

Fifth question

35 By its fifth question, the referring court asks, in essence, whether ongoing maintenance works in respect of the navigable channel of the estuary at issue in the main proceedings, which are not directly connected with or necessary to the management of the site and which were already authorised under national law before the expiry of the time-limit for transposing the Habitats Directive, must, to the extent that they are likely to have a significant effect on the site concerned, undergo an assessment of their implications for the site pursuant to Article 6(3) and (4) of the Habitats Directive where they are continued after inclusion of the site in the list of SCIs pursuant to the third subparagraph of Article 4(2) of that directive.

[…]

39. An activity consisting of dredging works in respect of a navigable channel may be covered by the concept of 'project' within the meaning of the second indent of Article 1(2) of Directive 85/337, which refers to 'other interventions in the natural surroundings and landscape including those involving the extraction of mineral resources'.

40. Therefore, such an activity may be considered to be covered by the concept of 'project' in Article 6(3) of the Habitats Directive.

41. Next, the fact that that activity has been definitively authorised under national law before the expiry of the time-limit for transposition of the Habitats Directive does not constitute, in itself, an obstacle to regarding it, at the time of each intervention in the navigable channel, as a distinct project for the purposes of the Habitats Directive.

[...]

47. Finally, if, having regard in particular to the regularity or nature of the maintenance works at issue in the main proceedings or the conditions under which they are carried out, they can be regarded as constituting a single operation, in particular where they are designed to maintain the navigable channel at a certain depth by means of regular dredging necessary for that purpose, those

maintenance works can be considered to be one and the same project for the purposes of Article 6(3) of the Habitats Directive

50. In the light of the above, the answer to the fifth question is that Article 6(3) and (4) of the Habitats Directive must be interpreted as meaning that ongoing maintenance works in respect of the navigable channels of estuaries, which are not connected with or necessary to the management of the site and which were already authorised under national law before the expiry of the time-limit for transposing the Habitats Directive, must, to the extent that they constitute a project and are likely to have a significant effect on the site concerned, undergo an assessment of their implications for that site pursuant to those provisions where they are continued after inclusion of the site in the list of SCIs pursuant to the third subparagraph of Article 4(2) of that directive.

51. If, having regard in particular to the regularity or nature of those works or the conditions under which they are carried out, they can be regarded as constituting a single operation, in particular where they are designed to maintain the navigable channel at a certain depth by means of regular dredging necessary for that purpose, the maintenance works can be considered to be one and the same project for the purposes of Article 6(3) of the Habitats Directive.
[...]

On those grounds, the Court (Second Chamber) hereby rules:
[…]
2. Article 6(3) and (4) of Directive 92/43, as amended by Directive 2006/105, must be interpreted as meaning that ongoing maintenance works in respect of the navigable channels of estuaries, which are not connected with or necessary to the management of the site and which were already authorised under national law before the expiry of the time-limit for transposing Directive 92/43, as amended by Directive 2006/105, must, to the extent that they constitute a project and are likely to have a significant effect on the site concerned, undergo an assessment of their implications for that site pursuant to those provisions where they are continued after inclusion of the site in the list of sites of Community importance pursuant to the third subparagraph of Article 4(2) of that directive.

If, having regard in particular to the regularity or nature of those works or the conditions under which they are carried out, they can be regarded as constituting a single operation, in particular where they are designed to maintain the navigable channel at a certain depth by means of regular dredging necessary for that purpose, the maintenance works can be considered to be one and the same project for the purposes of Article 6(3) of Directive 92/43, as amended by Directive 2006/105.

Full Judgement available at:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:62008J0226:EN:HTML

Case C-239/04: Commission of the European Communities v Portuguese Republic. *Failure of a Member State to fulfil obligations – Directive 92/43/EEC – Conservation of natural habitats and of wild fauna and flora – Article 6(4) – Castro Verde special protection area – Lack of alternative solutions.*

Summary of the Judgment

[…]
2. Environment – Conservation of natural habitats and of wild fauna and flora – Directive 92/43 – Special protection areas. (Council Directive 92/43, Art. 6(3) and (4))

Article 6(4) of Directive 92/43 on the conservation of natural habitats and of wild fauna and flora, which permits a plan or project which has given rise to a negative assessment under the first sentence of the same directive to be implemented on certain conditions, must, as a derogation from the criterion for authorisation laid down in the second sentence of Article 6(3), be interpreted strictly. Thus, the implementation of a plan or project under Article 6(4) of that directive is, inter alia, subject to the condition that the absence of alternative solutions be demonstrated. It follows that, where a Member State implements a project notwithstanding the negative environmental impact assessment and without having demonstrated the absence of alternative solutions, it fails to fulfil its obligations under Article 6(4) of Directive 92/43 (see para 35-36, 40).
[…]

Judgement

[…]

34 Article 6(4) of the Habitats Directive provides that, if, in spite of a negative assessment carried out pursuant to the first sentence of Article 6(3) and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, the Member State is to take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected.

35 That provision, which permits a plan or project which has given rise to a negative assessment under the first sentence of Article 6(3) of the Habitats Directive to be implemented on certain conditions, must, as a derogation from the criterion for authorisation laid down in the second sentence of Article 6(3), be interpreted strictly.

36 Thus, the implementation of a plan or project under Article 6(4) of the Habitats Directive is, inter alia, subject to the condition that the absence of alternative solutions be demonstrated.

[…]

Full Judgement available at:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:62004J0239:EN:HTML

Case C-244/05. Bund Naturschutz in Bayern eV and Others v Freistaat Bayern. *Reference for a preliminary ruling from the Bayerischer Verwaltungsgerichtshof - Conservation of natural habitats and of wild fauna and flora – Directive 92/43/EEC – Protection regime before the inclusion of a habitat in the list of sites of Community importance.*

Summary of the Judgment

Environment – Conservation of natural habitats and of wild fauna and flora – Directive 92/43 – Special areas of conservation (Council Directive 92/43, Arts 3(1) and 4(1)).

Before a site is placed on the list of sites of Community importance adopted by the Commission in accordance with Article 4(2) of Directive 92/43 on the conservation of natural habitats and of wild fauna and flora, Member States must take appropriate protective measures in order to maintain the ecological characteristics of the sites which appear on the national list transmitted to the Commission under Article 4(1) of that directive.

That appropriate protection scheme not only requires Member States not to authorise interventions which incur the risk of seriously compromising the ecological characteristics of those sites, but also to take, in accordance with the provisions of national law, all the measures necessary to avoid such interventions.

[…]

Judgement

[…]

25 In those circumstances, the Bayerischer Verwaltungsgerichtshof (Administrative Court, Bavaria) (Germany) […] decided to stay the proceedings and to refer the following questions to the Court of Justice for a preliminary ruling:

‘(1) What protection regime is required under Article 3(1) of Directive 92/43 in conjunction with the sixth recital in the preamble to that Directive in the light of the prohibition of any measure that might jeopardise the attainment of the objectives of the Treaty laid down in the second paragraph of Article 10 EC, as a result of the judgment of the Court of 13 January 2005 in Case C-117/03 in respect of sites which could be designated sites of Community importance, particularly those with priority natural habitat types or priority species, before they appear in the list of sites of Community importance adopted by the Commission of the European Communities under the procedure provided for in Article 21 of the Directive?

(2) What is the effect on that protection regime if those sites already appear in the national list submitted to the Commission under Article 4(1) of Directive 92/43?
[…]
44 Having regard to the foregoing considerations, the Member States must, as regards the sites identified with a view to their inclusion on the Community list, take appropriate protective measures in order to maintain the ecological characteristics of those sites.

45 In that regard, it must be remembered that, in accordance with the first part of Annexe III to the Directive, the ecological characteristics of a site identified by the competent national authorities must reflect the assessment criteria which are listed there, namely, the degree of representativity of the habitat type, its area, its structure and functions, the size and density of the population of the species present on the site, the features of the habitat which are important for the species concerned, the degree of isolation of the population present on the site and the value of the site for conservation of the habitat type and species concerned.

46 Member States cannot therefore authorise interventions which may pose the risk of seriously compromising the ecological characteristics of a site, as defined by those criteria. This is particularly the case when an intervention poses the risk either of significantly reducing the area of a site, or of leading to the disappearance of priority species present on the site, or, finally, of having as an outcome the destruction of the site or the destruction of its representative characteristics.

47 The answer to the first and second questions must therefore be that the appropriate protection scheme applicable to the sites which appear on a national list transmitted to the Commission under Article 4(1) of the Directive requires Member States not to authorise interventions which incur the risk of seriously compromising the ecological characteristics of those sites.

Full Judgement available at:
http://curia.europa.eu/jurisp/cgi-bin/form.pl?lang=en&alljur=alljur&jurcdj=jurcdj&jurtpi=jurtpi&jurtfp=jurtfp&numaff=C-244/05&nomusuel=&docnodecision=docnodecision&allcommjo=allcommjo&affint=affint&affclose=affclose&alldocrec=alldocrec&docor=docor&docav=docav&docsom=docsom&docinf=docinf&alldocnorec=alldocnorec&docnoor=docnoor&radtypeord=on&newform=newform&docj=docj&docop=docop&docnoj=docnoj&typeord=ALL&domaine=&mots=&resmax=100&Submit=Rechercher

Case C-371/98. Judgment of the Court of 7 November 2000. - The Queen v Secretary of State for the Environment, Transport and the Regions, ex parte First Corporate Shipping Ltd, interveners: World Wide Fund for Nature UK (WWF) and Avon Wildlife Trust. - *Reference for a preliminary ruling: High Court of Justice (England & Wales), Queen's Bench Division (Divisional Court) - United Kingdom. - Directive 92/43/EEC - Conservation of natural habitats and of wild fauna and flora - Definition of the boundaries of sites eligible for designation as special areas of conservation - Discretion of the Member States - Economic and social considerations - Severn Estuary.*

[…]
The main proceedings and the question referred for a preliminary ruling

11 […] The High Court of Justice stayed proceedings and referred the following question to the Court for a preliminary ruling:
Is a Member State entitled or obliged to take account of the considerations laid down in Article 2(3) of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (OJ 1992 L 206, p. 7), namely, economic, social and cultural requirements and regional and local characteristics, when deciding which sites to propose to the Commission pursuant to Article 4(1) of that Directive and/or in defining the boundaries of such sites?

The question referred for a preliminary ruling:
[…]
16 It follows that Article 4(1) of the Habitats Directive does not as such provide for requirements other than those relating to the conservation of natural habitats and of wild fauna and flora to be taken into

account when choosing, and defining the boundaries of, the sites to be proposed to the Commission as eligible for identification as sites of Community importance.
[…]
25 The answer to the national court's question must therefore be that, on a proper construction of Article 4(1) of the Habitats Directive, a Member State may not take account of economic, social and cultural requirements or regional and local characteristics, as mentioned in Article 2(3) of that directive, when selecting and defining the boundaries of the sites to be proposed to the Commission as eligible for identification as sites of Community importance.
[…]

Full judgement available at:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:61998J0371:EN:HTML

Case C-374/98: Judgment of the Court (Sixth Chamber) of 7 December 2000. - Commission of the European Communities v French Republic. *Failure of Member State to fulfil its obligations - Directives 79/409/EEC and 92/43/EEC - Conservation of wild birds - Special protection areas.*

Judgment

By application lodged at the Court Registry on 16 October 1998, the Commission of the European Communities brought an action under Article 169 of the EC Treaty (now Article 226 EC) for a declaration, first, that, by failing to classify the Basses Corbières site, France, as a special protection area ('SPA') for the conservation of certain species of birds listed in Annex I to Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (OJ 1979 L 103, p. 1; 'the birds directive') and of certain migratory species not listed in that Annex, and by also failing to adopt special conservation measures concerning their habitat, contrary to Article 4(1) and (2) of that directive, and, second, that, by failing to take appropriate steps in relation to the Basses Corbières to avoid disturbance of the species protected on that site and deterioration of their habitat likely to have a significant effect, as a result of the opening and working of limestone quarries within the municipalities of Tautavel and Vingrau, France, contrary to Article 6(2) to (4) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ 1992 L 206, p. 7; 'the habitats directive'), the French Republic has failed to fulfil its obligations under the EC Treaty.
[…]

The disturbance and deterioration caused by the limestone quarries of Vingrau and Tautavel
[…]
44 In that respect, it is important to note that the text of Article 7 of the habitats directive expressly states that Article 6(2) to (4) of the directive apply, in substitution for the first sentence of Article 4(4) of the birds directive, to the areas classified under Article 4(1) or (2) of the latter directive.

45 It follows that, on a literal interpretation of that passage of Article 7 of the habitats directive, only areas classified as SPAs fall under the influence of Article 6(2) to (4) of that directive.
[…]
47 It is clear, therefore, that areas which have not been classified as SPAs but should have been so classified continue to fall under the regime governed by the first sentence of Article 4(4) of the birds directive.
[…]

Full Judgement available at:
http://curia.europa.eu/jurisp/cgi-bin/form.pl?lang=en&alljur=alljur&jurcdj=jurcdj&jurtpi=jurtpi&jurtfp=jurtfp&numaff=C-374/98&nomusuel=&docnodecision=docnodecision&allcommjo=allcommjo&affint=affint&affclose=affclose&alldocrec=alldocrec&docor=docor&docav=docav&docsom=docsom&docinf=docinf&alldocnorec=alldocnorec&docnoor=docnoor&radtypeord=on&newform=newform&docj=docj&docop=docop&docnoj=docnoj&typeord=ALL&domaine=&mots=&resmax=100&Submit=Rechercher

ANNEX 4

List of guidelines and relevant documents for NEEI plans and projects assessments

There is a great deal of published material on the impacts of mining on biodiversity and natural ecosystems. Below, a non exhaustive list of guidelines that may be relevant for non-energy extractive activities is provided.

These examples aim to provide information that may be useful to the assessment of NEEI plans and projects. The European Commission does not necessarily share the views reflected in all these publications.

International organizations and NEEI

Good Practice Guidance for Mining and Biodiversity. 2006. International Council on Mining and Metals (ICMM).

This Guidance provides the mining industry with an outline of the steps required to improve biodiversity management throughout the mine cycle. It is intended to be helpful to mining professionals and specialists.

A review of biodiversity conservation performance measures. 2006. Earthwatch Institute/Rio Tinto.

The report summarises and reviews the key considerations in biodiversity conservation performance measurement,

Global Reporting Initiative (GRI) Mining and Metals Sector Supplement. Pilot Version 1.0. Incorporating an abridged version of the GRI 2002 Sustainability Reporting Guidelines. 2005. Global Reporting Initiative.

The GRI Guidelines are a framework for reporting on economic, environmental, and social performance.

Baltic Marine Environment Protection Commission - HELCOM, Helsinki (1999) Marine Sediment Extraction in the Baltic Sea - Status report. Series: Baltic Sea environment proceedings, ISSN 0357-2994 ; 76.

ICES Guidelines for the management of marine sediment extraction. Annex 10 of the report of the Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem, Ostend, Belgium, April 2003.

Mining and critical ecosystems: mapping the risks. 2003. World Research Institute.

This study provides indicators for ecosystems and communities that are vulnerable to the negative impacts of mining. It is intended to be used by financial institutions and insurance companies as a method of assessing environmentally and/or socially vulnerable areas to mining.

Extractive Industries in Arid and Semi-Arid Zones: Environmental Planning and Management. 2003. The World Conservation Union (IUCN) and United Nations Convention to Combat Desertification (UNCCD).

This publication aims to contribute to planning and management approaches that minimise land degradation and desertification in arid and semi-arid zones as a result of the operation of extractive industries.

Room to Manoeuvre? Mining, biodiversity and protected areas. 2003. Mining, Minerals, and Sustainable Development Project (MMSD), International Institute for Environment and Development (IIED).

This paper provides a brief analysis of some of the dilemmas surrounding the issue of whether or not to mine in or around areas of valuable biodiversity.

Sustaining a natural balance: A practical guide to integrating biodiversity into Rio Tinto's operational activities. 2002. Rio Tinto.

The guidance is designed to help Rio Tinto staff evaluate, assess and manage biodiversity issues on their sites.

Guidelines for mining and sustainable development. 2002. United Nations.

These Guidelines address mining and sustainable development; regulatory frameworks; environmental management; voluntary undertakings; and community consultation and development; as applied to all stages of a mining operation. It also includes a section on small-scale and artisanal mining.

To Dig or Not to Dig? Criteria for determining the acceptability of mineral exploration, extraction and transport from ecological and social perspectives. 2001. World Wide Fund for Nature (WWF).

The paper describes criteria and indicators for helping to make decisions about the suitability of prospecting for, extracting, transporting, processing and disposing of oil and other minerals in sensitive environments.

Environmental Guidelines for Mining Operations. 1998. United Nations Department of Economic and Social Affairs (UNDESA), UNEP.

These guidelines present recent examples of sound environmental management practices and regulations from various mining countries worldwide and are designed to assist government and industry, from both developing and developed countries, encourage sustainable mining practices.

Habitat Creation Handbook for the Minerals Industry. 2003. RSPB (Graham White and Jo Gilbert Eds.)

A practical guide to the creation of priority Biodiversity Action Plan habitats on mineral workings. Guidelines Cover sand and gravel, clay, soft and hard rock quarries and opencast coal. It aims to provide a reference for the process of planning habitat creation and presents the latest ideas and methodology for the creation of priority habitats appropriate for mineral extraction sites. Also shows practical management and restoration experience through case studies.

<u>European Commission</u>

Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC. 2007. EC.

The document provides clarification of the concepts of: Alternative solutions, Imperative Reasons of Overriding Public Interest, Compensatory Measures, Overall Coherence, Opinion of the Commission. 2007. EC

Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC. 2007. EC

The essential focus of this document is on the main obligations under Articles 12 and 16 of Directive 92/43/EEC, which establish a system of strict protection for the animal species listed in Annex IV(a), but allow for derogation from these provisions under defined conditions.

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. 2001. EC

This document provides non mandatory methodological help to carry out or review the assessments required under Article 6(3) and (4) of the habitats directive. These assessments are required where a project or plan may give rise to significant effects upon a Natura 2000 site.

Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. 2000. EC

This document provides interpretations of the provisions of Article 6.

Belgium

Guide pratique de la législation wallone sur les carrières et leurs dépendaces. Ministère de la Région Wallonne.

This guide presents the Wallonian legislation on quarrying.

Good Environmental Practice in the European Extractive Industry: A Reference Guide. 2002. Centre Pierre & Terre, Belgium.

This document presents case studies illustrating a number of good practices employed in the extractive industry.

Finland

Mine Closure Handbook*.* 2008. P. M. Heikkinen (ed.) *et all.* Publishers : Geological Survey of Finland (GTK), Technical Research Center of Finland (VTT), Outokumpu Oyj, Finnish Road Enterprise, and Soil and Water Ltd.

The purpose of this handbook is to provide mine operators, regulatory authorities and industry consultants with guidelines relating to planning and implementation of mine closure strategies.

Exploration and Mining in Finland's Protected Areas, the Sami Homeland and the Reindeer Herding Area*.* 2007. Ministry of Trade and Industry.

This guide describes the conditions for exploration in Finland's protected areas.

France

Guide Méthodologique pour l'évaluation des incidences des projets de carrières sur les sites Natura 2000. Melki, F. 2007. Biotope.

The guide aims to help operators to implement an evaluation of the impact of their operations on environment. It also aims to facilitate the dialogue between stakeholders and to develop sustainable practices.

Guide de bonnes pratiques. Aide à la prise en compte du paysage dans les études d'impact des carrières et du milieu naturel en Provence-Alpes-Côte d'Azur. Tomes 1

and 2. 2006. Direction Régionale de l'Environnement PACA et Direction Régionale de l'Industrie, de la Recherche et de l'Environnement PACA.

Technical guide devoted to the consideration of landscape and natural environment in the impact assessment of quarries in the Provence-Alpes-Côte d'Azur region.

Granulats en Ile-de-France: Mieux prendre en compte la ressource en matériaux dans les documents d'urbanisme. 2005. DRIRE Ile-de-France, France.

The guide aims to provide policy makers with elements to consider the raw material resources and extractive activities in urban planning.

Aménagement écologique des carrières en eaux. Guide pratique. Dasnias, P (Écosphère). 2002. Charte UNPG, Paris.

The objective of the guide is to provide technical assistance and to describe the ecological bases for the ecological recovery of quarries in alluvial environments and on rocky areas, which offer opportunities for the creation of wetlands.

Spain

Gestión de residuos en explotaciones mineras. 2008. ANEFA – Asociación Nacional de Empresarios Fabricantes de Áridos (Luaces, C. et al.). Gobierno de La Rioja.

This guide of good practices that can be carried out in this industry sector can help minimize the impacts on the environment of waste management in extraction sites, illustrated with real examples.

Buenas prácticas medioambientales en explotaciones mineras. 2008. ANEFA – Asociación Nacional de Empresarios Fabricantes de Áridos (Luaces, C. et al.). Gobierno de Aragón.

This guide provides some recommendations that may help in the restoration of open pit quarries, taking into account all variables necessary to ensure the success of the action.

Guia de bones pràctiques ambientals a les activitats extractives de Catalunya. 2008. Gremi d'Àrids de Catalunya.

This guide of good practices can help minimize the impacts of quarrying on the environment. The professional sector will find details on good practices that can be carried out in this industry sector, illustrated with real examples, as well as proposals for future actions to move forward on the path of sustainability.

Manual de Restauración de Explotaciones Mineras a Cielo Abierto de Aragón. ANEFA – Asociación Nacional de Empresarios Fabricantes de Áridos (Luaces, C. *et al*.). 2007. Gobierno de Aragón

This guide provides some recommendations that may help in the restoration of open pit quarries, taking into account all variables necessary to ensure the success of the action.

Explotaciones de áridos y medio ambiente. 2003. ANEFA – Asociación Nacional de Empresarios Fabricantes de Áridos (Luaces, C. *et al*.). 2003. Generalitat Valenciana.

The environmental good practices with real examples of application are a tool for the aggregates companies to achieve sustainable development objectives.

Guía de Buenas Prácticas Medioambientales en la Industria Extractiva Europea. Aplicación al Caso Español. (Luaces, C. *et al*.) 2002. Dirección General de Política Energética y Minas, Ministerio de Economía.

This guide reviews environmental practices developed by the extractive industry at the different stages of the extraction process. It also deals with maintenance and rehabilitation of affected zones.

Recomendaciones Técnicas para la Restauración y Acondicionamiento de los Espacios Afectados por Actividades Extractivas. 1987. Departamento de Política Territorial y Obras Públicas. Generalitat de Catalunya.

This guide provides some recommendations for the restoration of those areas affected by extractive industries.

Manual para la Restauración de Canteras de Roca Caliza en Clima Mediterráneo. ECOQUARRY LIFE 04- ENV00195. 2007. Dirección General de Calidad Ambiental. Área de Evaluación y restauració de Actividades Extractivas. Generalitat de Catalunya

Practical guide that provides the best technology available and the quality control protocols for the limestone quarries restoration processes within the Mediterranean climate.

Sweden

Guidance for good environmental practice at prospecting in protected areas *(Vägledning för god miljöpraxis vid prospektering i skyddade omraden).* 2007. SveMin.

Guidance for mineral prospectors, but also for politicians and civil servants involved in permit-giving and monitoring of prospecting activities on the national, regional and municipality levels.

Guidance for Mineral Prospecting in Protected Areas (*Prospektering i skyddade områden*). 2006. Swedish Geological Survey and The Swedish Environmental Protection Agency (SEPA)

Guidance for mineral prospectors and civil servants, prepared with the support of the Mineral industry.

Natura 2000 in Sweden - manual with general guidelines */ Natura 2000 i Sverige-handbook med alläna rad - Naturvardsverket Handbok.* 2003. Swedish Environmental Protection Agency (SEPA).

General instructions and guidelines for practical implementation of the national legal framework related to the protection and management of Natura 2000.

Annex 3, headline Sweden: There is also a guidance made jointly by the Swedish Geological Survey and The Swedish Environmental Protection Agency with support by the industry as a government assignment. Please add a reference to this guidance:

Guidance for Mineral Prospecting in Protected Areas (Prospektering i skyddade områden), 2006, by the Swedish Geological Survey in cooperation with The Swedish Environmental Protection Agency (SEPA) and with support by the Mineral industry. The same subtext can be used, i e a guidance for prospectors and civil servants etc.

Switzerland

Carrières de roches dures. Guide pour la planification des sites d'exploitation. 2006. Editors : Office fédéral du développement territorial (ARE), Office fédéral de l'environnement (OFEV), Conférence suisse des aménagistes cantonaux (COSAC), Association suisse des carrières de roches dures (VSH). Commission géotechnique suisse (SGTK).

This guide is intended to hard rock exploitations and it addresses conflicts that may arise from such exploitations.

United Kingdom

A guide to minerals information in the central belt of Scotland. 2008. The British Geological Survey for the Scottish Government.

The guide focuses on mineral information within the central belt of Scotland.

The Appropriate Assessment of Spatial Plans in England: a guide to why, when and how to do it. 2007. The Royal Society for the Protection of Birds (RSPB), Sandy, United Kingdom.

The RSPB have prepared this guide to set out their view on: when AA is or is not required; what the AA should examine; the level of detail required; and how to use the results of the AA as a key part of the plan-making process.

Planning for the protection of European sites: Appropriate Assessment. Guidance for Regional Spatial Strategies and Local Development Documents. *2006. South, G. Department for Communities and local government*.

This guide offers advice on how AA may be carried out as part of plan preparation and linked to the sustainability appraisal (SA) process. It is not a legal interpretation of the Habitats Directive.

Getting wetter for wildlife. Guidance on habitat restoration and creation by the Wetland HAP Steering Group. 2005. English Nature.

The purpose of this guidance is to increase and improve the sum of wetland achievement in the UK.

Habitat creation handbook for the minerals industry. 2003. The Royal Society for the Protection of Birds (RSPB).

The handbook provides best-practice advice for creating a wide range of different habitats.

Biodiversity and minerals – Extracting the benefits for wildlife. 1999. *English Nature, Quarry Products Association and Silica & Moulding Sands Association. Published by Entec UK Ltd.*

A guide to planning, operating, restoring and managing mineral sites for biodiversity. (http://www.mineralsandnature.org.uk/downloads/biod.pdf)

Australia

Guidelines for Management of Declared Rare Flora in Mineral Exploration and Mining. 2006. Department of Industry and Resources, Western Australia.

The guide details the management approach required by state legislation and regulation to ensure protection of rare flora.

Code of Practice for Exploration in Environmentally Sensitive Areas. 1995. The Chamber of Minerals and Energy of Western Australia.

This Code of Practice is intended to promote responsible land-use practices during mineral exploration so as to minimize environmental impacts and preserve future land use opportunities.

Marine extractive activities

Guidelines for the establishment of the Natura 2000 network in the marine environment. Application of the Habitats and Birds Directives. 2007. EC

The guide aims to explain the relevant legal and technical concepts needed to underpin the establishment of Natura 2000 throughout the marine area of application of the (79/409/EEC) Birds and (92/43/EEC) Habitats Directives. It covers both the inshore and offshore marine environments.

Aggregate Site Restoration and Enhancement: A policy review. 2004. Bellew, S. and Drable, R (eds.). Prepared by Emu Ltd. on behalf of the British Marine Aggregates Producers Association, The Crown Estate and English Nature.

This document has been prepared with the aim of stimulating debate on the feasibility and merits of undertaking restoration at marine aggregate dredging sites. Recommendations on approaches to the assessment of when, where and how to restore sites form a central theme of the document.

ICES Guidelines for the management of marine sediment extraction. Marine Habitat Committee. 2003. Report of the Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem, Annex 10.

Effects of Extraction of Marine Sediments on the Marine Environment 1998-2004.
Sutton, G. and Boyd, S. (eds.) 2009. ICES Cooperative Research Report no. 297, (180 pp.)

Marine Mineral Guidance 1: Extraction by dredging from the English seabed. 2002. Department for Communities and Local Government, UK.

Marine Mineral Guidance 1 (MMG1) provides a statement of the Government's policies on the extraction of marine sand and gravel and other minerals from the English seabed.

Marine Monitoring Handbook. 2001. Edited by Jon Davies (senior editor), John Baxter, Martin Bradley, David Connor, Janet Khan, Eleanor Murray, William Sanderson, Caroline Turnbull and Malcolm Vincent. Joint Nature Conservation Committee, UK.

This handbook addresses the principles behind, and the procedures for, monitoring Annex I habitats, and selected Annex II species, within marine SACs in British waters to assess their condition in accordance with the relevant requirements of the Directive and the UK's common standards for site monitoring.