

Prioritising weed management for biodiversity conservation at the NRM level

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Summary At a regional or Natural Resource Management (NRM) region level, weed management for biodiversity conservation has often lacked strategic direction and expertise. This has led to: programs that do not necessarily deliver biodiversity outcomes; ineffective monitoring systems; 'gaps' in funding; and a lack of long-term commitment. To help resolve these problems in NSW, one of the Natural Resources Commission biodiversity targets is specifically aimed at invasive species (weeds and pests). To meet this target by 2015, regional weed control programs need to be developed and implemented now.

In April 2007 an innovative project commenced to prioritise weed control for biodiversity conservation within each of the 13 NRM or Catchment Management Authority (CMA) regions in NSW. Weed species were prioritised according to their impact on biodiversity within each CMA, from which sites were identified where weed control is likely to have the greatest benefit to the biodiversity at risk. This list can then be used by each CMA region to direct weed control funding.

Standard monitoring protocols will be used to assess the performance of the weed control measures put in place by each CMA to meet the biodiversity and invasive species target.

Keywords Biodiversity, weed species, impact, NRM region, strategy, prioritisation, monitoring.

INTRODUCTION

Despite widespread acknowledgement that weeds pose a major threat to biodiversity (Groves and Willis 1999), there is a distinct lack of studies that quantify the ecological impacts of plant invasions (Grice 2004). A subsequent poor understanding of the specific impacts of weeds on native communities has hindered the effective management of environmental weeds. In addition, historical weed management has focused on addressing the impacts of agricultural and noxious weeds often failing to adequately tackle threats from environmental weeds. Reducing the impacts of weeds on biodiversity requires an identification of what is

under threat and a strategic approach towards control (Downey 2008).

A new target for weed management in NSW The NSW Natural Resources Commission (NRC), which provides independent advice to the NSW government, outlined a series of state-wide standards and targets to guide Natural Resources Management in NSW which are part of the government's state plan. Of the 13 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 [to biodiversity] of invasive species'. Three key indicators have been established to measure progress towards this target: (1) number of new invasive species established; (2) distribution and abundance of key invasive species (i.e. new and emerging threats); and (3) success of control programs for widespread invasive species as measured by (i) a reduction in biodiversity impact, and (ii) a reduction in other impacts.

This project specifically addresses the third NRC indicator for weeds. Achieving the reduction in impact will require co-ordination across a range of state agencies over the next decade. In particular, the 13 NRM or CMA regions in NSW will need to play a critical role by ensuring that their control programs have clear biodiversity outcomes and monitoring programs.

Are we on track to meet the target? The primary process for prioritising weed species in existing CMA weed strategies is the ranking system proposed by Randall (2000). This process gives priority to weeds that are easily eradicated, resulting in a failure to address the impacts from widespread weeds. Given that widespread weeds are likely to have the greatest current impact on biodiversity (Downey and Leys 2004), it is clear that strategies based on Randall's system, while addressing threats from new and emerging weeds, will fail to meet the third indicator of the NRC target as control of such weeds is unlikely to result in a reduction in the impact to biodiversity.

Meeting the NRC target will require a direction of effort towards sites where control will result in the greatest reduction in the impact of weeds on biodiversity. To ensure that weed management delivers biodiversity conservation in NSW, the Department of Environment and Climate Change (DECC) has developed a three-staged state-wide approach which involves: (1) determining which of the 1380 invasive species present in NSW pose a threat to biodiversity (Downey *et al.* submitted); (2) identifying what biodiversity is at risk (Coutts-Smith and Downey 2006); and (3) developing a strategy which aims to deliver on-ground control and biodiversity conservation (see DEC 2006). While these approaches are effective at a state-wide scale they are not so useful at a regional scale or for addressing multiple weed species on the ground. If the CMAs are to meet the NRC target then a regional set of priorities is needed in addition to existing state-wide priorities.

Monitoring the response of native species to weed control programs is critical to ensure the effectiveness of control, and measure progress towards the NRC target and indicator. To date, a lack of standardised monitoring protocols has hindered efforts to evaluate the success of control programs and the magnitude of biodiversity response (King and Downey 2008).

This project aims to work with the 13 CMAs to establish:

- 1) the weeds posing a threat to biodiversity;
- 2) the biodiversity at risk from these weeds;
- 3) the sites where control will have the greatest biodiversity benefit; and
- 4) monitoring systems to show investment in control programs has resulted in progress towards the NRC target.

To achieve this, DECC and the NSW Department of Primary Industries are working on a collaborative venture with each of the 13 CMAs to establish their priorities using a standard procedure.

A NEW PROJECT

This process is a site-led approach to weed management in which biodiversity assets are protected. However, the selection of sites will in part be driven by the weed species present and their relative impacts on the biodiversity at a particular site. The selection process involves four major steps.

1) Prioritise the weeds posing the threat The first step involved collating and analysing a range of weed dataset/documents relevant to each CMA, including but not limited to: NSW *Threatened Species Conservation Act 1995* (e.g. weeds listed as Key Threatening Processes, and the Priority Action Statement); DECC

Regional Pest Management Strategies; CMA weed strategies; and published weed lists like Coutts-Smith and Downey (2006).

Each weed species was allocated a priority of high, medium or low during a series of targeted workshops held within each CMA. Workshop attendees included representatives of major stakeholders in the region and experts with local knowledge of weed impacts, threatened biodiversity and sites under threat from widespread invasive plants.

2) Identify biodiversity at risk In order to reduce the threat of weeds on biodiversity, it is essential to identify exactly what is at risk. The Weed Impact to Native Species (WINS) assessment tool (Downey 2006) which establishes priorities for weed control directed at conserving biodiversity was modified here to account for the impacts from a suite of weed species to biodiversity. The modified WINS system was implemented at a series of workshops to identify the biodiversity at threat from all weeds within each CMA region.

3) Rank sites for control Identifying specific locations or sites within each CMA region where weed control will have the greatest benefit for biodiversity helps to ensure effectively targeted investment and progress towards the NRC target. Just because a weed has been identified as a threat to biodiversity at a site does not mean that it poses a threat at all sites or locations in which the weed occurs, or that control will reduce that threat. For example, re-invasion may occur following control or the biodiversity may be threatened by factors other than weeds e.g. pest animals. The site prioritisation process considers the (i) feasibility of control, (ii) actual impact of the weeds at the site, (iii) other threats present, and (iv) value of that site to the conservation of the biodiversity at risk.

4) Monitor success of control State-wide monitoring protocols are being developed as part of this process, based on those produced for the Bitou Bush Threat Abatement Plan (see King *et al.* 2008). These monitoring protocols assess three management aspects (i) the response of the threatened biodiversity, (ii) the response of all weed species to control, and (iii) the costs incurred. In addition these protocols will use a three-tier approach aimed at enabling a suite of different stakeholder capacity and capabilities (see Burley *et al.* (these proceedings) for further details). However, the protocols required for this project will have to account for all weed species, for example from grasses to trees.

DISCUSSION

Existing weed programs across the CMAs have typically emphasised emerging threats and noxious weeds as priorities. This project will address a serious gap by specifically focusing on environmental weeds and the areas where they are having the greatest impact on biodiversity at a catchment scale. The development of these regional priorities will help build capacity for the CMAs to achieve biodiversity outcomes as well as meet the NRC target. The consistent, state-wide framework developed here for assessing weed impacts to biodiversity and monitoring their response to weed control programs will be of direct relevance to the other 43 NRM regions in Australia, which are also grappling with the same issue.

One of the greatest challenges is the general lack of baseline data on which to base management decisions, particularly in the areas of weed distribution, prioritisation and impacts to biodiversity. Existing information is highly variable across the state and within CMAs. Filling these knowledge gaps requires a concerted effort, e.g. targeted workshops can result in the collation of a large amount of information in a short period of time, which then needs to be scrutinised (Downey 2006).

Another challenge is the integration of the priorities established during this project into existing CMA programs and strategies. Where possible this project will complement existing or upcoming projects which have other priorities, for example riparian restoration or other weed actions in the NSW threatened species Priority Action Statements. Given the relevance of the outcomes of this project to the other 43 NRM regions in Australia, we have also tried to ensure that this program is consistent with national priorities, including the recently revised Australian Weeds Strategy and the Weeds of National Significance initiative.

The final report outlining the procedure used to develop these regional priorities and the standardised monitoring protocols will help to establish the roles and responsibilities of NRM agencies for weed management and biodiversity conservation over the next decade. This, in turn, will help to move the emphasis of weed management from short-term funding cycles to long-term outcome based programs. Such a change to funding cycles is long overdue.

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