G0083

NSW SCIENTIFIC COMMITTEE

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Department of Environment, Climate Change and Water
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Attention: Biodiversity Certification

Dear Ms Corbyn

Thank you for the opportunity to comment on the *Biodiversity Certification: Draft Assessment Methodology*. The NSW Scientific Committee has a number of concerns chiefly related to the absence of meaningful data to drive the *Methodology,* with the result that we have little confidence that assessments using the *Methodology* can be deemed to improve or maintain biodiversity values. Accordingly, we are concerned that there will be an ongoing decline of many threatened species and ecological communities as a result of Biodiversity Certification extinguishing other provisions of the TSC Act.

Introduction

The NSW Scientific Committee supports the concept of regional biodiversity assessment as a strategic method of minimising biodiversity loss resulting from the failure of the planning system to adequately deal with the cumulative loss of habitat that follows from a case by case approach. To be effective in conserving threatened species, regional assessment must take place at a stage in the development of the land when options remain for retention of land that is comprehensive, adequate and representative in terms of its capacity to capture biodiversity in a way that affords some prospect of its indefinite survival as natural populations. However, the option of Biobanking assessment will be most attractive to developers in circumstances where there has already been substantial loss of vegetation from the landscape because this is where there is a lower probability of convincing the courts, using existing TSC Act provisions, that an individual development will have no significant effect on threatened taxa.

Threatened species are often rare, which presents difficulties both for their survey and for predicting their distribution. Species that are rare are prone to local extinction due to stochastic processes, often resulting in a loose relationship between vegetation type and the precise location of threatened species. Our knowledge of the distributions of threatened species is therefore generally poor, which means there must be sufficient redundancy in any reserve system to capture the as yet unknown locations of threatened species within a probability envelope as well as the stochastic process of local extinction and recolonisation

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that drives their distributions. There is little option for including redundancy, however, in the heavily cleared landscapes in which the option of a Biobanking/Biocertification approach is most attractive to developers.

The Scientific Committee applauds the attempt, and appreciates the difficulty, of designing objective assessment methods, based on science, to determine the relative impacts on biodiversity of different approaches to habitat loss. For the reason above, however, we do not consider that threatened species legislation provides the appropriate framework for considering such trade-offs. The Threatened Species Conservation Act provides a safety-net for protecting threatened species that have slipped through the cracks in legislation that is directed towards the more comprehensive protection of biodiversity. By removing the requirement of on-ground survey, and by providing a 10-year period within which development is quarantined from new species listings or the discovery of new locations (or indeed new species), the Biocertification approach undermines the capacity for the TSC Act to provide a safety net.

In addition, due to a number of flaws and assumptions described below, use of the "*Methodology*" is likely to result in the ongoing decline of many threatened species and ecological communities. Moreover, it is likely to result in new species and ecological communities becoming threatened, i.e., it will not stop the decline of species currently considered to not be threatened.

Lacks scientific underpinning

The red flag and credits methodology assumes large amounts of information for which we can see no reliable published source. Moreover, where relevant published information does exist in the literature, conflicting values often appear in the Threatened Species Profile database (see specific examples below).

There are also assumptions about the improvement to a species in relation to management that are simplistic and assume each threat acts independently, and that by addressing a single threat a response may be initiated (e.g., Table 5, p 38). Rather, there may be interactions between threats, or there may a few major threats that if not dealt with may render all other threat mitigation ineffective. As well, the concept of scoring gain values of 0.6 (p 39) where there is no data is dubious.

The database includes a column to flag whether a species 'cannot withstand further loss'. Loss of any individuals of any threatened species is likely to lead to decline and an impressionistic, desk-top judgement should not be imposed. Similarly, the column for the 'number of individuals that do not represent a loss' cannot be supported by any published studies. The "data" are therefore totally speculative and call into question the whole concept of using a numerical "methodology".

It is apparent in the database that where more is known about a particular species, there is a recognition of a lower potential for management actions to be effective. This reflects the difficulties of managing complex interacting threats impacting on threatened species. Hence, the database overestimates T_G for most species and as a consequence underestimates the

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required offsets. For example, for species for which we have a detailed knowledge of the way in which fire is critical to their life histories (Bradstock et al. 1995, Auld and Bradstock 2000, Keith et al. 2002, Auld and Ooi 2008), there is a limited ability to successfully implement on-going fire management to control threats. Most threatened plants occur in fire-prone habitats and we have little knowledge of their fire response, but the database considers there to be a moderate or good ability to control threats (which will include fire). However, these taxa face the same fire management challenges as the species we know have limited ability to respond. Furthermore, the situation will deteriorate under a changing climate and an increased risk of higher fire frequency.

For virtually all threatened taxa there is a shortage of data on life history characteristics, and there are almost no data on the relative success of management actions that may ameliorate threats. But even where data exist in the scientific literature, the database frequently overestimates the ability to control threats and the extent of available knowledge as indicated by the following plant examples.

Acacia carneorum

- Not identified as having 'Observed recruitment issues? (e.g., infertility, clonal) (scored as 0.125 for 'Yes')'. This contradicts the published literature. The species lacks seed production at all but two known sites, is highly clonal and has major recruitment issues (Auld 1993).
- Age to first significant flowering is given as 5-10 years. It is likely to be >25 years as young plants spend decades as suppressed juveniles under grazing pressure (Auld 1993, Denham & Auld 2004).
- Seedbank persistence is given as 'persistent soil >2 years'. Data from *Acacia oswaldii* with very similar seeds suggest it is likely to be very short lived in the soil <1 year (Auld 1993, 1995).
- Propagule dispersal distance is given as 'local'. Rather the species, in the rare locations that seed is produced, has bird-dispersed seeds.
- Tg value of 0.625 is overestimated. Under current management to reduce known threats (exotic grazers) the species is still declining across the landscape. This is thought to be due to long-term drought and possible climate change. These threats are beyond current management practices.

Darwinia biflora

- The loss of two plants is considered to be a negligible loss. There is no literature to support this claim. Rather, even a small number of above ground plants may support large soil seed banks and hence, much larger populations in the future after the next fire (Auld et al. 1993, Auld and Scott 1997).
- Stated a 'moderate ability to control' in 'Effectiveness of management actions'. However, one of the main threats to the species is too frequent fire and fires producing low soil heating (Auld 1993, Auld and Ooi 2009). There is a very limited ability to control the former (as wildfires will burn over any prescribed fire boundaries on extreme weather days, increasing local fire frequency). There is currently no ability to control the latter in fire management.

Calystegia affinis

- Age to first seed production is given as 2-5. Yet no known seed produced in the wild (Hutton 2001, Hutton et al. 2008).
- Scored as 'moderate ability to control' in relation to threats. This is overly optimistic as the species is impacted on by crofton weed in remote habitats where control is largely ineffective - See DECC (2007), Hutton 2001, Hutton et al. (2008).
- Claimed to have a persistent soil seed bank. No seed banks are known.
- Claimed to live for 5-25 years. Again this is simply unknown.
- Local dispersal scored. No dispersal event has ever been observed.
- Claimed not to be very poorly known.

Carmichaelia exsul

- Limited ability to control threats claimed. Rather the threats to this species (weeds) are currently beyond control (Hutton 2001, DECC 2007).
- First flowering/seeding claimed to be 2-5 years. This is simply unknown and is likely to be much longer.
- Senescence age suggested to be 5-25 years. There are no data to support this claim.
- Dispersal is claimed to be local. However, this species has seeds displayed in fruits that indicate bird dispersal.

Cynanchum elegans

- 'Moderate ability' to control threats claimed. In much of the southern part of the range of this species there has been no response to any management actions. Consequently this is more likely 'Limited ability'.
- Age to flowering given as 2-5. Rather it is essentially unknown

Diuris shaeffiana

- Species is essentially unknown, yet a 'good ability to control threats' is claimed along with 'not poorly known'. It is probably being confused with *D. tricolour* in the database.

Euphorbia sarcostemmoides

- Was known from only one NSW location, but now cannot be found there. Listed in database as 'moderate ability to control' threats. The species is essentially very poorly known.

Haloragodendron lucasii

- Claimed a 'good ability to control' threats. However, one of the major threats is lack of sexual reproduction, while fire management is another. Rather there is a very limited ability to manage threats (Sydes et al. 1996, Williams et al. 1997).

Homoranthus spp.

- Claimed a 'good ability to control' threats. However, *Phytophthora cinnamomi* affects these species and is essentially unmanageable.

Leucopogon exolasius

- Claimed a 'moderate ability to control' threats. This underestimates the difficulty of effective fire management in this species (Ooi et al. 2006).

Persoonia spp.

- Claimed a 'moderate ability to control' threats. Fire management is critical for these species. Most are very slow to mature after a fire (Benson and MacDougall 2000, Auld et al. 2007), and some occur in very low numbers at any remnant location. There is currently no effective fire management for these species. The ability to control threats is greatly overestimated.

Phaius spp.

- One species has not been seen in NSW for decades. Neither species is considered 'naturally very rare' or 'poorly known' when they should be. Ability to control threats overestimated.

Solanum karsense

- Claimed moderate ability to manage threats. However, changes to water management and river flows is the key threat to the species (Auld and Denham 2001). Essentially this threat is beyond control at present given the over allocation of water on the Murray/Darling river systems.

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Assumption of complete and comprehensive knowledge

The *Methodology* assumes that there is currently a complete and comprehensive knowledge of threatened species and ecological communities in NSW, at least sufficiently so as to allow exemptions from the Act of approved areas for periods of a decade. For example on p 4 it states that the 'methodology assesses the biodiversity values currently occurring within a ... planning area'. The reality is that current TSC Act listings are subject to dynamic change as new knowledge allows re-evaluation of extinction risk. Changes may result from better understanding of the nature of the entities being listed (e.g., for species and populations, improved taxonomic, distributional, ecological, and demographic knowledge; for communities, revised concepts of how to define ecologically meaningful communities).

For mammal and bird species, we can assume that the existence within NSW of nearly all species is known, with relatively minor changes to be expected in distributional, taxonomic and demographic-trend understanding which may result in changes of category, or some de-listings, for currently listed species. Knowledge of reptiles, amphibians, and vascular plants is less well developed; most species are at least known (although there is a steady trickle of entirely new plant species recognised each year in NSW), but numerous changes in listing status are to be expected as demographic and distributional knowledge improves or actual extinction risk changes. For example, despite significant progress by the Scientific Committee in reviewing the Schedules over the last three years, many species in these groups that are currently listed as Endangered or Vulnerable have yet to be re-assessed against the recently introduced criteria for Critically Endangered status which commenced in October 2005. Similarly, the status of non-endemic Vulnerable species also needs periodic review. Even for these relatively well known groups of organisms, there are large numbers of un-listed taxa and populations (and ecological communities) that might well qualify as 'near-threatened' but which have as yet been neither reviewed nor nominated for listing. As the processes causing biodiversity loss continue, the number of entities in this category can be expected to rise, and State policy needs to be able to anticipate and adapt to larger numbers of 'listed threatened' and 'near threatened' entities. For all other types of organism, there are much greater knowledge shortfalls, and hence current listings are less comprehensive and more subject to change in the light of better scientific knowledge. Few invertebrates, non-vascular plants and fungi have been listed or considered for listing. Finally, the consideration of threatened ecological communities is also in its infancy and the current TSC schedules do not yet reflect the real extent of threatened communities in NSW. Hence the current TSC Act listings form only a subset of what should be listed as threatened in any areas to be considered for Biodiversity Certification. To assume that the current listings and protection measures for the currently-listed species can act as a surrogate for those taxa and ecological communities that are not currently listed is not valid, especially where such species/communities only occur in small numbers or geographic areas. Determining the conservation status of species is very much a work in progress, with the Scientific Committee listing more than 270 species and 95 communities since 1996. Permitting biodiversity certification to extinguish the other provisions of the TSC Act for 10 years from the date of certification will result in the ongoing decline of biodiversity.

The *Methodology* also assumes that all species are currently listed at the most appropriate threat status. This assumption fails because the Critically Endangered category is poorly

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documented in NSW. As a recent addition to the TSC Act, few taxa are currently listed in the Critically Endangered category, and while the Scientific Committee has reviewed a subset of Endangered taxa, most have not yet been reassessed against the criteria for the Critically Endangered category. As the higher threat status (Critically Endangered) is likely to impose non-variant red flags more than an endangered listing, this is a fundamental failing in the *Methodology.*

The *Methodology* assumes that threats to biodiversity are known, understood and can be effectively managed. Clearly, the emerging impacts of climate change and their interaction with existing and novel threats (Ooi *et al.* 2009) negates this assumption. Essentially the whole document ignores the impacts of climate change and hence severely restricts the available adaptation measures in relation to a changing climate. There is considerable potential for single events or threatening processes (e.g. introduction of pathogens) to radically and very rapidly change the risk status of a whole range of species, populations and communities. Quarantining certified land from improvements in knowledge for a period of 10 years will result in further biodiversity decline.

Lacks consideration of genetic diversity

By focussing on a few large patches of vegetation and allowing small patches across the landscape to be lost, the *Methodology* does not consider the effect of the loss of vegetation on the genetic composition or diversity of species or populations. Ensuring that sufficient genetic diversity is retained in species and populations is essential if they are to adapt under expected environmental change in the coming decades. The maintenance of diversity at the genetic level is a key component underpinning the conservation of biodiversity (one of the major objectives of the TSC Act).

As populations become smaller the available genetic pool is also narrowed, limiting the number of compatible individuals available for mating. For example, in plants this loss can induce inbreeding effects such as reduced seed production or poor quality seed that fails to germinate and thrive, both of which will limit the capacity of populations to produce successive generations.

Rare species that are naturally disjunct with little interaction through pollinator movement or seed dispersal can develop unique genetic signatures including genetic combinations not found in other populations. Removal of these populations is likely to eliminate these genes from the species entirely.

Common species can also exhibit unique genetic combinations, especially if these are growing in environments where selection pressures for particular traits such as water-use efficiency or tolerating saline conditions are strong. Removal of these populations reduces overall species-level genetic diversity and may eliminate important adaptive genetic combinations required to meet environmental change.

Assumption that unprotected land will be lost

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A fundamental assumption for biodiversity certification is that land that does not have formal protection will eventually be lost. This is, in effect, an admission that existing State biodiversity policy and legislation are failing, including the TSC Act, the Native Vegetation Act 2003 and the Catchment Management Authorities Act. The Scientific Committee considers that where development is continuing to destroy the habitat of threatened taxa, this is not due to a failing of the Act itself, but rather in its interpretation by determining authorities and in a lack of compliance enforcement. However, the *Methodology* does not improve existing legislation by replacing the need for determining authorities or compliance. Although providing determining authorities with the *Methodology*, biocertification transfers the assessment from a transparent process to an algorithm of dubious scientific merit. The *Methodology* also acknowledges that enforcement is still required to ensure that the habitat value of land is not deliberately degraded prior to assessment and that long term habitat improvements are fully implemented. If regulation of illegal clearing is currently difficult, how likely is it that habitat devaluation will be controlled? The *Methodology* does not eliminate existing difficulties with the Act, yet it makes compromises that will have negative effects on threatened taxa. More rigorous application of the existing provisions of the Act will result in decreased loss of land that does not have formal protection.

Land without formal protection will also be retained if its characteristics are unsuitable for development, e.g. flood-prone land or land on steep slopes. To assume that this land will be lost and therefore allowable as a biodiversity credit, discounts the value of red-flagged areas. Such land should be excluded from land available for biodiversity credits.

Assumption that loss of vegetation can be balanced by offsets

The *Methodology* assumes that loss of vegetation can be balanced by offsets. Issues such as time lags, ongoing impacts of loss on species and community decline, etc are ignored (Burgin 2008; Bedward *et al.* 2009; Moilanen *et al.* 2009). Furthermore, it assumes that vegetation and habitat loss outside of red flag areas is acceptable and will not affect 'overall improvement or maintenance of biodiversity values'. Clearing of native vegetation (at all spatial scales) is listed as a Key Threatening Process in NSW and in the opinion of the Scientific Committee will have an impact on threatened species and cause species to become threatened. This is not compatible with 'overall improvement or maintenance of biodiversity values'.

The *Methodology* needs to clarify its application to different spatial and temporal scales. It lacks an explanation for the different spatial scales used in different parts of the assessment process including the "development area", CMA subregion, CMA region, 1000 ha assessment circle and Mitchell landscape. There is also no clear time-frame over which the desired maintenance or improvement of biodiversity will occur. It appears to discount the future, trading immediate loss for potential future gain by relying on long-term habitat improvements being fully implemented despite an uninspiring history of restoration in Australia. Moreover it makes assumptions about the likely cost of future management actions, without substantiation.

More fundamentally, the assessment, in only dealing with currently listed threatened species, assumes no value for declining species and ecological communities that, whilst under threat,

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have not yet reached the stage where they could be considered threatened under the TSC criteria. It also assumes vegetation types can be surrogates for general ecosystem biodiversity values. There is a diverse literature covering this subject and although vegetation may be a useful surrogate in certain circumstances it is not appropriate to consider vegetation as a surrogate for all organisms across all vegetation types and landforms. For example vascular vegetation cover may be a poor predictor of bryophyte and lichen diversity. This reinforces the likelihood of negative impacts on these taxonomic groups. In addition, no complete NSW vegetation typology has yet been assembled, reviewed, and published, although significant progress is being made towards this. Even so, any typology likely to be useful for scientific adaptive management needs to be constantly exposed to scientific critique and improvement, and many ecological communities need to be regarded as dynamic, not static entities in relation to extinction risk through time.

Does not adopt best practice standards where available

High biodiversity conservation values (see p 6) are based on a single value for decline (70%) and an unpublished Vegetation Types database. The IUCN and the NSW Scientific Committee use thresholds that are different from those in the *Methodology* for assessing conservation status in relation to decline (IUCN 2008, NSW Scientific Committee 2010). For example, these guidelines use a 50% decline threshold over three generations for Endangered status if the reduction may not have ceased or may not be understood or may not be reversible (as is frequently the case). The *Methodology* should explain why these conventional thresholds are not used and provide the grounds for adopting a 70% decline figure. It should also provide the basis for the adopted thresholds for habitat condition.

The *Methodology* also fails to fully consider the key elements used in determining the conservation value and status of species and ecological communities. The IUCN details criteria that can be used to assess the conservation status of species (IUCN 2008). For ecological communities, comparable elements exist along with ecological function issues (Threatened Species Conservation Regulation 2002). However, the *Methodology* fails to properly consider all these elements in assessing red flags, variations to red flags, high biodiversity conservation areas and conservation management credits. Instead, a high weight is given to decline as the key threat issue for communities, ignoring spatial distribution and loss of ecological function, etc. (For example, in Section 2.3.2, red flags can be varied if there is a 'relatively abundant' area of a community remaining.) As threat status is not based only on geographic distribution but rather, on a combination of either decline, geographic distribution or loss of ecological function, it is not appropriate to single out relative size of remaining area as a sufficient factor to vary a red flag.

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Relies on attributes for which little data are available

The section on viability (2.3.3) is very general and lacks any detail and justification for the implications given. Viability will vary for different taxa at different spatial scales and threat types. There is an assumption that remnant size, distance to nearest neighbour and condition are the three key issues that control viability of a species at a site. While there may be some literature on birds and mammals supporting this approach, published data for plants is far more complex and there is evidence that many plant sub-populations are viable in small isolated remnants (in direct contrast to the stated text in 2.3.3). There is no consideration of life history characteristics and threat levels and types. This whole section needs to be re-considered and replaced with the addition of a non-vertebrate focus. As well, there will be major climate change impacts on biodiversity and this section should include the role of stepping stones and other key elements on the conservation strategies to maximise resilience and adaptation to a changing climate, along with issues relation to the conservation of genetic diversity (as discussed above).

There is an assumption that DECCW has identified all vegetation linkages relevant to biodiversity certification. Given that climate change has not been addressed in the methods, this assumption is not valid. The role of vegetation remnants for stepping stones, refugia, adaptation *in situ*, remnant patches across climatic gradients etc need to be addressed.

Of particular concern, is the heavy reliance upon ecological assessments via aerial photography to confer biodiversity values. Whilst it is acknowledged that remote sensing is a powerful tool for acquiring useful environmental data, it has a number of significant limitations, many of which relate to the scale and resolution at which assessments can be conducted. Specifically in relation to Section 3.3, the remote sensing approach outlined for the assessment of vegetation condition is inappropriate. The approach claims to be adapted from the *Native Vegetation Interim Type Standard*, however, this standard clearly states that condition can only be assessed through field observation (Sivertsen 2009: Appendix 2, Part C).

Excludes community participation

While the *Methodology* seeks to assert a higher level of 'objective, science-based' techniques for assessment of areas, it does not acknowledge: 1) that there is as yet inadequate plot data in many regions, 2) that rapid, surrogate-based survey does not substitute for exhaustive plot-based survey plus diversity survey; and 3) that our present state of knowledge has been built upon a published, peer-reviewed, and iterative refinement of knowledge for both species and ecological communities. Such a process, not subject to arbitrary suspension for a decade at a time, continues to be necessary for both knowledge accumulation and for successful adaptive management of our biodiversity. Furthermore, the TSC Act presently provides quality control by allowing organizations or individuals to challenge assessments in the court by producing alternative expert advice. By quarantining individual developments from legal challenge, Biodiversity Certification effectively removes the opportunity of review of tests of significant impact. Third parties have only a single opportunity to evaluate impacts over very large areas, assessed using methods that are incomprehensible to all but the most specialist

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assessors. Apart from the inadequate time proposed for public exhibition of *Biobanking* assessments there is little room for objectors to engage using the same language as the assessors. The removal of third party assessment is likely to result in less accurate determination of the impact of developments on biodiversity.

In theory, an objective science-based assessment process should reduce the need for expert opinion and thus the necessity for alternate opinions. In spite of an attempt to standardize methods, the *Methodology*, does not succeed in replacing expert opinion, or does so only by accepting inadequate and static data. The *Methodology* states that threatened species survey is not required if "expert opinion stat[es] that (the species is) unlikely to be present in the biodiversity certification planning area." It is not clear how such opinion can be evaluated by third parties and whether there is a mechanism by which it can be challenged.

Solutions

In amending the TSC Act a first step is to understand where it is currently failing, and to determine what steps can be taken to strengthen it. Such an analysis is presently lacking in the discussion, although a number of shortfalls of the current Act are implied. Threatened species are still declining and developments are being approved that are resulting in net harm to species and ecological communities. Rather than undermine the existing Act by providing a Biocertification/biobanking alternative, steps could be taken to help developers and consent authorities with their decisions. Development of minimum survey guidelines, definitions of what constitutes significant impact for different entities and scales would assist developers, consultants, objectors and the court. A renewed focus on the declaration of critical habitat, increased attention to recovery planning and action, and particularly the implementation of threat abatement plans is likely to have greater benefits to biodiversity conservation than providing a black box approach to assessing development impacts.

Conclusion

As a result of unsustainable development, the earth is currently experiencing the highest rate of extinction since the meteorite impact that ended the age of dinosaurs. Australia has a particularly poor record in terms of recent extinctions. Urbanisation is a key cause of decline and it is therefore important that future development is properly assessed. The *Methodology* generates a false certainty by making assumptions about poorly-known elements of biodiversity to develop a numerical score that has little scientific underpinning. Unlike the existing system which leads to a steady incremental gain in knowledge of threatened species, the *Methodology* assumes perfect knowledge already exists and quarantines developers from undertaking the survey that improves our knowledge. The present system may result in development approval taking longer, but this should not be considered a weakness: rather, it is an indicator that the cost on biodiversity is being considered, and that the impact of any action is properly assessed which is one of the objects of the Act. The Scientific Committee acknowledges that there are competing societal priorities for land use and the conservation of biodiversity is only one, but biodiversity loss – especially extinction – is irreversible. While the Scientific Committee's responsibility relates to the conservation of threatened species in order to promote biodiversity conservation we recognise that situations will arise when socio-

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political constraints result in the loss of threatened taxa. However, we consider that this decision is best made transparently, rather than by introducing an abstract *Methodology* that gives the false impression that all objectives can simultaneously be satisfied.

Yours sincerely

- 3 AUG 2010

Dr Richard Major
Chairperson
NSW Scientific Committee

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