



**Review of proposed amendments
to the Environmental Outcomes
Assessment Methodology**

Chapters 2 and 5 (Biodiversity)

May 2009

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Enquiries

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List of acronyms

EOAM	Environmental Outcomes Assessment Methodology
CMA	Catchment Management Authority
DECC	Department of Environment and Climate Change
NRC	Natural Resources Commission
NRM	Natural Resource Management
NSW	New South Wales
PVP	Property Vegetation Plan

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1 Introduction

The Minister for Climate Change and the Environment has asked the Natural Resources Commission (NRC) for advice on some 109 proposed amendments to the *Environmental Outcomes Assessment Methodology* (EOAM) used to assess applications to manage native vegetation under the *Native Vegetation Act 2003*.

The amendments are to Chapters 2 and 5 of the EOAM, which deals with biodiversity aspects of landholders' applications to manage native vegetation on their properties.

1.1 Recommendations

The proposed amendments are intended to make the assessment process easier to use. They do not fundamentally change the scientific basis or policy settings of the EOAM.

The Department of Environment and Climate Change (DECC) staff have briefed stakeholders on the amendments and three catchment management authority (CMA) representatives were members of the DECC Biodiversity Assessment Review Panel. However, stakeholders, and those CMAs not directly involved in developing the amendments, could not anticipate their practical consequences, and support for the amendments is mixed.

On balance, the NRC does not believe this should stop the amendments being implemented. For such practical, incremental amendments as these, it is only when the changes are in fact used by CMAs in the field that DECC's belief that they will be beneficial can be tested.

However, it does raise the question of whether there is a better way to publicly demonstrate that the EOAM is in fact delivering the outcomes intended by Government, and that a large number of practical, incremental changes such as these are in fact improving the tool.

The NRC recommends that the Minister:

- implement the proposed amendments as most are intended to resolve long-standing practical issues raised by CMAs, and do not fundamentally alter the EOAM
- note that DECC will test the amendments during 'user acceptance testing' of the software, and later by way of feedback from CMAs
- consider options to further increase public confidence in the EOAM by meeting stakeholders' calls for more independent and accessible public information on the successes or otherwise of the EOAM and the merits of amendments
- note the broader policy issues raised by stakeholders in submissions (see Section 4.1) and scientific issues that remain outstanding (see Section 3.2), and consider these as part of the current review of the *Native Vegetation Act 2003*.

1.2 Process to develop our advice

To review the proposed amendments and the science underpinning them, the NRC:

- met with the independent Chair of the DECC Biodiversity Assessment Review Panel and reviewed the Review Panel's report
- sought submissions from stakeholders, receiving 13 submissions included 11 from CMAs

- held a workshop with three CMA vegetation officers to estimate the impacts in the field
- sought peer reviews from one independent scientist and two NRC Assistant Commissioners

The NRC would like to acknowledge the valuable contributions made by all those who participated, including CMA and agency staff, stakeholder groups and independent scientists.

2 The proposed amendments

The EOAM incorporates procedures to separately assess the impacts on four environmental outcomes (water quality, salinity, biodiversity, and land degradation), and is supported by decision support tools known as the *Native Vegetation Assessment Tools* (formerly the PVP Developer) and eight natural resource databases.

The revisions to chapters 2 and 5:

- clarify some ambiguities, improve efficiency in places and make minor adjustments to weightings within formulae
- strengthen the *Threatened Species Assessment Tool* by increasing the proximity value of site
- allow for some new ideas, notably the inclusion of additional interventions as options for offset management – one of which draws on recent DECC research
- extend into coastal regions the management option of ‘ecological thinning’, where native vegetation can be thinned to prescribed benchmark stem density ratios.

2.1 What do Chapters 2 and 5 do?

Chapter 2 provides general information about using the EOAM to assess broadscale clearing proposals. It contains information about the ‘improve or maintain’ test, offsets and data variation, including the use of more appropriate local data.

Chapter 5 relates specifically to assessing biodiversity value. It outlines the procedures to assess losses of biodiversity from proposed clearing, and gains in biodiversity from proposed offsets. The Chapter identifies a range of data and formulae to assess the value of biodiversity at national, regional, landscape and site scale.

2.2 Summary of the proposed amendments

The amendments were developed by the DECC Native Vegetation Steering Committee in response to CMA concerns, and build from the report¹ of an independently-chaired Biodiversity Assessment Review Panel (and supporting work by an expert Scientific Subgroup).

The proposed amendments are mainly administrative, designed to resolve issues with the operation and functionality of the assessment tools.

The 109 proposed amendments are summarised and grouped in Table 2.1.

The more substantive amendments which need to be underpinned by sound science are all to be made to Chapter 5, Biodiversity Assessment.

¹ Denny, M., Thomas, J., Ayers, D., Boyd, J., Briggs, J., Foster, G. and McElwain, L., *Review of Biodiversity Assessment Methodology and Decision Support Tools of the Property Vegetation Plan Developer under the Native Vegetation Act 2003*, May 2008.

This chapter specifies the use of two tools:

- *BioMetric* - to assess losses of biodiversity from proposed clearing, gains in biodiversity from proposed offsets, and thinning to benchmark stem densities, and
- the *Threatened Species Assessment Tool* - to assess whether threatened species, ecological communities and endangered populations listed under the *Threatened Species Conservation Act 1995* and Commonwealth-listed threatened species and ecological communities are maintained or improved.

BioMetric draws on data in several departmental databases (vegetation benchmarks, overcleared landscapes and vegetation types, and coastal thinning genera) and incorporates data on Mitchell Landscapes, vegetation formations, vegetation types and associated data and formulae needed to assess the value of biodiversity.

The *Threatened Species Assessment Tool* draws on threatened species profiles, photos and associated databases.

Table 2.1 Summary of proposed amendments

Proposed Amendments	DECC item # EOAM section #
Changes adding new material or expanding application	
A new method to assess how connectivity adds to Landscape Value Replacing an existing method with a simpler, more repeatable method to assess how connectivity adds to the determination of a Landscape Value	Items 23 & 31 Section 5.3
Addition of two management actions contributing to offset area Site Value Change in Site Value with the offset is determined from the difference between the current Site Value and predicted Site Value with the management actions on the offset site. Currently, there are eight management actions in the <i>BioMetric</i> tool. The proposed amendments would add: provision of artificial hollows; and exclusion of fertilisers (fertilisers can alter some veg communities by favouring exotic species)	Items 44-47 Section 5.3
Extending to coastal CMA areas the option of 'ecological thinning' Allows thinning to benchmark stem densities in coastal CMAs. Clarifies definitions.	Items 51-72 Section 5.4
Undertaking assessments using 'more appropriate local data' Addition of new circumstances where 'more appropriate local data' may be used	Items 2-4 Section 2.1
Changes adding flexibility to assessments	
Providing flexibility in offsets for vegetation types cleared to a certain extent Change to allow 10% more flexibility in offsets, where the vegetation type proposed for clearing is up to 70% cleared in the CMA area. For example, a vegetation type proposed for clearing that is 60% cleared in the CMA area may be offset by a vegetation type that is no less than 50% cleared in the CMA area	Items 6 & 20 Section 5.1
Changes to scale and precision of assessing the extent of native vegetation cover, in order to determine the Landscape Value of biodiversity Removal of 10ha circle extent assessment and additional assessment of extent at 10% increments for 100ha and 1000ha circles	Items 22 & 30 Section 5.3
Greater points for riparian area offsets in assessing Landscape Value The current minimum requirement of 25% of the offset area to be a riparian area is replaced with a scoring system where points are scored depending on the percentage of offset area in a riparian area	Item 33 Section 5.3
Additional Site Value offsets for relatively uncleared landscapes or veg types Greater flexibility to recognise positive biodiversity outcomes by allowing additional Site Value offsets in vegetation types that are up to 30% cleared in the CMA area	Items 26 & 34 Section 5.3
Increased area over which a threatened species local population is assessed Changes to increase the area over which a threatened species local population is assessed, as the range of some species may extend beyond the property boundary	Item 100 Section 5.8
Definitional changes and clarifications	
Definition of 'low condition' vegetation in overcleared veg types & landscapes Minor changes to the definition of low condition vegetation, which may be cleared even if that vegetation is overcleared in the surrounding area.	Items 11-14 Section 5.2
Definition of threatened species To match the <i>Threatened Species Conservation Act 1995</i> and the <i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>	Items 74 Section 5.5
Habitat offsets for proposed removal of paddock trees Changes to recognise an existing feature of the Threatened Species Profile Database that specifies the number of habitat-providing trees that must be managed for each paddock tree proposed to be removed.	Item 93 Section 5.6

2.3 The amendments do not change the fundamentals

The EOAM is a regulatory tool to limit clearing of native vegetation and an offset tool to promote conservation land management.

As a regulatory tool to limit clearing the EOAM is effective in drawing on threatened species legislation to prevent clearing whenever a listed species or habitat is present or when components of threatened species requirements, such as food or shelter, are affected by the management proposal.

As an offset tool, the EOAM remains conservation focused by restricting trading between combinations of species, or between different aspects of environmental value.

For many functional aspects of vegetation, various combinations of species may be able to produce similar levels of ecosystem services. However, from a strictly biodiversity standpoint, the loss of habitat from clearing when replaced by an area of another habitat type cannot improve or maintain the status of the species in the cleared habitat. In these circumstances the *Threatened Species Assessment Tool* 'red lights' the application.

Similarly no considerations of broader or longer term landscape functional value, such as soil retention, sustainable conservation farming, or conservation management of derived communities can override 'red lights' designed to preserve overcleared vegetation types or protect habitat value of threatened species or communities.

The 109 proposed amendments do not alter these fundamental policy settings of the EOAM.

3 Scientific basis of the proposed amendments

While predominantly administrative in nature, some aspects of these amendments do have implications for how well practical assessments will reflect the best available science.

The NRC considers that the process used to incorporate the best available scientific knowledge where necessary was sound, and that the science considered was generally appropriate.

Some important scientific issues with the EOAM remain outstanding, and are not addressed in these changes. For example, it remains anomalous that regional biodiversity value continues to be assessed by reference to CMA regional administrative boundaries. Rather it should be assessed by reference to appropriate bio-regional boundaries, fauna ranges, and the like.

3.1 The science underpinning the amendments

DECC Review Panel identified 32 matters which needed scientific assessment. It referred these to its Scientific Subgroup for detailed investigation and advice.

The scientific matters covered in the Scientific Subgroup's report included aspects of the:

- *BioMetric* tool
 - 5 issues related to over-cleared vegetation and landscapes
 - 8 issues related to assessing change in landscape value
 - 6 issues related to assessing site value
 - 2 issues related to assessing thinning to benchmark stem densities
- *Threatened Species Assessment Tool*
 - 5 issues related to identifying whether any threatened species occur or are likely to occur
 - 2 issues related to whether likely losses can be offset
- Field Methods
 - 3 issues related to methodologies for distinguishing pre-1750 and derived communities, measuring canopy cover and assessing paddock tree proposals
- Additional matter
 - 1 issue related to partial loss rules for threatened species.

The scientific review was conducted in a scientifically sound and pragmatic manner. While the Scientific Subgroup and DECC Steering Committee needed to use its expert judgement (both regulatory and scientific) to resolve many issues, they did so after doing their best to inform themselves of the underpinning science and its implications for the changes being proposed.

It would appear that there is other recently-generated scientific knowledge available which was not considered by the Scientific Subgroup and which might lead to further improvements in the EOAM. This should not stop the amendments proceeding, but it confirms the value of ongoing surveillance of relevant new science and periodic updating of the EOAM.

3.2 Further scientific issues that should be considered

Some important scientific issues remain outstanding and should be considered in either the current or future rounds of amendments.

3.2.1 Boundaries for assessment of regional biodiversity value

The Minister should consider further amendments to enable scientific assessments to be made on the basis of the natural extent of the species or communities in question, such as the sub-bioregion or an animal's natural range, rather than confining the assessment within a CMA boundary.

CMA boundaries are typically water catchments, which are usually not logical boundaries for assessments of terrestrial biodiversity. A more logical boundary to assess the health of terrestrial vegetation² is usually the bioregion or sub-bioregion, such as the relevant Mitchell Landscape, which may well occur over parts of two or more CMA regions. Once the scientific assessment has been made at the appropriate scale, management decisions and trade-offs should then be made within the relevant CMA region or sub-catchment areas.

It may be possible to modify the relevant amendments now to allow for scientific assessment at the most appropriate scale. However, we did not have sufficient time to discuss this issue fully with DECC.

3.2.2 Alignment between EOAM and Biobanking

Several of the recommendations are intended to align parts of the EOAM to Biobanking. Before further aspects of the EOAM system are aligned to the Biobanking system, there should be a review of both systems against the objectives of the respective legislation. EOAM provisions should only be aligned to corresponding Biobanking provisions where it is clear that this would further the objectives of the *Native Vegetation Act 2003*.

3.2.3 Assumptions about biodiversity value

In his peer review, Dr Dangerfield has illustrated a range of assumptions in the modules that would benefit from ongoing review in light of emerging scientific knowledge. These should be examined in subsequent reviews of the modules.

For example, a core assumption in the EOAM is that area is a close surrogate for biodiversity value, so the greater the area the greater the value, and that this relationship is linear or at least proportional. Biodiversity value, be it for conservation of components or delivery of ecosystem services, is only partly dependent on area. This is because landscape position, patch shape, patch condition and connectivity can also affect biodiversity value.

Similarly, the category approach to riparian value improves on the previous assessment but remains subjective and context dependent. A riparian patch in dry country will have higher biodiversity value than an equivalent patch in more mesic habitats.

² For fauna, the natural geographic unit of assessment may well be an animal's natural range.

3.2.4 Success of ecological thinning in practice

Ecological thinning appears to be an important management option in some landscapes, and has long been sought by CMAs in coastal regions. On balance the NRC recommends the amendments be implemented.

Such thinning may be contentious in practice as it raises the question of how much intervention is allowable before conservation is compromised, even though the intervention logic has a scientific basis in the established ecological principle of self-thinning in plant stands.

The assumption in the amendments is that thinning will accelerate condition toward benchmarks and in many cases this will be a likely outcome. However, it could be argued that having all vegetation patches at the benchmark is not the best way to conserve biodiversity.

So whilst the rationale for ecological theory of thinning is sound, the outcomes rely on the assumption that biodiversity value is maximised at the benchmark stem densities and can be achieved by mimicking the natural self-thinning process. Allowing ecological thinning relies heavily on defining and describing the benchmark sites properly. It is unlikely that many ecological communities are sufficiently predictable to have standard stem densities, either at maturity or through succession, across all the likely occurrences within a biome.

3.2.5 The impacts of climate change on current biodiversity valuation rules

The most significant change to the valuation formulae is the greater value given to proximity. The 100 ha area nearest to the site is eight times more important by area (20% relative weighting) than any of the other 100 ha blocks in the 1000 ha radius block (25% relative weighting). This is no doubt a pragmatic position, but there is no obvious ecological logic to this assumption of proximity value, especially in the landscape context.

Connectivity continues to be a decision factor. However the science behind the benefits of connectivity for biodiversity conservation may be more contentious in the context of climate change effects, for example corridors may facilitate disruptive species to invade areas they would otherwise be unable to reach.

The overall EOAM process remains heavily influenced by the *Threatened Species Assessment Tool*. The revisions will not reduce the number of 'red light' decisions on management tactics. This excludes consideration of situations where triage within an offset strategy will more likely deliver intended outcomes. Threatened species are given highest priority, when increasingly this may not be the best way to manage landscapes in a changing physical and social climate.

There is sufficient science on topics such as species-area relationships, pattern recognition, remote sensing analysis, and disturbance theory to think of more significant revisions to the approach. Apparent among these would be to find a better balance between the quantitative approach of *BioMetric* with the rules based approach of the *Threatened Species Assessment Tool*.

3.2.6 Landscape scale and scale of assessments

The amendments do not address a significant operational constraint of the assessment tool, which is the scale of decisions.

Land management units and properties east of the divide are small enough to sit as a mosaic on top of underlying landscape features and processes. The progressively larger properties to the

west of the state are the reverse. They often overlay many landscape units. The interaction between scale of property management, landscape and regional conservation outcomes is dynamic and location dependent. One size does not fit all.

The amendments have not taken up recommendations made by the NRC in its 2007 review of a landscape approach to vegetation management.

3.3 Some CMA issues to consider in future amendments

The proposed amendments do not address all of the issues raised by CMAs with the Review Panel.

Some outstanding issues are listed at Table 3.1.

Table 3.1 Issues raised by CMAs but not yet addressed in the proposed amendments

Issues still outstanding
Trading a loss of vegetation extent with a gain in vegetation condition
Confusion regarding the different scales and characteristics meant by the term 'landscape'
Stream-lining the process set out to update databases – including reconsidering the requirement to consult on database changes
Need for separate benchmarks for different landscapes
Scale of assessment of landscape value
Appropriateness of low condition definition for different regions
Limitations of threatened species assessment
Need to develop ecological burning protocols
Consider developing a methodology to address changing vegetation communities due to human disturbances

4 The challenges of consulting on practical amendments

On balance, the NRC considers that the proposed amendments are likely to improve operation and functionality of the decision support tool, but found it difficult to conclusively test this within the time allotted to prepare this advice.

Similarly, some stakeholders have met first with the Scientific Subgroup, then with the DECC Review Panel, and lastly with the NRC, yet feel they have not been able to properly engage with the proposed amendments. This illustrates the challenge of meaningfully consulting stakeholders 'on paper' about numerous, incremental amendments to an existing module.

By contrast, when DECC was introducing the Invasive Native Scrub module as a stand alone new methodology, it was more practical to conduct field trials before proposing the changes and to include these with the proposals.³

4.1 Stakeholder feedback on the proposed amendments

DECC and the Scientific Subgroup, which helped develop the changes, have gone to considerable lengths to consult stakeholders on the proposed changes. DECC has explained the practical application of the changes to stakeholders and the NRC.

Despite this, all parties find it very difficult to anticipate the impact of the changes without the benefit of field trials because of their detailed operational nature, and the myriad of different situations in which they might be used. For example, the NSW Farmers Association⁴ argues:

"...there is no practical way to evaluate the significant changes which are contained in the proposed amendments. An issue that has been raised many times by the Association is that the Property Vegetation Plan developer software cannot be used by anyone other than a Government officer with access to special computing equipment. Therefore, it is impossible for the Association, or any other external party, to conduct scenarios to investigate how changes will affect assessment results."

The Association did raise a range of detailed issues in their submission to the Scientific Subgroup, and they provided a copy of this to the NRC. These issues are broader than the proposed amendments and no doubt will be issues the Association would raise as part of the review of the *Native Vegetation Act 2003*.

Similarly, the Environmental Defender's Office struggled to comment on the specific amendments. It argued that the Review Panel's report to DECC should have been made publicly available to improve transparency of the rationale for the amendments.⁵

It also voiced the concerns of a number of stakeholders when it argued the timeframe available for the NRC's review was too short to allow them to form a considered view on the proposals.

³ NRC, *Advice to the Minister: Amendments to the EOAM, Chapter 7 Invasive Native Scrub*, September 2006.

⁴ NSW Farmers Association, *Submission to the review of EOAM*, 27 May 2009

⁵ Environmental Defender's Office Ltd, *Submission to the review of EOAM*, 29 April 2009.

The Total Environment Centre⁶ raised three issues:

- **New management actions for offsets**
Concern about the merits of allowing new management actions towards offset value without “independent audit of the success and persistence in the social and economic reality of farming” of current management actions.
- **Trading between vegetation types**
Concern that the new flexibility to allow clearing where the site value is up to 10% higher than the surrounding regional value of the same vegetation type, is too one-sided. That is, it resolves estimation error in favour of the landholder rather than the environment.
- **Area considered to support local population**
Concern about too broad a CMA discretion if the scale boundary for assessing a ‘secure population’ of a threatened species is left in guidelines and not tightly legally defined.

In practice, only those DECC staff and CMA vegetation assessment officers directly involved have sufficient detailed practical experience in using the tool to predict what the amendments will do.

This is not surprising given the complexity of managing native vegetation at such a detailed scale. Those not directly involved can readily engage with the bigger policy issues in this area, but need to see the practical demonstration of any amendments to the EOAM to judge their merits.

4.2 CMA feedback on the proposed amendments

Many of the proposed amendments were in response to issues raised by CMAs, in most cases to improve the operation and functionality of the assessment tools.

In general, those CMAs who have been actively involved in developing the amendments support them, while those not involved remain uncomfortable.

The proposed amendments do not address all of the issues raised by CMAs. Examples of issues raised in CMAs’ submissions included:

- the definition of ‘low condition’ vegetation was not clear and consistent with the *Native Vegetation Act 2003*, including some shrublands that would now be inappropriately defined and assessed as grasslands⁷, and false assessments resulting from derived landscapes where the entire over-storey has been cleared and the remaining understorey being taller than one metre
- the method for assessing ‘landscape value’ is confusing⁸, the new assessment requirements will be onerous and subjective⁹, and properties within some CMA regions are small and would still need assessment within the removed 10ha circle
- the method for assessing ‘ecological thinning’ is inadequate, the additional criteria will increase restrictions on clearing and could result in inaccurate representation of site

⁶ Total Environment Centre, *Email on the review of EOAM*, 27 May 2009

⁷ Hawkesbury Nepean CMA, *Submission on the review of EOAM*, 21 May 2009, page 2

⁸ Lower Murray Darling CMA, *Submission on the review of EOAM*, May 2009, page 3

⁹ Lachlan CMA, *Submission on the review of EOAM*, 22 May 2009, page 2

variability, and the grouping of size classes of the same age cohort will result in preferential thinning¹⁰

- the definition of 'threatened species' may result in more 'red lights'¹¹, the actual threats to each species are not addressed in assessments¹², and the database has generalised threatened species habitat profiles¹³.

4.3 NRC's efforts to test the amendments on case studies

The NRC conducted a workshop with four CMA native vegetation staff to consider how specific field examples involving assessing native vegetation extent, riparian areas in offsets and landscape value might be affected by the proposed amendments.

The proposed amendments made sense on paper. However, the NRC and CMA staff found it difficult to anticipate the impact of the proposed amendments without a 'beta version' of how the amendments might be coded into the software.

4.4 Could field trials of proposed amendments be done?

DECC has indicated it does not think it practical to do field trials of incremental changes to an existing module as this would duplicate its normal software maintenance practices. As a matter of course DECC tests new software against some hypothetical situations as part of 'user acceptance testing'.

This testing is to see that the software does not have bugs. DECC does not believe it is practical or cost-effective to examine a statistical sample of the full range of permutations, circumstances and setting across NSW prior to implementing the amendments.

In practice, DECC and CMAs are, like all software developers and users, in a continual refinement loop where they identify issues, develop solutions, test and implement those, and then field test them through subsequent cycles. It is likely to be inefficient and impractical to ask DECC to separately field test each cycle of incremental amendments before they are officially approved.

Further, in all likelihood the way in which CMAs implement the amendments may have as significant an impact in the field as the 'on paper' amendments themselves. DECC trains CMAs in using the tool and retrains when it makes amendments. Over time it seeks feedback on further training needs, guides CMAs on implementation issues, and proposes further amendments where these seem necessary.

The NRC is recommending that the Minister approve the amendments and ask DECC to continue on with its plans to codify the changes into the tool, test the new software using hypothetical situations drawn from previous PVPs, and then train CMAs in using the new version and associated changes.

¹⁰ Environmental Defender's Office Ltd, *Submission on the review of EOAM*, 29 April 2009, page 4

¹¹ Border Rivers Gwydir CMA, *Submission on the review of EOAM*, 25 May 2009, page 3

¹² Western CMA, *Submission on the review of EOAM*, 19 May 2009, page 5

¹³ Hunter Central Rivers CMA, *Submission on the review of EOAM*, 25 May 2009, page 3

In coming months when CMAs use the updated version of the tool, they will provide feedback to DECC and confirm the merits of the changes or suggest alternate minor modifications. As these changes are primarily designed to make the tool work better in the field, this feedback is particularly important.

The community of practice that DECC has set up to support CMA vegetation officers should provide the transparency and feedback that CMAs and DECC need to continue to make minor improvements to the tool over time.

However, broader stakeholders do not have the access to information or specialised knowledge necessary to satisfy themselves that the tool is operating in line with Governments stated policy positions, or in fact that CMAs are using the tool appropriately.

4.5 Options for publicly demonstrating the tool is effective

The EOAM has been used to approve 1,333 property vegetation plans, including 938 which involve incentives.¹⁴ Environmental stakeholders are increasingly seeking more independent and systematic assessment of the operation of the EOAM in the field. They remain interested in being consulted about ongoing changes to the current methodology, but are also asking whether the overall EOAM is working as intended or not.

For example, the Environmental Defender's Office¹⁵ argues:

"It is unclear to what extent this review evaluated whether the EOAM properly values biodiversity at a site. It is also unclear to what extent the EOAM has been tested and monitored over the four or so years of its operation to provide the data needed to undertake such an evaluation.

On-going independent and systematic testing and monitoring of the EOAM across different sites and landscapes is vital to the ecological integrity of the EOAM and the results of such testing and monitoring should be considered in reviews such as this one.

Without such testing, sites that are actually of highest value to biodiversity may be being lost over sites of lower value."

Similarly, the Total Environment Centre is looking for "independent audit" of the success of the current EOAM before Government makes any changes to it.

One option would be for the Minister to ask DECC to extend the scope of information it publicly reports on the tool to include practical illustrations and greater performance information. However, there are legitimate privacy concerns if too specific information on PVPs is publicly reported, and DECC's reports may not be seen as independent.

Another option would be for the Minister to ask DECC to develop hypothetical case studies to illustrate the likely operation of any future amendments when they are proposed to the Minister. However, that is likely to be time consuming and speculative, and does not address the call for independent performance monitoring and reporting.

¹⁴ Personal communication, DECC, May 2009

¹⁵ Environmental Defender's Office Ltd, *Submission to the review of EOAM*, 29 April 2009, page 2.

A third alternative would be for the Minister to ask the NRC to audit and report¹⁶ on CMAs' use of the tool and its compliance with Government's policy settings in the EOAM. NSW may be getting to a point in implementing the current EOAM, where the NRC should review how CMAs are in fact using the tool in the field, rather than (re)reviewing incremental changes to the methodology.

There are established audit methodologies for managing confidential information and still providing sufficient assurance of compliance to third parties. The NRC could independently audit CMAs' operation of the tool, and ensure its public reports contained the appropriate balance of detail while retaining privacy.

The most effective form of such reporting is likely to be an annual report based on auditing a representative sample of PVPs across NSW, to 'ground truth' the available PVP performance data and illustrate operation of the EOAM with appropriately anonymous case studies.

¹⁶ The Minister can ask the Premier to request, under Section 13 (1) (d) of the *Natural Resources Commission Act 2003* that the NRC audit and report on aspects of CMAs' activities beyond their compliance with state-wide standards and targets.

Attachment 1 List of submissions

The NRC received written submissions from the following:

1. Border Rivers Gwydir CMA
2. Environmental Defender's Office
3. Hawkesbury Nepean CMA
4. Hunter Central Rivers CMA
5. Lachlan CMA
6. Lower Murray Darling CMA
7. Murray CMA
8. Murrumbidgee CMA
9. Namoi CMA
10. NSW Farmers Association
11. Southern Rivers CMA
12. Sydney Metro CMA
13. Western CMA

Attachment 2 Peer review - Dr Mark Dangerfield

Review of proposed changes to the Environmental Outcomes Assessment Methodology under the Native Vegetation Regulation 2005

Independent scientific review and comments

Dr J. Mark Dangerfield
22 May 2009

Brief and scope of comments

The comments below refer to the changes proposed for chapter 2 and chapter 5 of the Environmental Outcomes Assessment Methodology (EOAM) outlined in documentation supplied by the Department of Environment and Climate Change (DECC).

The terms of reference from the NRC were to review these proposed changes to the EOAM against the following criteria:

1. Are the proposed changes based on sound scientific concepts and the most recent information regarding the subject matter?
2. Will the proposed changes deliver their intended outcomes, which are to: ensure biodiversity assessment is meeting the intent and objectives of the Native vegetation Act, incorporating new science, and improve operational and functional aspects of the assessment tools?
3. Will the proposed changes encourage the adoption of a landscape approach to management of vegetation (as outlined in the NRC's report *A Landscape Approach to Vegetation Management*)?
4. Will the proposed changes promote convergence between like-NRM decisions made under the *Native Vegetation Act* and the *Environmental Planning and Assessment Act*?

The comments provided here refer to the 108 changes listed by DECC in the Ministers letter to the Commissioner and not to the fundamental premise of the EOAM procedure except where this is necessary for clarification.

Documentation from a Biodiversity Assessment Review Panel and a Biodiversity Assessment Scientific Subgroup established by DECC to review the biodiversity assessment component of the EOAM was used as background information but not explicitly reviewed.

This assessment is preliminary due to time constraints but in some cases detailed analysis of proposed changes, notably to the valuation formulae, would be instructive.

The EOAM and proposed changes

The EOAM is both an assessment tool for an offset scheme and a filter for management of native vegetation, especially the clearing of native vegetation. It contains a combination of quantitative assessment, rule based decisions and expert input to determine if any proposed land management change affecting native vegetation will improve or maintain environmental outcomes and so proceed under the *Native Vegetation Act*.

The EOAM covers four environmental outcomes: water quality, biodiversity, salinity and soil. The methodology is applied through a computer-based decision support tool, the Native Vegetation Assessment Tool (NVAT; formerly the PVP Developer).

It is important to note that biodiversity is only one of the environmental values within the 'improve or maintain' test, yet it retains the most significant influence on outcomes of applying the methodology.

The changes under review refer mostly to the biodiversity outcome that is assessed through the application of two decision tools (BioMetric and Threatened Species).

There are 108 proposed changes, including editorial and documentation changes needed for clarification.

General comments

The EOAM is both a regulatory tool to limit clearing of native vegetation (a stick) and an offset tool to promote land management that will facilitate conservation outcomes within a managed landscape (a carrot).

As a stick the EOAM is, and has been, effective in delivering outcomes according to the intent of the Act as it draws on threatened species legislation to prevent clearing of native vegetation whenever a listed species or habitat is present or when components of threatened species requirements, such as food or shelter, are affected by the management proposal.

As a carrot the tool can promote offsets that would see overall improvements to landscape outcomes by increasing the proportion of the landscape managed for beneficial native vegetation outcomes.

As with all offset tools it suffers from the known issue of equivalence, where the assumption is always that elements of biodiversity are interchangeable. This may be true for many of the functional aspects of biodiversity, where various combinations of species can achieve the delivery of ecosystem services, but not for conservation outcomes designed to maintain biodiversity components (species or genes). The reason being that loss of one habitat unit from clearing when replaced by an area of another habitat type cannot improve or maintain the status of species in the cleared habitat, hence the constant 'red lights' thrown up by the threatened species tool.

The EOAM revisions do not alter any of these fundamentals.

The revisions:

- clarify some ambiguities, improve efficiency in places and make minor adjustments to weightings within formulae,
- strengthen the threatened species tool by increasing the proximity value of site,
- allow for some new ideas, notably the inclusion of additional interventions as options for offset management – one of which draws on recent DECC research,
- include ecological thinning as a tactic, a change that will be contentious but is based on sound scientific principles.

Although the changes are minor in the context of the structure and application of the EOAM, they are mostly positive and based on sound science.

Omissions, given the extensive nature of the review process, are perhaps more significant.

Comments on specific NRC criteria

1. Are the proposed changes based on sound scientific concepts and the most recent information regarding the subject matter?

Yes. Whilst minor, the modifications are sound, consistent with the original framework of the tool, and begin to incorporate the latest information on the subject matter.

There are, however, structural constraints to revision. For example, a core assumption in the EOAM is that area is a surrogate for biodiversity value, so the greater the area the greater the value, and that this relationship is linear or at least proportional. Biodiversity value, be it for conservation of components or delivery of services, is only partly dependent on area - landscape position, patch shape, patch condition and connectivity also affect value. The small revisions proposed do not tamper with these structural constraints, however, there are well-tested scientific ideas that could have been included if the revisions were more substantial.

There are some scale mismatches (see comment on revision #11, 12 & 16) that may have an impact on some decisions. It would be wise to model scenarios and consider a sensitivity analysis for these.

The category approach to riparian value (#25) improves on the previous assessment but remains subjective and context dependent - a riparian patch in dry country will have higher biodiversity value than an equivalent patch in more mesic habitats.

The changes to the valuation formulae (#27, 29 and others) are consistent with the intent of the revision. They alter proportions slightly but in the context of the overall EOAM they are small changes - cover (-5%), adjacent remnants (-3%) and riparian (-3%) in the landscape value calculation are reduced in favour of connectivity (+3%) and contribution of site (+9%). More significant is the greater value given to proximity in this revision. The 100 ha nearest to the site is eight times more important by area (20% relative weighting) than any of the other 100 ha blocks in the 1000 ha radius block (25% relative weighting). There is no obvious ecological logic to this assumption of proximity value, especially in the landscape context.

Connectivity continues to be a decision factor, however, the science behind the benefits of connectivity for biodiversity conservation remain contentious, notably in the context of climate change effects where corridors may facilitate disruptive species to invade areas they would otherwise be unable to reach. Whilst the revision here is minor the importance of connectivity requires more detailed consideration in upcoming review of the Native Vegetation Act.

The concept of ecological thinning (revisions #51-72) will be contentious as it raises ire around how much intervention is allowable before conservation is compromised even though the intervention logic has a scientific basis in the established ecological principle of self-thinning in plant stands. The assumption in the revision here would be that thinning will accelerate condition toward benchmarks and in many cases this will be a likely outcome. It could be argued that a world with all vegetation patches at the benchmark is not the best one to conserve biodiversity.

So whilst the application of ecological theory in the addition of thinning is sound, the outcomes rely on the assumption that biodiversity value is maximized at the benchmark stem densities and can be achieved by mimicking the natural self-thinning process. Allowing 'ecological thinning' places great store on the definition and description of benchmark sites. It is unlikely that many ecological communities are sufficiently predictable to have standard stem densities, either at maturity or through succession, across the all likely occurrences within a biome.

2. Will the proposed changes deliver their intended outcomes, which are to: ensure biodiversity assessment is meeting the intent and objectives of the Native Vegetation Act, incorporating new science, and improve operational and functional aspects of the assessment tools?

Not necessarily.

The overall EOAM process remains heavily influenced by the Threatened Species Tool. The revisions will not reduce the number of 'red light' decisions on management tactics – this severely hampers situations where triage (with an offset strategy) will more likely deliver intended outcomes. In other words

'threatened species' are given highest priority. Increasingly this will not be the best way to manage landscapes in a changing physical and social climate.

The revisions do incorporate some new science but they are only minor, akin to fixing bugs in software, rather than a major platform upgrade. There is sufficient science on topics such as species-area relationships, pattern recognition and remote sensing analysis, and disturbance theory to think of more significant revisions to the approach – most notably to try and balance the quantitative nature of BioMetric with the rules based approach of the threatened Species tool.

The revisions will improve the operation and function of the EOAM. It is important, however, that the documented changes can be rapidly incorporated into the software tool.

The revisions did not address a significant operational constraint of the NVAT: the scale of decisions. Land management units and properties east of the divide are small enough to sit as a mosaic on top of underlying landscape features. The progressively larger properties to the west of the state, with their large paddocks, are the reverse. They often overlay many landscape units. The interaction between scale of property management, landscape and regional conservation outcomes (the premis of NVAT) is dynamic and location dependent – one size does not fit all. This issue has not been addressed in the revisions.

The revisions have not been tested, presumably because revisions must be updated in the software. However, without real quantitative tests of applying the tool, the impacts of revisions on outcomes remain unknown.

3. Will the proposed changes encourage the adoption of a landscape approach to management of vegetation (as outlined in the NRC's report *A Landscape Approach to Vegetation Management*)?

No.

The revisions enhance the Threatened Species Tool, which remains inflexible, and a likely generator of 'red lights'. If anything the subtle changes proposed to the assessment of habitat conditions and the reliance on 'the assessor determines' will increase this likelihood.

The revisions have not taken up suggestions made by the NRC in its 2007 review of the landscape approach to vegetation management, notably to include a 10,000 ha circle in the landscape assessment.

4. Will the proposed changes promote convergence between like-NRM decisions made under the *Native Vegetation Act* and the *Environmental Planning and Assessment Act*?

No comment at this time.

Specific comments on individual changes

	Specific comments on proposed changes
1	Agreed
2	Agreed
3 & 4	<ul style="list-style-type: none"> i. It is not clear how a 'local expert' would have more detailed knowledge of the over-cleared Mitchell landscape distributions than is available from the DECC databases, however, local threatened species knowledge may well be more accurate. ii. The delegation of accredited expert status to CMAs is a significant responsibility even if the Minister supplies clear criteria. iii. The definition of over-cleared is necessarily prescriptive but makes, by default, the different Mitchell vegetation types equivalent (by area) in their biodiversity value – it is unlikely that all types have equivalent value to landscapes or conservation objectives.
5	This does change meaning because it now negates the improbable, but not impossible, situation where clearing of native vegetation in good condition would improve or maintain environmental outcomes. [Note here that EOAM environmental outcomes include four environmental values: water quality, salinity, biodiversity and land degradation]. This is a subtle but significant change because it gives more weight to the assumptions behind the improve or maintain test. It also implies that we always know what 'poor condition' really means and that this is equivalent across all four values.
6	This change does provide more flexibility but not because of any scientific principle – clearing did not consider conservation status, hence 30% is not a magic number nor does it cover all the science. For example, proportion retained is only part of the biodiversity issue as patch size, shape, configuration, condition, disturbance regime and connectivity all have a significant bearing on conservation status – percentage retained can be a weak surrogate.
7	Agreed
8	See comment #5
9	Agreed
10	Agreed
11 & 12	This change should achieve the desired distinction, however, 90% seems a high threshold and may cause confusion where the land management unit is smaller than the area assessed for clearing.
13	Agreed
14	Agreed and in line with other ecological definitions
15	Agreed, except to note that over-cleared status is a function of the classification and mapping system in use for Mitchell vegetation classes; and that this is at a coarse scale. Other systems are in development that will operate at finer scales that, among other things, may change the idea of over-cleared.
16	Agreed, however, 70% within a CMA now mixes the scale of vegetation classification with that defined by the CMA boundaries – any such scale mismatches can result in odd outcomes such as clearing being allowed on one property but not on another across the border in a neighboring CMA. It would be a useful exercise to assess the database and maps to identify where this may happen.
17	Agreed
18	Agreed
19	Agreed
20	Agreed that this change increases flexibility to obtain offset outcomes as it strengthens the opportunities in habitats with greater retention at the CMA scale. Issues of scale are also pertinent to the regional value clause.
21	Agreed
22	<p>Increments of 10% are easy to record through area calculations with GIS mapping tools but more tricky if 'the assessor determines' from visual inspection.</p> <p>The relationship between percentage and score (Table 5.2) is linear and so assumes that the species-area relationship is linear – theory suggests they are usually logarithmic.</p>
23	Agreed
24	Agreed. Note that the score is linear to the 1000 ha threshold and so assumes that

	biodiversity scales directly with area.
25	This category approach to riparian value is subjective and context dependent. For example, in drier habitats riparian vegetation has more significant biodiversity value than similar vegetation in wetter systems.
26	Agreed, although will be trumped by the Threatened Species tool
27	The omission of 'percentage cover in 0.2 km radius (10 ha)' changes the formula and weights landscape value toward the wider radii.
28	Agreed
29	This change reduces the importance of cover (-5%), adjacent remnants (-3%) and riparian (-3%) in the landscape value calculation in favour of connectivity (+3%) and contribution of site (+9%). The 100 ha nearest to the site is eight times more important by area (20% relative weighting) than any of the other 100 ha blocks in the 1000 ha radius block (25% relative weighting) – there is no obvious ecological logic to this assumption of proximity value.
30	More linearity assumptions and proximity value. Wary of 'operator judgement' in what is otherwise an objective, numerical tool.
31	Agreed as a simplification of the scoring system for connectivity.
32	Agreed, however, note threshold comments #24
33	See comment #25
34	This addition to the formula (9% relative weighting) values proximity.
35	Agreed
36	Agreed, it is important to clarify the definition of cover
37	Agreed
38	In most sites a transect assessment is more likely to capture the heterogeneity in the system than plot methods because the latter is scale dependent.
39	Agreed
40	Agreed as amendment increases precision
41	Agreed as an important clarification of procedure
42	Agreed
43	Agreed
44	Agreed
45	Agreed
46	Note that artificial hollows assist only a fraction of the biodiversity at a site. Exclusion of fertilizers is potentially significant on many sites and is a direct outcome of the Better Bush project
47	Agreed so long as the BioMetric Manual is clear and officers are given adequate training.
48	Agreed
49	This becomes an inclusive clause. It is a limitation that these additional actions are not scored in the BioMetric tool, also that potential synergies from multiple actions are not captured.
50	Agreed and an important addition
51	Agreed
52	Agreed
53	Agreed
54	Agreed
55	The application of ecological theory here is sound, however the outcomes rely on the assumption that biodiversity value is maximized at the benchmark stem densities. It is well known that thinning will bring on maturation of stands by mimicking the natural self-thinning process. Allowing 'ecological thinning' places great store on the definition and description of benchmark sites. It is unlikely that many ecological communities are sufficiently predictable to have standard stem densities, either at maturity or through succession, across the all likely occurrences within a biome.
56	This issue is contentious – defer comment at this time.
57	Agreed
58	This clause reinforces benchmarks as the preferred outcome.
59	Agreed
60	Agreed
61	Agreed

62	The wording in this change is confusing
63	Agreed
64	Agreed
65	Nearest-neighbour techniques are much easier to use in the field than plot based assessments and are often better at estimating heterogeneity.
66	Agreed
67	Benchmarks are treated as fixed. This will be rare.
68	Agreed
69	Agreed
70	Agreed
71	Agreed
72	It would be instructive to compare these provisions with those under the silviculture codes under Private Native Forestry
73	Agreed
74	Improves clarity and consistency.
75	Agreed
76	Agreed
77	Agreed
78	Agreed
79	Agreed
80	Agreed
81	Agreed
82	This is a species level distinction that has been extended to cover 'vegetation types with which it is associated' – this risks many exclusions (red lights) dependent on the interpretation of habitat components.
83	It is a weakness that this sensitive criterion is assessed by visual inspection and it is inconsistent with the quantitative approach of the BioMetric tool. It also makes the definition of 'essential habitat features' very important.
84	Agreed
85	Agreed
86	Agreed
87	Agreed
88	Agreed but it is not clear under what circumstances it would be invoked.
89	Agreed
90	Agreed
91	Agreed
92	Agreed
93	Agreed
94	Agreed
95	Agreed
96	Agreed
97	Agreed
98	Emphasis on area.
99	Agreed
100	This is a logical extension, however, the cutoff for a local population (1.79 km) is still arbitrary, especially for mobile species.
101	This makes for a larger disjunct with the BioMetric tool for it defines an offset as acceptable only if it contains equivalent habitat features. It is not surprising that the Threatened Species tool flashes red.
102	This is probably an issue for the Native Vegetation Act review.
103	Agreed
104	Agreed
105	Agreed
106	Agreed
107	Agreed
108	See #72

Attachment 3 Peer review - Dr David Leece

Dr David R. Leece, PSM, RFD, ED

MScAgr (Sydney), PhD (Michigan State), CBiol (UK), FAIAST, FAIBiol, FAICD

Proposed Amendments to the Environmental Outcomes Assessment Methodology April 2009

DRAFT OPINION¹

The Remit

I have been requested to review the amendments proposed in April 2009 by the Department of Environment and Climate Change to the Environmental Outcomes Assessment Methodology under the *Native Vegetation Regulation 2005*. I have been specifically requested to provide an opinion as to whether or not the changes proposed are based on sound scientific concepts and the most recent information regarding the subject matter.

Relevant Expertise

I have a broad knowledge of science, including botany and zoology, and have had extensive experience in its application to agriculture, natural resource management and environment protection². This extends to a broad knowledge of the native vegetation and fauna of New South Wales and their management. I do not have specialist knowledge of native vegetation or fauna taxonomy, distribution or ecology, nor of threatened plant or animal species.

Documents Examined

I have examined the following documents:

- the letter dated 27 April 2009 from the Honourable Carmel Tebbutt, MP, Minister for Climate Change and the Environment, to Dr John Williams, Commissioner, Natural Resources Commission, which sought his advice on the amendments proposed;
- Attachment 1 to that letter, which set out the 109 amendments recommended by the Department of Environment and Climate Change;
- an unpublished report entitled *Review of the Biodiversity Assessment Methodology and Decision Support Tools of the Property Vegetation Plan Developer under the Native Vegetation Act 2003 – Volume 1, Review Panel Recommendation Report* dated 16 May 2008, which was submitted to the Minister for Climate Change and the Environment and to the New South Wales Department of Environment and Climate Change; and
- an unpublished report entitled *Review of the Biodiversity Assessment Methodology and Decision Support Tools of the Property Vegetation Plan Developer under the Native Vegetation Act 2003 – Volume 2, Scientific Subgroup Advice Report to Review Panel on issues requiring further scientific examination* dated 16 May 2008, which was submitted to the Biodiversity Assessment Review Panel and to the New South Wales Department of Environment and Climate Change.

The time available has not permitted any examination of the extensive bibliography (“Reading List”) that underpinned the Review Panel’s report or the extensive list of references cited by the

¹ I am an assistant commissioner of the Natural Resources Commission of New South Wales and a vice-president of the Royal United Services Institute of New South Wales. These are my personal views.

² As a research scientist, my expertise was in plant physiology, soil chemistry and ecotoxicology (particularly phytotoxicology) and my clinical practice was in plant nutrition, particularly the diagnosis and correction of nutritional disorders of crops. I am a former chief scientist of the New South Wales Environment Protection Authority and represented New South Wales for nearly 13 years on the Murray-Darling Basin Commission.

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Scientific Subgroup in its report. Dr Martin Denny, who chaired both the Biodiversity Assessment Review Panel and its Scientific Subgroup, however, has briefed me on both reports.

The Biodiversity Assessment Review

The Department of Environment and Climate Change (the Department) has recommended that the Minister for Climate Change and the Environment (the Minister) make 109 amendments to the Environmental Outcomes Assessment Methodology (EOAM). It did so after considering the recommendations of a Biodiversity Assessment Review Panel and a Biodiversity Assessment Scientific Subgroup which it established to review the biodiversity assessment component of the EOAM.

The Biodiversity Assessment Review Panel (the Review Panel) comprised two Departmental scientists with relevant expertise, a Departmental specialist in regulatory policy and two catchment management authority officers with field experience in using the EOAM. The Biodiversity Assessment Scientific Subgroup (the Scientific Subgroup) consisted of four Departmental scientists with requisite expertise and one catchment management authority scientist. Both committees were chaired by Dr Martin Denny, a zoologist with expertise in the fauna of New South Wales who practices as an independent ecological consultant and has had extensive experience in undertaking faunal assessments for environmental impact statements. The Department also provided secretariat assistance to both committees

At the outset, it needs to be recognised that, of the Department's 109 recommendations, many do not require a scientific underpinning. They are either purely administrative in nature (*e.g.* updating the EOAM to reflect recent changes in departmental names; editing and formatting changes; *etc.*) or, while more substantive, are administrative changes designed simply to enable better implementation of existing policy (*e.g.* to allow use of more appropriate local data where those data more accurately reflect local environmental conditions than do the relevant data in the EOAM databases; or to specify more precisely which datasets/databases are most relevant to specific circumstances).

The substantive changes proposed to the EOAM which need to be underpinned by sound science are all to be made to Chapter 5, "Biodiversity Assessment". This chapter specifies the use of two tools – *BioMetric*, to assess losses of biodiversity from proposed clearing, gains in biodiversity from proposed offsets, and thinning to benchmark stem densities; and the *Threatened Species Assessment Tool*, to assess whether threatened species, ecological communities and endangered populations listed under the *Threatened Species Conservation Act 1995* and Commonwealth-listed threatened species and ecological communities are maintained or improved. *BioMetric* draws on data in several departmental databases – vegetation benchmarks, overcleared landscapes and vegetation types, and coastal thinning genera – and incorporates data on Mitchell Landscapes, vegetation formations, vegetation types and associated data and formulae needed to assess the value of biodiversity. The *Threatened Species Assessment Tool* draws on threatened species profiles, photos and associated databases.

As best as I have been able to establish, the substantive amendments proposed to Chapter 5 are all ones which were recommended to the Minister by the Review Panel in May 2008. The Review Panel consulted the New South Wales catchment management authorities (CMAs), the statutory bodies which administer the *Native Vegetation Act 2003* in relation to applications to clear native vegetation within their jurisdictions. The CMAs identified numerous problems that they were experiencing in using *BioMetric* and the *Threatened Species Assessment Tool*, which, if successfully addressed, would improve the effectiveness and/or efficiency of their assessments.

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The CMAs also observed that important scientific knowledge, which had become available since the EOAM was developed, needed to be considered for incorporation into it.

The issues raised by the CMAs drove the review. The Review Panel examined each of these issues very carefully and consulted relevant state government agencies and other key stakeholders in relation to them. It also received a number of written submissions. In the main, the matters raised necessitated pragmatic improvements in regulatory procedures (*i.e.* what is frequently referred to by regulatory agencies as operational policy and standard practices³). Such changes, however, can have scientific implications and the Review Panel identified 32 matters which needed scientific assessment. These it referred to its Scientific Subgroup for detailed investigation and advice. These matters covered:

- *BioMetric* tool
 - 5 issues related to over-cleared vegetation and landscapes
 - 8 issues related to assessing change in landscape value
 - 6 issues related to assessing site value
 - 2 issues related to assessing thinning to benchmark stem densities
- *Threatened Species Assessment Tool*
 - 5 issues related to identifying whether any threatened species occur or are likely to occur
 - 2 issues related to whether likely losses can be offset
- Field Methods
 - 3 issues related to methodologies for distinguishing pre-1750 and derived communities, measuring canopy cover and assessing paddock tree proposals
- Additional matter
 - 1 issue related to partial loss rules for threatened species.

For each of these issues, the Scientific Subgroup appointed one of its members – selected on the basis of interest and expertise – to undertake ‘desktop’ research into the issue. This research primarily involved reviewing the peer-reviewed scientific literature relating to the issue and then formulating an opinion on the issue based on that review. The Subgroup, informed by the literature review on the issue, then debated the issue to arrive at a consensus view which it submitted to the Review Panel as its advice on the matter.

The Subgroup has succinctly captured its proceedings in its report. While it addressed each of the 32 questions referred to it, it has also expressed concern in its report that those issues were ones that arose during consultation with CMAs, relevant state agencies and other key stakeholders. The Scientific Subgroup was not given the time or opportunity to perform two tasks which it considered would have been of “critical value” to the review, namely :

- to review a suite of recent scientific publications and new assessment tools of relevance to maintaining the EOAM up-to-date *i.e.* ensuring that it incorporates the latest science; and
- to analyse data collected to date during development and monitoring of property vegetation plans to see what could be learned from the EOAM experience so far.

The Subgroup was particularly concerned that it had been unable to undertake the first of these tasks and listed some eight pieces of research which it considered warranted early review.

³ The military term, ‘standing operating procedures’, or a variation on it, is increasingly coming into general use to describe them.

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The Review Panel carefully considered and debated the Scientific Subgroup's advice and in the main accepted it and used it to inform the changes it formulated to the EOAM. There were a few instances where the Review Panel considered the Scientific Subgroup's advice would lead to outcomes which were impracticable or would lead to outcomes that were unacceptable to key stakeholders. In these instances, it formulated more pragmatic solutions to the relevant issues.

The Review Panel has detailed its findings and recommendations in its report in which it has made the science which underpins its recommendations transparent, including providing a list of the papers – mainly papers in refereed journals of international standing – on which it relied.

Comment

Overall, this review has been conducted in a scientifically sound and pragmatic manner. While the Review Panel has needed to use its expert (both regulatory and scientific) judgement to resolve many issues, it has clearly done so after doing its best to inform itself of the underpinning science and its implications for the changes being proposed.

In my opinion, the Review Panel faced three key risks: a lack of independence; a failure to unearth the key science; and emotional commitment to conservation outcomes clouding its objectivity.

- ***Independence:*** The Review panel relied predominantly on Departmental scientists. This was probably appropriate in the circumstances as this is a highly specialist field and much, if not most, of the relevant expertise resides in the Department. The risk was ameliorated to some extent by the appointment of an independent chair and the extensive review of the relevant literature on each of the issues examined. While the addition of one or more academic experts to the Scientific Subgroup or independent peer review of the Scientific Subgroup's advice would have been desirable from a transparency perspective, I doubt that either would have changed the outcomes substantially.
- ***The latest science:*** The CMAs drew attention to the need to incorporate the latest science in the EOAM tools. The Scientific Subgroup, very conscious of this need, has drawn attention to the fact that there are at least eight pieces of recent research that it was unable to examine. Nor was it able to assess data collected to date during development and monitoring of property vegetation plans using the EOAM. While I am satisfied that the best available science was accessed to inform consideration of the issues addressed by the Review Panel, there would appear to be other recent science available which, if reviewed, might lead to further improvements to the EOAM.
- ***Objectivity:*** There is always a risk that a scientist may become so emotionally committed to the subject of his/her studies that his/her assessments come to lack the necessary objectivity. I looked for evidence of this in both volumes of the report and have not detected it. I am sure that the independent chair would have been alert to this risk and, by ensuring that the research done by individual Scientific Subgroup members was subjected to debate within the Subgroup before being forwarded to the Review Panel, helped to reduce it. More debate within the Review Panel, particularly input from the regulatory expert and CMA members, would have served to further ameliorate the risk. That the Review Panel chose to recommend a more pragmatic approach to that proposed by the Scientific Subgroup in a few instances suggests that this risk was recognised and was well managed.

Specific Issues

While I make no claim to expertise in this field, there are two specific issues that do not appear to me to be being managed in accordance with scientific logic: the constraining of biodiversity assessments within administrative (catchment) boundaries; and the alignment to Biobanking.

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Biodiversity assessment boundaries

There is an apparent assumption within certain of the recommendations that the scientific assessment and the subsequent management decision must be made at the same scale and within the same boundaries – presumably for pragmatic reasons. I consider that this needs further thought.

A few of the proposed changes would lead to biodiversity assessments being constrained within administrative (catchment) boundaries. This makes little sense to me. Catchment boundaries are the natural boundaries for the consideration and management of water issues. Catchments have been chosen as the basic unit of natural resource management because of our predominant concern about water and because, when management trade-offs among resources (water, soils, land use, biodiversity *etc.*) need to be made, it is the potential impact on water and downstream communities which is usually of most socio-political concern.

Water catchment boundaries, however, are usually not logical boundaries for assessments of terrestrial biodiversity. If one wishes to assess the health of terrestrial vegetation⁴, in particular, a more logical boundary is usually the bioregion or sub-bioregion, such as the relevant Mitchell Landscape, which may well occur over parts of two or more catchments. Once the scientific assessment has been made at the appropriate scale, properly informed management decisions and trade-offs can then be made within the relevant management unit – usually the catchment or sub-catchment.

It should not be too difficult to modify the relevant recommendations to allow for scientific assessment at the most appropriate scale and within the most appropriate boundaries for it and then to make the management decision again at the scale and within the boundaries most appropriate to it.

Alignment to Biobanking

Several of the recommendations are intended to align parts of the EOAM to Biobanking. I have not been able to assess these provisions adequately as the relevant Biobanking documents are not available to me nor is the report of the recent review of the Biobanking system.

It is my understanding, though, that the EOAM and Biobanking systems have been established under separate legislation, yet have similar, but not identical, objectives and are underpinned by essentially the same science. They differ primarily in their respective regulatory prescriptions, Biobanking tending overall to be less rigorous than EOAM, particularly with respect to offsetting provisions.

As a consequence, it is not clear to me at this point that the objectives of the *Native Vegetation Act 2003* will necessarily be furthered by aligning the EOAM with Biobanking. If common provisions are needed to facilitate administration and provide greater outcome equity across the state, it may be better to align Biobanking to EOAM rather than the reverse.

Overall Opinion

As best as I can establish on the basis of the material I have examined and not being a native flora or fauna expert, the recommendations being put forward by the Department to the Minister for her approval are based on sound scientific concepts and the most recent information regarding the subject matter.

⁴ For fauna, the natural geographic unit of assessment may well be an animal's natural range.

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That said, it would appear that there is other recently-generated scientific knowledge available which was not considered by the Review Panel and which, if considered, may lead to further improvements in the EOAM. This is not a reason not to proceed to make the changes now proposed. Rather, it indicates that a further review of the EOAM is now needed. Indeed, a strong case can be made for ongoing surveillance of new science which may have an impact on the EOAM and for updating the EOAM as the need to do so emerges.

Before the Minister approves the changes now proposed, however, consideration should be given to enabling EOAM scientific assessments to be made on the basis of the natural extent of the species or communities in question, such as the sub-bioregion, Mitchell Landscape or an animal's natural range, rather confining the assessment within an artificial administrative boundary such as a CMA boundary.

Further, before aspects of the EOAM system are aligned to the Biobanking system, there should be a review of both systems against the objectives of the respective legislation that these systems are designed to implement. EOAM provisions should only be aligned to corresponding Biobanking provisions where it is clear that this would further the objectives of the *Native Vegetation Act 2003*.

David Leece

19 May 2008

Attachment 4 Peer review - Ms Dianne Bentley

Proposed Amendments to the Environmental Outcomes Assessment Methodology April 2009

Over the past eighteen months, a panel appointed by the Minister for Climate Change, Environment and Water has undertaken a 'Review of the Biodiversity Assessment Methodology and Decision Support Tools of the Property Vegetation Plan Developer under the *Native Vegetation Act 2005*' and changes have been recommended. This short report provides an opinion on:

- will the proposed changes encourage the adoption of a landscape approach to the management of vegetation?

Background

In 2007 the Natural Resources Commission (NRC) published 'A Landscape Approach to Vegetation Management' (the report). This report advised that government:

- explicitly adopt a landscape approach as underpinning its natural resources policies and legislation (including the *Native Vegetation Act 2003*) and Catchment Management Authorities' (CMAs) regional delivery of natural resource management in NSW
- encourage CMAs and natural resource management agencies to proactively use existing processes to refine the current Property Vegetation Plan (PVP) Developer over time so it can accommodate more elements of a landscape approach, including the capacity to appropriately assess proposed multi-property plans
- give CMAs greater flexibility (with appropriate accountability) to build on the strengths of the PVP Developer, but be better able to engage private landholders and regional communities in managing landscapes to deliver agreed environmental, economic and social values expressed in catchment and state-wide targets.

Steps suggested to implement this advice included:

- the NSW Government to:
 - amend the *Native Vegetation Regulation 2005* to clarify their policy settings at a more strategic scale, give CMAs more and flexibility in how they can improve and maintain environmental outcomes and move towards state-wide targets for NRM
 - review how to implement a landscape approach across other relevant NRM legislation such as the *Water Management Act 2000*, *Soil Conservation Act 1938* and *Coastal Protection Act 1979*
- NRM agencies to take the lead in developing the new assessment methodologies, based on a landscape approach as outlined in chapter 2 [of the report] and the opportunities to improve the PVP Developer (as outlined in chapter 3 and table 3).

In light of the above advice, the NRC is interested in the extent to which the current review has proposed amendments which will 'encourage the adoption of a landscape approach to the management of vegetation'.

Reasons for a landscape approach

A landscape approach is one which recognises the essential interdependence of all biophysical processes and their roles in landscape function at a range of scales.

The benefits of such an integrated management approach include the promotion of healthy, functioning landscapes, the minimisation of unintended negative impacts, the alignment of

landuse with biophysical capacity, and an increase in environmental stewardship. More specifically, the growing demand for food, fibre and fuel – together with carbon sequestration – is bringing into focus the need to understand the precarious food/fuel/carbon/water balance when managing our natural resource assets.

Importantly, vegetation is a key tool in managing these processes and in maximising environmental, economic, social and cultural outcomes.

Challenges of a landscape approach

A landscape approach also presents challenges including the scale of assessment, lack of appropriate data, increased time and cost in developing plans, the need for additional flexibility and the difficulty of matching this flexibility to a regulatory framework.

Nevertheless, in its 2007 report, the NRC suggested some potential changes to the PVP Developer which would allow it overcome some of these difficulties. These included:

1. integrate the assessment of all environmental outcomes
2. value environmental assets by their role in supporting landscape processes and values
3. incorporate Catchment Action Plan priorities and targets into the assessment of environmental outcomes
4. assess the social and economic sustainability of proposed PVPs
5. better support realignment of land-use with biophysical capacity and landscape processes

Clause 25 of the *Native Vegetation Regulation 2005* allows the Minister to change the assessment methodology and PVP Developer after taking advice from the NRC.

The current review

The Review Panel was directed to review, scientific, policy and operational/functional issues relating to *Biometric* and the *Threatened Species Assessment Tool*, review the underpinning science and advise on new knowledge that could be incorporated, and consider other issues raised by DECC, stakeholders or the panel.

A landscape approach was not considered by the review panel although some recommendations do relate to issues of scale. These include:

- Removal of the requirement to assess percent native vegetation cover within 0.2km radius (10ha circle)
- Addition of an extra size category above the existing 'very large' category for patches of native vegetation
- Additional Site Value offsets may contribute to Landscape Value in Mitchell Landscapes
- Larger areas, including outside property boundaries, assessed for local populations of threatened species.

Conclusion

Although the amendments above generally increase the scale of assessment, none promotes an holistic landscape approach. While the removal of the 10ha circle will streamline the operation of *Biometric*, and the addition of an extra patch size category is positive, neither recommendations require vegetation to be valued for its role in integrating and supporting landscape processes. The additional site value recognises vegetation types in a broader context but not its broader function and the ability to assess threatened species outside property

boundaries is somewhat compromised by the retention of Catchment Management Authority boundaries for these assessments.

While recognising the various difficulties imposed by administrative boundaries, regulatory requirements and the intent of not trading off biodiversity, it is suggested that future reviews should take the lead in grappling with these challenges. The risks of not doing so include:

- unintended negative impacts on natural resource assets
- having to invest more than once in the same part of the landscape to achieve long term health
- decreasing community resilience
- threats to biophysical processes and landscape resilience from not appropriately balancing the increasing demands on resources for food, alternative fuels, water quantity and quality, and carbon sequestration.

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