

'BIODIVERSITY MAINSTREAMING' AND EIA: ART, SCIENCE OR MYTH?

Charl de Villiers

Conservation Unit

Botanical Society of South Africa

Private Bag X10

7735 Claremont

South Africa

Tel: +27 21 799-8824

Fax: +27 21 761-5983

E-mail: Devilliersc@botanicalsociety.org.za

Susie Brownlie

DeVilliers Brownlie Associates

dbass@icon.co.za

Jeffrey Manuel

Western Cape Department of Environmental Affairs and Development Planning

jmanuel@pgwc.gov.za

ABSTRACT

Is EIA an appropriate instrument for conserving threatened biodiversity? This question is explored in the context of the Cape Floristic Region, a global biodiversity hotspot, where some 40% of the landscape outside protected areas needs special management to meet biodiversity targets. The National Biodiversity Strategy and Action Plan, correctly, favours a more strategic approach to that of conventional, project-level EIA. However, until SEA becomes mandatory, and spatial planning must give effect to conservation priorities, EIA seemingly offers the most pragmatic 'mainstreaming' option in development planning. EIAs can contribute to 'mainstreaming' if:

- Systematic conservation plans inform project suitability, planning and assessment;
- Habitat loss is evaluated in terms of impacts on conservation targets and ecological processes; and
- Development secures biodiversity gains.

Unresolved questions for biodiversity-inclusive EIA include: thresholds for functional viability of fragmented ecosystems, minimum requirements for biodiversity reporting, climate change and criteria used in decision-making.

Key words: Biodiversity mainstreaming, environmental impact assessment, Cape Floristic Region.

I say: take no thought of the harvest, [But] only of proper sowing...

TS Eliot, "Choruses from 'The Rock'", *Collected Poems 1909-1962* Faber and Faber Limited, London.p 163.

1. INTRODUCTION

The ability of activity or site-specific Environmental Impact Assessment (EIA) to report adequately on the biodiversity implications of project proposals has been in question for more than a decade (Krattiger *et al.* 1994; Treweek 2001; Brownlie *et al.* 2006). Where antidotes are proposed (e.g. Treweek *et al.* 2005; UNEP 2006), these generally entail arguments for a more strategic, ecosystem-based approach.

In South Africa, the National Biodiversity Strategy and Action Plan (NBSAP) views EIA as a limited tool for influencing decisions on changes in land use (DEAT 2005). The NBSAP justifiably favours strategic environmental assessment (SEA) to EIA. In common with most of the literature on 'biodiversity mainstreaming' in South Africa (Gelderblom *et al.* 2002; Sandwith *et al.* 2005) the NBSAP advocates the integration of biodiversity priority areas with spatial plans at the provincial and municipal level (DEAT 2005). Municipal-scale 'mainstreaming' holds important potential for overcoming the shortcomings of

piecemeal, reactive and project-level EIA (Brownlie *et al.* 2005). However, a number of factors caution against placing excessive reliance on forward planning instruments as vehicles for ‘mainstreaming’.

Lack of awareness of biodiversity issues, weak capacity and poor governance are not unique to municipalities, but these circumstances are likely to obstruct the ‘uptake’ of biodiversity priorities in the municipal sphere (Pierce *et al.* 2005). Zoning scheme regulations give municipalities substantial powers to control land-use in terms of mapped biodiversity priorities (DEAT 2007). These powers do not, however, always apply to land uses that have the greatest impact on biodiversity. For example, there is no administrative instrument at municipal level that extends the reach of biodiversity-inclusive planning into the domain of agricultural expansion, yet intensive agriculture is the greatest driver of habitat loss in South Africa (Rouget *et al.* 2006).

Despite doubts about the value of EIA as a safeguard for biodiversity, it may sometimes provide the only means of effectively ‘mainstreaming’ strategic, ecosystem-scale conservation considerations into individual projects. The experience of the non-governmental Botanical Society of South Africa (BotSoc) in South Africa’s Western Cape province provides a test for this assertion.

2. EIA AND THREATENED BIODIVERSITY IN SOUTH AFRICA

EIA regulations have been in force in South Africa since 1997. In certain instances, biophysical attributes can trigger the need for a ‘basic assessment’, e.g. specified activities within: 32 m from the bank of a river; 100 m of the high water mark; or rivers, tidal lagoons, floodplains or wetlands.

The transformation of 3 ha or more of indigenous vegetation currently requires environmental authorisation. Development within ecosystems listed as threatened in terms of national biodiversity legislation will in future also require environmental authorization. However, as noted by the NBSAP, (DEAT 2005), the law does not provide for measurable thresholds beyond which further loss of biodiversity would be viewed as unacceptable. In effect, the best protection that the law offers threatened biodiversity is no more than the guarantee of an EIA-type process.

3. SYSTEMATIC CONSERVATION PLANNING, ‘MAINSTREAMING’ AND EIA

Systematic conservation planning (SCP) (Margules and Pressey 2000) is distinguished by its commitment to ‘mainstreaming’ – chiefly by means of spatially explicit products that can support conservation action by non-specialists (Driver *et al.* 2003). SCP is guided by two objectives: achieving conservation targets that ensure representation of a full variety of biodiversity pattern, and promoting its persistence by maintaining ecological and evolutionary processes and excluding threats (Margules and Pressey 2000; Cowling *et al.* 2003). Conservation priorities are identified by means of quantitative targets for biodiversity features such as vegetation types (Driver *et al.* 2003; Reyers *et al.* 2007). Prioritisation has also focused on identifying spatial surrogates for ecological processes, such as corridors, edaphic interfaces and macro-climatic gradients (Rouget *et al.* 2003). Finer-grained conservation plans ($\geq 1:50\ 000$ scale) have taken mapping to the habitat level.

In South Africa, mainstreaming has been undertaken at all levels of government and for a variety of objectives, e.g. identifying national conservation priorities (Sandwith *et al.* 2005); aligning the Western Cape provincial spatial development framework with the National Spatial Biodiversity Assessment (NSBA) (Reyers *et al.* 2007); and developing municipal land-use planning products based on SCP for the Sub-tropical Thicket Biome (Pierce *et al.* 2005). Overall, conservation planning and the NBSAP have demonstrated limited interest in EIA as a vehicle for ‘mainstreaming’.

This perspective may warrant reconsideration. In the Cape Floristic Region (CFR), a global biodiversity hotspot (Mittermeier *et al.* 2005) which corresponds largely with the borders of the Western Cape, about 42% of the landscape outside protected areas needs some form of conservation management to meet biodiversity targets (Cowling *et al.* 2003). Given that municipalities have varying capacity (Pierce *et al.* 2005) and little direct control over agriculture, water resources or mining, the EIA regime emerges as a potentially strong contender for securing effective mainstreaming.

4. BOTSOC’S BIODIVERSITY IN ENVIRONMENTAL ASSESSMENT PROJECT

It is in this context that BotSoc launched its Biodiversity in Environmental Assessment (BEA) project from the premise that SCP and EIA had considerable, if untapped, mutual benefit. The BEA project

postulated that EIA could help to secure priority habitat and ecological corridors outside protected areas, and conservation plans could be used to overcome many of the failings of EIA towards biodiversity, chiefly by:

- Locating sites and project alternatives within a broader biodiversity conservation context;
- Early red-flagging of pattern and process issues (e.g. threatened vegetation and corridors);
- Supporting the evaluation of impacts of habitat loss against quantitative, spatially explicit targets; and
- Securing conservation gains through biodiversity-compatible development in priority areas.

BotSoc's approach to biodiversity-inclusive EIA was geared towards contributing to three prerequisites for 'mainstreaming': enabling legislation and policy (Cowling *et al.* 2002), guidelines that detail the steps and levels of assessment for biodiversity-inclusive EIA (Slootweg and Kolhoff 2003; Wegner *et al.* 2004; UNEP 2006), and providing information on biodiversity (Driver *et al.* 2003; Pierce *et al.* 2005; Wegner 2004). It was also recognised that biodiversity capacity had to be built in the broad EIA sector.

The BEA project was established in June 2004. It entailed four broad areas of activity and output:

- Commenting on the biodiversity and procedural aspects of EIA processes and, less frequently, applications for cultivation and mining rights (of the 61 applications commented on by BotSoc, 75% required environmental authorisation). A review (Brownlie *et al.* 2006a) was undertaken with IAIA-CBBIA assistance to assess the effectiveness of this casework-based engagement and to inform future interventions;
- Developing the *Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape* (De Villiers *et al.* 2005);
- Presenting training to Environmental Assessment Practitioners (EAPs) and the provincial Department of Environmental Affairs and Development Planning (DEA&DP) on biodiversity 'mainstreaming' in EIA (Manuel 2007);
- Integrating key biodiversity questions into the official 'Basic Assessment' checklist (DEA&DP 2006); and
- Exploring strategic, ecosystem-scale alternatives to agri-environmental decision-making in areas with a high coincidence of intensive farming activity and threatened biodiversity (De Villiers and Hill 2007).

BotSoc based its EIA comment on the NSBA, conservation plans and relevant legislation and environmental guidelines. Its submissions included basic biodiversity terms of reference endorsed by the provincial conservation agency, CapeNature.

In the few (8) cases where official records of decision (RoDs) had been issued by the end of the review period, 60% of these RoDs had 'adequately' reflected BotSoc's comments. Biodiversity-related considerations seemed to have the greatest prospect of being addressed 'adequately' when raised as early as possible in the EIA process (Brownlie *et al.*, 2006a). This finding is consistent with international experience (cf. UNEP, 2006). 'Adequacy' hinged on three considerations: demonstrable use of strategic biodiversity informants (e.g. the NSBA or conservation plans); attention to ecological process issues; and identifying potential impacts on known special habitats or features valued for ecosystem services.

The review found that BotSoc's comments had targeted most of the main problems identified in a study on biodiversity, EIA and decision making in southern Africa (Brownlie *et al.* 2006b). These included: the failure to consider ecological process issues and the bigger conservation context (e.g. laws and biodiversity plans); poor or no consideration of alternatives; passing off baseline surveys or sensitivity studies as a 'biodiversity assessment'; failure to provide effective recommendations on ecosystem management; and undue reliance on environmental management plans to manage significant impacts on biodiversity. This information has assisted BotSoc and the provincial environmental authorities in identify training and other responses to improve biodiversity capacity in EIA in the Western Cape.

5. DISCUSSION

Has the BEA project delivered on its primary supposition, i.e. that the alignment of EIA with SCP and biodiversity priorities can support off-reserve biodiversity conservation?

The BEA review offered some evidence that BotSoc's *approach* to biodiversity-inclusive EIA was an effective one, i.e. early reference to conservation plans and the NSBA in project-level impact assessment

appeared to improve the chances that biodiversity would be dealt with ‘adequately’ in the EIA process and, by implication, the ensuing official decision. However, it also seemed that the quality of biodiversity reporting was contingent upon BotSoc’s sustained participation in an EIA process.

Informed in part by the findings of the BEA review, BotSoc has encouraging key government agencies to adopt its ‘approach’ to biodiversity-inclusive EIA. BotSoc’s contribution to institutional ‘mainstreaming’ has entailed: (i) the provincial biodiversity agency’s adoption of the BotSoc biodiversity ToR as a standard guideline for EAPs; (ii) the inclusion of key references to the NSBA and conservation plans in the official DEA&DP ‘basic assessment’ questionnaire; and (iii) the SA National Biodiversity Institute’s hosting of the Fynbos Forum guidelines on its GIS unit’s website (<http://bgis.sanbi.org>). The Fynbos Forum guidelines are also cited in the DEA&DP guideline on biodiversity specialists in EIA (Brownlie 2005). Ongoing training with DEA&DP, SANBI B-GIS and CapeNature continues to reinforce these advances.

Disappointingly, there has been no evident uptake of the potential for SCP to support the assessment and evaluation of cumulative impacts on biodiversity at the ecosystem scale. Even at a relatively coarse level, a conservation plan can indicate that cumulative impacts are occurring and are likely to be significant if certain trends in land use were to persist. Quantitative biodiversity targets that underpin the conservation assessment of the NSBA (Driver *et al.* 2005) provide that measure: a vegetation type will move towards a higher category of threat as it is reduced in extent and ecosystem functioning is disrupted (Reyers *et al.* 2007). This approach to assessing cumulative impacts would be particularly useful in sectors such as agriculture where ecosystems are subject to large-scale but incremental transformation. However, it will only work if the decision-support system that underpins a systematic conservation plan is curated and updated by keeping track of biodiversity losses and gains (Cowling *et al.* 1999).

The definition of ‘biodiversity’ and the requirements of a ‘biodiversity assessment’ have caused considerable confusion among EAPs and officials. Experience in the Western Cape is remarkably consistent with that outlined in Western Australia by Wegner *et al.* (2004). Key areas of debate include: the level at which ‘biodiversity’ should be reported (genetic, species, or ecosystem, etc); the dependability of vegetation types (Mucina and Rutherford 2006) as biodiversity surrogates (Cowling and Heijnis 2001; Rouget *et al.* 2003); and the qualification and expertise of a ‘biodiversity specialist’.

There are still many unresolved questions regarding spatial thresholds for maintaining ecological persistence, e.g. the minimum viable width of corridors in different vegetation types, minimum viable patch sizes, and maximum, functional distances between remnant vegetation in fragmented ecosystems (Fynbos Forum 2007). The (divergent) opinions of individual specialists can be decisive in the absence of scientifically-endorsed benchmarks.

The implications of climate change (Midgley *et al.* 2005) for project-level biodiversity reporting has hardly been explored. Cowling *et al.* (2003) and Rouget *et al.* (2003) have focused attention on the need for landscape-scale corridors to accommodate species adaptation and migration along climatic gradients, but EIA is probably incapable of dealing with issues that need to be addressed at such a broad scale.

One of the greatest inhibitions to EIA’s role as a vehicle for off-reserve conservation is the absence of explicit, statutorily-endorsed limits to the loss of biodiversity and ecological functioning beyond set thresholds. Without firm guidance on biodiversity ‘non-negotiables’ in trade-offs central to decision-making, the fate of biodiversity will be determined by negotiation in which biodiversity often emerges as ‘the loser’. ‘Pragmatic’, project-level trade-offs, replicated at scale, will continue to fragment and degrade biodiversity by the dynamic best described as ‘death-by-a-thousand-cuts’. Barring rare cases where development results in pro-conservation decisions, EIA – no matter how well intentioned – cannot be relied upon to yield conservation outcomes. The same goes for municipal planning.

The real measure of the effectiveness of BotSoc’s mainstreaming efforts is the extent to which EIA has proactively avoided biodiversity loss while securing actual conservation benefits. However, common to most ‘mainstreaming’ initiatives in South Africa (Pierce *et al.* 2005; Reyers *et al.* 2007), there is no monitoring of biodiversity losses or gains arising from environmental authorisations in the Western Cape.

6. CONCLUSIONS

Effective biodiversity mainstreaming in EIA starts with enabling policy, reliable information and an active commitment to building capacity. In this regard, the BotSoc BEA project seems to have sowed its seeds properly. But without testing the potential of SCP to calculate cumulative impacts on biodiversity, or having the monitoring in place to measure results, it would be premature to make any predictions about the

anticipated harvest. Biodiversity ‘mainstreaming’ in EIA requires artful application of conservation science to a complex reality where, sometimes, there are only hopeful myths to show the way.

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