

The Integration of Biodiversity into National Environmental Assessment Procedures

National Case Studies

United Kingdom

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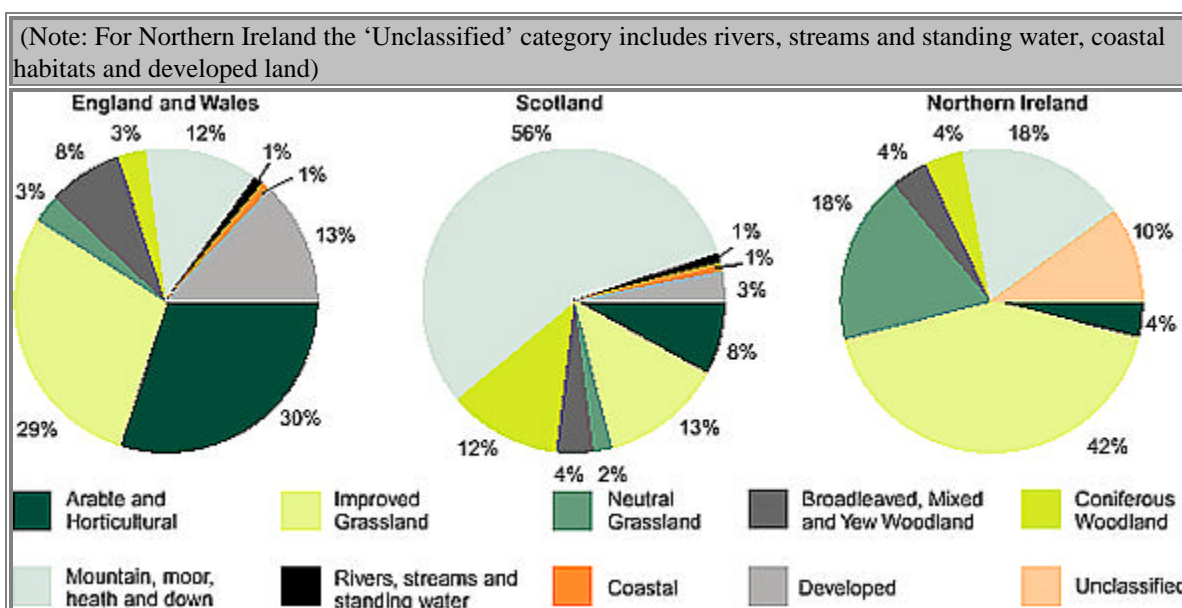
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13.1 Introduction

The UK is a collection of temperate offshore islands on the north-eastern Atlantic edge of Europe with a rich and characteristic biodiversity. Its geographical position, diverse geology, geomorphology, soils, and results of past human management (particularly traditional countryside management practices) has resulted in a great variety of landscapes and habitats, each with characteristic assemblages of plants and animals, within a small area (HMSO, 1994).

The main UK habitats are woodlands, heathlands, lowland grasslands, coastal areas (cliffs, estuaries, saltmarshes, sand dunes and shingle shorelines), marine, freshwater habitats (lakes and ponds, rivers and streams, canals and grazing marsh ditches), peatlands, uplands, farmland and urban areas. The areas occupied by major habitat types are summarised in Figure 1. See Annex 1 for more details.

Figure 1: Major habitat types in England and Wales, Scotland and Northern Ireland in 1998 (taken from DETR, 2000a).



Some UK habitats are internationally important as they represent a large proportion of the European or world resource, for example, blanket bog, salt marsh and wood pasture. Caledonian pinewood is arguably unique to the UK.

Most rare UK habitats are now rarer than they were 50 years ago – some dramatically so, eg chalk downland, reedbed, lowland wet grassland, ancient broad-leaved woodland and lowland heath. Many others have declined in extent, but retain viable areas. The few habitats that have increased are generally those of lower biodiversity importance eg arable farmland. Loss of habitat is the main cause of decline in the ranges and numbers of many UK species. All habitats in the UK have experienced reductions in quality over the last 50 years.

Although, UK biodiversity is well studied there is no comprehensive inventory of its plants and animals. More than 88,000 terrestrial species and an unknown, but very large, number of marine species occur in the UK– see Table 1.

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Table 1: Numbers of terrestrial and freshwater species in the UK compared with recent global estimates of described species in major groups (taken from HMSO, 1994)

Group	UK species	World species
Viruses	Unknown	>5,000
Bacteria	Unknown	>4,000
Protozoa	>20,000	>40,000
Algae	>20,000	>40,000
Lichens	1,500	>17,000
Fungi	>15,000	>40,000
Bryophytes	1000	>14,000
Pteridophytes	80	>12,000
Flowering plants	1,400	>250,000
Non-arthropod invertebrates	>3,000	>90,000
Insects	23,000	>>1,000,000
Arthropods other than insects	>3,000	>190,000
Fish	38	>8,500
Amphibians	6	>4,000
Reptiles	6	>6,500
Breeding birds	210	9,900
Wintering birds	180	-
Mammals	48	4,300
TOTAL	>88,000	>>1,770,000

Most of the UK's species are not currently at risk from extinction. The UK has relatively few endemic species. As far as is known the UK has 14 endemic species of lichens, 14 endemic species of bryophytes, one endemic species of fern, 21 endemic species of flowering plants, 16 endemic species of invertebrates, and one endemic species of bird (Wynne *et al.*, 1995).

Many species, although not confined to the UK, occur in the UK in internationally significant numbers. For example, the UK, for a least some of the year, holds a high proportion of the world population of *Hyacinthoides non-scripta* (bluebell) (>20% of the world population), *Leiostryla anglica* (a snail) (70% of the world population), *Halichoerus grypus* (grey seal) (55% of the world population), and *Stercorarius skua* (great skua) (60% of the world population).

About 9.6% of the total land area of the UK¹ is within protected areas of national importance for flora, fauna, geological or physiographical features (Sites of Special Scientific Interest (SSSIs) or Areas of Special Scientific Interest (ASSIs) in Northern Ireland). Some of these areas have also been designated as areas of international importance – Ramsar sites designated under the International Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) and candidate Special Areas of Conservation (cSACs) and Special Protection Areas (SPAs) designated under the European legislation². Together SACs and SPAs form the EU Natura 2000 network of sites designed to promote the conservation of habitats, wild animals and plants, both on land and sea. Protected areas in the UK are summarised in Table 2.

Table 2: Protected areas in the UK as at 31 March 2001 (adapted from DETR, 2000b)

Status	¹ Number	Area ('000ha)	% UK land area
<i>Statutory</i>			
National Nature Reserves	383	220	0.90
Local Nature Reserves	² 718	44	0.18

¹ UK total land area is 24, 495,000 ha/242,910 sq km.

² EC Directive on the Conservation of Wild Birds 1979 (79/409/EEC) ("the Birds Directive") and EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora 1992 (92/43/EEC) ("the Habitats Directive").

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SSSIs	²	6,545	2,268	9.26
ASSIs	³	174	86	0.35
Marine Nature Reserves		3	19	0.08
SPAs		216	975	3.98
Ramsar sites	⁴	147	670	2.75
cSACs		340	1,766	7.21
<i>Non-statutory</i>				
Biosphere Reserves		13	44	0.18
Biogenetic Reserves		18	8	0.03

¹Some areas may be included in more than one category.

²Great Britain only.

³Northern Ireland only.

⁴Figure excludes sites classified in dependent territories.

The main threats to UK biodiversity are habitat loss, pollution, drainage, disturbance, neglect, agriculture intensification, over-exploitation (particularly of fisheries) and the introduction of non-native species. Key development threats include mineral extraction, road construction and house building. Other threats include coastal development such as port development, wind farms and infrastructure works. Threats to UK biodiversity are discussed in more detail in section 3.

13.2 National Biodiversity Strategy and Action Plan (NBSAP) or equivalent

In the UK, as elsewhere around the world, implementation of the obligations of the Convention on Biological Diversity (CBD) has focused on the requirement to produce and implement a national biodiversity plan. The UK was one of the first countries to produce a national plan.

In January 1994, following consultation with a range of interest groups, including voluntary conservation organisations, the UK Government published *Biodiversity the UK Action Plan* (UK BAP) (HMSO, 1994). This included the overall goal:

‘To conserve and enhance biological diversity within the UK and to contribute to the conservation of global biodiversity through all appropriate mechanisms’.

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The overall goal is developed through six underlying principles:

- ❑ Where biological resources are used, such use should be sustainable
- ❑ Wise use should be ensured for non-renewable resources
- ❑ The conservation of biodiversity requires the care and involvement of individuals and communities as well as Government processes
- ❑ Conservation of biodiversity should be an integral part of Government programmes, policy and action
- ❑ Conservation practice and policy should be based upon a sound knowledge base
- ❑ The precautionary principle should guide decisions (HMSO, 1994).

The UK BAP was significantly influenced by the work of Biodiversity Challenge, a coalition of six UK voluntary conservation bodies. This group produced the discussion document *Biodiversity Challenge: an agenda for conservation in the UK* in 1993. This document was produced to aid the UK Government in the production of the UK BAP. It advocated the adoption of an approach to biodiversity conservation based on a clear focus on biological outcomes, ie what needed to be achieved for species in terms of numbers and range and for habitats in terms of extent and quality. It argued for the development of specific species and habitat action plans. A second edition was published in 1995 (Wynne *et al*, 1995).

UK BAP Objectives for conserving biodiversity

1. To conserve and, where practicable, to enhance:
 - a) The overall populations and natural ranges of native species and the quality and range of wildlife habitats and ecosystems.
 - b) Internationally important and threatened species, habitats and ecosystems.
 - c) Species, habitats and managed ecosystems that are characteristic of local areas.
 - d) The biodiversity of natural and semi-natural habitats where this has been diminished over recent past decades.
2. To increase public awareness of, and involvement in, conserving biodiversity.
3. To contribute to the conservation of biodiversity on a European and global scale.

(HM Government, 1994)

The UK BAP set out objectives (see above) and 59 broad targets and intentions for conserving and enhancing wild species and wildlife habitats, promoting public awareness and contributing to international nature conservation efforts. In addition the UK Government took the important step of establishing UK Steering Group to prepare a detailed programme of action to achieve the objectives of the UK plan including the development of Species and Habitat Action Plans. The UK Steering Group included representatives of a range of stakeholders including voluntary conservation organisations from Biodiversity Challenge.

The UK Steering Group (replaced by the UK Biodiversity Group (UKBG) in 1996) published its findings in December 1995 (HM Government, 1995a and b). These were endorsed by the Government in May 1996 (HM Government, 1996). An important element of the Steering Group report was the production of the first tranche of Species and Habitat Action Plans which require urgent conservation action (see below). These represent plans of action and specific targets for these species and habitats that have been agreed by a partnership including the UK government.

The UKBG has co-ordinated the UK biodiversity process, assisted by a Biodiversity Secretariat which is staffed by civil servants from the Department of Environment, Transport and the Regions (DETR). In recent years in response to devolution the role of encouraging biodiversity work is now the responsibility of the national governments and

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there are four country groups (England, Northern Ireland, Scotland and Welsh Biodiversity Groups). The UKBG has now become the UK Biodiversity Partnership..

The UKBG identified a provisional list of 1250 Species of Conservation Concern which fall in one or more of the following categories:

- ❑ Threatened endemic and other globally threatened species;
- ❑ Species where the UK has more than 25% of the world or appropriate biogeographical population;
- ❑ Species where numbers or range have declined by more than 25% in the last 25 years;
- ❑ In some instances where the species is found in fewer than 15 ten km squares in the UK; and
- ❑ Species which are listed in the EU Birds or Habitats Directives, the Berne, Bonn or CITES Conventions, or under national legislation (English Nature, 1998b).

Certain species within the list of Species of Conservation Concern have been classified as Priority Species. These are species that are globally threatened and/or species that are rapidly declining in the UK, ie by more than 50% in the last 25 years (English Nature, 1998b).

Key habitats have been identified based on the following criteria:

- ❑ Habitats for which the UK has international obligations,
- ❑ Habitats at risk, such as those which have had a high rate of decline over the last 20 years, or which are rare,
- ❑ Areas, particularly marine areas, which may be 'functionally critical' for organisms inhabiting wider areas (e.g. sea grass beds for spawning fish), and
- ❑ Areas important for key species (HM Government, 1995a).

Costed action plans (Habitat Action Plans (HAPs) and Species Action Plans (SAPs) have now been produced for all the 391 Priority Species and 45 priority habitat types (English Nature, 1998a & b, 1999a to d). The targets and proposals put forward in the plans are designed to be appropriate up to 2010.

Each SAP details the current status, current factors causing loss or decline, current action, action plan objectives and targets, and proposed action with lead agencies for the species in question. Each SAP has a "Lead Partner" to give a lead and provide guidance on carrying out activities in the proposed action plan work programme. The lead partner, who are also responsible for co-ordinating reporting, can be a voluntary conservation organisation.

Each HAP details the current status (physical and chemical, biological, and links with SAPs), current factors affecting the habitat, current action (legal status and management, research and guidance), proposed action with lead agencies (policy and legislation, site safeguard and management, advisory, international, monitoring and research, and communications and publicity), costings, and key references. Each HAP has a Lead Agency to co-ordinate implementation. All Lead Agencies are Government agencies. As well as these national level initiatives, the UK BAP is also being implemented through a series of local biodiversity action plans (LBAPs) for priority habitats and species. Various LBAPs, both at regional and local authority levels, are at different stages of preparation³.

Essential elements of the UK BAP

³ A database of LBAPs and relevant contacts is available from the UK Biodiversity Secretariat's website at <http://www.jncc.gov.uk/ukbg>.

- *Partnership* – involving statutory, voluntary, academic and business sectors nationally and locally;
- *Actions and targets* – addressing the priority biodiversity needs by establishing clear actions, measurable outcomes and accountability;
- *Policy integration* – recognising that significant shifts in policy are needed to reverse declining trends in UK biodiversity and to support sustainable development in all sectors of society;
- *Information* – recognising that sound science and knowledge should underpin decisions and that new approaches are needed to fill information gaps and understanding;
- *Public awareness* – recognising that the changes needed to maintain biodiversity in the long term must be supported by people's actions, attitudes and understanding (UKBG, 2001).

13.3 Progress with implementation of NBSAP or equivalent

Sustaining the Variety of Life: 5 years of the UK Biodiversity Action Plan, a report that discusses progress with implementation of the UK BAP, draws conclusions and makes recommendations for the future has just been published by the UKBG (UKBG, 2001 – available from <http://www.ukbap.org.uk>). Overall, the report concludes that there has been good progress with the UK BAP, but that there are significant challenges ahead and that the UK BAP now needs to move to a new phase – concentrating on implementation.

The report summarises key elements of progress:

- ❑ A unique and highly successful public/voluntary/private sector partnership established to take forward the UK BAP
- ❑ Drawing up of 391 individual SAPs and 45 individual HAPs for the species and habitats at most risk in the UK
- ❑ Progress was not known for 17 habitats and 199 species (because plans had only recently been completed) however, despite the short period for implementation, 33 priority species and 5 priority habitats are showing signs of recovery. 58 species and one habitat are thought to be stable.
- ❑ Preparation and implementation of around 160 LBAPs covering all of Scotland and Wales and the majority of England
- ❑ Major wildlife legislation in England and Wales – the first for nearly 20 years – which incorporates the CBD into domestic law
- ❑ Consultation in Scotland and Northern Ireland on proposals to improve the protection and management of nationally important designated sites
- ❑ A continued increase in active national and local biodiversity partnerships, eg 243 organisations are involved in 191 HAP/SAP Steering Groups
- ❑ Establishment of the National Biodiversity Network (NBN) Trust to provide a basis for the development of a web-based information source
- ❑ Public membership of ten leading biodiversity conservation organisations rose by 18% between 1995-2000, to a total of 4.99 million members

The report then notes that much more needs to be done – the directions set by the UK BAP need to be consolidated and reinforced. Key challenges are identified:

- ❑ To translate the effort of developing action plans into effective action on the ground – 43 priority species and one priority habitat are still reported to be in decline and the status of 17 habitats and 199 species is not known. There are problems obtaining sufficient information to assess the biological status of species/habitats and in securing resources.
- ❑ To increase efforts to make biodiversity a mainstream consideration in the policies and practices of all sectors – a start has been made to recognise the implications for

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biodiversity of policies and practices in central and local government, their agencies and larger companies. Effective integration across all sectors must be achieved if biodiversity is to be at the heart of sustainable development.

- ❑ To recognise, encourage and facilitate the contribution made by LBAPs.
- ❑ To build on the opportunities of internet technology to facilitate communication and make information available – the NBN is an essential tool for the collation and dissemination of biodiversity information.
- ❑ To ensure that our concepts of biodiversity do not stand still – increases in scientific understanding, the results of monitoring and review and appreciation of society's perceptions and attitudes should continue to influence our view of biodiversity priorities. Climate change will increasingly affect actions needed.

Key recommendations suggested to help meet these challenges include:

- ❑ Continue the targeted action plan approach, maintaining the impetus for implementation and identifying ways of improving efficiency and removing obstacles to action.
- ❑ Encourage expansion of LBAP coverage and develop effective mechanisms for LBAPs to report on their own goals and contribute to national goals.
- ❑ Press ahead with the development of the NBN and support the development of more comprehensive and up-to-date information sources and interactive reporting mechanisms for the whole biodiversity partnership.
- ❑ Ensure that the UK BAP retains a flexible and dynamic framework to respond to new knowledge and changing pressures.
- ❑ The roles of the UKBG and the Country Biodiversity Groups need to change following devolution of powers to Scottish, Welsh and Northern Ireland administrations to reinforce the importance of the Country Groups in identifying directions and policy instruments now more of the implementation of the UK BAP is at the country level.

The report stresses the need for integration of biodiversity obligations in to all sectors of economic and social activity and discusses the problems and potential for change in the agriculture, water and wetland management, forestry, development, coastal management and the marine environment sectors. However, despite this, there is no discussion of key tools such as policy appraisal, sustainability appraisal, strategic environmental assessment, and EIA, which could potentially facilitate the mainstreaming of biodiversity into decision-making at all levels.

In addition to the UKBG report, the Biodiversity Challenge group of voluntary conservation organisations has produced a report *Biodiversity Counts: delivering a better quality of life* (Avery *et al*, 2001, available from <http://www.biodiversity-challenge.org.uk>) which gives an independent assessment of progress with the UK BAP. This report supports much of what is said in the UKBG report and summarises the major constraints to conservation of habitats and species for which HAPs/SAPs have been produced (see Tables 3 and 4).

Table 3: Major constraints to habitat conservation (taken from Avery *et al*, 2001)

Constraint	No. of habitats for which the constraint is particularly significant
High-level agricultural policy	8
Lack of commitment to delivering BAP targets	8
Limitations of agri-environment schemes	7
Inadequate information/research	7
Inadequate controls on water management or remedial action	6

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Inadequate management on protected areas	5
Lack of habitat re-creation/recovery	5
Water pollution	4
Inadequate habitat protection or enforcement	2
Lack of resources for raising awareness or providing advice	2
Development planning failure	1
Lack of appropriate management of “abandoned” land	1
Forestry management	1
Failure to develop policies to support natural coastal erosion	1
Failure to influence other areas of policy (water policy)	1

The report stresses that the objectives of the UK BAP cannot be delivered by targeted species or habitat recovery work alone and that many of the threats identified in the action plans and the constraints to the achievement of plan objectives arise from overarching issues relating to the unsustainable use of land, air and water. To overcome these the report calls for changes in the policy framework governing land use. The report concludes by identifying “top ten” challenges for action for the next five years. These include:

- Integration – ensure proper consideration of biodiversity through Strategic Environmental Assessment (SEA) of all plans, policies and programmes.
- Planning – revise all planning guidance to ensure that the planning system contributes to the maintenance and positive enhancement of biodiversity.

However, again, no reference is made to the further potential of EIA to play an important role in integrating biodiversity considerations into development decision-making.

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Table 4: Major constraints to species conservation (taken from Avery *et al*, 2001)

Constraint	No. of species for which the constraint is particularly significant
Inadequate information/research	45
Limitations of agri-environment schemes	21
Inadequate management on protected areas	19
High-level agricultural policy	17
Lack of resources for raising awareness or providing advice	12
Inadequate species or habitat protection or enforcement	10
Lack of habitat re-creation/recovery	9
Lack of appropriate management of “abandoned” land	9
Lack of commitment to delivering BAP targets	8
Process failures – eg species/habitat links	8
Failure to balance needs of recreation and conservation	6
Forestry management	5
Water pollution	5
Inadequate controls on water management or remedial action	4
Failure to develop policies to support natural coastal erosion	3
Inability of species plans to act on broad environment issues eg air pollution, global warming	2
Development planning failure	1
Introduced species	1
Failure to influence other areas of policy (minerals policy)	1

To conclude, while progress on preparing and starting to implement action plans in the UK is good, at present there is a lack of integration of biodiversity considerations into sectoral or cross sectoral plans, programmes and policies (as required by Article 6(b) CBD). At present, such integration is only happening in some sectors.

13.4 The EIA System

The EIA regime in the UK derives from European Union legislation - *the EIA Directive on the assessment of the effects of certain public and private projects on the environment* (85/337/EEC). This Directive was adopted by the EU in 1985 and had to be implemented in Member States by 1998. It was subsequently amended by EC Directive 97/11 (the EIA Amendment Directive), which had to be implemented in Member States in 1999⁴. The EU legislation provides that certain categories of projects require an EIA in every case and that other categories require EIA only if the particular project in question is likely to give rise to significant environmental effects – see below.

⁴ References in this report to the EIA Directive are to the EIA Directive as subsequently amended by the EIA Amendment Directive.

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Examples of projects which always require EIA (Annex I projects)⁵

- Crude oil refineries
- Large thermal power stations
- Nuclear power stations and reactors, and works for production of reprocessing of nuclear fuel
- Integrated works for the initial smelting of cast iron and steel
- Works for extraction, processing and transformation of asbestos
- Integrated chemical installations
- Construction of long distance railway lines, airports over a certain size, and motorways and express roads
- Inland waterways and ports for passage of vehicles over a certain size
- Certain waste disposal installations
- Large groundwater abstraction or artificial groundwater recharge schemes
- Large waste water treatment plants
- Large dams
- Installations for the intensive rearing of poultry or pigs with other a certain number of animals
- Industrial plants

Examples of projects which require EIA if significant environmental effects are likely (Annex II projects)⁶

- Agriculture, silviculture and aquaculture projects for the use of uncultivated land or semi-natural areas for intensive agricultural purposes
- Extractive industry projects including underground mining, deep drillings and extraction of minerals by marine dredging
- Energy industry projects including projects for surface storage of natural gas, surface storage of fossil fuels, wind farms
- Production and processing of metals including installations for the processing of ferrous metals
- Mineral industry projects including coke ovens
- Certain chemical industry projects
- Food industry projects including for the manufacture of vegetable and animals oils and fats
- Certain textile, leather, wood and paper industries
- Rubber industry projects
- Certain infrastructure projects

The UK has implemented the EIA Directive via various sets of Regulations which apply to particular types of projects. In England and Wales the principal Regulations are *The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (SI 1999 No. 293)* (the 1999 Regs). Guidance on these Regulations is provided in *DETR Circular No. 02/99 dated 12 March 1999* (DETR, 1999a). The Regulations require that:

- ❑ a project is screened to decide if an EIA is required;
- ❑ if an EIA is required, the developer must produce an Environmental Impact Statement (EIS) which contains sufficient information on the likely significant environmental impacts of the project. The EIS must be submitted to the decision-maker with the planning application. There is no independent review of the EIS, the decision-maker examines its adequacy. If the decision-maker is of the opinion that the EIS is inadequate, it can request further environmental information.
- ❑ the EIS has to be published and made available to statutory consultees and the public who can submit representations.
- ❑ the decision-maker must take the EIS, any further information and any representations made by the public and the statutory authorities into account when taking a decision on the project. Mitigation measures described in an EIS are not legally binding unless the decision-maker makes this a condition of the planning permission, or the developer enters into a separate legal agreement securing compliance.

⁵ The full list is contained in Annex I of the EIA Directive – see Appendix 2.

⁶ The full list is contained in Annex II of the EIA Directive – see Appendix 2.

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- ❑ The decision-maker must publish its decision giving the main reasons and considerations on which the decision is based and a description, where permission has been granted, of the main measures to avoid, reduce and, if possible, offset the major adverse effects of the development.
- ❑ There is no statutory requirement to monitor the proficiency with which mitigation is carried out or its effectiveness.

The key legal requirements of the UK EIA system are described further below. Other specific Regulations apply to forestry projects, land drainage works, fish farming, highways, harbour works, pipeline works, etc – see Appendix 3.

13.4.1 Screening

For Annex II categories of projects, whether a particular project requires EIA is determined by reference to thresholds and criteria. An EIA is required where:

1. any part of that development is to be carried out in a **sensitive area**; OR
2. any **applicable threshold or criterion** is respectively exceeded or met in relation to that development.

AND the development is likely to have **significant effects on the environment**.

Sensitive areas include internationally and nationally designated nature conservation sites. However, not every proposed development in (or affecting) these areas will automatically require an EIA (DETR, 1999a).

Applicable thresholds and criteria are set out in Schedule 2 to the 1999 Regs. For example, the threshold/criteria for the construction of a road is where the area of the works exceeds 1 hectare; for motorway service areas where the area of the development exceeds 0.5 hectare; for waste-water treatment plants where the area of the development exceeds 1000 square metres.

The key criteria to be considered when determining whether there are likely to be significant effects are:

- ❑ **Characteristics of projects** eg the size of the development, the cumulation with other projects, the use of natural resources, the production of waste, pollution and nuisances, and risk of accidents.
- ❑ **Location of projects** eg the environmental sensitivity of geographical areas likely to be affected by projects.
- ❑ **Characteristics of the potential impact** eg the extent of the impact (geographical area and size of the affected population), the trans-frontier nature of the impact, the magnitude and complexity of the impact, the probability of the impact, the duration, frequency and reversibility of the impact. (See Appendix 2 for full details).

A developer may decide to carry out an EIA even if a project is not within these criteria if they think it will help the development application to proceed more smoothly. Under the 1999 Regs, for an Annex II project a developer can:

1. request a screening opinion (i.e. opinion as to whether an EIA is necessary) from the local planning authority (LPA) (see Flowchart 1 in Appendix 4);
2. submit an EIA with the planning application; or
3. Submit the planning application without an EIA.

In (1) the LPA will adopt a screening position. If the opinion is that an EIA is required the developer has a right of appeal to the relevant Secretary of State (SoS) - see Flowchart 2 in Appendix 4). In (3) the LPA treats the application as an application for a screening request – again the developer has a right of appeal to the relevant SoS.

13.4.2 Scoping

The EIA Amendment Directive has incorporated new provisions relating to scoping in the EIA Directive. As implemented in the 1999 Regs there is now a provision for a developer to ask an LPA for a scoping opinion i.e. an opinion as to the information to be provided in the EIS. The planning authority must consult statutory consultees including nature conservation bodies before adopting a scoping opinion – see Flowcharts 3 and 4 in Appendix 4).

13.4.3 Environmental Impact Statement

An EIS *must* contain such of the information referred to in Part I of the box below as is *reasonably required* to assess the environmental effects of the development and which the applicant can, having regard to current knowledge and methods of assessment, *reasonably be required* to compile. It *must* include at least the information referred to in Part II. Flowchart 4 in Appendix 4 sets out the procedure from submission of the EIS to the competent authority – for planning projects the LPA – to decision-making.

Key references and sources of further information on EIA in the UK are included in Appendix 5.

At present there few requirements to carry out SEAs in the UK. A form of SEA – a sustainability appraisal that examines the economic, social and environmental implications – is required for certain regional level planning strategies (DETR, 2000d). Some SEAs have also been carried out on a voluntary basis, for example the UK Ministry of Defence recently carried out an SEA of a strategic review of its activities, and DETR are currently working on guidance for carrying out SEAs of transport options. The EU is in the process of adopting a Directive on SEA (which is based on the approach of the EIA Directive). Once adopted, this will need to be implemented in Member States in mid 2004 and will require SEAs to be carried out as part of the formulation of certain plans and programmes. The agreed text of the Directive is available from <http://europa.eu.int/comm/environment/eia/sea-legalcontext.htm#ep2>.

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Part I – Include in EIS as far as reasonably required

1. Description of the development, including in particular:
 - a) a description of the physical characteristics of the whole development and the land-use requirements during the construction and operational phases;
 - b) a description of the main characteristics of the production processes, for instance, nature and quantity of the materials used;
 - c) an estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the proposed development.
2. An outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects.
3. A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter-relationship between the above factors.
4. A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development arising from:
 - (a) the existence of the development;
 - (b) the use of natural resources;
 - (c) the emission of pollutants, the creation of nuisances and the elimination of waste,and the description by the applicant of the forecasting methods used to assess the effects on the environment.
5. A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.
6. A non-technical summary of the information provided under paragraphs 1 to 5 of this Part.
7. An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.

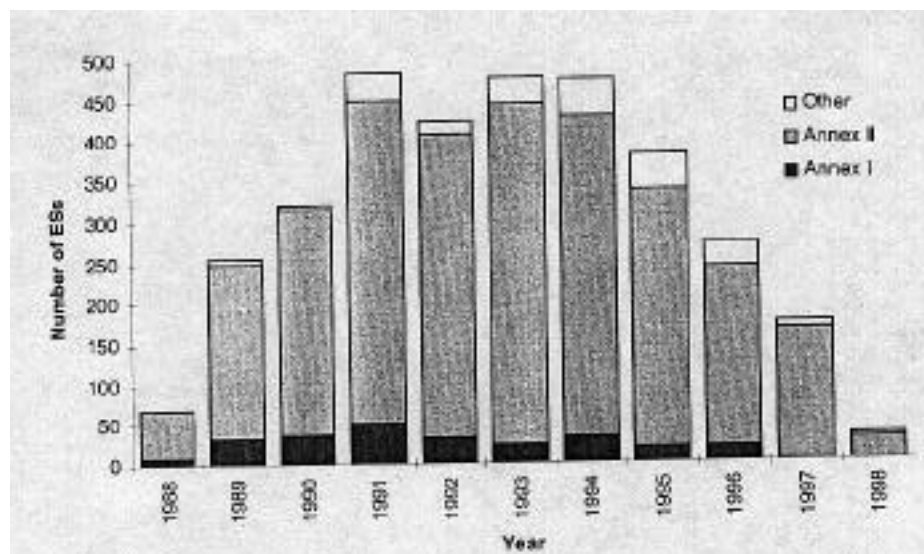
Part II – MUST be included in each EIS

1. A description of the development comprising information on the site, design and size of the development.
2. A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.
3. The data required to identify and assess the main effects which the development is likely to have on the environment.
4. An outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects.
5. A non-technical summary of the information provided under paragraphs 1 to 4 of this Part.

13.4.4 EIA implementation

Since the implementation of the EU EIA Directive in the UK in 1988 over 3000 EISs have been produced (Wood and Bellanger, 1999). Approximately 70% of these have been produced under the Town and Country Planning EIA Regulations⁷. The annual output has fluctuated, peaking at over 350 per year – see Figure 2.

Figure 2: UK EIS submissions under Annex I and Annex II (July 1988 to April 1998) (taken from Wood, 2000)



Notes – No comprehensive list of UK EISs is kept by the Government. The database held by Oxford Brookes University (Wood and Bellanger, 1999) is the most comprehensive record of UK EISs (Wood, 2000). For the years 1996-95 the database is considered to be highly accurate. The figures for 1998 relate to only the first quarter of the year. The figures for 1996-7 appear to indicate a sharp decline in EIS submissions, but it is thought that the data for this period is less comprehensive – reasons for this include local government reorganisation (Wood, 2000).

A breakdown of EIS submissions considered by Wood (2000) shows that special waste disposal installations were the most common Annex I project category and that the project categories infrastructure, other projects, and extractive industry dominated Annex II EIA activity.

There have been several studies of UK EIA quality (eg Wood, 1995). A recent study by Oxford Brookes University for the UK Department of the Environment (DoE, now DETR) looked at compliance with procedures and impact on decisions (DoE, 1996; Glasson, 1999). Based on this study Glasson (1999) presents changes in EIS quality in

⁷ Initially the *Town and Country Planning (Assessment of Environmental Effects) Regulations 1988* (SI No. 1199), the *Environmental Assessment (Scotland) Regulations 1988* (SI No. 1221), and the *Planning (Assessment of Environmental Effects) Regulations (Northern Ireland) 1989* (SR No. 20), which were replaced in 1999 by the *Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999* (SI 1999 No. 293), the *Environmental Impact Assessment (Scotland) Regulations 1999* (SSI 1999 No. 1) and the *Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 1999* (SR 1999 No. 73).

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the UK, perspectives on the influence of EISs on planning decisions and analyses the overall performance of the UK EIA system. This work is summarised below. Changes in EIS quality in the UK as reported in this study are shown in Table 5. This comparison of EISs over the two-time periods considered (pre and post 1991) does show some improvement in quality, but 36% of post-1991 EISs were still unsatisfactory (Glasson, 1999).

Table 5: Changes in EIS quality in the UK (taken from Glasson, 1999)

Criterion category	Qualitative assessment (A (high) to F (low))	
	Pre-1991 EISs	Post 1991 EISs
1. Description of the development	C/D	C
2. Description of the environment	C/D	C
3. Scoping, consultation and impact identification	D	C/D
4. Predictions and evaluation of impacts	D	C
5. Alternatives	E	D
6. Mitigation and monitoring	C/D	C/D
7. Non-technical summary	D	C/D
8. Organisation and presentation of information	C/D	C
Overall quality of EIS	D	C
Overall numbers of EISs		
• Satisfactory (A-C)	9 (36%)	15 (60%)
• Marginal (C/D)	3 (12%)	1 (4%)
• Unsatisfactory (D-F)	13 (52%)	9 (36%)
Total	25 (100%)	25 (100%)

Table 6 compares views on comprehensiveness, objectivity and comprehensiveness over the two time periods. There are signs of improvement, but worryingly only 41% of those taking part reported objectivity as good. The improvement in quality is likely to be attributable to several factors, such as learning through experience, with consultants and local authorities handling large numbers of EIA studies associated with better-quality EISs, and better guidance and good practice for certain project types. Glasson (1999) also reports a correlation between EIS quality and length up to about 150 pages, after which there are diminishing returns.

Table 6: Changes in EIS quality in the UK – further findings (taken from Glasson, 1999)

Criteria	Grade		
	Good	Marginal	Poor
Pre-1991			
Comprehensiveness	31%	31%	38%
Objectivity	18%	37%	45%
Clarity of information	25%	56%	19%
Post-1991			
Comprehensiveness	55%	27%	18%
Objectivity	41%	35%	24%
Clarity of information	55%	38%	7%

Table 7 shows variations in perception of the influence of EIA between different participants. As can be seen, consultees, including nature conservation consultees are less positive than planners and developers about the influence of EISs.

Table 7: Perspectives on extent to which EIS influenced planning decision (taken from Glasson, 1999)

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Groups	Extent (%)		
	Much	Some	Little/none
Planners	20	60	20
Consultees	10	50	40
Developers (small sample)	25	50	25

Wood and Jones (1997) carried out a detailed study on the influence of UK EIAs on decisions. This seems to indicate that EISs do not alter the final outcome of the decision, but that the main benefits relate to the better provision of information to decision makers and to some extent, modification of the project and setting conditions to reduce environmental impacts (Wood, 2000). Wood (2000) reports the decision outcomes of 1512 EISs. These indicate that the proportion of Annex I and Annex II projects gaining approval was very similar – 81% and 79% respectively (Wood, 2000). By comparison, on average 88% of all planning decisions made by district planning authorities receive approval (DETR ,1999b).

Strengths, weakness, opportunities and threats of the UK EIA system are summarised in Table 8.

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Table 8: Analysis of UK EIA performance (taken from Glasson, 1999)

Strengths	<ul style="list-style-type: none"> • Underpinned by EU legislation • Has not become over-technical • Capacity building: guidance documents; training programmes • General acceptance of utility of EIA from all “actors” in the process • Some widening (eg environmental appraisal of development plans⁸) • Is a fast “learning curve”
Weaknesses	<ul style="list-style-type: none"> • Multiple and fragmented legislation and links (eg to pollution control) • Little consideration of alternatives • Little monitoring and auditing • Bio-physical perspective on environment • Little consideration of cumulative impacts • 100s of “competent” authorities; weak quality control • Perceived problem of developer/consultant management of the EIA process • Lack of effective public participation; too little too late
Opportunities	<ul style="list-style-type: none"> • Environmental politics/pressures (eg Local Agenda 21) • Pressures from environmental liability/insurers • Amended EU Directive; new Directives • More projects subject to EIA; more stages of project life cycle (eg planning, decommissioning) • Widening scope – SIA, etc • Tiered assessment – SEA, etc • Use of IT (GIS, expert systems, etc)
Threats	<ul style="list-style-type: none"> • Deregulation/privatisations (more one-offs; less continuity) • Fast-tracking/routinisation/cost reduction (more with less) • Continuing perceived bias; inequity of process • Perceived threats to/from competitive procedures eg integrated pollution prevention control

To summarise, EIA in the UK is now a firmly established process for informing decision making. However, there are still issues on which progress is needed. These include:

- ❑ A “whole of the environment” approach (as opposed to compartmentalisation of individual environmental components eg biodiversity, hydrology, geology, etc)
- ❑ Wider application of EIA at early stages of project design
- ❑ More effective public participation
- ❑ Monitoring and post auditing (for details see Dipper *et al*, 1998; Wood *et al*, 2000)
- ❑ Feedback of the lessons from EIA into policy, institutional and project design.

Changes to the UK EIA system resulting from implementation of the EIA Amendment Directive in 1999 have the potential to increase the importance of EIA in development decision-making. The changes should bring:

- ❑ More local planning authority involvement, including scoping advice
- ❑ Consideration of alternatives
- ❑ EIA for a wider range of projects
- ❑ Improved information and earlier consultation – which hopefully will benefit the general public and NGOs
- ❑ Improved consistency of application of EIA across the country – as a result of the clearer and in some cases more stringent criteria/thresholds.

⁸ Development plans are local government plans setting out planning policies which form the framework within which planning authorities determine particular development consent applications.

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DETR estimated that implementation of the EIA Amendment Directive would result in around 55 additional EISs each year – 20 Annex I and 35 Annex II (DETR, 1999c). However, it is too early yet to judge whether EIA numbers have increased and whether there have been significant improvements. When the UK Government implemented the Amended EIA Directive, it indicated that it would review the amended procedures after two years of operation. This review should now have commenced – it will be interesting to see the results. In addition, when implemented the SEA Directive will provide an improved framework for tiered assessments.

13.5 Biodiversity and EIA

13.5.1 How are biodiversity strategies integrated with the EIA system?

As mentioned above, while progress on preparing and starting to implement biodiversity action plans in the UK is good, at present there is a lack of integration of biodiversity considerations into sectoral or cross sectoral plans, programmes and policies and into project EIA. However, there does appear to be good potential for integrating information, objectives and targets from national and local BAPs into EIA. In addition, the potential for biodiversity baseline and monitoring data collected for EIAs to be fed into the BAP processes.

Current Government guidance on nature conservation and planning⁹ does not explicitly address biodiversity. There is a need for Government guidance on what weight UK and LBAPs are to be given in the planning system. Recent English legislation (the Countryside and Rights of Way Act 2000) now provides a statutory basis for biodiversity conservation. Current English guidance on nature conservation and planning will shortly be revised to reflect the new legislation and should provide more guidance on biodiversity/BAPs in the planning system. This guidance should subsequently feed through into EIA practice.

UK EIA legislation and Government guidance does not explicitly mention biodiversity. This may be largely explained by the historical timing of EIA and the CBD - the EIA Directive was agreed in 1985 before the CBD. Neither the EIA Directive nor the EIA Amendment Directive (agreed in 1997) explicitly mention biodiversity. However, the preamble to the EIA Directive does refer to the need to assess:

“effects of a project on the environment...to ensure maintenance of the diversity of species and to maintain the reproductive capacity of the ecosystem as a basic resource for life” (CEC, 1985).

Further, as the EIA Directive requires the identification, description and assessment of direct and indirect effects of a project on flora and fauna and the interaction between these and soil, water, air, climate and the landscape, taking a purposive approach to the legislation, it is clear that the treatment of biodiversity should be an integral part of UK EIAs.

To date explicit links between EIA and the UK BAP and LBAP processes have largely been missed and not enough emphasis has been placed on different levels of biodiversity, structure and function (Byron, 2000). Instead, EIAs tend to be overly focussed on designated sites and protected species (Byron et al, 2000; Thompson et al, 1997; RSPB, 1995).

Although there is no Government guidance, guidance on the treatment of biodiversity in EIA has recently been published by four UK organisations (the RSPB, English Nature, WWF-UK and the Wildlife Trusts) – in the form of a free leaflet (RSPB et al, 2000) and full report (Byron, 2000). Both publications are based on a three-year study carried out at Imperial College, London, UK.

⁹ PPG 9 (DoE, 1994), NPPG 14 (SOED, 1999) and Circular 6/1995 (SOED, 1995), and PPS 2 (DoE-Northern Ireland, 1997).

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The full report focuses on road EIAs and is in three parts. Part I introduces biodiversity and explains why it needs to be considered in detail in EIAs. It discusses the concept of biodiversity, how biodiversity differs from the traditional concepts of ecology and nature conservation, why biodiversity must be considered in EIAs, and current treatment of biodiversity in road EIAs.

Part II provides detailed technical guidance for considering biodiversity in road EIAs. Over-arching principles are explained and advice given on how to deal with biodiversity at each stage of the EIA process. This includes screening criteria for triggering an EIA on biodiversity grounds, scoping checklists to identify potential impacts, assessment of biodiversity baseline conditions, criteria for assessing the magnitude and significance of biodiversity impacts, checklists for identifying potential mitigation and enhancement measures, advice on the presentation of biodiversity information in EISs, and biodiversity monitoring.

Part III concludes the guidance by providing a biodiversity checklist. This summarizes good practice treatment of biodiversity in EIA – see Appendix 6. It is intended for use as a final check to ensure that an EIA has considered all relevant biodiversity issues thoroughly. Although, it can also be used for reviewing the biodiversity components of EISs.

The publications complement existing EIA guidance and should help all participants in the EIA process, including government, local authority planners and ecologists, statutory and voluntary nature conservation bodies, developers and promoters, and environmental and ecological consultants. They will be particularly relevant to consultants and ecologists planning and carrying out the biodiversity components of EIAs, consultees taking part in the EIA process, and decision-makers evaluating EISs.

These publications should help play a part in ensuring that potential impacts on biodiversity are thoroughly and systematically addressed in UK EIAs. Although the full report focuses on road schemes, the principles and detailed guidance it contains can be readily applied to EIAs of other development types and strategic environmental assessments.

13.6 Treatment of biodiversity in EIA procedures

This section is based on information from the three case studies discussed in section 7 (referred to in this section as Abergavenny, Iwade and Rainworth) plus several key sources as follows:

- Byron *et al* (2000) a review of the ecological component of 40 UK road EISs produced between 1993 and 1997;
- Thompson *et al* (1997) a review of the ecological component of 179 UK EISs for all development types produced between 1988 and 1993;
- RSPB (1995) a report on the treatment of nature conservation in EIA based on a review of the ecological component of 37 UK EISs; and
- Treweek *et al* (1993) a review of the ecological components of UK road EIAs produced up to 1991.

13.6.1 Screening

Are potential impacts on biodiversity taken into account during screening?

For Annex II categories of projects, an EIA is required where:

1. any part of that development is to be carried out in a **sensitive area**; OR

2. any **applicable threshold or criterion** is respectively exceeded or met in relation to that development.

AND The development is likely to have **significant effects on the environment**.

Sensitive areas include internationally and nationally designated nature conservation sites. Not every proposed development in (or affecting) these areas will automatically require an EIA. *“In each case, it will be necessary to judge whether the likely effects on the environment of that particular development will be significant in that particular location.”* (DETR, 1999a). Views expressed by the nature conservation consultees should be taken into account. The Circular notes that *“where relevant Local Biodiversity Action Plans will be of assistance in determining the sensitivity of a location”* (DETR, 1999a).

The location of the project, in terms of the environmental sensitivity of the areas likely to be affected by the project is one of the key criteria, which needs to be considered when determining whether there are likely to be **significant effects**. The explanations of this criteria mention the relative abundance, quality and regenerative capacity of natural resources in the area and the absorption capacity of the natural environment, particularly in wetlands, coastal zones, mountain and forest areas, nature reserves and parks and designated areas of international importance – see Appendix 2.

So there is no requirement for mandatory EIA for proposals in areas of high biodiversity. Although biodiversity should be one of attributes of the location of the project that is taken into account when considering whether there are likely to be significant effects, although it is not explicitly mentioned. In practice it is not clear how important biodiversity is as a trigger for EIA – the detailed reasons for carrying out EIAs are not generally discussed in EISs. However, under the 1999 Regs if an LPA determines that an EIA is required it must give reasons for this decision and these must be made public. Hence, analysis of screening opinions may reveal information about the extent to which biodiversity issues trigger EIAs, but to date no such analysis is available.

Are biodiversity data available to flag up cases where biodiversity might be an important issue?

Key sources of information on biodiversity potentially available to/used by EIA practitioners are summarised in Table 9. As can be seen, a lot of background data is potentially available. To date BAP sources have tended not to be fully utilised.

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Table 9: Key sources of biodiversity information

Data sources available	Used by EIA practitioners?
<i>Statutory nature conservation bodies</i>	
• information on designated sites and protected species	Yes
• information on biogeographical areas eg English Nature's Natural Areas ¹⁰	Rarely
• regional biodiversity indicators (eg English Nature, 1999e and f)	Not to date
<i>Voluntary nature conservation bodies</i>	
• information on reserves and species eg from RSPB, County Wildlife Trusts, specialist groups eg Bat groups	Yes
<i>Local authorities</i>	
• information on local sites eg LNRs	Yes
• Broad level habitat surveys	Yes
• Information from previous projects/EIAs	No
• Local Records Centres (often, but not always, run by local authorities)	Yes
<i>Biodiversity Groups</i>	
• UK BAPs	Rarely to date
• Biodiversity Audits	Rarely to date
• LBAPs	Rarely to date
• NBN	Rarely to date –still at a pilot stage
<i>Other</i>	
• Lists of designated sites/protected species	Yes
• Countryside Survey information	?

¹⁰ English Nature has developed a Natural Areas approach for its conservation work. There are 120 Natural Areas each with a unique identity based on the wildlife and natural features of the landscape and the opinions of local people (English Nature, 1997). Detailed profiles have been produced for each Natural Area. The aim is that the Natural Areas will help the breakdown of national HAP and SAP targets to a more local level (English Nature, 1998c).

13.6.2 Are lists of protected species/habitats available for use in screening and scoping?

Lists of designated sites, habitats and protected and important species are available. these include:

- ❑ Lists of designated sites - at international, national, regional and local levels;
- ❑ habitats of community interest – priority habitats listed in Annex I of the Habitats Directive;
- ❑ protected species – species protected under the Birds and Habitats Directives, the Bern, CITES and Bonn Conventions, and under national law (eg Wildlife and Countryside Act 1981 as amended and the Protection of Badgers Act 1992).
- ❑ The UK BAPs for priority habitats and species and LBAPs for more local priorities. The UK BAPs do contain distribution maps – but these are at a large scale (10 km square).

Other sources of relevant information are summarised in Appendix 7.

13.6.3 Scoping

Do EIA TORs include assessment of impacts on biodiversity?

Biodiversity terminology is not generally used in TORs. Instead, these tend to refer to ecology and hence may miss consideration of all relevant biodiversity components.

What components or levels of biodiversity are considered?

A study of road EISs produced between 1993 and 1999 found that none explicitly mentioned biodiversity or made references to national or local BAPs (Byron *et al*, 2000). Generally EIAs tend to concentrate on designated sites and protected species to the detriment of other components of biodiversity – see the box below.

Biodiversity and road EIAs
<p>Current weaknesses include the lack of:</p> <ul style="list-style-type: none"> • Use of biodiversity terminology/linkages with UK BAPs and LBAPs. • Proper consideration of non-designated sites. • Consideration of non-protected species. • Consideration of all levels of biodiversity eg focus on site scale rather than ecosystem level. • Consideration of structural/functional relationships. <p style="text-align: right; margin-right: 20px;">(Byron <i>et al</i>, 2000)</p>

Encouragingly, two of the case studies (Abergavenny and Iwade) do mention biodiversity. However, none use a definition of biodiversity or consider all of the relevant levels of biodiversity thoroughly. The higher levels (bioregional and landscape biodiversity) and the genetic level being those dealt with most poorly. None of the case studies specifically identify structural/functional components of biodiversity as potential receptors, but some (e.g. fragmentation, water availability) are discussed incidentally.

Two of the case studies refer to national BAP processes, and one (Iwade) to an LBAP (the Kent LBAP (Kent BAP Steering Group, 1997)). However, the case studies do not draw on the BAP/LBAP information as fully as they might. For example, an Addendum to the Iwade EIS refers to certain habitats and species being UK BAP/Kent LBAP habitats/species, but it appears that the detailed information available in these plans was

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not used as the context for analysing potential impacts, or for considering potential mitigation/enhancement measures that could contribute to relevant UK BAP/LBAP targets.

The timing of the national and local BAP processes may be largely responsible for the lack of linkages with these processes. When the Rainworth EIA was being carried out the UK BAP and LBAP processes were in their infancy. However, the relevant local authority planners confirmed that they now expect any current EISs to refer to the Nottinghamshire LBAP (Nottinghamshire Biodiversity Action Group, 1998), which was published in 1998. All the three case studies consider both non-designated sites and non-protected species.

Is it possible to set EIA study limits to “capture” biodiversity impacts?

In theory this is possible. However, in practice study limits tend to be restricted to the proposed development site and its close vicinity. In the case studies, it was difficult to evaluate the study areas as these were not explained/described in the documentation, but it appears that these concentrated on the immediate development site.

Good practice example of scoping (taken from RSPB (1995))

EIS accompanying an application for planning permission for a proposed sewage treatment works and sewerage system - The scoping phase was described in the opening pages of the EIS and a list of organisations /individuals involved in the scoping process given. The whole EIS was structured in response to issues raised during consultations with these organisations. Constant reference was made to concerns raised by various consultees about potential impacts in an area of considerable ecological value. A genuine effort was made to satisfy these concerns through extensive research, review and further consultation. For example, a section of the EIS was devoted to a research project on alga growth following nutrient enrichment carried out for the EIA. Considerable attention was also paid to the discussion of alternative projects and locations. The end result of this extensive scoping and consultation phase was an impressive EIS containing development proposals that met with no objection from the nature conservation bodies.

13.6.4 Baseline conditions

The description of baseline conditions should be based on information provided by consultees, background sources of information, and the results of new surveys. There are three potential key sources of background information: background biodiversity information, relevant scientific references, and relevant information on other projects/activities. UK EIAs do tend to use background ecological/biodiversity information, however use of relevant scientific references is weaker and information on other projects/activities tends not to be utilised. All three of the case studies did use background biodiversity information e.g. from previous reports and surveys and some sources of background scientific information. By comparison, only 30% of the road EISs analysed by Byron *et al* (2000) referred to ecological scientific literature. None of the case study EIA documentation mentions any information on other projects/activities.

Are field studies carried out to collect biodiversity data?

Collection of new ecological information for EIAs appears to have improved since 1993 with some new field studies now being carried for the majority of EIAs. For example,

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Byron *et al* (2000) found that 87.5% of the EISs included new survey information, compared to 35% of EISs examined in a 1993 study (Treweek *et al*, 1993) and 45% in a 1997 study (Thompson *et al*, 1997). Some new field studies were carried out for each of the case study EIAs. The new survey work carried out for the Iwade proposal was particularly extensive and thorough – see section 7.2 below.

For EIAs typically with time and resource constraints, key issues are focusing new survey work to generate sufficient information about the key receptors. Both of these issues are discussed below.

Is intensity of study or level of detail influenced by biodiversity importance?

It appears that the biodiversity importance does influence the intensity/level of study to a certain degree eg protected species tend to be studied in greater detail. Ideally, new survey work will be focused to collect information on:

- ❑ ecosystem/habitat/communities
- ❑ key species groups eg threatened, endemic, and protected species, BAP species, characteristic species for each habitat and species particularly susceptible to habitat fragmentation.
- ❑ genetic information – may be relevant for particular populations.

However, in practice there appears to be a tendency to concentrate on surveying certain groups eg plants mammals and birds and it appears that groups may have been selected for ad hoc reasons, such as their ease of surveying. For example, Thompson *et al* (1997) reported surveys of higher plants in 40% of the EISs studied, compared to animal surveys on 20% of cases. Byron *et al* (2000) reports an emphasis on surveying and mapping broad categories of habitat or vegetation, with markedly less survey effort invested in particular groups or species. There was a greater emphasis on surveying mammals than any other group - 40% included badger surveys, 17.5% bat surveys, 7.5% otter surveys, and 2.5% deer surveys. Invertebrates, birds, and higher plants were surveyed in 20%, 17.1% and 11% of EISs respectively (Byron *et al*, 2000). On the whole, EISs need to be much more transparent at explaining the rationale for selecting the species/groups which they chose to survey.

13.6.5 Are biodiversity data adequate for meaningful assessment and mitigation?

It is essential that new survey work generates sufficient ecological data to make defensible and robust predictions and mitigation suggestions for the full range of biodiversity impacts. To facilitate this, ideally the following information should be collected:

- ❑ ecosystem/habitat/communities - quantity, quality and biodiversity potential (ie with the potential for biodiversity enhancement), structural elements eg slope and aspect, water and resource availability, and functions eg resource productivity, population dynamics,
- ❑ key species groups – population status eg composition: species distribution and abundance trends, structural elements: range, population structure, and functional elements: demographic processes eg mortality and fertility, metapopulation dynamics and population fluctuations
- ❑ genetic information – generally it will not be feasible to try and take direct measurements of genetic resources for EIAs and more indirect methods eg gene flow, identification of isolated populations, considering inbreeding depression and outbreeding rates¹¹ will be used.

¹¹ See Byron (2000) for a detailed framework of information/measurements that could be collected at each level of biodiversity.

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In practice, it is often unclear in the majority of cases whether new surveys are sufficiently intensive to capture all relevant information. Byron *et al* (2000) reports that the majority of EISs included some form of species list, with species recorded on a presence/absence basis. However, only fifteen of the EISs for which there were new surveys included any abundance data. In the majority of cases, EISs included simply numbers of individuals present or affected. The results of this review suggest that relatively few specialist surveys are carried out for EIA of proposed road developments. In addition, that, few EISs include the information that would be necessary to evaluate susceptibility of ecological receptors to impacts, their relative importance or the significance of impacts on them. The case studies did however, include assessments of habitat quantity and quality and selected key species groups for further study.

Good survey practice

The time of year at which ecological surveys are carried out is important (IEA, 1995). However, many of the EISs reviewed in the study by Byron *et al* (2000) failed to indicate when surveys had been carried out. The survey date was specified for only 52% of the surveys reported. However, where survey dates were recorded, few surveys appeared to have been carried out at very inappropriate times. Survey methodologies were described in twenty-nine of the EISs (82.9%) for which new surveys had been carried out. However, the duration of surveys was detailed in only five (14.3%) of these EISs.

Good practice example of baseline information (taken from RSPB (1995))

EIS accompanying an application for planning permission for a gas pipeline landfall – The EIS contained:

- extensive descriptions of baseline ornithological, herpetological, entomological and botanical conditions for the terrestrial phase of the development;
- extensive data for fisheries, marine mammals, benthic invertebrate fauna and marine phytoplankton for the marine phase of the development; and
- details of geological and geomorphological baselines for both phases.

Baseline data were collected through an appropriate mix of literature review, consultation and site visits conducted over a period of two years. Field studies were carried out initially by generalist ecologists and then by separate expert consultants in each field (botanical, ornithological, marine. Ecological, etc) to obtain more detailed and comprehensive data than could be collected by the general consultants. Employing independent consultant, ensured that survey techniques were employed effectively and that the general level and detail of survey was of a high standard.

purchasing copies of EISs and lack of central records of EIAs are likely to result in information from previous studies not being used as widely as possible. Ideally, data collected for EIAs (and subsequent monitoring) should be made as widely available as possible eg to local authorities, appropriate authorities and biodiversity information networks such as the NBN.

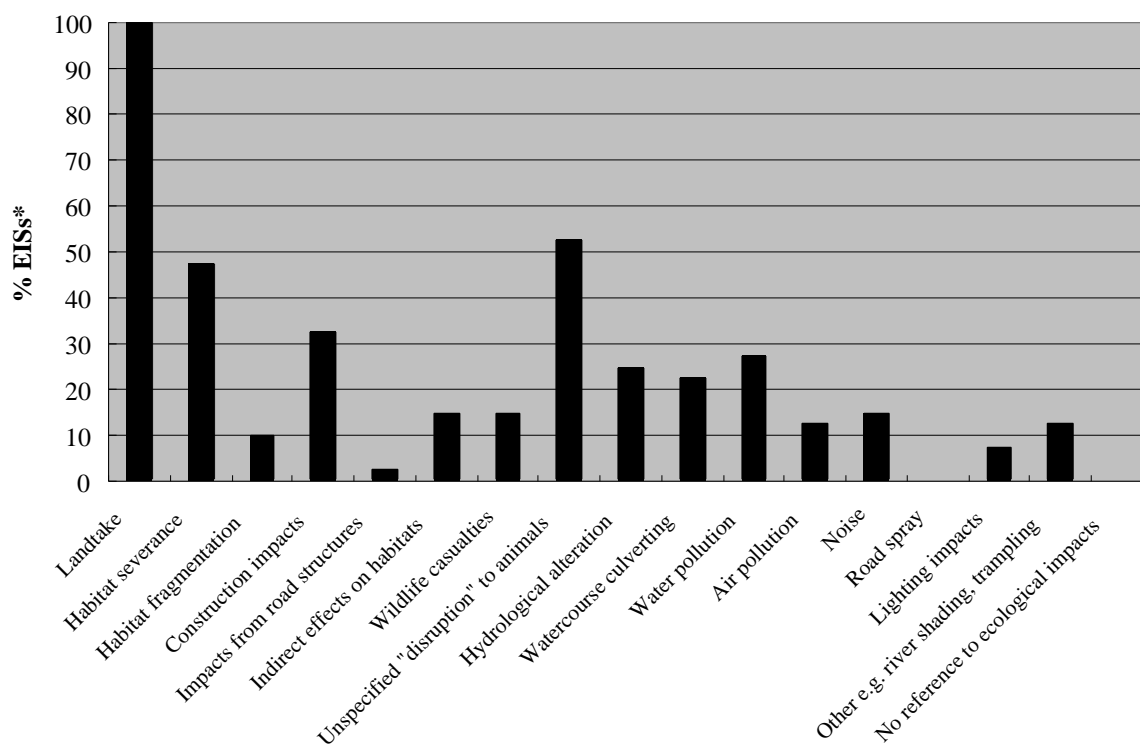
Generally the main elements of survey good practice: appropriate timing, survey duration, study area, methodologies, evaluation criteria, repeated sampling, and the need for each of these elements to be recorded in the EIS, were recorded in the EISs in all three case studies. The weakest area was repeated sampling – likely to be a result of limited resources.

13.6.6 Impact prediction

Are biodiversity impacts identified and if so, do they relate to genes, species or ecosystems?

Figure 3 summarises the potential ecological impacts identified in the Byron *et al* (2000) study. As can be seen all EISs referred to direct habitat loss from land take, a range of indirect impacts were identified, although these were not discussed in some EISs where baseline conditions suggested they would be likely. Cumulative effects were mentioned in only one of the 40 EISs studied.

Figure 3: Potential ecological impacts of the proposed developments



Note: *Percentages do not total 100 due to EISs discussing multiple impact types.

All of the case studies considered permanent habitat loss on-site, and certain indirect effects - reduced connectivity in the landscape, barrier effects on species, increased mortality, water pollution, and disturbance. Potential indirect impacts poorly dealt with are edge effects, soil pollution, windfunneling, reduced visibility, introduction of exotics, changes to habitat management, public pressure, and off site habitat losses and changes in habitat quality. Cumulative impacts were discussed in two of the three studies. The range of potential impacts identified and discussed in the Rainworth EIS was particularly good – see section 7.3 below.

It is good practice to provide quantitative impact predictions and as much information as possible on the nature of the impact ie impact magnitude, duration, timing, probability, reversibility, potential for mitigation. Also to state the criteria used to judge impact magnitude and explain how these have been derived and whether they are project

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specific. However, the majority of EIAs fail to provide much of this information. Byron *et al* (2000) found that 77.5% of EISs quantified areas to be lost, but only 15% of these provided estimates of the areas of each habitat type which would be lost and only one EIS attempted to quantify any other type of ecological impact. Examples of used for determining impact magnitude from recent EISs are included in Table 10 below.

Two of the case studies provide some of the impact information, the third (Rainworth) does not provide any of this information. Only one of the case studies (Abergavenny) includes explicit statements of impact magnitude (severe, moderate, slight, negligible, none). It explains that the scale for impacts is not strictly defined and that values are given on the basis of professional judgement based on several criteria: type, potential extent, duration, magnitude, nature, probability, timing . These criteria are not explicitly related to BAP targets and are not scheme specific.

Table 10: Magnitude criteria used in recent EISs

EIS	Magnitude Criteria
M25 Motorway Link Roads between Junctions 12 and 15 (DoT, 1994)	Impacts are summarised as follows:
A proposal to increase the capacity of the M25 between junction 12 (M3) to junction 15 (M4) by the addition of 2 or 3 lane link roads parallel and on either side of the existing M25 over a distance of approx. 7 miles. Also to widen the existing M25 through junctions 13, 14 and 15 and re-routing of part of the A30	<ul style="list-style-type: none"> • Major – loss of 5% or more of habitat or site. • Moderate – loss of up to 5 % of habitat or site, or predicted change in adjacent habitat. • Minor – no loss of habitat, or possible change in adjacent habitat.
Thames Water, Best Practicable Environmental Option Study (Thames Water, 1998)	Impacts are classified as:
A strategic study on planning for future water resources	<ul style="list-style-type: none"> • High – loss or damage to any site covered by a statutory (national) or international nature conservation designation eg SSSI, NNR, SPA. • Medium – loss or damage to a site covered by a local nature conservation designation. • Low – no loss or damage to sites covered by statutory designations or local nature conservation designations, but possible other damage eg to wetlands, hedgerows, woodland.

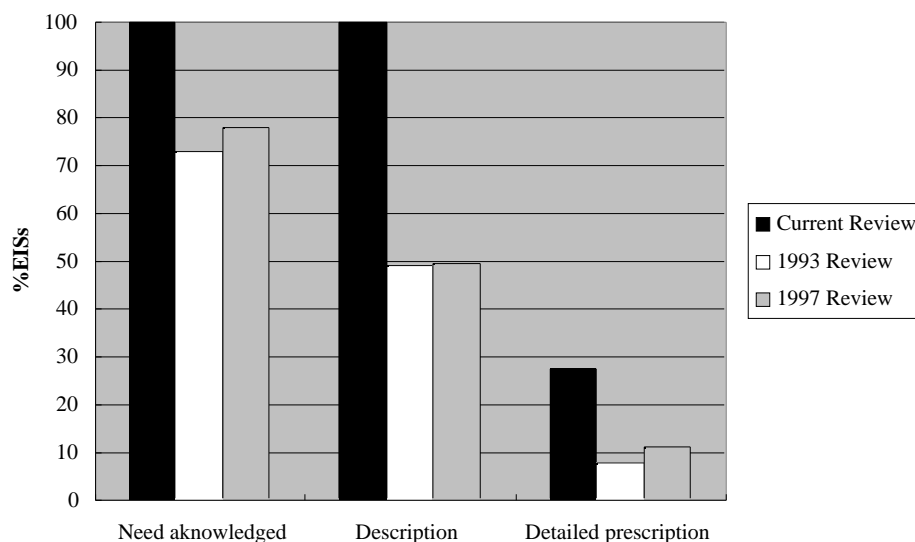
Note: These criteria are good in that they attempt to quantify magnitude through percentage of habitat affected. However, any criteria formulated using this approach should include a percentage of habitat or site loss that is ecologically relevant.

13.6.7 Mitigation

Are mitigation measures specified for impact on biodiversity?

Most EIAs acknowledge the need for mitigation and include descriptions of mitigation measures that will be put in place. However, detailed prescriptions are much less common – see Figure 4. This still means that the majority of proposed ecological mitigation measures are recommended without any indication of their feasibility or reliability.

Figure 4: Mitigation of potentially adverse ecological impacts (taken from Byron et al, 2000)



Note: The Current Review is the Byron et al (2000) review, the 1993 Review the Trewick et al review and the 1997 Review the Thompson et al review.

Discussion of mitigation/enhancement issues was patchy in all of the case studies. The Abergavenny EIS adopted a positive and clear mitigation strategy of avoiding impacts where possible, mitigating impacts that cannot be avoided, and considering compensation as a last resort – see section 7.1 below. None of the EISs included clear descriptions of the mitigation measures proposed, or provided clear assessments of their likely success. An example of criteria used for assessing the effectiveness of proposed mitigation is given in Table 11.

Good Practice Example (taken from RSPB (1995))

EIS accompanying an application for planning permission for a crushed stone quarry – The EIS contained comprehensive mitigation that aimed to keep damage at a minimum during the construction and operational phases so that restoration of the site could be more easily achieved. Mitigating measures suggested for the site preparation phase included delaying construction until ground-nesting birds had finished breeding and until amphibians in on-site ponds had reached the terrestrial phase of their life cycles. Early in the operational phase, a new pond would be created to allow amphibians to “reproduce and maintain healthy numbers” and land surrounding the site would be maintained to provide suitable forage for birds. Much attention had also been paid to the restoration of land once quarrying activities had ceased. Plans included the creation and enhancement of wildlife areas such as ponds and rocky ground to provide new habitats for a wider range of bird and invertebrate species. This proposal included mitigation, compensation and genuine enhancement.

Table 11: Criteria for assessing effectiveness of mitigation

A322 Improvement – Bisley Common to Brookwood Crossroads (Surrey County Council, 1995)	<p>'The effectiveness of recommended mitigation measures are evaluated on the following basis:</p> <ul style="list-style-type: none"> • Poor – some mitigation but little overall reduction in impact. • Limited – the mitigation measures reduce the impact to some degree. • Moderate – reasonable mitigation, but original impact will still be felt to a significant degree. • Substantial – almost complete mitigation.'
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Does biodiversity value or importance influence the level of mitigation recommended?

Yes, for European (Natura 2000) sites a high standard of mitigation is required and so needs to be recommended if the project is going to be given approval eg the Iwade case study. For local sites, habitats outside designated areas and non-protected species mitigation tends to be more limited. Ideally, BAP habitats and species should be considered for detailed mitigation, but EIAs have not been taking this approach to date.

Are opportunities for biodiversity mitigation missed?

It would appear that opportunities are missed, especially opportunities for biodiversity enhancement eg to contribute to BAP/LBAP targets, in many EIAs.

Is there any legal requirement to implement mitigation proposals?

The EIA system does not impose a legal requirement to implement mitigation proposals. Unless mitigation proposals are made the subject of planning conditions (ie Rainworth), or the subject of a separate legal agreement (ie Iwade) they are not legally binding. Therefore their implementation is wholly dependent on the good will/integrity of the developer. The fact that descriptions of mitigation measures in EISs tend to be general in nature can also make it difficult to assess implementation of mitigation measures. Further, even where project approval is made subject to planning conditions or a separate legal agreement in practice these may not be enforced.

Are there examples of effective biodiversity mitigation?

Proposed mitigation measures often appear promising in EISs, however, it is difficult to assess the effectiveness of mitigation given the absence of a requirement for monitoring and post-project review.

13.6.8 Impact evaluation

Are biodiversity values taken into account in evaluation?

Byron *et al* (2000) found that the majority of EIAs failed to state and define the criteria used to evaluate the importance of biodiversity receptors and indicate the magnitude and significance of an impact. Only nine EISs (22.5%) specified the criteria used to estimate impact significance; of these four used matrices to establish significance – these were particularly clear and relatively straightforward to understand. Four of the EISs gave descriptions of the significance classifications which they had adopted e.g. definitions of the terms "high", "moderate" and "low" significance. The final EIS defined "major", "moderate" and "minor" specifically in relation to impacts on habitats. Two of the EISs explicitly linked the level of significance to the level of recommended mitigation and ranked the effectiveness of the proposed mitigation measures on a defined scale. Many of the EISs referred to "significant" impacts or classified impacts as "minor", "moderate", "serious" etc without providing any definition of these terms (Byron *et al*, 2000). For example, one EIS stated "an assessment has been made of whether the effects would be

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significant for ecology or nature conservation" but did not explain the basis on which this assessment had been carried out. Byron (2000) contains examples of criteria used in recent EIAs. A collaborative initiative has been initiated by a professional body for ecologists (the Institute of Ecology & Environmental Management (IEEM)) to develop guidelines on assessment of ecological impacts for use in Environmental Impact Assessment (EIA), including guidance on evaluation of biodiversity importance, impact magnitude and impact significance. IEEM hopes that a wide range of organisations will ratify the final guidelines, which should be available in 2001, thus giving all participants in the ecological components of EIAs guidance in which they can place confidence.

Three of the case study EISs stated impact significance criteria (none of these were scheme specific, nor was there an explanation of how they were derived). The relationship between the assessments of impact significance and the assessments of biodiversity receptor importance and impact magnitude was discussed in only one of these EISs (Abergavenny). An example of criteria used to assess impact significance in a recent EIS is shown in Table 12.

Does the NBSAP provide targets which can be used to evaluate impacts or set mitigation requirements?

The UK BAPs and LBAPs do provide targets which could potentially be used to evaluate impacts and set mitigation requirements. However, to date there are no examples of these from actual EISs. Byron (2000) includes some theoretical examples – see Appendix 8. The Iwade EIS Addendum is good in that it starts to make links with relevant BAPs and LBAPs. However, the relevant BAP objectives and targets are not specifically used for evaluating the significance of impacts – see section 7.2 below.

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Table 11: Criteria for assessing impact significance

A1 Motorway North of Leeming to Scotch Corner (Highways Agency, 1994)	Impact significance	Explanation	Impact
The improvement and conversion to motorway of a 10 mile section of the A1	EXTREME	Adverse impacts that are of international significance and thus represent key factors in the decision-making process. Typically, no mitigation of the impact is possible. Effects may be such as to prevent a scheme from progressing.	Any impact on a site of international importance. High impact on a site of national importance.
	SEVERE	Adverse impacts that are of national significance and are important factors in the decision-making process. Mitigation of the adverse effects is not usually possible and if it is, there are likely to be residual impacts. Effects may be of such a scale as to radically influence scheme design.	Medium impact on a site of national importance.
	SUBSTANTIAL	Adverse impacts that are of county significance and are important factors in the decision-making process. Mitigation is usually possible to a certain extent but residual impacts are likely to remain. Will influence decision-making process but are not likely to be a deciding factor.	Low impact on a site of national importance. Medium high impact on a site of county importance.
	MODERATE	Adverse impacts that are of local significance and are likely to influence the decision-making process only if other factors are not an issue. The scope for mitigation is usually high, especially habitat creation.	Low impact on site of county importance. Medium high impact on a site of local importance.
	SLIGHT	Adverse impacts that are so small as to be of little or no significance.	Low impact on a site of local importance.

13.6.9 Environmental Impact Statement

Are impacts on biodiversity explained in EISs?

Byron *et al* (2000) found several well prepared EISs which appeared to consider most of the major ecological components, but these were the exception rather than the rule. One EIS failed to include a location map showing the location of the proposed project, 32.5% of the EISs failed to include maps of the sites of nature conservation in the footprint of the proposed roads and half of the EISs failed to include maps of the different habitat

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types along the proposed route. The maps were clear in 87.5% of the EISs where maps were included. It appeared that a specialist ecologist had been employed in 87.5% of the EISs, although the ecologist was only specifically identified in half the EISs. An estimate was made of the proportion of volume one of each EIS which dealt with ecological issues and impacts. The average proportion of the main volume of the EIA devoted to ecology was 9.5%, with a maximum of 27% and a minimum of 3%. Presentation of the biodiversity information in the case study EIAs is summarised in Appendix 9.

The case studies vary in their treatment of biodiversity information, the Rainworth documentation is the weakest. All of the case studies included details of the specialist ecologist company/individuals responsible for the biodiversity part of the EIS and of the guidelines, methods or techniques used. None contained terms of reference for specialist studies or gave detailed prescriptions for proposed mitigation and enhancement measures and all provided only a partial map showing the different types and quality of all habitats likely to be affected. The Abergavenny EIS contained clear summaries of expected residual impacts.

13.6.10 Review

Are there any review criteria available for impacts on biodiversity? Have EISs been reviewed to assess their coverage of biodiversity?

As noted above, the UK EIA system does not incorporate a formal review of EISs to check compliance with the EIA requirements and audit sufficiency of information. EISs are considered by the competent authority as part of the decision-making procedure and competent authorities do have the power to require further environmental information where the EIS is inadequate. However, the expertise and experience of considering EISs varies between competent authorities and as a result, EISs which do not adequately assess treatment of impacts on biodiversity may be accepted as the basis for decision-making.

There have been various reviews of the ecological components of EISs (eg Byron *et al*, 2000; Thompson *et al*, 1997; RSPB, 1995; Treweek *et al*, 1993) and the results of these have been used in this report – the results of the most recent review are summarised below. These reviews are based on review criteria derived from the requirements of the legislation and elements of good practice. Criteria which can be used for reviewing the biodiversity content of EISs are contained in Byron (2000) – see Appendix 6.

The results of the review (Byron *et al*, 2000) suggest that there have been some improvements in ecological assessment practice for proposed road developments following the introduction of official guidance in 1993 (DoT, 1993) eg all EISs reviewed discussed potential ecological impacts to some extent and a wider range of impacts was considered, and more new ecological surveys being carried out.

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However, the results also demonstrate a number of shortcomings in the assessment of potential ecological impacts of proposed road developments. For example:

- ❑ Failure to state the total area which would be occupied by the scheme, making it very difficult to estimate wildlife habitat losses.
- ❑ Emphasis on simple identification of sites, areas and species, with an emphasis on sites and species which are formally protected – ie not providing the level of detail that would permit evaluation of impact significance for species.
- ❑ Failure to state explicitly whether designated sites would be subject to direct effects and lack of discussion of potential indirect effects.
- ❑ Failure to explain whether protected species would be exposed to direct or indirect impacts, or indeed, whether reasonable searches had been carried out to ensure that all presences of rare or protected species had been recorded.
- ❑ Widespread failure to predict ecological effects in such a way that their importance can be evaluated meaningfully, eg failure to quantify even ecological impacts which are relatively straightforward to quantify eg habitat loss.
- ❑ A general failure to discuss possible cumulative effects and to consider the full range of impacts as outlined in the EIA Directive.
- ❑ While ecological surveys have become more extensive, it appears that the surveys may not be of an appropriate type or intensity to capture relevant ecological information. Ie surveys also remain largely descriptive, recording species on a presence/absence basis, rather than providing any quantitative information which is necessary to allow more detailed impact predictions
- ❑ Failure to specify both the criteria used to assess the wildlife value of habitats and species and those used to evaluate impact significance.
- ❑ Inadequate detail about proposed mitigation measures and their likely effectiveness.
- ❑ Poor presentation of ecological information in EISs
- ❑ Weak links between EIAs and current research in the scientific community.

In summary, the majority of EISs failed to comply with the requirements of the EIA Directive in their entirety or with best practice guidance on ecological assessment and it was not possible to assess the ecological implications of the proposed schemes with any degree of confidence.

13.6.11 Decision-making

Do biodiversity issues play a part in decision-making or are they over-ridden eg by economic considerations?

The 1999 Regs provide that a competent authority must take the environmental information (the EIS, any further information provided by the developer, comments from statutory authorities and any representations from the public consultation) into account into decision-making. Therefore the biodiversity information should play a part in decision-making.

However, in practice, it is difficult to assess the weight that biodiversity issues are afforded. For example, government guidance on appraisal of trunk roads states that “Options that have a “very large adverse effect” [on biodiversity] are likely to be unacceptable on nature conservation grounds alone (even with compensation proposals” (DETR, 1998). However, despite this principle, two road schemes judged to have “very large adverse effects” were given consent, which suggests that biodiversity issues are over-ridden by other considerations. A further potentially damaging road scheme (the Hasting Bypass) is currently awaiting a decision from DETR. The key issue is whether the scheme will be granted consent on economic justification grounds despite potential damage to three designated wildlife sites of national importance and a designated

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landscape site of national importance, or whether the scheme will be refused on biodiversity/landscape grounds.

The study by Wood and Jones (1997) on the influence of EIA on decisions – discussed above - suggests that EISs do not alter the final outcome of the decision, but that the main benefits relate to the better provision of information to decision makers and to some extent, modification of the project and setting conditions to reduce environmental impacts (Wood, 2000). This implies that environmental considerations (and therefore biodiversity considerations) are not a strong consideration in decision-making. However, no research has been carried out specifically on the weight given to biodiversity issues in decision-making. Competent authorities are required to publish the main reasons for their decision when they consider EIA projects. Analysis of these reasons might reveal information about the importance of biodiversity considerations in influencing decision outcomes, but no such analysis has been carried out to date.

13.6.12 Monitoring and post-project audit

Are there any examples where biodiversity monitoring has been recommended?

Post-implementation monitoring is not required by the EIA Directive or UK EIA legislation. Two of the case study EISs (Iwade and Rainworth) failed to address monitoring. However, documentation subsequently produced for a Public Inquiry on the Iwade proposals did contain some information about proposed monitoring. The Abergavenny EIS is good in that it outlines the monitoring envisaged and provides that this will be implemented via an Environmental Management System (EMS), but no details of the proposed monitoring or EMS are provided.

Byron *et al* (2000) found that 5% of the EISs included a commitment to monitoring some aspect of the scheme (no EISs in either of the previous reviews by Thompson *et al* (1997) and Treweek *et al* (1993) included such a commitment) and monitoring as a possibility for the future was discussed in four EISs (10%). This is higher than the average of 5% found for a range of development types by Thompson *et al* (1997).

Good practice example of mitigation (taken from RSPB (1995))

EIS accompanying an application for planning permission for a proposed holiday village – The EIS described extensive mitigation and compensation measures for the adverse ecological effects of the proposed development. The development would result in the loss of 28 hectares of woodland, parts of which were of considerable ecological value as a habitat to several notable species including firecrests, sparrowhawks, badgers and dormice. In an attempt to compensate for this, the developer had bought neighbouring woodland and farmland and had secured agreement on two further adjacent woods that would be protected from further development. It was also stated that a full time ecologist would be employed to continually monitor and manage the flora and fauna of the site and monitor success of the mitigation measures. A legal agreement was reached to legally bind the developer into implementing these measures.

13.6.13 Summary

Drawing on these three examples, the key areas where consideration of biodiversity in UK EIAs could be improved are:

- Adoption of a clear objective for biodiversity in relation to the project - ie concept of no net loss or net gain (enhancement);

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- ❑ Full consideration of all levels of biodiversity and the structural and functional links;
- ❑ Linkages with relevant BAP processes e.g. more positive consideration of BAP targets to help design mitigation/enhancement measures;
- ❑ More extensive/appropriate new survey work;
- ❑ Clearer statements of the attributes of impacts;
- ❑ Clearer criteria (with explanations of the reasons for their choice) for determining: the importance of biodiversity receptors, impact magnitude and impact significance; and
- ❑ Biodiversity monitoring/environmental management plans.

13.7 Case Studies

13.7.1 A465 Abergavenny to Hirwaun Dualling (Abergavenny)

Introduction

The A465 trunk road links south and west Wales to the Midlands and the north of England. This proposal is to upgrade the existing A465 between Abergavenny and Hirwaun a distance of approximately 40 km (25 miles). The existing road is a three-lane single carriageway road and the proposal is to improve this to a two-lane dual carriageway with climbing lanes in some areas. The proponent is the Welsh Office Highways Directorate.

Alternatives

The EIA specifically discusses the need, in the first instance, for impacts to be avoided where possible through the choice of route or through particular design measures. The EIS also states that “*The possible effects of the scheme on ecology are minimised by keeping the majority of its length on-line. This would reduce direct habitat loss resulting from landtake and also the effects of fragmentation.....*”. However, the EIS does not discuss the different alternatives considered or the biodiversity impacts in any more detail. This is likely to be a result of the staged process of adopting and appraising large road proposals in the UK¹².

Biodiversity characteristics of proposed development area

- ❑ The Brecon Beacons National Park;
- ❑ A wide range of habitats adjacent to the road (open farmland, marshland areas, wooded valleys, river margins with rich variety of mosses, liverworts and invertebrates, ancient woodland);
- ❑ The River Usk – designated as two SSSIs, which together comprise a potential SAC. This is an important riparian habitat overall and supports protected and other species; River Clydach/Clydach Gorge (genetically unique brown trout, bryophytes, lichens, vascular plants, riparian inverts, otters);
- ❑ Mynydd Llangatwg SSSI - notified as a candidate SAC. This encompasses part of the Clydach Gorge and the upland plateau. The cave system is one of the five most important hibernation sites in the UK for lesser horseshoe bats which use the gorge

¹² UK road proposals go through a three-stage assessment process. The objective of stage one is to undertake sufficient assessment to identify the nature conservation constraints associated with particular broadly defined route corridors. Stage two to undertake sufficient assessment to identify the nature conservation factors, and the significance of effects of the proposed route options on them. Stage 3 to undertake sufficient assessment to identify any significant nature conservation impacts likely to arise from construction of the preferred route, and to identify the location, type and importance of all areas of significant interest that may be affected. The EIS is the Stage 3 assessment and therefore does not present ecological information on route alternatives as this is considered to have been presented in the Stage 1 and 2 assessments.

for feeding and the caves for hibernation; The Gorge and surrounding area are important for birds;

- Taf Fechan SSSI - of value for river and woodland on the steep valley sides, it supports protected and nationally scarce species; and
- Other areas of interest along route support nationally and regionally important species e.g. lapwing, marsh fritillary, butterflies, grassland terrestrial and aquatic invertebrates.

Biodiversity data

The EIS only mentions biodiversity explicitly when referring to the relevant national BAPs. However, the EIS summary of planning and policy framework does mention the CBD. The EIS concentrates on ecosystem, habitat, communities, species, and population levels of biodiversity. However, there is a brief description of the landscape of each section to set the context, and a genetically unique species of fish is discussed. Structural/functional elements of biodiversity are not specifically identified as potential receptors, but some aspects are discussed in relation to specific habitats/species. For example fragmentation, slope and aspect, distribution of key physical features, water availability, dispersion, and range, hydrology and proposed changes in land management regimes. The EIS refers to relevant UK HAPs and SAPs, LBAPs are not mentioned. Non-designated sites and non-protected species are considered eg plants, terrestrial and aquatic invertebrates, bryophytes, lichens, and birds.

Background sources of information

Background sources of biodiversity information e.g. from previous reports and surveys were used and fully referenced. Some sources of background scientific information were used. No information on past, existing and future projects and activities was given.

New surveys

Extensive new survey work was carried out. Thirteen detailed survey reports are presented in the EIS. These include an Amphibian Survey and Assessment, a Survey of Bat use of Underground Sites in Clydach Gorge, a Bryophyte Survey and Assessment and a Vegetation Survey and Assessment. Abundance and distribution data is presented for key species e.g. aquatic ecology, bats, badgers, lichens, bryophytes, birds, vegetation, reptiles, amphibians, and invertebrates.

Evaluation

Biodiversity elements were evaluated into the following categories of importance - European, i.e. within the EC jurisdiction, Great Britain, Wales, South Wales, Route corridor i.e. within the survey area of the proposed scheme; and Local, i.e. within the survey area for each route section of the proposed scheme.

EIA process

Screening

Screening is not discussed in the EIA and so there is no indication of the extent to which biodiversity elements contributed to the decision that an EIA was needed.

Scoping

The EIS mentions a scoping study and public consultation at the route selection stage of the project and lists the main issues raised in questionnaires and letters. There is no list of activities associated with the project in the EIS although a few of the activities are mentioned in the text - principally permanent and temporary landtake.

The time and spatial parameters of the EIA are not explained in the EIS, nor is the overall study area described. Each of the ecological surveys does explain the area it covered;

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these are related to the habitat/species being surveyed. There is no scoping map, nor is a timetable for the EIA process provided. A scoping report was produced.

Impact assessment

Potential impacts are identified in the following categories habitat loss, habitat fragmentation, indirect impacts on habitat quality and species. The types of impacts identified are permanent habitat loss of site, physical removal of soils and vegetation, reduced connectivity in the landscape, barrier effects on species, increased mortality, changes to natural processes, water pollution, air pollution, changes to microclimate, disturbance, cumulative effects, habitat enhancement and new structures.

There are few quantitative impact predictions and information on the nature of each impact is only partial. Categories of impact magnitude (severe, moderate, slight, negligible, none) are stated. The EIS explains that the scale for impacts is not strictly defined and that values are given on the basis of professional judgement based on several criteria: type, potential extent, duration, magnitude, nature, probability, timing. These criteria are not explicitly related to BAP targets and are not scheme specific.

Mitigation

The EIS notes the possibility of enhancement but states that it is not within the proponent's powers to carry enhancement measures out. Discussion of mitigation/enhancement issues is patchy, there are no clear descriptions of the mitigation measures proposed, or assessments of their likely success. Treatment of mitigation/enhancement measures in all three case studies is summarised in Appendix 9.

Integration of biodiversity into EIA – good practice example

The EIA adopts an avoid, reduce, compensate strategy ie impacts will be avoided where possible, where not possible they will be reduced, compensation will be viewed as a last resort.

Impact evaluation

Impacts are evaluated into one of five categories (highly significant, significant, minor significance, not significant, and no impact), which do not appear to be scheme specific. Evaluation is largely by using a matrix that combines receptor importance and impact magnitude.

Integration of biodiversity into EIA – good practice example

The EIA includes clear tables showing the pre and post mitigation significance level of each impact.

EIS

The EIS and supporting documentation includes many good practice elements. For example, guidelines, methods and sources of background information are referenced, cumulative effects are presented, proposed mitigation and enhancement measures are explained, residual impacts are summarised and the proposed biodiversity post-project monitoring programme described. Presentation of biodiversity information in all of the case studies is summarised in Appendix 9.

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Monitoring

The EIA states that monitoring will be carried out pursuant to an Environmental Management System (EMS) and lists the elements which will be monitored. However further details of the proposed EMS are not provided – so there are no details of the proposed monitoring programme, schedules, timescale, targets, a quality control mechanism or provisions for remedial action if the mitigation/management targets are not achieved.

Integration of biodiversity into EIA – good practice example

Proposed Environmental Management System outlined and receptors to be monitored identified.

Biodiversity survey techniques

Generally the main elements of survey good practice: appropriate timing, survey duration, study area, methodologies, evaluation criteria, repeated sampling, and the need for each of these elements are recorded in the EIA documentation. The weakest area was repeated sampling – likely to be a result of limited resources.

Obvious omissions of biodiversity impacts

Omitted biodiversity impacts include edge effects, soil and air pollution, wind funnelling effects, reduced visibility, introduction of exotics, offsite habitat losses and changes in quality, cumulative impacts, habitat enhancement.

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Outcome

Public consultation on several alternative routes was held between 24 October and 20 December 1994 and the Secretary of State (SoS) for Wales announced the Preferred Route in July 1995. The EIS for the proposal was published in October 1997. A Public Inquiry was held between 23 June and 26 August 1998 and in 1999 the report from this, which recommended that the proposal be constructed subject to various amendments, was published. In June 1999 the SoS for Wales issued his decision letter confirming that the scheme (incorporating some, but not all, of the proposed amendments) should proceed. It appears that biodiversity issues were considered in the decision-making process as the SoS's decision letter authorising the scheme specifically mentions:

"In considering his recommendations, the Inspector paid particular attention to the environmental effects of the scheme.....On ecology and landscape he has considered the mitigation measures proposed as outline in the Environmental Statement. He is satisfied that these measures are sufficient to mitigate against future geological and hydrological aspects, that every effort has been made to minimise the effect a new road may have on the caves in the Clydach Gorge, and that the interests of flora and fauna are being protected." (WOHD, 1999).

Construction is expected to start in 2002. The most likely predicted residual biodiversity effects are:

- ❑ Impacts on watercourses from pollution incidents during construction and increased run-off;
- ❑ Small losses of ecological valuable habitats;
- ❑ Impacts on a lapwing feeding site; and
- ❑ Potential impacts on horseshoe bats.

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13.7.2 A249 Iwade Bypass to Queenborough Improvement (Iwade)

Introduction

This proposal is to upgrade the A249 between Iwade and Queenborough and is the last of four schemes to improve the A249. The proposal will link the existing Iwade bypass across the River Swale to the edge of Queenborough. The location is shown in Figure 5. The proponent is the Highways Agency Southern Operations Division. Studies commissioned by the Department of Transport in 1993 assessed the options for crossing the Swale and recommended a high level bridge and an alignment for the road. In October 1994 the SoS announced his Preferred Route – a 5km dual two-lane carriageway which crosses the Swale on a 1.4km viaduct with a 29m clearance above the high water level. In February 1995, the Highways Agency commissioned consultants to carry out a full EIA. A scoping report was produced and circulated in 1996 and the EIS published in January 1997. An addendum to the EIS was published in August 1999. The EIS discusses habitat creation as compensation for land lost to the scheme and a specific agreement was prepared to provide for the management of this proposed compensation land.

Figure 5: Location of Iwade proposal

Alternatives

Avoidance of the loss of, as far as possible, and minimisation of damage to a designated site of European importance was a key factor in route selection for the section of the route in the SPA. However, alternatives are not discussed in any detail – again likely to have been considered to some extent at an earlier stage in the project planning process.

Biodiversity characteristics of proposed development area

- ❑ **3 designated sites of national importance** – 2 of which are also designated as sites of European and International importance (SPAs and Ramsar sites);
- ❑ **Habitats** – salt marsh, grazing marsh, intertidal mud and sand flats, lowland farmland and hedgerows
- ❑ **Plants** – notable species, national status species and biodiversity status species
- ❑ **Terrestrial, aquatic and intertidal invertebrates** – RDB and nationally notable, also species which are UK or draft Kent SAP species
- ❑ **Fish and marine life** – bass, mullet, eels and small shrimps
- ❑ **Amphibians and reptiles** – including great crested newt
- ❑ **Birds** – important area for spring passage, breeding and winter birds
- ❑ **Mammals** – otter and water vole

Biodiversity data

Biodiversity components

The scoping report does not explicitly mention biodiversity. The main EIS mentions national and local BAP species. The EIS addendum considers national and local BAP habitats and species. The main EIS concentrates on habitats, communities, species, and

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population levels of biodiversity. The addendum touches on regional level biodiversity characteristics. Structural/functional elements of biodiversity are not specifically identified as potential receptors. However, hydrological issues are discussed for relevant receptors and compensation land selected specifically because it is a hydrologically distinct unit. Non-designated sites and non-protected species are considered - plants, terrestrial, aquatic and intertidal invertebrates, and birds.

Background sources of information

Background sources of biodiversity information e.g. from previous reports and surveys were used but not fully referenced. Some sources of background scientific information were used. No information on past, existing and future projects and activities was given.

New surveys

Detailed new survey work was carried out for the EIA. Twelve survey reports are discussed in the Ecology volumes of the EIS. These include an Invertebrate survey report, a botanical, herpetological and mammal survey report, an intertidal invertebrate survey and a three part ornithological survey. The survey work for this EIA seems extremely thorough. Abundance and distribution data are presented for key species (e.g. bats, birds, reptiles, invertebrates).

Integration of biodiversity into EIA – good practice example

Extensive and thorough new survey work

The survey work appears to have focussed on a selection of key species: plants, invertebrates, fish and marine life, amphibians and reptiles, birds, mammals (badger, dormouse, water vole, bats). Reasons are given for selection of some of the species, e.g.: certain plants, invertebrates and birds as they are mentioned in designated citations; certain species of amphibians and mammals because they are protected /endangered. There is no indication in the EIS of whether consultees participated in the selection of the key species. However, it is understood that consultees were involved in this selection during the scoping process.

Evaluation

The Iwade EIS clearly states and explains the evaluation criteria used (for habitats: designations, Ratcliffe (1977) and Nature Conservancy Council (1989) criteria, and natural critical capital concept; for species whether they are of international, national or local importance). The majority of habitats outside designated areas appear to have been evaluated. The evaluation criteria do not explicitly mention BAP priority habitats and species, but SAPs are discussed and used in the assessment of species status.

EIA process

Screening

Screening is not discussed in the EIA and so there is no indication of the extent to which biodiversity elements contributed to the decision that an EIA was needed.

Scoping

The EIS refers to a detailed scoping exercise, but there is little discussion of this in the documentation. The time and spatial parameters of the EIA are defined. The selected study area is referred to as a “corridor” and is shown on a map. However, the map does not have a scale and the text gives no indication of the actual extent of study area. The

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text does however, state that the study area was large enough to consider indirect effects, but it is not possible to assess this properly based on the information/map provided. A distinction is made between temporary and permanent effects – the former lasting less than and the later more than 25 years. There is no “scoping map” or timetable for the EIA. A scoping report was prepared for the Iwade EIA, but the EIS does not give a comprehensive list of the organisations/people consulted.

Impact assessment

Potential habitat loss effects, habitat fragmentation effects and changes in habitat quality and other indirect effects were identified – cumulative impacts were not considered. The following types of impacts identified: permanent habitat loss on site, temporary habitat loss on site, reduced connectivity in the landscape, barrier effects on species, increased mortality, changes to natural processes, water, soil and air pollution, disturbance, reduced visibility, off site habitat losses and changes in quality, improved habitat management, and habitat creation.

There are no explicit statements of impact magnitude, habitat loss is the only impact quantified, and only partial information is provided on the nature of the impacts.

Mitigation

It seems that an approach of avoidance and minimisation of impacts was adopted for the section of the proposed scheme that would impact on SPA/SSSI land. However, this strong approach does not appear to have been adopted in relation to the remainder of the scheme. There are, however, some elements of enhancement e.g. restoration of a lay-by to reconnect habitats in the landscape and provision of drainage system superior to the current one which the EIS implies will result in a net improvement in water quality in the locality beyond and above the pre-scheme position. See Appendix 9 for further details.

Impact evaluation

The Iwade EIS assesses impact significance into three categories (major, moderate, and minor) which are generic rather than scheme specific. It states that impacts are placed into one of these categories by consideration of: the magnitude of the effect, the levels of importance of the impact in terms of the environmental and planning policy/legislation, sensitivity, uniqueness and rarity of location, and if the effect is permanent or reversible through mitigation. The EIS does not explain how these significance criteria have been derived but it appears to be principally based on site designations/protected species. Although the explanations of the categories of significance do mention levels of receptor importance, they do not relate to assessment of impact magnitude which is not explicitly given in the EIS.

In the 1999 EIS Addendum direct and indirect impacts of the scheme considered were considered for each HAP/SAP habitat/species by checking proposed post mitigation/compensation assessments of impact significance against BAP and English Nature’s Natural Area goals to check that there were no conflicts. The Addendum concluded that there were no conflicts. While it is good that there was no conflict and that the BAP targets were brought into the EIA, the approach taken was not the most positive use of the BAP targets. For instance, if BAP goals had been used as criteria by which to judge impact significance this may have resulted in specific impacts being given different measures of significance. For example, the scheme involves the loss of grazing marsh a BAP habitat which will be compensated by habitat creation in an alternative location. This is described as having no conflict with the BAP targets of no loss of this habitat due to the proposed habitat creation. However, as this replacement habitat will take time to create – there will be a net habitat loss for as long as habitat restoration takes.

Integration of biodiversity into EIA – good practice example

Addendum to EIS starts to make linkages with the UK and Local BAP processes.

EIS

The EIS and supporting documentation includes some good practice elements. For example, explanation of the criteria used to determine the importance of biodiversity receptors and significance of impacts, explanations of the study areas considered, references to guidelines and inclusion of all new survey data, explanations of proposed mitigation/enhancement measures, residual impacts are summarised and the proposed biodiversity post-project monitoring programme described. See Appendix 9 for further details.

Monitoring

The Iwade EIS refers to a management agreement for the compensation land, but no further details of this are given in the EIS. Part of a separate compensation land agreement was made available for the Public Inquiry. This sets out:

- ❑ The four key aims for the management of the compensation land: habitat for at least a specified number of pairs of 8 breeding bird species, habitat for 400 wintering lapwing, to foster development of grazing marsh structure, and to develop invertebrate fauna in ditches/pasture;
- ❑ The ideal management requirements of each of the eight breeding bird species; lapwing; grazing marsh, invertebrates;
- ❑ The overall management regime for birds and other objectives.
- ❑ Monitoring requirements.

The compensation land area is a 22 ha site – on three sides of which is SSSI and the fourth failed arable land. This area is larger than the land take lost to the scheme, but was selected not because of its size, but because it is a distinct hydrological unit and therefore can be managed. The management plan for the habitat creation was prepared with input from English Nature and the RSPB and is to be reviewed every five years. The Highways Agency are considering establishing an ecology group to consider the results of the monitoring data, in any event the Highways Agency intend to work with English Nature on the monitoring work.

Biodiversity survey techniques

Generally the main elements of survey good practice: appropriate timing, survey duration, study area, methodologies, evaluation criteria, repeated sampling, and the need for each of these elements are recorded in the EIA documentation. The weakest area was repeated sampling – likely to be a result of limited resources.

Obvious omissions of biodiversity impacts

Physical removal of soils and vegetation, edge effects, reduced patch size, changes to microclimate, windfunneling, introduction of exotics, changes to habitat management, public pressure, cumulative impacts, habitat enhancement and new structures.

Outcome

The EIS specifically states that because of the SPA “*only the route which causes the least damage to the environment in respect of nature conservation issues can be considered*” (Paragraph 3.1 HASOD, 1997a). A short Public Inquiry on the scheme was held in September 1999 and the SoS has just authorised this scheme to proceed.

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The EIS summary implies that there will be no residual impacts. The permanent loss of 4.04 hectares of SSSI/SPA will be balanced by the new compensation land. However this is dependent on the success of the compensation land which cannot be guaranteed. In addition, a further 8.11ha of ecologically important grazing marsh will be lost to the scheme.

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13.7.3 A617 Rainworth Bypass

Introduction

Rainworth Village is situated on the A617 between Mansfield and Newark in Nottinghamshire. The A617 is an important strategic route forming an east west link between the A1 and the M1. The proposal is to build an off-line bypass which would be predominantly two-lane dual carriageway and is approximately 0.4 km in length. The proponent is Nottinghamshire County Council (NCC). In July 1993, NCC published a report which considered four bypass route alternatives and carried out a public consultation exercise which showed strong support for a bypass with a preference for a route passing to the north of Rainworth. This route was then adopted as the Preferred Route. In April 1993 environmental consultants were commissioned to carry out an EIA of the Preferred Route and the EIS was published in October 1994.

Alternatives

The EIS does not discuss the ecological impacts of different scheme alternatives and there is no indication that ecological issues had any part in influencing the scheme route selection or design.

Biodiversity characteristics of proposed development area

- ❑ A nationally designated site (SSSI), County site and Wildlife Trust heathland reserve
- ❑ Heathland, including a small wet heath community, heath/grassland mosaics, hedgerows
- ❑ Terrestrial and aquatic invertebrates
- ❑ Heathland birds
- ❑ Bats and deer

Biodiversity data

Biodiversity components

The EIS does not explicitly mention biodiversity. It EIS concentrates on landscape, ecosystem, habitat, community and species levels of biodiversity. Structural and functional elements of biodiversity are not specifically identified as potential receptors, but connectivity and hydrological issues are discussed to some extent. There are no references to national and local BAPs. Non-designated sites and non-protected species are considered.

Background sources of information

Background sources of biodiversity information e.g. from previous reports and surveys were used but not fully referenced, but the EIS did refer to some of the suggested sources. Some sources of background scientific information were used (e.g. published papers on roadside communities with elevated nitrogen levels and on the accumulation of toxic metals in roadside invertebrate communities). No information on past, existing and future projects and activities was given.

New surveys

Some new survey work was carried out for the Rainworth EIA: a broad habitat survey, a more detailed vegetation survey of certain selected areas, a terrestrial invertebrate study, an aquatic invertebrate survey, searches for the presence of larger mammals and bats, and notes of the birds seen/heard (NCC, 1994b). However, although birds are mentioned in relation to the heathland in the locality of the proposed scheme no detailed bird survey work was carried out. The survey work is limited in detail - habitats in certain areas of the study area appear to have been evaluated for their quality, but there is no indication of the criteria on which these assessments were made.

The survey work appeared to have been focussed by the selection of key species: terrestrial and aquatic invertebrates, larger mammals (deer and badger) and bats. Reasons are given for the selection of these species as follows:

- ❑ Terrestrial invertebrate species – because lowland heath provides an important habitat for a number of the less common species;
- ❑ Aquatic invertebrates in a stream – to assess the ecological interest of this small stream and the potential for damage from road run off ;
- ❑ Larger mammals including deer and badger – because of statutory protection; and
- ❑ Bats – because they are protected species (NCC, 1994b).

Evaluation

The Rainworth EIS does not state the evaluation criteria used. Some, but not all, areas of natural and semi-natural vegetation outside sites were evaluated. There is no reference to sites with BAP habitats/species.

EIA process

Screening

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Screening is not discussed in the EIA and so there is no indication of the extent to which biodiversity elements contributed to the decision that an EIA was needed.

Scoping

There is no discussion of the scoping process in the EIS or other documentation. The study area for the EIA was a fixed 500 metre wide corridor. There is no definition of the time parameters, no timetable, scoping map or mention of a scoping report.

Impact assessment

Potential habitat loss effects, habitat fragmentation effects and changes in habitat quality and other indirect effects were identified – cumulative impacts were not considered. The following types of impacts were identified: permanent habitat loss on site, temporary habitat loss on site, reduced connectivity in the landscape, barrier effects on species, increased mortality, edge effects, reduced patch size, changes to natural processes, water, and air pollution, and disturbance.

Integration of biodiversity into EIA – good practice example

Identification of a good range of indirect impacts.

There are no explicit statements of impact magnitude, no quantified impact predictions and little information on the nature of the impacts.

Mitigation

There is no indication in the documentation that ecological considerations had any part in influencing scheme route selection or design and treatment of mitigation/enhancement in the EIS is poor - see Appendix 9 for further details.

Impact evaluation

There is no explanation of the criteria used to assess impact significance.

EIS

The EIS and supporting documentation include very few good practice elements. The specialist ecologist company/individuals responsible for the biodiversity part of the EIS are named, guidelines, methods and techniques used referenced, and a map of biodiversity constraints included. See Appendix 9 for more details.

Monitoring

The EIS does not mention monitoring. It does however mention a three year habitat management contract, but no further details of this are provided. The planning permission refers to a five year habitat management contract, but again no further details are provided.

Biodiversity survey techniques

Generally the main elements of survey good practice: appropriate timing, survey duration, study area, methodologies, evaluation criteria, repeated sampling, and the need for each of these elements are recorded in the EIA documentation. The weakest area was repeated sampling – likely to be a result of limited resources.

Obvious omissions of biodiversity impacts

Biodiversity impacts which were not considered include physical removal of soils and vegetation, soil pollution, changes to microclimate, windfunneling, reduced visibility,

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introduction of exotics, changes to habitat management, public pressure, off site habitat losses and changes in habitat quality, cumulative impacts, habitat enhancement, improved habitat management, habitat creation and new structures.

Outcome

A Public Inquiry was held between September and November 1996 and in February 1997 at which an objection was made to the line of the proposed route. The objector suggested an alternative route south of Rainworth or failing that a realignment of the proposed route (referred to as the northern realignment). The report from the Inquiry was published in early 1998 and recommended that the road should not proceed until consideration had been given to incorporating the northern realignment. This prompted the SoS to consult NCC about the proposed northern realignment. The result was that the County Council adopted this realignment, for which planning permission was granted in July 1998 and the SoS approved the scheme in 1999. The planning permission included sixteen conditions, including three conditions relating to a proposed area of habitat creation.

These required that:

- ❑ certain details of “a scheme for the creation of nature conservation areas” covering a certain area to be submitted to NCC for approval;
- ❑ the bypass shall not be brought into use until the nature conservation scheme has been carried out; and
- ❑ following creation, the nature conservation areas shall be managed for five years.

Although in theory these conditions appear strong, in practice, 18 months after the grant of the planning permission the areas of nature conservation land were still being negotiated and, despite the on going negotiations, construction of the scheme had commenced.

There is no indication in the Rainworth documentation that biodiversity issues were important in the decision-making process – the EIA is not very clear as to what residual impacts there will be if the scheme proceeds. The Public Inquiry consideration of the route focuses on proposed alterations to the route to avoid impacts on a school and this is the main issue raised in the SoS’s decision letter.

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13.8 Future actions to improve effectiveness of biodiversity conservation and sustainable use

UK EIA legislation, guidance and practice is relatively well advanced – as is evidenced from elements of the case studies described above. However, there are still various areas of EIA that could be strengthened to improve the effectiveness of biodiversity conservation and sustainable use, as follows.

- ❑ SEAs need to be carried out for strategic proposals – these will enable impacts on biodiversity and potential biodiversity enhancements to be identified early in the policy, plan, programme, project hierarchy of decision-making. At the strategic level there is greater flexibility to select options which will avoid adverse impacts on biodiversity and to plan meaningful biodiversity enhancements. SEAs are currently be carried out on a voluntary basis. By 2004, SEAs for many plans and programmes will be required by EU legislation.
- ❑ EIAs and SEAs need to be tiered so that environmental information (including biodiversity information) is available for consideration in decision-making at all levels. Biodiversity information from SEAs will be available for use in EIAs. While biodiversity information required for EIAs is likely to be much more detailed than that used for SEAs, it will certainly be a useful information source. Biodiversity information generated from monitoring SEAs will also be useful.
- ❑ EIAs need to be carried out for a wider range of projects/activities to ensure that all projects with potentially damaging impacts on biodiversity are subject to EIA – the level of detail of which should be commensurate with the potential damage. For example, provisions in the EIA Directive requiring EIAs for certain agricultural projects have yet to be implemented in the UK, though these provisions should have been implemented in 1988. This loophole has meant that there are cases where important biodiversity has been lost without prior assessment or consent.
- ❑ EIAs need to start earlier in the project planning process to help achieve improved environmental design. The earlier the EIA commences the greater the scope that impacts on biodiversity can be avoided by siting and design. Early EIA is also more likely to be able to identify opportunities for biodiversity enhancement and incorporate these as integral components of projects.
- ❑ Better consideration of the full range of biodiversity issues, particularly consideration of all levels of biodiversity and structural and functional processes and potential linkages with national and local BAPs in EIAs.
- ❑ Better understanding of the potential of SEA and EIA (and other informational-tools) to play an important role in integrating biodiversity considerations into decision-making by the UKBG, County Biodiversity Groups, Local Biodiversity Partnerships and organisations holding biodiversity information. Promotion of the integration of biodiversity issues into decision-making in all sectors at all levels – in which SEA and EIA could play a vital role – needs to be emphasised and promoted as widely as the UK BAPs and LBAPs. While the BAPs are a vital part of the UK’s strategy and approach for conserving and ensuring the sustainable use of biodiversity, this cannot be achieved by “conservation sector” specific action alone – integration of biodiversity concerns into all sectors is essential.
- ❑ Improved EIA experience and expertise of local authorities and other competent authorities, developers, and environmental and ecological consultants of preparing and reviewing/considering the adequacy of the biodiversity components of EIAs. Rosters of “approved” consultants for carrying out biodiversity elements of EIAs.

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- ❑ Existing best practice guidance on treatment of biodiversity/ecological impacts in EIA (including Byron (2000), RSPB et al (2000), Treweek (2000) and the recommendations in RSPB (1995) needs to be adopted and used more widely.
- ❑ Increased integration of the different components of EIAs to produce more integrated EIAs/EISs – at present work on different environmental components tends to be sub contracted to different people so there is frequently a severe lack of integration. For example, between the biodiversity and hydrology aspects, and commonly even between sub-components of the biodiversity section. Encouraging closer team working between different specialists and placing more emphasis on the role of the EIA coordinator/manager should help this.
- ❑ Earlier and more participative consultation through the whole of the EIA process.
- ❑ All developments in areas of importance for biodiversity should require mandatory EIA. Areas with UK BAP habitats or species should automatically require EIA.
- ❑ Improved consideration of alternatives in EIA – more information needs to be provided on the biodiversity impacts of different alternatives.
- ❑ Mandatory scoping – it should be compulsory for all developers to contact the competent authority and statutory nature conservation authorities for advice on the scope of the EIA, including the scope of the biodiversity component. Developers should also be encouraged to consultation with other relevant bodies with biodiversity knowledge and information eg ngos, and the general public.
- ❑ More informed impact predictions and proposed mitigation measures in EIAs based on better baseline biodiversity information – sufficient and appropriate survey work must be carried out at appropriate times of the year by suitably qualified people using standard methodologies. More use of relevant existing biodiversity information and links to scientific literature.
- ❑ Increased dissemination of biodiversity data collected for EIAs ensuring that the maximum benefits are achieved from this information. Baseline (and any subsequent monitoring) data should be made as widely available as possible eg to local communities, appropriate authorities, and biodiversity information networks, including the UK NBN.
- ❑ Clearer explanations of the criteria (and ideally more consistent criteria) used to assess the importance of biodiversity receptors and the magnitude and significance of impacts on biodiversity.
- ❑ Mandatory mitigation (planning conditions and legal agreements) – dealing with negative impacts – the bottom line should be no net loss and where possible biodiversity gains eg contributing to BAP targets
- ❑ Better quality and more accessible EISs – particularly improved descriptions of biodiversity impacts (quantified wherever possible) and of proposed avoidance, mitigation, compensation and enhancement measures and proposed post project monitoring.
- ❑ Establishment of formal system of EIS review – for quality control of biodiversity and other EIA components eg by a specially established body or approved experts.
- ❑ Improved transparency of decision-making - more weight be placed on biodiversity considerations in decision-making and more information on the rationale for the decisions to be made public.
- ❑ Mandatory post project monitoring of important elements and post project audits and reporting.
- ❑ An official central catalogue of EIAs and decision results, ideally with copies of EISs – to facilitate analysis of effectiveness of the UK EIA system, comparison between different sectors, etc.

The most effective mechanism for achieving many of these measures is likely to be by implementing new legislation and accompanying guidance and by revising existing legislation and official guidance. However, much progress could also be achieved by:

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- ❑ Raising the awareness of the importance of biodiversity issues in EIAs;
- ❑ Promotion of good practice;
- ❑ Capacity building of EIA professionals ie through workshops, conferences, email networks;
- ❑ Establishing lists of experts;
- ❑ Providing lists of relevant sources of guidance and information – including on the internet for ease of reference;
- ❑ Publication of further good practice guidance (eg from the IEEM work in progress); and
- ❑ Analysis and publication of case study information.

13.9 Final conclusions

The UK has a strong tradition of collecting biodiversity information and a well-developed national biodiversity action planning process the focus of which is currently moving towards implementation phase. The national process is supported by biodiversity action planning at a local level. The UK EIA system is relatively advanced and already ensures that some biodiversity information is included into EIAs. Although there is still room for improvement in many areas – eg collection of sufficient and more appropriate biodiversity data, more detailed analysis and evaluation of the potential impacts on biodiversity, proposal of stronger mitigation and enhancement measures which are translated into definite action on the ground, and post project monitoring.

Disappointingly, to date links between the biodiversity action planning process and EIA are generally poor. However, what is encouraging is the potential for two-way linkages to be made between the strong system of national and local BAPs already in place and EIA, in terms of information, objectives and targets from the UK BAP and national and local level BAPs being used in EIAs and SEAs. In addition, for the biodiversity action planning process to recognise and capitalise on the potential of EIA and SEA to contribute to the achievement of BAP objectives and targets by integration of biodiversity considerations into decision-making at all levels. It is vital that these linkages are exploited to ensure that UK biodiversity is not damaged and that wherever possible it is enhanced by developments, policies, plans and programmes. The goal is for UK decision-makers make decisions based on full knowledge of the potential effects on biodiversity and to take these effects in to account in decision-making.

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Appendix 1 – Estimated stock of broad habitats in the UK in 1998 (taken from DETR, 2000b)

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1. Figures presented are for Built up and Gardens in rural areas surveyed by CS2000 and NICS2000
2. Figures presented are for transport features (roads, railways, tracks including verges) in rural areas surveyed by CS200 and NICS2000
3. The field survey did not sample areas more than 75% built up
4. Totals may not agree due to rounding

Summary of broad habitat types by country

Scotland has a high proportion of the UK's semi-natural habitats. The most extensive broad habitat found in Scotland is bog. Other important semi-natural habitat types include acid grassland, dwarf shrub heath, fen, marsh and swamp and montane habitats. Collectively, these habitats cover just over half the land area of Scotland. Coniferous woodland also covers a larger proportion of land in Scotland than elsewhere in the UK.

Improved and neutral grasslands cover two-thirds of the land in Northern Ireland and a substantial proportion of the UK stock of neutral grassland. This type of grassland is less intensively managed than many other agricultural grassland types and includes hay meadows of high conservation value. Fen, marsh and swamp, and bog are also important landscape elements in Northern Ireland.

England and Wales have proportionally more broadleaved woodland and a much higher concentration of developed land. Other semi-natural habitats are found only on 11% of the land in England and Wales (DETR, 2000a).

Appendix 2 – Annexes I, II and III of the EIA Directive as amended

Annex I projects

1. Crude-oil refineries (excluding undertakings manufacturing only lubricants from crude oil) and installations for the gasification and liquefaction of 500 tonnes or more of coal or bituminous shale per day.
2. Thermal power stations and other combustion installations with a heat output of 300 megawatts or more, and nuclear power stations and other nuclear reactors including the dismantling or decommissioning of such power stations or reactors (*) (except research installations for the production and conversion of fissionable and fertile materials, whose maximum power does not exceed 1 kilowatt continuous thermal load).
3. (a) Installations for the reprocessing of irradiated nuclear fuel.
(b) Installations designed:
 - for the production or enrichment of nuclear fuel,
 - for the processing of irradiated nuclear fuel or high-level radioactive waste,
 - for the final disposal of irradiated nuclear fuel,
 - solely for the final disposal of radioactive waste,
 - solely for the storage (planned for more than 10 years) of irradiated nuclear fuels or radioactive waste in a different site than the production site.
4. Integrated works for the initial smelting of cast-iron and steel; Installations for the production of non-ferrous crude metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes.
5. Installations for the extraction of asbestos and for the processing and transformation of asbestos and products containing asbestos: for asbestos-cement products, with an annual production of more than 20 000 tonnes of finished products, for friction material, with an annual production of more than 50 tonnes of finished products, and for other uses of asbestos, utilization of more than 200 tonnes per year.
6. Integrated chemical installations, i.e. those installations for the manufacture on an industrial scale of substances using chemical conversion processes, in which several units are juxtaposed and are functionally linked to one another and which are:
 - (i) for the production of basic organic chemicals;
 - (ii) for the production of basic inorganic chemicals;
 - (iii) for the production of phosphorous-, nitrogen- or potassium-based fertilizers (simple or compound fertilizers);
 - (iv) for the production of basic plant health products and of biocides;
 - (v) for the production of basic pharmaceutical products using a chemical or biological process;
 - (vi) for the production of explosives.
- 7 (a) Construction of lines for long-distance railway traffic and of airports (1) with a basic runway length of 2 100 m or more;
(b) Construction of motorways and express roads (2);
(c) Construction of a new road of four or more lanes, or realignment and/or widening of an existing road of two lanes or less so as to provide four or more lanes, where such new road, or realigned and/or widened section of road would be 10 km or more in a continuous length.
- 8(a) Inland waterways and ports for inland-waterway traffic which permit the passage of vessels of over 1 350 tonnes;

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(b) Trading ports, piers for loading and unloading connected to land and outside ports (excluding ferry piers) which can take vessels of over 1 350 tonnes.

9. Waste disposal installations for the incineration, chemical treatment as defined in Annex IIA to Directive 75/442/EEC (3) under heading D9, or landfill of hazardous waste (i.e. waste to which Directive 91/689/EEC (4) applies).

10. Waste disposal installations for the incineration or chemical treatment as defined in Annex IIA to Directive 75/442/EEC under heading D9 of non-hazardous waste with a capacity exceeding 100 tonnes per day.

11. Groundwater abstraction or artificial groundwater recharge schemes where the annual volume of water abstracted or recharged is equivalent to or exceeds 10 million cubic metres.

12 (a) Works for the transfer of water resources between river basins where this transfer aims at preventing possible shortages of water and where the amount of water transferred exceeds 100 million cubic metres/year;

(b) In all other cases, works for the transfer of water resources between river basins where the multi-annual average flow of the basin of abstraction exceeds 2 000 million cubic metres/year and where the amount of water transferred exceeds 5 % of this flow. In both cases transfers of piped drinking water are excluded.

13. Waste water treatment plants with a capacity exceeding 150 000 population equivalent as defined in Article 2 point (6) of Directive 91/271/EEC (5).

14. Extraction of petroleum and natural gas for commercial purposes where the amount extracted exceeds 500 tonnes/day in the case of petroleum and 500 000 m³/day in the case of gas.

15. Dams and other installations designed for the holding back or permanent storage of water, where a new or additional amount of water held back or stored exceeds 10 million cubic metres.

16. Pipelines for the transport of gas, oil or chemicals with a diameter of more than 800 mm and a length of more than 40 km.

17. Installations for the intensive rearing of poultry or pigs with more than:

(a) 85 000 places for broilers, 60 000 places for hens;

(b) 3 000 places for production pigs (over 30 kg); or
900 places for sows.

18. Industrial plants for the

(a) production of pulp from timber or similar fibrous materials;

(b) production of paper and board with a production capacity exceeding 200 tonnes per day.

19. Quarries and open-cast mining where the surface of the site exceeds 25 hectares, or peat extraction, where the surface of the site exceeds 150 hectares.

20. Construction of overhead electrical power lines with a voltage of 220 kV or more and a length of more than 15 km.

21. Installations for storage of petroleum, petrochemical, or chemical products with a capacity of 200 000 tonnes or more.

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Annex II projects

1. Agriculture, silviculture and aquaculture

- (a) Projects for the restructuring of rural land holdings;
- (b) Projects for the use of uncultivated land or semi-natural areas for intensive agricultural purposes;
- (c) Water management projects for agriculture, including irrigation and land drainage projects;
- (d) Initial afforestation and deforestation for the purposes of conversion to another type of land use;
- (e) Intensive livestock installations (projects not included in Annex I); (f) Intensive fish farming;
- (g) Reclamation of land from the sea.

2. Extractive industry

- (a) Quarries, open-cast mining and peat extraction (projects not included in Annex I);
- (b) Underground mining;
- (c) Extraction of minerals by marine or fluvial dredging;
- (d) Deep drillings, in particular:
geothermal drilling,
drilling for the storage of nuclear waste material,
drilling for water supplies,
with the exception of drillings for investigating the stability of the soil;
- (e) Surface industrial installations for the extraction of coal, petroleum, natural gas and ores, as well as bituminous shale.

3. Energy industry

- (a) Industrial installations for the production of electricity, steam and hot water (projects not included in Annex I);
- (b) Industrial installations for carrying gas, steam and hot water; transmission of electrical energy by overhead cables (projects not included in Annex I);
- (c) Surface storage of natural gas;
- (d) Underground storage of combustible gases;
- (e) Surface storage of fossil fuels;
- (f) Industrial briquetting of coal and lignite;
- (g) Installations for the processing and storage of radioactive waste (unless included in Annex I);
- (h) Installations for hydroelectric energy production;
- (i) Installations for the harnessing of wind power for energy production (wind farms).

4. Production and processing of metals

- (a) Installations for the production of pig iron or steel (primary or secondary fusion) including continuous casting;
- (b) Installations for the processing of ferrous metals:
 - (i) hot-rolling mills;
 - (ii) smitheries with hammers;
 - (iii) application of protective fused metal coats;
- (c) Ferrous metal foundries;
- (d) Installations for the smelting, including the alloyage, of non-ferrous metals, excluding precious metals, including recovered products (refining, foundry casting, etc.);
- (e) Installations for surface treatment of metals and plastic materials using an electrolytic or chemical process;
- (f) Manufacture and assembly of motor vehicles and manufacture of motor-vehicle engines;

- (g) Shipyards;
- (h) Installations for the construction and repair of aircraft;
- (i) Manufacture of railway equipment;
- (j) Swaging by explosives;
- (k) Installations for the roasting and sintering of metallic ores.

5. Mineral industry

- (a) Coke ovens (dry coal distillation);
- (b) Installations for the manufacture of cement;
- (c) Installations for the production of asbestos and the manufacture of asbestos-products (projects not included in Annex I);
- (d) Installations for the manufacture of glass including glass fibre;
- (e) Installations for smelting mineral substances including the production of mineral fibres;
- (f) Manufacture of ceramic products by burning, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain.

6. Chemical industry (Projects not included in Annex I)

- (a) Treatment of intermediate products and production of chemicals;
- (b) Production of pesticides and pharmaceutical products, paint and varnishes, elastomers and peroxides;
- (c) Storage facilities for petroleum, petrochemical and chemical products.

7. Food industry

- (a) Manufacture of vegetable and animal oils and fats;
- (b) Packing and canning of animal and vegetable products;
- (c) Manufacture of dairy products;
- (d) Brewing and malting;
- (e) Confectionery and syrup manufacture;
- (f) Installations for the slaughter of animals;
- (g) Industrial starch manufacturing installations;
- (h) Fish-meal and fish-oil factories;
- (i) Sugar factories.

8. Textile, leather, wood and paper industries

- (a) Industrial plants for the production of paper and board (projects not included in Annex I);
- (b) Plants for the pretreatment (operations such as washing, bleaching, mercerization) or dyeing of fibres or textiles;
- (c) Plants for the tanning of hides and skins;
- (d) Cellulose-processing and production installations.

9. Rubber industry

Manufacture and treatment of elastomer-based products.

10. Infrastructure projects

- (a) Industrial estate development projects;
- (b) Urban development projects, including the construction of shopping centres and car parks;
- (c) Construction of railways and intermodal transshipment facilities, and of intermodal terminals (projects not included in Annex I);
- (d) Construction of airfields (projects not included in Annex I);
- (e) Construction of roads, harbours and port installations, including fishing harbours (projects not included in Annex I);

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- (f) Inland-waterway construction not included in Annex I, canalization and flood-relief works;
- (g) Dams and other installations designed to hold water or store it on a long-term basis (projects not included in Annex I);
- (h) Tramways, elevated and underground railways, suspended lines or similar lines of a particular type, used exclusively or mainly for passenger transport;
- (i) Oil and gas pipeline installations (projects not included in Annex I); (j) Installations of long-distance aqueducts;
- (k) Coastal work to combat erosion and maritime works capable of altering the coast through the construction, for example, of dykes, moles, jetties and other sea defence works, excluding the maintenance and reconstruction of such works;
- (l) Groundwater abstraction and artificial groundwater recharge schemes not included in Annex I;
- (m) Works for the transfer of water resources between river basins not included in Annex I.

11. Other projects

- (a) Permanent racing and test tracks for motorized vehicles;
- (b) Installations for the disposal of waste (projects not included in Annex I);
- (c) Waste-water treatment plants (projects not included in Annex I);
- (d) Sludge-deposition sites;
- (e) Storage of scrap iron, including scrap vehicles;
- (f) Test benches for engines, turbines or reactors;
- (g) Installations for the manufacture of artificial mineral fibres;
- (h) Installations for the recovery or destruction of explosive substances; (i) Knackers' yards.

12. Tourism and leisure

- (a) Ski-runs, ski-lifts and cable-cars and associated developments;
- (b) Marinas;
- (c) Holiday villages and hotel complexes outside urban areas and associated developments;
- (d) Permanent camp sites and caravan sites;
- (e) Theme parks.

13. - Any change or extension of projects listed in Annex I or Annex II, already authorized, executed or in the process of being executed, which may have significant adverse effects on the environment;
- Projects in Annex I, undertaken exclusively or mainly for the development and testing of new methods or products and not used for more than two years.

Annex III – screening criteria

1. Characteristics of projects

The characteristics of projects must be considered having regard, in particular, to:

- the size of the project,
- the cumulation with other projects,
- the use of natural resources,
- the production of waste,
- pollution and nuisances,
- the risk of accidents, having regard in particular to substances or technologies used.

2. Location of projects

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The environmental sensitivity of geographical areas likely to be affected by projects must be considered, having regard, in particular, to:

the existing land use,

the relative abundance, quality and regenerative capacity of natural resources in the area,

the absorption capacity of the natural environment, paying particular attention to the following areas:

(a) wetlands;

(b) coastal zones;

(c) mountain and forest areas;

(d) nature reserves and parks;

(e) areas classified or protected under Member States' legislation; special protection areas designated by Member States pursuant to Directive 79/409/EEC and 92/43/EEC;

(f) areas in which the environmental quality standards laid down in Community legislation have already been exceeded;

(g) densely populated areas;

(h) landscapes of historical, cultural or archaeological significance.

3. Characteristics of the potential impact

The potential significant effects of projects must be considered in relation to criteria set out under 1 and 2 above, and having regard in particular to:

the extent of the impact (geographical area and size of the affected population),

the transfrontier nature of the impact,

the magnitude and complexity of the impact,

the probability of the impact,

the duration, frequency and reversibility of the impact.

Appendix 3 – Current EIA Regulations, England and Wales

Main implementing regulations

- Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (SI No 293)
- Town and Country Planning (Environmental Impact Assessment) (England and Wales) (Amendment) Regulations 2000 (SI 2000 No 2867) - implements EIA for reviews of existing mineral permissions

Sectoral regulations

Forestry

- Environmental Impact Assessment (Forestry) (England and Wales) Regulations 1999 (SI 2228)

Land drainage

- Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999 (SI 1783)

Fish farming

- Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations (SI 367) - England & Wales, Scotland

Transport

- Highways (Assessment of Environmental Effects) Regulations 1999 (SI No. 369)
- Transport and Works (Assessment of Environmental Effects) Regulations 1995 (SI 1995 No. 1541)
- Transport and Works (Assessment of Environmental Effects) Regulations 1998 (SI 1998 No. 2226) - applies to England & Wales

Ports and Harbours

- The Harbour Works (Environmental Impact Assessment) Regulations 1999 (SI 1999 No. 3445) - England & Wales, Scotland
- The Harbour Works (Environmental Impact Assessment) (Amendment) Regulations 2000 (SI 2000 No. 2391) - England & Wales, Scotland

Energy

- The Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2000 (SI 2000 No 1927)
- Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 (SI 1999 No 2892) - applies to England & Wales, & Scotland
- The Offshore Petroleum Production and Pipe-lines (Assessment of Environmental Effects) Regulations 1999 (SI 1999 No. 360) - applies to England & Wales, Scotland, & Northern Ireland.
- The Public Gas Transporter Pipe-line Works (Environmental Impact Assessment) Regulations 1999 (SI 1999 No 1672) - applies to England, Scotland & Wales
- The Pipe-line Works (Environmental Impact Assessment) Regulations 2000 (SI 2000 No. 1928) - applies to England & Wales, Scotland, & Northern Ireland.

Regulations in the course of preparation

Extraction of minerals by marine dredging

Environmental Assessment and Habitats (Extraction of Minerals by Marine Dredging) Regulations - Consultation on draft Regulations took place September-November 1998

Water abstraction

Water Resources (Environmental Impact Assessment) Regulations - Consultation on draft Regulations took place January-February 1999

Agriculture

Will implement the EIA Directive for “Projects for the use of uncultivated land or semi-natural areas for intensive agricultural purposes” - MAFF currently preparing draft Regulations for consultation

Current EIA Regulations: Scotland

Main implementing regulations

- Environmental Impact Assessment (Scotland) Regulations 1999 (SSI No 1) - Part II Town and Country Planning

Sectoral regulations

Forestry

- The Environmental Impact Assessment (Forestry) (Scotland) Regulations 1999 (SSI 43)

Land drainage

- Environmental Impact Assessment (Scotland) Regulations 1999 (SSI No 1) - Part IV Drainage Works

Fish farming

- Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations (SI 367)

Transport

- Environmental Impact Assessment (Scotland) Regulations 1999 (SSI No 1) - Part III Roads

Ports and Harbours

- The Harbour Works (Environmental Impact Assessment) Regulations 1999 (SI 1999 No. 3445) - England & Wales, Scotland
- The Harbour Works (Environmental Impact Assessment) (Amendment) Regulations 2000 (SI 2000 No. 2391) - England & Wales, Scotland

Energy

- Environmental Impact Assessment (Scotland) Regulations 1988 (SSI No 1221) - Part III Electricity
- Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 - applies to England & Wales, & Scotland
- The Offshore Petroleum Production and Pipe-lines (Assessment of Environmental Effects) Regulations 1999 (SI 1999 No. 360) - applies to England & Wales, Scotland, & Northern Ireland.

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- ❑ The Public Gas Transporter Pipe-line Works (Environmental Impact Assessment) Regulations 1999 - applies to England, Scotland & Wales
- ❑ The Pipe-line Works (Environmental Impact Assessment) Regulations 2000 (SI 2000 No. 1928) - applies to England & Wales, Scotland, & Northern Ireland.

Current EIA Regulations Northern Ireland

Main implementing regulations

- ❑ Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 1999 (SR No 73)

Sectoral regulations

Forestry

- ❑ Environmental Impact Assessment (Forestry) Regulations (Northern Ireland) 2000 (SR No 84)

Land drainage

- ❑ Drainage (Environmental Assessment) Regulations (Northern Ireland) 1991 (SR No 376)
- ❑ Drainage (Environmental Assessment) Regulations (Northern Ireland) 1998 (SR No 446)

Fish farming

- ❑ Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations (Northern Ireland) 1999 (SR No 415)

Transport

- ❑ Roads (Environmental Impact Assessment) Regulations (Northern Ireland) 1999 (SR No. 98)

Ports and Harbours

- ❑ Harbour Works (Assessment of Environmental Effects) Regulations (Northern Ireland) 1990 (SR No 181)

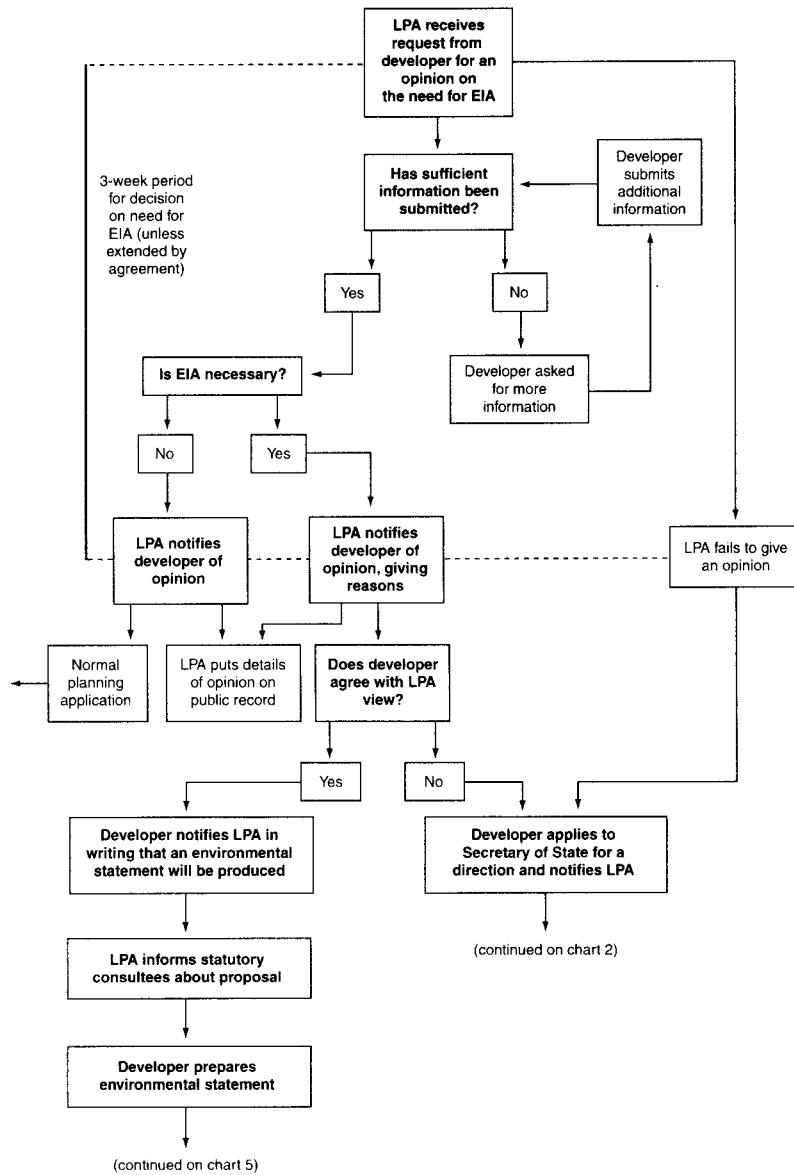
Energy

- ❑ The Offshore Petroleum Production and Pipe-lines (Assessment of Environmental Effects) Regulations 1999 (SI 1999 No. 360) - applies to England & Wales, Scotland, & Northern Ireland.
- ❑ The Pipe-line Works (Environmental Impact Assessment) Regulations 2000 (SI 2000 No. 1928) - applies to England & Wales, Scotland, & Northern Ireland.

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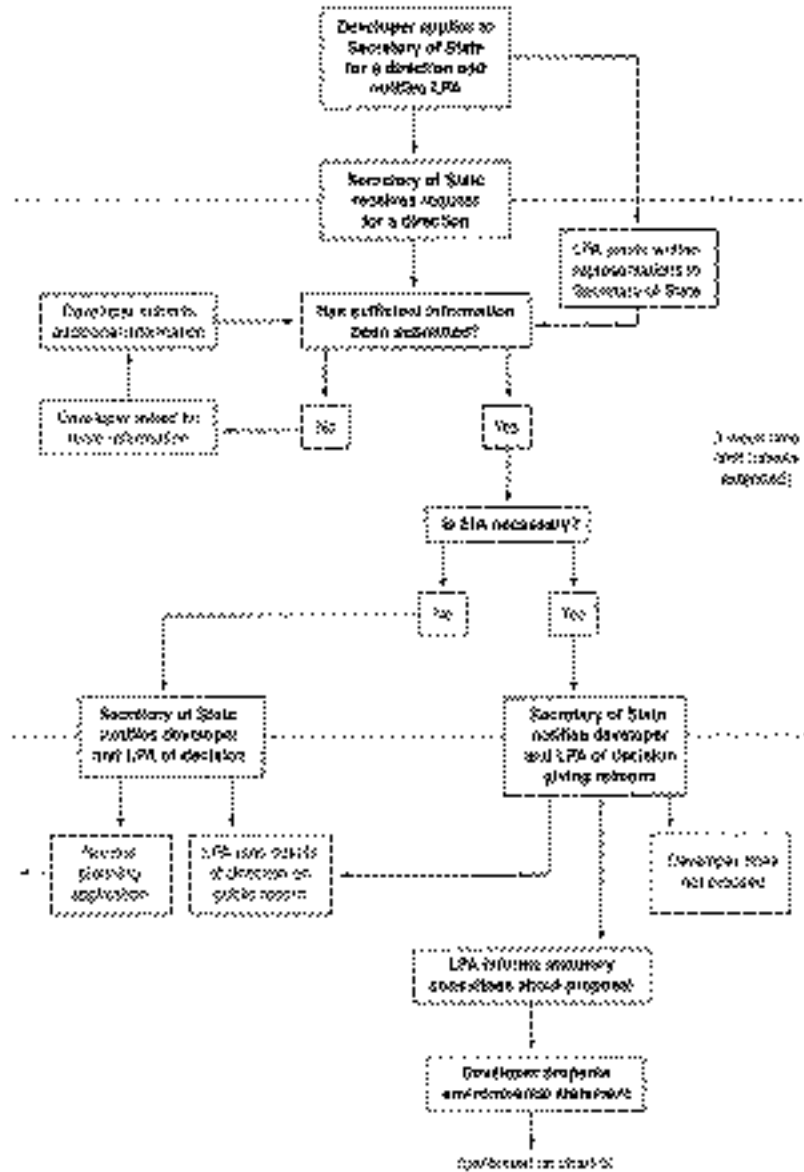
Appendix 4 – Flowcharts of the EIA process (all taken from DETR, 2000c)

1. PRE-APPLICATION REQUEST BY DEVELOPER TO LOCAL PLANNING AUTHORITY FOR SCREENING OPINION

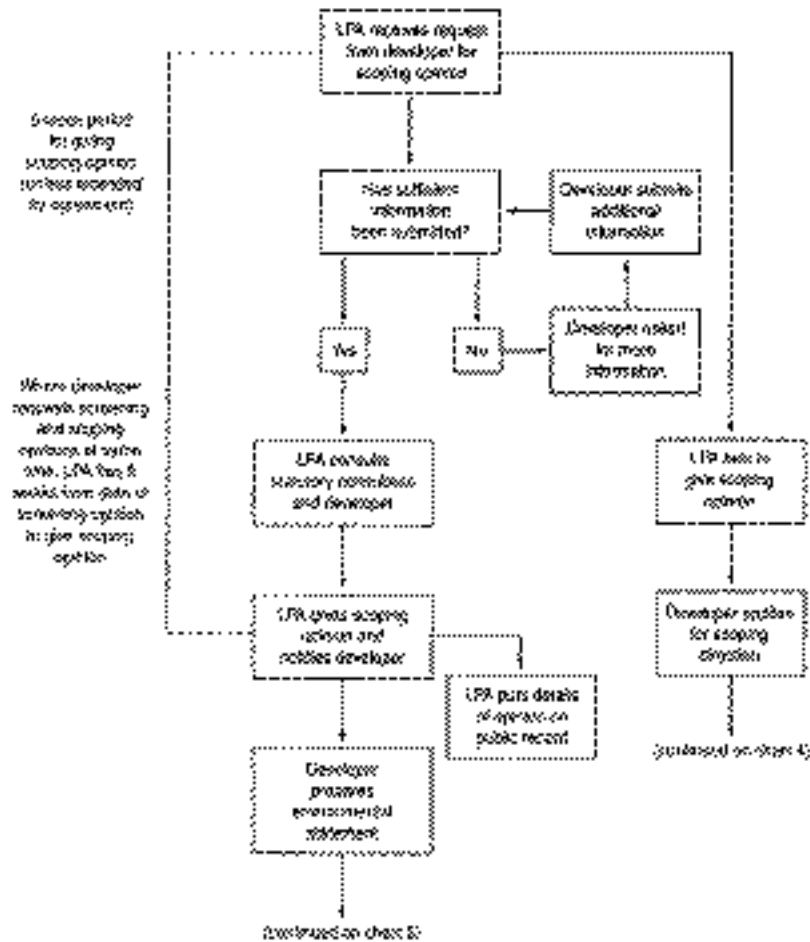


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2. PRE-APPLICATION REQUEST TO SECRETARY OF STATE FOR SCREENING DIRECTION

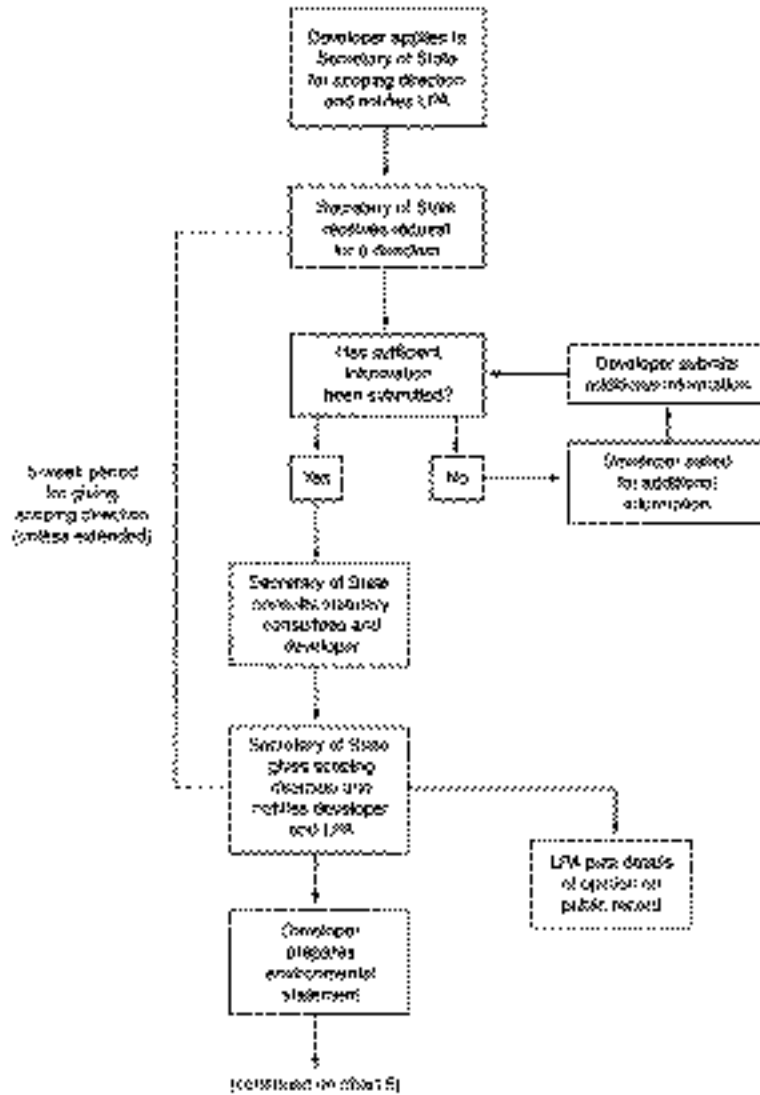


3. APPLICATION BY DEVELOPER TO LOCAL PLANNING AUTHORITY FOR SCOPING OPTION

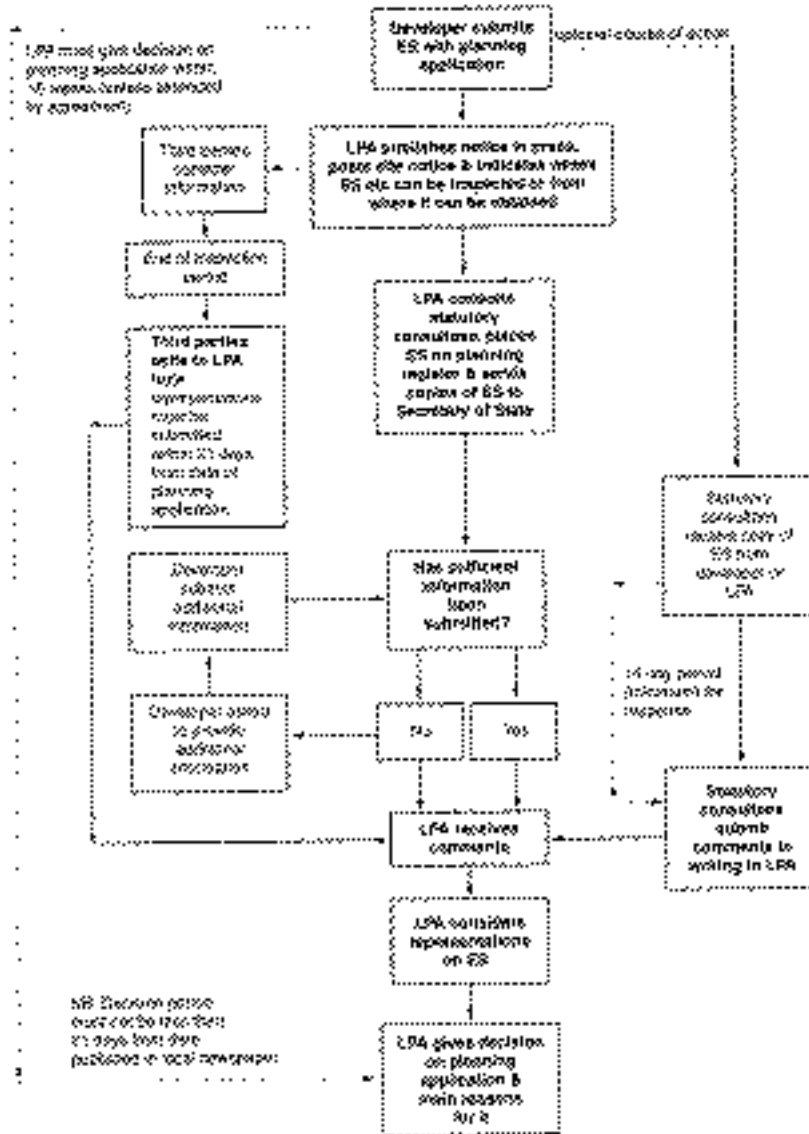


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4. APPLICATION TO SECRETARY OF STATE FOR SCOPING DIRECTION



5. SUBMISSION OF ENVIRONMENTAL STATEMENT TO LOCAL PLANNING AUTHORITY IN CONJUNCTION WITH PLANNING APPLICATION



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Appendix 5 – Key references and sources of further information on EIA in the UK

EIA general

- Bond, A and Wathern, P (1999) Impact Assessment in the European Union. Chapter 12 in Petts, J (ed.) *Handbook of Environmental Impact Assessment Volume 2 Environmental Impact Assessment In Practice: Impact and Limitations*, 223-248. Blackwell Science, Oxford.
- Commission of the European Communities (CEC) (1985) Council Directive 85/337/EEC of the 27 June 1985 on the assessment of the effects of certain public and private sector projects on the environment. *Official Journal of the European Communities*, L175, 5.7.1985, 40-48.
- CEC (1997) Council Directive 97/11/EC. *Official Journal of the European Communities*, L73, 14.3.1997.
- Department of the Environment (DoE) 1995 *Preparation of Environmental Statements for Projects which require Environmental Assessment: A Good Practice Guide*. HMSO, London.
- DETR (1999) *Circular 02/99 on the Town and Country Planning (Environmental Impact Regulations) (England and Wales) Regulations 1999 No. 293*. DETR, London.
- DETR (2000) *Environmental Impact Assessment: A Guide to the Procedures*. DETR, London.
- *Environmental Impact Assessment (Scotland) Regulations 1999* (SSI 1999 No. 1)
- Glasson, J, Therivel, R and Chadwick, A (1999) *Introduction to Environmental Impact Assessment: principles and procedures, process, practice and prospects*, 2nd edition. UCL Press, London.
- Morris, P and R Therivel (1995) *Methods of Environmental Impact Assessment*, UCL Press, London.
- *Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 1999* (SR 1999 No. 73)
- Planning Service (Northern Ireland) (1999) *Development Control Advice Note 10* (Revised 1999)
- Scottish Office Environment Department (1999)) *Circular 15/99 on the Environmental Impact Assessment (Scotland) Regulations 1999 No. 1*. Scottish Office, Edinburgh.
- *Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999* (SI 1999 No. 293)
- Welsh Office (1999) *Circular 11/99 Environmental Impact Assessment*. Welsh Office Cardiff.
- Wood (1995) *Environmental Impact Assessment: A Comparative Review*. Longman Scientific & Technical, Harlow. Particularly, Chapter 3 The European Directive on EIA and Chapter 4 EIA in the United Kingdom.

Ecological impact assessment

- English Nature (1994) *Roads and nature conservation: Guidance on impacts, mitigation and enhancement*. English Nature, Peterborough.
- English Nature (1994) *Nature conservation in Environmental Assessment*. English Nature, Peterborough.
- English Nature (1995) *Badgers – guidelines for developers*. English Nature, Peterborough.
- English Nature (1996) *Great crested newts – guidelines for developers*. English Nature, Peterborough.
- English Nature (1996) *Strategic environmental assessment and nature conservation*, English Nature, Peterborough
- English Nature (1999) *Water vole – guidance for planners and developers*. English Nature, Peterborough.
- Institute of Environmental Assessment (1995) *Guidelines for Baseline Ecological Assessment*. E & FN Spon, London.
- Petts, J (ed.) (1999) *Handbook of Environmental Impact Assessment Volume 1 Environmental Impact Assessment: Process, Methods and Potential*. Blackwell Science, Oxford. Especially Chapter 15 by Peter Wathern on ecological impact assessment.
- RSPB (1995) *Wildlife impact – the treatment of nature conservation in environmental assessment*. The RSPB, Sandy.
- Treweek, J (1996) Ecology and environmental impact assessment, *Journal of Applied Ecology* 33: 191-199.
- Treweek, J (1999) *Ecological Assessment*. Blackwell Science, Oxford.

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Appendix 6 – Biodiversity checklist (taken from Byron, 2000)

Guiding Principles	Key Questions
<p>✓ Avoid impacts on biodiversity and create opportunities for enhancement of biodiversity wherever possible by route selection and scheme design. Where this is not possible identify the best practical mitigation and enhancement option to ensure that there is no significant loss of biodiversity. Compensation measures such as translocation should be viewed as a last resort.</p>	<ul style="list-style-type: none"> • Have all impacts on biodiversity been avoided wherever possible? • Have all unavoidable impacts on biodiversity been reduced as far as possible? • Does the scheme ensure that there is not a significant loss of biodiversity? • If the scheme involves compensation eg habitat creation is this likely to be successful? • Have opportunities for enhancement been considered?
<p>✓ Apply the precautionary principle to avoid irreversible losses of biodiversity. ie where an activity raises threats or harm to biodiversity precautionary measures should be taken even if certain cause and effect relationships are not scientifically established.</p>	<ul style="list-style-type: none"> • In each case where it is not possible to thoroughly assess but it is suspected that there maybe an impact on biodiversity have avoidance/mitigation measures been incorporated?
<p>✓ Widen existing EIA practice to an ecosystem perspective – ie consider the impacts of a road scheme on biodiversity and possible enhancements of biodiversity in the context of local and regional ecosystems, not just the immediate vicinity of the road.</p>	<ul style="list-style-type: none"> • Has the EIA considered impacts and enhancements of biodiversity in the context of local and regional ecosystems?
<p>✓ Safeguard genetic resources by protecting the higher levels of biodiversity (ie individuals, populations, species and communities, etc.) and the environmental processes which sustain them.</p>	<ul style="list-style-type: none"> • Has the EIA considered all of the levels of biodiversity? • Has the EIA considered environmental processes?
<p>✓ Consider the full range of impacts on biodiversity eg indirect and cumulative impacts not just the direct impacts such as species and habitat loss.</p>	<ul style="list-style-type: none"> • Has the EIA considered direct impacts on biodiversity? • Has the EIA considered indirect impacts on biodiversity? • Has the EIA considered cumulative impacts on biodiversity? • Has each impact been discussed in detail and quantified wherever possible?

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<p>✓ The study area of the scheme should reflect the impact type (eg indirect effects will often extend throughout a watershed) rather than taking a fixed width corridor approach.</p>	<ul style="list-style-type: none"> • Does the EIS clearly explain the study area chosen and the rationale for selecting this? • Does the EIS discuss the study area for each impact type? • Is the study area for the EIA appropriate for the consideration of cumulative impacts?
<p>✓ Evaluate the impacts of a road scheme on biodiversity in local, regional, national, and, where relevant, international contexts ie an impact could be minor locally but significant at a national level eg where the locality has a very high proportion of a national rare biodiversity resource.</p>	<ul style="list-style-type: none"> • Does the EIS clearly set out the following and explain why these were chosen: <ul style="list-style-type: none"> i) criteria for determining receptor importance? ii) criteria for determining the magnitude of each impact type? iii) criteria for determining the significance of each impact type? • Has the significance of each impact after mitigation been considered at each of local, regional, national, and where relevant international, levels?
<p>✓ Retain the existing pattern and connectivity of habitats eg protect natural corridors and migration routes and avoid artificial barriers. Where existing habitat is fragmented implement measures eg tunnels, bridges to enhance connectivity.</p>	<ul style="list-style-type: none"> • Does the scheme preserve the existing habitat connectivity by route selection and/or the inclusion of animal tunnels and bridges? • Have connectivity enhancement measures been included where appropriate? • Have full details of the design and installation of each tunnel and bridge been set out in the EIS?
<p>✓ Use buffers to protect important biodiversity areas wherever possible</p>	<ul style="list-style-type: none"> • Have buffers been used to protect important biodiversity areas wherever possible?
<p>✓ Maintain natural ecosystem processes in particular hydrology and water quality. Wherever possible use soft engineering solutions to minimise impacts on hydrology.</p>	<ul style="list-style-type: none"> • Have impacts on ecosystem processes been avoided or minimised as far as possible? • Have soft engineering solutions been incorporated where appropriate?
<p>✓ Strive to maintain/enhance natural structural and functional diversity eg ensure that the quality of habitats and communities is not diminished and wherever possible is enhanced by the road scheme.</p>	<ul style="list-style-type: none"> • Does the scheme preserve the quality of each habitat/community? • Where a habitat/community is not currently of high quality have enhancement measures to improve habitat/community quality been incorporated?

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✓	Maintain/enhance rare and ecologically important species (key species) - ie protected species SAP species, characteristic species for each habitat as loss of these may affect a large number of other species and can affect overall ecosystem structure and function.	<ul style="list-style-type: none">• Does the EIS clearly set out the key species considered and explain why each of these has been chosen?• Have impacts on key species been avoided wherever possible?• Have unavoidable impacts on key species been mitigated as far as possible?• Have measures to enhance the status of key species been included?
✓	Decisions on biodiversity should be based on full information and monitoring must be part of the EIA process. The results of monitoring should be available to allow evaluation of the accuracy of impact prediction and should be widely circulated to help improve future road scheme design and mitigation.	<ul style="list-style-type: none">• Have all appropriate background sources of biodiversity data been utilised?• Has relevant scientific literature been consulted?• Have all necessary surveys been carried out?• Do habitat/community surveys include an assessment of the quality of each habitat/community?• Has abundance and distribution data been collected for each key species?• Are the results of each survey included or referenced in the EIS?• For each survey does the EIS record: the date, the duration, the methodology, the qualifications of the person/people who carried out the work?• Has a monitoring programme been devised and explained in the EIS?• Will funding be made available to ensure that the monitoring programme goes ahead?• Will a quality control mechanism for reviewing the monitoring data (eg a Conservation/Monitoring Group of interested parties) be put in place?• Will the results of the monitoring programme be disseminated as widely as possible?
✓	Implement ongoing monitoring/management plans for existing and newly created habitats and other mitigation, compensation and enhancement measures.	<ul style="list-style-type: none">• Will an ongoing monitoring/management plan be devised?• Has an outline of a proposed plan been described in the EIS?• Does the plan provide for remedial action if mitigation/management targets are not achieved?

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Appendix 7 – Sources of information on species groups (collated from IEA, 2000)

Species groups	Sources
Vascular plants	<input type="checkbox"/> Red Data Book (RDB) (Perring and Farrell, 1983; Curtis and McGough, 1988) <input type="checkbox"/> Schedule 8 of the WCA (Wildlife Order NI) <input type="checkbox"/> Appendix I of the Bern Convention <input type="checkbox"/> Annexes II and IV of the Habitats Directive <input type="checkbox"/> Nationally Scarce plant species lists (Stewart <i>et al</i> , in press).
Lichens and bryophytes	<input type="checkbox"/> RDB (Stewart and Church, in press) <input type="checkbox"/> Nationally Scarce species (Hodgetts, 1992) <input type="checkbox"/> Schedule 8 of the WCA.
Freshwater algae	<input type="checkbox"/> RDB on stoneworts (Stewart and Church, 1992) <input type="checkbox"/> Nationally Scarce species (Hodgetts, 1992) <input type="checkbox"/> Schedule 8 of the WCA (Wildlife Order NI)
Birds	<input type="checkbox"/> Schedule 1 WCA (Wildlife Order NI) <input type="checkbox"/> Annex 1 of the Birds Directive <input type="checkbox"/> Birds of Conservation Concern (RSPB <i>et al</i> , 1996)
Mammals	<input type="checkbox"/> Bern, Bonn and ASCOBANS conventions <input type="checkbox"/> WCA (Wildlife Order NI) <input type="checkbox"/> Habitats Directive <input type="checkbox"/> Protection of Badgers Act 1992.
Amphibians and Reptiles	<input type="checkbox"/> protected species eg great crested newt, natterjack toad and in Northern Ireland
Fish	<input type="checkbox"/> Schedule 5 WCA <input type="checkbox"/> Appendix 2 Bern Convention <input type="checkbox"/> Annexes II or V Habitats Directive.
Terrestrial and aquatic invertebrates	<input type="checkbox"/> Nationally Notable species (Ball, 1986) <input type="checkbox"/> comprehensive reviews of rare and threatened species for certain orders eg coleoptera (Hyman and Parsons, 1992, 1994) <input type="checkbox"/> RDB (Shirt, 1987; Bratton, 1991) <input type="checkbox"/> Habitats Directive <input type="checkbox"/> Bern Convention <input type="checkbox"/> WCA

Appendix 8 – Examples of impact criteria derived from BAPs (from Byron, 2000)

Examples of criteria derived from National BAPs

BAP	Targets	Possible criteria
National Upland Oakwood HAP (HM Government, 1995b)	<ul style="list-style-type: none"> • Maintain the existing area of habitat and improve its condition • Expand the existing area of habitat by about 10% by some planting but particularly by natural regeneration by 2005 • Identify and encourage restoration of a similar area of former upland oakwood that has been degraded by planting with conifers or invasion by rhododendron 	<ul style="list-style-type: none"> • Major negative – loss of any existing area of upland oak woodland • Moderate negative – predicted reduction in condition of an area of upland oak woodland • Minor negative – possible change in condition of an area of upland oak woodland • Beneficial – improved management of an area of existing upland oak woodland, restoration of an area of former upland oak woodland
National Natterjack toad SAP (HM Government, 1995b)	<ul style="list-style-type: none"> • Sustain all existing populations and where appropriate restore each population to its size in the 1970s 	<ul style="list-style-type: none"> • Major negative – loss or fragmentation of existing habitat • Moderate negative – predicted reduction in condition of existing habitat • Minor negative – possible change in condition of existing habitat • Beneficial – improved management of an area of existing habitat, creation of addition new habitat

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Examples of criteria derived from County BAPs

BAP	Targets	Possible criteria
Kent Chalk Grassland HAP (Kent Biodiversity Action Plan Steering Group, 1997)	<ul style="list-style-type: none"> • To ensure that all unimproved and semi-improved chalk grassland is under optimal management • To increase the extent of unimproved chalk grassland in the county • To create links between existing areas along the spine of the North Downs 	<ul style="list-style-type: none"> • Major negative – loss of any existing area of unimproved chalk grassland in the county and/or severance/ fragmentation of links between existing areas of chalk grassland along the spine of the North Downs • Moderate negative – predicted reduction in condition of an area of unimproved chalk grassland in the county and/or predicted change in the management of an area of unimproved chalk grassland in the county which is likely to result in a reduction in condition • Minor negative – predicted reduction in condition of an area of semi-improved chalk grassland in the county and/or predicted change in the management of an area of semi-improved chalk grassland in the county which is likely to result in a reduction in condition • Beneficial – improved management of an area of existing unimproved and/or semi-improved chalk grassland, creation of additional new habitat, creation of links between existing areas of habitat
Kent Water Vole SAP (Kent Biodiversity Action Plan Steering Group, 1997)	<ul style="list-style-type: none"> • To arrest the decline in the water vole population in Kent by 2000 	<ul style="list-style-type: none"> • Major negative – loss or fragmentation of existing water vole habitat and/or a decline in local populations • Moderate negative – predicted reduction in condition of existing water vole habitat and/or a decline in local populations • Minor negative – possible change in condition of existing water vole habitat • Beneficial – improved management of an area of existing water vole habitat, creation of addition new water vole habitat

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Appendix 9 – Summaries from case studies

Treatment of mitigation/enhancement

Good practice elements

	Heads of the Valleys	Iwade	Rainworth
As far as possible, have all negative impacts been mitigated?	X	P	X
Is it clear what residual impacts will occur if the scheme proceeds?	✓	P	X
Does the EIS give a precise description of the mitigation measures proposed, how these will be implemented and their status?	X	X	X
Is there a clear assessment of the likely success of the proposed mitigation/enhancement measures?	P	X	X
Is it clear what types of mitigating measures are proposed i.e. avoidance, mitigation, compensatory or genuine enhancement measures?	P	✓	X
Was a wide range of possible avoidance, mitigation, compensation measures considered?	✓	✓	?
<i>If habitat creation and translocation are proposed was this a measure of last resort?</i>	✓	✓	?
Where these measures are proposed is there a clear assessment of the likely effectiveness/chance of success?	P	X	X
<i>Is there a discussion about how biodiversity mitigation measures will be integrated with other measures?</i>	P	X	X
<i>Will the mitigation be enforceable?</i>	?	?	? Planning conditions
<i>Is there any attempt to place mitigation in the wider framework of cumulative effects and biodiversity maintenance?</i>	X	X	X

Key: ✓ = covered; **X** = not covered; **P** = partially covered; ? = not clear

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Presentation of biodiversity information

Good practice elements

	Abergavenny	Iwade	Rainworth
<i>"Biodiversity method statement" describing:</i>			
Specialist ecologist company/individuals responsible for the biodiversity part of the	EIS ✓	✓	✓
Terms of reference (TOR) for specialist studies	X	X	X
Scoping process	X	P	X
Level of contact with biodiversity consultees	X	X	X
Criteria used to evaluate:	✓	✓	X
<input type="checkbox"/> Importance of biodiversity elements;	X	X	X
<input type="checkbox"/> Magnitude of impacts;	✓	✓	X
<input type="checkbox"/> Significance of impacts; and	X	X	X
<input type="checkbox"/> Likely success of proposed mitigation/enhancement measures			
Any guidelines, methods or techniques used	✓	✓	✓
<i>Include clear colour coded or annotated maps showing:</i>			
<input type="checkbox"/> Study areas considered	✓	✓	X
<input type="checkbox"/> Biodiversity constraints	✓	P	✓
<input type="checkbox"/> Different types and quality of all habitats likely to be affected	P	P	P
<input type="checkbox"/> Reference all sources of background information	✓	P	X
Include or clearly reference all new data	✓	✓	P
As full a factual description as possible of predicted impacts	P	X	X
Presentation of cumulative effects	✓	X	X
<i>Proposed mitigation and enhancement measures</i>			
<input type="checkbox"/> Explain	✓	✓	X
<input type="checkbox"/> Give detailed prescriptions	X	X	X
<input type="checkbox"/> Assess their likely success	P	X	X
Summarise the residual impacts	✓	✓	X
Describe the proposed biodiversity post-project monitoring programme	✓	✓	X

Key: ✓ = covered; X = not covered; P= partially covered