

# NSW SCIENTIFIC COMMITTEE

Native Vegetation Regulation Review  
Conservation Policy and Strategy Section  
Office of Environment and Heritage  
Level 12, PO Box A290  
SYDNEY SOUTH NSW 1232

Dear Sir/ Madam,

Please find attached the Scientific Committee's comments on the following documents:

- Draft Native Vegetation Regulation 2012,
- Draft revised Environmental Outcomes Assessment Methodology
- Draft Code of Practice for the Management of Invasive Native Species in the Namoi CMA
- Draft Private Native Forestry Code of Practice

The above documents were downloaded by the Committee from the OEH website on 19<sup>th</sup> June 2012. The Committee notes that two further documents have since been added to the website at some later time also seeking comments. Furthermore a series of fact sheets has also been provided. It is unfortunate that the closing date for submissions has not been extended to allow an equal consultation period for these later documents. The Committee was not aware of these documents until recently and consequently we have not been able to review or comment on the following documents:

- Draft Code of Practice for the Thinning to Benchmark Stem Densities in the Namoi CMA
- Managing Native Grasslands: Discussion Paper

The Scientific Committee notes that OEH intends to make submissions publicly available on the website and supports this approach to open consultation. The Committee does not object to this submission being publicly released.

Yours sincerely

*Michelle Leishman*

24 AUG 2012

Associate Professor Michelle Leishman  
Chairperson  
Scientific Committee

54 000 3015

## **NSW Scientific Committee submission on the review of the regulations for the Native Vegetation Act 2003.**

The NSW Scientific Committee provides the following as a submission on the review of the regulations for the Native Vegetation Act 2003, including comments on the draft Native Vegetation Regulation 2012, the draft revised Environmental Outcomes Assessment Methodology, the draft Private Native Forestry Code of Practice and the Draft Code of Practice for the Management of Invasive Native Species in the Namoi CMA.

### **Overview:**

The Native Vegetation Regulation underpins endeavours under the Native Vegetation Act to end broad scale clearing and protect native vegetation that is considered to be of high conservation value in NSW. The Scientific Committee strongly supports such attempts given the strong scientific evidence of the role that clearing and fragmentation of native habitats has played in the decline of plant and animal biodiversity in NSW. Protection of native vegetation plays a significant role in maintaining ecosystem services to agricultural and non agricultural areas through protection of soils, water and biodiversity, and reduction in salinity impacts and topsoil loss. This value is recognised across a broad spectrum of society, both rural and urban.

The Scientific Committee has a number of comments that are intended to enhance the operation of the Native Vegetation Regulation. These are provided in detail below.

### **General comments on the review of the regulations for the Native Vegetation Act 2003:**

The Scientific Committee is concerned that the draft Native Vegetation Regulation 2012 presents a number of important policy changes but has failed to establish an appropriate mechanism to assess the impacts or effectiveness of these proposed changes. To provide transparency to stakeholders and assurance that the Native Vegetation Regulation proposed changes are achieving their aims, it is essential to include an assessment program with publicly reported results. The Scientific Committee recommends the inclusion of a monitoring and evaluation requirement within the Native Vegetation Regulation to provide a transparent process for the assessment of policy outcomes and to ensure flexibility to incorporate change where the need for improvements has been identified.

A significant component of the review of the draft Native Vegetation Regulation 2012 is the new approach to native vegetation compliance. It is unclear what the impacts of these changes will be on monitoring programs, compliance resourcing and prosecutions. Therefore, the Scientific Committee requests that more information be provided in relation to the specific actions that will be undertaken by both OEH and EPA, including any re-drafting of the current *Native Vegetation: Compliance and Enforcement Strategy*.

### Specific comments on new compliance approach:

The review of the Native Vegetation Regulation 2005 includes a new approach to native vegetation compliance which advocates a greater focus on supporting '*voluntary compliance*' that '*places greater trust in landholders*' (e.g. Fact Sheet 6). However, this changed focus to voluntary compliance has not been explained in detail and it is unclear what the impacts on monitoring programs, compliance resourcing and prosecutions will be. Therefore, the Scientific Committee requests that more information be provided in relation to the following questions:

- Will the monitoring of native vegetation change using satellite images and aerial photography that has previously been undertaken by OEH and EPA be continued?
- Will the resourcing for this monitoring be maintained at current levels?
- Given the emphasis on education and communication, will the criteria for commencement of prosecutions against landholders for alleged illegal clearing be changed?
- Will prosecutions that are currently underway be discontinued?
- Will additional resources be allocated to the new efforts aimed at targeted extension or will cuts be made to other activities?

Given that these new compliance approaches also aim to '*protect long-term environmental outcomes*', the Scientific Committee is concerned that arrangements for evaluation of the proposed changes is not evident. Data publicly available from the NSW Annual Report on Native Vegetation 2010 shows that the number of compliance and enforcement actions has generally increased between 2008 and 2010 (see table below), suggesting that greater familiarity with clearing regulations over time may not correlate with decreasing illegal activity. In light of this, the Scientific Committee believes that it is necessary to have a process for collecting information to test the hypothesis that better education and placing greater trust in landholders will reduce illegal clearing and improve environmental outcomes.

**Table 6.1 Compliance and enforcement actions**

|                                       | 2008 | 2009 | 2010 |
|---------------------------------------|------|------|------|
| <b>Legal directions</b>               |      |      |      |
| Stop work orders served               | 2    | 0    | 0    |
| Remedial directions served            | 4    | 26   | 35   |
| Notices to produce information served | 51   | 28   | 111  |
| <b>Advisory and warning letters</b>   |      |      |      |
| Numbers sent                          | 103  | 192  | 240  |
| <b>Prosecutions *</b>                 |      |      |      |
| Commenced                             | 10   | 11   | 7    |
| Convictions                           | 4    | 8    | 6    |
| <b>Penalty notices</b>                |      |      |      |
| Numbers issued                        | 8    | 22   | 25   |

\* Prosecutions completed in 2010 were not all commenced in 2010.

### Comments on draft Native Vegetation Regulation 2012:

The Scientific Committee submits the following comments on the draft Native Vegetation regulation 2012. The Committee notes that review of other aspects of the regulation of native vegetation management is outside the scope of the current review, but understands that comments on other aspects may be considered. In this respect, we wish to express our opinion that the provisions which allow a defence to prosecution under Section 118G of the National Parks and Wildlife Act, from activities conducted under Sections 19 and 24 of the Native Vegetation Act (NVA), are not consistent with the objectives of the Threatened Species Conservation Act. This opinion is based on the potential risk to threatened species or communities under Section 19, which allows clearing of non-protected regrowth, even if it contains threatened species or communities. In the case of Section 24, there is a risk to threatened species or communities because neither 'sustainable grazing', or 'substantial long-term decline in structure and composition', are defined. 'As it stands, Section 24 may allow the destruction of threatened species or communities. We strongly suggest that Sections 19 and 24 of the NVA are revised to include consideration of threatened species and communities.

Specific comments on the draft Native Vegetation Regulation follow:

#### Clause 27

The Committee supports subclause 3 of this clause, and the similar subclause 2 of clause 30, which exclude threatened species and habitats from the provisions of these clauses. However, we strongly advise that this exclusion provision should also apply to clauses 26, 28, 29, 31 and 32, as the activities defined by these clauses similarly pose risks to threatened species to the extent that they allow clearing of native vegetation

#### Clause 32

The proposed change extends the previous clause 15, which prescribes activities associated with telecommunications infrastructure on Crown land as routine agricultural management activities (RAMA), to private land. While this change is consistent with the previous Clause

15, the Committee considers that clearing of native vegetation for telecommunications infrastructure should not be routine agricultural maintenance activities (RAMA) on any tenure, due to the potential risk it poses to threatened species and communities. This is of particular concern as hill summits are favoured locations for telecommunications infrastructure and may also be disproportionately important as habitat for threatened species. We also note that Clause 32 potentially also directly sanctions a Key Threatening Process: 'Loss or degradation (or both) of sites used for hill-topping by butterflies'.

#### Clause 34

Clearing of 'invasive native plant species' may be consistent with the objectives of the TSC Act if the species genuinely satisfies subclause 1(a)(ii), in causing decline in the structure or composition of a vegetation community. However, it is likely to be difficult to determine the thresholds or features of such a decline which will ensure that all relevant threatened species are adequately protected. In particular, clearing which is regarded as enhancing the structure or composition of a community by one measure does not necessarily protect or enhance it for all or particular features, some of which may be threatened species or communities. The successful implementation of this clause depends on an appropriate code of practice being in place.

The Scientific Committee is particularly concerned that subclause 1(a)(ii) of Clause 34 and the definition of 'acting invasively' in paragraph 4B of the draft code of practice for Namoi CMA, both include the situation where a species is regenerating according to its natural recruitment process and common mode of response to disturbance. This particularly applies to species which recruit episodically following an infrequent climatic event, such as unusually high rainfall or flooding. Thus, a species which is naturally densely regenerating following past clearing and could be considered to be passively restoring a highly-cleared landscape, would be 'acting invasively' under 4B of the draft code. We believe that clearing such a species is unlikely to result in improved environmental outcomes. This question has been poorly studied, but there is some recent evidence of the conservation value of dense regrowth (e.g. Good *et al* 2011, Good *et al* 2012). At the very least, the list of INS should not include species which are characteristic of an EEC (e.g. *Eucalyptus coolabah*, *E. largiflorens* and *Acacia stenophylla* in 'Coolibah-Black Box Woodland in the Darling Riverine Plains and Brigalow Belt South Bioregions' EEC). Dense regrowth, particularly of shrubs or trees, may also provide important or exclusive habitat for a range of species, including threatened species. For example, in Namoi CMA, the threatened bird, Diamond Firetail (*Stagonopleura guttata*) nests in dense foliage of shrubs or small trees and the threatened plant *Pterostylis cobarensis* occurs in dense stands of *Callitris glaucophylla*. These and other threatened species may decline if densely regenerating woody vegetation is cleared.

We strongly suggest that Clause 34 be revised by omitting the phrase 'is densely regenerating' from paragraph 1(a)(ii) and that any code of practice omits the paragraph numbered as 4B in the draft code for Namoi CMA. We further suggest that a paragraph similar to paragraph 2 of clause 30 should be added to Clause 34, to exempt vegetation that comprises threatened species or threatened communities from its provisions.

## Clause 36

In a similar manner to clause 34, the implementation of this clause in a way that is consistent with the objectives of the NVA and the Threatened Species Conservation Act depends on an appropriate code of practice. In this respect, the draft code of practice for Namoi CMA relating to this clause has several flaws. There is no transparency in how the benchmark thresholds were developed, what data were used, whether data were adequate or what principles were used to define a benchmark. There are also no data to indicate whether benchmark stem densities are even appropriate in respect of maintaining or enhancing environmental values. For example, the assumption that increased stem density beyond a threshold value causes a loss of biodiversity values appears to be based largely on casual observations or unsubstantiated traditional beliefs. Recent studies are demonstrating that these beliefs may be unfounded (e.g. Thompson and Eldridge 2005). In any case, it is very unlikely that a single benchmark value for a community will be appropriate for the range of habitats represented by varying stand structures of stands at varying stages of development. Even if data were available to develop benchmark thresholds, it is likely that, for example, a young regrowth stand would have very different thresholds than a mature or mixed-age stand and a single threshold to represent all stands would not be appropriate. In addition, as noted in the discussion under Clause 34, thresholds which are applicable to maintaining or enhancing structure and composition of a stand for overall biodiversity value may not be appropriate for particular threatened species or communities. As a result, application of this clause potentially threatens species or communities which favour or rely on dense stands.

Due to the difficulty of specifying an appropriate code of practice, we strongly suggest that a paragraph similar to paragraph 2 of clause 30 should be added to Clause 36, to exempt vegetation that comprises threatened species or threatened communities from its provisions.

### References

- Good MK, Price JN, Clarke PJ, Reid N. (2011). Densely regenerating coolabah (*Eucalyptus coolabah*) woodlands are more species-rich than surrounding derived grasslands in floodplains of eastern Australia. *Australian Journal of Botany* 64, 468-479.
- Good MK, Price JN, Clarke PJ, Reid N. (2012). Dense regeneration of floodplain *Eucalyptus coolabah*: invasive scrub or passive restoration of an endangered woodland community? *Rangeland Journal* 34(2), 219-230.
- Thompson WA, Eldridge DJ. (2005) Plant cover and composition in relation to density of *Callitris glaucophylla* (white cypress pine) along a rainfall gradient in eastern Australia. *Australian Journal of Botany* 53, 545-554.

## Comments on Environmental Outcomes Assessment Methodology:

The Environmental Outcomes Assessment Methodology sets out the circumstances in which broadscale clearing is to be regarded as improving or maintaining environmental outcomes. Therefore, the efficacy, accuracy and integrity of this methodology is paramount for biodiversity conservation across the State. In setting out the context for the Methodology, the public exhibition document emphasises that *"It provides the scientific underpinning for, and the logic used in this assessment. It will continue to be refined as the science improves"* (p. 6). The NSW Scientific Committee fully supports the concept of using the best available science in making decisions concerning improving or maintaining environmental outcomes. However, the foundational precept of the EOAM is not underpinned by supporting policy or process. In particular, the Methodology lacks a robust, transparent and adaptive monitoring and evaluation component.

Given that the Methodology relies heavily on speculative estimates of future 'Site Values' and 'Landscape Values', it is essential to embed some type of evaluation, review and improvement process. The calculation of offsets is predicated on formulaic guesses at biodiversity value improvements at some undetermined point in the future but there is no framework established to groundtruth such estimates or improve the Methodology if changes are warranted.

Whilst the commitment to continual refinement espoused in the Introduction is essential to the scientific underpinning claimed, it has not been demonstrated by the Methodology as it stands. *The Scientific Committee recommends the inclusion of a MERI (monitoring, evaluation, reporting and improvement) requirement within the policy.* A transparent process of evaluation should be undertaken to assess the performance of the Methodology which includes public reporting of assessment outcomes and explicit policy flexibility to incorporate change where the need for improvements has been identified.

In order to achieve a best-practice science basis, the Scientific Committee provides specific comments on the EAOM in relation to:

- The lack of monitoring and evaluation;
- Clarifying certain definitions; and
- highlighting issues which do not adequately reflect best practice science in terms of risk, benefits from actions and viability.

### Monitoring and evaluation in an adaptive management framework

The Scientific Committee is concerned that the EOAM has failed to establish an appropriate mechanism to assess the impacts or effectiveness of the methodology. The EOAM sets out in great detail the procedures to follow when assessing broadscale clearing applications. It needs to be pointed out that while the methodology for assessing applications is listed at length, there is no provision for follow-through or monitoring of the management actions specified in Property Vegetation Plans (PVPs). Thus if actions to establish offset areas are specified in a PVP, the effectiveness of the management actions need also to be assessed through time. This is a process called adaptive management, which enables managers to judge whether the actions undertaken have worked well, or partially well, or not at all, and so modify management as required in subsequent years. To provide transparency to



stakeholders and assurance that the EOAM within the Native Vegetation Regulation are achieving their aims it is essential to include an assessment program with publicly reported results. *The Scientific Committee recommends the inclusion of a monitoring and evaluation requirement within the Native Vegetation Regulation to provide a transparent process for the assessment of policy outcomes and to ensure flexibility to incorporate change where the need for improvements has been identified.*

#### Clarifying definitions

There is a definition of 'threatened species' on p. 149, which states that the definition is for the purposes of Chapter 10. The definition states that the term 'threatened species' encompasses individual species (from 'critically endangered' through to 'vulnerable'), and ecological communities ('critically endangered' or 'endangered'). The Scientific Committee recommends that:

- The definition should extend to all Chapters in the Assessment Methodology, and not just Chapter 10. The treatment of threatened species in the earlier chapters could be taken as meaning only individual threatened species, and not covering ecological communities at all. If this meaning is adopted, then the Assessment Methodology in other Chapters (especially Chapter 6) affords no protection to small remnants of endangered ecological communities, some of which have been reduced to very low total areas, with the bulk of remnants of very small size (1 – few hectares).
- 'vulnerable' ecological communities should be included in the definition; again, many are represented by remnants of very small size; allowing clearing of these remnants would represent a substantial loss of biodiversity.

#### Risk factors

The clearing thresholds for small remnants (Pages 15-16, section 2.8.4) and associated proportion of vegetation type cleared are not supported by ecological science and ignore other Internationally accepted conditions for risk assessment. Firstly, the thresholds assume a lack of viability for small remnants in direct contrast to best available science. They appear to be inferred from mobile vertebrate information, but are much too large for many more sessile organisms. Secondly, the two elements considered (remnant size and % vegetation type cleared) focus essentially on decline as the only appropriate measure of risk. For example in Table 10.8 even large remnants can be called 'small' and give no score if they are in a relatively uncleared area. This is inappropriate as it fails to consider other aspects of risk. This is not best practice science and needs to be updated in light of international and national standards of risk assessments. For example, IUCN have recently (Rodriguez *et al.* 2011), established a series of criteria for assessing risk in ecological communities. The key elements of these criteria are already imbedded in Threatened species legislation in NSW (TSC Act Regulations) and at the Commonwealth level (EPBC Act criteria). In a NSW context, they are also used in assessing risk in the development of vegetation types (Benson *et al.* 2010). Consequently EOAM needs to broaden the risk criteria to mirror risk assessment in the TSC Act and nationally and internationally by including elements of risk in relation to not only decline but also geographic distribution context and alterations to ecological functioning.

### Lack of critical review of databases

The EOAM relies on 17 databases (2.10.1). Most of the databases lack peer review and are not published as a sound methodology upon which to base conservation decisions. It is simply not adequate to have the databases available on the web. The Scientific Committee recommends that as a priority each database requires critical review. As an example, the Scientific Committee provides the following detailed comments on the Threatened Species Profile Database to illustrate the significant flaws in this database that underpins the EOAM:

- The Threatened Species Profile Database (TSPD) is based on information from expert panels (DECC 2008a). The TSPD is to be consulted as part of the assessment methodology to determine whether threatened species may be present. In the opinion of the NSW Scientific Committee, the TSPD is flawed and cannot deliver a scientifically rigorous assessment of a species' ability to respond to improvement through management actions. The methodology assumes large amounts of information for which we can see no reliable published source nor for many cases any reasonable inference from other published sources. Moreover, where relevant published information does exist in the literature, conflicting values often appear in the TSPD (see specific examples in Appendix 1).
- The TSPD is based on information from expert panels. However, it lacks peer review, much of the 'expert opinion' is simply guesswork and there is no reliable information that would justify many entries. There are major assumptions about the improvement to a species in relation to management that are unrealistic and assume each threat acts independently, and that by addressing a single threat a response may be initiated. Rather, there may be interactions between threats, or there may be a few major threats that if not dealt with may render all other threat mitigation ineffective. This also applies in other parts of EOAM (eg Table 10.2). As well, the concept of scoring gain values of 0.60 (p. 185) where there is no data is dubious and a precautionary approach would be to have a minimal gain in these species as is the pattern for many taxa where there are available data (see below). The consequences of the above points lead to an inflation of the  $T_G$  score and an underestimation of the required offsets.
- It is apparent in the TSPD 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 (as most have little known about them) and as a consequence underestimates the 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. This limited ability to manage threats is reflected in the database for some well studied species. However, for most threatened plants that occur in fire-prone habitats we have little knowledge of their fire response (apart from simple resprouting or not), but the database considers there to be a moderate or good ability to control threats in these taxa. Instead, these taxa face the same fire management challenges as the species we know have a limited ability to respond and consequently a precautionary approach for all fire-prone species would be to score them as having a limited ability

to respond to threat management. Furthermore, the degree of uncertainty in our ability to effectively manage fire will increase under a changing climate and an increased risk of higher fire frequency. As a consequence many more species should be identified in the database as poorly known (one trigger for red flagging an area).

- The database also includes a column to flag whether a species is 'able to withstand loss'. Loss of any individuals of any threatened species is likely to lead to decline and an impressionistic, desk-top judgement of what can be tolerated should not be imposed. Similarly, the column for the 'number considered a negligible loss' cannot be supported by any published studies and should not be used. The "data" are therefore totally speculative and call into question the whole concept of using a numerical "methodology". At the very least all of this ignores the importance of the conservation of the genetic diversity within a species across its range, and the role of soil seed banks in the life history of plants.
- 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. Even where data exist in the scientific literature, the database frequently overestimates the ability to control threats and the extent of available knowledge. We have illustrated this issue using a series of examples (see Appendix 1).

#### Biodiversity values

The definition of 'high biodiversity conservation' is biased toward only threatened species and carries the implication all other areas are not of high biodiversity conservation value. This is confusing and places the document out of context with biodiversity conservation planning in NSW and elsewhere. Areas of high biodiversity conservation value may be identified for a broad range of reasons eg. comprehensive, representative, unique, resilience capacity, connectivity, refugial, keystone, indicators, key functional types, species richness (and many others) and NOT just in relation to a narrow interpretation of threatened species and ecological community risks of extinction. In addition the EOAM states that 'Vegetation types are used as surrogates for general biodiversity values'. This inappropriately assumes that the loss of vegetation is the only relevant parameter. Consequently, the use of this terminology in the EOAM is misleading, and inappropriate. It also risks undermining other conservation measures not solely focussed on threatened species and ecological communities by creating confusion in the terminology used by OEH, the government and the community (both scientific and the broader public).

On page 149 Vulnerable ecological communities are not considered. Why? Vulnerable ecological communities can and have been listed under the schedules of the TSC Act.

On page 159, connectivity is used as a measure but other key issues are excluded, eg stepping stones, etc. What is the basis for a gap of >100m being used? How does this relate to different organisms, both plant and animal? Connectivity for different taxa is obviously scale-dependent and this has not been considered.

### Viability and clearing of small remnant vegetation

Two parts of the EOAM consider small remnants of vegetation:

- Section 10.5.2 considers the viability of biodiversity. The three aspects being considered here are surrounding land use, size and connectedness and condition. There is little quantitative information here to make an assessment. Sentences such as 'Relatively small areas of isolated native vegetation (e.g. patches of a few hectares or less that are more than several hundred metres from another patch of native vegetation) can be unviable or have low viability' lack any scientific rigour and seem to be biased towards highly mobile vertebrates. Small areas may still be viable and play a key role in both species persistence, refugia and stepping stones and it is inappropriate to assume otherwise. Many remnants of critically endangered communities may be smaller than 10 ha, particularly in urban areas. Tozer (2003) highlights this for the Cumberland Plain area of western Sydney. He states that "While it is frequently assumed that the conservation value of a remnant is proportional to its size, the results of this survey suggest that this assumption is inappropriate for conservation planning on the Cumberland Plain. First, small remnants constitute a large proportion of the remaining vegetation therefore the protection of these remnants is required to maintain vegetation cover at its present level. Second, although there was some evidence that small remnants were more susceptible to impacts from adjoining lands, many still contained a high diversity of native species and relatively few weeds. Third, given the large number of rare species recorded in the survey, the protection of all remnants is required to minimise the loss of floristic diversity."
- Section 6.3 considers Clearing of small clumps in cultivation. It appears that up to 2 ha (not in low condition) and 4 ha (in low condition) can be cleared in this section. It is not clear if this excludes threatened ecological communities. The Scientific Committee recommends that this be changed to the wording used for 2(b) and 2(c), which would *not* allow clearing of low-condition remnants of < 2 ha if they were a threatened ecological community ie add 'and is not a threatened ecological community' at the end of the current wording. The reason for this recommendation is that many endangered ecological communities are represented by very small remnants, and allowing clearing of these remnants will lead to loss of biodiversity, rather than the stated aim of 'improving or maintaining environmental outcomes'. Again, here the concept of viability of small remnants is being considered, but as in section 10.5.2 (discussed above), other key elements of risk are ignored and the biodiversity value of small remnants is greatly undervalued and does not reflect current scientific thinking. The same problems arise in section 6.4, clearing of very small remnants. Again, risk needs to be assessed not just in % vegetation type remaining, and clearing of threatened ecological communities should be excluded.

### Management actions to generate credits

Section 10.7.3 considers improvement to biodiversity through management actions. There are major assumptions about the improvement to a species in relation to management that are unrealistic and assume each threat acts independently, and that by addressing a single threat a response may be initiated (e.g., Table 10.2). Rather, there may be interactions between threats, or there may be a few major threats that if not dealt with may render all

other threat mitigation ineffective. The consequences of the above points lead to an inflation of the Ecosystem credits given for any management action.

### References

- Auld TD, Bradstock RA (2000) Understanding the ecological impacts of fire regimes on plants and animals: a fire management tool. In 'Red trucks: Green Futures'. Proceedings of a conference on ecologically sustainable bush fire management. Pp 48-54. Nature Conservation Council of New South Wales Inc.
- Auld TD, Ooi MKJ (2008) Applying seed germination studies in fire management for biodiversity conservation in south-eastern Australia. *Web Ecology* 8, 47-54.
- Benson JS, Richards PG, Waller S, Allen CB (2010) New South Wales Vegetation classification and Assessment: Part 3 Plant communities of the NSW Brigalow Belt South, Nandewar and west New England Bioregions and update of NSW Western Plains and South-western Slopes plant communities, Version 3 of the NSWVCA database. *Cunninghamia* 11, 457-579.
- Bradstock RA, Keith DA, Auld TD (1995) Management of fire for conservation: imperatives and constraints. In: *Conserving Biodiversity: Threats and Solutions* (eds R.A. Bradstock, T.D. Auld, D.A. Keith, R. Kingsford, D. Lunney & D. Sivertsen), pp. 323-33. Surrey Beatty & Sons, Sydney.
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- Rodriguez JP, *et al.* (2011) Establishing IUCN Red List Criteria for Threatened Ecosystems. *Conservation Biology* 25, 21-29.
- Tozer M (2003) The native vegetation of the Cumberland Plain, western Sydney: systematic classification and field identification of communities. *Cunninghamia* 8, 1-75.

## **Comments on Draft Private Native Forestry Code of Practice for (i) River Red Gum Forests; (ii) Cypress and Western Hardwood Forests; and forests in (iii) Northern NSW; and (iv) Southern NSW**

The NSW Scientific Committee wishes to submit the comments below relating to the proposed changes outlined in the Draft Private Native Forestry Code of Practice (hereon referred to as 'Draft Code(s) of Practice') for (i) River Red Gum Forests; (ii) Cypress and Western Hardwood Forests; and forests in (iii) Northern NSW; and (iv) Southern NSW. The Committee notes that the proposed changes have been formulated in conjunction with the current review of the Native Vegetation Regulation 2005. Clearing of private native forest is subject to the *Native Vegetation Act 2003*.

### **Introductory Clause for all Draft Codes of Practice**

Previously, private native forestry (PNF) was defined as the harvesting of native trees for commercial purposes on private land according to an approved property vegetation plan (PVP). In the Draft Code of Practice the existing area of 'privately owned forests' has been expanded with the addition of the wording 'and Crown land that is not Crown-timber land'. Crown-timber land is defined as land within a State Forest or Flora Reserve. While it is indicated that this change will address an 'unintentional gap' which existed in the previous Codes of Practice and will 'improve the equity of Crown lease landholders', it will potentially allow a greater number of Crown lease landholders to apply for forestry-related activities and therefore a greater area of forested Crown land can be harvested. It is not clear what 'Crown land' is that is not 'timber-land' or State forest. There needs to be more clarity around what land tenure is intended in this clause and who is now eligible to apply for harvesting activities in private native forests.

The wording in the Introductory Clause has been changed to 'a regular supply of products' rather than just 'a supply'. Even under the *Forestry Act 1916* the wording is an 'adequate supply' of timber from Crown-timber lands. The NSW Scientific Committee suggests that the wording be changed to 'an ecologically sustainable supply' to comply with the ethos of the Native Vegetation Regulation 2005 and the Private Native Forestry Code of Practice in general.

As a more general comment, clarity also needs to be provided around the definitions and interrelatedness of a Property Vegetation Plan (PVP), a Forestry Operation Plan (presumably this is a component of a PVP) and an Ecological Harvesting Plan (EHP). While PVPs and FOPs have been referred to most frequently in the Draft Codes of Practice, EHPs also feature. It is not obvious how each plan is related to another and if there is replicated or unique information in each. This needs to be addressed to provide transparency for the Landholders, forestry operation contractors and precision for EPA and other administering bodies.

### **Minor variation of Code and Clause 2.1(7) for all Draft Codes of Practice**

Clause 22 of the Native Vegetation Regulation 2012 has been dealt with elsewhere in the submission from the NSW Scientific Committee. The qualification standards of 'accredited assessors' have not yet been determined (see comment below).

### **Clause 1 (and Clause 2.1(6) for all Draft Codes of Practice**

Clause 1 is related to the provision of available information from the EPA but this information does not constitute the sole source of information that the Landholder has to gather. The NSW Scientific Committee welcomes this clarification.

### **2.1 (5)(b)(ii) for Draft Codes of Practice for Northern and Southern Forests and Cypress and Western hardwood Forests**

Under this amendment, a Forest Operation Plan (FOP) for native forests in areas in the Northern, Southern and Cypress (Western) areas will not need to include information about forest type and the composition of the overstorey species. Previously this information was required from the Landholders. The justification for this change is that it will bring it in line with current requirements for Forest Operation Plans for River Red Gums.

While this alignment seems reasonable at face value, it will reduce the amount of information that is included in a FOP or EHP. Not including important details about forest type and overstorey species composition may adversely affect the ability to correctly assess or interpret the condition of the forest, the state and type of regeneration, growth rates and the silvicultural practices to be used. For example, Tableland hardwood forests and Spotted Gum forest both vary widely in species composition and condition, often as a consequence of climate, aspect and soil type (Florence 2004). These natural variations can be captured to at least some degree with inclusion of information about forest type and the composition of overstorey species. In certain circumstances, stand management may be used to favour commercially preferred species over others in landscapes where this is not sustainable. Again, a description of the forest type and overstorey species could be a means of alerting the EPA and may prevent this from happening if it is ecologically unsuitable for the area. In comparison, forests that come under the Draft Code of Practice for River Red Gum Forests are dominated by a single species, *Eucalyptus camaldulensis* so it is reasonable that a description of the forest type and overstorey species is not required. For all Draft Codes of Practice, disturbance history and current condition and the estimated stand height and basal area for each broad forest type is still required. *The NSW Scientific Committee strongly recommends that this clause for the Draft Codes of Practice for Northern and Southern Forests and Cypress and Western Hardwood Forests remain unchanged.*

### **2.1(7) (and Minor variation of Code) all Draft Codes of Practice**

Forest Operation Plans must be approved by an 'accredited expert'. It is not clear if the requirements for an 'accredited expert' have been determined and if they are similar to what was required in the previous Codes of Practice. It is also not clear if accredited experts are to be employed or contracted by the EPA or are privately run businesses. Issues associated with experience, equity and conflict of interest may arise. It should be noted that the accredited experts will need to have a good working knowledge of the requirements for protecting landscape features, particularly critically endangered, endangered and vulnerable

communities and endangered populations as described in Table C for all Draft Codes of Practice. The NSW Scientific Committee asks for clarification of what criteria and processes will be used by the Minister for the Environment and the Minister for Primary Industries for an approval of an accredited expert.

## **2.2 Notification for all Draft Codes of Practice**

Previously this section was called 'Reporting' and the requirement was for every relevant landowner to supply information about past and proposed forestry operations for a period of 12 months. All reporting had to be completed by 31 March of the specified year. The volume of timber products harvested, number of hectares affected and silvicultural treatments applied was formerly reported in the annual reports. The general attempt in the Draft Codes of Practice to improve accessibility and streamline the process for notifying the EPA of forestry operations using modern communication resources is applauded by the NSW Scientific Committee. However, some further clarification and retention of information is requested.

The clause is now called 'Notification'. The timing has been altered so that a plan for the next 12 months of forestry operations is not required. Instead, Landowners must notify EPA within: (i) 14 days prior of starting the operation, (ii) 3 days after commencement of the operation and (iii) 14 days of cessation of operation. These three notification periods can be interpreted from reading of Parts (2) and (3) of the Clause but it is not clear from the accompanying notes if there are actually two or three reporting periods (i.e. '*14 days before or up to up to three days after*'). The NSW Scientific Committee asks that this be clarified as much as possible in the new clause. Very simply, the inclusion of the total number of times a Landholder has to contact the EPA in relation to a forestry operation on their property could be stated. The NSW Scientific Committee also asks that the '14 day period' (equivalent to 10 business days) be extended to a '30 day period' (equivalent to approximately 20 business days) for both notification and cessation of forestry-related activities to allow a more reasonable timeframe for reporting by Landholders and monitoring/assessment by EPA personnel.

The new notification schedule is accompanied by a range of options for providing notification of forestry operations to the EPA. Similarly, the EPA notifies the Landholder that their notification has been received. This certainly allows flexibility but there is no mention in the clause how the EPA then acts upon, stores or manages this information. Although it may not be appropriate to include this information in the Draft Codes of Practice, the NSW Scientific Committee recommends that the EPA consider how the information received from Landholders about forestry operations is used, stored and managed.

In the Draft Codes of Practice, the information that is provided by the Landholder to the EPA is largely administrative (i.e. PNF PVP number, dates, type of operation and contact details of the contractor). The NSW Scientific Committee questions why the provision of information relating to volume of timber products harvested, number of hectares affected and silvicultural treatments applied which was formerly reported is not being continued. How can the EPA monitor the 'regular' supply of timber products from native forestry operations? The last sentence of the notes for this clause suggests that the changes will provide more up-to-date information for compliance and regulation but the NSW Scientific



Committee fails to see how this will be achieved as important information on timber products will now not be gathered. The NSW Scientific Committee requests that the Draft Codes of Practice reinstate the Sub-clause 2.2(2) detailing the approximate volumes of the timber products harvested, the approximate number of hectares on which forest operations occurred and the silvicultural treatments that were applied during the forestry operation as part of Sub-clause 2.2(6) relating to any cessation notification sent to the EPA.

#### **Table C for all Draft Codes of Practice**

To align with the *Threatened Species Conservation Act 1995* (i.e. not listed in the Codes of Practice when last gazetted in 2007), Table C (Requirements for protecting landscape features) now includes (i) 'critically endangered ecological communities' (no forestry operations can occur in these areas); (ii) 'Endangered ecological communities' have the same status as in previous Codes of Practice (i.e. an approved Ecological Harvesting Plan is required); (iii) 'Vulnerable ecological communities' where trees can be harvested according to an approved Ecological Harvesting Plan; and (iv) 'Endangered populations' which has the same status as in the previous Codes of Practice ('Forest operation must not result in any harm...'). The approver of FOPs has to be an accredited expert implying that their expertise must include knowledge of the definition, type and extent of endangered and vulnerable communities and populations. The NSW Scientific Committee advocates that accredited experts assigned to assess Forestry Operation Plans must have a good working knowledge of the *Threatened Species Conservation Act 1995* to recognise these entities and deal with them appropriately.

#### **Table D and Clause 4.3(3)(b) for Draft Codes of Practice for Cypress and Western Hardwood Forests, Table B (Minimum standards for tree retention) for River Red Gum Forests and Glossary for all Codes of Practice (definition of Protected trees)**

The tables now include specifications for retention of 10 individuals (5 female, 5 male) of *Allocasuarina* spp. per 2 ha. In the previous Codes of Practice, *Allocasuarina* spp. had protected tree status (Clause 4.3(3)(b)), along with *Xanthorrhoea* spp. and *Banksia* spp. The NSW Scientific Committee is adamant that this clause not be amended as proposed as, firstly, a blanket classification such as this could potentially affect the protection status of endangered populations of *Allocasuarina* (e.g. *A. luehmannii* in the Woodland in the Riverina and Murray-Darling Depression bioregions) or communities containing *Allocasuarina*. Secondly, this change conflicts with the requirements for ecological prescriptions for the Glossy Black-cockatoo and the Red-tailed Black-cockatoo (i.e. species of *Allocasuarina* are important food and shelter resources), one or both of which birds are listed in all of the Draft Codes of Practice. Thirdly, it may be difficult to determine which individuals are males and which are females when they are not flowering or there is no sign of cones beneath female trees. As other changes in the Draft Codes of Practice have been made to 'improve consistency' between the different codes, this change introduces inconsistency.

#### **General comments for Appendices for all Draft Codes of Practice**

The Large-footed Myotis (*Myotis macropus* formerly *M. adversus*) has been removed from the Appendices of all Draft Codes of Practice. The argument used is that the habitat of this species is restricted to permanent water and the Draft Codes of Practice protects riparian zones adequately under Clause 4.4. *The NSW Scientific Committee strongly advises against*

*this deletion* as Clause 4.4 does not include a prescription for protection of permanent water bodies (only drainage features) which are a feature of foraging areas of the Large-footed Myotis (Anderson *et al.* (2006) and references therein). In addition, the prescription for this species should not be removed because: (i) the species is considered to be generally uncommon to rare throughout most of its range (Lumsden and Menkhorst 1995), (ii) the evidence of habitat requirements for this species is limited (Anderson *et al.* 2006), and (iii) the taxonomic confusion around this species makes it difficult to make definitive statements about conservation requirements (Environment Australia, 1999). Regardless of habitat requirements, no other threatened species listed in the Draft Codes of Practice have been treated in this manner and indicates a major inconsistency in dealing with threatened species.

Plant species that have been listed according to the *Threatened Species Conservation Act 2005* since the last review of the Codes of Practice have been added to the tables of threatened flora requiring specific prescriptions (Table F, I or J). While this is a requirement, there is no indication of how the 'condition' A to H was decided for each new species. For example, a species that has been added to the Draft Code of Practice for Southern Forests, Merimbula star-hair (*Astrotricha* sp. Wallagaraugh) is restricted in range and has only two known populations yet it has been given the 'lowest' level of protection (Condition H). A protection condition of at least D would be more ecologically appropriate. This question can also be asked for how decisions were made to change the condition for several species (e.g. Slaty red gum changed from condition 'E' to 'G' in the Draft Code of Practice for Northern Forests). The NSW Scientific Committee asks that the Draft Codes of Practice include a general description of how the protection condition for each species is decided. This will make the process evident and will improve consistency among the Draft Codes of Practice. In addition, it is the opinion of the NSW Scientific Committee that the conditions of all species should be re-examined as some of them are currently inappropriate. Here, the example is *Banksia conferta* subsp. *conferta* (in the Draft Code of Practice for Northern Forests) is very restricted in distribution and only occurs in small populations. As this species is also susceptible to *Phytophthora*, the current condition (H, damage to individuals should be avoided) does not protect the species from this pathogen adequately and should be redesignated to a condition with some form of exclusion zone around small individuals or groups (i.e. 'A' or 'B').

#### **Specific detail for the Appendix in the Draft Code of Practice for Southern Forests**

The NSW Scientific Committee is pleased that information has been added for Koalas recognising that low density or little sign of activity should not be interpreted as there being no active populations present.

*Eucalyptus rubida* (Candlebark) has been removed from Table I on the basis that it is not a primary food tree for the Koala. This species is recognised as a secondary food tree in the Koala Recovery Plan but none of the 36 or so other species of trees that are also listed as secondary food trees have been removed using this argument. This demonstrates biased elimination presumably because Candlebark is a preferred logging species. In comparison, *Eucalyptus camaldulensis* has not been removed from the equivalent table in the Code of Practice for River Red Gum Forests or Northern Forests. The NSW Scientific Committee strongly suggests that this species be reinstated as a secondary feed tree for Koalas in the

Code of Practice for Southern Forests to demonstrate consistency and no bias towards species selection.

Removal of Large-footed Myotis, see general comment above.

\**Eucalyptus macrocarpa* still needs to be changed to '*microcarpa*' in Table I.

**Specific detail for the Appendix in the Draft Code of Practice for Northern Forests**

\**Eucalyptus macrocarpa* still needs to be changed to '*microcarpa*' in Table I.

In Table J, conditions applying to *Acacia macnuttiana* from B to E; *Bertya opponens* from A to B; *Eucalyptus glaucina* from G to E, see general comment above.

Removal of Large-footed Myotis, see general comment above.

**Specific detail for the Appendix in the Draft Code of Practice for Cypress and Western Hardwood Forests**

\**Eucalyptus macrocarpa* still needs to be changed to '*microcarpa*' in Table H.

\*The common name for *E. bicostata* needs to be corrected to 'Eurabbie' in Table H.

In Table I, conditions applying to *Bertya opponens* from A to B, see general comment above.

Removal of Large-footed Myotis, see general comment above.

**Specific detail for the Appendix in the Draft Code of Practice for Red Gum Forests**

\**Eucalyptus macrocarpa* still needs to be changed to '*microcarpa*' in Table E.

Removal of Large-footed Myotis, see general comment above.

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## **Comments on the Draft Code of Practice for the Management of Invasive Native Species in the Namoi CMA**

The NSW Scientific Committee wishes to submit the comments below relating to the proposed changes outlined in the Draft Code of Practice for the Management of Invasive Native Species in the Namoi CMA.

### **Overview**

The Scientific Committee recognises that there are stringent requirements outlined in the draft Code of Practice that must be met before 'invasive native species' can be cleared as part of routine agricultural management activity. However the Scientific Committee considers that there are a number of significant issues that must be addressed in order to ensure that the outcome of the proposed changes is not a significant decline in biodiversity in the Namoi CMA. These issues include the definition of invasive native species and the list itself, disturbance to soil and ground cover as well as regulation, monitoring and compliance of the Code of Practice.

### **Definition of Invasive Native Species (INS)**

The code defines an INS as a species that is (1) invading plant communities where it has not been known to occur previously, or (2) is regenerating densely following natural or artificial disturbance and the invasion and/or dense regeneration of the species is resulting in a change of structure and/or composition of a vegetation community. There are several problems with condition (1). Firstly, it is not clear at what scale the condition of no previous occurrence would be defined. For example, would the condition apply at the level of the individual property, or the region, or the plant community generally? Secondly, excellent records of species' occurrence on the property would need to be kept in order to judge that it had not occurred there previously. Condition (2) is even more problematic. Many plant species regenerate densely after disturbance such as fire, flood or grazing and then decline in abundance through time. This is a normal regeneration attribute and results in a natural variation in vegetation structure and composition through time. Recent scientific evidence shows that this natural regeneration can be an important form of passive restoration of heavily cleared landscapes, resulting in higher biodiversity values and also greater amounts of soil carbon storage (Good et al. 2011, 2012). Thus clearing of these 'regeneration patches' is likely to result in a significant decline in biodiversity and productivity.

### **Disturbance to soil and ground cover**

The draft Code of Practice requires that soil and ground cover disturbance must be minimised, whether clearing is by management burning or clearing of individual plants. However there is no definition of 'minimal disturbance' or any requirement to measure or quantify loss of ground cover or soil in response to the clearing activity. Without measures of potential impact, clearing activities cannot be managed adaptively to ensure minimal disturbance.

Under the draft Code of Practice, management burning to clear INS can occur every two years. This is an extremely high fire frequency for this region and is likely to result in reduced native vegetation cover, increased bare ground with consequent soil loss and invasion by exotic plant species, and dramatic declines in biodiversity and carbon storage. 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition' is listed as a Key Threatening Process under the Threatened Species Conservation Act.

### **Monitoring and compliance**

The draft Code of Practice has almost no requirement for an assessment of impact, or monitoring of impact after the clearing activity. Neither is there any provision for regulation or compliance checking of the Code. The landholder is only required to keep a diary for 7 years. There is no specification of what records before and after clearing must be kept as part of this 'diary'. The Scientific Committee strongly recommends the inclusion of a monitoring and evaluation requirement within the draft Code of Practice to provide a transparent process for the assessment of the outcomes of INS clearing and to ensure flexibility to incorporate change where the need for improvements has been identified.

### **The list of declared invasive native species**

The Code of Practice provides a list of 6 tree and 17 shrub species. Most of these species are widespread and common, or occur along water courses. At a regional scale (eg Namoi CMA) it is extremely unlikely that any would be considered 'invasive' on the basis of occurring in an area where they have not been known to occur previously. Thus they could only be considered 'invasive' on the basis of their regeneration strategy ie dense regeneration after disturbance, which is part of the normal variation in the abundance of species through time. Thus it is the view of the Scientific Committee that listing these 23 species as 'invasive native' species is disingenuous and serves only to encourage clearing of this wide range of important structural components of the landscape by labelling them inappropriately as 'invasive'. Such a list is highly likely to be seen as a 'licence to clear' by the community, particularly when there are no clear assessment and compliance protocols in place.

The list of 'invasive native' species is problematic on several more fronts. Firstly, it includes several species that are the structural dominants of the endangered ecological community 'Coolibah Black Box Woodlands of the Northern Riverine Plains in the Darling Riverine Plains and Brigalow Belt South Bioregions' (ie *Eucalyptus cololabah* and *Eucalyptus largiflorens*). It is the opinion of the Scientific Committee that any clearing within this listed EEC will result in further substantial biodiversity decline. Secondly, many of the listed species occur along water courses where any clearing of listed species would also result in significant biodiversity declines, particularly where they occur in River Red Gum or Coolibah Black Box

Woodlands (eg *Acacia stenophylla*, *Eucalyptus coolabah*, *Eucalyptus largiflorens*, *Eremophila bignoniiflora*). Thirdly, some of the listed species are fire-sensitive (eg *Callitris glaucophylla*) and so are likely to be severely adversely affected by frequent management burning. Finally, many of the species have several sub-species and there is no indication from the list whether all or only some sub-species are included.

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## Appendix 1 to comments on Environmental Outcomes Assessment Methodology

Examples of species where the Threatened Species Profile Database does not comply with available scientific literature.

### Species occurring in fire-prone areas

For most threatened plants that occur in fire-prone habitats we have little knowledge of their fire response (apart from simple resprouting or not), but the database considers there to be a moderate or good ability to control threats in these taxa. Rather, there is a limited ability to successfully implement on-going fire management to control threats. This is because uncontrollable wildfires may burn over areas independent of previous fire histories or fire management activities. Given the many predictions that under a changing climate there will be an ever increasing risk of higher fire frequency and some high fire intensities (Hennessey et al. 2006; Bradstock et al. 2009), all species occupying fire prone habitats should be assessed as having a low ability to respond to threat management. This limited ability to manage threats is reflected in the database for some well studied species e.g. *Grevillea caleyi*. Many other taxa which are less well studied will also have a limited ability to manage fire threats and an appropriate precautionary approach for all of these is a listing of 'Limited ability to control' due to fire management being difficult. Examples of species in this category include (but are by no means limited to) the list below. This list represents some 150 species and population listings of which only 20 currently recognise fire management as a limitation. Many other taxa also occur in fire prone areas and will be similarly affected (e.g. all terrestrial orchids).

Examples: A number of *Acacia* spp, (e.g. *Acacia baueri* subsp. *aspera*, *Acacia bynoeana*, *Acacia terminalis* subsp. *terminalis*), *Asterolasia* spp., many *Boronia* spp., *Darwinia* spp., *Dillwynia* spp., *Epacris* spp., several *Eucalyptus* spp., many *Grevillea* spp., *Haloragodendron lucasii*, *Homaranthus* spp., *Kunzea* spp., *Lasiopetalum* spp., *Leionema* spp., *Leptospermum* spp., *Leucopogon* spp., *Melaleuca* spp., *Micromyrtus* spp., *Persoonia* spp., *Phyllota humifusa*, *Pimelea* spp., *Pomaderris* spp., *Pultenaea* spp., *Rulingia* spp., *Tetradthea* spp., *Triplarina* spp., *Velleia perfoliata*, many *Zieria* spp.

### Other specific examples

#### *Acacia carneorum*

- Not identified as having 'Observed recruitment issues? (e.g., infertility, clonal). 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 0.63 is grossly 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 heat stress under a changing climate. 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 years. Yet seed production has only just been discovered in the wild and nothing about age to reproduction is known (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 by crofton weed in remote habitats where control is largely ineffective - See DECC (2007b), 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 2007b).
- 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 years. Rather it is essentially unknown.



*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 'moderate 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).

All *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 greatly overestimated.

*Solanum karsense*

- Claimed moderate ability to manage threats. However, changes to water management and river flows are 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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