



# An evaluation of ecological impact assessment procedural effectiveness over time



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## ABSTRACT

Environmental Impact Assessment (EIA) is an important tool to help decision-makers balance the environmental impacts of a proposed built development with its potential economic benefits. Used in most countries across the globe, EIA commonly includes an ecological component (Ecological Impact Assessment, or EclA). However, despite considerable changes in relevant legislation, policy and guidance, there has been no recent review of UK EclA chapter content, with the latest review having been published in 2000.

This study attempts to determine the procedural effectiveness of EclA chapters over time by comparing a new review of 112 English EclA chapters from 2000 onwards with earlier reviews. This was achieved through the novel use of inferential statistics, an approach previously lacking in the EIA and EclA review literature.

The limitations and advantages of the use of quantitative methods are discussed. In general, there has been an improvement in the information content of EclA chapters over time, for example in the percentage of EclA chapters stating the size of the development and estimating the likely effectiveness of proposed mitigation measures. However, the earlier reviews highlighted such severe information deficiencies that the progress seen in the post-2000 EclA chapter review still leaves considerable scope for improvement.

Changes in the EU's EIA Directive in force since May 2014 (and to be transposed into Member State legislation by May 2017) have the potential to encourage the use of inferential statistics in EIA and EclA review: the requirement for Member States to provide central access to EIA information should enable representative samples to be analysed.

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## 1. Introduction

Across the globe, biodiversity is being lost at unprecedented rates (Millennium Ecosystem Assessment, 2005; RSPB, 2016) and international targets to slow or halt this loss have not been met (Butchart et al., 2010). A key cause of biodiversity loss is land use change (Millennium Ecosystem Assessment, 2005). In England, as across much of the inhabited world, the main drivers of land use change include agriculture, forestry and built development (Foley et al., 2005; Land Use Consultants, 2005; Maxwell et al., 2016). Given predictions of likely population increases and the

consequent need for major infrastructure creation and renewal over the next ten years (Fothergill, 2011), a focus on the built environment's impacts on ecology is of importance.

Environmental Impact Assessment (EIA) is a process referenced in the legislation of approximately 180 countries worldwide (Morgan, 2012). It allows the potential environmental impacts of a proposed built development to be assessed, prior to a planning decision being made. Depending on the outcome of the scoping exercise, ecology may form a component of an EIA.

EIA can, in theory, aid decision-making and contribute towards sustainable development (Glasson, 1994). However, the effectiveness of EIA, whether substantive or procedural, has frequently been called into question (e.g. Cashmore et al., 2004). An investigation of an aspect of substantive effectiveness of EclA (the implementation and success of habitat mitigation measures in completed EIA developments) can be found in Drayson and Thompson (2013).

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Procedural effectiveness relates to whether EIA is undertaken according to “established provisions and principles” (Sadler, 1996). This paper examines the procedural effectiveness of the ecological component of EIA (Ecological Impact Assessment, or EclA) to identify current weaknesses in practice and determine whether there have been any changes over time.

One of the simplest and most cost-effective methods of researching EIA procedure is to review the key EIA documentary output, i.e. the Environmental Statement (ES) by using a checklist (TrewEEK, 1996). This method does, however, depend on being able to access all the relevant key documentary information, such as technical appendices and planning agreements. Site visits, interviews and questionnaires will provide a richer context and higher level of detail, particularly since not all of the processes and findings from undertaking the EIA are necessarily reported in the ES and its associated documents (TrewEEK et al., 1993). However, ES review is relatively inexpensive and less time-consuming, allowing for examination of larger numbers of ESs and therefore providing a wider picture of practice. In addition, it allows for detailed and systematic comparisons and the identification of patterns and trends over time and between countries, for example through the use of inferential statistics. This, in turn, can provide an evidence base to help inform environmental policy and legislation. This will be particularly important in the event of the UK exiting the European Union, since there may be future changes in environmental legislation and policy, the impacts of which will require assessment against a reliable baseline.

### 1.1. Previous EclA chapter reviews

In comparison with reviews of entire ESs, reviews of individual ES technical chapters, such as the EclA chapter, have been conducted relatively infrequently. Yet these disaggregated studies can reveal differences that would otherwise be masked by a whole-ES review. For example, socio-economic impacts tend to be poorly considered within ESs (Glasson and Heaney, 1993) and water impact assessments tend to be less poorly conducted than ecological impact assessments (Badr et al., 2004).

There have been six main published reviews of UK EclA chapters (see Table 1) ranging in publication year from 1992 to 2000 and reviewing EclA chapters from 1988 to 1997. All used study-specific criteria, based on legislation, policy and guidance existing at the time, making comparisons between the reviews difficult.

Of those early EclA chapter reviews, all found elements requiring considerable improvement in almost every part of the EclA process (Byron et al., 2000; RSPB, 1995; Spellerberg and Minshull, 1992; Thompson et al., 1997; TrewEEK and Thompson, 1997; TrewEEK et al., 1993). These included, for example, lack of consultation, poor baseline survey, lack of quantification (of the ecological baseline and impact predictions), inadequate cumulative impact assessment, vague mitigation measure descriptions,

and low levels of commitment to mitigation and follow-up. However, with changes in legislation, policy and guidance, there is potential for some improvements to have been made (changes between 2000 and 2010 are summarised in Appendix B). Yet there has been little recent work evaluating EclA performance. Increasingly strong legislative protection of biodiversity, as well as increased recognition of the importance of ecology in planning guidance and improvements in professional development, warrant a study that builds on these early EclA chapter reviews.

### 1.2. Use of the quantitative approach in ES research

#### 1.2.1. Difficulties

The lack of inferential statistics in the literature on this topic is partly due to the subjective nature of ES research. For example, whether an ES or EclA chapter is deemed to have met particular criteria in checklist-based reviews often depends on the reviewer (Pöder and Lukki, 2011). In addition, each ES is subject to a different array of constraints and contexts (such as the likely controversy of the proposed development and the development type), making comparisons between ESs and assessments of changes over time less reliable. One way to overcome this problem is to use matched pairs of ESs (i.e. each ES assigned to one time period is ‘matched’ to an ES in another time period by development type, development size, etc.), as demonstrated by Glasson et al. (1997). Another method is to ensure the sample size (i.e. the number of ESs reviewed) is large (e.g. Ryan, 2013, p. 298).

The use of the results of previous reviews of EclA chapters to quantitatively examine changes over time also presents several difficulties. For example, some of the assessment criteria may have been slightly different in different reviews, making comparisons difficult. In addition, previous reviews may have expressed their findings as percentages of EclA chapters. If these are expressed to one or fewer decimal places, determining the actual number of EclA chapters may be less accurate (for example, 14.8% of 37 EclA chapters could be either five or six EclA chapters, depending on the rounding method used. All of these issues make the use of inferential statistics more challenging.

#### 1.2.2. Advantages

However, whilst another analysis of EclA chapters using purely descriptive statistics would be timely given the decade since the last review, it would miss an important opportunity. That opportunity is the secondary analysis of results from the earlier reviews in order to address the new question of whether there have been changes over time. There are, as described above, several issues with statistically comparing the results of previous reviews. However, whilst simple comparisons of percentages across reviews may be illustrative, a statistical analysis across reviews (whilst making attempts to minimise, and clearly stating, the limitations of such an approach) may prove more informative

**Table 1**

Characteristics of the six main published UK EclA chapter reviews, in publication year order, in comparison with the current review.

Review Authors	Publication Year	EclA Year Range	No. of EclAs	Geographic Distribution of EclAs	Planning Application Status	Comments
Spellerberg & Minshull	1992	1988–1989	45	UK	All	N/A
TrewEEK et al.	1993	1989–1991	37	UK	All	Road EclA chapters only
RSPB	1995	1988–1994	37	UK	All	N/A
Thompson et al.	1997	1988–1993	179	UK	All	N/A
TrewEEK & Thompson	1997	1988–1993	194	UK	All	Mitigation only
Byron et al.	2000	1993–1997	40	UK	All	Road EclA chapters only
Current Review	N/A	2000–2011	112	England	Granted permission	N/A

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