



ADVICE TO THE MINISTER

AMENDMENTS TO ENVIRONMENTAL OUTCOMES ASSESSMENT METHODOLOGY

Chapter 7 Invasive Native Scrub

SEPTEMBER 2006

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1 Introduction

In July 2006 the Minister for Natural Resources (the Minister) formally requested advice from the Natural Resources Commission (NRC) on amendments to Chapter 7 of the Environmental Outcomes Assessment Methodology (Assessment Methodology). Chapter 7 deals with the assessment of Invasive Native Scrub (INS).

Clause 25 of the Native Vegetation Regulation 2005 sets out the formal procedure for amending the Assessment Methodology. Consistent with these requirements, the following process has (and will) be undertaken before any changes are made to Chapter 7 of the Assessment Methodology:

1. The INS Review Group undertook a review and recommended a series of amendments to the Minister regarding Chapter 7 of the Assessment Methodology as well as the associated INS Tool, Operational Manual and Property Vegetation Plan (PVP) Agreement (Saunders, D. et al, 2006)
2. The Minister proposed amending Chapter 7 of the Assessment Methodology in line with the recommendations of the INS Review Group, and requested the advice of the NRC
3. The NRC has undertaken an independent review of the proposed amendments and is now providing formal advice to the Minister regarding the INS Review Group's recommendations (this report). The NRC's review has been informed by consultation with stakeholders and experts
4. The Minister will consider the NRC's advice and seeks the concurrence of the Minister for the Environment and the Minister for Primary Industries where amendments relate to assessment of biodiversity in deciding to amend the Assessment Methodology
5. Amendments agreed by the Minister will be formally made to the Assessment Methodology and gazetted.

This report is the NRC's formal advice to the Minister regarding the INS Review Group's recommendations to amend the Assessment Methodology (step 3 above). In developing this advice we accept the INS Review Group's premise that INS needs to be managed and we note that the current Assessment Methodology is the statutory vehicle within which measures to manage INS must be assessed to ensure environmental outcomes are improved or maintained. This represents the starting point for developing our advice. Recommendations by the INS Review Group and concerns raised in stakeholder submissions that are not associated with the Assessment Methodology are outside the scope of our advice.

In developing our advice we have drawn on outcomes of the Central West Catchment Management Authority (CMA) trial of the proposed amendments, submissions from stakeholders and peer reviews from three independent scientists to determine whether the amendments proposed by the INS Review Group will lead to better environmental outcomes than the current Assessment Methodology.

In summary we advise that the majority of the INS Review Group's amendments be adopted. However, one amendment has not been sufficiently justified and should not be adopted. We have also suggested changes to specific amendments, and made some additional suggestions which we believe will assist in the implementation of the tool and identifying amendments for future reviews. Overall, the language of the amendments needs to be reviewed in conjunction with legal, compliance and implementation experts.

In this report:

- Chapter 2 outlines the background to the INS Tool, the context of the INS issue and how it is currently managed
- Chapter 3 describes the review process that the NRC has adopted to develop our advice
- Chapter 4 summarises the INS Review Group's recommendations
- Chapter 5 summarises the findings of the trial in the Central West CMA, and issues raised in submissions and peer reviews
- Chapter 6 presents the NRC's advice on the proposed amendments to the Assessment Methodology.

2 Background to the Invasive Native Scrub Tool

Invasive native scrub (INS) is defined as:

1. a species that invades plant communities where it has not been known to occur previously or a species that regenerates densely following natural or artificial disturbance; and
2. the invasion and/or dense regeneration of the species results in change of structure and/or composition of a vegetation community; and
3. the species is within its natural geographic range.

INS has always existed in the landscape, but has become an issue for Government and landholders in Australia since the 1800s (Kerle, J.A., 2005 ; Noble, J., 1997 , Westoby, M. et al, 1989). While there is some debate on the nature of Australia's vegetation prior to European settlement, there seems no dispute that the landscape was a mosaic of both open and park-like landscapes, and dense woodland and scrubland, and that the introduction of European farming practices has resulted in a shift in that mix.

Noble (1997, see pp 63 – 68 in particular) provides information on the mosaic landscape that existed in western NSW during the 1800s, and the rapid change that occurred following European settlement. European farming practices, clearing and associated reduction in fire frequency, replaced diverse plant communities, especially those containing several perennial grasses, with simplified and uniform scrub.

This change in balance between open and park-like landscapes and dense woodland and scrubland has had negative implications for the landscape and environment. Extensive regeneration and increased density associated with INS has contributed to the loss of ground cover of native grasses and forbs. This in turn has resulted in a loss of stocking capacity on some properties, soil erosion, loss of biological diversity and suitable fauna habitat.

The INS Tool was developed as part of the Assessment Methodology in recognition of the fact that in areas where INS is far more extensive than what might be termed its natural condition and where it is having negative environmental impacts, clearing it in certain circumstances and under certain conditions can improve or maintain environmental outcomes. The aim of managing INS using the Assessment Methodology is to rehabilitate native vegetation to create a mosaic of

vegetation communities across the landscape, consistent with the landscape prior to European settlement.

3 Review Process

In reviewing the INS Review Group's Report and proposed amendments to the Assessment Methodology, we have:

1. posted the Report and the proposed amendments on our website and invited comment from 85 key stakeholders which included agencies, CMAs, and environment and landholder groups
2. worked with the Central West CMA to trial the proposed amendments on three properties in their region
3. invited scientific peer reviews from three independent scientists
4. internally reviewed the report, outcome of the trial, submissions and peer review reports
5. received feedback from the Ministerial Review Committee on the implementation of the Native Vegetation Reforms.

The NRC note that the INS Review Group is yet to document the scientific basis on which its recommendations were made due to the limited timeframe to undertake its review. The scientific information used by the Group is being documented under a separate process by a consultant managed by the Central West CMA. As a result, we consulted with the INS Review Group to ascertain the scientific basis for the Group's recommendations.

The NRC also note the thorough level of targeted consultation that took place during the INS Review, including discussions with CMAs, landholders and representatives of environmental and landholder groups.

4 Summary of INS Review Group's Recommendations

The INS Review Group identified a number of recommendations to improve the management of INS, 19 of which are associated with amendments to the Assessment Methodology.

Recommendations regarding the Assessment Methodology are provided in full in Attachment 1. We have grouped these into four broad areas:

1. Administrative processes and definitions - including changes to the INS Species Database and process for future amendments to the Database, and changes in terminology used in the Assessment Methodology
2. Retention of individual large trees and small plants - including changes in stem diameter thresholds for large trees and extent of retention of smaller plants
3. Management actions - associated with INS retention areas, use of burning, introduction of exotic groundcover and use of cropping for managing INS
4. Management of INS in threatened ecological communities (TECs).

5 Summary of trial, submissions and peer reviews

In developing our advice we have considered a trial of the proposed amendments, submissions from various stakeholders and independent peer reviews. The submissions are available on the NRC website.

Landholders involved in the trial with the Central West CMA were generally supportive of the INS Review Group's recommendations. However, these landholders and also submissions from other landholders and landholder groups suggested that the amendments do not go far enough in providing flexibility to landholders in managing their land. Submissions were also received from groups and individuals representing the environment movement, which questioned the fundamental principles underlying the background and management of INS to achieve a mosaic landscape. The three peer reviews by independent scientists were generally supportive of the INS Review Group's recommendations. A common issue identified during the trial, in submissions and from the independent scientists was the need for clarity and consistency in expressing the requirements of the Assessment Methodology.

Following provides a summary of the outcomes of the trial, and issues raised in submissions and through the peer reviews.

5.1 Trial by the Central West CMA

The trial involved representatives from the Central West CMA, three landholders as well as representatives from the INS Review Group and the NRC. The outcomes of the trial supported the INS Review Group's recommendations and resulted in landholders being able to improve or maintain environmental outcomes through appropriate management of INS while meeting their own objectives.

Landholders were supportive of the new requirements for stem retention in clumps rather than in stems per hectare as well as changes to the mapping rules which allowed greater flexibility for CMA assessors and certainty for landholders. Landholders also highlighted the importance of the interaction with CMA staff in developing management options and of guidance materials to ensure the Assessment Methodology was accurately interpreted.

Although landholders involved in the trial did suggest further amendments to the Assessment Methodology, overall the changes proposed by the INS Review Group were considered to be positive. As a result, landholders were more accepting of the need to restrict some activities in order to achieve a mosaic landscape.

5.2 Submissions from stakeholders

Nine submissions were received from various stakeholder groups and individuals. In general, submissions from landholder groups considered that the changes proposed by the INS Review Group were too conservative while submissions from the environment movement were opposed to the INS tool and considered that it would allow broadscale clearing of native vegetation. Two submissions, from Border Rivers-Gwydir CMA and NSW Farmers Association, identified positive aspects of the proposed changes as well as areas for improvement.

The five submissions received from landholders and landholder groups proposed the following additional changes to the Assessment Methodology:

- reducing 20% retention of INS to 15% across a property with compensation to manage INS beyond this level
- increasing the stem diameter threshold of large trees to 40 cm in order to manage multi-stemmed trees previously treated by ring-barking
- increasing the rate of cropping to 2 crops over 8 years and allowing cropping over a whole property rather than at 20% increments
- allowing the use of other exotic groundcover in addition to lucerne.

Although generally supportive of a number of recommendations made by the INS Review Group, NSW Farmers also made a number of suggestions including the following:

- reducing the groundcover requirement for cropping from 50% cover with 75% native species to 40% cover with 50% natives species
- creating a condition threshold to exclude poor condition threatened ecological communities from requiring additional controls
- allowing the management of INS to be treated as an offset.

The three submissions received from groups and individuals representing environmental issues raised the following specific concerns regarding the Assessment Methodology:

- opposition to the listing of specific species on the INS Database, including Lignum species and Belah
- opposition to increasing the stem diameter threshold of Poplar Box to 30 cm
- questioning the scientific validity of retaining 20 stems per hectare and removing the requirement to retain small stems of cypress species
- opposition to the use of exotic groundcover, such as lucerne, and cropping as a means of managing INS.

The submission from Border Rivers-Gwydir CMA also indicated that lucerne should only be used in semi-arid and arid areas and also expressed concern that once an area is subject to cropping it is unlikely to return to native vegetation cover.

5.3 Independent peer review

The three independent scientists engaged to peer review the findings of the INS Review Group did not identify any major concerns with the INS Review Group's recommendations. The peer reviews raised a number of suggestions and issues for clarification which have been forwarded to the INS Review Group for consideration in drafting the changes to the Assessment Methodology. These suggestions included:

- clarifying terminology and administrative processes
- ensuring that amendments to the INS Species Database can be nominated by a broad range of stakeholders not just CMAs

- further consideration of spacing of cropping events and limiting use of fertilisers to avoid converting native vegetation to exotic annual vegetation through cropping.

6 Consideration of amendments to the Assessment Methodology

The NRC supports most of the recommendations made by the INS Review Group to amend the Assessment Methodology. In consulting with the Group and engaging independent peer reviews we believe these amendments have been based on sound science and will result in more effective management of INS to achieve a mosaic landscape and improve or maintain environmental outcomes in comparison to the current Assessment Methodology.

The only recommendation which we do not support is the increase in the stem diameter threshold of Poplar Box, which we do not think has been sufficiently justified. Additionally, there are a number of further improvements which we believe will enhance the recommendations made by the INS Review Group.

The following sections provide additional detail on the INS Review Group's recommendations, (numbering of recommendations is consistent with those of the INS Review Group), followed by our advice to the Minister.

6.1 Administrative processes and definitions

The INS Review Group recommends:

- 2.1.3 - amending the species listed on the INS Species Database
- 2.1.4 - streamlining the process for future amendments to the INS Species Database
- 2.5.5 - amending terminology for stony soils
- 2.6.1 - amending terminology for groundcover definition
- 2.6.4 - amending role of accredited experts in identifying INS species

6.1.1 NRC Advice

The NRC supports these amendments to the administrative processes and definitions of the Assessment Methodology.

The NRC recognises that the INS Review Group has adopted a rigorous assessment process with input from recognised experts in adding species to the INS Species Database. The Group has recognised that Lignum and Belah provide important habitat for fauna, and have therefore only recommended these species be listed where they have become invasive within limited areas of the state and have only recommended low impact management techniques.

The NRC supports the streamlined process recommended by the Group and the need for rigorous and independent review when adding or removing species from the Database.

6.2 Retention of individual large trees and small plants

The INS Review Group recommends:

- 2.2.1 - amending the stem diameter thresholds within the INS Species Database
- 2.2.2 - allowing CMA officers to vary maximum stem diameters by +/- 5 cm and providing guidance on how to exercise this judgement
- 2.2.3 - removing the maximum stem diameter requirement for shrubs
- 2.2.4 - specifying that retention figures for smaller stems are not cumulative
- 2.2.5 - removing the requirement to retain smaller stems of Black and White Cypress Pine
- 2.2.6 - allowing uneven retention of small plants in clumps when using paddock scale treatments
- 2.2.7 - amending the additional retention requirements for individual and paddock scale treatment of shrub species, cypress species and other INS tree species.

6.2.1 NRC Advice

The NRC supports all of these recommendations except for the amended stem diameter threshold for Poplar Box trees, included as part of recommendation 2.2.1. The remaining recommendations have been based on sound science and will enable the desired outcome of a mosaic landscape.

The NRC does not support the increase in the stem diameter threshold for Poplar Box trees as the INS Review Group has not provided sufficient justification for this increase, and evidence presented by Shelly (2003) indicates that trees of this size have important habitat value which suggest that they should not be considered to be INS. Additionally, recommendation 2.2.2 will provide CMA's with flexibility to increase or decrease stem diameter thresholds to manage this and other INS species based on local conditions.

The NRC supports recommendation 2.2.4 to 2.2.6. Retaining clumps of small plants at different sizes will ensure there are a sufficient number of young trees with the potential to reach maturity and will assist in achieving a mosaic landscape. Additionally, removing the requirements to retain small stems of cypress pine is also more likely to result in restoration of a mosaic landscape as there is clear evidence that since European colonisation, cypress pine densities have increased relative to the densities of eucalypts (Lunt, I.D. et al 2006).

Although the NRC agrees with the intent of recommendation 2.2.7, we advise that this amendment should be written more simply to ensure intended outcomes are clear to stakeholders. We also suggest guidance material is required to accurately interpret this amendment for implementation by CMA staff and landholders.

6.3 Management actions

The INS Review Group recommends:

- 2.4.4 - allowing burning or individual treatment of untreated INS areas retained in excess of the 20% requirement
- 2.4.5 - removing the 18 degree slope constraint on use of burning to manage INS

- 2.4.10 - allowing lucerne to be planted for clearing with disturbance to groundcover and soil
- 2.4.11 - referring to cropping as the act of cultivation rather than harvest
- 2.4.12 - retaining the current requirement for 50% groundcover with 75% native species and permitting variation of this groundcover target by individual CMAs
- 2.4.15 - allowing three crops in a 15 year period from the date of granting consent or approval of the PVP.

6.3.1 NRC Advice

The NRC supports these amendments to the management actions provided in the Assessment Methodology. The use of cropping for INS management is available in the current Assessment Methodology and the amended extent and rate of cropping is in line with the current length of a PVP agreement and will improve or maintain environmental outcomes. We recognise landholders' concerns regarding the restrictions on cropping, however at present there is a lack of sufficient evidence to justify more extensive cropping to manage INS. We also note stakeholder concerns that cropping, and the associated use of fertilisers, creates a risk that native vegetation will not be re-established. While scientific research on this matter is not well documented, there is anecdotal evidence that limited cropping to manage INS can result in positive environmental outcomes. Nevertheless, we recognise this is an issue that warrants research.

Additionally the NRC recommends:

- amending the wording of recommendation 2.4.4 to ensure intended outcomes are clear to stakeholders
- ensuring the Assessment Methodology identifies suitable climates for using lucerne as it can persist for long periods if grown in high rainfall areas
- the process for amending the INS Species Database (recommendation 2.1.4) be adopted for the assessment of the use of other non-persistent perennials
- linking groundcover requirements for cropping to Catchment Action Plan targets for individual CMA areas.

The NRC has also considered the further amendments that were suggested by landholders involved in the trial by the Central West CMA. At this time there is not sufficient scientific evidence to support these further amendments, some of which warrant research.

6.4 Threatened ecological communities

The INS Review Group recommends:

- 2.5.1 - permitting paddock-scale treatment without ground disturbance for INS within a TEC that is not in a high condition and where impact of the treatment will be low.

6.4.1 NRC Advice

The NRC supports this amendment to the management of INS in areas of threatened ecological communities.

Additionally, the NRC recommends the preparation of clear and unambiguous guidance material to support CMA staff and landholders in implementing this amendment.

6.5 Additional recommendations

The trial, submissions and peer reviews identified a number of additional concerns in using the Assessment Methodology for managing INS. Many of these concerns stem from the difficulties in implementing the Assessment Methodology and the costs involved in managing INS. As a result we also suggest the following:

- clarifying the language of the proposed amendments to the Assessment Methodology in consultation with legal, compliance and implementation experts, and providing guidance material as necessary
- offsetting the costs of managing INS where it is linked to targets in Catchment Action Plans
- undertaking research in partnership with environmental groups and landholders to determine whether alternative retention requirements and suggested management techniques, such as cropping and use of other non-persistent perennials, lead to improved environmental outcomes
- amending the Assessment Methodology as new information becomes available.

7 References

Kerle, J.A. (2005) Collation and review of stem density data and thinning prescriptions for the vegetation communities of New South Wales, Department of Environment and Conservation, Sydney, p. 152.

Lunt, I.D., Jones, N, Spooner, P.G. and Petrow, M. (2006) Effects of European colonization on indigenous ecosystems: post-settlement changes in tree stand structures in *Eucalyptus-Callitris* woodlands in central New South Wales, Australia. *Journal of Biogeography*, 33, pp. 1,102 – 1,115.

Noble, J. (1997) *The Delicate and Noxious Scrub*, CSIRO, Canberra.

Saunders, D., Shepherd, R., Kneipp, K., Norman, P., Raine, C., Green, D., Briggs, S., Howling, G. and Ferraro, T. (2006) Review of the Invasive Native Scrub Assessment Methodology and Decision Support Tool of the Property Vegetation Plan Developer under the *Native Vegetation Act 2003*.

Shelly, D. (2003) *Hollow Occurrence in Selected Tree Species in the Central West Catchment of New South Wales*, Internal Report for the Central-west Region, Department of Land and Water Conservation, Dubbo.

Westoby, M., Walker, B. and Noy-Meir, I. (1989) Opportunistic management for rangelands not at equilibrium. *Journal of Range Management* 42, pp 266 – 274.

Attachment 1 INS Review Group recommendations

Recommendations for changing the Assessment Methodology

- 2.1.3 Amend the INS Species Database to include the recommended species as listed in Table 1 of Appendix 2.
- 2.1.4 In relation to the operational procedure for amendments to the INS Species Database, the following process should be adopted:
- Nominations, accompanied by relevant technical information and using the proforma in Appendix 3 are lodged by CMAs with the NRC;
 - Nominations are assessed by an impartial review group comprising independent ecological expertise which could include members of the INS Review Group, convened by the NRC;
 - Nominations be incorporated into the INS Species Database by DNR on recommendation from the impartial review group and following consultation with other appropriate persons and organisations;
 - All information that is received by the impartial review group from the CMAs should be stored in an adequate and traceable manner by the managing agency; and
 - Any changes to the INS Species Database be made publicly available on the internet.
- 2.2.1 Amend the stem diameter thresholds within the INS Species Database for the species listed in Table 3 of Appendix 2.
- 2.2.2 Amend the EOAM to allow CMA officers to vary the maximum dbh to be cleared of individual INS species by +/- 5 cm, using judgement. Guidance on the application of this judgement to be provided in the Operational Manual, including a proforma to document the justification for any such variation where the CMA officer wishes to do this.
- 2.2.3 Remove the maximum dbh to be cleared requirement for shrubs in the INS Species database.
- 2.2.4 Specify in the EOAM that the retention figures for smaller stems are not cumulative. When using individual plant treatments, and more than one species with a stem retention requirement is present, stems are to be retained at the maximum number specified for the highest retention species. These stems are to be retained in a range of size classes and INS species that reflect the proportions present in the vegetation community. Species with like retention requirements to be grouped by CMA and IBRA regions in the INS Species Database.
- 2.2.5 The INS Species Database be amended to remove the requirement to retain smaller stems for Black and White Cypress Pine for paddock-scale treatments.
- 2.2.6 The EOAM, Operational Manual, and PVP agreement be amended to allow the retention of small plants unevenly (ie in clumps) when using paddock scale treatments. Clumps are to be as follows:
- 10 ha of native vegetation must be retained per 100 ha for INS listed as requiring smaller stem retention in the INS Species Database within each 500 ha parcel treated,
 - wherever possible clumps of small stems should be retained around or adjoining retained larger trees.

Note: clumps retained according to these requirements are additional to the 20% retention of native vegetation in each 500 ha area specified elsewhere.

- 2.2.7 The EOAM, Operational Manual and INS Tool be amended to allow and specify the following:
- A. Paddock scale treatments: If shrubs or cypress species are being treated, no retention of smaller stems (ie. stems below the dbh specified for retention of all larger trees, see Table 1 of Appendix 5) is required in addition to the 20% of INS retained across the property. If the species being treated are not shrubs or cypress species (ie. they are trees), then 10 ha per 100 ha of INS treated is required to be retained, in addition to the 20% of INS retained across the property and in addition to the retention of all larger trees, see Table 1 of Appendix 5, OR 20 stems per ha are required to be retained in each ha in the treated areas in similar proportions to the species present before treatment, in addition to the 20% of INS retained across the property and in addition to the retention of all larger trees, see Table 1 of Appendix 5.
- B. Individual plant treatments: If shrub species are being treated, no retention of smaller stems (ie. stems below the dbh specified for retention of all larger trees, see Table 1 of Appendix 5) is required in addition to the 20% of INS retained across the property. If cypress or other tree species are being treated, then 20 stems per ha are required to be retained in the treated areas in similar proportions to the species present before treatment, in addition to the 20% of INS retained across the property and in addition to the retention of all larger trees, see Table 1 of Appendix 5.
- 2.4.4 Note in the EOAM that where the retained, untreated INS areas exceed 20% of the total extent then burning (where ecologically suitable) or individual (spot) treatment options may be applied.
- 2.4.5 Revise the EOAM and INS Tool to remove the 18 degree slope constraint on use of burning to manage INS.
- 2.4.10 Amend the EOAM to allow lucerne to be planted for clearing plants at paddock scale with temporary groundcover and soil disturbance and for clearing plants at paddock scale with longer-term disturbance to soil and groundcover.
- 2.4.11 The EOAM be amended to refer to cropping as the act of cultivation rather than harvest in relation to the last treatment option.
- 2.4.12 The current 50%/75% groundcover percentages be retained, however the EOAM should be amended to permit variation to a higher percentage of the groundcover target by individual CMAs.
- 2.4.15 The method of clearing plants at paddock scale with longer-term disturbance to soil and groundcover be amended to allow for three crops in 15 years from the date of granting consent or approval of the PVP.
- 2.5.1 Amend the EOAM to permit paddock-scale treatment with no ground disturbance (eg roping etc) where TEC condition is not high and impact of treatment low.
- 2.5.5 That the EOAM be amended to substitute the term "rocky" for "stony" in Clause (9), Chapter 7.
- 2.6.1 State in the EOAM that reference to 'native vegetation' equates to 'live native vegetation'.
- 2.6.4 Remove the requirement for an accredited biodiversity expert to certify that species are behaving invasively from the EOAM. Ensure that PVP officers have the biodiversity expertise required by including training in the identification of INS in the PVP accreditation process.