
BIODIVERSITY AND IMPACT ASSESSMENT

by
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Overview. *Work is currently being undertaken to examine what role impact assessment can play in delivering international obligations on biodiversity conservation. The Convention on Biological Diversity (CBD) requires biodiversity to be considered in impact assessments, but also provides an opportunity for a more positive approach to be taken in impact assessments, to identify opportunities for enhancing biodiversity, as well as mitigating impacts. This paper outlines the requirements of the CBD; examines what is required for biodiversity conservation from impact assessment; and identifies changes needed in traditional impact assessment systems to achieve this. The paper identifies that existing impact assessments are not dealing with ecological impacts satisfactorily, and are rarely dealing with biodiversity impacts at all. It concludes that the biodiversity agenda should be used to raise awareness of these issues within the impact assessment community, and to encourage a more positive approach, considering impacts on ecosystems as a whole, dealing with fragmentation of habitats or isolation of species, and identifying enhancement opportunities. This requires changes to legislation and procedures to introduce formal requirements for biodiversity issues to be addressed, as well as revised guidelines. In addition, structural changes are needed such as the establishment of a register of biodiversity experts, to ensure that the impact assessment process better addresses biodiversity. Examples of case studies and guidelines where biodiversity is addressed in impact assessment are called for to feed into ongoing work on this topic.*

1. Why biodiversity and impact assessment?

The impact assessment community has recently been debating the implications of international obligations on biodiversity conservation for impact assessment. The impetus for this has come from the Convention on Biological Diversity (CBD) negotiated at the Earth Summit in Rio de Janeiro in 1992 and ratified by over 170 nations. The objectives of the CBD are to:

- conserve biodiversity
- use biological resources sustainably, and
- equitably share in the benefits arising from that use.

The CBD provides a strong international platform for applying impact assessment techniques to biodiversity conservation. It specifically calls for impact assessment measures to ensure that biodiversity is addressed in

projects, plans and policy decisions (Article 14). An underlying justification for the application of impact assessment is given in other articles, such as promoting the protection of ecosystems, natural habitats and maintenance of viable populations, promoting environmentally sound and sustainable development in areas next to protected areas (Article 8); calling for the integration of biodiversity concerns into national decision making and the adoption of measures relating to the use of biological resources to avoid or minimise adverse impacts on biological diversity (Article 10).

One of the main tasks the CBD commits signatories to is preparing a biodiversity action plan. In the UK, a group of non-governmental organisations initiated the process by preparing their own *Biodiversity Challenge* (Wynne 1995) for the Government, and subsequently the UK Biodiversity Strategy (1994) was produced. A steering group of experts was established to oversee the preparation of action plans for priority habitats and species. Work is currently underway at the national and local level to help implement these plans. The Biodiversity Strategy aims to protect and enhance biological resources, and to maintain their diversity. There is a clear role for impact assessment within this, to help protect existing resources from adverse impacts. This paper also argues that the CBD provides a mandate for impact assessment to identify opportunities for enhancing the biological resource of habitats and species.

The opportunities to deliver CBD objectives through impact assessment, and the opportunities for impact assessment within the biodiversity agenda were discussed at the 3rd meeting of the CBD's Standing Body for Scientific, Technical, and Technological Advice (SBSTTA3) and at 18th Conference of the International Association of Impact Assessment (IAIA) in Christchurch in April 1998. IUCN (Bagri and Vorhies 1997) proposed at SBSTTA3 a new impact assessment tool - Biodiversity Impact Assessment (BIA) as an extension of EIA which would ensure that biodiversity issues are explicitly considered in impact assessments. Others argued that a new tool was not needed, given the plethora of existing tools, and that existing EIA tools should be strengthened to include a rigorous consideration of biodiversity impacts as part of a wider assessment. Although a new tool may not be necessary, a serious review of existing tools is needed to ensure that the obligations of the CBD are met.

2. What do we mean by biodiversity and impact assessment?

So what is biodiversity and impact assessment all about? Is it just another way of looking at ecological impacts as part of EIA? Certainly ecological impacts have often been poorly considered in impact assessments. Treweek

et al's (1997) analysis of 179 British environmental statements found that in many cases the ecological information provided was so limited in quantity, or of such poor quality, that it was not possible to assess the ecological implications of proposed schemes. This has been reinforced by recent research into how biodiversity impacts are dealt with in road impact statements (Byron and Sheate 1998). Research by the Royal Society for the Protection of Birds (RSPB 1995) also concluded that EIAs in Britain needed to be considerably improved in terms of their consideration of ecological impacts. Even without the obligations of the CBD therefore, the requirements of existing EIA legislation such as the European Union (EU)'s EIA Directive, which requires the assessment of impacts on flora and fauna, were not being met.

Traditionally, EIAs have focused on impacts upon protected species and habitats. They have been less likely to address other aspects of biodiversity such as diversity between species and habitats, trends over time, species abundance and distribution, and the functional components of biodiversity. Le Maitre et al (1998) found that impacts on biodiversity were not being adequately addressed in South African impact statements, and that functional biodiversity in particular, was inadequately addressed. Positive conservation measures such as the rehabilitation of degraded ecosystems are also unlikely to receive explicit attention. Bagri et al (1998) conclude that components of biodiversity which are already protected, either by established protected areas or by a listed status, are more likely to be included in an EIA study than components which have been given less attention but may be important to the long term productivity of ecosystems and maintenance of biodiversity.

Biodiversity impact assessment therefore demands a more sophisticated investigation and analysis of potential impacts on a ecological unit and the species and communities within it. The CBD defines biodiversity as being concerned with diversity at the levels of species (both within and between species), and ecosystems. Biodiversity impacts could therefore be seen as a subset of ecological impacts, looking at the wider relationships between organisms and their environments at the species, community and ecosystem levels.

Biodiversity impact assessment should therefore be seen as part of existing impact assessment systems, and not promoted as a separate entity, purely because of the difficulties that other disciplines, such as social impact assessment, have encountered through trying to 'go it alone'. There is an impetus behind the biodiversity agenda, and so the term 'biodiversity impact assessment' can be used to raise awareness of these issues within the impact assessment community. This enables a focus on the more positive aspects of

biodiversity, looking at the ecosystem approach, dealing with fragmentation issues and so on, not just the traditional EIA approach of mitigating impacts. Biodiversity is not just about rare species and habitats, but about enhancing degraded areas, reversing species declines, and creating new habitats.

3. What do we want for biodiversity from impact assessment?

There are two main challenges that biodiversity conservation raises for impact assessment. Firstly, existing impact assessment tools must be improved to address biodiversity impacts, and secondly they need to be expanded to provide more positive benefits for biodiversity.

Bagri et al (1997 and 1998) identify how all the stages in the impact assessment process provide opportunities to integrate requirements of the CBD. For example, it is important to ensure that screening procedures include biodiversity criteria, so that projects with potentially detrimental effects on biodiversity are subject to EIA. The scoping stage is vital, to identify the impacts which will be fully addressed. Bagri et al identify four principles to be considered at the scoping stage for biodiversity: spatial context, cumulative effects, public participation and biodiversity criterion. The EIA study itself must consider potential biodiversity impacts, determine their significance, and recommend measures to mitigate adverse impacts and maximise positive impacts. Finally, the post-project monitoring and review stages are essential to determine whether impacts were predicted accurately, to assess if mitigation measures are effective, and to address any unexpected impacts.

As identified in section 2, traditional EIAs do not address biodiversity impacts. Where ecological impacts are included, these are often restricted to the results of brief habitat surveys and species lists. These need to be analysed and their significance identified. In particular, reference should be made to priority species and habitats identified in biodiversity action plans, such as the UK's Biodiversity Action Plan. Species that are in relative abundance, but are rapidly declining, such as many farmland birds, should receive particular attention. Historic declines of species and habitats (as illustrated in the tables 1 and 2 below) should be taken into consideration, as well as issues such as habitat fragmentation. Targets in biodiversity action plans will help to identify the significance of the likely impacts on these habitats or species.

Table 1 Habitat Declines in the UK since 1945

Habitat	Percentage	Present area (UK in ha)
Lowland raised bog	94%	6,000 ha
Chalk downland	70%	50,000 ha
Reedbed	70%	5,000 ha
Lowland wet grassland	60%	350,000 ha
Ancient broadleaved woodland	37%	520,000 ha
Lowland heath	36%	60,000 ha
Saltmarsh	36%	50,000 ha

Various sources

Table 2 Declines in numbers of bird species, UK 1969 – 1991

Bird species	Estimated current population (pairs)	Decline in numbers (%)
song thrush	990,000	54%
starling	1,100,000	c. 50%
skylark	2,000,000	54%
linnet	520,000	56%
bullfinch	190,000	67%
lapwing	210,000	50%
grey partridge	150,000	73%
tree sparrow	110,000	80%

figures from British Trust for Ornithology

A more ecosystem approach is needed, which looks at potential impacts on the ecosystem as a whole, particularly its functions (for example wetlands providing a ‘storage function’ to help avoid flooding), and the potential knock-on effects of impacts, for example the loss of species at lower levels of the food chain having implications for the food source of predators higher up the chain.

Achieving the objectives of the CBD requires more than just mitigating impacts on biodiversity. A proactive approach is required, which seeks first to avoid impacts, and identifies opportunities to enhance biodiversity. For example, opportunities to create wildlife corridors or links between habitats could be highlighted, or the potential for management practices to enhance the biodiversity interest of existing features.

Bagri et al (1998) identify this as one of the main challenges for impact assessment, mainly as EIA has traditionally been a reactive tool, because it responds to impacts through mitigation rather than examining the potential to design out impacts through the consideration of alternatives. The treatment of alternatives in the EIA process has long been criticised (e.g. Sadler 1996), and in the EU this is compounded by the EIA Directive failing to include the consideration of alternatives as one of its requirements. The recently amended Directive (97/11/EC) stopped short of including this requirement, although where alternatives have been considered, these must be included in the ES, and reasons given for why these options were not chosen.

The ultimate aim of any impact assessment must be to avoid impacts altogether, and this is just as true for biodiversity impacts. The best way to achieve this, is to design out any potential impacts at an early stage in the project proposal. In practice however, EIA requirements are seldom designed to achieve this, and formal assessments take place once a firm project proposal has been developed. Changes to EIA procedures are required to remedy this, but good practice in project development could also help to overcome some of these deficiencies. The RSPB (1996) has produced Good Practice Guides for Prospective Developers, which advocate a sequential or stepped approach, to firstly avoid impacts; to mitigate any residual impacts which cannot be avoided; to compensate for any losses (as a last resort); and always to seek opportunities to enhance the existing natural assets.

Strategic Environmental Assessment (SEA) also provides opportunities for addressing some of these issues. SEAs have been developed for plan and programme making in particular, and policy appraisals for higher level decisions. The key here is that decisions made early on, for example on land use development plans in the UK, or funding programmes such as the EU's Structural Funds, are assessed for their potential environmental effects, and enable alternative options to be more easily considered. This also enables a more positive approach to be taken to biodiversity conservation, particularly through identifying opportunities for enhancement.

4. How do we achieve these objectives?

Changes are needed at all levels of impact assessment, from legislative requirements, guidelines, training and impact assessment practice, if these objectives for biodiversity and impact assessment are to be achieved.

At national, international and regional levels, changes to impact assessment legislation are necessary to introduce formal requirements for biodiversity issues to be addressed. Governments have already signed up to the obligations in the CBD, these need to be transferred into existing impact assessment requirements. Revised guidance is also essential to highlight the importance of addressing biodiversity impacts, and to encourage the more positive approach suggested in section 3.

Bagri et al (1998) provide a checklist of biodiversity requirements for legislation and guidelines:

Table 3 Checklist of Biodiversity Requirements for Legislation and Guidelines

<p><i>Screening</i></p> <ul style="list-style-type: none"> • Categories include activities likely to impact biological diversity such as projects which effect a protected area or projects which would result in the introduction of alien species • Thresholds apply biodiversity measures, especially those relevant to over-exploitation of plant and animal species <p><i>Preliminary Assessment</i></p> <ul style="list-style-type: none"> • Impact lists include impacts on ecosystems, habitats, species and communities important to biodiversity <p><i>Scoping</i></p> <ul style="list-style-type: none"> • Temporal and spatial parameters reflect biodiversity considerations • Cumulative effects on biodiversity are taken into account • Public participation is used to minimise bias in defining impacts • Impact lists include impacts on ecosystems, habitats, species and communities important to biodiversity <p><i>Identification</i></p> <ul style="list-style-type: none"> • Methodologies include direct and indirect impacts on biodiversity such as habitat loss and fragmentation, introduced species, pollution of soil, water and atmosphere, and global climate change • Indicator species are used as criterion <p><i>Examination of Alternatives</i></p> <ul style="list-style-type: none"> • Alternatives are assessed for their potential impacts on biodiversity and for the distribution of their costs and benefits <p><i>Prediction</i></p> <ul style="list-style-type: none"> • Baseline biodiversity information is obtained from information provided from sources such as the CBD's clearinghouse mechanism and the BCIS • Existing baseline data is supplemented by further studies if necessary • Data produced through studies and predictions is available to the clearinghouse mechanism and BCIS thereby furthering the exchange of information (Art 17) <p><i>Evaluation of Significance</i></p> <ul style="list-style-type: none"> • Stakeholders are involved in the process of attaching significance to impacts thereby furthering the equitable sharing objective of the CBD.

Changes to legislation and guidance are necessary precursors to changing impact assessment practice. However, there is no reason why good practice in considering biodiversity implications cannot be established and promoted in the meantime. In particular, case studies should be identified and publicised, to illustrate what can be achieved. This point is returned to in section 5.

There are obviously practical difficulties, particularly resource limitations, in achieving these objectives. Investigating the implications of a development proposal on biodiversity interests is potentially very time and cost intensive, particularly if a wider ecosystem approach is adopted. However, there are ways of overcoming this. In particular, the impetus behind biodiversity conservation, and the preparation of action plans, means that significantly more data is collected and analysed, and importantly will be held in one place. In the UK, a National Biodiversity Network is being developed, to provide a central data source, and local biodiversity action plan partnerships are also co-ordinating data collection to monitor progress towards targets in local action plans.

The biodiversity action planning process should therefore provide more detailed, readily accessible information, which can be utilised in impact assessments. However, it will be some time before a comprehensive system of monitoring and data collection is established. There is also a considerable imbalance in the level of information about different species, for example many bird species are well monitored and researched, whereas there is little data or information available for a large proportion of invertebrates. In the meantime therefore, it may be sensible for a system to be established to trigger more detailed investigation of biodiversity impacts. This could be achieved by the use of indicators, for example the technical working group of the CBD is preparing a core set of biodiversity indicators, to be available in 2000. Alternatively, policies in plans or programmes (such as development plans in the UK), could be used to identify when a more detailed assessment should be carried out. This could include the presence of priority habitats or species; areas which have been subject to habitat fragmentation in the past; or areas where the local biodiversity action plan has identified opportunities for enhancement.

As well as the technical requirements that need to be addressed for biodiversity and impact assessment, Bagri et al (1998) identify some structural changes that could be made in EIA to ensure it better addresses biodiversity:

- the establishment of a register of biodiversity experts who could assist with the completion of EIAs and be consulted in the review process
- the introduction of a broader, more ecosystems based, perspective for assessments
- the collection and dissemination of 'best practice' EIAs which address biodiversity issues, and
- the development of guidelines on explicitly incorporating biodiversity issues into impact assessments based on existing knowledge of best practice.

Finally, transparency of decision-making is crucial, so that it can be clearly seen how biodiversity impacts have been taken into consideration. This issue has recently been raised in the UK, with the new multi-criteria approach to appraisal developed by the Government (DETR 1998) to assess the trunk road programme. Each road proposal is analysed for its potential impacts on a range of factors such as air quality, landscape and biodiversity. A cost-benefit analysis is also carried out, and the results of all the assessments are listed on a summary sheet. Whilst the more rigorous and integrated approach to appraisal is welcome, it is unclear what weight is given to each category, and on what basis the final decision is made. Consequently, at least one road scheme with potential serious adverse impacts on biodiversity was approved. A cut-off point or trigger for biodiversity impacts is therefore required in such decisions, so that schemes which have impacts above a certain magnitude (for example impacts on nationally or internationally designated sites) are automatically ruled out.

5. The challenge ahead

The challenge ahead is enormous, but very exciting. The biodiversity agenda provides an opportunity to take a new look at impact assessment, to review whether it is delivering its fundamental objective of protecting the environment, and to move impact assessment practice forward to provide a tool that will serve the needs of a changing society in the 21st century.

Bagri et al (1998) challenge the impact assessment community to take advantage of the CBD mandate to strengthen existing methodologies and techniques and advocate stronger application of those techniques to protect biodiversity. In addition, we need to make the most of opportunities to expand impact assessment into a more positive, proactive tool, in order to reverse some of the damage and declines of the past, rather than just mitigating the impacts of current activity. In this way, impact assessment can help to deliver the objectives of sustainable development, *to meet the needs of the present without compromising the ability of future generations to meet their needs* (WCED 1987).

Work is ongoing to take forward the biodiversity and impact assessment agenda. A paper is being prepared by the Secretariat to the CBD with input from IUCN, IAIA, Ramsar and the Convention on Migratory Species for the next meeting of the CBD technical working group (SBSTTA4) in May 1999. The 19th annual IAIA Conference will also take place in June 1999, and will include a session on biodiversity and impact assessment, following on from the Christchurch session. Case studies of the consideration of biodiversity in impact assessments are being sought for both these events.

Lessons from the case studies will be drawn together to start work on a set of guidelines for biodiversity and impact assessment. Existing guidelines are also being identified, for example from Canada (CEAA 1996), UK (Round Table on Sustainable Development 1998), and the World Bank (1997). Finally, complementary work in other areas such as the Ramsar Convention is also being utilised.

Any participants with relevant case studies or suggestions for this work would be warmly welcomed! Contact details are given below. Additional information can be found at <http://economics.iucn.org/assessment.htm>.

If you have any examples of case studies where biodiversity has been considered in impact assessments, or guidelines/procedures prepared for biodiversity impacts, please contact Clare Brooke or Andrea Bagri at the addresses below:

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