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SUBMISSION TO THE SENATE STANDING COMMITTEE ON THE ENVIRONMENT AND COMMUNICATIONS REFERENCES COMMITTEE INQUIRY INTO ENVIRONMENTAL OFFSETS

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The following submission has been prepared to address Item 1 of the terms of reference of the Senate inquiry into environmental offsets by the Environment and Communications References Committee. It is based largely on my personal experience in investigating offsets for a number of development projects in the Canberra area, including the development of draft rating scales for relevant threatened species and ecological communities for application in the Commonwealth offsets assessment guide. These development projects have been of local significance only and of much smaller scale than those addressed in Item 2 of the terms of reference. The points made in the submission, however, this may still be relevant to nationally significant projects.

Summary

Based on my experience with the application of offset principles, I consider that offsets should be encouraged as an element of environmental best practice, but should not be mandatory. Offsets should themselves be subject to an appropriate level of environmental assessment, and should be considered in the wider context of strategic planning. Greater recognition should be given to the potential use of indirect offsets (other compensatory measures), particularly in situations when direct offsets are not achievable or their value is questionable.

I support the principles of the EPBC Act offsets assessment guide, but see several significant weaknesses in the application of the guide which need to be rectified to improve its credibility. Even if these weaknesses are addressed, it should not be used as the only tool for evaluating offsets. Its quantitative application should make allowance for the potential variability arising from the assumptions made in specifying the input data.

A. Principles that underpin the use of offsets

The use of environmental offsets can be seen as an extension of the environmental impact assessment (EIA) process, which was established in Australia at the Commonwealth level in 1974 through the *Environment Protection (Impact of Proposals) Act (EPIP Act)*. At the time, that Act defined the environment as 'all aspects of the surrounding of man, whether affecting him as an individual or in his social groupings'. This is a very broad definition of the environment, embracing biophysical, social and economic elements. While this wording has been subject to revision and may vary significantly in detail, the breadth of this definition is found in most relevant environmental legislation throughout Australia, and is widely accepted and applied within the environmental profession.

In contrast, the application of environmental offsets at the Commonwealth level to date has been limited primarily to threatened species and ecological communities. Such offsets are better described as 'biodiversity offsets' and even then do not relate to biodiversity as a whole but only to those species and ecological communities which are protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act (EPBC Act).* Such a narrow approach towards offsets means that the application of selective biodiversity offsets may sometimes result in adverse impacts on other aspects of the environment which could potentially outweigh any benefits of the offsets from a biodiversity perspective.

When the *EPIP Act* was passed, its underlying purpose was to avoid a situation where major decisions affecting the environment were made without regard for the environmental consequences. The Act introduced a system of environmental impact statements and public enquiries with a view to ensuring that effects on the environment were adequately investigated and made known to decision makers, and that decisions were made in a way that sought to balance the beneficial and adverse effects on the full range of environmental values. While this process was seen as leading to measures to avoid or mitigate potential adverse effects, it was not intended, nor was it considered practicable, to avoid adverse impacts entirely, if only because of the conflicts that can arise between different environmental or social values. The key purpose of the EIA process is to ensure that decision makers are aware of such conflicts, and do not make decisions in ignorance.

Environmental offsets, whether related to biodiversity or to some other environmental factor, are seen as an extension of the EIA process, particularly in situations in which adverse effects cannot be avoided or adequately mitigated. By achieving environment benefits through other actions, offsets are intended to result in a situation of 'no net loss', at least with respect to the environmental factor that has been targeted. Such an approach is commendable, reflecting good environmental practice, and there are many situations where it can work effectively in practice. The offset process, however, subject to the following limitations:

- The process of establishing offsets for a particular environmental impact may in itself lead directly or indirectly to adverse impacts on other environmental values. While this may not necessarily preclude the use of those offsets, decision makers should be aware of such impacts before agreeing to the offsets. In other words, the offsets themselves may need to be subject to a broad assessment process, which documents their environmental, social and economic consequences, and such assessment should be subject to public scrutiny if the consequences are significant.

- There are some situations where a 'like-for-like' offset is not available, for example, if all of the known habitat for an impacted species other than that in the impact area is already being adequately managed within existing conservation reserves. Furthermore, there can be situations in which a like-for-like offset may be of more limited biodiversity benefit in a broad sense than a different type of offset of greater strategic value.

This example raises the question of whether biodiversity offsets are warranted in a situation where a strategic planning approach has already established a system of biodiversity conservation reserves which is comprehensive, adequate and representative. Only in the most extreme cases is biodiversity conservation likely to warrant the protection of all relevant habitat. Some of the offsets required in the Canberra area, however, have related to impacts which are of minimal significance in a broad regional context.

In the ACT, the strategic planning approach towards the development of the national capital, which has been implemented for nearly a century, has resulted in a land use system which protects an

exceptionally high component of its biodiversity resources (Ref. 1). This has been achieved without the conscious use of offsets although, in some situations, offset principles have effectively been adopted in the way in which the planning has been implemented. Some former rural land with biodiversity values has been developed while other land with similar (or higher) values which is potentially developable has been set aside as nature reserves and is managed accordingly.

The best example of this is perhaps reflected in the decision by the ACT Government in the mid-1990s to forgo development of a large area of the new town of Gungahlin with prime development potential close to the town centre in order to create a series of grassland nature reserves. That action, which is probably one of the best examples of the offset process in Australia, however, is not recognised under the *EPBC Act* because it took place prior to the Act coming into force.

A somewhat similar but less extensive historical application of the offset process took place in North Watson in 2001-02 with the withdrawal of the majority of a 20 ha woodland area from proposed residential development, while retaining about 4 ha for future development. The withdrawn land became public open space and, while it was not included in the formal nature reserve system, was made available for a local community group to undertake enhancement of the woodland. The setting aside of that woodland has since been accepted as an advanced offset under Section 4.2.3 of the *EPBC Act* Environmental Offsets Policy.

The strategic approach to biodiversity conservation in the ACT has resulted in new nature reserves being declared or existing reserves being extended on a fairly regular basis until a few years ago. Paradoxically, as a result of the Commonwealth Environmental Offsets Policy, the *EPBC Act* has retarded this process as the ACT Government appears to have adopted a position of not declaring a new nature reserve until it is required as an offset for development. While under Section 4.2.3 of the policy, it appears that such new nature reserves could still be created as advanced offsets, because of some community opposition to acceptance of the principle of advanced offsets in the case of the North Watson woodlands, it is understandable that the ACT Government is cautious with regard to application of that principle.

From my observations of offsets in the ACT and elsewhere, it appears that most offsets are based on a piecemeal approach and lack a strategic context. Where they are of strategic value, it is generally likely they would have been implemented in any case through strategic biodiversity planning. This reflects the proactive nature of strategic planning, compared with the reactive nature of offsets.

The Commonwealth Environmental Offsets Policy is very restrictive in the use of indirect offsets or 'other compensatory measures' as they are described in Section 4.2.2 of that policy. There is a requirement for 90% of the offset requirements to be direct offsets (Section 4.2.1), although there are conditions allowing for a deviation from that figure. These conditions, however, do not include the situation where it is physically impracticable to achieve the necessary level of direct offsets.

There are situations where other compensatory measures have the potential to achieve much greater biodiversity gains than direct offsets. One possible example in the ACT is in relation to the golden sun moth (*Synemon plana*), which is listed as critically endangered under the *EPBC Act*, although the scientific evidence on which that listing was based has been largely superseded by more recent surveys and research. Virtually all of the known habitat of the golden sun moth in the ACT is either within existing nature reserves (and hence not available as an offset), subject to future development, on Commonwealth land which is not available to the ACT Government as an offset, or in small pockets of land which do not lend themselves to effective management for direct offset purposes. Finding direct offset areas for this species is very difficult, and any further potential sites are likely to face conflicts with other environmental values.

There are, however, many locations within the Canberra area with habitat which appears suitable for supporting the golden sun moth, if it were reintroduced. Partly as a result of a previous development condition under the *EPBC Act* (effectively an indirect offset), a research program at the University of Canberra has been developing techniques are cultivating and translocating golden sun moth larvae, and I understand that this program shows some early indications of success. Refinement and expansion of the program could lead to the ability to 'seed' golden sun moths in numerous locations throughout the Canberra urban area and some nearby rural land, utilising areas such as urban open space and road reserves where the grassland habitat is suitable. The ability of the golden sun moth to recolonise such areas has been suggested by observations of the moth in road reserves that had previously been completely disturbed but have regenerated (Ref. 2). The ongoing support and application of such a research program through offsets against areas where habitat is developed could conceivably lead to a situation where the golden sun moth becomes so widespread that it is no longer regarded as threatened in the ACT.

Based on the above discussion, I would make the following suggestions with regard to offsets principles:

1. Offset should be encouraged an element of environmental best practice, and should be considered by decision makers as part of a proposal, but should not be mandatory. (This applies to all aspects of the environment, not just biodiversity or threatened species and communities, although it is recognised that the scope of offsets at the Commonwealth level is limited).

2. Before offsets are adopted, they should be subject to an appropriate level of assessment with respect to their impacts on other environmental values.

3. The benefits of strategic planning, particularly in relation to biodiversity, should be taken into account in considering the need for offsets and the value of additional offsets outside the strategic planning process. This should apply to all 'offsets' which have effectively been achieved through strategic planning, even if they preceded the commencement of the *EPBC Act.*

4. Greater recognition should be given to the potential use of indirect offsets (other compensatory measures), particularly in situations where direct offsets are not achievable or their value is questionable.

B. Processes used to develop and assess proposed offsets

When the principle of offsets was first adopted under the *EPBC Act*, its early application was on an *ad hoc* basis, with offset measures being based largely on value judgements of their benefits relative to the impacts. In due course, to create an impression of greater objectivity, the approach was adopted of requiring offsets which led to the protection of an area of similar habitat, which was generally larger by an arbitrary factor than that of the offset area. The mathematical calculations to assess those offsets were very precise (sometimes to a fraction of a hectare), yet the accuracy of determining the size of both the impact area and the offset area was frequently subject to large errors because the imprecision in describing and delineating the relevant habitat. Also, the relative habitat quality of the impact and offset areas was not necessarily taken into account, resulting in some offsets being considered excessive.

The adoption of the *EPBC Act* Environmental Offsets Policy in October 2012 and the parallel development of an offsets assessment guide can be seen as an attempt to introduce a higher level of rigour into the offsets assessment process. I was involved in several exercises in the early application of this guide in the Canberra area, and became very familiar with his potential and its limitations.

I see the strengths of the offsets assessment guide as follows:

1. The rationale on which it is based appears to be generally sound in terms of what it aims to achieve.

2. The offset calculation process is easy to use and is transparent, making it relatively easy for other people to review the offset calculations and test their own variations (in contrast to the NSW Biometrics approach). This feature, however, can also be seen as a weakness as it may encourage people to use the guide without giving proper thought to the science underlying the benefits of offsets.

On the other hand, there are several significant weaknesses in the application of the guide, as follows:

1. Application of the guide requires the use of rating scales for habitat quality for both the impact area and the offset area. A specific scale is required for each threatened species or ecological community, but no such scales were available when the offsets assessment guide was released. In order to use the guide, I have developed draft scales for three *EPBC Act* listed entities, namely golden sun moth, White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derive native grasslands (box – gum woodland), and Natural Temperate Grassland of the Southern Tablelands and the ACT (natural temperate grassland). These scales appear to be acceptable to the Commonwealth, although I still regard them as having draft status only, as they have not been subject to peer review outside my own project team. Other people applying the guide may well come up with a different scale. While I have prepared the rating scales without being deliberately biased by specific projects, I feel that it is desirable that rating scales be developed and peer reviewed independently for every listed species and ecological community that is likely to be subject to offsets.

2. Irrespective of the quality and objectivity of the above rating scales, there is an underlying assumption that the scales are linear in nature for purposes of mathematical manipulation, e.g. that the difference between level 1 and level 2 is the same as that between level 9 and level 10. Given the subjective basis for defining these levels, such linearity cannot be precisely demonstrated, and this gives rise to a potential margin of error in the application of these scales.

3. The problem of accurately designating the size of impact and offset areas of habitat identified in relation to the previous calculation method remains in using this guide. For example, in one of the offset calculations that I undertook, the impact area varied between 1.25 ha and 3 ha depending on the habitat criteria applied (Ref. 3). This difference was partly compensated for by differences in their respective rated values of habitat quality, but nevertheless produced a large element of variation into the offset calculation.

4. The most significant potential for 'error' in applying the offsets assessment guide is associated with the figure used for the annual probability of extinction. This is the estimate that a species or ecological community will be completely lost in the wild each year, given recent rates of decline. The guide determines the annual probability of extinction on the

basis of criteria derived from the International Union for the Conservation of Nature (IUCN) Red List for threatened species (Ref. 4).

The IUCN Red List includes the following probabilities of extinction for determining whether a species is critically endangered, endangered or vulnerable:

- Critically endangered – at least 50% in 10 years (annual probability of extinction 6.7%).
- Endangered – at least 20% in 20 years (annual probability of extinction 1.1%).
- Vulnerable – at least 10% in 100 years (annual probability of extinction 0 .1%).

A further 0.1% can be added to each of the above annual probabilities to take account of catastrophic events.

The above figures produce significantly different results due to the way in which they are applied in the guide. For example, in one of the offset calculations I have undertaken (Ref. 3), the offsets based on the different extinction probabilities above worked out to be 99%, 189%, and 214% using the critically endangered, endangered and vulnerable criteria respectively. In another example (Ref. 5), the corresponding figures were 121%, 340% and 411%.

While in the above examples, the offset requirement of 100% would be achieved (or almost achieved) in all cases, in a situation with a less generous offset, the annual probability of extinction factor could make the difference between an offset being clearly unacceptable or clearly acceptable. This may be particularly important in a situation where there is disagreement about the threatened status of the species. For example, the golden sun moth is listed as critically endangered under the *EPBC Act* but only as endangered under the ACT *Nature Conservation Act*.

In this example, there is no realistic chance of the golden sun moth, for which the number of known sites has increased steadily in recent years and which has survived for decades without active management in many urban and rural sites around the ACT, would become extinct in the wild in 10 or even 20 years. Likewise, with extensive nature reserves protecting box – gum woodland in the ACT and ongoing regeneration of this critically endangered community in many areas which have not been developed, that community seems assured of surviving and improving in condition for many decades hence. I could quote many other examples where the assumed extinction probability based on the *EPBC Act* listing status does not appear to reflect the actual risk to those species or communities.

The offsets assessment guide, however, does allow for the use of a different probability of extinction for a species or ecological community where there is peer reviewed scientific evidence to support the alternative figure. To add credibility to the guide, I suggest that a specific probability of extinction should be determined through a peer reviewed scientific process for every listed species or community that is subject to application of the guide.

There is a further compelling reason from implementing this process. The IUCN probability of extinction figures form only one of five criteria for determining the threatened status of a species, and can be applied only when the probability has been determined through a Probability Variability Analysis as described in the Red Book (Ref. 4). This analysis is designated as quantitative analysis (Criterion E), while Criteria A to D relate respectively to population reduction, geographic range, small population size and decline, and very small and restricted population.

Section 4.12 of the Red Book specifically states:

It is important to note that the risk-based thresholds of Criterion E should not be used to infer extinction risk for a taxon assessed as VU, EN and CR under any of the criteria A to D.

In other words, one of the most fundamental and influential factors in the offsets assessment guide is applied in direct contravention to the advice of the leading international authority on threatened species. This seriously undermines the scientific credibility of the guide as a quantitative tool for determining offsets. Furthermore, Red Book criteria apply only to species and not to ecological communities.

If the offsets assessment guide is to be used on a quantitative basis as intended, I suggest that its use should be subject to the determination of a peer reviewed estimate of the probability of extinction for each relevant species or ecological community. Otherwise a more subjective approach towards offsets should be applied.

Assuming that the issue of probability of extinction can be satisfactorily addressed, the cumulative effect of variations in the other three weaknesses described above can still result in significant potential 'errors' in the offset calculations. Based on my experience, I feel that a calculated offset of less than 60% can reasonably be considered inadequate, while a calculated offset of more than 150% should be considered over-generous. Anything in between (i.e. 60 to 150%) would be of an appropriate order of magnitude to provide a reasonable offset.

Given the high level of variability or potential error in input data used in the offset calculations, it seems incongruous that the guide calculates percentage offsets to two decimal places. Ecology is far from being an exact science, and often requires detailed statistical analysis of data to draw quantitative conclusions. I would not suggest incorporating statistical analysis into the offsets assessment guide, however, as this would undermine its benefits of simplicity and transparency. Rather, it is preferable to acknowledge the quantitative limitations of the guide and apply it on a semi-quantitative basis only, with a high degree of common sense.

In summary, my views on the processes used to develop and assess proposed offsets are as follows:

1. Subject to addressing the weakness as discussed above, I would support the ongoing use in principle of the *EPBC Act* offsets assessment guide as one tool for evaluating offsets, but not as the only tool.

2. The assessment of biodiversity offsets should also include a subjective process based on sound scientific knowledge of the relevant species or ecological community in its full context, rather than just 'number-crunching'.

3. The offsets assessment guide should be applied on an absolute basis only to species and ecological communities for which the annual probability of extinction has been specifically and objectively determined. It is desirable also to have peer reviewed rating scales for habitat quality.

4. The quantitative results obtained through the guide should make allowance for the potential variability arising from describing and delineating habitat, possible variation and non-linearity in rating scales, and potential errors in assessing annual probability of extinction. The scope of such variability can be assessed through sensitivity testing using a reasonable range of input data.

C. Adequacy of monitoring and evaluation of approved offsets arrangements

I would support the requirement for ongoing monitoring and evaluation of offsets, as it is only by doing this that the real value of applying the offsets principles can be determined. Such monitoring, however, should be viewed in the broader context of environmental impact assessment.

The review of completed projects to determine whether the impact predictions are reliable, understated or overstated, and whether proposed mitigation and management measures, as well as offsets, have been effective is part of the ongoing learning process for environment planning and assessment. While some proponents and environmental practitioners may undertake ongoing review for their own satisfaction, this tends to be done informally and very little is documented for the benefit of others. There is usually no requirement and little incentive to undertake such documentation once the project is completed.

While supporting ongoing monitoring and evaluation of offsets, I feel that the reporting requirements should not be unduly onerous, i.e. they should be limited to broad landscape scale assessment, possibly with some carefully targeted quantitative data collection, rather than exhaustive scientific monitoring of a wide range of parameters, some of which may be of marginal value. The monitoring process should also identify any other beneficial or adverse impacts (e.g. of a social nature) that may result from the offset.

Concluding Comments

I have been involved professionally in environmental planning and assessment for over 40 years and during that time have seen many changes in the way in which environmental issues are addressed. Certain approaches come into fashion for a while, then fall from favour as their limitations become evident. The use of offsets is a relatively recent fashion, which has its benefits but also its limitations, and is by no means the answer to the problems of biodiversity conservation. One common criticism of offsets is that they appear to be dependent on development in order to be implemented. Furthermore, the way in which they are applied often does not result in the optimum outcomes for biodiversity conservation. The use of offsets is therefore inferior to the process of strategic biodiversity planning.

Project-based environmental assessments form just one component of the *EPBC Act*, but have received considerable emphasis in the application of the Act, possibly at the expense of other components. There are other provisions in the Act, such as strategic environmental assessment, bioregional planning and recovery plans, which do not necessarily involve offsets but have the potential to achieve much more with respect to biodiversity conservation. While not advocating against the use of offsets where they can be beneficial, I would not like to see them become a distraction from these other potentially more valuable provisions of the Act.

References

All of the following references have been made publicly available and can be provided to the Committee if required.

1. Hogg, D. *Strategic planning for biodiversity conservation in the Australian Capital Territory.* Paper presented to the 2009 Environment Institute of Australia and New Zealand Conference, Canberra, 20-21 October 2009.

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3. Nash, K., Jessop, R. and Hogg, D.McC. *Campbell Section 5, ACT. EPBC 2012/6292. Preliminary Documentation.* Prepared on behalf of the Land Development Agency, October 2012.

4. IUCN Standards and Petitions Subcommittee. *Guidelines for using the IUCN Red List categories and criteria. Version 8.1.* March 2010.

5. Moore, D., Nash, K. and Hogg, D.McC. *Block 9 Section 64 Watson residential development, ACT. EPBC 2012/6418. Preliminary Documentation.* Prepared on behalf of the Land Development Agency, April 2013.