DEVELOPING CMA PRIORITIES FOR THE MANAGEMENT OF
WEEDS THREATENING BIODIVERSITY

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ABSTRACT
Invasive species pose a significant threat to biodiversity, but few management strategies have been developed to adequately address the threat. Such management strategies need to identify the species at risk, sites for control, monitor the effectiveness of control programs, and run for a sufficient time to have demonstrable conservation outcomes (ie 5+ years). The length of time required to detect a change in native species densities is also a relevant problem for many other land management issues. To address this problem, the Natural Resources Commission (NRC) has established a series of resource condition targets that the Catchment Management Authorities (CMA) must meet. The target relevant to invasive species states: “by 2015 there is a reduction in the impact of invasive species [on biodiversity]”. What does this mean and how will the CMAs achieve this target?

A project has recently commenced to develop a standard process for CMAs to meet this NRC target for weeds. The process identifies:

(i) the weeds posing a threat to biodiversity in each CMA;
(ii) the biodiversity most at risk from those weeds;
(iii) sites at which control will be needed until 2015; and
(iv) the biological monitoring required to report on progress towards the target.

These protocols will consider both regional issues and existing weed priorities, and be consistent with similar approaches developed for other statewide initiatives. By mid-2008 the standard protocols will be completed and the CMAs can begin control programs. This will provide the opportunity to fund programs for seven years, something that has been rare until now, and will provide sufficient time to detect changes to biodiversity condition as a result of control actions.

INTRODUCTION
Weeds pose a significant threat to biodiversity (Coutts-Smith and Downey 2006), but few management strategies have been developed to adequately address the threat (Downey 2007 - in press). Added to this is the distinct lack of quantitative studies that look at weed impacts on biodiversity (Grice 2004). While more research is obviously needed, many weed management decisions will have to take place in the absence of quantitative studies on impact (Grice et al. 2004).
To help guide weed management decisions for biodiversity conservation in NSW, a number of novel approaches have recently been developed (see Downey these proceedings). These include: (i) an assessment of the weeds in NSW posing a threat to biodiversity (Downey et al. 2007 - in press) in which 350 environmental weeds were ranked for their impact to biodiversity, (ii) a review of the impacts weeds are having on biodiversity in NSW (Coutts-Smith and Downey 2006), and (iii) development of the WINS (Weed Impacts to Native Species) model for establishing priorities for weed control directed at conserving biodiversity (see the Bitou TAP: DEC 2006). While the above initiatives are useful from a state-wide perspective, they do not adequately address regional issues or priorities.

In NSW, regional issues concerning natural resources are the responsibility of the Catchment Management Authorities (CMAs). The CMAs have an important role in weed control as they are “the primary means for the delivery of funding from the NSW and Commonwealth Governments to help land managers improve and restore the natural resources of the State” (CMA NSW 2005). The activities of the CMAs are guided by their Catchment Action Plans (CAPs) which were developed to address the Natural Resource Commission (NRC) state-wide standards and targets (NRC 2005). Of the 14 NRC targets, four were developed to protect biodiversity, with one specifically aimed at addressing the impact of invasive species: “By 2015 there is a reduction in the impact of invasive species”. NSW CMAs are required by the NSW Government to meet and report on the NRC targets by 2015.

CURRENT STATUS OF WEED CONTROL FOR BIODIVERSITY ACROSS THE 13 CMAS

Despite the importance of weed control for biodiversity, as outlined by the NRC target, the processes that the CMAs have put in place to date may not enable them to meet the target. Although specific management actions and targets for weed impacts on biodiversity are addressed in each CMA’s CAP, CMA weed strategies (few of which exist), do not adequately deal with weeds impacting on biodiversity. There are several reasons for this:

- Not all CMAs have weed strategies or plans. Two of the 13 CMAs have published weed strategies, while most of the others are still in draft form or are being developed. These strategies differ greatly, but most are based on the Noxious Weeds Act and the ranking system proposed by Randall (2000). Randall’s ranking system is one method to determine the most cost-effective resource allocation to prevent the spread of weeds. Since widespread weeds are more likely to have a bigger impact on biodiversity (Downey & Leys, 2004), and Randall’s system has not been specifically designed to address the impact of weeds on biodiversity, such considerations also need to be adopted to allow CMAs to adequately meet the NRC target discussed above.

- Weed control has historically been focused on noxious weeds (ie those listed under the NSW Noxious Weeds Act 1993) as it is the only formal legislation which requires landholders to control weeds. The Act has traditionally listed mainly agricultural weeds (Arcioni 2004), however, it is increasingly listing weeds that impact on biodiversity. Despite this, it
will be difficult for CMAs to meet NRC biodiversity targets, when this piece of legislation does not adequately cover all weeds impacting on biodiversity.

- Until recently, strategic information and mechanisms for reducing the impacts of weeds on biodiversity have been limited and sometimes unavailable to CMA decision makers. In addition, the lack of weed expertise within the CMAs has hampered their ability to make informed decisions.

As outlined above there are numerous reasons for undertaking weed control, which are not necessarily consistent with each other. To illustrate this, the diagram below outlines some different reasons for controlling weeds and where they overlap (Fig. 1). This project deals only with weeds that fall within the grey circle, and as such will not necessarily result in a regional or CMA-wide weeds strategy. Each CMA may fund weed initiatives outside of the grey circle, and where this is the case, the responsibility of stakeholders needs to be clear and all parties need to work co-operatively where responsibilities overlap (Herbert 2004).

![Diagram of weed categories](image)

**Fig. 1. Diagram illustrating the focus of this project.**

In order for all 13 CMAs to meet and report on the invasive species NRC target for weeds, a standardised strategy facilitating long-term investment for weed control that will be of most benefit to biodiversity must be developed and adopted (Keel 2004). This paper outlines a new project which aims to develop a strategy for this purpose.
THE PROJECT

The project will use a standardised, state-wide approach to select priority species and sites for weed control to reduce the impact of weed species on biodiversity.

We propose to do this by identifying:
1) the weeds posing a threat to biodiversity in each CMA;
2) the biodiversity most at risk from those weeds;
3) sites at which control will be needed until 2015; and
4) the biological monitoring required to report on progress towards the target.

This project will consider both regional issues and existing weed priorities, and be consistent with similar approaches developed for other state-wide initiatives. This standard approach will be completed by mid-2008 and the CMAs can then begin control and monitoring programs. A significant flow-on effect of this approach is that it will provide long-term opportunities for environmental weed management (ie for seven years), something that has been rare, yet critical for the long-term success of any weed infested site, and thus allowing sufficient time to detect changes to biodiversity condition as a result of weed control actions.

Step 1 – Rank the weeds
For each CMA, a weeds dataset will be collated and analysed. The dataset will include a comprehensive list of weeds present in each CMA, along with information about each species. The information will be gathered from a variety of sources including but not limited to herbarium data, the NSW DECC Wildlife Atlas, relevant reports (Coutts-Smith and Downey 2006; Downey et al. 2007 - in press), regional DECC pest management strategies, regional and local weeds lists and any other relevant strategies or literature. Information about each weed species will also be incorporated into the dataset. For example, whether a weed is a Weed of National Significance (WONS), or whether it is listed as an alert weed etc. Information regarding the species’ state, regional and local significance will also be included in the dataset. For example, the species’ control class in the Noxious Weeds Act 1993, its distribution, any information known about its impacts on biodiversity, the species’ ranking in state-wide lists or significance according to any relevant local plans and strategies, and local stakeholder knowledge. Using this data, a ranked list of the worst weeds posing a threat to biodiversity will be generated for each CMA.

Step 2 – Identify native species at risk and sites
Lists of native species that are present and at risk from weeds in each CMA will be collated. Data will be collated from a variety of sources including but not limited to: threatened species lists and associated distributional data, herbarium datasets and the NPWS Wildlife Atlas. Information about which biodiversity is impacted by these weed species will also included in the dataset (ie Coutts-Smith & Downey (2006), Priorities Action Statement, and other relevant studies (eg. Vidler 2004)). Using these lists plus distribution
information and local knowledge, we will identify sites where weeds and priority species occur, resulting in a list of sites where weeds are impacting on biodiversity (ie potential sites to direct funding for control).

**Step 3 – Rank sites**
Sites identified in Step 2 above, will be ranked for each CMA according to the number, type and extent of weed species and biodiversity present. We will again be relying on maps and local stakeholder knowledge to complete this step. We anticipate that this will be done through workshops over the next 12 months. Sites where control will have the greatest benefit to biodiversity will be given the highest priority. CMA funding should be directed to these sites to ensure the NRC targets are met. Commitment is needed for these programs to run for a sufficient time to have demonstrable conservation outcomes (ie until 2015).

**Step 4 – Monitor success of control**
In order to report on the progress made towards the NRC target, weed control programs need to have a monitoring component, which assesses the response of biodiversity to weed control. Recommendations for standardised monitoring programs will be made to the CMAs as part of this project. Standardised monitoring protocols have recently been developed for bitou bush using a three tiered system, aimed at all levels of expertise and resources (see King and Downey these proceedings). It is anticipated that this style of monitoring can be adapted for other environmental weed control programs in the future.

**TAKE HOME MESSAGE**
- The focus of weed control for CMAs needs to address control for biodiversity, in order for the NRC targets to be met.
- This project aims to do this by developing a state-wide strategy and individual priority lists for each of the 13 CMAs to direct control & monitoring efforts to areas where there will be the greatest benefit to biodiversity.

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REFERENCES


**Curriculum vitae**

Clare has worked on a number of projects for the Pest Management Unit of the Department of Environment and Climate Change over the last three years. She commenced this project in April 2007, and has worked on other projects including National mapping for bitou bush and boneseed, Gorse mapping for NSW, priority site selection for the Bitou TAP, and data analysis for the Fox TAP.